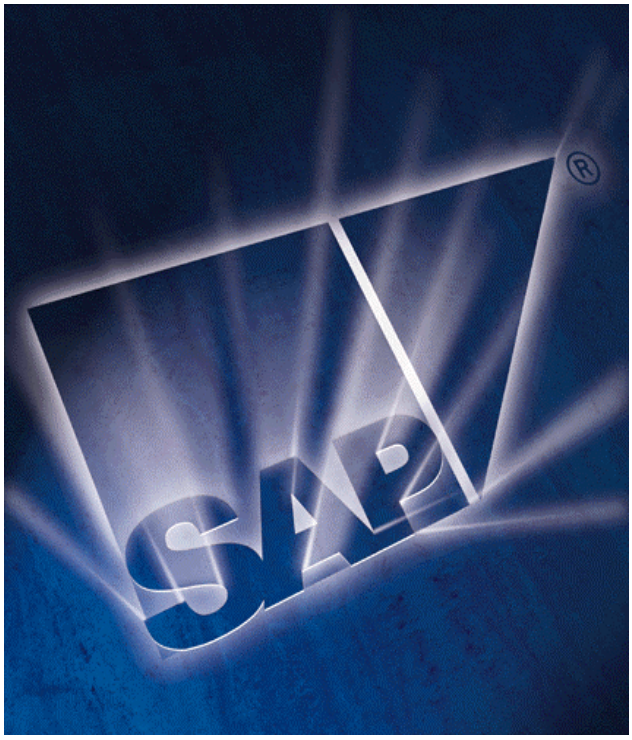
SAP Basis Installation on Windows NT: Oracle Database



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Documentation in the SAP Service Marketplace

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Typographic Conventions

Type Style	Represents
Interface Text	Words or characters that appear on the screen. This includes system messages, field names, screen titles, pushbuttons, menu names, and menu options.
Document Title	Cross-references to other documentation
`User Entry`	Exact user entry. These are words and characters that you enter exactly as they appear in the documentation.
`File Name`	File names, batch files, paths or directories, and screen messages
`<Variable User Entry>`	Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.
NAME	Names of elements in the SAP System. These include report names, program names, transaction codes, table names, and ABAP language elements.
`KEY`	Keys on your keyboard. These include function keys (for example, `F2`) and the `ENTER` key.

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax
	Tip

Contents

SAP Basis Installation on Windows NT: Oracle

Purpose

This documentation explains how to install the SAP System when your operating system is Windows NT and your database is Oracle.

Throughout this documentation, the term *SAP System* is the same as *SAP Basis System*. Also, *SAP* stands for *SAP Basis* in terms such as *SAP profile* or *SAP instance*.

Implementation Considerations

There are two different procedures for installing an SAP System. Both are explained in detail in this documentation.

- Standard SAP installation

  The standard procedure must be followed for all systems except those on clustered hardware. It can be used to set up different system configurations:

  - A central system, in which the central instance and the database instance are on the **same** host machine
  - A standalone database system, in which the central instance and the database instance are on **different** host machines

  The procedure optionally includes the installation of dialog or gateway instances. The installation of frontends for the SAP System is a separate procedure.

- MSCS SAP installation

  This procedure must only be used for a Microsoft Cluster Server (MSCS) configuration. The central instance and database are installed on two clustered machines and then configured to protect the system against failure. The installation is performed in two stages. In the first stage, a standard installation is performed including supplementary, cluster-specific steps. In the second stage, the system is configured so that it becomes cluster-aware and is able to take advantage of features that improve availability.

Integration

For both installation procedures, SAP provides the tool R3SETUP. This has a graphical user interface (GUI) called INSTGUI that allows you to watch the progress of the installation and see all messages issued by R3SETUP. You can call online help from the INSTGUI while you perform the installation. You can start INSTGUI on a remote computer if you want.

Part I Standard SAP System Installation

Purpose

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
- Frontends

The following gives you an overview of the installation process.

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 installation documentation.

Installation Notes

312428	NT SAP Installation on WINDOWS NT (general information)
312436	SAP Installation on WINDOWS NT - Oracle
162266	Questions and Tips for R3SETUP NT

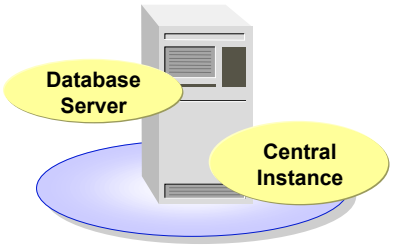
Configuration Planning

Before you can begin with the practical tasks that are necessary to install the main components of the SAP System, 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 two basic configuration types: a central system and standalone database system.

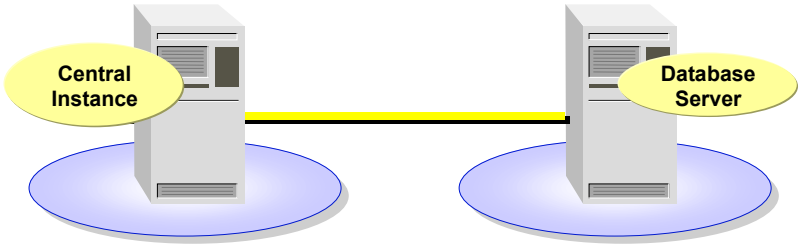
- **Central System**

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



- **Standalone Database System**

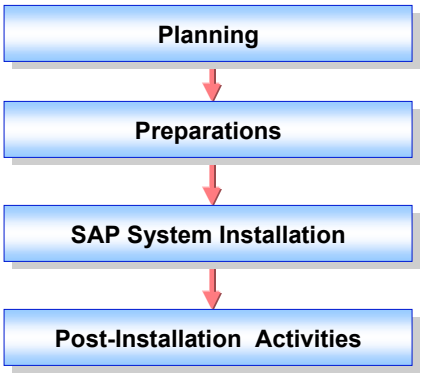
  The central instance and database Instance are installed on two different hosts.



The configuration plan must specify whether a central or standalone database system is to be installed and how many frontends and dialog instances are required. Once the plan is complete and the required hardware is available, you can start with the installation process as summarized in the following. Keep in mind that the process differs, depending on the hardware configuration you have decided to implement.

Process Flow

The task of installing an SAP System can be subdivided into a number of phases:



The following summarizes the actions that have to be performed in each of the phases.

1. In the **planning phase**, you have to:
   - Check the hardware and software requirements

     SAP specifies hardware and software requirements for different system configurations in check lists. On the basis of these lists you can determine whether your hardware meets the minimal requirements for your planned configuration and find out which software versions are necessary for the subsequent installation process.

     For more information, see Hardware and Software Requirements Check. [Page 16]
   - Work out how the main system directories are to be distributed to RAID arrays in the system

     During the actual installation procedure, the utilities that help you to install the database and SAP software prompt you to specify the drives on which the main software components are to be installed. Before you run these utilities, it is therefore essential to get an overview the directories involved and to decide how these can be best distributed to RAID arrays. An effective distribution takes into account aspects, such as the expected workload, the size of individual components, performance of the system and security of the data.
     For more information, see Distribution of Components to Disks [Page 25].

2. In the **preparations phase**, before you run the installation utilities, you need to perform a number of tasks that are a prerequisite for a successful installation. These can be grouped into two categories:
   - Preparations related to the operating system
     - Checking the Windows NT file system
     - Checking the Windows NT domain structure
     - Installing the Microsoft Management Console
     - Updating the Dynamic Link Libraries
     - Reserving virtual memory
     - Reducing the size of the NT cache
     - Granting user rights for the installation
     - Preparing the Active Directory (optional)
   - Other preparations
     - Choosing system and host names
     - Preparing the SAP System transport host

   For more information, see Installation Preparations [Page 37].
3. In the **installation phase**, you have to carry out the steps that are necessary to set up the core components of the SAP System. This involves installing the:
   - Central and database instance
   - Dialog instances
   - Frontends

   The installation procedure differs, depending on the planned system configuration. When you set up a **central system,** all the required steps are performed on the same host. When you set up a **standalone database system** some actions are carried out on the database host, others on the central instance host. The following summarizes the actions for both configuration types.

a. Installation of the central and database instance

Central System	Standalone Database System
a) Actions on the central system host: – Installation of the Oracle server software and latest Patch using the *Oracle Installer*. – Installation of the R3SETUP tool using the file `R3SETUP.BAT`. – Installation of the central instance and database instance using the R3SETUP option *Install Central and Database Instance*.	a) Actions on the central instance host: – Installation of the Oracle **client** software and latest patch using the *Oracle Installer.* – Installation of the R3SETUP tool using the file `R3SETUP.BAT`. – Installation of the central instance using the R3SETUP option *Install Central Instance.* b) Actions on the database host: – Installation of the Oracle **server** software and latest patch using the *Oracle Installer*. – Installation of the R3SETUP tool using the file `R3SETUP.BAT`. – Database creation and load using the R3SETUP option *Install Database Instance*.

b. Installation of the dialog instances

When the central and database instance have been installed, you can optionally install one or more dialog instances on further hosts in the system. The following actions are necessary to set up a dialog instance:

- Installation of the Oracle **client** software and the latest patch using the *Oracle Installer*.
- Installation of the R3SETUP tool with the file `R3SETUP.BAT`.
- Installation of the dialog instance with the R3SETUP option *Install Dialog Instance*.

c. Installation of the frontends

Once the central, database and dialog instances have been set up, you can install the SAP frontends following the instructions given in the documentation *Installing SAP Frontend Software for PCs.*

For more information, see The SAP System Installation [Page 48]

In a final, **post-installation activities phase**, you have to perform a number of tasks to complete the installation. Some of these tasks are mandatory, others are optional and serve to activate optional features that may be useful.

- Necessary tasks
  - Starting and stopping the system
  - Logging on to the system
  - Installing the SAP License
  - Checking the services
  - Installing the online documentation
  - Configuring the SAProuter and SAPNet - R/3 Frontend
  - Performing steps specified in the System Administration Assistant
  - Performing a full backup
- Optional tasks
  - Configuring Single Sign-On
  - Installing the SAP Internet solution

For more information, see Post-Installation Activities [Page 91].

1 Installation Planning

Purpose

Before you begin with the practical installation tasks, it is essential to have a planning phase in which you make a number of fundamental decisions that influence the subsequent installation procedure. Careful planning is a prerequisite for the successful installation of the system.

Process Flow

When you plan the installation you have to:

- Decide on the optimal configuration for the system
- Decide whether a **domain** or **local** installation is suitable
- Make sure that you can meet the hardware and software requirements specified by SAP
- Work out how the software components must be distributed to disks
- Decide whether you want to integrate Active Directory Services

System Configuration

The configuration of the system is generally planned well in advance of the installation together with the hardware vendor. Configuration planning involves deciding whether a **central system** or **standalone database system** is to be installed, and how many dialog instances and frontends are required.

The configuration is worked out with the hardware partner on the basis of sizing information that reflects the system workload. Details such as the set of applications that are to be deployed, how intensively these are to be used, and the number of users enable the hardware vendor to recommend a configuration that performs well. To simplify the process of planning an appropriate configuration, SAP provides a *Quick Sizer* tool that helps to determine the right combination of resources such as CPU, disk space and memory.

Domain or Local Installation

One of the fundamental decisions that have to be made before the installation, is to decide whether a **domain** or a **local** installation is to be performed. Depending on the type of installation, different rights and privileges are necessary to permit the execution of the installation steps. To perform a local installation, you need to be `Local Administrator` of the machine involved. To perform a 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 local installation, all Windows NT account and user information is stored locally on one host and is not visible to any other hosts in the system. 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 SAP System is to run on a single machine, you can perform a **local** installation. If the system is to be distributed across more than one machine SAP strongly recommends a **domain** installation.

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

A domain installation requires an additional component called the NT primary domain controller (PDC). This stores user account information centrally for the whole system and must therefore be installed on one of the hosts in the domain. For performance and security reasons it must **not** be located on a host where the central instance or database are running.

It is not advisable to run an SAP instance (including the database instance) on the primary domain controller (PDC) or on the backup domain controllers (BDC). Never perform a local installation on a domain controller.

For more information, see Granting User Rights for the Installation [Page 41].

Checking SAP Hardware and Software Requirements

SAP specifies minimal hardware and software requirements for different system configurations to ensure that a newly installed system performs well. These requirements are summarized in check lists that are available for a central system and a standalone database system.

In the planning stage, it is essential to look at the check lists to find out the requirements and to make sure that they can be met.

For more information see, Hardware and Software Requirements Check [Page 16]

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.

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 44].

1.1 Hardware and Software Requirements Check

Purpose

In the following sections you can find check lists that specify the software and hardware requirements for different SAP system configurations. Use the check lists to ensure that you install the correct software components and that your hardware is suitably sized.

Each system has individual hardware requirements that are influenced by the number of concurrent users, the transaction load, and the amount of customer data. The following lists can only give you a rough idea of the **minimal** requirements for a new system without taking customer data into account. For a more precise definition that reflects your particular system load, you can:

- Use the *Quick Sizer* tool that is available on the SAPNet. This prompts you to enter information on your planned system and then works out the requirements that have to be met to handle the load. To access the tool enter the alias `QUICKSIZING` in the SAPNet.
- Contact a hardware vendor. The vendor analyses the load and works out suitable hardware sizing.

The check lists are only valid for Release 4.6D.

Prerequisites

- Remote support

  To get 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.

- Hardware certification

  You are only allowed to install an SAP System on certified hardware. iXOS R/3NTC certifies hardware platforms for SAP on Microsoft Windows NT. iXOS certifies a specified release of MS Windows NT. SAP customers can then run the SAP System on the respective platform for all combinations of the SAP System and databases released by SAP for the specified release of MS Windows NT.

  For the list of certified platforms, see the internet address `http:\\www.r3onnt.com`.

Process Flow

1. You follow the relevant procedure to check the requirements on each machine where you intend to install the SAP System:
   a. To install the central instance and database, you check one of the following:
      - Central system requirements
      - Standalone database system requirements
   b. To install the dialog instance, you check the dialog instance requirements.
2. You check the network requirements.

1.1.1 Checking Requirements for a Central System

Use

For the installation of a central SAP System, make sure you meet the minimal requirements listed in this section.

Prerequisites

You are installing a standard SAP System as a central system. That is, the central instance and the Oracle database are on the **same** host machine.

Procedure

1. Ensure that the host machine meets the hardware requirements that enable the SAP system to perform well. The following list gives you a rough idea of the requirements for a new system with no customer data.

Hardware Requirement	**How to check**
CD drive locally connected to host running central instance	–
Tape drive for backups, either 4mm DAT or DLT. Hardware compression is recommended.	–
Disk space of 13 GB (not including virtual memory) on at least 3 physically separate disks	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*.
RAM of 512 MB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Windows NT Diagnostics*.
Virtual memory of at least 4 times RAM. Maximum required is 10GB.	a. Choose *Start* → *Settings* → *Control Panel* → *System*. b. Choose *Performance*. c. If required, in section *Virtual Memory*, choose *Change*.

2. Check that the software on the host machine meets the following requirements:

Software Requirement	**How to check**
Oracle version 8.1.6 Patch 8.1.6.1.1**)**	–
Windows NT Server Version 4.0, English (international), service pack 6 or higher	a. Choose *Start* → *Programs* → *Command Prompt*. b. Enter the command **`winver`**
Microsoft Internet Explorer 4.0, service pack 1 or Microsoft Internet Explorer 5.0	In the Explorer, choose *Help* → *About Internet Explorer*.
Windows NT Resource Kit is strongly recommended to enable support	–

3. Check that the network configuration meets the requirements in Checking Requirements for the Network [Page 23].
4. To prepare printers for use in the SAP System, check that they operate correctly at the Windows NT level by using the Print Manager:
   a. Choose *Start* → *Settings* → *Printers* to check the printer installation.
   b. If you can print from a Windows application (for example, Notepad), the printer is installed correctly.

   For more information, see the Windows NT documentation.

Result

You have met the requirements for the machine where the central system is to be installed.

1.1.2 Checking Requirements for a Standalone Database System

Use

For the installation of an SAP System with a standalone Oracle database, make sure you meet the minimal requirements listed in this section.

Prerequisites

You are installing a standard SAP System with a standalone database. That is, the central instance and the database are on **different** host machines.

Procedure

Checking the Host for the Central Instance

1. Check that the host machine meets the following hardware requirements:

Hardware Requirement	**How to check**
CD drive locally connected to host running central instance	–
Tape drive for backups, either 4mm DAT or DLT. Hardware compression is recommended.	–
Disk space of 300 MB (not including virtual memory)	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*.
RAM of 512 MB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Windows NT Diagnostics*.
Virtual memory of 4 times RAM. Maximum required is 10GB.	a. Choose *Start* → *Settings* → *Control Panel* → *System* → *Performance*. b. If required, in section *Virtual Memory*, choose *Change*.

2. Check that the software on the host machine meets the following requirements:

Software Requirement	**How to check**
Oracle version 8.1.6 Patch 8.1.6.1.1	–
Windows NT Server Version 4.0, English (international), service pack 6 or higher	a. Choose *Start* → *Programs* → *Command Prompt*. b. Enter the command **`winver`**
Microsoft Internet Explorer 4.0, service pack 1 or Microsoft Internet Explorer 5.0	In the Explorer, choose *Help* → *About Internet Explorer*.
Windows NT Resource Kit is strongly recommended to enable support	–

3. To prepare printers for use in the SAP System, check that they operate correctly at the Windows NT level using the Print Manager as follows:

   a. Choose *Start* → *Settings* → *Printers* to check the printer installation.

   b. If you can print from a Windows application (for example, Notepad), the printer is installed correctly.

   For more information, see the Windows NT documentation.

Checking the Host for the Database Instance

1. Check that the host machine meets the following hardware requirements:

	Hardware Requirement	**How to check**
	CD drive locally connected to host running central instance	–
	Tape drive for backups, either 4mm DAT or DLT. Hardware compression is recommended.	–
	Disk space of 13 GB (not including virtual memory)	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*.
	RAM of 512 MB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Windows NT Diagnostics*.
	Virtual memory of 2 times RAM.	a. Choose *Start* → *Settings* → *Control Panel* → *System*. b. Choose *Performance*. c. If required, in section *Virtual Memory*, choose *Change*.

2. Check that the software on the host machine meets the following requirements:

	Software Requirement	**How to check**
	Oracle version 8.1.6. Patch 8.1.6.1.1	–
	Windows NT Server Version 4.0, English (international), service pack 6 or higher	a. Choose *Start* → *Programs* → *Command Prompt*. b. Enter the command `winver`
	Windows NT Resource Kit is strongly recommended to enable support	–

Checking the Network

Check that the network configuration meets the requirements in Checking Requirements for the Network [Page 23].

1.1.3 Checking Requirements for a Dialog Instance

Use

For the installation of a dialog instance, make sure you meet the minimal requirements listed in this section.

Procedure

1. Check that the host machine meets the following hardware requirements:

Hardware Requirement	**How to check**
CD drive locally connected to host running central instance	–
Tape drive for backups, either 4mm DAT or DLT. Hardware compression is recommended.	–
Disk space of 250 MB (not including virtual memory)	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*.
RAM of 512 MB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Windows NT Diagnostics*.
Virtual memory of 4 times RAM. Maximum required is 10 GB.	a. Choose *Start* → *Settings* → *Control Panel* → *System* → *Performance*. b. If required, in section *Virtual Memory*, choose *Change*.

2. Check that the software on the host machine meets the following requirements

Software Requirement	**How to check**
Oracle version 8.1.6 Patch 8.1.6.1.1	–
Windows NT Server Version 4.0, English (international), service pack 6 or higher	a. Choose *Start* → *Programs* → *Command Prompt*. b. Enter the command `winver`
Internet Explorer 4.0, service pack 1 or Internet Explorer 5.0	
Windows NT Resource Kit is strongly recommended to enable support	–

3. Check that the network configuration meets the requirements in Checking Requirements for the Network [Page 23].

4. To prepare printers for use in the SAP System, check that they operate correctly at the Windows NT level using the Print Manager as follows:

   a. Choose *Start* → *Settings* → *Printers* to check the printer installation.

   b. If you can print from a Windows application (for example, Notepad), the printer is installed correctly.

   For more information, see the Windows NT documentation.

Result

You have met the requirements for the machine where the dialog instance is to be installed.

1.1.4 Checking Requirements for the Network

Use

Be sure to meet the minimal requirements for the network of your SAP System installation listed in this section.

Prerequisites

You have read the following documentation, available in SAPNet:

- *Network Integration of R/3 Servers*
- *SAP Software in PC Networks* (SAP Note 5324)

If you do not meet the requirements in this section, you might have problems or be restricted when working with the SAP System.

Procedure

1. Check the configuration of the network on each host machine by choosing *Start* → *Settings* → *Control Panel* → *Network*.
2. Check whether the TCP/IP protocol is installed correctly. For more information, see the Windows NT documentation.
3. Check whether the file `C:\WINNT\SYSTEM32\DRIVERS\ETC\HOSTS` is complete and up-to-date. The notation used for the computer name in the file must be compatible with the "TCP/IP Protocol" entries. Also, the file must contain the following entry:

   ```
   127.0.0.1 localhost
   ```

4. Open a command prompt with *Start* → *Programs* → *Command Prompt* .

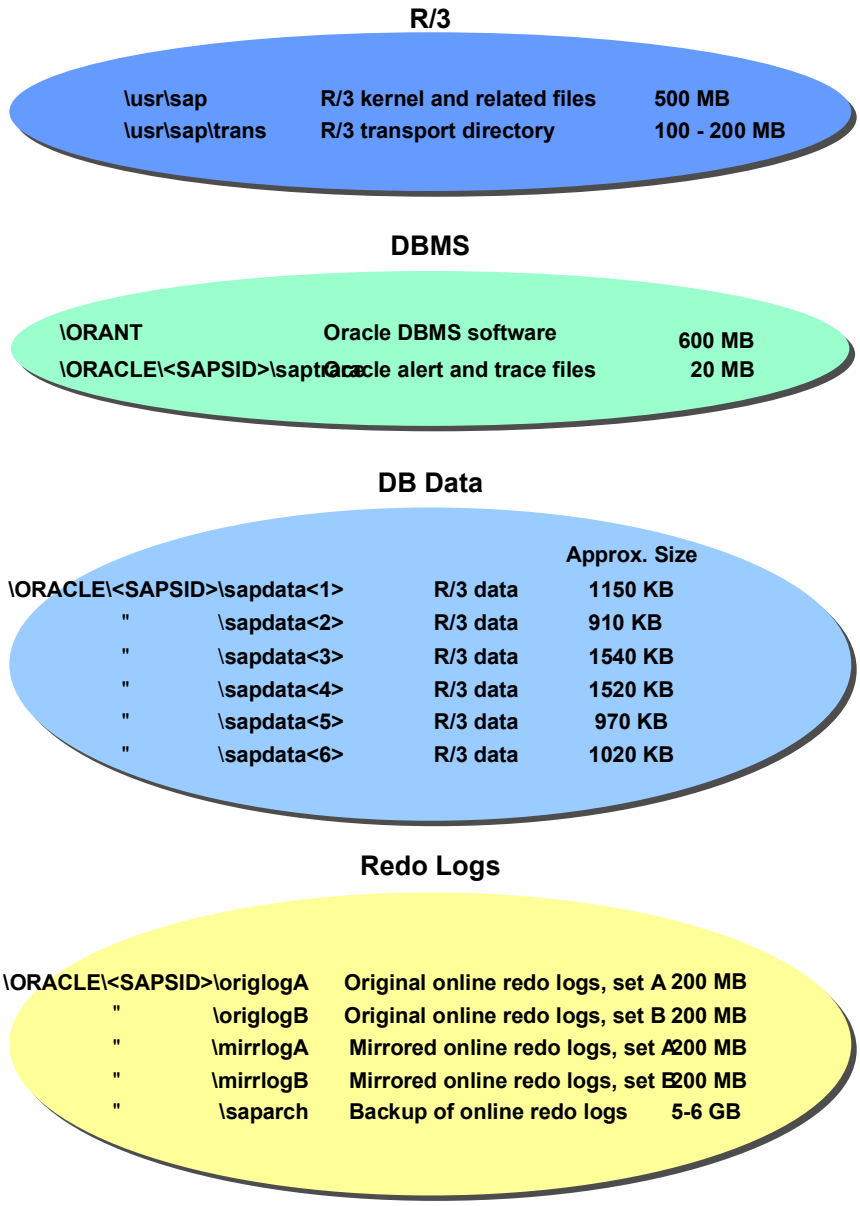
5. Enter the following commands in the sequence specified. Use the output of each command as the input for the next command:

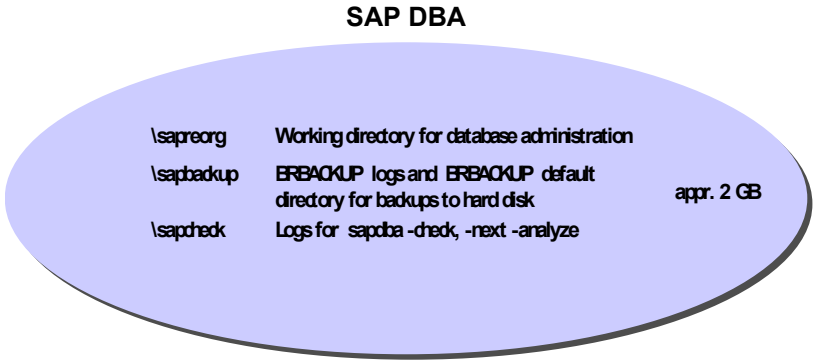
Command	Output
hostname	Local host name
ping <hostname>	The IP address of the local host
ping -a <IP_address>	The host name of the local host

The name returned by the commands **`hostname`** and **`ping -a <IP_address>`** must be the same, including upper and lowercase. If the output returned by the commands is consistent and corresponds to the entries in the `HOSTS` file, the network connection is functioning properly.

