



Installation Information

Installing and Configuring a Standalone Java 6.40 SR1 System on Windows with MSCS: Oracle

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Typographic Conventions

Type Style	Description
<i>Example Text</i>	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options.
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
EXAMPLE TEXT	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example text	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example text	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
<Example text>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
EXAMPLE TEXT	Keys on the keyboard, for example, F2 or ENTER.

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax

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Installing and Configuring a Standalone Java 6.40 SR1 System

1 Introduction

This documentation explains how to install and configure your Java 6.40 SR1 system on Windows with Microsoft Cluster Service (MSCS) when your database is Oracle.

It is written for experienced database administrators and technical consultants who are familiar with the Windows operating system and with Microsoft Cluster Service.

For this type of installation, you have to set up the system on two clustered hosts (called "MSCS nodes") 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 unplanned downtime. Ideally it enables 24-hour operation, 365 days a year.

With MSCS you enable critical system components, so-called Single Points of Failure (SPOFs) to be automatically switched from one machine to the other, if hardware or software problems arise on one machine. With the help of this switchover – or failover – the system can continue functioning normally so that unplanned system downtime is avoided.

Apart from enabling failover when hardware or software problems occur, you can also use MSCS during system maintenance work. If you need to maintain one node, you can deliberately switch the cluster resources to the other node and temporarily operate it there while maintenance is in progress. When maintenance work is finished you can easily move the resources back to their original node and continue operating them there.

1.1 Java System Landscape

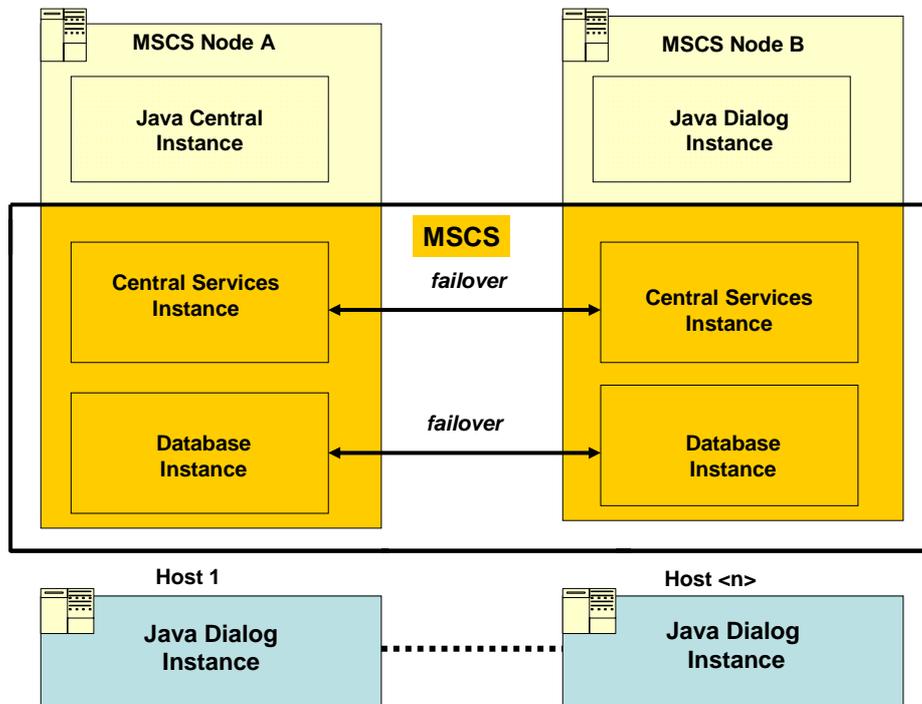
In a Java standalone system you have the following components:

Component	Number of Components per Java system	Single Point of Failure
SCS instance (message services and enqueue services)	1	yes
Database instance	1	yes
Application server Java central instance, Java dialog instance	1 – n	no

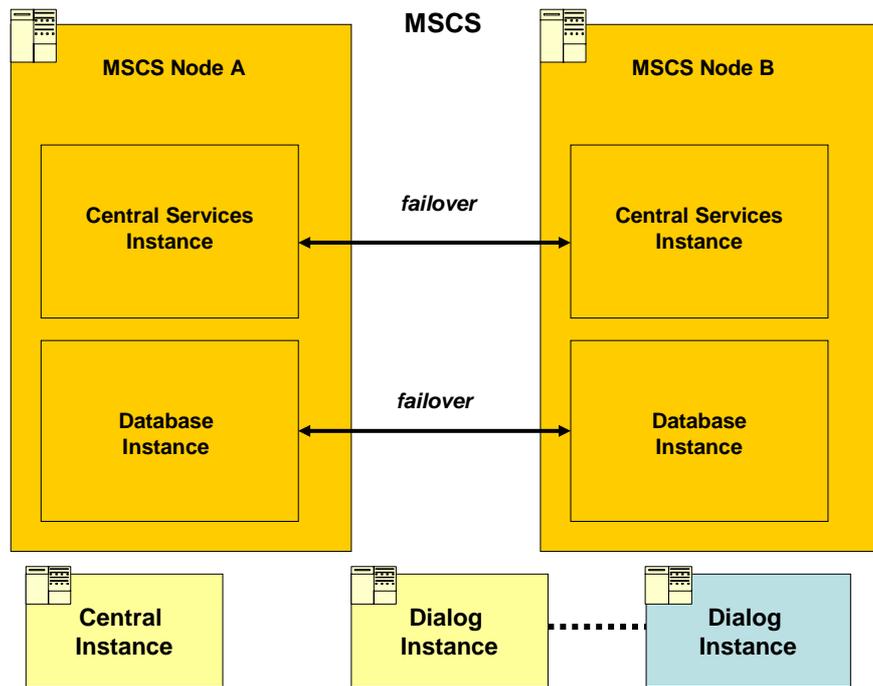
- To protect the SPOFs (SCS instance and database instance) you have to use MSCS. If a hardware or software problem occurs the clustered SCS instance and the clustered database automatically fail over to the other node. If you need to maintain the node where the SCS instance and database are running you can switch these instances on the other node. When maintenance work is finished you move the SCS and database instance back to the original node.
- To protect system components that are non-SPOFs, for example application servers, you have to install them as multiple components. In this case you must install at least

two application servers (one central and at least one dialog instance) on two different hosts. You have the following options:

- You install the central instance and the dialog instance on two MSCS nodes. Any additional application servers (dialog instances) are installed outside of MSCS. The J2EE Engine has to be installed on a local disk. If the J2EE Engine is installed on an MSCS node to be maintained, you have to stop the J2EE Engine. When you have finished maintenance, you restart the J2EE Engine.



- You install the central instance and all dialog instances outside of MSCS on different hosts. Only the SCS instance and the database instance are installed on the cluster nodes.



2 Planning

You need to plan the cluster installation for your Java system.



In the following the two machines in the cluster are referred to as MSCS node A and MSCS node B.

Process Flow

1. You [have to read the installation documentation \[Page 8\]](#).
2. You [distribute components to disks for MSCS \[Page 9\]](#).
3. You [obtain IP addresses for MSCS \[Page 12\]](#).
4. You [check the hardware and software requirements for MSCS \[Page 16\]](#).



The cluster hardware is equipped with two sets of disks:

- Local disks that are attached directly to one of the nodes
- Shared disks that can be accessed by both nodes via a shared interconnect.

You need to 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.

2.1 Installation Documentation

Before you begin the installation, read:

- The following SAP Notes as they contain the most recent information as well as corrections to this documentation.

Note Number	Description
787451	MSCS-specific information about the Web AS 6.40 SR1 Java system installation and corrections to the documentation.
786608	Windows-specific information about the Java system installation and corrections to this documentation.
786673	Oracle-specific information about the Web AS 6.40 SR1 system installation and corrections to this documentation

- The current installation guide *SAP Web Application Server 6.40 SR1 <Java> on Windows: Oracle*, which is available on SAP Service Marketplace at: service.sap.com/instguidesNW04 → *Installation* → *SAP Web AS* → *SAP Web AS 6.40 SR 1 and Related Documentation*

This guide contains important general information about the standard installation of an SAP system.

