

Veritas™ High Availability Agent for SAP NetWeaver Installation and Configuration Guide

Windows 2000, Windows 2003

4.3.01.0

Veritas High Availability Agent for SAP NetWeaver Installation and Configuration Guide

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Introducing the Veritas High Availability Agent for SAP NetWeaver

This chapter includes the following topics:

- [About the High Availability agent for SAP NetWeaver](#)
- [What's new in this release](#)
- [Supported software](#)
- [Agent functions](#)

About the High Availability agent for SAP NetWeaver

Veritas High Availability agents monitor specific resources within an enterprise application, determine the status of these resources, and start or stop them according to external events.

The Veritas agent for SAP NetWeaver provides high availability for SAP R/3 and SAP NetWeaver in a clustered environment.

It is designed to support a wide range of SAP environments, including the traditional basis architecture and the SAP J2EE Web Application server architecture (NetWeaver). The agent also support Standalone Enqueue and Enqueue Replication servers in a distributed SAP installation.

The agent for SAP NetWeaver brings SAP instances online, monitors the instances, and bring the instances offline. The agent monitors the system processes and server states, and can shut down the instance in case of a failure.

The agent for SAP NetWeaver supports the following SAP instance types:

- Central instance
- Dialog instance
- Standalone Enqueue server
- Enqueue Replication server

See the following Technical Support TechNote for the latest updates or software issues for this agent:

<http://seer.entsupport.symantec.com/docs/282004.htm>

What's new in this release

The following changes were made for this release:

- Added support for VCS 5.1 on Microsoft Windows Server 2003 (x64)

Supported software

The Veritas agent for SAP NetWeaver is supported in the following environments:

Veritas Cluster Server	VCS 4.2, 4.3, 5.0, 5.1
Operating Systems	<ul style="list-style-type: none">■ Microsoft Windows 2000 (SP4)■ Microsoft Windows Server 2003 (x64)■ Microsoft Windows Server 2003■ Microsoft Windows Server 2003 (IA64)
SAP R/3	4.6C with a 4.6D Kernel 4.6D 4.7 Enterprise Version
SAP Web AS	6.20, 6.40, 7.00
SAP NetWeaver	04, 04s
mySAP Business Suite	Based on SAP NetWeaver Platform
SAP applications	Applications Based on SAP NetWeaver platform

Agent functions

The agent consists of resource type declarations and agent executables. The agent executables are organized into online, offline, monitor, and clean functions.

Online

The online function performs the following tasks:

- Validates the values of the agent attributes required to bring the SAP instance online.
- Performs a preliminary check to ensure that the SAP instance is not running already on the specified node in the cluster.
- Starts the SAP Windows service `SAPSAPSID_InstID`, where *InstID* is the last two characters of the `InstName` attribute.
- Starts the SAP instance using the `startsap.exe` utility.
- Ensures that the instance is initialized successfully.

Offline

The offline function performs the following tasks:

- Validates the values of the agent attributes required to bring the SAP instance offline.
- Performs a preliminary check to ensure that the SAP instance is not already offline.
- Stops the SAP instance using the `stopsap.exe` utility.
- Stops the SAP Windows service. `SAPSAPSID_InstID`, where *InstID* is the last two characters of the `InstName` attribute.
- Kills any remaining SAP instance processes to ensure that the instance processes are removed completely.

Monitor

The monitor function performs the following tasks:

- Validates the values of the agent attributes required to monitor the SAP instance.
- Performs a first-level monitor check as follows:
 - The function verifies that the SAP Windows service `SAPSAPSID_InstID` is running, where *InstID* is the last two characters of the `InstName` attribute.
 - Verifies that all processes that the `ProcMon` attribute lists are running.
- If the value of `SecondLevelMonitor` attribute is greater than 0, the monitor function performs a more thorough check of the SAP instance as follows:

- For an ABAP Central or Dialog instance, the function uses the sapinfo.exe utility.

To use second-level monitoring for the ABAP configuration, download the rfcsdk file for the sapinfo.exe utility. Unzip this file and place the contents on shared storage that is accessible by all the nodes in the cluster.

- For a Java Central or Dialog instance, the function uses the jcmon.exe utility.
- For an Enqueue or Enqueue Replication server instance, the function uses the ensmon.exe utility.
- If the MonitorProgram attribute specifies a custom monitor program, the monitor function executes the specified program.
See [“Executing a custom monitor program”](#) on page 30.