1.2 Distribution of Components to Disks

When you install a SAP System with an Oracle database, the main directories required for the system are automatically created. However, during the installation procedure you have to explicitly specify where these directories are to be located, that is, on which drives or disks they must reside. The assignment of the directories to drives and corresponding disks fundamentally affects the security and performance of the system and must therefore be carefully considered. The following graphic gives you an overview of the main SAP System components and directories, their purpose, and the amount of free space they initially require. A good distribution of these to disks ensures that enough free space is available for system growth, the data is secure and Performance is good.





Directory Sizes

\sapreorg and \sapbackup

No definite initial size can be specified for the SAPDBA directories `\sapreorg` and `\sapbackup` because they are normally only used when tablespaces have to be reorganized. `\sapbackup` is generally used for backup logs and online backups that are made in preparation for a database reorganization. `\sapreorg` is used for the reorganization itself. If you have to reorganize the database, the SAPDBA utility informs you how much space is necessary.

\saparch

The space required for `\saparch` can vary between 100 MB and 10 GB. It depends on the workload and the archiving strategy you plan to implement. If the archive logs are written directly from `\saparch` to tape, this reduces the amount of disk space required. If a backup is being executed and only one tape drive is available, more free space is necessary. In this case, at least enough space must be free to allow all the redo logs generated during the backup to be archived. If the archive directory fills up, the backup stops. It only continues processing when enough space for archiving logs is available again.

Sample Configurations

As SAP production systems are generally installed on RAID arrays, the following focuses on the use of RAID technology.

The best way to assign the SAP System directories to RAID arrays depends on your specific workload and individual performance and security requirements. There is no single solution or any definite rules. To help you work out a good solution that suits your particular environment, the following shows you some examples and gives recommendations that may be useful.

For a discussion of a basic distribution that provides adequate data security and performance in an average size production system, see the example:

Standard Configuration [Page 28]

For an illustration of a large configuration that provides a large degree of data redundancy and benefits performance, see the example:

Large Configuration [Page 30]

For a distribution that is suitable for a small test or demo system, see the example:

Test System Configuration [Page 32]

General Recommendations

The following gives you information and recommendations that are valid for all systems.

- For security and performance reasons always distribute the following to different arrays:
  - Original online redo logs
  - Mirrored redo logs
  - Archived redo logs
  - Database data
- For performance reasons, do not install several database systems for different SAP Systems on a single host.
- Use the standard naming conventions for the main directories to ensure trouble-free database administration.
- Use RAID disk technology
  - RAID 1 disk arrays are recommended for the original and mirrored redo logs. This technology writes data to a primary disk and duplicates it on a second disk thus providing a high level of data security.
  - RAID 5 disk arrays are recommended for the database data and the archived redo logs. This RAID level stripes the data over all the disks in the array and writes parity information. The parity information enables data to be reconstructed if a single disk fails.

Changing Tablespace Sizes

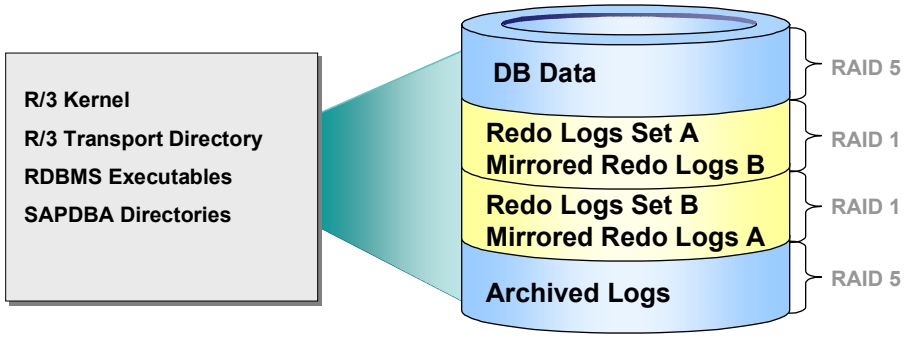
When the directories for the database data are created, they are assigned to tablespaces that have a predefined default size. If you have a large amount of data and are uncertain whether the predefined tablespaces are big enough, you can increase their sizes before beginning the installation. For more information about the tablespace sizes and how to proceed in order to change them, see Changing Tablespace Sizes or Locations [Page 108]. System Components and Directories.

1.2.1 Standard Configuration

The following graphic illustrates how the main directories that are created during the installation can be distributed to RAID arrays. The distribution is suitable for an average-sized production system. Keep in mind that this is only an example and that no single solution is fitting for all environments.

The configuration shown is suitable for the main host of a central system or the database server of a standalone database system. The components in the box on the left can be assigned to any of the arrays depicted. The transport directory does not necessarily have to reside on the central instance host.

Distribution of Components to RAID Arrays



Distribution of Directories to Arrays

Array 1	\ORACLE\<SAPSID>\sapdata1 ... \ORACLE\<SAPSID>\sapdata6
Array 2	\ORACLE\<SAPSID>\origlogA \ORACLE\<SAPSID>\mirrlogB \usr\sap \ORANT
Array 3	\ORACLE\<SAPSID>\origlogB \ORACLE\<SAPSID>\mirrlogA \ORACLE\<SAPSID>\sapreorg \ORACLE\<SAPSID>\saptrace \ORACLE\<SAPSID>\sapbackup \ORACLE\<SAPSID>\sapcheck
Array 4	\ORACLE\<SAPSID>\saparch

Comments

- Security of the Redo Logs

  From a security point of view, the redo logs play a crucial role. They record all the changes made to the database and thus provide the information that is necessary to recover a database that has been damaged. It is therefore important that they are stored very securely and are never lost together with the database data. By placing the redo logs on a different array to the database data, you can ensure that they are not lost if the array with the database data is severely damaged.

- Security of the Oracle Control files

  The Oracle control files contain important information for the operation of the database, for example, they store the structure of the data files and the SCN. They enable the database to function properly and are essential to recover the database.

  To ensure that the control files are not lost in the event of a disk failure, the R3SETUP tool locates them in directories that always have to be placed on separate arrays or disks. Altogether there are 3 control files that are all named `cntrl<DB_SID>.dbf`. After the installation they are located in the following directories:

  ```
  CONTROLFILE 1:
  <DRIVE>:\ORACLE\<SAPSID>\SAPDATA1\cntrl\cntrl<DB_SID>.dbf

  CONTROLFILE 2:
  <DRIVE>:\ORACLE\<SAPSID>\origlogA\cntrl\cntrl<DB_SID>.dbf

  CONTROLFILE 3:
  <DRIVE>:\ORACLE\<SAPSID>\saparch\ cntrl\cntrl<DB_SID>.dbf
  ```

- Performance

  Locating the first and second set of online redo logs (set A and B) on different RAID arrays enables you to avoid I/O bottlenecks. When set A of the online redo logs is full, the system immediately begins to read and archive these. As a consequence, there is a high level of read activity. At the same time the online redo logs are switched to set B, thus resulting in intensive write operations. To avoid simultaneous high read and write activity on the same array, it is therefore advisable to locate set A and B of the redo logs on different arrays.

  Further potential sources of I/O bottlenecks can be eliminated by placing the original redo logs of set A and B on different arrays to their corresponding mirrored logs. Original and mirrored redo logs are written in parallel, therefore if they are located on the same array this results in a high level of write activity that has to be handled by the same controller. A separation of original and mirrored logs distributes the write activity to two different arrays, thus reducing the likelihood of I/O bottlenecks.

- RAID levels

  The use of RAID 1 arrays for the original and mirrored redo logs provides a high degree of data security combined with good performance. The data is written to a primary disk and duplicated identically on a second disk. If one disk fails the data is still intact on the second disk.

  The use of RAID 5 for the database and archive logs ensures fault tolerance. The data is striped over all the disks in the array together with parity information. If one disk fails, the parity information is used to automatically reconstruct the data lost on the damaged disk.

- Number of Raid Arrays

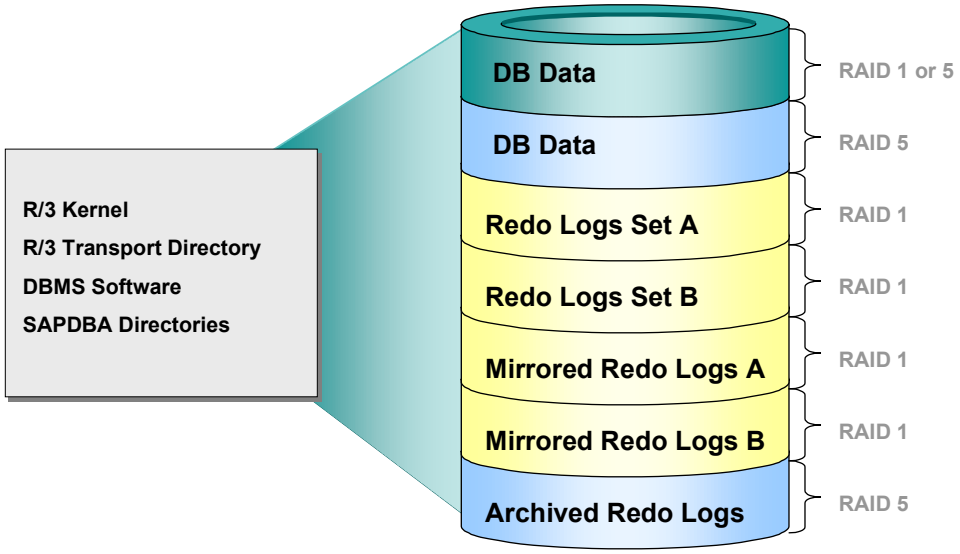
  In the graphic above, three RAID 1 arrays are used for the redo logs to achieve optimal performance and security. If you do not need the disk capacity offered by 3 arrays and can accept a less optimal level of performance, it is also feasible to use a single array. In this case a single RAID 1 array can be used for the original, online and archived redo logs.

1.2.2 Large Configuration

The following illustrates a good disk configuration for a large production system with a high throughput. The main system directories are distributed across several RAID arrays in a manner which ensures good performance and security, despite the large amount of data and heavy workload.

The configuration shown is suitable for the database server of a standalone database system, or the main host of a central system. The components displayed in the box on the left can be distributed to any of the arrays depicted. The transport directory does not necessarily have to reside on the central instance or database host.

Distribution of System Components to RAID Arrays



Distribution of Directories to Arrays

RAID Array	Directories
Array 1 and 2	\ORACLE\<SAPSID>\sapdata1 ... \ORACLE\<SAPSID>\sapdata6
Array 3	\ORACLE\<SAPSID>\origlogA \usr\sap\trans
Array 4	\ORACLE\<SAPSID>\origlogB \ORACLE\<SAPSID>\sapreorg \ORANT
Array 5	\ORACLE\<SAPSID>\mirrlogA \ORACLE\<SAPSID>\saptrace \ORACLE\<SAPSID>\sapbackup
Array 6	\ORACLE\<SAPSID>\mirrlogB \ORACLE\<SAPSID>\sapcheck \usr\sap
Array 7	\ORACLE\<SAPSID>\saparch

Comments

The following recommendations are only relevant for large systems. An optimal distribution can sometimes only be achieved once the system is running and additional information is available about read and write activity on individual tables.

- Separating index and table data

  In installations where a large amount of customer data is expected, storing index and data tablespaces on separate arrays improves performance. Whenever an insert operation takes place, generally both the data and the index tablespaces have to be modified. Consequently, two write operations have to be executed simultaneously. It is advantageous if both operations are not on the same array. Avoiding the double write operation at the same location by separating indexes and data improves I/0 performance.

  Ensuring that index and table data are separated during the installation is a complex task. You have to manually edit the R3SETUP installation files that control the creation of the tablespaces. In these files, index and data tablespaces are assigned to different SAP data directories. By changing this assignment and subsequently, during the installation, appropriately distributing the data directories to different arrays you can achieve index and data separation.

  Often it is sufficient to ensure that only particular index and data tablespaces containing heavily accessed tables are distributed across different arrays.

  Table data and index data can be distinguished as follows:

  – Tablespaces with table data always end with *D*, for example, PSAPPOOLD.

  – Tablespaces with index data always end with *I*, for example, PSAPPOOLI.

–

- Alternative RAID levels for the SAP data directories
  - RAID configurations, other than the one illustrated above, also provide good solutions for the SAP data directories. One available option is a combination of RAID 1 and RAID 0, also referred to as RAID 1/0. This solution could replace array 1 and 2 in the above graphic. It provides maximum protection by mirroring the data (RAID 1) and also good performance by striping the data across all drives (RAID 0).

    Another option for the data directories is to use RAID 5, but to include one or more additional RAID 1 arrays. RAID 1 offers significantly better write performance than RAID 5 and is therefore a good choice for heavily accessed tablespaces. To take advantage of such a configuration, you have to place tablespaces with a high write load on the array implementing RAID 1.
  - To locate certain tablespaces on a particular array, you have to edit the R3SETUP files that assign tablespaces to SAP data directories. In these files you need to assign critical tablespaces with a high level of read and write activity to a particular SAP data directory. Subsequently, during the installation, you have to ensure that this particular directory is created on the RAID 1 array.

See also:

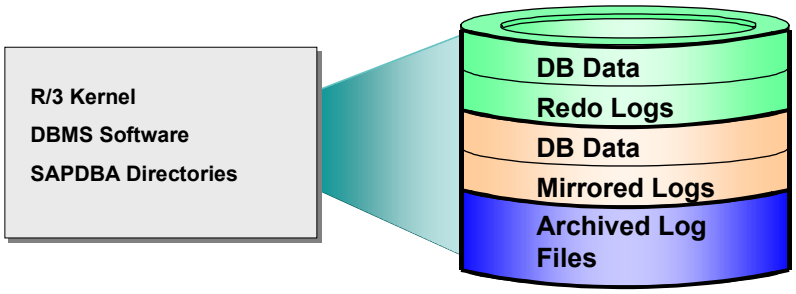
Changing Tablespace Sizes or Locations [Page 108]

1.2.3 Test System 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.

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.

Distribution of Components to Disks



Distribution of Directories to Disks

Disk 1	\ORANT \ORACLE\<SAPSID>\sapreorg \ORACLE\<SAPSID>\origlogA \ORACLE\<SAPSID>\origlogB \ORACLE\<SAPSID>\sapdata1 \ORACLE\<SAPSID>\sapdata2 \ORACLE\<SAPSID>\sapdata3
Disk 2	\ORACLE\<SAPSID>\mirrlogA \ORACLE\<SAPSID>\mirrlogB \ORACLE\<SAPSID>\saptrace \ORACLE\<SAPSID>\sapbackup \ORACLE\<SAPSID>\sapcheck \usr\sap \ORACLE\<SAPSID>\sapdata4 \ORACLE\<SAPSID>\sapdata5 \ORACLE\<SAPSID>\sapdata6
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.

1.2.4 SAP Directories

Definition

The following gives you some background information about the SAP directories that are created during the installation. The base directories required for the SAP 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 these 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).

The following explanation distinguishes between a global, local and database host.

The **global host** is the machine on which the R/3 central instance runs.
The **local host**, is the current machine on which an SAP instance is running.
The **DB host** is the machine on which the database server runs.

Use

Directory \usr\sap

The SAP software is stored in the directory `\usr\sap` and contains global and local (instance-specific) data on a global host.
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 directory `\usr\sap` on the global host and shares it with the names `sapmnt` and `saploc`. The same directory on the local host is shared as `saploc`.

Since SAP traces for the instance are created in the directory `\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 presentation 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.

Directory \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 (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, additional space is required in directory `\usr\sap\trans`. Since the required storage size differs depending on the transport volume,

SAP cannot 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.

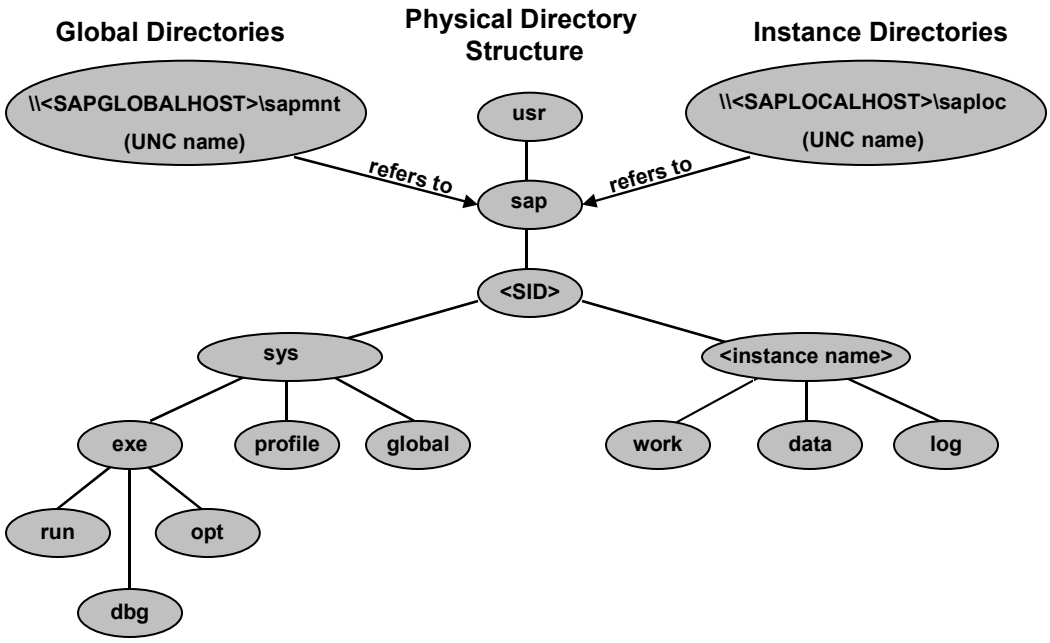
SAP enables you to make a transport host known to the Domain Name Server for all Windows NT systems. For more information, see Preparing SAP System Transport Host [Page 43].

Structure

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

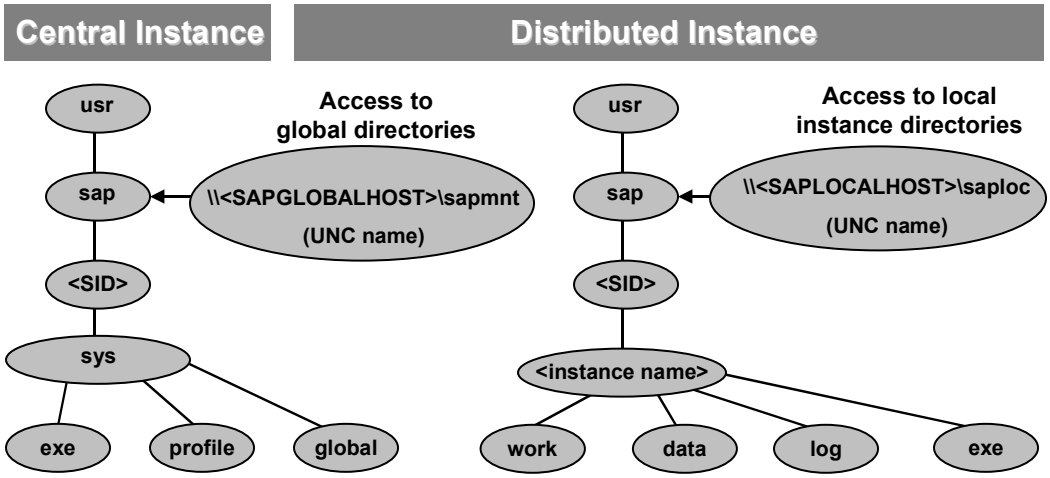
- `\\<SAPGLOBALHOST>\sapmnt` to access global directories
- `\\<SAPLOCALHOST>\saploc` to access local instance-specific data

Directory Structure on the Global Host



This graphic shows the directory structure on the global host. The global data is stored in the global directories on the global host. This data 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.

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.

2 Installation Preparations

Purpose

Before you start the installation, you must prepare the operating system and the SAP System.

Prerequisites

You have finished the planning phase.

Only the **English (International)** version of Windows NT is supported.

Process Flow

1. You perform preparations for the operating system on hosts that are to be used with the SAP System:
   a. You check that Windows NT File System (NTFS) is being used [Page 37].
   b. You check that the Windows NT domain structure is correct [Page 38].
   c. You install Microsoft Management Console (MMC). [Page 38]
   d. You install up-to-date dynamic link libraries (DLLs) [Page 39].
   e. You adjust virtual memory [Page 40].
   f. You reduce the size of the NT file cache [Page 40].
   g. You grant user rights for the installation [Page 41].
2. You perform preparations for the SAP System:
   a. You choose the SAP System name and the host name [Page 42].
   b. You prepare the SAP System transport host [Page 43].
3. Optionally, you prepare for the integration of Active Directory [Page 44].

Result

You can now start the installation.

2.1 Checking for Windows NT File System

Use

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

2.2 Checking the Windows NT Domain Structure

Use

This section describes how to check that **all** SAP System and database hosts are members of a **single** Windows NT domain. We recommend this for all SAP System setups, whether standalone central systems or distributed systems.

For performance and security reasons, **no** SAP instance (including the database instance) should run on the primary domain controller (PDC) or on the backup domain controllers (BDC).

Prerequisites

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

Procedure

1. Check that all SAP System and database hosts are part of a single Windows NT 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.

2.3 Installing Microsoft Management Console

Use

You must set up the following components on all hosts in the system where you intend to run an SAP instance, so that the installation functions correctly:

- Internet Explorer version 4.01 or higher
- Active Directory Service Interfaces (ADSI)
- Microsoft Management Console (MMC)

The MMC lets you monitor and start or stop the SAP System and instances centrally, that is, from a single location.

On a standalone database host, you do not have to install MMC and ADSI.