2.2 Distribution of Components to Disks for MSCS

Keep in mind that the cluster has the following different sets of disks:

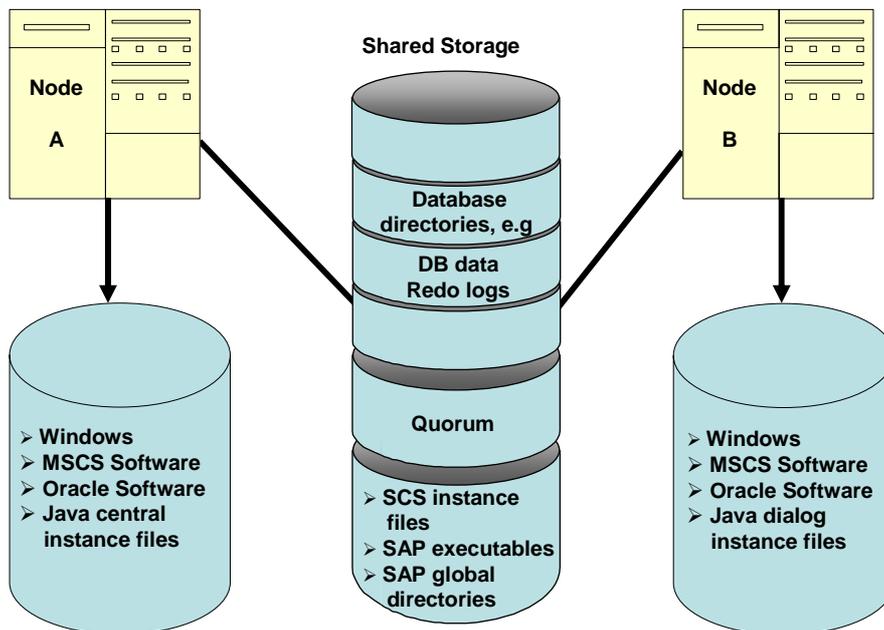
- Disk arrays connected locally to MSCS node A
- Disk arrays connected locally to MSCS node B
- Disk arrays connected to both MSCS nodes A and B with a shared bus, providing shared storage for both MSCS nodes

You need to install system components in both the following ways:

- Separately on both MSCS nodes A and B to use the local storage on each MSCS node
- Once on the shared storage that is used in common by MSCS nodes A and B

The following graphic illustrates how you distribute the software to different volumes of a RAID system during the installation. You need to locate the database data files, the SAP program files (executables), and the quorum resource on **different** RAID volumes. This configuration is required so that the SAP system and database can be switched as separate units during failover.

Software Distribution on a Cluster System with RAID for Oracle



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 MSCS nodes. It has the following main functions in the cluster:

- It logs changes to the cluster configuration that are entered in the *Registry*.
- It arbitrates between competing MSCS nodes when the communication between MSCS nodes breaks down. This means that cluster resources are forced to fail over to the MSCS node that owns the `quorum` disk.



The default quorum log size is 64 MB. If you use a large number of shares, the quorum disk size may be too small.

To increase the quorum log size, carry out the following steps:

- Right-click the cluster group and choose *Properties*.
- Select *quorum log* and increase the value to 4096 in the Size box.

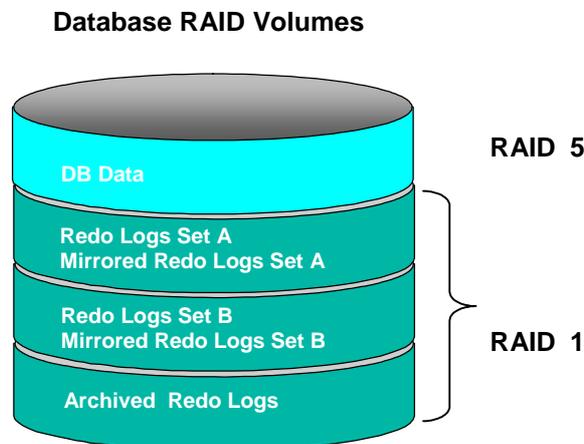
For more information, see also the *Microsoft Knowledge Base Article 225081*.

Database Directories

As shown in the graphic above, you must distribute the database directories so that they:

- Do not reside on the same RAID volumes as the SAP program files or the quorum resource.
- Reside on several different RAID volumes for security reasons

Depending on the disks available and the size of your system, various disk configurations are possible, but you must always locate the database data and redo logs on **separate** volumes. The following graphic shows a secure method to distribute the database directories to volumes.



Note that the BR*Tools directories `\sapreorg`, `\saptrace`, `\sapbackup`, `\sapcheck` are not shown in the graphic. You can locate these directories on any of the database volumes as they do not require special security measures.

2.2.1 Directories in an MSCS Configuration

The following tables show the directories where the main software components for the SAP cluster installation are stored:

Directories on Local RAID Volumes on both MSCS nodes A and B

Component	Default Directory
A supported operating system [Page 16]	%windir%
MSCS Software	%windir%\Cluster
SAP cluster files	%windir%\SAPCluster
Oracle server software	\oracle\<<SAPSID>\920
Oracle Fail Safe Software	\oracle\OFS

Directories on shared volumes

Component	Default Directory
Cluster <i>quorumresource</i>	\MSCS
SAP global and SCS instance directories	\usr\sap...
SAP data files	\ORACLE\<<SAPSID>\<SAPSID>DATA1 ... \<SAPSID>DATA<n>
Online redo logs, set A	\ORACLE\<<SAPSID>\origlogA
Online redo logs, set B	\ORACLE\<<SAPSID>\origlogB
Mirrored online redo logs, set A	\ORACLE\<<SAPSID>\mirrlogA
Mirrored online redo logs, set B	\ORACLE\<<SAPSID>\mirrlogB
Backup of online redo logs	\ORACLE\<<SAPSID>\oraarch
BR*Tools directories	... \sapreorg, \saptrace, ... \sapbackup, \sapcheck, ... \saparch



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 has to be created manually under the system directory: %WINDIR%\SapCluster

This directory contains all the SAP files required by both cluster nodes, independently of the MSCS node the SAP instance is running on. The files are database tools and program files (executables) used by the operating system monitor (SAPOsCol).

The directory is added to the path variable of the user <sapsid>adm.

2.3 IP Addresses in an MSCS Configuration

A part of the installation process that 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. Addressing must be set up correctly so that the system can take advantage of the cluster functionality and switch between MSCS nodes when hardware problems arise.

This section explains the different types of addresses and their function in the switchover mechanism of the cluster.

Types of IP Addresses

In a correctly configured cluster, there are seven 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:

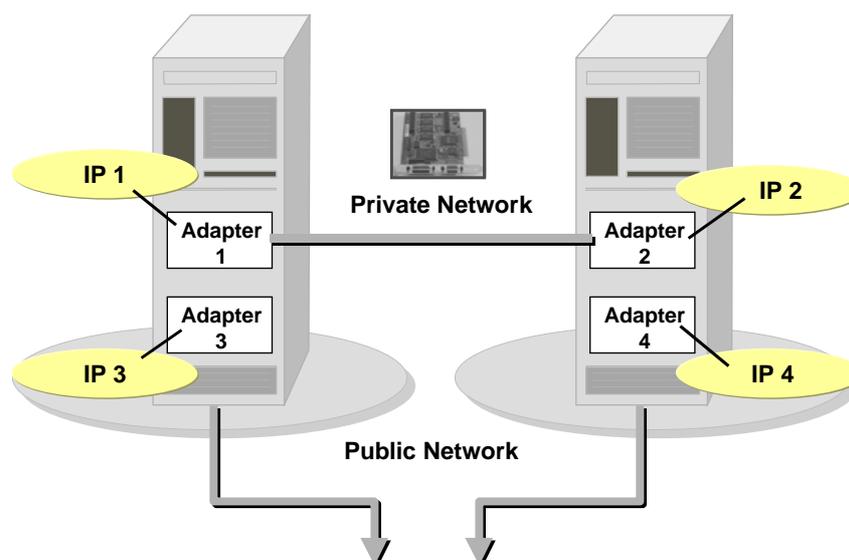
- A public network that is used for the communication between the central instance, application servers and the LAN.
- A private network that is used internally for communication between the MSCS nodes of the cluster.

To set up these two networks, each MSCS node needs an adapter for both the private and public network. This means that each MSCS 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.



For more information on network configuration, see also the Microsoft Knowledge Base Article 259267.

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 MSCS node above, you might assign the IP addresses of the public and private network adapters as follows:

IP Addresses and Host Names

Network Adapter	IP Address	Host Name
Adapter 1 (private network)	10.1.1.1	clusA_priv
Adapter 3 (public network)	129.20.5.1	clusA



Make sure that you are aware of the following:

- 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 means that the machine that is the MSCS node on the left has the name `clusA`.
- Do **not** confuse the **host name** with the **computer name**. Each MSCS 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 MSCS node column of the *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, not the computer names.

Virtual IP Addresses Assigned to Cluster Groups

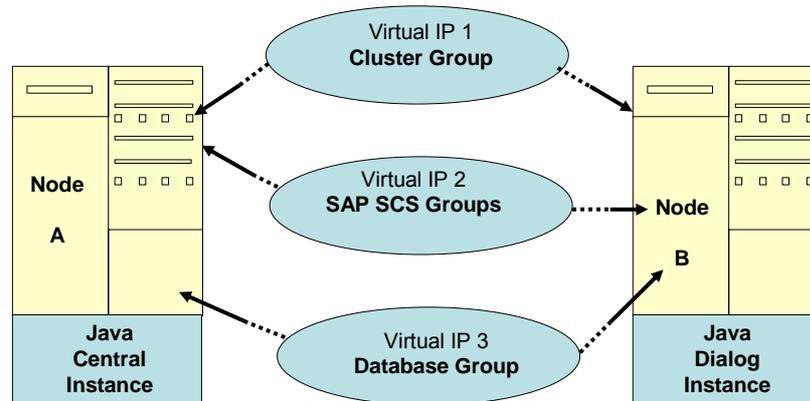
When you have installed the SAP system and fully configured the cluster, the critical system resources are bound together in three different **groups**. Each of these groups requires a virtual IP address and host name that is permanently mapped to the group and not to a particular MSCS node. This has the advantage that, whenever a group is moved between MSCS nodes, its IP address and host name move together with it.

A cluster configuration has the following groups:

- SAP SCS cluster group
- Database cluster group
- Cluster group

Each group consists of a set of related resources that work together to offer a service to the system. 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 MSCS node to the other, due to MSCS 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 with the same address as before.

The following graphic illustrates how the virtual addresses of the database group and SAP group can move from one MSCS node to the other when failover occurs.



2.3.1 Obtaining IP Addresses for MSCS

Use

You need to correctly configure IP addresses for a cluster system. During the installation procedure you have to assign seven IP addresses and host names. You normally obtain these names and addresses from the system administrator.

Prerequisites

- If you are installing Windows for the first time on your system, follow the procedure “Obtaining IP Addresses” below.
- If Windows has already been installed on your system, the host names and IP addresses of the network adapters (cards) have already been defined and exist in your system.

This means that you can find out the IP addresses for the network adapters using the procedure “Determining Existing IP Addresses” below.

However, you still need to also use the table “Virtual IP Addresses” in the procedure “Obtaining IP Addresses.”

Procedure

Obtaining IP Addresses

Ask the system administrator to give you the addresses and host names listed in the tables below. You will need to enter them later during the installation process.

The column *Defined During* indicates at which stage of the installation the addresses are defined in the system.



Use 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
MSCS node A: adapter for private network	10.1.1.1	clusA_priv	Address for inter-MSCS node communication on the private network	Windows installation
MSCS node A: adapter for public network	129.20.5.1	clusA	Address of MSCS node A for communication with application servers and LAN (this is the same as the address of MSCS node A)	Windows installation
MSCS node B: adapter for private network	10.1.1.2	clusB_priv	Address for inter-MSCS node communication on the private network	Windows installation
MSCS node B: adapter for public network	129.20.5.2	clusB	Address of MSCS node B for communication with application servers and LAN (this is the same as the address of MSCS node B)	Windows installation

Virtual IP Addresses

Component	Example for Virtual IP Address	Example for Name (Host Name)	Purpose	Defined During or Before
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 SCS cluster group	129.20.5.4	sapgrp	Virtual address and name for accessing the group of SAP resources,	Installing the SCS instance on MSCS node A

Component	Example for Virtual IP Address	Example for Name (Host Name)	Purpose	Defined During or Before
			regardless of the MSCS node it is running on	
Database cluster group	129.20.5.5	dbgrp	Virtual address and name for accessing the group of database resources, regardless of the MSCS node it is running on	Execution of MSCS Wizard or database-specific cluster scripts

Determining Existing IP Addresses

To find out the existing IP addresses and corresponding host names and addresses, proceed as follows:

1. Choose *Start* → *Settings* → *Network and dial-up Connections*.
The *Network and dial-up Connections* window appears.
2. Select one of the network cards that are displayed and choose *File* → *Properties*.
A dialog box opens.
3. Choose *TCP/IP Protocol* → *Properties*.
The *TCP/IP Properties* dialog box appears and shows the IP address of the initially selected network card.
4. To find out the host name that is mapped to the IP address, use the `ping` command:
`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.
5. Repeat these steps for the other network cards.

2.4 Checking Hardware and Software Requirements for MSCS

Use

When you install the SAP system on cluster hardware, you have to meet the hardware and software requirements shown below. This makes sure that the system can take advantage of the MSCS functionality and achieve an acceptable performance level.

Procedure

1. Check that your cluster hardware is certified.
AddOn Technology Center for SAP (AddOn TCS) certifies hardware platforms for SAP on Microsoft Windows. The cluster must be included in the Microsoft list of certified clusters and its components. You can access the lists at the following Internet addresses:

www.microsoft.com/hcl

www.saponwin.com

2. Make sure that both MSCS nodes of the cluster are connected by a private and public network:
 - The public network enables communication from the MSCS nodes of the cluster to other resources in the local area network (LAN).
 - The private network enables internal communication between the MSCS nodes. In particular, it enables the *Cluster Service* running on both MSCS nodes to regularly exchange messages on the state of the MSCS nodes so that the failure of resources is quickly detected.
3. Check that sufficient storage space is available.

Each of the MSCS nodes in the cluster must have its own local disks and have access to shared disks that can be reached by both MSCS nodes via a shared bus.

All software – except the Windows operating system, the Oracle home directory, the MSCS software executables, and the Java application server instance – is stored on the shared disks. One of the shared disks must be used exclusively by the Quorum resource that stores the cluster registry and records information about the state of the cluster.

Disks	Minimum Disk Space	How to Check
1 local disk on each MSCS node	4 GB (plus 2 GB for each installation DVD)	<ol style="list-style-type: none"> 1. Choose <i>Start</i> → <i>Programs</i> → <i>Administrative Tools</i> → <i>Computer Management</i> → <i>Disk Management</i>. 2. Right-click the disk and choose <i>Properties</i>.
At least 6 shared disks	6 GB	<ol style="list-style-type: none"> 1. Choose <i>Start</i> → <i>Programs</i> → <i>Administrative Tools</i> → <i>Computer Management</i> → <i>Disk Management</i>. 2. Right-click the disk and choose <i>Properties</i>.



All disk controllers must be able to support hardware-based RAID.

4. Check the RAM and paging file size on each MSCS node:

Requirement	How to check
Minimum RAM: 1 GB	In the <i>Windows Explorer</i> choose <i>Help</i> → <i>About Windows</i> .
Paging File Size: <ul style="list-style-type: none"> • 32-bit: 1 GB plus 3 times RAM. Maximum required is 10 GB. 	<ol style="list-style-type: none"> 1. Right-click <i>My Computer</i> and choose <i>Properties</i>. 2. Choose <i>Advanced</i> → <i>Performance Options</i>. 3. If required, in section <i>Virtual Memory</i>, choose <i>Change</i>.

<ul style="list-style-type: none"> 64-bit: At least 20 GB 	
--	--

5. Check that the software you install on the MSCS nodes meets the following requirements:

Software Requirement	How to Check
<p>English international version of one of the following:</p> <ul style="list-style-type: none"> Windows Server 2003 Enterprise Edition Windows Server 2003 Datacenter Edition Windows 2000 Advanced Server with at least service pack 4 Windows 2000 Datacenter Server with at least service pack 4  <p>For any version of Windows 2000, you need at least service pack 4. For more information on the latest service pack supported by SAP, see SAP Note 30478.</p>	<p>To check the Windows version, open a command prompt and enter the command <code>winver</code></p>
MSCS software	–
Oracle Enterprise Edition 9.2.0 with the current patch and hot fix (if available).	<p>For more information on the current patch set, see SAP Note 578683.</p>  <p>You have to install the Oracle patch set and hot fix (if available) on both nodes.</p>
Oracle Fail Safe software version 3.3.2	–
Suitable Windows Resource Kit is strongly recommended	–

3 Preparation

Purpose

Before you install the Java system, you need to prepare the system for MSCS.

Prerequisites

- Make sure that you have finished the [installation planning \[Page 8\]](#), especially the [hardware and software requirements \[Page 16\]](#).



You **cannot** use a host with a domain controller as a cluster node.

- On **both nodes**, you have installed the [operating system \[Page 16\]](#) with the option *Cluster Service*. For more information, see the Windows documentation.



When you install the *Cluster Service*, you specify a separate, shared disk for the quorum resource.

Process Flow

1. On both nodes, you [manually assign drive letters to the shared disks \[Page 19\]](#) using the *Windows Disk Administrator*. Both nodes must access the shared disks with the same drive letters.
2. On **both nodes**, you adjust the size of paging file and the file cache. For more information, see [hardware and software requirements \[Page 16\]](#) and „[Reducing the Size of File Cache](#)” [\[Page 20\]](#).
3. You [map the seven IP addresses to host names \[Page 20\]](#) on the Domain Name Server (DNS) or in the `hosts` file.
4. You check the [mapping of host names for MSCS \[Page 21\]](#).
5. In the *Cluster Administrator*, you [move all disk groups and the cluster group to node A \[Page 43\]](#).
6. On **both nodes**, you [install the Oracle 9.2.0 server software and the current patch set and hotfix \(if available\) \[Page 22\]](#).
7. On both nodes, you [install the Oracle Fail Safe Software 3.3.2 \[Page 24\]](#).
8. On **Node A**, you [create an Oracle Fail Safe database group \[Page 28\]](#).