Procedure

1. If necessary, install the Internet Explorer.
   a. Insert the Presentation CD into the CD-ROM drive.
   b. Switch to the directory `<CD_DRIVE>:\MS_IE5\<processor>\<EN>`
   c. Start the program `ie5setup.exe`.
2. Install ADSI and MMC:
   a. Insert the SAP Kernel CD into the CD-ROM drive.
   b. Switch to the following directory:
      - `<CD_DRIVE>:\NT\I386\MMC`
      - On DEC-ALPHA: `<CD_DRIVE>:\NT\ALPHA\MMC`
   c. To install the Active Directory Services, start the program `ads.exe`.
   d. To install the Microsoft Management Console 1.1, start the program `immc.exe`.

2.4 Installing Up-To-Date Dynamic Link Libraries

Use

You must install up-to-date dynamic link libraries (DLLs) on all hosts in the system where you intend to run an SAP instance. This includes hosts where a standalone database or gateway instance are to run. The DLLS are required for correct functioning of the SAP System.

Procedure

1. Insert the SAP Kernel CD in the CD-ROM drive.
2. Switch to the directory `<CD_DRIVE>:\NT\I386\NTPATCH`

   For ALPHA: `<CD_DRIVE>:\NT\ALPHA\NTPATCH`
3. Start the program `r3dllins.exe`.

When the installation has finished, you are prompted to reboot the system to activate the changes.
If your DLLs were already up-to-date before you started the `r3dllins.exe` program, no new DLLs are installed and you are not prompted to reboot.

2.5 Adjusting Virtual Memory

Use

You must adjust virtual memory on all hosts in the system where you intend to run an SAP instance.

Procedure

1. Choose *Start* → *Settings* → *Control Panel* → *System*.
2. Make a note of the amount of RAM installed.
3. Choose *Performance*.
4. Choose *Change* to change the paging file size if required.

   The size should be at least four times the RAM installed. More than 10 GB is not required. On a host for a standalone database or a gateway instance, the paging file should be approximately double the size of the RAM.

2.6 Reducing the Size of the NT File Cache

Use

You must reduce the size of the NT file cache on all hosts in the system where you intend to run an SAP instance. This avoids conflicts between the NT file cache and SAP programs in memory. If you do not reduce the cache size, this might cause SAP programs to be displaced from memory.

Procedure

1. Choose *Start* → *Settings* → *Control Panel* → *Network*.
2. Choose *Services*.
3. From the list under *Network Services,* select *Server.*
4. Choose *Properties*.

   The *Server* dialog box opens.
5. Under *Optimization*, select *Maximize the throughput for Network Applications.*
6. Choose *OK* to confirm.

   The setting for the size of the NT cache has now been reduced.
7. Reboot your server to activate the new setting.

2.7 Granting User Rights for the Installation

Use

The installation of the SAP System and the R3SETUP tool is only possible with certain NT rights and privileges that authorize the execution of the installation steps. Without these rights and privileges any attempt to install the system aborts. Therefore, before you start the installation, you have to ask the system administrator to grant you the necessary authorizations.

The rights you need depend on whether you intend to perform a **domain** or **local** installation. For more information, see Domain or Local Installation. [Page 14]

For performance and security reasons, it is advisable not to run an SAP instance (including the database instance) on the primary domain controller (PDC) or on the backup domain controllers (BDC).
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.

Domain Installation

To perform a domain installation, you need to have `Domain Administration` rights. To obtain these rights the system administrator must enter you as a member of the `Domain Admins` group.

Domain Installation Without Domain Administration Rights

If, for any reason, you are unable to get domain administrator rights for the installation, you can perform the installation as a user with local administrator rights. However, you first have to prepare this user as follows:

1. Ask the current `Domain Administrator` to create a new global group called `SAP_<SAPSID>_GlobalAdmin` and the following two user accounts.
   - `SAPService<SAPSID>` (this is **not** required for Informix installations)
   - `<sapsid>adm`

Be careful to enter `SAPService<SAPSID>`, `<sapsid>adm` and `SAP_<SAPSID>_GlobalAdmin` exactly as specified observing upper and lowercase. For example, for a system called PRD enter `SAPServicePRD` and `prdadm`

2. Once the accounts have been created:
   - Assign the users `SAPService<SAPSID>` and `<sapsid>adm` to the newly created group `SAP_<SAPSID>_GlobalAdmin`
   - Assign the user `<sapsid>adm` to the group `Domain Users`.

   Any user with local administrator rights can now perform a domain installation with R3SETUP without being a member of the `Domain admins` group.

See also:

Performing a Domain Installation as Local Administrator [Page 122].

2.8 Choosing the SAP System Name and the Host Name

Use

You need to choose an SAP System name that identifies the whole system. This name 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 name after the installation.

Procedure

1. Choose a name for your SAP System, conforming to the following conventions:
   - It must be unique within your network.
   - It must consist of three alphanumeric characters, for example, `C11`.
   - Only uppercase letters are allowed.
   - The first character must be a letter, **not** a digit.
   - Since the following names are reserved, you **cannot** assign them to your SAP System:

     ```
     ADD, ALL, AND, ANY, ASC, AUX, B20, B30, BCO, BIN, COM, CON, DBA,
     END, EPS, FAX, FOR, GID, INT, KEY, LOG, LPT, MAX, MIN, MON, NOT,
     OFF, OMS, P30, PRN, PUT, RAW, ROW, SAP, SET, SGA, SHG, SID, UID,
     VAR, TMP
     ```

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.

2.9 Preparing 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 directory `usr\sap\trans` 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.

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 NT 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* → Control *Panel* → *Network* → *Bindings*
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`.
   b. Grant *Everyone* the permission *Full Control* for the directory.

These permissions are only necessary during the course of the R3SETUP installation. After the installation, only the `SAP_<SID>_GloabalAdmin` groups of all the systems that are part of your transport infrastructure must be granted *Full Control* on the directory. R3SETUP assigns the appropriate rights with the help of an additional `SAP_LocalAdmin` group. For more information, see Automatic Creation of Accounts and Groups [Page 120].

c. If no SAP instance is to be installed on the transport host, you have to share the directory `usr\sap` on the transport host as `SAPMNT`. This enables R3SETUP to address the transport directory in the standard way as `\\SAPTRANSHOST\SAPMNT\trans`.

Result

You have configured your system so that the installation tool R3SETUP can recognize the transport host.

2.10 Integration of Active Directory Services

Purpose

The Active Directory is a Windows 2000 feature that allows important information within a corporate network to be stored centrally on a server where it can easily be accessed and administered. Storing information at one central location for the entire network has the advantage that data only has to be maintained once and will therefore not be redundant or inconsistent.

If an Active directory is available in the corporate network, the SAP System can be configured to take advantage of it. An appropriately configured SAP system can read information from the directory and also store information there.
The following explains how SAP Systems can benefit from using the Active Directory and also gives an overview of steps the that are necessary to configure the system for the use of the directory.

The SAP System is able to interact with the Active directory on the basis of 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 directory types other than the Active Directory also support 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 NT machine, the SAP System can be configured so that it can use the information available there. In the following, 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:

- The Microsoft Management Console (MMC)
- The LDAP Connector
- SAP Logon (planned for the future)

The MMC

The MMC is a graphical user interface for administering and monitoring SAP Systems from a central location. It presents and analyses 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 which 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.

The LDAP Connector

The LDAP Connector is an ABAP interface to the Active Directory that enables SAP applications to access and utilize information stored in the directory. For example, the LDAP Connector enables the SAP Office application to fill and update its address book data simply by reading information from the directory. The Connector can be used by SAP applications, but also by customers that wish to develop enhancements for applications that integrate Active Directory Services.

Before the LDAP Connector can be used, it has to be installed as described in the SAPNet- R/3 Frontend Note 188371.

The SAP Logon

In future, the configuration of the SAP Logon dialog box will be simplified with the help of the Active Directory. At present, after the SAP installation, the SAP logon for each frontend has to be manually configured by entering technical details on available systems. A planned SAP feature will be able to automatically configure the logon for systems that integrate Active Directory services.

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 part of a Windows 2000 installation and is automatically available on all Domain Controllers. A Generic LDAP directory is an additional component that has to be installed separately on a Unix or Windows NT Server.

Process Flow

Active Directory

To enable an SAP System to make use of the features offered by the Active directory, both the Active directory and the SAP System have to be configured.

- In a first step, the Active Directory has to 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 with the help of the R3SETUP tool which offers the option *Configure Active directory for SAP*.

For more information see Preparing the Active Directory for SAP [Page 46]

- In a second step, the SAP System has to be configured to enable interaction with the Active Directory. This is done during the installation of the SAP central instance with the help of the R3SETUP tool. The R3SETUP tool prompts for information related to the Active Directory and then configures the system correspondingly.
  For information on R3SETUP prompts that have to be answered for the Active Directory configuration see Input for a Central System Installation [Page 58].

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 has to be prepared so that it can store SAP data. This involves extending the directory schema and creating a container for the SAP data.
- The SAP System has to be configured to enable interaction with the LDAP directory. The configuration steps are performed by the R3SETUP tool during the installation of the SAP central instance. R3SETUP is able to configure the system correctly on the basis of information related to the directory that has to be entered before the installation procedure begins. For details on LDAP-related input for R3SETUP see Input for a Central System Installation [Page 58]
- A user with a password has to be set up on the machine where the SAP System is running to permit the system to access and modify the LDAP directory. This is done by running the script `ldappasswd`.

For detailed instructions on how to enable interaction between a generic LDAP directory and the SAP System, refer to the documentation available in the SAPNet under:
Solutions → *mySAP.com Technology* → *System Management* → *Directory Access Services.*

2.10.1 Preparing the Active Directory for SAP

Use

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 which 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.

Prerequisites

A Windows 2000 Domain Controller with an Active Directory must be installed on the network.

Procedure

Installing R3SETUP

Use the R3SETUP tool to prepare the Active Directory for the SAP System. In a first step, you 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. Make sure that the `TEMP` environment variable has been set.

   To check the variable, choose *Start* → *Settings* → *Control Panel* → *System*. On the *Environment* tab, look under *User Variables*. `TEMP` is normally set to `C:\temp`. Make sure that the specified directory really exists in your file system.
3. Insert the `Kernel` CD-ROM.
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, R3SETUP is automatically installed.
6. Enter *Yes* when a dialog box appears prompting you to log off or reboot.

   R3SETUP 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 NT *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 for the `sapldap` user.

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

3 The SAP System Installation

Purpose

Once you have planned and prepared the installation, you can begin with the actual installation steps. In this core part of the installation process, you set up the main components that enable the operation of an SAP System. These are:

- The central instance
- The database instance
- The SAP frontends
- If required, one or more dialog instances
- If required, a standalone gateway instance

Two fundamentally different approaches are possible:

- You can install a **central system**

  In this type of configuration you locate the SAP central system and database on a single host.

- You can install a **standalone database system**

  In this type of configuration you install SAP central instance on one host and the database server on a second host.

Which of these two approaches is best for your environment depends on various factors such as the type of applications you intend to deploy, the size of the anticipated workload and the number of expected concurrent users. The most commonly implemented configuration for an average-size system is a central system. A standalone database system is usually implemented for larger systems with a high throughput.

In a standalone database system, the database can be installed on a UNIX host. The installation procedure is the same as for a normal system on NT hosts, but the database has to be installed according to the instructions given in the documentation *R/3 Installation on UNIX.*

Prerequisites

In a sizing phase, well in advance of the actual installation procedure, you have decided whether a central system or standalone database system best meets your business requirements.

Process Flow

The installation of the SAP System comprises several steps. Essentially, various components have to be installed on the different hosts in the system according to a predefined sequence and using the installation tools provided. To get a clear picture of what has to be done, it is useful to get an overview of the different hosts involved and which components have to be installed on each host. The following table gives you an overview. It distinguishes between a central and standalone database system configuration and shows:

- The hosts that make up the system

- The components that have to installed on each host
- The sequence in which the components have to be installed
- The tool that must be used to install the various components

Central System Installation

Host	Components to Install	Tool
Central instance host	1. Database **server** software 2. R3SETUP tool 3. Central and database instance	1. Oracle Installer 2. File `R3SETUP.BAT` 3. R3SETUP
Dialog instance hosts (optional)	1. Database **client** software 2. R3SETUP tool 3. Dialog instance	1. Oracle Installer 2. File `R3SETUP.BAT` 3. R3SETUP
Frontend machines	SAP frontends	

For more information, see Central System Installation [Page 50].

Standalone Database System Installation

Host	Component to Install	Tool
Central instance host	1. Database **client** software 2. R3SETUP tool 3. Central instance	1. Oracle Installer 2. File `R3SETUP.BAT` 3. R3SETUP
Database server host	1. Database **server** software 2. R3SETUP tool 3. Database instance	1. Oracle Installer 2. File `R3SETUP.BAT` 3. R3SETUP
Dialog instance hosts (optional)	1. Database **client** software 2. R3SETUP tool 3. Dialog instance	1. Oracle Installer 2. File `R3SETUP.BAT` 3. R3SETUP
Frontend machines	SAP frontends	

For more information, see Standalone Database System Installation [Page 62].

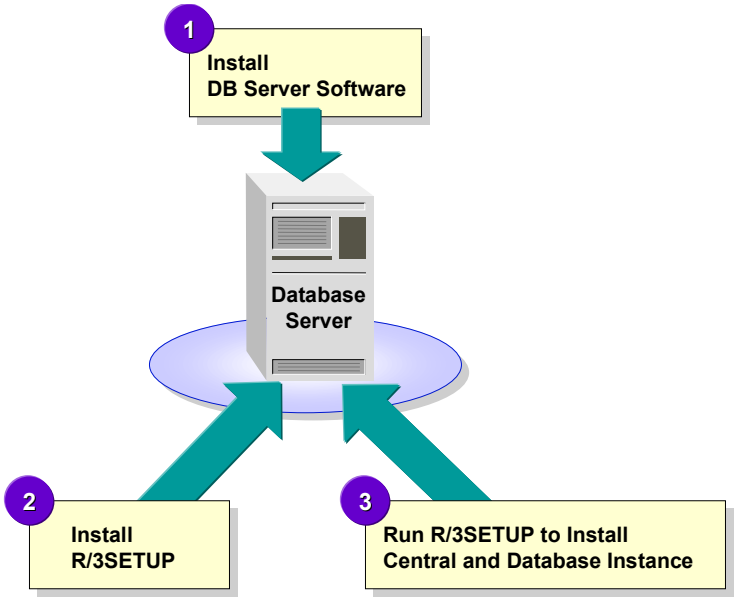
3.1 Central System Installation

Purpose

When a small to medium-sized SAP System is set up, the core parts of the system, namely the central instance and database, are generally installed on a single machine.

Process Flow

The following graphic illustrates the actions required to install the central and database instance on a single machine.



3.1.1 Installing the Oracle 8.1.6 Database Software

Use

The **server** software and patch 8.0.6.1.1 must be installed on the host where the database runs.

Prerequisites

600 MB free space must be available for the **server** software.

Procedure

1. Make sure you are logged on as a user with administrator rights.
2. Insert the `Oracle DBMS` CD into the CD-ROM drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\INSTALL\WIN32`
3. Choose the file `SETUP.EXE` to start the Oracle installation program.

   The *Oracle Universal Installer* guides you through the process in a series of screens and prompts you to make the following entries:

	Window	Entry
1.	*File Locations*	Under *Source*: The path to the Oracle source software is displayed. Do not change the path. Under *Destination*: For *Name* enter the name of the Oracle Home directory. SAP recommends the name `<SAPSID><ORACLE_VERSION>`, for example, C11816 You must specify a **`new`** Oracle home. For *Path* enter the path of the Oracle Home directory. SAP recommends: **`<DRIVE>:\ORACLE\<SAPSID>\<ORA_VERS>`**, for example, **`C:\ORACLE\C11\816`**
2.	*Available Products*	Select *Oracle8i Enterprise Edition* 8.1.6.0.0
3.	*Installation Types*	Select *Minimal.*
4.	*Upgrading or Migrating an Existing Database*	Appears only if there is an other configured oracle database instance on the host; Choose *Do not upgrade or migrate an existing DB*

	Window	Entry
5.	*Select Starter Database*	Choose *No*, if the window appears.
6.	*Summary*	View the information displayed on the screen and then choose *Install*.
7.	*Install*	No entries are required. The Oracle 8.1.6 software is installed and the *Net8 Configuration Assistant* is started in the background.
8.	*Net8 Configuration Assistant*	Select *Perform typical configuration*.
9.	*Oracle Universal Installer: End of Installation*	Choose Exit to close the *Installer*.

Installing Oracle Patch 8.1.6.1.1

1. Make sure the Oracle `RDBMS CD` is in the CD Drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\Patches\8.1.6.1.1`

2. To start the *Oracle Universal Installer*, double-click the file `setup.exe`.

   The installer opens and guides you through the patch installation process in a series of windows.

	Window	Entry
1.	*File Locations*	Under *Source*: The path to the Oracle source software is displayed. Do not change the path. Under *Destination*: *Name* From the dropdown box, select the name of Oracle Home for 8.1.6. *Path* Make sure that the path of the Oracle 8.1.6 Home directory is displayed and then choose *Next*.
2.	*Summary: Oracle 8i Patch Set 8.1.6.1.1*	View the information displayed on the screen about the patch set and then choose *Install*.
3.	*Install*	No entries are required. The patch is installed and the progress is indicated with a progress bar.

3.1.2 Installing R3SETUP

Use

The R3SETUP tool can only be used for the installation of an SAP component on a specific host if it is available locally on that host. You must therefore make sure that R3SETUP is installed locally on the host before you install a central, database, dialog, or gateway instance.

Prerequisites

- 50 MB free space must be available on the drive where the R3SETUP files are to be installed. By default, R3SETUP is copied to the directory:

  `<DRIVE>:\USERS\<SAPSID>ADM\INSTALL`

- To install R3SETUP, you need certain NT rights and privileges. These differ, depending on whether a **domain** or **local** installation is to be performed:

  – For a **domain** installation, you need `Domain Administration Rights` and you must therefore be a member of the `Domain Admins` group.

  If you cannot acquire domain administration rights, you can also install R3SETUP with local administrator rights, but you have to carry out a number of steps to prepare the user involved. This includes creating the group `SAP_<SAPSID>_GlobalAdmin`, with the two domain user accounts `SapService<SAPSID>` (this user is **not** created for Informix installations) and `<sapsid>adm`.

  – For a **local** installation, log on as a user with `Local Administration Rights`.

  For details, see Granting User Rights for the Installation [Page 40]

Procedure

1. Log on to the NT system as a user that has the rights and privileges required for the installation of R3SETUP.

   Later when you install an SAP component, you must log on as the **same** user, otherwise the installation will abort. Only this user will have the authorizations that permit the execution of the steps necessary for the installation.

2. Make sure that the `TEMP` environment variable has been set.

3. To check the variable, choose *Start* → *Settings* → *Control Panel* → *System*. On the *Environment* tab, look under *User Variables*. `TEMP` is normally set to `C:\temp`. Make sure that the specified directory really exists in your file system.

4. Insert the `Kernel` CD-ROM.

5. Start the program `R3SETUP.BAT` from the directory

   `<CD_DRIVE>:\NT\COMMON`

   The R3SETUP window opens.

6. 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`
   Remember the path as you might need to access it later during the installation procedure, for example, to look at log files.

7. Choose *Next* when you have made an entry. When you have made all the required entries, R3SETUP is automatically installed.

   After the installation, a dialog box appears prompting you either to log off or reboot.

8. Enter *Yes*.

   R3SETUP now automatically logs off or reboots.

Result

When you have installed R3SETUP on a host:

- All the files required to run R3SETUP have been copied to the installation directory. These include R3SETUP, the graphical user interface INSTGUI, the command files and the online documentation.
- Options to start R3SETUP have been added to the NT *Programs* menu. For example, the option *Install Central Instance* is available to enable you to start the installation of a central instance.
- Special rights have been granted to the NT user that installed R3SETUP. These rights are necessary later when the same user executes R3SETUP to install an SAP component.

3.1.3 Installing the SAP System and Loading the Database

Use

The following describes how to install the SAP central and database instance on single host using the R3SETUP tool. The installation procedure has two main phases: the **input** phase and **processing** phase.

In the first phase, the **input phase**, R3SETUP collects information about the configuration and hardware setup of the target system. To find out how the new system is to be configured, R3SETUP prompts you to enter values for a series of parameters (keys).

In the second phase, the **processing phase**, R3SETUP automatically performs the installation. It sets up the target system on the basis of the information you have entered. It

- Creates the central instance
- Creates the database
- Imports the SAP data into the database tables

Prerequisites

Actions Prior to the Installation

When R3SETUP creates and loads the database, the size of the tablespaces and their assignment to the SAP data directories is predefined. These are preset in the file `DBSIZE.TPL`. and can, in special situations, be viewed and changed before running R3SETUP. If you change the `DBSIZE.TPL` settings, the R3SETUP command file that controls the installation process reads the file and creates the layout of the database accordingly.
For more information see Changing Tablespace Sizes or Locations [Page 108]

Before you run R3SETUP, the following actions must be complete:

- You have checked whether your host meets the minimal requirements [Page 16] specified in the check list.
- You have decided how to distribute the SAP components [Page 25] to arrays.
- You have completed all preparations [Page 37] for the host.
- You have installed the following components on the host:
  - The DBMS software [Page 50]
  - The R3SETUP tool [Page 53]
  - *Microsoft Internet Explorer* to enable the display of R3SETUP online help

Input

To be well-prepared for the **input phase** of the installation, we recommend that you get an overview of the information you have to enter before starting R3SETUP. Having the required information ready in advance helps you to avoid unnecessary delays or errors.

For a list of prompts and an explanation of their meaning, see the next section Input for Central System Installation. [Page 58]

Procedure

1. Log on to the NT system as the **same** user that installed the R3SETUP tool.

   If you do not log on as the user that installed R3SETUP, the installation aborts because you do not have the rights that are necessary to execute the installation steps. The error *Required Privileges not held by the client* is displayed.
   See also: Granting User Rights for the Installation [Page 40]

2. Start R3SETUP from the NT *Start* menu with:

   Programs → SAP System Setup for <SAPSID> → Install Central and Database Instance

   The INSTGUI window of the R3SETUP tool opens. A second *Command Prompt* window appears in the background, but this is of less importance. In the course of the installation, all information and prompts are displayed in the main INSTGUI window.

   R3SETUP now prompts you to enter values for a series of parameters (keys).

3. Enter all the information R3SETUP requests. The screen waits for an entry. If a plausible entry has been made, the next screen automatically appears, prompting you for a new value. If the system rejects your entry, the same window and prompt reappear.

   After three unacceptable entries in a row, R3SETUP automatically stops. In this case you are advised to critically analyze the entries you have made before restarting R3SETUP to continue the installation. If you are uncertain about entering a particular value, choose *Help* to access more information about the step and parameter involved.

   Be careful to distinguish between:
   A prompt for a new parameter value
   A repeated prompt for a parameter value that has already been entered, but has been rejected by the system
   Sometimes, although the parameter name on the screen has changed, the text for the prompt is identical to the previous one. This can lead to unintentional entries.
   If an entry is rejected by the system, switch to the log view to find out the reason.

4. When all values have been entered, R3SETUP automatically begins with installation processing. During the **processing phase**, the screen shows which step is being executed and gives a brief explanation of its purpose.

   Apart form inserting CDs, this phase can run unattended:

   Insert the export CD into the CD-ROM drive when you are prompted. No prompt appears if you specified a remote location for the CD during the input phase.

   When the export CD has been inserted, R3SETUP can run unattended.

5. Towards the end of the installation, R3SETUP asks you whether you plan to import languages other than Latin-1 (not West European).

– Enter *Exit* if you need non-Latin1 languages

  The installation is interrupted to allow you to manually edit the SAP Multi National Language Support (MNLS) tables. To edit the tables, follow the instructions given in the **SAP Notes 15023** and **45619**. When you have finished, restart R3SETUP from the NT *Start* menu with *Programs → SAP System Setup for <SAPSID> → Install Central and Database Instance.*

  R3SETUP automatically starts up the SAP System before continuing with the installation.

– Enter *CONT* if you do not need any non-Latin1 languages

  R3SETUP automatically starts up the SAP System and then continues with the installation.

Alternatively, you can update MNLS tables in a second window. When you have finished, choose *CONT* in the R3SETUP window to proceed with the installation.

Shortly after this step, the installation finishes. The message *R3SETUP finished* is displayed and the progress bar indicates 100%.

6. Check the log file for warnings and errors.

If you specified that you want to integrate Active Directory services during the input phase, check the log file for the following error message:

```
Please add account
<SAP_INSTALLATION_DOMAIN>\SAP_<SAPSID>_GlobalAdmin
 to group
//<DOMAIN_sapldapuser>\SAP_LDAP
```

The message indicates that this step, which is normally performed automatically, must be performed manually at the end of the installation. If the message appears, the domain of the system you are currently installing is different to the domain of the `sapldap` user. As a result, the `domain administrator` who is performing the installation does not have the rights necessary to modify the accounts in the domain of the `sapldap` user.

RESULT

You have now completed the installation of the database instance and the SAP central instance. You can continue as follows:

- Perform the post-installation activities
- If required, install one or more dialog instances
- If required, install a gateway instance

3.1.4 Input for a Central System Installation

The input for the central system is the information you have to enter when you run the R3SETUP tool with the option *Install Central and Database Instance*.

Use

The input you enter gives R3SETUP general information about the target system you want to install and the location of the CDs required for the installation.

The table below lists and explains the prompts that appear. When R3SETUP is running, you can also view help for each prompt by displaying a tooltip that appears when you position the cursor near the prompt.

Structure

Prompt	Entry
SAP System Name	The name of the SAP System `<SAPSID>`, for example, C11. Enter a three-character string in uppercase letters.
Instance number	Number of the central instance. You can assign a value from 0 to 97.
Directory for SAP System	Specify the base directory for the SAP directory tree. For example, if you enter **`D:`**, the directory `usr\sap` is created under drive D.
Domain selection	Choose whether you want to perform a local or domain installation.
Name of the central transport host	Name of the host where the central transport directory is to be located. If you have defined a central transport host with the alias `SAPTRANSHOST`, the system proposes this host. Otherwise, it suggests the current host as the transport host. See Preparing SAP System Transport Host [Page 43]
Character set selection	Character set that is used to store data in the database. For a new installation, accept WE8DEC. For an old system, for example, one that is being installed on the basis of a system copy, select the character set previously used for the system. See Note 123951.
Default drive for Oracle directories	Default drive where the Oracle subdirectories are to be created.
Location of SAP database-specific files	Specify the drives where the listed directories are to be created. For recommendations on the distribution of files to disks see Distribution of Components to Disks [Page 25]
Location of Oracle data files	Specify the drives where the directories for SAP data are to be created. See also Distribution of Components to Disks [Page 25].
Location of database log files	Specify the drives where the database log files are to be created. See also Distribution of Components to Disks [Page 25].
Location of mirrored database log files	Specify the drives where the mirrored versions of database log files are to be created. See also Distribution of Components to Disks [Page 25].

Prompt	Entry
RAM for the SAP System	RAM that is reserved for the SAP System. The default value is the entire RAM. Only change this value if another SAP System or application is running on the host. In this case, adjust this value to ensure that enough RAM is available for the other system or application. On a host with a database and central instance, 40% of the value specified is automatically assigned to the database and 60% to the central instance.
Location of CDs	*Location*: Drive where the CDs required for the installation can be accessed. This can be a single CD_ROM drive, several CD-ROM drives or several network drives.
Enter the password for the SAP System administrator	Enter and verify the password for the user `<sapsid>adm`. This NT user is created by R3SETUP during the installation. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Enter the password for the SAP System service user	Enter and verify the password for the user `SAPService<SAPSID>`. This NT user is created by R3SETUP during the installation. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Port number	The port number of the message server. The default is the standard value 3600 plus the number of the instance. The default value is correct if no other programs or SAP Systems are running on the host.

Prompt	Entry
LDAP support	Choose the type of LDAP integration you want to configure for the SAP System.

	Active Directory Service
	
	Select this option to integrate Windows 2000 Active Directory services. An Active Directory must be available on the network.
	
	If you select *Active Directory Service*, subsequent prompts ask for:
	
	Management Domain
	Specify 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 (management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be:
	`CN=Finance,CN=Walldorf`
	
	LDAP Servers (Prompt only appears under Windows NT)
	Enter the DNS host name of the server on which the Active Directory is located. The Active Directory is located on all domain controllers (DCs) on the network. If there are several DCs, specify the host name of each one. For example:
	`ldapsrv1 ldapsrv2`
	
	Domain Containing SAP_LDAP Group
	Enter or confirm the name of the Win2000 domain in which the *SAP_LDAP Group* is defined. The group was defined earlier, when the *Active Directory* was configured for the SAP System. See Preparing the Active Directory for SAP [Page 46]

Prompt	Entry

	Generic LDAP Directory
	Select this option to configure the system to support LDAP directories that are running on NT or Unix machines. A generic LDAP directory must be available on the network.
	If you select *Generic LDAP*, subsequent prompts ask for:
	Container for all SAP-related entries
	Specify 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.
	Administration Domain
	Specify a container in the LDAP Directory where information related to the new SAP System is to be stored using the distinguished name syntax. The name of the container (administration domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be:
	`CN=Finance,CN=Walldorf`
	LDAP Server
	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`

	No LDAP Support Choose this if you do not want to configure the SAP System to integrate LDAP services.
Number of parallel processes.	Number of processes that can be used simultaneously to load the database. Only use one process for the Oracle database.
Check the installation parameters	Check whether the values displayed for the parameters are correct. If you discover any errors, use the R3SEDIT utility [Page 112] to make required changes.
Start Installation?	Select *Continue* to start installation processing immediately. Select *Exit*, if you want to leave R3SETUP and continue with installation processing at a later time.

3.2 Standalone Database System Installation

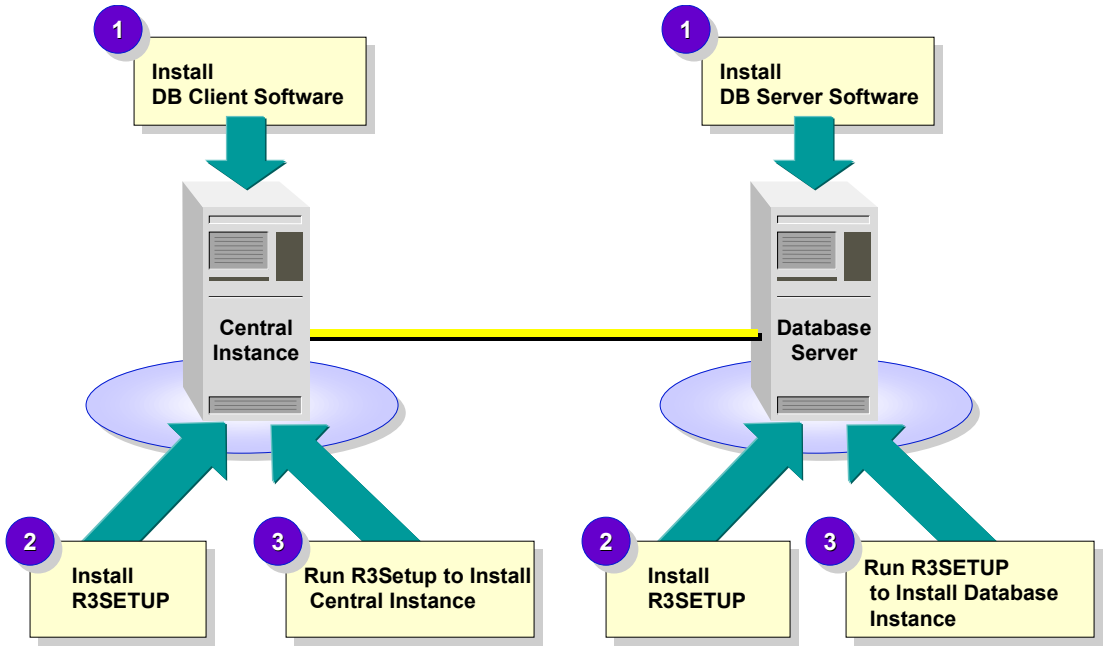
Purpose

When a large SAP System with a heavy workload and many concurrent users is set up, the central instance and database frequently need to be installed on two different hosts. This type of configuration is referred to as a standalone database system.

In a standalone database system, it is possible to install the database on a UNIX host. To perform this type of heterogeneous installation, you have to install the database according to the instructions given in the UNIX documentation *R/3 Installation on UNIX: Oracle Database.* The other system components must be installed in the normal way as described in this documentation.

Process Flow

The following graphic illustrates the actions required to install the central and database instance on two different hosts.



To complete the installation on the database server, we recommended that you install an additional component that makes it possible to run the SAPDBA tool and enables the system to display database monitoring data. The additional component can be any of the following:
A dialog instance
A standalone gateway instance
A remote daemon shell purchased from a third-party vendor
The additional component is not required on a UNIX database host.

3.2.1 Installing the Oracle 8.1.6 Database Software

Use

Install the database **server** software and patch 8.6.1.1 on the host where the database is to run.

Install the database **client** software and patch 8.6.1.1 on the host where the central instance is to run.

Installing the Server Software

Prerequisites

600 MB free space must be available for the **server** software

Procedure

Install the database **server** software on the host where the database is to run.

1. Make sure there is 600 MB fre space for the software.
2. Make sure you are logged on as a user with administrator rights.
3. Insert the `Oracle DBMS` CD into the CD-ROM drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\INSTALL\WIN32`
4. Choose the file `SETUP.EXE` to start the Oracle installation program.

   The *Oracle Universal Installer* guides you through the process in a series of screens and prompts you to make the following entries:

	Window	Entry
1.	*File Locations*	Under *Source*: The path to the Oracle source software is displayed. Do not change the path. Under *Destination*: For *Name* enter the name of the Oracle Home directory. SAP recommends the name `<SAPSID><ORACLE_VERSION>`, for example, C11816 You must specify a **`new`** Oracle home. For *Path* enter the path of the Oracle Home directory. SAP recommends: **`<DRIVE>:\ORACLE\<SAPSID>\<ORA_VERS>`**, for example, **`C:\ORACLE\C11\816`**

	Window	Entry
2.	*Available Products*	Select *Oracle8i Enterprise Edition* 8.1.6.0.0
3.	*Installation Types*	Select *Minimal.*
4.	*Upgrading or Migrating an Existing Database*	Appears only if there is an other configured oracle database instance on the host; Choose *Do not upgrade or migrate an existing DB*
5.	*Select Starter Database*	Choose *No*, if the window appears.
6.	*Summary*	View the information displayed on the screen and then choose *Install*.
7.	*Install*	No entries are required. The Oracle 8.1.6 software is installed and the *Net8 Configuration Assistant* is started in the background.
8.	*Net8 Configuration Assistant*	Select *Perform typical configuration*.
9.	*Oracle Universal Installer: End of Installation*	Choose Exit to close the *Installer*.

Installing the Client Software

The Oracle **client** software must be installed on all hosts without the database. It enables the communication between a host and the database.

1. Make sure you have 250 MB free space for the **client** software
2. Make sure you are logged on as a user with administrator rights.
3. Insert the `Oracle DBMS` CD into the CD-ROM drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\WIN32\INSTALL`

4. Choose the file `ORAINST.EXE` to start the Oracle installation program.

   The *Oracle Installer* appears and prompts you to make entries in a series of dialog boxes.

	Screen	Entry
1.	*File Locations*	Under *Source*: Leave the path displayed for the location of the Oracle source software unchanged. Under *Destination*: For *Name*, enter the name of the Oracle Home directory. SAP recommends the name **<SAPSID><ORACLE_VERSION>,** for example, **C11816** You must specify a **new** Oracle home For *Path*, enter the location of the Oracle Home directory. SAP recommends the path **<DRIVE>:\<ORACLE>\<SAPSID>\<ORA_VERS>** For example: **C:\ORACLE\C11\816**
2.	*Available Products*	Select *Oracle8i Client*
3.	*Installation Types*	Select *Custom.*
4.	*Available Product Components*	Select: *Net8 Products 8.1.6.0.0* *Net8 Client 8.1.6.0.0* Deselect any other components that are marked.
5.	*Oracle Protocol Support*	Choose *Next*.
6.	*Summary*	Choose *Install*.

Installing Oracle Patch 8.1.6.1.1

1. Make sure the Oracle `RDBMS CD` is in the CD Drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\Patches\8.1.6.1.1`

2. To start the *Oracle Universal Installer*, double-click the file `setup.exe`.

The installer opens and guides you through the patch installation process in a series of windows.

	Window	Entry
1.	*Welcome*	Choose *Next*
2.	*File Locations*	Under *Source*: The path to the Oracle source software is displayed. Do not change the path. Under *Destination*: *Name* From the dropdown box, select the name of Oracle Home for 8.1.6. *Path* Make sure that the path of the Oracle 8.1.6 Home directory is displayed and then choose *Next*.
3.	*Summary: Oracle 8i Patch Set 8.1.6.1.1*	View the information displayed on the screen about the patch set and then choose *Install*.
4.	*Install*	No entries are required. The patch is installed and the progress is indicated with a progress bar.

3.2.2 Installing R3SETUP

Use

The R3SETUP tool can only be used for the installation of an SAP component on a specific host if it is available locally on that host. You must therefore make sure that R3SETUP is installed locally on the host before you install a central, database, dialog, or gateway instance.

Prerequisites

- 50 MB free space must be available on the drive where the R3SETUP files are to be installed. By default, R3SETUP is copied to the directory:

  `<DRIVE>:\USERS\<SAPSID>ADM\INSTALL`

- To install R3SETUP, you need certain NT rights and privileges. These differ, depending on whether a **domain** or **local** installation is to be performed:

  – For a **domain** installation, you need `Domain Administration Rights` and you must therefore be a member of the `Domain Admins` group.

    If you cannot acquire domain administration rights, you can also install R3SETUP with local administrator rights, but you have to carry out a number of steps to prepare the user involved. This includes creating the group `SAP_<SAPSID>_GlobalAdmin`, with the two domain user accounts `SapService<SAPSID>` (this user is **not** created for Informix installations) and `<sapsid>adm`.

  – For a **local** installation, log on as a user with `Local Administration Rights`.

  For details, see Granting User Rights for the Installation [Page 40]

Procedure

1. Log on to the NT system as a user that has the rights and privileges required for the installation of R3SETUP.

   Later when you install an SAP component, you must log on as the **same** user, otherwise the installation will abort. Only this user will have the authorizations that permit the execution of the steps necessary for the installation.

2. Make sure that the `TEMP` environment variable has been set.

3. To check the variable, choose *Start* → *Settings* → *Control Panel* → *System*. On the *Environment* tab, look under *User Variables*. `TEMP` is normally set to `C:\temp`. Make sure that the specified directory really exists in your file system.

4. Insert the `Kernel` CD-ROM.

5. Start the program `R3SETUP.BAT` from the directory

   `<CD_DRIVE>:\NT\COMMON`

   The R3SETUP window opens.

6. 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
Remember the path as you might need to access it later during the installation procedure, for example, to look at log files.

7. Choose *Next* when you have made an entry. When you have made all the required entries, R3SETUP is automatically installed.

   After the installation, a dialog box appears prompting you either to log off or reboot.

8. Enter *Yes*.

   R3SETUP now automatically logs off or reboots.

Result

When you have installed R3SETUP on a host:

- All the files required to run R3SETUP have been copied to the installation directory. These include R3SETUP, the graphical user interface INSTGUI, the command files and the online documentation.
- Options to start R3SETUP have been added to the NT *Programs* menu. For example, the option *Install Central Instance* is available to enable you to start the installation of a central instance.
- Special rights have been granted to the NT user that installed R3SETUP. These rights are necessary later when the same user executes R3SETUP to install an SAP component.

See also:

The R3SETUP Tool [Page 104]

3.2.3 Installing the SAP System and Loading the Database

Use

The following describes how to install the central instance and database on two different hosts using the R3SETUP tool. On each host, the installation procedure has two main phases: the **input** phase and **processing** phase.

In the first phase, the **input phase**, R3SETUP collects information about the configuration and hardware setup of the target system. To find out how the new system is to be configured, R3SETUP prompts you to enter values for a series of parameters (keys).

In the second phase, the **processing phase**, R3SETUP automatically performs the installation. It sets up the target system on the basis of the information you have entered.

- On the central instance host, R3SETUP:
  - Creates the central instance
- On the database server instance, R3SETUP:
  - Creates the database
  - Imports SAP data into the database tables

Prerequisites

Actions Prior to Running R3SETUP

When R3SETUP creates and loads the database, the size of the tablespaces and their assignment to the SAP data directories is predefined. They are preset in the file `DBSIZE.TPL`. and can, in special situations, be viewed and changed before running R3SETUP. If the settings in the `DBSIZE.TPL` file are changed, the R3SETUP command file that controls the installation process reads the file and creates the layout of the database accordingly.
For more information see Changing Tablespace Sizes or Locations [Page 108]

Before you run R3SETUP, the following actions must be complete:

- You have checked whether both hosts meets the minimal requirements [Page 19] specified in the check list.
- You have decided how to distribute the SAP components [Page 25] to arrays.
- You have completed all preparations [Page 37] on both hosts.
- You have installed the following on both hosts:
  - The DBMS software [Page 63]
  - The R3SETUP tool [Page 67]
  - *Microsoft Internet Explorer* to enable the display of R3SETUP online help

Input Parameters

To be well-prepared for the input phase of the installation, we recommend that you get an overview of the information you have to enter before starting R3SETUP. Having the required data ready in advance helps you to avoid unnecessary delays or errors.

For a list of input prompts and an explanation of their meaning, see the next two sections Input for Central Instance Installation [Page 73] and Input for Database Instance Installation [Page 76].

Procedure

Installing the Central Instance

Perform the following steps on the **central instance host**:

1. Log on to the NT system as the **same** user that installed the R3SETUP tool.

   If you do not log on as the user that installed R3SETUP, the installation aborts because you do not have the rights that are necessary to execute the installation steps. The error *Required Privileges not held by the client* is displayed.
   For more information, see Granting User Rights for the Installation [Page 40]

2. Start R3SETUP from the NT *Start* menu with:

   Programs → SAP System Setup for <SAPSID> → Install Central Instance

   The INSTGUI window of the R3SETUP tool opens. A second *Command Prompt* window appears in the background, but this is of less importance. In the course of the installation, all information and prompts are displayed in the main INSTGUI window.

   R3SETUP now prompts you to enter values for a series of parameters (keys).

3. Enter all the information R3SETUP requests. The screen waits for an entry. If a plausible entry has been made, the next screen automatically appears, prompting you for a new value. If the system rejects your entry, the same window and prompt reappear.

   After three unacceptable entries in a row, R3SETUP automatically stops. In this case you are advised to critically analyze the entries you have made before restarting R3SETUP to continue the installation. If you are uncertain about

entering a particular value, choose *Help* to access more information about the step and parameter involved.

Be careful to distinguish between:
A prompt for a new parameter value
A repeated prompt for a parameter value that has already been entered, but has been rejected by the system
Sometimes, although the parameter name on the screen has changed, the text for the prompt is identical to the previous one. This can lead to unintentional entries.
If an entry is rejected by the system, switch to the log view to find out the reason.

4. When all values have been entered, R3SETUP automatically begins with installation processing. During the **processing phase**, the screen shows which step is being executed and gives a brief explanation of its purpose.

   The message *R3SETUP finished* is displayed and the progress bar indicates 100%.

5. Check the log file for warnings and errors.

If you specified that you want to integrate Active Directory services during the input phase, check the log file for the following error message:

```
Please add account
<SAP_INSTALLATION_DOMAIN>\SAP_<SAPSID>_GlobalAdmin
 to group
//<DOMAIN_sapldapuser>\SAP_LDAP
```

The message indicates that this step, which is normally performed automatically, must be performed manually at the end of the installation. If the message appears, the domain of the system you are currently installing is different to the domain of the `sapldap` user. As a result, the `domain administrator`, who is performing the installation, does not have the rights necessary to modify the accounts in the domain of the `sapldap` user.

Installing the Database

Perform the following steps on the **database host**.

1. Log on to the NT system as the **same** user that installed the R3SETUP tool.
2. Start R3SETUP from the NT *Start* menu with:

   Programs → *SAP System Setup for <SAPSID>* → *Install Database Instance*

3. Enter all the information R3SETUP requests.

   When all values have been entered, R3SETUP automatically begins with installation processing.

4. Insert the export CD when you are prompted. No prompt appears if you specified a remote location for the CD during the input phase.

When the export CD has been inserted, R3SETUP can run unattended.

5. Towards the end of the installation, R3SETUP asks you whether you plan to import languages other than Latin-1 (not West European). You can select either *EXIT* or *CONT*:

   At this point of the installation, you have to start up the SAP System for the first time.
   - If you select *EXIT*, start the system **after** installing the languages, but before you restart R3SETUP.
   - If you want to select *CONT*, start the SAP System **before** you select *CONT*.

   To start the system, log on to the computer where the central instance is installed, open the MMC and start the SAP System. See also Starting and Stopping the SAP System [Page 93].

   – Select *EXIT* if you need non-Latin1 languages

     The installation is interrupted to allow you to manually edit the SAP Multi National Language Support (MNLS) tables. To edit the tables, follow the instructions given in the **SAP Notes 15023** and **45619**. When you have finished, restart R3SETUP from the NT *Start* menu with *Programs* → *SAP System Setup* → *Install Database Instance*

   – Select *CONT* if you do not need non-Latin1 languages

     The installation continues.

     Alternatively, you can update MNLS tables in a second window. When you have finished, choose *CONT* in the R3SETUP window to proceed with the installation.

   Shortly after this step, the installation finishes. The message *R3SETUP finished* is displayed and the progress bar indicates 100%. The central instance and database are now set up on two different hosts.

6. In a final step, to complete the installation, install one of the following components on the database host:

   – A dialog instance [Page 78]

   – A standalone gateway instance [Page 87]

   – A remote daemon purchased from a third-party vendor.

   When this additional component has been installed, you can run the functions offered by the SAPDBA tool and display database monitoring data in the system.

See also:

The R3SETUP Tool [Page 104]

Result

You have now completed the installation of the database instance and the SAP central instance. You can continue as follows:

- Perform the post - installation activities.
- If required, install one or more dialog instances
- If required, install a gateway instance

3.2.4 Input for Central Instance Installation

Definition

The input for the central instance is the information you have to enter when you run the R3SETUP tool with the option *Install Central Instance*.

Use

The information that you enter informs R3SETUP how the new system has to be configured and where the CDs required for the installation are located.
The following table gives an overview of the prompts for the central instance. When R3SETUP is running, you can view help for each prompt by displaying a tooltip that appears when you position the cursor near the prompt.

Prompt	Entry
SAP System Name	The name of the SAP System `<SAPSID>`, for example, C11. Enter a three-character string in uppercase letters.
Instance number	Number of the central instance. You can assign a value from 0 to 97.
Domain selection	Choose whether you want to perform a local or domain installation.
Name of the central transport host	Name of the host where the central transport directory is to be located. If you have defined a central transport host with the alias `SAPTRANSHOST`, the system proposes this host. Otherwise, it suggests the current host as the transport host. See Preparing SAP System Transport Host [Page 43]
Name of database instance host	Name of the host on which the database is to be installed. To find out the name, enter **`hostname`** at the command prompt of the host in question.
Directory for SAP System	Specify the base directory for the SAP directory tree. For example, if you enter **`D:`**, the directory `usr\sap` is created under drive D.
RAM for the SAP System	RAM that is reserved for the SAP System. The default value is the entire RAM. Only change this value if another SAP System or application is running on the host. In this case, adjust this value to ensure that enough RAM is available for the other system or application. On a host with a database and central instance, 40% of the value specified is automatically assigned to the database and 60% to the central instance.
Location of KERNEL CD	Drive or path where the kernel CD is located. This can be a CD-ROM drive or network drive.
Enter the password for the SAP System administrator	Enter and verify the password for the NT user `<sapsid>adm`. This NT user is created by R3SETUP during the installation and is afterwards used to administer the SAP System. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.