3.1 Assigning Drive Letters for MSCS

Use

We recommend that you assign drive letters for MSCS.

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.

Procedure

1. Choose *Start* → *Programs* → *Administrative Tools* → *Computer Management* → *Storage* → *Disk Management*.

2. Select a disk and choose *Action* → *All tasks* → *Change drive*.
3. Enter a new drive letter.

3.2 Reducing the Size of the File Cache

Use

The Windows file cache directly competes with SAP programs for working memory by pushing them out of the memory. Therefore, you should minimize the file cache as described below.

Procedure

4. Do one of the following:
 - **Windows Server 2003:**
Choose *Start* → *Control Panel* → *Network Connections* → *Local Area Connections*.
 - **Windows 2000:**
Choose *Start* → *Settings* → *Control Panel* → *Network and Dial-up Connections* and double-click *Local Area Connections*.
5. In the *Local Area Connection Status* dialog box, choose *Properties*.
6. In the *Local Area Connection Properties* dialog box, double-click *File and Printer Sharing for Microsoft Networks*.



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

7. Select *Maximize data throughput for network applications*.
8. To confirm your entries, choose *OK*.

3.3 Mapping Host Names to IP Addresses for MSCS

Use

To enable correct operation of the failover mechanism, you have to map all IP addresses in the cluster to host names. The mapping enables 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. The system can only respond to host names if they are translated into IP addresses with the information stored on a DNS Server or in the `hosts` file.

Prerequisites

- You have the [list of addresses \[Page 14\]](#).
- You have installed Windows.
- You have entered **all** seven IP addresses required for the cluster configuration.



Missing or incorrect entries can cause problems later during the installation:

- The names are case-sensitive.

- You need to enter the names exactly as specified by the system administrator.

Procedure

To map the host names to the IP addresses, do one of the following:

- You map the host names to IP addresses on a Domain Name System (DNS) server.
- You map the IP addresses in the Windows `hosts` file.

The `hosts` file is located in the default directory for Windows:

```
%SystemRoot%\system32\drivers\etc
```



We recommend that you perform the mapping on a DNS server, because it only requires a single entry. If you perform the mapping in the Windows `hosts` file, you have to maintain the `hosts` file on both nodes of the cluster and on all application servers and front ends, as each host in the system has its own `hosts` file.

3.4 Checking the Mapping of Host Names for MSCS

Use

You need to check the [mapping of host names to IP addresses \[Page 20\]](#) because this is crucial for cluster operation.



Make sure that you perform this procedure. Otherwise you might have serious problems later.

Prerequisites

- You have mapped IP addresses to host names on the DNS Server or in the `hosts` file.
- Make sure that you check **all** IP addresses.

Procedure

1. For each IP address enter the following 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.



When you enter the ping command, you do not get a reply, if the host does not yet exist.

If the address you are checking already exists in the system, you also receive a reply from the host. For example, after the installation of Windows and the configuration of the network, you get a reply when entering the IP addresses of the network adapters.

2. Compare the output with your own record of addresses and host names and check for the following possible errors:

- Incorrect output of uppercase and lowercase

Make sure that you correct the error before proceeding with the installation.

- Error in the network bindings

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. To correct the network bindings, do the following on **both** nodes:

- i. Choose *Start* → *Settings* → *Network and Dial-up Connections*

The *Network and Dial-up Connections* window appears.

- ii. Choose *Advanced* → *Advanced Settings* → *Adapters and Bindings*

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



The card of the **public** network must be displayed **before** that of the **private** network.

If necessary, change the order in which the cards are listed by using the *Move Up* and *Move down* arrows.

3.5 Installing the Oracle Database Software

Use

You install the Oracle 9.2.0 database software, patch set and hot fix (if available) on a 32-bit or 64-bit system.

- There are different files to install the client and the server software.
- For a 32-bit system there are three RDBMS CDs. They are located on the RDBMS DVD for 32-bit in the directories ORA92_1 to ORA92_3.
- For a 64-bit system there are two RDBMS CDs. They are located on the RDBMS DVD for 64-bit in the directories ORA92_1 to ORA92_2.



During the installation, you are prompted to specify the correct path to CD2 and CD3, if applicable. To avoid this, you can copy the CDs to disk as follows **before** the installation:

- a. Copy the contents of ORA92_1\NT\<OS> on the RDBMS DVD to `\disk1` on your hard disk.
- b. Repeat this for the second CD.
- c. For a 32-bit system, also repeat this for the third CD.

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

Procedure



You have to install the Oracle 9.2.0 software, patch set and hot fix (if available) on both nodes.

1. Start the *Oracle Universal Installer* as follows:
 - Place the Oracle RDBMS DVD for 32-bit or 64-bit in the DVD drive and start from `<DVD_DRIVE> : \ORA92_1\NT\<OS>`.
 - If you have copied the CDs to disk, start from `\disk1`

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



To install the database client software, double-click the file `sapclient.cmd`. You require the client software, if you want to install SAP instances **outside** the MSCS cluster, for example, a Java dialog instance.

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

Window	Entry
<i>File Locations</i>	<p>Under <i>Source</i>:</p> <p>For <i>Path</i>:</p> <p>Shows the path to the Oracle source software. Do not change the path.</p> <p>Under <i>Destination</i>:</p> <p>For <i>Name</i>:</p> <p>Enter the name of the new Oracle Home directory. We recommend that you use the name <code><SAPSID><ORACLE_VERSION></code>, for example, <code>C11920</code></p> <p>For <i>Path</i>:</p> <p>Enter the path of a new Oracle Home directory. We recommend that you use the path:</p> <p><code><DRIVE> : \ORACLE\<DBSID>\<ORA_VERS></code>, for example, <code>C : \ORACLE\C11\920</code></p> <div style="text-align: center;"> </div> <div style="background-color: #e0e0e0; padding: 5px;"> <p>Do not specify an already existing Oracle Home directory. You must specify a new directory.</p> <p>You need 2.2 GB disk space for the Oracle 9.2.0 server software and about 250 MB for the Oracle 9.2.0 client software</p> </div> <p>Choose <i>Next</i>.</p>
32-bit and Oracle Server Software only: <i>Create Database</i>	Choose <i>No</i> and then <i>Next</i> .
<i>Summary</i>	Choose <i>Install</i> .
Oracle Server Software only: <i>Oracle Net Configuration Assistant: Welcome</i>	If this dialog appears, select <i>Perform typical configuration</i> .

Window	Entry
<i>File Locations / End of Installation</i>	Choose <i>Exit</i> .

3. Install the current patch set and hot fix (if available) as described in **SAP Note 578683** and the `patch_note.htm` file for your platform on the patch DVD.



- You have to install the Oracle patch set and hot fix (if available) on both nodes.
- Check **SAP Note 306408**, if you require an interim patch and the relevant Perl version for the Oracle database installation.

3.6 Installing the Oracle Failsafe Software

To enable the database to take advantage of the cluster functionality, you have to install an additional component, the Oracle Fail Safe software. The installation procedure differs depending on whether you install the Oracle Fail Safe software in a 32-bit or a 64-bit system.



The Oracle Failsafe Service from previous Oracle releases is now called **OracleMSCSServices**. You might still see the old name in certain SAP Notes. Be sure that you always use the new name `OracleMSCSServices`.

Prerequisites

You have installed the Oracle database software locally on both nodes, using the same Oracle home.

Procedure



You have to install the Oracle Fail Safe (OFS) software on both nodes. Do **not** install the Fail Safe Software **in parallel** on both nodes.

Installing the Oracle Fail Safe Software in a 32-Bit System

1. 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.
2. Make sure that the Cluster Server service is started on both nodes.
3. Insert the **Oracle RDBMS DVD for 32-bit**.
4. Start the *Oracle Universal Installer*. To do this, double-click the file `sapofs.cmd` in the directory `<DVD_DRIVE>:\ORAFS332I386`

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 <i>Next</i> .
File Locations	<p><i>Source...</i></p> <p>For <i>Path</i></p> <p>The path to the Oracle software on the DVD is displayed. Do not change the path.</p> <p><i>Destination...</i></p> <p>For <i>Name</i></p> <p>Enter the name of the Oracle Home for the Fail Safe software. The Fail Safe software must be installed in a separate Oracle home directory, for example <code>OFS</code>.</p> <p>Use the same Oracle home for both nodes.</p> <p>For <i>Path</i></p> <p>Enter the path of the Oracle Home directory for the Fail Safe software. It must be on a local disk, for example:</p> <p>F:\Oracle\OFS</p>
Available Products	Select <i>Oracle Fail Safe <current_version></i> and choose <i>Next</i> .
Installation types	Choose <i>Typical</i> .
Reboot Needed After Installation	Choose <i>Next</i> .
Summary	View the information and choose <i>Install</i> .
Install	Wait while the software is installed.
Configuration Tools	<p>On the dialog box <i>Oracle Services for MSCS Account/Password</i> enter the account and password under which the <i>Fail Safe software</i> is to run. This must be the same account as the one under which the <i>Cluster Server</i> service is running.</p> <p>To find out which account must be entered, choose <i>Start</i> → <i>Settings</i> → <i>Control Panel</i> → <i>Administrative Tools</i> → <i>Services</i>.</p> <p>Select the <i>Cluster Service</i> and click <i>Startup...</i></p> <p>The logon account for the service is displayed. Enter this account for <i>Oracle Fail Safe Account/Password</i>.</p>
End of Installation	Click <i>Exit</i> to leave the <i>Installer</i> .