Prompt	Entry
Enter the password for the SAP System service user	Enter and verify the password for the user `SAPService<SAPSID>`. This NT user is created by R3SETUP during the installation and is not an interactive user, but a virtual user that is necessary to start the SAP System (this user is **not** created for Informix installations). If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Port number	The port number of the message server. The default is the standard value 3600 plus the number of the instance. The default value is correct if no other programs or SAP Systems are running on the host.
LDAP support	Choose the type of LDAP integration you want to configure for the SAP System.
	Active Directory Service Select this option to integrate Windows 2000 Active Directory services. An Active Directory must be available on the network. If you select *Active Directory Service*, subsequent prompts ask for: *Management Domain* Specify 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 (management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be: CN=Finance,CN=Walldorf *LDAP Servers* (Prompt only appears under Windows NT) Enter the DNS host name of the server on which the Active Directory is located. The Active Directory is located on all domain controllers (DCs) on the network. If there are several DCs, specify the host name of each one. For example: ldapsrv1 ldapsrv2 *Domain Containing SAP_LDAP Group* Enter or confirm the name of the Win2000 domain in which the *SAP_LDAP Group* is defined. The group was defined earlier, when the *Active Directory* was configured for the SAP System. See Preparing the Active Directory for SAP [Page 46]

Prompt	Entry
	Generic LDAP Directory Select this option to configure the system to support LDAP directories that are running on NT or Unix machines. A generic LDAP directory must be available on the network. If you select *Generic LDAP*, subsequent prompts ask for: *Container for all SAP-related entries* Specify 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. *Management Domain* Specify a container in the LDAP Directory where information related to the new SAP System is to be stored using the distinguished name syntax. The name of the container (management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be: CN=Finance,CN=Walldorf *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`
	No LDAP Support Choose this if you do not want to configure the SAP System to integrate LDAP services.
Check the installation parameters	If any of the entries displayed are wrong, you can correct them by repeating the input with the R3SEDIT utility [Page 114].
Start Installation?	You can choose *Continue* to start the actual installation procedure or *Exit* to leave R3SETUP and start the installation at a later time.

3.2.5 Input for the Database Instance Installation

Definition

The input for the database instance is the information you have to enter when you run the R3SETUP tool with the option *Install Database Instance*.

Use

The input you enter gives R3SETUP general information about the target system you want to install and the location of the CDs required for the installation.

The table below lists and explains the prompts for the central and database instance. When R3SETUP is running, you can view help for each prompt by displaying a tooltip that appears when you position the cursor near the prompt.

Prompt	Entry
SAP System Name	The name of the SAP System `<SAPSID>`, for example, C11. Enter a three-character string in uppercase letters.
Central instance number	Number of the central instance. You can assign a value from 0 to 97.
Domain selection	Choose whether you want to perform a local or domain installation.
Name of the central transport host	Name of the host where the central transport directory is to be located. If you have defined a central transport host [Page 43] with the alias `SAPTRANSHOST`, the system proposes this host. Otherwise, it suggests the current host as the transport host.
Character set selection	Character set that is used to store data in the database. For a new installation, accept WE8DEC. For an old system, for example, one that is being installed on the basis of a system copy, select the character set previously used for the system. To find out the character set, see Note 123951.
Default drive for Oracle directories	Drive where the Oracle subdirectories are to be created.
Location of SAP database-specific files	Drives where the database-related SAP directories and files are to be created.
Location of Oracle data files	Drives where the directories for the Oracle database data is to be created.
Location of database log files	Drives where the database log files are to be located.
Location of mirrored database log files	Drives where the mirrored versions of the Oracle redo log files are to be created.

Prompt	Entry
Location of CDs	*Location*: Drive where the CDs required for the installation can be accessed. This can be a single CD-ROM drive, several CD-ROM drives or several network drives.
Enter the password for the SAP System administrator	Enter and verify the password for the user `<sapsid>adm`. This NT user is created by R3SETUP during the installation and is later used to administer the SAP System. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Enter the password for the SAP System service user	Enter and verify the password for the user `SAPService<SAPSID>`. This NT user is created by R3SETUP during the installation and is not an interactive user, but a virtual user that is necessary to start the SAP System. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Number of parallel processes.	Number of processes that can be used simultaneously for the database load. Use only one process for the Oracle database.
Check installation parameters	If any of the parameter values displayed are wrong, use the R3SEDIT utility [Page 113] to repeat the input.
Start Installation?	Select *Continue* to start installation processing immediately. Select *Exit*, if you want to leave R3SETUP and continue with the installation at a later time.

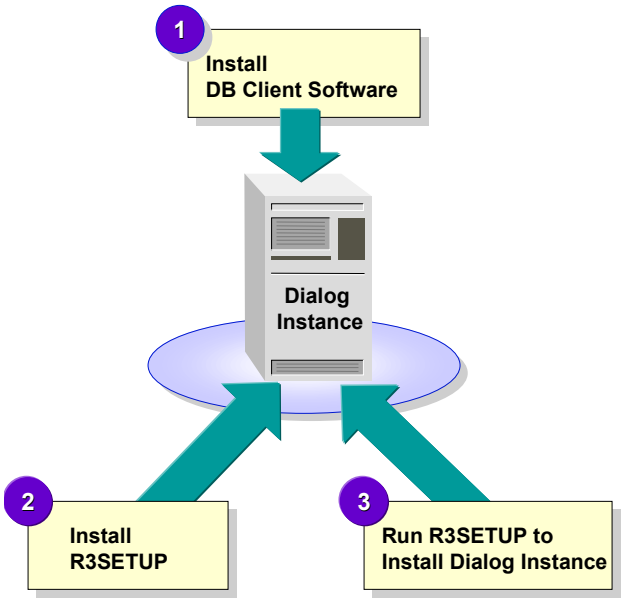
3.3 Dialog Instance Installation

Purpose

Optionally, you can install one or more dialog instances on hosts in your SAP System.

Process Flow

The following graphic illustrates the actions required to install a dialog instance on a host in the system.



3.3.1 Installing the Oracle 8.1.6 Client Software

Use

The Oracle **client** software and patch 8.1.6.1.1 must be installed on all hosts without the database. It enables the communication between a host and the database.

Prerequisites

250 MB must be available for the **client** software

Procedure

Installing Oracle 8.1.6

1. Make sure you are logged on as a user with administrator rights.
2. Insert the `Oracle DBMS` CD into the CD-ROM drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\WIN32\INSTALL`
3. Choose the file `ORAINST.EXE` to start the Oracle installation program.

The *Oracle Installer* appears and prompts you to make entries in a series of dialog boxes.

	Screen	Entry
1.	*File Locations*	Under *Source*: Leave the path displayed for the location of the Oracle source software unchanged. Under *Destination*: For *Name*, enter the name of the Oracle Home directory. SAP recommends the name **<SAPSID><ORACLE_VERSION>,** for example, **C11816** For *Path*, enter the location of the Oracle Home directory. SAP recommends the path **<DRIVE>:\<ORACLE>\<SAPSID>\<ORA_VERS>** For example: **C:\ORACLE\C11\816**
2.	*Available Products*	Select *Oracle8i Client*
3.	*Installation Types*	Select *Custom.*
4.	*Available Product Components*	Select: *Net8 Products 8.1.6.0.0* *Net8 Client 8.1.6.0.0* Deselect any other components that are marked.
5.	*Oracle Protocol Support*	Choose *Next*.
6.	*Summary*	Choose *Install*.

Installing Oracle Patch 8.1.6.1.1

1. Make sure the Oracle `RDBMS CD` is in the CD Drive and switch to the directory:

   `<CD_DRIVE>:\NT\I386\Patches\8.1.6.1.1`

2. To start the *Oracle Universal Installer*, double-click the file `setup.exe`.

The installer opens and guides you through the patch installation process in a series of windows.

	Window	Entry
1.	*Welcome*	Choose *Next*
2.	*File Locations*	Under *Source*: The path to the Oracle source software is displayed. Do not change the path. Under *Destination*: *Name* From the dropdown box, select the name of Oracle Home for 8.1.6. *Path* Make sure that the path of the Oracle 8.1.6 Home directory is displayed and then choose *Next*.
3.	*Summary: Oracle 8i Patch Set 8.1.6.1.1*	View the information displayed on the screen about the patch set and then choose *Install*.
4.	*Install*	No entries are required. The patch is installed and the progress is indicated with a progress bar.

3.3.2 Installing R3SETUP

Use

The R3SETUP tool can only be used for the installation of an SAP component on a specific host if it is available locally on that host. You must therefore make sure that R3SETUP is installed locally on the host before you install a central, database, dialog, or gateway instance.

Prerequisites

- 50 MB free space must be available on the drive where the R3SETUP files are to be installed. By default, R3SETUP is copied to the directory:

  `<DRIVE>:\USERS\<SAPSID>ADM\INSTALL`

- To install R3SETUP, you need certain NT rights and privileges. These differ, depending on whether a **domain** or **local** installation is to be performed:

  – For a **domain** installation, you need `Domain Administration Rights` and you must therefore be a member of the `Domain Admins` group.

  If you cannot acquire domain administration rights, you can also install R3SETUP with local administrator rights, but you have to carry out a number of steps to prepare the user involved. This includes creating the group `SAP_<SAPSID>_GlobalAdmin`, with the two domain user accounts `SapService<SAPSID>` (this user is **not** created for Informix installations) and `<sapsid>adm`.

– For a **local** installation, log on as a user with `Local Administration Rights`.

For details, see Granting User Rights for the Installation [Page 40]

Procedure

1. Log on to the NT system as a user that has the rights and privileges required for the installation of R3SETUP.

   Later when you install an SAP component, you must log on as the **same** user, otherwise the installation will abort. Only this user will have the authorizations that permit the execution of the steps necessary for the installation.

2. Make sure that the `TEMP` environment variable has been set.
3. To check the variable, choose *Start* → *Settings* → *Control Panel* → *System*. On the *Environment* tab, look under *User Variables*. `TEMP` is normally set to `C:\temp`. Make sure that the specified directory really exists in your file system.
4. Insert the `Kernel` CD-ROM.
5. Start the program `R3SETUP.BAT` from the directory

   `<CD_DRIVE>:\NT\COMMON`

   The R3SETUP window opens.
6. 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`
   Remember the path as you might need to access it later during the installation procedure, for example, to look at log files.
7. Choose *Next* when you have made an entry. When you have made all the required entries, R3SETUP is automatically installed.

   After the installation, a dialog box appears prompting you either to log off or reboot.
8. Enter *Yes*.

   R3SETUP now automatically logs off or reboots.

Result

When you have installed R3SETUP on a host:

- All the files required to run R3SETUP have been copied to the installation directory. These include R3SETUP, the graphical user interface INSTGUI, the command files and the online documentation.
- Options to start R3SETUP have been added to the NT *Programs* menu. For example, the option *Install Central Instance* is available to enable you to start the installation of a central instance.

- Special rights have been granted to the NT user that installed R3SETUP. These rights are necessary later when the same user executes R3SETUP to install an SAP component.

See also:

The R3SETUP Tool [Page 104]

3.3.3 Installing a Dialog Instance

Use

The following describes how to install the dialog instance using the R3SETUP tool. The installation procedure has two main phases: the **input** phase and **processing** phase.

In the first phase, the **input phase**, R3SETUP prompts you to enter values for a series of parameters in order to collect information about the configuration and hardware setup of the system.

In the second phase, the **processing phase**, R3SETUP automatically sets up the dialog instance on the basis of the information you have entered.

Prerequisites

Before you can run R3SETUP, the following actions must be complete:

- You have checked whether your dialog instance host meets the minimal requirements [Page 22] specified in the check list.
- You have completed all preparations [Page 37] for the host.
- You have installed the following on the host:
  - The DBMS client software [Page 78]
  - The R3SETUP tool [Page 87]
  - *Microsoft Internet Explorer* to enable the display of R3SETUP online help

Input Parameters

To be well-prepared for the input phase of the installation, we recommend that you get an overview of the information you have to enter before starting R3SETUP. Having the required information ready in advance helps you to avoid unnecessary delays or errors.

For more information, see Input for Dialog Instance Installation [Page 84]

1. Log on to the NT system as the **same** user that installed the R3SETUP tool on the host.

   If you do not log on as the user that installed R3SETUP, the installation aborts because you do not have the rights that are necessary to execute the installation steps. The error *Required Privileges not held by the client* is displayed.

2. Start R3SETUP from the NT *Start* menu with:

   Programs → SAP System Setup for <SAPSID>→ Install Dialog Instance

   The INSTGUI window of the R3SETUP tool opens. A second *Command Prompt* window appears in the background, but this is of less importance. In the course of the installation, all information and prompts are displayed in the main INSTGUI window.

   R3SETUP now asks you to enter values for a series of parameters (keys).

3. Enter all the information R3SETUP requests. The screen waits for an entry. If a plausible entry has been made, the next screen automatically appears, prompting you for a new value. If the system rejects your entry, the same window and prompt reappear.

   After three unacceptable entries in a row, R3SETUP automatically stops. In this case you are advised to critically analyze the entries you have made before restarting R3SETUP to continue the installation. If you are uncertain about entering a particular value, choose *Help* to access more information about the step and parameter involved.

   Be careful to distinguish between:
   A prompt for a new parameter value
   A repeated prompt for a parameter value that has already been entered, but has been rejected by the system
   Sometimes, although the parameter name on the screen has changed, the text for the prompt is identical to the previous one. This can lead to unintentional entries.
   If an entry is rejected by the system, switch to the log view to find out the reason.

4. When all values have been entered, R3SETUP automatically installs the dialog instance. The screen shows which step is being executed and gives a brief explanation of its purpose.

   When the installation is complete the message *R3SETUP finished* is displayed and the progress bar indicates 100%.

Result

You have now completed the installation of a dialog instance.

See also:

The R3SETUP Tool [Page 104]

3.3.4 Input for Dialog Instance Installation

Definition

The input for the dialog instance is the information you have to enter when you run the R3SETUP tool with the option *Install Dialog Instance*.

Use

The input you enter gives R3SETUP general information about the target system you want to install and the location of the CDs required for the installation.

The table lists and explains the prompts that appear for the dialog instance. When R3SETUP is running, you can view help for each prompt by displaying a tooltip that appears when you position the cursor near the prompt.

Prompt	Meaning
SAP System name	The name of the SAP System `<SAPSID>`, for example, C11. Enter a three-character string in uppercase letters.
Instance number	Number of the dialog instance. You can specify a value from 0 to 97. To simplify administration, it is recommended that you give all instances within the system the same number. However, if more than one instance is running on the same host, both instances must be assigned different numbers.
Central instance number	Number of the central instance. This number was already specified during the installation of the central instance. To find out the number, look under the SAP directory `usr\sap\<SAPSID>\DVEBMGS<nn>` in the *Windows NT Explorer*. The value `<nn>` is the number assigned to the central instance.
Directory for SAP System	Specify the base directory for the SAP directory tree. For example, if you enter **`D:`**, the directory usr\sap is created under drive D.
Domain selection	Choose whether you want to perform a local or domain installation.
Name of the central transport host	Name of the host where the central transport directory is to be located. If you have defined a central transport host with the alias `SAPTRANSHOST`, the system proposes this host. Otherwise, it suggests the current host as the transport host.
Name of the central instance host	Name of the central instance host. To find out the name, enter **`hostname`** at the command prompt of the central instance host.
Name of the database instance host	Name of the database host. To find out the name, enter **`hostname`** at the command prompt of the database host.

Prompt	Meaning
Location of the Kernel CD	Specify the path to the Kernel CD.
RAM for the SAP System	RAM that is reserved for the SAP System. The default value is the entire RAM. Only change this value if another SAP instance or application is running on the host. In this case, change the value to ensure that enough RAM is available for the other system or application.
Enter the password for the SAP System administrator	Enter and verify the password for the user `<sapsid>adm`. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Enter the password for the SAP System service user	Enter and verify the password for the NT user `SAPService<SAPSID>`. If you have to restart the installation after you have already entered the password, you are prompted to re-enter and verify the same password.
Port number	The port number of the message server. The default is the standard value 3600 plus the number of the instance. The default value is correct if no other SAP Systems are running on the host.
LDAP support	Choose the type of LDAP integration you want to configure for the SAP System. If you have already configured the SAP System for LDAP support on the central instance, select *No LDAP Support.* It is not necessary to repeat the configuration process on the dialog instance.
	Active Directory Service Select this option to integrate Windows 2000 Active Directory services. An Active Directory must be available on the network. If you select *Active Directory Service*, subsequent prompts ask for: *Management Domain* Specify 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 (management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be: CN=Finance,CN=Walldorf *LDAP Servers* (Prompt only appears under Windows NT) Enter the DNS host name of the server on which the Active Directory is located. The Active Directory is located on all domain controllers (DCs) on the network. If there are several DCs, specify the host name of each one. For example: ldapsrv1 ldapsrv2 *Domain Containing SAP_LDAP Group* Enter or confirm the name of the Win2000 domain in which the *SAP_LDAP Group* is defined. The group was defined earlier, when the *Active Directory* was configured for the SAP System. See Integration of Active Directory Services [Page 44].

Prompt	Meaning
	Generic LDAP Directory Select this option to configure the system to support LDAP directories that are running on NT or Unix machines. A generic LDAP directory must be available on the network. If you select *Generic LDAP*, subsequent prompts ask for: *Container for all SAP-related entries* Specify 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. *Administration Domain* Specify a container in the LDAP Directory where information related to the new SAP System is to be stored using the distinguished name syntax. The name of the container (administration domain) can reflect the organizational structure of your company. For example, if the system is for corporate finances and located in Walldorf, the name can be: CN=Finance,CN=Walldorf *LDAP Server* 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
	No LDAP Support Choose this if you do not want to configure the SAP System to integrate LDAP services.
Check installation parameters	If any of the parameter values displayed are incorrect, use the R3SEDIT utility [Page 113] to repeat the input.
Start Installation?	You can choose *Continue* to start the actual installation procedure immediately or *Exit* to leave R3SETUP and start the installation at a later time.

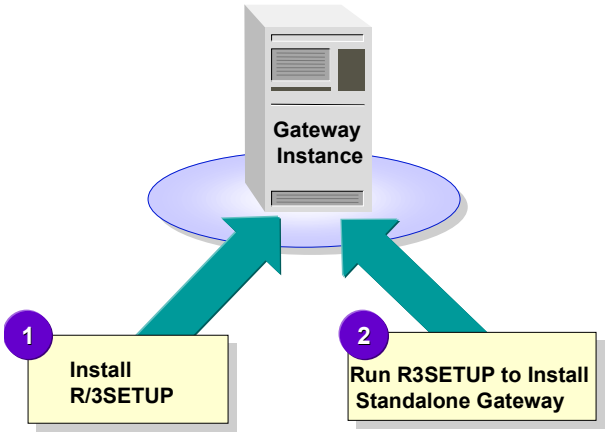
3.4 Standalone Gateway Instance Installation

Purpose

Optionally, you can install one or more gateway instances on hosts in your SAP System:

Process Flow

The following graphic illustrates the actions required to install a gateway instance on a host in your system.



3.4.1 Installing R3SETUP

Use

The R3SETUP tool can only be used for the installation of an SAP component on a specific host if it is available locally on that host. You must therefore make sure that R3SETUP is installed locally on the host before you install a central, database, dialog, or gateway instance.

Prerequisites

- 50 MB free space must be available on the drive where the R3SETUP files are to be installed. By default, R3SETUP is copied to the directory:

  `<DRIVE>:\USERS\<SAPSID>ADM\INSTALL`

- To install R3SETUP, you need certain NT rights and privileges. These differ, depending on whether a **domain** or **local** installation is to be performed:

  – For a **domain** installation, you need `Domain Administration Rights` and you must therefore be a member of the `Domain Admins` group.

If you cannot acquire domain administration rights, you can also install R3SETUP with local administrator rights, but you have to carry out a number of steps to prepare the user involved. This includes creating the group `SAP_<SAPSID>_GlobalAdmin`, with the two domain user accounts `SapService<SAPSID>` (this user is **not** created for Informix installations) and `<sapsid>adm`.

– For a **local** installation, log on as a user with `Local Administration Rights`.

For details, see Granting User Rights for the Installation [Page 40]

Procedure

1. Log on to the NT system as a user that has the rights and privileges required for the installation of R3SETUP.

   Later when you install an SAP component, you must log on as the **same** user, otherwise the installation will abort. Only this user will have the authorizations that permit the execution of the steps necessary for the installation.

2. Make sure that the `TEMP` environment variable has been set.
3. To check the variable, choose *Start* → *Settings* → *Control Panel* → *System*. On the *Environment* tab, look under *User Variables*. `TEMP` is normally set to `C:\temp`. Make sure that the specified directory really exists in your file system.
4. Insert the `Kernel` CD-ROM.
5. Start the program `R3SETUP.BAT` from the directory

   `<CD_DRIVE>:\NT\COMMON`

   The R3SETUP window opens.
6. 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`
   Remember the path as you might need to access it later during the installation procedure, for example, to look at log files.
7. Choose *Next* when you have made an entry. When you have made all the required entries, R3SETUP is automatically installed.

   After the installation, a dialog box appears prompting you either to log off or reboot.
8. Enter *Yes*.

   R3SETUP now automatically logs off or reboots.

Result

When you have installed R3SETUP on a host:

- All the files required to run R3SETUP have been copied to the installation directory. These include R3SETUP, the graphical user interface INSTGUI, the command files and the online documentation.
- Options to start R3SETUP have been added to the NT *Programs* menu. For example, the option *Install Central Instance* is available to enable you to start the installation of a central instance.
- Special rights have been granted to the NT user that installed R3SETUP. These rights are necessary later when the same user executes R3SETUP to install an SAP component.

See also:

The R3SETUP Tool [Page 104]

3.4.2 Installing a Gateway Instance

Use

The following describes how to install a standalone gateway instance using the R3SETUP tool. This instance can be installed on a separate host or on a host where a database server is already installed.

The installation procedure has two main phases: the **input** phase and **processing** phase.

In the **input phase**, R3SETUP collects information about the system configuration and target host. In the **processing phase**, R3SETUP automatically installs the gateway instance on the basis of the information you have entered.

Prerequisites

Before you run R3SETUP, the following components must be installed on the gateway instance host:

- Windows NT 4.0 and Service Pack 5
- The latest Dynamic Link Libraries for Windows NT
- *Internet Explorer* version 3.0 or later
- The *Microsoft Management Console*
- The R3SETUP tool

Procedure

1. Log on to the NT system as the **same** user that installed the R3SETUP tool on the host.

   If you do not log on as the user that installed R3SETUP, the installation aborts because you do not have the rights that are necessary to execute the installation steps. The error *Required Privileges not held by the client* is displayed.

2. Start R3SETUP from the NT *Start* menu with:

   Programs → SAP System Setup for <SAPSID> → Install Standalone Gateway Instance

   The INSTGUI window of the R3SETUP tool opens. A second *Command Prompt* window appears in the background, but this is of less importance. In the course of the installation, all information and prompts are displayed in the main INSTGUI window.

   R3SETUP now asks you to enter values for a series of parameters (keys).

3. Enter all the information R3SETUP requests. The screen waits for an entry. If a plausible entry has been made, the next screen automatically appears, prompting you for a new value. If the system rejects your entry, the same window and prompt reappear.