5. Reboot and log on again.



Do not reboot a node, if the installation of OFS 3.3.2 is in progress on the other node.

Installing the Oracle Fail Safe Software in a 64-Bit System

If you use a 64-bit system you first have to install the 64-bit Fail Safe server software, and then the 32-bit Fail Safe client software.

1. 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.
2. Make sure that the *Cluster Server* service is started on both nodes.
3. Insert the **Oracle RDBMS DVD for 64 bit** to install the Oracle Fail Safe Server Software.
4. Start the *Oracle Universal Installer* by double-clicking the file `sapofs.cmd` in the directory `<DVD_DRIVE>:\ORAFS332`.
5. Enter the required information as follows:

Screen	Entry
Welcome	Choose <i>Next</i> .
File Locations	<p><i>Source...</i></p> <p>For <i>Path</i></p> <p>The path to the Oracle software on the DVD is displayed. Do not change the path.</p> <p><i>Destination...</i></p> <p>For <i>Name</i></p> <p>Enter the name of the Oracle Home for the <i>Fail Safe</i> software. The Fail Safe software must be installed in a separate Oracle home directory, for example <code>OFSSRV</code>.</p> <p>Use the same Oracle home for both nodes.</p> <p>For <i>Path</i></p> <p>Enter the path of the Oracle Home directory for the <i>Fail Safe</i> software. It must be on a local disk, for example:</p> <p>F:\Oracle\OFS\SRV</p> <p>Choose Next.</p>
Installation Types	Choose <i>Typical</i> .
Reboot Needed After Installation	Choose <i>Next</i> .
Summary	View the information and choose <i>Install</i> .
Install	Wait while the software is installed.

Screen	Entry
Configuration Tools	<p>On the dialog box <i>Oracle Services for MSCS Account/Password</i> enter the account and password under which the <i>Fail Safe software</i> is to run. This must be the same account as the one under which the <i>Cluster Server</i> service is running.</p> <p>To find out which account must be entered, choose <i>Start</i> → <i>Settings</i> → <i>Control Panel</i> → <i>Administrative Tools</i> → <i>Services</i>.</p> <p>Select the <i>Cluster Service</i> and click <i>Startup...</i></p> <p>The log on account for the service is displayed. Enter this account for <i>Oracle Fail Safe Account/Password</i>.</p>
End of Installation	Click <i>Exit</i> to leave the <i>Installer</i> .

6. Insert the **Oracle RDBMS DVD for 32-bit** to install the Oracle Fail Safe client software.
7. Start the *Oracle Universal Installer* by double-clicking the file `sapofs.cmd` in the directory `<DVD_DRIVE>:\ORAFS332I386`
8. Enter the required information as follows:

Screen	Entry
Welcome	Choose <i>Next</i> .
File Locations	<p><i>Source...</i></p> <p>For <i>Path</i></p> <p>The path to the Oracle software on the DVD is displayed. Do not change the path.</p> <p><i>Destination...</i></p> <p>For <i>Name</i></p> <p>Enter the name of the Oracle Home for the Fail Safe software. The Fail Safe software must be installed in a separate Oracle home directory, for example <code>OFSCLI</code>.</p> <p>Use the same Oracle home for both nodes.</p> <p>For <i>Path</i></p> <p>Enter the path of the Oracle Home directory for the Fail Safe software. It must be on a local disk, for example:</p> <p>F:\Oracle\OFS\CLI</p>
Available Products	Select <i>Oracle Fail Safe <current_version></i> and choose <i>Next</i> .
Installation Types	Choose <i>Client Only</i> .
Summary	View the information and choose <i>Install</i> .
Install	Wait while the software is installed.
End of Installation	Click <i>Exit</i> to leave the <i>Installer</i> .

9. Reboot and log on again.



Do not reboot a node, if the installation of OFS 3.3.2 is in progress on the other node.

3.7 Creating the Oracle Fail Safe Group

Use

You create the Oracle Fail Safe database group on Node A. With this step you enable the database to be created with the virtual database host name.

Procedure

1. On node A, choose *Start* → *Programs* → *Oracle - <OFSCClient_Home>* → *Oracle Fail Safe Manager*.
The window *Add Cluster To Tree* appears.
2. Insert your virtual cluster name.
3. Right-click the cluster and choose *Connect to cluster*.
4. Depending on the user privileges you are asked to enter the information listed in the table below and to confirm your entries with *OK*.



If you use a new OFS version, this information is not asked.

<i>User name</i>	<user> (user with the account under which the service <i>ClusterServer</i> is running)
<i>Password</i>	<password>
<i>Cluster Alias</i>	<virtual_cluster_name> (name of the cluster you are installing)
<i>Domain</i>	<domain_name>

5. 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.

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

Choose *Groups* → *Create*.

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

7. Enter the *Group Name* `ORACLE<SAPSID>`.

In answer to the question *Do you want to allow the group to failback to preferred node?*, select *Prevent failback*.

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

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

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

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

Under *Network* leave the entry **public**

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

The *IP Address* is automatically recognized.

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 *Windows Event Logs* on both nodes to find out the reason for the failure.

4 Installation

Purpose

You use the following procedure to install and cluster your Java system.



When you [reboot during the installation process \[Page 43\]](#), resources fail over to the second node. Therefore, after each reboot, you have to return the system to the state it had before the reboot.

Prerequisites

- You [have completed the preparations \[Page 19\]](#).



To make sure that all preparation steps have been correctly performed, check that you can move the disk resources from one node to the other so that they are only accessible from a single node at any time.

- You are logged on as domain administrator.

If for any reason, you are not granted domain administrators rights, you can perform the installation as a domain user who is a member of the local administrators group. However, the domain administrator has to prepare the system appropriately for you, as described in the Web Application Server installation guide. Do not use the user <sid>adm unless specified.

- On node A, in the *Cluster Administrator*, you make sure that all existing cluster groups are online.
- On node A, log off and log on again when you are prompted.

Process Flow

1. On Node A, [you install the SCS Instance \[Page 30\]](#).
2. You [cluster the Java SCS instance manually \[Page 32\]](#).
3. On node A, you [install the Java database \[Page 37\]](#).
4. You [configure the Java database for Fail Safe \[Page 38\]](#).
5. You [install the Java central instance \[Page 40\]](#).
6. You [install an additional dialog instance \[Page 41\]](#).
7. You [install the J2EE Engine license \[Page 41\]](#).
8. You [configure SAP MMC for MSCS \[Page 42\]](#).

4.1 Installing the SCS Instance on MSCS Node A

1. Create the SCS cluster group and add one shared disk where the SCS instance is to be located.
2. Add the virtual SCS IP and Network Name in the SAP cluster group and bring it online on node A.
3. Install a released JDK version.

For more information on the required JDK version, see SAP Service Marketplace at service.sap.com/platforms → *Product Availability Matrix* → *SAP NetWeaver* → *SAP NetWeaver 04* → *SAP NETWEAVER 04* → *JSE Platforms*.

4. Add an environment variable `JAVA_HOME=<JDK_DIR>` and `PATH=<JAVA_HOME>\bin`
5. Start SAPinst with a **virtual** SCS host name variable as follows:
 - a. Open a command prompt and change to the relevant directory of the Installation Master DVD:

```
<DVD>:\IM<xx>\SAPINST\NT\I386 (32-bit) or  
<DVD>:\IM<xx>\SAPINST\NT\IA64 (64-bit)
```
 - b. Enter:

```
sapinst product_ha.catalog  
SAPINST_USE_HOSTNAME=<SCS_virtual_host_name> to use the virtual  
host name for the SCS installation.
```
6. Choose *SAP NetWeaver '04 Support Release 1* → *Java System* → *Oracle* → *SCS Installation*.
7. If you install the SCS instance with SAPinst for the first time, you are asked to log off. In this case, choose *OK*.
SAPinst logs off automatically.
8. Log on again.
SAPinst restarts automatically.
9. Choose *Cancel* and stop SAPinst.
To stop SAPinst, right-click the icon for the SAPinst output window located in the Windows tray and choose *Exit*.
10. Restart SAPinst manually from the command prompt with the previous command:

```
sapinst product_ha.catalog  
SAPINST_USE_HOSTNAME=<SCS_virtual_host_name>.
```
11. Choose again *SAP NetWeaver '04 Support Release 1* → *Java System* → *Oracle* → *SCS Installation*.
12. Select *Run a new installation* and choose *OK*.



During the installation, the virtual host name will be used instead of the local host name. Make sure that get a pop-up warning that you are using a virtual host name.

13. Follow the instructions in the SAPinst dialogs and enter the required parameter values.
For the database host name, enter the **virtual** database host name.
The SCS installation drive must be a **shared** disk which belongs to the SCS cluster group.
14. Check that the SCS instance is running.

4.2 Clustering the Java SCS Instance Manually

Activities on MSCS Node A

1. Stop the SCS instance and services.
2. Add the following lines to **both the start and SCS** instance profiles:


```
DIR_INSTALL = <DISK>:\usr\sap\<SID>\SYS
DIR_INSTANCE = <DISK>:\usr\sap\<SID>\SCS<InstanceNumber>
SAPLOCALHOST = <SCSVirtualHostName>
SAPLOCALHOSTFULL = <SCSVirtualHostName>
```

In addition, change the content of the following lines of SCS instance start profile file START_SCS<InstanceNumber>_<SCSVirtualHostName>:

```
Autostart = 0
```
3. Extract `ntclust.sar` archive from the directory `<drive>:\SAPINST\NT\<platform>` with `sapcar.exe -xvzf <drive>:\SAPINST\NT\<platform>\ntclust.sar` to `<UNPACKED_TEMP_DIR>`
4. Copy the files `SapClus.dll`, `Saprc.dll`, `Saprcex.dll`, `insaprc.exe` from the `\NTCLUST\` directory to `%windir%\system32`
5. Run `insaprc.exe` in directory `%windir%\system32\` to register sap cluster dll
6. Change the `<SAPSID>adm` user environment as follows:
 - a. Open a command prompt and enter `runas /profile /user:<domain>\<sid>adm regedit`
 - b. Go to: `HKEY_CURRENT_USER\Environment` and change `PATH=%PATH%;%windir%\SapCluster`
7. Under *Services*, stop the following SAP services `saposcol`, `SAP<SID>_<SCSInst.No>`
8. Create the directory: `%windir%\SapCluster`
9. Copy the following files from `\usr\sap\<SID>\SCS<Inst_no>\exe` to `%windir%\SapCluster`:


```
sapevents.dll
sapntchk.exe
saposcol.exe
sapstartsrv.exe
```
10. Change `sapservice` config by opening a command prompt and typing:


```
sc config saposcol binPath= "%windir%\SapCluster\saposcol service"
```
11. Adapt the SCS `SAP<SID>_<SCS_inst_no.>` service:
 - a. Set it to *Manual* start
 - b. Register the type library as follows:

Start `sapstartsrv.exe` from the `%windir%\SapCluster\` directory and choose *Register COM Typelibrary only*.

12. Delete the SCS IP address and network name cluster resources from the SCS cluster group.
13. Start <UNPACKED_TEMP_DIR>\NTCLUSTER\crclgrp.exe
14. Enter the following parameters:
 - Cluster Name: <virtual cluster name – network name> (should be filled automatically)
 - Global disk: <share disk where SCS instance is located>
 - Local Disk: <share disk where is SCS instance is located>
 - Network name: <virtual SCS host name>
 - IP address: <IP address of virtual SAP host name> (should be filled automatically)
 - Subnet mask: <subnet address mask of the public network>

For the public network name, look in `AdressMask` located in the registry key:

```
HKEY_LOCAL_MACHINE\Cluster\Networks\  
<public_netw_card_number>\
```

 - Network to use: <public network name>

For the public network name, look in `Name` located in

```
HKEY_LOCAL_MACHINE\Cluster\Networks\  
<public_netw_card_number>\
```
15. Finish creating the SAP Cluster group as follows:
 - a. Run <UNPACKED_TEMP_DIR>\NTCLUSTER\ coclgrp.exe
 - b. In the GUI enter:
 - Cluster Name: <is filled automatically>
 - SID: <J2EE_SID>
 - Instance: <SCS_Instance_Number>

16. Create the following registry keys and entries, if they do not exist:

Registry keys:

- HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\EventLog\Application\SAPOsCol
- HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\EventLog\Application\SAP<SID>_<SCSInstanceNumber>

Registry entries for `SAP<SAPSID>_<No. >` and SAPOsCol:

ValueName	ValueType	ValueData
TypesSupported	REG_DWORD	7
EventMessageFile	REG_EXPAND_SZ	%windir%\SapCluster\SAPEVENTS.DLL

Activities on MSCS Node B

Prerequisites

Make sure that on **Node A** all resources of the SAP SCS cluster group are online, except the SAP SCS cluster resource.

Procedure

1. Make the required dll files available
 - a. **32-bit only:** Run `R3DLLINS.exe` in the directory `<DVD>\SAPINST\NT\<platform>\NTPATCH\`
The `msvcr71.dll`, `msvc71.dll`, `mfc71.dll`, and `mfc71u.dll` are extracted.
 - b. Open a command prompt in the local temp directory and enter `<DVD>:\IM<xx>\SAPINST\NT\<platform>\sapinst.exe -extract` to extract the archive.
 - c. Copy all dlls from subdirectory `SYSTEM` to `%windir%\system32`.
 - d. Extract `ntclust.sar` archive from the directory `<DVD>:\SAPINST\NT\<platform>` with `sapcar.exe -xvzf <DVD>:\SAPINST\NT\<platform>\ntclust.sar` to `<UNPACKED_TEMP_DIR>`
 - e. Copy the files `SapClus.dll`, `Saprc.dll`, `Saprcex.dll`, `insaprct.exe` from the `\NTCLUST\` directory to `system32`
 - f. Run `insaprct.exe` in directory `%windir%\system32\` to register sap cluster dll
2. Create local groups and add user accounts:
 - a. Create the local groups `SAP_<SID>_LocalAdmin` and `SAP_LocalAdmin`
 - b. Add the domain group `SAP_<J2EE_SID>_GlobalAdmin` into these local groups.
 - c. Add the domain group `SAP_<J2EE_SID>_GlobalAdmin` to the local Administrators group.

For more information on creating groups and adding users, see [Creating and Adding New Groups and Users \[Page 44\]](#).

3. Choose *Administrative Tools* → *Local Security Policy* → *Local Policies* → *User Right Assignment* to add the following privileges:
 - `<J2EE_SID>adm` privileges
 - `SeTcbPrivilege` (Act as a part of the Operating System)
 - `SeAssignPrimaryTokenPrivilege` (Replace a process-level token)
 - `SeIncreaseQuotaPrivilege` (Increase Quotas) (for Windows 2000)
 - `SeIncreaseQuotaPrivilege` (Adjust memory quotas for a process) (for Windows Server 2003)
 - `SAPService<J2EE_SID>` privileges
 - `SeServiceLogonRight` (Log on as a Service)
 - `SeNetworkLogonRight` (Access this computer from the network)

- SeDenyInteractiveLogonRight (Deny Logon Locally and Deny log on through Terminal Services)
4. Create the <SID>adm user environment as follows:
 - a. Open a command prompt and enter:
runas /profile /user:<domain>\<sid>adm regedit
 - b. Choose HKEY_CURRENT_USER\Environment and create the user environment in the same environment as on MSCS Node A.
 5. Copy the services file located in %windir%\system32\drivers\etc\ on Node A to Node B into the same directory.

The services file includes the following SCS ports:

```

sapdp <SCSInstanceNumber>      32<SCSInstanceNumber>/tcp # SAP System Dispatcher
Security Port

sapdp<SCSInstanceNumber>s      47<SCSInstanceNumber>/tcp # SAP System Dispatcher
Security Port

sapgw<SCSInstanceNumber>      33<SCSInstanceNumber>/tcp # SAP System Gateway Port

sapgw<SCSInstanceNumber>s      48<SCSInstanceNumber>/tcp # SAP System Gateway
Security Port

sapms<SID>                      36<SCSInstanceNumber>/tcp #SAP System Message Port

```

6. Move the SAP SCS cluster group to Node B.
7. Create the directory: %windir%\SapCluster
8. Copy the following files from \usr\sap\<SID>\SCS<Inst_no>\exe to %windir%\SapCluster:
 - sapevents.dll
 - sapntchk.exe
 - saposcol.exe
 - sapstartsrv.exe
9. Create saposcol in a command prompt:


```

sc create saposcol binPath= "%windir%\SapCluster\saposcol"
service start= auto obj= <domain>\SAPService<SAPSID> password=
<password_of_SAPService<SAPSID>_user>

```



Make sure that there is a space after each equal sign.



If you use Windows 2000, sc.exe is part of the Windows Resource Kit.