   After three unacceptable entries in a row, R3SETUP automatically stops. In this case you are advised to critically analyze the entries you have made before restarting R3SETUP to continue the installation. If you are uncertain about entering a particular value, choose *Help* to access more information about the step and parameter involved.

   Be careful to distinguish between:
   A prompt for a new parameter value
   A repeated prompt for a parameter value that has already been entered, but has been rejected by the system
   Sometimes, although the parameter name on the screen has changed, the text for the prompt is identical to the previous one. This can lead to unintentional entries.
   If an entry is rejected by the system, switch to the log view to find out the reason.

4. When all values have been entered, R3SETUP automatically installs the standalone gateway instance. The screen shows which step is being executed and gives a brief explanation of its purpose. The installation takes 5 to 10 minutes.

   When the installation is complete the message *R3SETUP finished* is displayed and the progress bar indicates 100%.

5. Run the program `R3GWSIDEINFO.EXE` to add parameter values to the gateway configuration file `sideinfo`. To start the program, switch to the directory `<DRIVE>:\usr\sap\<SID>\sys\exe\run` and choose the file `R3GWSIDEINFO.EXE`. Enter the information you are prompted for.

   The program `R3GWSIDEINFO.EXE` records the information you provide in the `sideinfo` file, which controls the configuration of the gateway instance.

4 Post-Installation Activities

Purpose

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

Many of the steps in this process are documented in detail in the System Administration Assistant. You can use the Assistant to execute the step and call up the documentation.

Prerequisites

You have completed the SAP System Installation on all the hosts of your SAP System, including setting up at least one frontend (for example, on the central instance host).

You install the frontend 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 frontend software, see the separate documentation:

- *Installing SAP Frontend Software for PCs* (English version)
- *SAP-Frontend-Software für PCs installieren* (German version)

On NT-ALPHA systems you have to use the 16-bit SAPgui.
Alternatively, you can use an Intel PC with 32-bit SAPgui for the frontend instead of the central instance host.

Process Flow

1. You check that you can start and stop the SAP System [Page 93].
2. You check that you can log on to the SAP System [Page 94] with the SAP frontend.
3. You install the SAP License [Page 95]. Without a permanent license, you cannot use the SAP System after the temporary license expires (that is, after the first four weeks).
4. You check that the SAP System services are present [Page 96] on the correct instances.
5. You install the SAP online documentation [Page 96] and check that you can access it.
6. In a standalone database system, you check the RFC destination for the database host [Page 97].
7. You Configure SAProuter and the SAPNet R/3 Frontend [Page 97].
8. If required, you set up secure single sign on [Page 98].
9. You perform the steps specified in *Installation follow-up Work* in the System Administration Assistant. You can use the Assistant to execute the step and call up the documentation. To access the Administration Assistant start **transaction SSAA.**
10. You perform a full installation backup [Page 102]. Make sure that you have finished all client maintenance (for example, copying clients) **before** the backup.

11. If you want to implement the SAP Internet Solution, you install the Internet Transaction Server [Page 103].

Result

You have completed and checked the SAP System installation.

You now need to prepare the SAP System for using business applications. This process includes customizing the Basis system and the various business components. The procedure for implementing the business processes and organizational structure of your SAP System is **not** described in this documentation.

4.2 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 Online Documentation under *Basis Components → Computing Center Management System → BC Computing Center Management System → CCMS Monitoring → Microsoft Management Console: Windows NT.*

Starting the SAP System

1. On the central system host, choose *Start → Programs → SAP R3 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*.
5. The SAP central instance **and** database start.
6. 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 R3 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.

4.3 Logging on to the SAP System

Use

This section tells you how to log on to the SAP System after the installation. To start with, you log on using the frontend of the host where the central instance is running.

Prerequisites

You have already started the SAP System and installed a frontend.

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

User	Initial password	Clients in which user exists
SAP*	06071992	000, 001, 066
DDIC	19920706	000, 001

Procedure

1. Make sure that you are logged on to the operating system as `<sapsid>adm`.
2. On the machine, where you have installed the frontend, choose *Start* → *Programs* → *SAP Frontend<Release>* → *SAPlogon*

   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 name.
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.

4.4 Installing and Using the SAP License

Use

To work with the SAP System, you need an SAP license. 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.

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.

Prerequisites

You need to install a new permanent license if you are:

- Performing a new SAP System installation
- Renaming your SAP System ID (that is, `<SAPSID>`)
- Changing the message server host (that is, the central instance)
- Changing an existing hardware configuration

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

```
saplicense -help
```

See SAP Online Help for more information about the SAP license (*SAP Library* → *BC - Basis Components* → *Kernel Components* → *BC - SAP License*).

Procedure

1. To find the hardware key (that is, the customer key) needed for the license request, enter the following command on the host where the message server is running:

   ```
   saplicense -get
   ```

   The system displays an 11-character hardware key, for example, `D1903055560`.

2. Using the fax form in the installation package, send a fax with the following information to SAP:
   - Hardware key from previous step
   - Name of the installed SAP System (that is, the value of `<SAPSID>`)
   - The date when you installed the database

3. After you have received your license key from SAP, install it as follows, being sure to enter the license key **exactly** as shown in the SAP reply to your fax:

   ```
   saplicense -install
   ```

   - If the license installation is successful, you see the following message:

     ```
     license successfully installed
     ```

     You now have a permanent license for your SAP System.
   - If the license installation is **not** successful, you see the following message:

```
check failed, no license installed
```

4. For more information, see the following in SAP Online Help:

   BC Basis → Kernel Components → BC SAP License

4.5 Recognizing Initial System Problems

Use

This section describes how to deal with initial problems that you might experience when trying to log on or run the system for the first time.

Procedure

1. Log on to the SAP System [Page 94]. 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.

4.6 Installing the 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 frontend platforms supported by SAP.

Procedure

1. Install the online documentation. For more information, see *Installing the Online Documentation*, delivered as part of the installation package.
2. Log on to your SAP System [Page 94].
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 Windows NT 4.0 or Windows 95 to install the HTMLHelp Viewer for the `Online Documentation` CD.

See also:

Using R3SETUP Online Help [Page 110]

4.7 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, *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 online SAP Library under:

   BC-Basis Components → Basis Services/Communication Interfaces → Remote Communications → ABAP Interfaces → RFC Programming in ABAP → Maintaining Remote Destinations

4.8 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.

If you are using any of the following, you require SAProuter:

- 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 alias *sapnet-guide* in SAPNet – Web Frontend, and the SAP online documentation.

- EarlyWatch

  For more information, use the alias *earlywatch* in SAPNet – Web Frontend.

- Remote Consulting

  For more information, use the alias *remoteconsulting* in SAPNet – Web Frontend.

Procedure

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

saprouter

For more information see the SAP online documentation. For information on installing SAProuter as a Windows NT service, see **SAP Note 41054**.

4.9 Secure Single Sign-On

Use

Single Sign-On 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 a quick method of logging on to the system and has the advantage that it is easy to administer because it significantly reduces the work associated with SAP System user management.

Prerequisites

An essential prerequisite for enabling Single Sign-On is the assignment of the SAP System user to the NT user that is normally entered to log on to the operating system. Once this assignment has been made and the system prepared accordingly, the user logging on to the operating system is always automatically associated with the assigned SAP System user. As a result, the system recognizes that the rights and authenticity of the SAP System user need to be verified, without explicitly requiring the entry of the user name and password.

Features

When an NT user has logged on successfully, the SAPgui gets the security context for authentication through the GSS-API interface. The security context is then passed on to the application server where it is verified. The GSS-API interface (Dynamic Link Library `gssapi32.dll`) is delivered together with the SAP System and enables the use of the native security functionality offered by the Microsoft *Security Support Provider Interface* (SSPI).

SAP particularly recommends the configuration of Single Sign-On when strict guidelines are applied to the syntax and expiration period of user passwords. The resulting user and password administration is often complex and can be reduced effectively by implementing Single Sign-On.

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. To view the documentation, choose *BC -Basis Components* → *Security* → *Secure Network Communications (SNC)*.

Activities

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

1. Prepare the application server
2. Prepare the SAPgui and SAP Logon
3. Map SAP System users to NT users

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

1. Choose *Start* → *Settings* → *Control Panel* → *Services*.
2. Select the service *NT LM Security Support Provider*.
3. Choose *Startup*.
4. Change the startup type from *manual* to *automatic*.

4.9.1 Preparing the Application Server for Single Sign-On

Use

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

Procedure

1. Copy the `gssapi32.dll` file from the Kernel CD to the directory `<DRIVE>:\USR\SAP\<SAPSID>\SYS\EXE\RUN` on the central instance of your system. The `gssapi32.dll` file is located on the Kernel CD in the directory `<CD_DRIVE>:\NT\I386\` (for ALPHA: `<CD_DRIVE>:\NT\ALPHA\`).
2. In the profile of the central instance, enter the following SAP parameters:

   ```
   snc/accept_insecure_cpic =1
   snc/accept_insecure_gui    =1
   snc/accept_insecure_r3int_rfc    =1
   snc/accept_insecure_rfc    =1
   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\gssapi32.dll
   snc/permit_insecure_start =1
   snc/identity/as =p:<DOMAIN_NAME>\<sapsid>adm
   ```

   (`<DOMAIN_NAME>` is the NT domain that the user `<sapsid>adm` belongs to.)

   ```
   snc/r3int_rfc_secure =0
   ```

3. Stop and restart the SAP System to activate the profile parameters.

4.9.2 Preparing SAPgui and SAP Logon for Single Sign-On

Use

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

Prerequisites

You have completed Preparing the Application Server for Single Sign-On [Page 99].

Procedure

1. Copy the `gssapi32.dll` file from the Kernel CD to the SAPgui directory.
2. Set the NT environment variable `SNC_LIB` on the PC where your SAPgui runs. The variable specifies the path to the `gssapi32.dll` file. To do this:
   a. Choose *Start* → *Settings* → *Control Panel* → *System* → *Environment*.
   b. In *User Variables for <user>* enter the following:

      Variable: **SNC_LIB**

      Value: **<DRIVE>:\<SAPGUI_PATH>\gssapi32.dll**

   c. Choose *Set* and confirm your entries with *OK*.
3. Log off and then log on to your NT system again, as the same user, to activate the new environment variable setting.
4. Set the required logon options to activate Single Sign-On.
   a. In the SAP logon window, choose *Edit* and in the window that opens, *Advanced*.

      The *Advanced Options* dialog box appears.

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

      p:<DOMAIN_NAME>\<sapsid>adm

   `<DOMAIN_NAME>` is the NT domain the user `<sapsid>adm` belongs to.

   The administrator of the system `HWA`, belonging to the domain `DEC_NT`, would enter:
   P:DEC_NT\HWAADM
5. Select *Enable Secure Network Communications* and confirm the entries with OK.

Result

The SAP Logon window now displays an icon with a key beside the system entry. This indicates that Single Sign-On is active. The next time an SAP System user that has been assigned to an NT user logs on to the system, the application is opened without requiring the entry of a user name and password.

4.9.3 Mapping SAP System Users to NT Users for Single Sign-On

Use

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

Prerequisites

You have completed the following procedures:

- Preparing the Application Server for Single Sign-On [Page 99]
- Preparing SAPgui and SAP Logon for Single Sign-On [Page 100]

Procedure

1. Log on to the SAP System.
2. Choose *Tools* → *Administration* → *Maintain Users* → *Users*. Alternatively, enter transaction code SU01.

   The *User Maintenance* window appears.
3. Enter the name of the SAP System user and then choose *User names -> Change*.
4. Choose the *SNC* tab. In the field *SNC name*, enter the name of the NT user that is to be assigned to the SAP System user in **uppercase**:

   p:<DOMAIN_NAME>\<NT_USERNAME>

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

   For the NT user `Walker`, belonging to the domain `SAP_ALL`, enter **`p:SAP_ALL\Walker`**
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.

4.10 Performing a Full Backup of the Installation

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

1. To save the Registry:
   a. Start the RDISK repair disk utility.
      i. Choose *Start* → *Run*.
      ii. Enter **`rdisk`**.
   b. Choose *Update Repair Info* to save the configuration on the hard disk.
   c. Choose *Create Repair Disk* to back up the configuration to a floppy disk.
   d. Choose *Exit* to leave `rdisk`.
2. To save the disk configuration, use the Disk Administrator:

   Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator* to start the *Disk Administrator*.

   a. Select *Partition* → *Configuration* → *Save*.
   b. Insert a formatted disk in the disk drive and choose *OK*.
   c. To leave the *Disk Administrator* select *Partition* → *Exit*.
3. Back up all SAP-specific and all database-related directories:

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

   This list is only valid for a standard installation.

   Proceed as follows:

   a. Log on as user `<sapsid>adm`.
   b. Shut down the SAP System and the database.

c. Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Backup* to start the backup.

d. Select the files described above.

e. Start the backup procedure.

f. Check whether any errors occurred.

4.11 SAP Internet Solution Installation

Purpose

The SAP Internet Transaction Server (ITS) links the SAP System to the Internet. The ITS enables Internet and intranet users to communicate directly with SAP Systems and run SAP Internet Application Components (IACs), which are Internet-enabled SAP System transactions.

Prerequisites

To use the SAP Internet Solution, you must install the SAP Internet Transaction Server (ITS). If you want to modify the standard Internet application components, also install SAP@Web Studio, the ITS development environment.

The requirements for hard- and software are described in the installation documentation *SAP@Web Installation*. Install the most current versions of ITS and SAP@Web Studio. **SAP Note 85129** contains information on when the latest versions are available.

Process Flow

Installation of the SAP Internet Solution consists of the following installation procedures:

- ITS Installation
- SAP@Web Studio Installation, if required

For more information on installation of ITS and SAP@Web Studio, see the installation documentation *SAP@Web Installation*.

5 The R3SETUP Tool

Use

R3SETUP is the SAP tool to automate installation of the SAP System. It installs the different components of an SAP System.

Integration

You can use INSTGUI, the graphical user interface for R3SETUP, to monitor the progress of the installation.

Prerequisites

R3SETUP does **not** support the following steps, which you must do **before** installation:

- UNIX
  - Setup of file systems and raw devices
  - Configuration of UNIX kernel parameters and swap space
- NT
  - Installation of the Microsoft Management Console (MMC)
  - Adjustment of virtual memory and file cache
- AS/400
  - Configuration of AS/400 system values
  - Addition of user auxiliary storage pools (ASPs)
  - Configuration of TCP/IP
  - Checking and adjusting memory pools
- OS/390
  - Configuration of OS/390 UNIX System Services
  - Setup of file systems
  - Creation of OS/390 groups and users

Features

The R3SETUP tool supports the installation of:

- The central instance
- The database
- A dialog instance
- The SAP software development kits (UNIX)
- A standalone gateway

R3SETUP does this by:

- Creating operating system users and groups (UNIX and NT)

- Creating user profiles (AS/400)
- Defining services at operating system level
- Creating and modifying files and directories
- Unpacking (restoring) and copying software
- Creating the database and loading it with data
- Configuring essential database and operating system objects for the SAP System

Create a new installation directory every time you start R3SETUP with another service (that is, with another command file identified by the ending .R3S). Otherwise, old log and command files are overwritten.

When you start R3SETUP, the following options are available:

Option	Meaning
`-f <command file>`	Specify the service you want to install (required)
`-l <log file>`	Specify log file, default: `<service>.log`
`-t trace`	Include detailed trace messages in log file
`-g <gui_host>:<gui_port>`	Specify host and port for INSTGUI
`-m`	Create file with messages for INSTGUI
`-h`	List R3SETUP options

After it is started, R3SETUP shows the following properties:

- It performs all installation steps that are defined in the command file
- It writes error messages, warnings and other information to the log file
- Important messages are also written to the console.
- When the last installation step is completed, R3SETUP finishes with the message `R3SETUP finished.`
- If R3SETUP encounters a problem that it cannot handle, it stops with an error message.

Activities

You can:

- Run R3SETUP unattended

  You determine how R3SETUP performs the installation by making entries in a command file during the input phase. This allows you to provide all the necessary information before the actual installation starts. R3SETUP then goes into the processing phase to automatically perform the installation in unattended mode, without prompting you for any further information.

  If necessary you can re-use the command file to perform another identical installation or to restart the installation in the event of failure.

- Restart R3SETUP

The installation consists of a number of independent installation steps. If a step fails, R3SETUP stops. When the problem has been solved, you can restart R3SETUP. Since R3SETUP records the installation progress in the command file, it can continue the installation from the failed step, without repeating previous steps.

5.1 INSTGUI

Use

You use INSTGUI, the graphical user interface (GUI) for R3SETUP, during the:

- Input phase to enter information for later use by R3SETUP
- Processing phase to:
  - Monitor progress of the installation steps
  - View log messages

You can also use INSTGUI to get online help on R3SETUP.

Integration

Depending on your operating system platform, you start INSTGUI:

- Independently of R3SETUP as a separate process, on non-Windows platforms
- Simultaneously with R3SETUP, on Windows platforms

For a remote installation on Windows platforms, you also have to start INSTGUI as a separate process on the host from which you supervise the installation.

If you use INSTGUI, it is closely integrated with R3SETUP to exchange information about the progress of the installation.

Prerequisites

INSTGUI is available for X Windows (on UNIX operating systems) and for Windows NT 4.0 and Windows 95 or 98.

Features

You can start INSTGUI with these options:

Options	Meaning
`-port <number>`	Port for communication with R3SETUP, default: 59595
`-docupath <path>`	Path to the R3SETUP online help files, default: `./doc`
`-fontsize <size>`	Font size for INSTGUI (8 to 14), default: 8
`-help`	List INSTGUI options

Activities

When using INSTGUI, you can switch between the following views:

- Step View

  When you start R3SETUP, it goes into step view. You can:

  – See which installation step is currently being performed and what it does

  – Get online help on the installation step that is currently being performed

  – Switch to the log view

- Log View

  This shows all R3SETUP messages as they are recorded in the log file. You can:

  – Display the next or previous information, warning, or error message

  – Get online help on the installation step that created a message

  – Switch back to the step view

5.2 R3SETUP Command Files

Definition

The R3SETUP command files determine how R3SETUP performs the installation of the SAP System. The main command files are listed below:

Command File	Installs
`CENTRAL.R3S`	The central instance
`DATABASE.R3S`	The database
`CENTRDB.R3S`	The central instance with database
`DIALOG.R3S`	A dialog instance
`CDINST.R3S` (UNIX and NT only)	The R3SETUP tool from CD-ROM

Use

During the input phase of the installation, you enter information into the R3SETUP command file, which is then used by the R3SETUP program during the unattended processing phase of the installation.

An installation step can run in one of two different modes, `SKIP` or `DO`. The default mode before the installation is `DO`. After the step has run successfully, the default mode is `SKIP`. This means the step is skipped if you restart R3SETUP.

You can force a step to run even if installation results already exist by adding the key `ACTION=FORCEDDO` to the step's section in the command file. If you want to skip a step although it has not yet run, add the key `ACTION=SKIP`.

If you modify the command file, you must save your changes **before** you start R3SETUP. Otherwise, your changes have no effect.

Structure

The command file consists of several sections. The beginning of a section is always indicated by the section name in brackets. Each section contains a set of keys and their values. There are the following types of section:

- The `[EXE]` section

  This is the installation roadmap. Steps are listed in numerical order of execution, as shown in the following example:

  ```
  [EXE]
  10=GATEWAYINSTANCE_IND_IND
  20=R3GATEWAYPORT_IND_IND
  30=R3GATEWAYSECURITYPORT_IND_IND
  40=OSGROUPSAPLOCAL_NT_IND
  50=OSUSERSIDADM_NT_ORA
  60=R3DIRECTORIES_NT_IND
  ```

- Step sections

  These describe in detail a step named in the `[EXE]` section. After execution, step sections are updated with the status `OK` or `ERROR`.

- List section

  These contain additional information for the installation, such as a list of directories to be created. The names of list sections start with `[Z…]`.

Keys enclosed in `@` characters, for example `@SAPSYSNR@`, are variables that are replaced by suitable values during the installation.

5.3 Changing Tablespace Sizes or Locations

Use

Before you run R3SETUP, you might have reasons to change the default size of tablespaces or the assignment of tablespaces to SAP data directories.

R3SETUP creates the database using default sizes for the tablespaces. If, for any reason, you assume that the default sizes are too small, you can check and change them in the `DBSIZE.TPL` file before running R3SETUP.

During the installation of the database, the allocation of tablespaces to SAP data directories is predefined. Under special circumstances, you might want to change this allocation. For example, in large systems with a high throughput you might have to place index and data tablespaces on different arrays to improve performance. To do this, you have to edit the R3SETUP `DBSIZE.TPL` file and change the assignment of tablespaces to SAP data directories. Later, during the actual installation procedure, you have to ensure that these critical directories are appropriately distributed to arrays.

Editing the DBSIZE.TPL with the aim of distributing tablespaces to different RAID arrays is a complex task. It presupposes a thorough knowledge of the system load and its consequences for individual tablespaces. Only choose this approach for very large, high-end systems. For more information, see Large Configuration [Page 30].

Never delete or rename any of the SAP tablespaces that are created during the installation with R3SETUP. These are all required for any subsequent upgrade of the system. To view a list of all the SAP tablespaces, look at the file DBSIZE.TPL that is located on the Export CD 1 in the directory <CD-DRIVE>:\DB\ORA

Procedure

Never set tablespace sizes to values below those delivered by SAP.

1. Insert the Export CD 1 into the CD-ROM drive and switch to the directory:

   <CD-DRIVE>:\DB\ORA

2. Copy the file DBSIZE.TPL from the CD to your installation directory. The default installation directory is:

   <DRIVE>:\USERS\<SAPSID>ADM\INSTALL

3. Open the file DBSIZE.TPL with the SAPPAD editor.

4. Look for the tablespace entry you wish to change.

   The entry for the tablespace PSAPTEMP is:
   PSAPTEMP=@SAPDATA1@;200
   SAPDATA1 is the location of the tablespace and 200 is its size in MB.

5. Change the size of the tablespace or its assignment to an SAP data directory as required.

6. Save your entry.

   If you have to change the size to a value greater than 2000 MB, for example 2500 MB, this must be done in two steps separated by an exclamation mark. The syntax is as shown in the example.

   PSAPTEMP=@SAPDATA1@;2000!@SAPDATA1@;500

Result

When you run R3SETUP, the tablespaces are created with the new sizes or directories you have specified in the `DBSIZE.TPL` file.

5.4 R3SETUP Messages

Definition

R3SETUP records all information about the installation process in the relevant log file:

- UNIX: `<INSTDIR>/<COMMAND_FILE_NAME>.log` (or `<COMMAND_FILE_NAME>.log<NR>` if R3SETUP was started several times)
- NT: `<INSTDIR>\<COMMAND_FILE_NAME>.LOG` (or `<COMMAND_FILE_NAME>.LOG<NR>` if R3SETUP was started several times)

Use

Since the log file can contain up to several hundred messages, we recommend you use the R3SETUP frontend to navigate through the messages. See Using R3SETUP Online Help [Page 110].

Structure

Every message in the log file contains:

- Message type (`INFO`, `WARNING`, or `ERROR`)
- Date and time
- Installation step (that is, the name of the section in the command file)
- Message and text

```
INFO 1997-12-09 13:52:20 R3LINKS_IND_IND ColdKeyCheck:0
Phase successful
```

5.5 Using R3SETUP Online Help

Use

You can display R3SETUP online help for information on the R3SETUP installation steps.

Prerequisites

You need an HTML browser to view the online help for the R3SETUP installation steps:

- UNIX

  Netscape Navigator 3.0 or higher

  The HTML help files are stored in a SAR archive on the `SAP Kernel` CD. They are unpacked and stored in the directory `<INSTDIR>/doc` by the shell script when INSTGUI is copied from the CD to the hard disk.

- Windows

Windows NT 4.0 and Windows 95

Netscape Navigator 3.0 or higher (32-bit version), and Microsoft Internet Explorer 3.0 or higher (32-bit version). Internet Explorer is shipped with the SAP System on the `Online Documentation` CD. See the `README.TXT` file on this CD.

The HTML help files are stored in a SAR archive on the `SAP Kernel` CD. They are unpacked and stored in the directory `<instguidir>/doc` on your PC.

- AS/400

  Netscape Navigator 3.0 or higher (32-bit version), and Microsoft Internet Explorer 3.0 or higher (32-bit version). Internet Explorer is shipped with the SAP System on the `Online Documentation` CD. See the `README.TXT` file on this CD.

  The HTML help files are stored in a SAR archive on the `SAP Kernel` CD. You can do one of the following:

  – Unpack the HTML files and store them in the directory `<instguidir>/doc` on your PC.

  – Configure your AS/400 as an HTTP server and unpack and store the HTML files on your AS/400.

Procedure

You can access the R3SETUP online help in the following ways:

- You can display context-sensitive help on installation steps and log messages by choosing *Help* in INSTGUI.
- You can browse the help by opening the file `<INSTDIR>/doc/_START.HTM` (AS/400: `<instguidir>/doc/START.HTM)` on your PC with your web browser.
- AS/400: If you configured your AS/400 as an HTTP server, you can also start INSTGUI with the option `instgui -docupath http://<your_AS400>/r3setup/`

See also:

Installing the Online Documentation [Page 96]

5.6 Continuing an Interrupted Installation

Use

You can continue an installation that has failed from the point of failure, without repeating steps that have already successfully completed.

Prerequisites

If an installation step fails, R3SETUP stops with an error message.

Procedure

1. Look at the log file [Page 110] to find out exactly what happened.
2. If necessary, see the R3SETUP online help [Page 110].
3. When you have solved the problem, restart R3SETUP.

Since R3SETUP records installation progress in the command file, it can continue the installation from the point of failure.

Windows NT only:
You can use the R3SEDIT utility to restart the installation at a particular step.

5.7 Monitoring a Remote Installation

Use

You can run R3SETUP and its graphical interface, INSTGUI, on different computers that are connected with a TCP/IP network. This allows you to install an SAP System on a remote computer, but to control the installation from the R3SETUP frontend (INSTGUI) on your local computer.

Procedure

1. Install the files for the R3SETUP frontend (INSTGUI) on your local machine. To do this:
   a. On the local computer, insert the `KERNEL CD` into the CD-ROM drive and switch to the directory `<CD_DRIVE>:\NT\COMMON`.
   b. Start the program `INSTGUI.BAT`. When you are prompted:
      - Enter the name of the system you want to install
      - Enter the target directory for the R3SETUP INSTGUI files
      - Log off and log on again
2. Start the R3SETUP frontend (INSTGUI) on your local machine with the option *Start* → *Programs* → *SAP System Setup for <SAPSID>* → *SAP System Setup Frontend*

   The R3SETUP frontend appears on the screen of the local machine.
3. Make sure the R3SETUP files are installed on the remote computer where you intend to install the SAP System.
4. Open a command prompt on the remote machine. Enter the following command to start R3SETUP on the machine where you want to install the SAP System:

   `<INSTDIR>\R3SETUP -f <COMMAND_FILE_NAME>.R3S -g<Hostname>`

   Where `<INSTDIR>` is the directory where the R3SETUP files are located on the remote computer.

If the default communication port 59595 is already occupied, a popup appears and asks you to enter a new port number.

5.8 R3SEDIT Utility

Use

The R3SEDIT utility supplements the R3SETUP tool by offering functions that allow you to use R3SETUP more flexibly.
With the help of the utility you can get an overview of all the installation steps, their sequence and which steps have already been completed. It allows you to restart the installation at a particular point or to repeat a specific step that has failed. For example, if you realize that the input for a particular R3SETUP step was incorrect, you can choose to repeat the input and change your entry. An additional feature allows you to access and edit sections of the R3SETUP command files. For a selected step, you can choose to view or edit the section of the command file that controls the step.

Prerequisites

The R3SEDIT utility is available when you have installed R3SETUP on the local hard disk.

Features

To access R3SEDIT you choose *Start* → *Programs* → *SAPR3 Setup for <SAPSID>* → *Command File Editor - R3SEDIT*

The following table gives an overview of the functions offered:

Option	Purpose
Load	Allows you to choose a command file, for example CNTRDB.R3S and to display a list of all the steps it executes. The check box next to each step indicates its status: • A gray, marked box shows that user input has been entered for the step but not yet executed. • A white, marked box shows that the step has been completed • A white box that is not marked shows that no input has been entered for the step and that the step has not been executed.
Reload	Refreshes the step list so that it reflects the current status of the installation
Install	Starts the installation. The step with which the installation is started depends on the status of the check boxes in the step list.
More/Less	Displays or hides the contents of the command file for a selected step. When the contents of the command file are displayed, they can be edited and saved with the *Save* button.
<< / >>	<< resets the marks in the check boxes of the step list in a backward direction. >> sets the marks in the check boxes of the step list in a forward direction.
Help	Displays detailed online help about R3SEDIT.

6 Additional Information

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

Deletion of an SAP Installation [Page 114]

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

SAP Security on Windows NT [Page 117]

6.1 Deletion of an SAP System Installation

Purpose

The following describes how to delete an SAP System.

Process Flow

To remove an SAP System, you have to delete the:

1. Central instance and any dialog instances that might exist
2. Database
3. Database software

6.1.1 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 Properties* dialog box appears. On the *Install/Uninstall* tab, 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 *Add/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
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.

6.1.2 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:

      `oradim80 -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\Net80\Admin`

   `listener.ora`

   `tnsnames.ora`

   `sqlnet.ora`

   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. In the *User Manager for Domains* delete the groups `ORA_<SAPSID>_DBA` and `ORA_<SAPSID>_OPER`:
   a. To start the *User Manager for Domains* choose:

      Programs → *Administrative Tools (Common)* → *User Manager for Domains*.
   b. Choose *User* → *Select Domain.*
   c. Enter:

   `\\<local_hostname>` and choose *OK.*
   d. Select and delete the local groups `ORA_<SAPSID>_DBA` and `ORA_<SAPSID>_OPER`.

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* in the Control Panel. To access the services choose *Start* → *Settings*→ *Control Panel* → *Services.*
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 NT user and system environment. To access the environment choose *Start* → *Settings*→ *Control Panel* → *Environment.* 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 NT *Start* menu:
   a. In the *Windows NT Explorer*, choose the directory `<SystemRoot>\Profiles`, for example, `C:\Winnt\Profiles`).
   b. In the subdirectory `\All Users\Start Menu\Programs`, select the folders for Oracle and delete them.
   c. Delete the Oracle shortcut from the desktop.

6.2 SAP System Security on Windows NT

In a standard SAP System installation, all steps relevant for security are automatically performed by R3SETUP. Although R3SETUP 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 NT domain to ensure central and straightforward administration of the SAP System. The following gives you an overview of the user accounts and groups that R3SETUP creates during a domain installation.

User Accounts

R3SETUP 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

R3SETUP creates two 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.

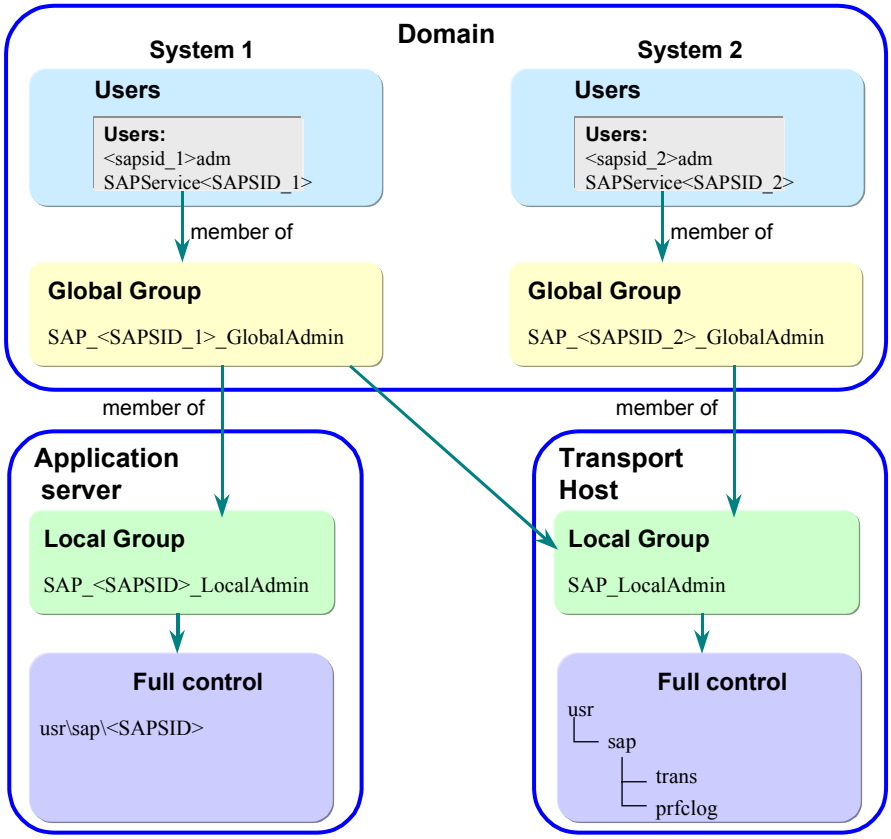
  The SAP_<SAPSID>_GlobalAdmin groups of all the SAP Systems that are part of the transport infrastructure are added to the SAP_LocalAdmin group. As a consequence, the users <sapsid>adm and SAPService<SAPSID> of all systems in the transport infrastructure are members of the SAP_LocalAdmin group and have the authorizations necessary to initiate and execute transports.

SAP Directories

R3SETUP protects the SAP directories under usr\SAP\<SAPSID> by only granting the group <SAPSID>_local\administrators full control over these directories.

The following graphic illustrates the user accounts and groups created by R3SETUP 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:

Automatic Creation of Accounts and Groups [Page 119]

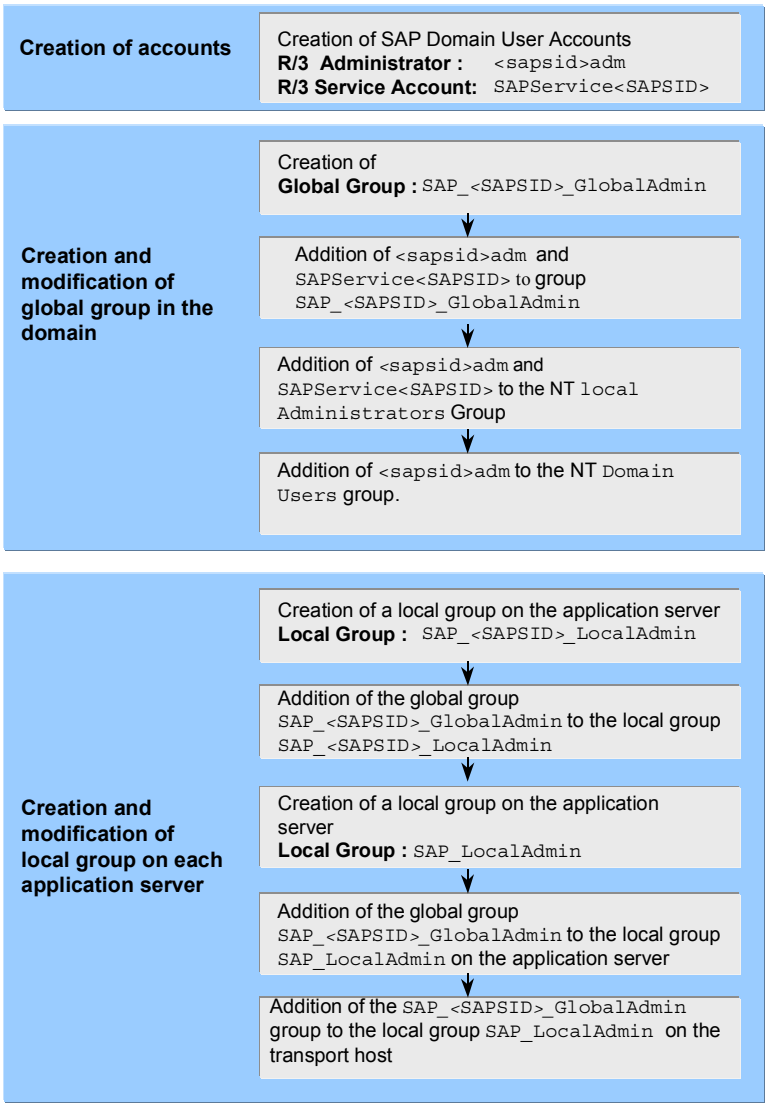
6.2.1 Automatic Creation of Accounts and Groups

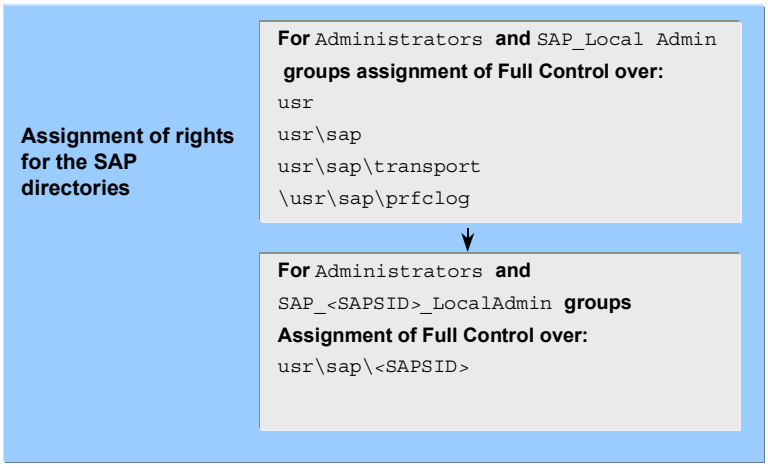
Purpose

During the installation, R3SETUP 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 R3SETUP to create the users and groups for a **domain** installation.





6.2.2 Manually Granting Rights for the Installation

Use

The NT 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 R3SETUP tool. The rights required for the installation are automatically assigned to the user who installs the R3SETUP tool. You can grant another user the rights listed above manually, using the procedure described here.

Procedure

To grant user rights:

1. From the NT menu, choose:

   Start → *Programs* → *Administrative Tools* → *User Manager for Domains,* then *Policies* → *User Rights.*

2. Choose *Users* → *Select Domain* and then enter the SAP domain:

   \\<hostname>

3. In the *User Rights Policy* dialog box, choose *Show advanced user rights*.
4. Expand the list of available rights.
5. Select a right that is needed for the installation and choose *Add*.

   The *Add Users and Groups* window opens.

6. To display a list of users defined in the system, choose *Show users.*
7. Select the name of the user that is to perform the installation and choose *Add.*

The selected user appears in the *Add Names* box.

8. Confirm the selection with *OK.*

   The *User Rights Policy* dialog box reappears. The selected user and the right that is to be granted to this user are displayed.

9. Repeat steps 2 and 3 for each of the rights the user requires for the installation.

10. When you have finished, confirm the entries in the *User Rights Policy* window with *OK.*

The user has now been granted all the rights you added in the *User Rights Policy* dialog box.

6.2.3 Performing a Domain Installation as Local Administrator

Use

The installation of the R3SETUP tool and the SAP System must be performed by a user that is a domain administrator. If, for any reason, you are unable to grant a user domain administrator rights, it is possible to perform the installation as a user with local administrator rights. However, the system has to be prepared appropriately. A new global group, `SAP_<SAPSID>_GlobalAdmin`, and two new users, `SAPService<SAPSID>` (this user is **not** created for Informix installations) and `<sapsid>adm`, have to be created. The new users must be added to the `SAP_<SAPSID>_GlobalAdmin` group.

Prerequisites

The actions described must be performed by a domain administrator.

Procedure

Creating the New Group

To create the group `SAP_<SAPSID>_GlobalAdmin:`

1. Log on as domain administrator.
2. To start the *User Manager*, choose the following from the NT *Start* menu:

   Programs → *Administrative Tools (Common)* → *User Manager for Domains*.

3. On the *User Manager* <*Domain*> screen, choose:

   User → *New Global Group*

4. Enter the following data and then confirm the entries with `OK`.

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

   Description: Enter a meaningful description

Creating the New Users

To define the SAP System users `<sapsid>adm` and `SAPService<SAPSID>`:

1. In the *User Manager for Domains* choose *User* → *New User*.

   The dialog box *New User* appears.

2. Enter the following data in the dialog box *New User*:

   User name: **<sapsid>adm**

   Full Name: SAP system administrator, SAP service account

   Description: Enter a meaningful description

   Password **<password>**

   Enter the user <sapsid>adm in lowercase.
   Make sure that no other options are selected.

3. Choose *Groups*.

   The *Group Membership* dialog box appears.

4. In the *Group Membership* dialog box, select the new SAP_<SAPSID>_GlobalAdmin group and add it to the *Member of* list for the user <sapsid>adm. By default, the user is also a member of the Domain Users group.

5. Choose *OK* to return to the *New User* dialog box.

6. In the dialog box *New User,* enter the following data:

   User name: **SAPService<SAPSID>**

   Full Name: SAP service account

   Description: Enter a meaningful description

   Password **<Password>**

   Select the option *Password never expires.*

7. Choose *Groups.*

8. In the *Group Membership* dialog box, select the new SAP_<SAPSID>_GlobalAdmin group and add it to the *Member of* list for the user SAPService<SAPSID>.

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

   – Select the group SAP_<SAPSID>_GlobalAdmin and choose *Set*. This group becomes the primary group.

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

9. Close the *User Manager for Domains*.

Part II MSCS SAP Installation

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

The installation of the SAP System in a MSCS configuration is only possible on certified cluster hardware. The cluster must be certified by Microsoft and the hardware components by iXOS R/3NTC. To find out which hardware is permitted, see the web sites:

`www.microsoft.com\hwtest\hcl`

`www.r3onnt.com`

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

208841	Conversion to MSCS
312436	SAP Installation on Windows NT - Oracle
312428	SAP Installation on Windows NT (general information)

Process Flow

The process of setting up a 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 R3SETUP 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

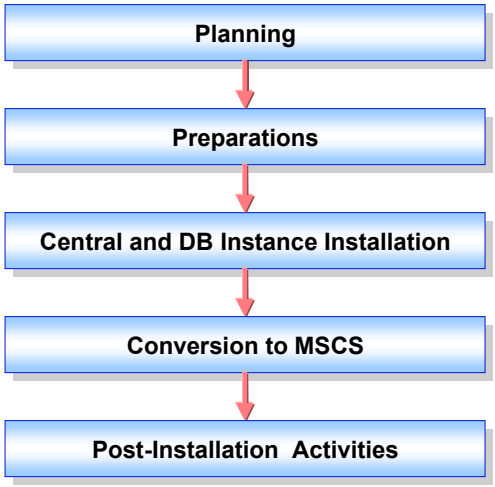
When you follow the instructions to set up the SAP System in a MSCS configuration, it is important to keep in mind that the process is a combination of standard installation steps and supplementary steps specifically required for the cluster. Whenever steps correspond to those in the standard installation 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:



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 CD, 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. Instructions on how to proceed are given in the documentation *R/3 Homogeneous System Copy* available on the SAPNet under: *Service* → *Support Services* → *Installation/Upgrade* → *Installation/Upgrade Guides* → *<Release>*
- If the original system and target system have a different database or operating system, but the same SAP Release, perform a heterogeneous system copy. A prerequisite for this type of copy is a migration package that can be ordered from SAP.

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 Conversion to MSCS [Page 149]

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.

7 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.

7.1 Checking Hardware Requirements for MSCS

Use

The hardware on which you install a 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 iXOS R/3NTC. You can access lists of certified clusters and components on the Internet at:

   `www.microsoft.com\hwtest\hcl`

   `www.r3onnt.com`

2. Ensure that both nodes of the cluster are connected by a private and public network:
   - 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 NT 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	4 GB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*. Select the local disks.
At least 6 shared disks	22 GB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Disk Administrator*. Select the local disks.

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 512 MB	Choose *Start* → *Programs* → *Administrative Tools (Common)* → *Windows NT Diagnostics*.
Virtual memory of 5 times RAM. 10 GB is the maximum required.	a. Choose *Start* → *Settings* → *Control Panel* → *System*. b. Choose *Performance*. c. If required, in section *Virtual Memory*, choose *Change*. Only select the local disks.

7.2 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:

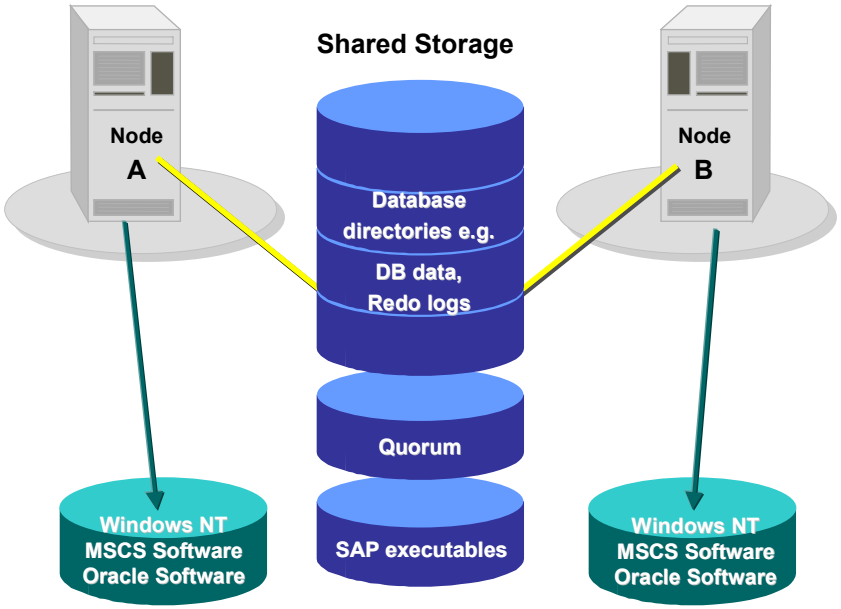
Software Requirement	**How to check**
Windows NT Enterprise Edition, English (international) version, service pack 5 or higher	c. Choose *Start* → *Programs* → *Command Prompt*. d. Enter the command **`winver`**
Internet Explorer 4.0, service pack 1, or 5.0	In the Explorer, choose *Help* → *About Internet Explorer*
MSCS software Version 1.0.	–
Oracle Enterprise Edition version 8.1.6 Patch 8.1.6.1.1	–
Oracle Fail Safe software version 3.0.4	–
Windows NT Resource Kit is strongly recommended to enable support	–

7.3 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.



The Oracle server software in the ORACLE HOME directory must have the same drive letter and path on both nodes.

Quorum Disk

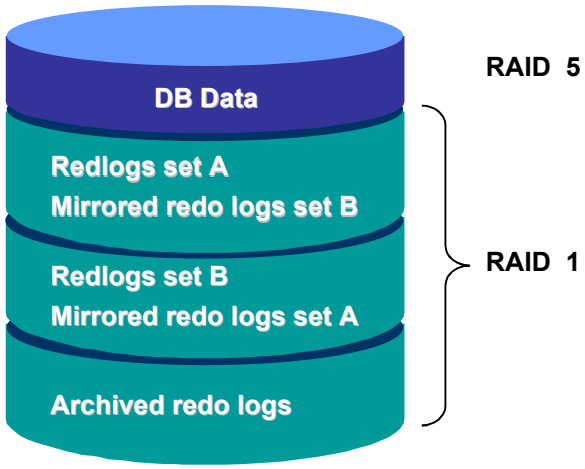
The MSCS `Quorum` disk is unique to a cluster installation and is always owned by one of the nodes. It has two main functions in the cluster:

- 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 Distribution of Components to Disks [Page 25].