10. Create SAP<SAPSID>_<No.> and reregister type library
 - a. Run sapstartsrv.exe in directory \usr\sap\<SID>\SCS<InstNo>\exe
 - b. In the GUI enter the following:
 - SID: <J2EE_SID>
 - NR: <SCSInstanceNumber>
 - Startprofile:

- <disk>\usr\sap\<SID>\SYS\profile\START_SCS<SCSInstanceNumber>_
<SCSVirtualHostName>
- User: <Domain>\SAPService<SID>
 - Password: <SAPService<SID> password>
 - Startup type: manual
 - Use Environment of user: <Domain>\<SID>adm
- c. Choose *OK*.
11. Reregister type library:
- a. Run `sapstartsrv.exe` located in the directory `%windir%\SapCluster\`
 - b. Choose *Register COM Typelibrary only*.
 - c. Choose *OK*.
12. Register event log applications for `SAP<SAPSID>_<No.>` and `saposcol` as described in Step 16 of “*Clustering the Java SCS Instance Manually: Activities on MSCS Node A*”.
13. Registering SAP MMC
- a. Extract the `SAPMMCU.SAR` (Unicode) archive from `<DVD>:\SAPINST\NT\<platform>\MMC` with the command:

```
sapcar -xvf "<DVD>:\SAPINST\NT\<platform>\MMC\SAPMMCU.SAR"
```
 - b. Copy the files to `%windir%\system32`


If you cannot copy `librfc32u.dll` because the file is in use, stop the service `SAP<SID>_<No.>`.
 - c. Register all `sapmmc*.dlls` in a command prompt, for example:

```
%windir%\system32\regsvr32 sapmmc.dll
```
 - d. Create a desktop shortcut of `%windir%\system32\sapmmc.msc`
14. Start the SCS instance with the Cluster MMC and try failover from one node to another.
15. Remove the `SAPLOC` share from the SCS cluster group as follows:
- a. Right-click the SAP SCS resource and choose *Properties*.
 - b. Select *Dependencies* and choose *Modify*.
 - c. Remove `SAPLOC` from the *Dependencies* list and choose *OK*.
16. Delete `saploc` in Cluster MMC.
17. Change the old name of the SAP cluster group and its cluster resources as shown in the following table:

Cluster group or Resource Type	New Name
SAP Cluster group:	<code>SAP <SAPSID></code>
IP Address:	<code>SAP <SAPSID> IP</code>

Network Name:	SAP <SAPSID> NetName
SAP Resource:	SAP <SAPSID> <SCS_InstanceNumber> Instance

18. Create the generic service resource in the *Cluster Administrator* as follows:
 - a. Choose *File* → *New* → *Resource*
 - b. Under *New Resource*, enter or choose the following:
 - Name: SAP <SAPSID> <InstanceNumber> Service
 - Resource Type: *Generic Service*
 - Group: SAP <SAPSID>
 - c. Under *Possible Owners*, add both nodes.
 - d. Under *Dependencies*, add *Resource dependencies* to SAP <SAPSID> SAPMNT
 - e. Under *Generic Service Parameters*, for *Service Name* enter: SAP<SAPSID>_<InstanceNummber>
 - f. Choose *Next* and *Finish*.
19. In the *Cluster Administrator* check that the following dependencies are set:
 - SAP <SAPSID> NetName is dependent on SAP <SAPSID> IP
 - SAP <SAPSID> SAPMNT is dependent on SAP <SAPSID> NetName and <Disk>
 - SAP <SAPSID> <InstanceNumber> Service is dependent on SAP <SAPSID> SAPMNT
 - SAP <SAPSID> <InstanceNumber> Instance is dependent on SAP <SAPSID> <InstanceNumber> Service

To check the dependencies double-click the corresponding resource and choose *Dependencies*.
20. If required, bring the resources offline and modify the dependencies.

4.3 Installing the Java Database

Prerequisites

- The SAP cluster group is online on Node A.
- The Oracle shared disk is online on Node A.
- You have mapped the IP adress and its correcoponding network name on the DNS server.
- You have added the Oracle virtual IP network name to the Oracle cluster group and brought it online on Node A.

Procedure

1. On node A, start SAPinst with a virtual database host name variable as follows:
 - a. Open a command prompt and change to the relevant directory of the Installation Master DVD:


```
<DVD> : \IM<xx>\SAPINST\NT\I386 (32-bit) or
```

```
<DVD>:\IM<xx>\SAPINST\NT\IA64 (64-bit)
```

- b. Enter:


```
sapinst product_ha.catalog
SAPINST_USE_HOSTNAME=<database_virtual_host_name> to use the
virtual host name for the Java database installation.
```

2. Choose *SAP NetWeaver '04 Support Release 1 → Java System → Oracle → Java Database Installation*.
3. Follow the instructions in the SAPinst dialogs and enter the required parameter values. For the SCS instance host name, enter the **virtual** SCS host name.
4. Delete the saploc share with the command:


```
net share saploc /delete
```
5. Change sapservice config by opening a command prompt and typing:


```
sc config saposcol binPath= "%windir%\SapCluster\
saposcol service"
```

4.4 Configuring the Database for Fail Safe

Use

The database must be cluster-enabled so that it can be switched between nodes as a group of resources. To do this, you add the database of the SAP system to Oracle Fail Safe group which you have created in a previous step.

Prerequisites

1. Create a new configuration file and name it for example `init<DBSID>_OFS.ora`, as the original `init<DBSID>.ora` file will be overwritten by the BR*Tools.
For more information see **SAP Note 773173**.
2. Enter the following line in the new configuration file:


```
SPFILE=<ORACLE_HOME>\database\SPFILE<DBSID>.ora
```
3. Copy all `init*. * files` and `SPFILE<DBSID>.ora` from `%ORACLE_HOME%\database` on the first node to the second node.
4. Copy `sqlnet.ora` and `tnsnames.ora` from `%ORACLE_HOME%\network\admin` of the first node to the second node.
5. On MSCS node B, create the local groups `ORA_<DBSID>_DBA` and `ORA_<DBSID>_OPER`.
6. Add the `<DOMAIN>\<SAPSID>adm` and `<DOMAIN>\SAPService<SAPSID>` users to these local groups.

Procedure

Perform the following steps in the Fail Safe Manager on the primary node A:

1. In the tree on the left, expand `<Primary_Node> → Standalone Resources` and then select the database `<SAPSID>.world`.
2. Choose *Resources → Add to Group*.
3. On the dialog box *Add Resource to Group – Resources*:

For *Resource Type*, select *Oracle Database*.

For *Group name*, select *Oracle<SAPSID>*

4. On the dialog box *Add Resource to Group – Database Identity*, enter the following:

<i>Service Name</i>	<DBSID>.world
<i>Instance Name</i>	<DBSID>
<i>Database Name</i>	<DBSID>
<i>Parameter File</i>	<DRIVE>:\<ORACLE_HOME>\database\init<DBSID>.ora

5. When you have made all entries, choose *Finish*.



If a warning appears about the location of `init<sapsid>.ora`, you can ignore it.

6. On the dialog box *Confirm Add Database to Group* choose *Yes* to shutdown the database.
7. For each node a Pop-Up appears: The *Oracle Net Listener* uses a host name in the host address parameter. It must be converted to use an IP address.

Choose *Yes* to convert to an IP address.

The SAP database <DBSID> is now added to the Fail Safe group.

8. On MSCS node B, open a command prompt as user <DBSID>adm on the MSCS Node where the database is online (active node), and enter the following command:

```
runas /profile /u:<domain>\<DBSID>adm cmd.exe
```

- a. Run `regedit`, choose `HKEY_CURRENT_USER\Environment` and set the following entries:

ValueName	ValueType	ValueData
ORACLE_HOME	REG_SZ	<ORACLE_HOME_DIR>
ORACLE_SID	REG_SZ	<DBSID>

- b. Enter the following commands:

```
sqlplus /nolog
connect / as sysdba
create spfile from pfile
```

9. Copy `PFILE` from <ORACLE_HOME>\database\ to the other MSCS node (offline node).
10. In the OFS Manager, choose *Clusters → Groups → Oracle <DBSID> group*.
 - a. Select <DBSID>.world and choose the *Database* tab.
 - b. In the *Parameter File* field, change `init<DBSID>.ora` into `init<DBSID>_OFS.ora`
 - c. Choose *Apply*.

4.5 Installing the Java Central Instance



You can install the Java central instance on MSCS node A or on a host outside of MSCS.

- If you install the central instance on a host outside of MSCS, you have to install the database client software on this host.
- If you install the central instance on an MSCS node, make sure that the central instance number is **different** from the SCS instance number.

1. Open a command prompt and change to the relevant directory of the Installation Master DVD:
 <DVD>:\IM<xx>\SAPINST\NT\I386 (32-bit) or
 <DVD>:\IM<xx>\SAPINST\NT\IA64 (64-bit)
2. Enter:

```
sapinst product_ha.catalog
```
3. Choose *SAP NetWeaver '04 Support Release 1 → Java System → Oracle → Java Central Instance Installation*.
4. If you are asked to log off, choose *OK*.
 SAPinst logs off automatically.
5. Log on again.
 SAPinst restarts automatically.
6. Choose *Cancel* and stop SAPinst.
 To stop SAPinst, right-click the icon for the SAPinst output window located in the Windows tray and choose *Exit*.
7. Restart SAPinst manually from the command prompt with the previous command:

```
sapinst product_ha.catalog
```
8. Choose again *SAP NetWeaver '04 Support Release 1 → Java System → Oracle → Java Central Instance Installation*.
9. Follow the instructions in the SAPinst dialogs and enter the required parameter values.



If you install the central instance on an MSCS node, make sure that on the screen *Java System > SCS Instance* you enter the following:

- For the SCS instance host name, enter the **virtual** SCS host name.
- For the installation drive, you choose the **local** disk where you want to install the **Java central instance**. Do not enter the shared disk for the SCS instance.

10. Check that the Java central instance is running and you can log on to the Java system.

4.6 Installing an Additional Dialog Instance



You can install the dialog instance on MSCS node B or on a host outside of MSCS.

- If you install the dialog instance on a host outside of MSCS, you have to install the database client software on this host.
- If you install the dialog instance on an MSCS node, make sure that:
 - The dialog instance number is **different** from the SCS instance number.
 - For the dialog instance installation drive, you choose a **local** disk. Do **not** choose the shared disk of the SCS instance.

1. Open a command prompt and change to the relevant directory of the Installation Master DVD:


```
<DVD> : \IM<xx>\SAPINST\NT\I386 (32-bit) or
<DVD> : \IM<xx>\SAPINST\NT\IA64 (64-bit)
```
2. Enter:


```
sapinst product_ha.catalog
```
3. Choose *SAP NetWeaver'04 Support Release 1 → Java System → Oracle → Dialog Instance Installation*.
4. If you are asked to log off, choose *OK*.

SAPinst logs off automatically.
5. Log on again.

SAPinst restarts automatically.
6. Choose *Cancel* and stop SAPinst.

To stop SAPinst, right-click the icon for the SAPinst output window located in the Windows tray and choose *Exit*.
7. Restart SAPinst manually from the command prompt with the previous command:


```
sapinst product_ha.catalog
```
8. Choose again *SAP NetWeaver'04 Support Release 1 → Java System → Oracle → Dialog Instance Installation*.
9. Follow the instructions in the SAPinst dialogs and enter the required parameter values.

For the dialog instance installation drive, choose a **local** disk.

For the central instance host, enter the **virtual** SCS host name.

4.7 Installing the J2EE License

As in an MSCS environment the SCS instance can run on both nodes in case of hardware failure (failover mechanism), the J2EE license has to be installed on both nodes, as follows:

1. Start the Java application server.
2. Log on to the Java central instance and install the license on the first MSCS node.
3. Start the Visual Administrator with `go.bat` from the directory


```
usr\sap\<sid>\<instance>\j2ee\admin\
```

4. Choose *Server* → *Services* → *Licensing Adapter*
5. In the *General* tab you find all information about how to get a permanent license for the J2EE Engine.
6. After you have installed the license on the first node, move the SAP SCS cluster group to the second node.
7. Restart the Java application server and install the license on the second node as described above.

4.8 Configuring SAP MMC for MSCS

You can use SAP Microsoft Management Console (MMC) to monitor the status of a clustered SCS instance and any other remote system, view start profiles, development traces, and so on.

You **cannot** use SAP MMC to start or stop a clustered SCS instance. For this purpose you must use the cluster administrator tool. If you try to start or stop a clustered SCS instance with SAP MCC, the cluster software regards this as an error.

You configure SAP MMC on both nodes to include the information from the clustered SCS instance (or any remote instance) as follows:

1. Start SAP MMC by double clicking the shortcut on the desktop.
2. Choose *Console Root* → *SAP Systems*.
3. Right-click and choose *Properties*.
4. In the *General* tab, check the following settings:
 - *Options* → *Use fix SAP instance list* must be selected
 - *Options* → *Always show local SAP instances* must **not** be selected
5. In the *Fixed* tab, add required instances to the list.
6. Choose *File* → *Save* to save your changes.

5 Additional Information

The following section provides information about:

- [Moving MSCS Groups \[Page 43\]](#)
- [Rebooting during the installation for MSCS \[Page 43\]](#)
- [Creating and adding new groups and users \[Page 44\]](#)
- [Starting and stopping the SAP system in an MSCS configuration \[Page 45\]](#)

5.1 Moving MSCS Groups

Use

During various stages of the cluster installation, you have to move the database, or the SAP SCS cluster groups from one node to the other before you can continue.

You use the Cluster Administrator to move groups that do not belong to the Oracle database groups.

You use the Fail Safe Manager to move the Oracle resources, for example, the Oracle database group.

The following describes both procedures

Moving Groups with the Cluster Administrator

1. Start the *Cluster Administrator* with *Start* → *Programs* → *Administrative Tools* → *Cluster Administrator*.
2. In the *Cluster Administrator*, select the group you want to move, and drag it to the required node on the left-hand pane.
3. Repeat the previous step for each group that you want to move.

Moving Groups with the Fail Safe Manager

1. Start the *Fail Safe Manager* with *Start* → *Programs* → *Oracle Fail Safe Manager*.
2. On the left-hand pane, right-click the group you want to move, and choose *Move to a Different Node* on the context menu.

The group is now moved to the other node.

5.2 Rebooting During the Installation for MSCS

Use

You only need to perform this procedure if you have to reboot during the installation for MSCS. A reboot means that resources fail over to the second node. Therefore, after each reboot, you have to return the system to the state it had before the reboot, as described below.

Procedure

1. In the Cluster Administrator, move all resources back to the original node.
2. If you have not yet clustered the database, restart the database service.
3. If you have already clustered the database, bring the database group online.
4. Recreate the `SAPMNT` share for the directory `usr\sap` on the SCS instance drive



If you use Windows Server 2003, you have to reset the permissions for the SAPMNT shares from *Read* to *Full Control*, as follows:

- a. Right-click on the directory `usr\sap` and choose *Sharing and Security*.
- b. Select *Sharing* and in the *Share Name* field, enter SAPMNT.
- c. Under *Permissions*, make sure that the permission for SAPMNT is set to *Full Control*.

5.3 Creating and Adding New Groups and Users

Creating Local Groups

The following procedure describes how to create the local group named `SAP_SAP_<SID>_LocalAdmin`.

1. Choose *Start* <→ *Control Panel*> → *Administrative Tools* → *Computer Management*.
2. Choose *Local Users and Groups*.
3. Right-click *Groups* and choose *New Group*.
4. For *Group name*, enter `SAP_<SID>_LocalAdmin` and choose *Add*.

The window *Select Users, Computers, or Groups*, opens.

5. In the *Object names* field enter:
`<domain>\SAP_<SID>_GlobalAdmin`
6. Choose *OK*.
In the Window *New Group* the group is added.
7. Choose *OK*.

Adding a domain group to a local group

With the following procedure you can add all users belonging to the domain group to a local group. In the example, we add the domain group `SAP_<SID>_GlobalAdmin` to the local *Administrators* group.

1. Choose *Start* <→ *Control Panel*> → *Administrative Tools* → *Computer Management*.
2. Choose *Local Users and Groups*.
3. Choose *Groups*.
4. In the right panel double-click the *Administrators* group and choose *Add*.
5. In the *Object names* field enter `:<domain>\SAP_<SID>_GlobalAdmin`
6. Choose *OK*.
7. Choose *OK* again.

5.4 Starting and Stopping the Java System in an MSCS Configuration

Use

You use this procedure to start or stop the Java system in an MSCS configuration.

Process Flow

1. You start or stop the SCS instance with the MSCS Management Console.
2. You start or stop the Java application server with the SAP Management Console.

Procedure

1. Start and stop the SCS instance with the MSCS Management Console as follows:

Starting the SCS Instance

- a. Start the Cluster Administrator by choosing *Start* → *Programs* → *Administrative Tools* → *Cluster Administrator*.
- b. Right-click the SCS cluster group *SAP-<SCS> <SAPSID>* and choose *Bring online*.

The SCS instance is started.

Stopping the SCS Instance

- a. Start the Cluster Administrator by choosing *Start* → *Programs* → *Administrative Tools* → *Cluster Administrator*.
- b. Click the SCS cluster group *SAP-<SCS> <SAPSID>* to display the resources belonging to the SCS cluster group.
- c. Right-click the resource *SAP-<SCS> <SAPSID>* and choose *Take offline*.

The SCS instance is stopped.

2. Start and stop the Java application server with the SAP Management Console.



Before you start the Java application server, make sure that the SCS instance is running.