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.

7.4 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 NT Enterprise Edition	`\Winnt`	500 MB
MSCS Software	\Winnt\Cluster	3 MB
SAP cluster files	\Winnt\SAPCluster	10 MB
NT page file	\	2500 MB
Oracle server software	\orant	600 MB
Oracle Fail Safe Software	\orant	10 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	\<SAPSID>DATA<1>. ..\<SAPSID>DATA<6>	13 GB (initially)
Online redo logs, set A	\ORACLE\<SAPSID>\origlogA	40 MB
Online redo logs, set B	\ORACLE\<SAPSID>\origlogB	40 MB
Mirrored online redo logs, set A	\ORACLE\<SAPSID>\mirrlogA	40 MB
Mirrored online redo logs, set B	\ORACLE\<SAPSID>\mirrlogB	40 MB
Backup of online redo logs	\ORACLE\<SAPSID>\saparch	5 - 6 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 NT system directory:
<DRIVE>:\<NT_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.

7.5 Obtaining Addresses 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	NT 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)	NT installation
Node B: adapter for private network	`10.1.1.2`	`decc15_priv`	Address for inter-node communication on the private network	NT 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)	NT 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
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 for the cluster using R3SETUP 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 NT 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 NT *Start* menu choose *Start* → *Control Panel* → *Settings* → *Network*

   The *Network* dialog box appears.

2. On the *Protocols* tab select *TCP/IP Protocol* and then choose *Properties*.
3. On the *TCP/IP Properties* dialog box, select one of the network cards. The corresponding IP address is displayed.
4. 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 Using Addresses in an MSCS Configuration [Page 139].

8 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.

See also Checking Hardware Requirements for MSCS [Page 128]
and Checking Software Requirements for MSCS [Page 130].

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 primary domain controller (PDC) or a backup domain controller (BDC) may not be used as a cluster node.

	Cluster-Specific	Task	Comment
1		On both nodes, you install Windows NT 4.0 **Enterprise Edition** and service pack 5 or higher. Alternatively you can install Windows 2000.	See the Windows NT documentation.
2		On **both nodes**, you install the Internet Explorer version 4.0 and service pack 1 or version 5	You log on as domain administrator for this step.
3		On **both nodes**, you install the Microsoft Management Console.	See Installing Microsoft Management Console [Page 38].
4		On **both nodes**, you install latest version of the DLLs.	See Installing Up-To-Date Dynamic Link Libraries [Page 39].
5		On **both nodes**, you adjust the size of the paging file and the NT file cache.	See Adjusting Virtual Memory [Page 40] and Reducing the Size of the NT File Cache [Page 40]
6	✓	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 141] below.
7	✓	You check the IP address and corresponding host name assignment.	See Checking the Mapping of Host Names [Page 142] below.
8	✓	Only on node A, you manually assign meaningful drive letters to the shared disks using the *Windows NT 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 143].
9	✓	On **both nodes**, you install the MSCS software on local disks. During the installation on node A, 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.	The default location of the MSCS software is the NT directory `<DRIVE>:\Winnt\Cluster` The purpose of the *quorum* resource is to record information about the cluster configuration centrally. See the Windows NT documentation.

8.1 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**.

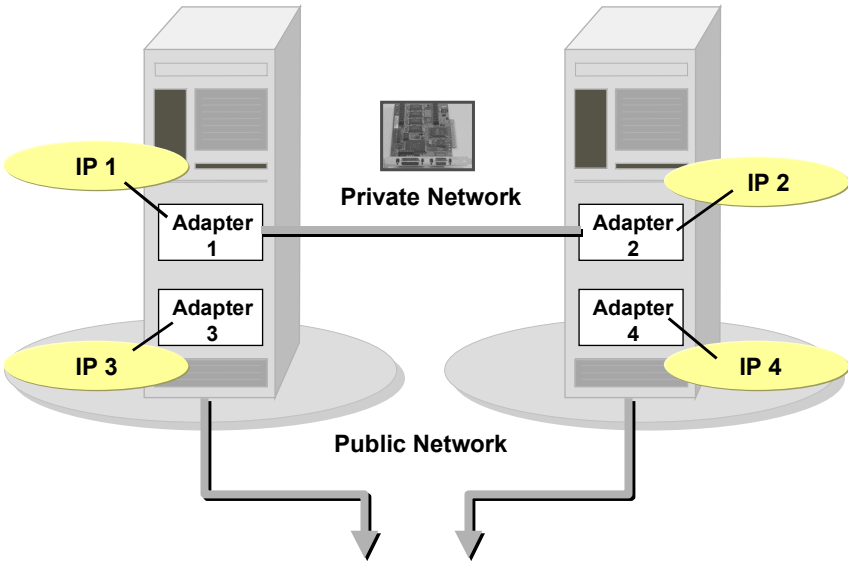
Physical IP Addresses Assigned to Network Adapters

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.

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

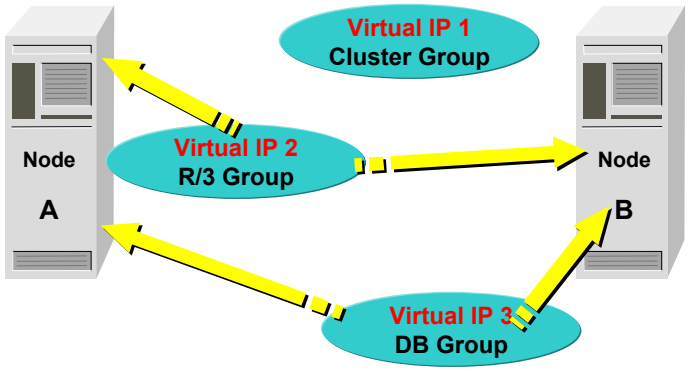
When the SAP System has been installed and the cluster fully configured, the critical system resources are bound together in three different **groups**. Each of these groups requires a virtual IP address and host name that is permanently mapped to the group and not to a particular node. This has the 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.



8.2 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 NT `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 133] you obtained from the system administrator during the planning phase of the installation. Map the host names to addresses after you have installed Windows NT.

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 NT:

  `<Drive>:\WINNT\system32\drivers\etc`

  The `hosts` file has to be identical on both nodes of the cluster, and on all application servers and frontends. The newly edited file therefore has to be copied to all these locations in the system.

8.3 Checking the Mapping of Host Names for MSCS

Use

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 [Page 133] and compare the output with your own record of addresses and host names.

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 NT and the configuration of the network, you get a reply when entering the IP addresses of the network adapters.

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 NT *Start* menu choose *Start* → *Control Panel* → *Settings* → *Network*

   The *Network* dialog box appears.

2. From the *Bindings* tab, select *Show Bindings* for *all protocols.* Select one of the listed TCP/IP protocols and expand it.

   The network cards of the private and public networks are displayed for the current node.

3. Change the order in which the cards are listed. The card of the **public** network must be displayed before that of the **private** network. Use the *Move Up* and *Move down* buttons to change the order of entries.

4. Repeat the procedure for any other TCP/IP protocols that might be listed.

8.4 Assigning Drive Letters for MSCS

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. From the NT *Start* menu choose *Start* → *Programs* → *Administrative Tools* → *Disk Administrator.*

2. Select a disk and choose *Tools* → *Assign Drive Letter.* In the dialog box that appears, enter a new drive letter.

9 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 137] for the installation of the SAP System and database:

You have installed the following components on both nodes:

- Windows NT Enterprise Edition
- Microsoft Management Console
- Internet Explorer
- Latest version of the Windows NT DLLs
- MSCS software

You have completed the following actions:

- Adjusted the size of the paging file and the NT file cache
- Mapped IP addresses to host names and checked the mapping
- Assigned meaningful drive letters to the shared disks

Process Flow

In the table below:

- 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.

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 146] below.
2.		On both nodes, you install the Oracle 8.1.6 **server** software and patch set 8.1.6.1.1	See the section Installing the Database Software [Page 50]
3.		On **both nodes**, you install the Oracle Fail Safe Software Fail 3.0.4. After the installation reboot.	See the section Installing the Oracle Fail Safe Software [Page 147]. See the section Rebooting During the Installation for MSCS [Page 146].
4.		On node A, you install the R3SETUP 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 Installing R3SETUP [Page 53].
5.		On node A, you install the SAP central instance and load the database using the R3SETUP option *Install Central and Database Instance*. You are prompted to enter the drives for the database data and log files and the SAP executables. You must distribute these to different **shared** RAID volumes as described earlier.	Make sure that you are logged on as the same user with domain administration rights that installed the R3SETUP 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 130] Installing the SAP System and Loading the Database [Page 55]

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.

9.1 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. On the NT *Control Panel* under *Services*, 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:
   - Open a command prompt and start the *Oracle Server Manager* with the command **`svrmgr30.`**
   - In the *Server Manager* enter:

     ```
     svrmgr> connect internal
     svrmgr> startup
     svrmgr> exit
     ```
7. Log off and log on again as domain administrator.

9.2 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 NT *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.

9.3 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 3.0.4.

Prerequisites

You have installed the Oracle database software locally on both nodes.

Procedure

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. On the NT *Control Panel* under *Services*, make sure that the *Cluster Server* service is started on both nodes.
4. Insert the CD `Oracle Fail Safe` in the CD drive.
5. Install *Oracle Fail Safe* version 3.0.4:
   a. Insert the `Oracle Fail Safe` CD.
   b. Start the *Oracle Universal Installer*. To do this, double-click the file `ORAINST.EXE` in the directory `<CD_DRIVE>:\NT\I386\WIN32\INSTALL`

   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. The Fail Safe software must be installed in a separate Oracle home directory, for example, **`Failsafe`** *Path* Enter the path of the Oracle Home directory for the *Fail Safe* software. It must be on a local disk. For example, **`F:\Oracle\OFS304`**

Screen	Entry
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 *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* → *Settings* → *Control Panel* → *Services*. Select the *Cluster Server* service and click *Startup*... The log on account for the service is displayed. Enter this account for *Oracle Fail Safe Account/Password.*
End of Installation	Click *Exit* to leave the *Installer.*

6. Reboot and log on again.

10 The Conversion to MSCS

Purpose

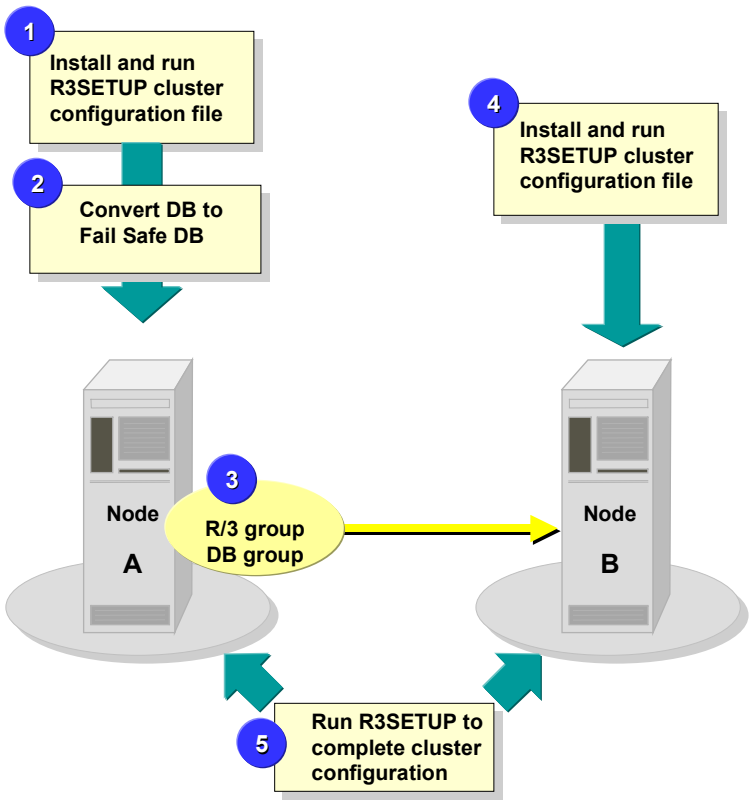
The conversion phase of the cluster installation configures the database and the SAP instances to enable them to interact with the cluster software and make use of the failover functionality.

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 diagram gives an overview of the steps involved in the cluster conversion process.



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.

Caution

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 for MSCS

	Cluster-Specific	Action	Comments
1.	✓	On node A, you run `NTCLUS.BAT` to install the R3SETUP files required for the cluster conversion.	See the section Converting Node A for MSCS [Page 151]
2.	✓	On node A, you run the R3SETUP option *Configuring Node A for a MSCS* .	See the section Converting Node A for MSCS [Page 151]
3.	✓	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 153]
4.	✓	You move the database group and SAP group to node B. On node B, all resources except the resource `SAP-R/3 <SAPSID>` must be online.	The SAP resource `SAP-R/3 <SAPSID>` must be offline on node B. See the section Moving MSCS Groups [Page 146]
5.	✓	On node B, you run `NTCLUS.BAT` to install the R3SETUP files required for the cluster conversion.	See the section Converting Node B for MSCS [Page 156].
6.	✓	On node B, you run the R3SETUP option *Configuring Node B for a MSCS*.	See the section Converting Node B for MSCS [Page 156]
7.	✓	On node B, you run the R3SETUP option *Completing the Conversion to a MSCS*	The R/3 group and the database group must be online on node B. See the section Completing the MSCS Conversion [Page 158]
8.	✓	Move the R/3 group and the database group to node A.	See the section Moving MSCS Groups [Page 146]
9.	✓	On node A, you run the R3SETUP option *Completing the Conversion to a MSCS*	The R/3 group and the database group must be online on node A. See the section Completing the MSCS Conversion [Page 158]
10.	✓	Prepare the MSCS configuration for the use of SAPDBA.	See SAP Note 114287.
11.	✓	On both nodes, test the failover mechanism.	

10.1 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>` in the *Control Panel* under *Services*.
- If the database is not yet cluster-enabled (**Steps 1 to 3** above):
  - On the NT *Control Panel* under *Services*, make sure that the service *OracleService<SAPSID>* is running
  - Log off and log on again as user `<sapsid>adm`
  - Start up the database:

    Open a command prompt and start the *Oracle Server Manager* with the command **`svrmgr30.`**

    In the *Server Manager* enter:

    ```
    svrmgr> connect internal
    svrmgr> startup
    svrmgr> exit
    ```
  - Log off and log on again as domain administrator

10.2 Converting 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 R3SETUP tool. When you run this option, amongst other things, it:

- Creates of 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

- Copies the Oracle `tnsnames.ora` file to node B and adds the account under which the Cluster Service runs to the NT group `ORACLE_<SAPSID>_DBA`

Procedure

Preparing R3SETUP for Cluster Conversion on Node A

Before you can use the R3SETUP tool to convert node A, you must install the required R3SETUP files on your local hard disk.

1. Make sure that you are logged on to node A as Domain Administrator.
2. Insert the `Kernel` CD-ROM.
3. Start the program `NTCLUST.BAT` from the directory

   `<CD_DRIVE>:\NT\COMMON`
4. When you are prompted to specify an installation directory, enter the same directory that you used for R3SETUP when you initially installed the SAP central instance. The default is:

   `<Drive>:\users\<SID>adm\install`

   R3SETUP now copies all the files required for the cluster conversion to the specified directory.
5. You are prompted to log off and log on again as Domain Administrator.

Converting Node A for Operation in a Cluster

Configure the SAP instance on node A for cluster operation as follows:

1. Make sure that you are logged on to node A as a user with domain administration rights and as the **same user** that installed the R3SETUP conversion files.
2. From the NT *Start* menu choose:

   Programs → *SAP System Setup for <SAPSID>* → *Configuring Node A for a MSCS*

   The R3SETUP window appears. You are prompted to enter values for a number of parameters.
3. Enter the parameter values that you are prompted for. Take care when making entries for the following:

Prompt	Entry
Network name for SAP cluster group	Enter the name of the **SAP cluster group**. Do not enter the name of the cluster.
RAM	Accept the default. Note that the entire RAM specified is then reserved for the SAP System. If the database is moved to the same node, due to failover, it only functions properly if the paging file is large enough. It must be set to 5 times RAM (10 GB is sufficient).

Names are case-sensitive! Make sure you enter them correctly.

In addition to the above entries, 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.

When all entries have been made, R3SETUP begins processing. It converts the SAP instance on node A for operation in the cluster.

10.3 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 Converting Node A for MSCS [Page 151]

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 NT menu choose *Start* → *Programs* → *Oracle Fail - Safe* → *Oracle Fail Safe Manager*.
   The window *Connect to Oracle Fail Safe Cluster* appears.
2. 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>`

3. In the *Welcome* dialog box 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.

4. In the *Oracle Fail Safe Manager*, create the *Fail Safe* group `ORACLE<SAPSID>`.

   Choose *Groups* → *Create*.

   The window *Create Group:...* appears.

5. Enter the *Group Name* **`ORACLE<SAPSID>`**.
   In answer to the question *Do you want to enable failback for this group?*, select *No* and then choose *Finish*.

   The window *Finish Creating the Group* appears and displays information about the group. Choose *OK* to continue.

6. In the window *Add Virtual Address*, select *Yes* to indicate that you want to add a virtual address to the group.

   The *Add Resource Group: - Virtual Address* appears.

7. Select *Show networks accessible by clients* and enter the following information:

   Under *Network* enter **`<network_for_public_LAN>`**

   Under *Virtual Address* for *Host Name* enter **`<database_group_name>`** (the virtual name for the database group).

   For *IP Address* enter **`<virtual_IP_address_database_group>`**

   Choose *Finish*.

   The window *Add the Virtual Address to the Fail Group* appears. Choose *OK*.

   If the *Fail Safe Manager* cannot create the *Fail Safe* group, look at the *NT 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 on the primary node A:

1. Start the *Oracle Fail Safe Manager* with *Start* → *Programs* → *Oracle - Failsafe* → *Oracle Fail Safe Manager*
2. In the window *Connect to Cluster*, enter the following and then choose *OK*:

Prompt	Entry
User name	User with the account under which the *Cluster Server* runs.
Password	Password
Cluster Alias	Name of the cluster that is installed
Domain	Domain Name

3. In the *Welcome* dialog box 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.

4. Add the R/3 database to the Fail Safe group `Oracle<SAPSID>`.
   a. In the tree on the left, expand <*Primary_Node*> → *Standalone Resources* and then select the database `<SAPSID>.world`
   b. Choose *Resources* → *Add to Group.*
5. On the dialog box *Add Resource to Group*, for *Resource Type,* select *Oracle Database*. For *Group name*, select *Oracle<SAPSID>*
6. On the dialog box *Add Resource to Group – Database Identity...,* enter the following and then choose *Next*:

Group Name	**Oracle<SAPSID>**
Service Name	**<SAPSID>.world**
Instance Name	**<SAPSID>**
Database Name	**<SAPSID>**
Parameter File	**<DRIVE>:\<ORACLE_HOME>\database\init<SAPSID>.ora**

7. In the window *Add Resource to Group – Database Authentication...* enter the following and then choose *Next*:

User name	**internal**
Password:	**<password>**
Confirm Password:	Repeat the password

The R/3 database `<SAPSID>` is now added to the Fail Safe group.

10.4 Converting 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 R3SETUP option for cluster configuration on node B. This option:

- Creates users and groups
- Sets the NT system and user environment
- Copies tools to the `SAPCluster` directory
- Enters required port numbers in the Windows NT 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.

Procedure

To prepare for the use of the R3SETUP tool on node B, you have to install the files of the tool locally on node B.

Installing R3SETUP for Cluster Conversion on Node B

1. Make sure that you are logged on to node B as Domain Administrator.
2. Insert the `kernel` CD-ROM.
3. Start the program `NTCLUST.BAT` from the directory:

   `<CD_DRIVE>:\NT\COMMON`

   When you are prompted to enter an installation directory, specify the local target directory for the R3SETUP files. The default is:

   `<Drive>:\users\<sapsid>adm\install`

   All the files required for the cluster conversion are copied from the CD to the installation directory you have specified.
4. When you are prompted, log off and log on again.

Converting Node B for Operation in a Cluster

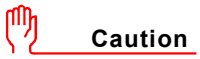
1. Make sure that you are logged on to node B with domain administration rights and as the **same user** that installed the R3SETUP conversion files.
2. From the NT *Start* menu choose:

   Programs → *SAP System Setup for <SAPSID>* → *Configuring Node B for a MSCS*

   The R3SETUP window appears. You are prompted to enter values for a number of parameters.

3. Enter all the parameter values you are prompted for. Take care when making entries for the following:

Prompt	Entry
Database host name (DBHOSTNAME)	Virtual name of the database group
Network name for SAP cluster group	Enter the name of the **SAP cluster group**. Do not enter the name of the cluster.
RAM	Accept the default. Note that the entire RAM specified is then reserved for the SAP System. If the database is moved to the same node, due to failover, it only functions properly if the paging file is large enough. It must be set to 5 times the RAM (10 GB is sufficient).



Caution

The suggested default value for the DBHOSTNAME parameter might be wrong. Sometimes the physical host name instead of the virtual host name is proposed.

When all required entries have been made, R3SETUP begins processing and converts the SAP instance on node B for operation in the cluster.

10.5 Completing the MSCS Conversion

Use

To complete the cluster conversion, you have to run the R3SETUP option *Completing the Conversion to a MSCS* on **node B and node A.** This edits the entries for SAP System host names in the `INSTVERS` table.

Prerequisites

You have converted node A and B for operation in the cluster and set up the database as a Fail Safe database.

Procedure

The database and SAP instance must be running on the node where you complete the cluster migration.

1. On node B, in the *Cluster Administrator* , make sure that the SAP and database group are online.
2. From the NT *Start* menu choose the option:

   Programs → *SAP R3 Setup for <SAPSID>* → *Completing the Migration to a MSCS*

   The R3SETUP window appears. You are prompted to enter values for a number of parameters. Take care when you enter the following:

Prompt	Entry
Host name of the central instance	Enter the virtual name of the SAP cluster group

3. Move the SAP and database group to node A.
4. On node A, in the *Cluster Administrator* , make sure that the SAP and database group are online.
5. From the NT *Start* menu choose the option:

   Programs → *SAP R3 Setup for <SAPSID>* → *Completing the Migration to a MSCS*

6. The R3SETUP window appears. When you enter the host name of the central instance make sure you specify the virtual name of the SAP cluster group.

Your SAP System has now been fully converted for operation in the cluster and can make use of the available cluster functionality.

11 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 frontend.

For instructions on how to install the frontend see the documentation:

Installing SAP Frontend Software for PCs

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 160] below.
2.	You check that you can log on	See Logging on to the SAP System [Page 94] 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 95]
4.	On **both nodes**, you check the SAP System Services	See Checking SAP System Services [Page 96]
5.	You install the SAP online documentation	See Installing the Online Documentation [Page 96]
6.	You configure the SAProuter and the SAPNet R/3 Frontend	See Configuring SAProuter and SAPNet - R/3 Frontend [Page 97]
7.	If required, you set up secure single sign on,	See Secure Single Sign On [Page 98]
8.	You start transaction SSAA and perform the steps specified under *Installation follow-up Work*	See the documentation available within the transaction
9.	If you want to implement the SAP Internet solution, install the Internet Transaction Server	See SAP Internet Solution Installation [Page 103]

11.1 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

1. Start the *Cluster Administrator* from the NT *Start* menu with *Programs* → *Administrative Tools* → *Cluster Administrator*

   The *Cluster Administrator* opens.

2. 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

1. Start the *Cluster Administrator* from the NT *Start* menu with *Programs* → *Administrative Tools* → *Cluster Administrator*
2. In the tree, double-click on the group `SAP-R/3 <SAPSID>` to display the resources belonging to the SAP group.
3. Select the resource SAP-R/3 <SAPSID>, press the right mouse button, and *choose Take offline*.

   The SAP System is stopped.