Clean

In case of a fault event or an unsuccessful attempt to bring a resource online or offline, the clean function removes any remaining SAP instance processes. The clean function performs the following tasks:

- Uses SAP's sapsrvkill.exe utility to stop all processes of the particular SAP instance.
- Stops SAPSAPSID_InstID, the SAP Windows service for the instance.
- The clean function identifies and kills any remaining SAP instance processes using the unique combination of the SAPSID attribute and InstID, that is the last two characters of the InstName attribute. All these processes must also belong to the SAPServiceSAPSID or *sapsidadm* user.

Installing, upgrading, and removing the agent for SAP NetWeaver

This chapter includes the following topics:

- [Before you install the agent for SAP NetWeaver](#)
- [Installing the VCS agent for SAP NetWeaver](#)
- [Removing the VCS agent for SAP NetWeaver](#)
- [Upgrading the agent for SAP NetWeaver](#)

Before you install the agent for SAP NetWeaver

You must install the agent on all the systems that will host an SAP Service Group.

Ensure that you meet the following prerequisites before installing the agent for SAP NetWeaver:

- Install and configure Veritas Cluster Server.
- Remove any previous version of this agent.
See [“Removing the VCS agent for SAP NetWeaver”](#) on page 17.

Installing the VCS agent for SAP NetWeaver

Use the Product Installer to install the agent for SAP NetWeaver.

To install the VCS agent for SAP NetWeaver

- 1 Log into any node in the cluster as a user with domain administrative privileges.
- 2 Go to the directory mentioned in the following list:

Windows 2000	<code>cd_mount/windows/w2k/application/ sapnw_agent/vcs_version/version_agent/ sapnw04_agt.4.3.01.0-GA_w2k</code>
Windows 2003	<code>cd_mount/windows/w2k3/application/ sapnw_agent/vcs_version/version_agent/ sapnw04_agt.4.3.01.0-GA_w2k3</code>
Windows 2003 (IA64)	<code>cd_mount/windows/w2k3IA64/application/ sapnw_agent/vcs_version/version_agent/ sapnw04_agt.4.3.01.0-GA_w2k3IA64</code>
Windows 2003 (x64)	<code>cd_mount/windows/w2k3x64/application/ sapnw_agent/vcs_version/version_agent/ sapnw04_agt.4.3.01.0-GA_w2k3x64</code>

- 3 Double-click the Setup.exe file to begin the installation.
 You may see a setup directory here. Do not start the installation by executing the vrtsvcssapnw04.msi file in this directory.
- 4 In the Veritas Product Installer screen, click **VCS Agent 4.3.01.0 for SAP NetWeaver**.
- 5 In the Welcome screen, click **Next**.
- 6 In the Computer Selection dialog box, enter the following:
 - In the Domain field, select the domain in which you want to install the agent for SAP NetWeaver.
 The Computer field shows a list of computers in the domain that you selected.
 - Click **Add** to select the computers in the domain on which you want to install the agent. The selected computers appear in the Selected computers for installation field.
 - Click **Next**.

- 7 The product installer validates the installation on the selected computers and displays the status in the Validation screen. Click **Next**.

If the installer finds an error, such as the presence of a previous version of the agent on a computer, the Validation screen shows an error.

- 8 The installer displays a summary report in the Report screen. Click **Install** to install the agent for SAP NetWeaver.

The installer displays the installation status during and after the installation.

Note: If the error "The InstallScript engine on this machine is older than the version required to run this setup" appears, install the InstallShield driver 10 or later, clean your system for any traces of the agent and retry the installation.

- 9 After the installation is complete, click **Next** in the Finish screen.
- 10 In the Veritas Product Installer screen, click **Exit** to exit the installer.

Removing the VCS agent for SAP NetWeaver

Perform the following procedure to uninstall the agent for SAP NetWeaver from a cluster. Perform these steps while the cluster is active.

To uninstall the VCS agent for SAP NetWeaver

- 1 Ensure that all clustered SAP resources are offline.
- 2 From the cluster, remove all the resources that use the agent for SAP NetWeaver.
- 3 Perform the following steps on each node from which you want to uninstall the agent. Ensure that you have a user with administrative privileges.
 - Click **Start > Settings > Control Panel**. The Control Panel window opens.
 - Double-click **Add/Remove Programs**. The Add or Remove Programs window opens.
 - From the list of programs, select **VCS Agent 4.3 for SAP NetWeaver**.
- 4 Click **Change/Remove**.
- 5 Follow the instructions that the uninstall program provides, to complete the uninstallation of SAP NetWeaver.

Upgrading the agent for SAP NetWeaver

To upgrade the agent, first remove the older version of the agent.

See [“Removing the VCS agent for SAP NetWeaver”](#) on page 17.

Then, follow the instructions to install the new agent software.

See [“Installing the VCS agent for SAP NetWeaver”](#) on page 15.

Preparing to configure the agent for SAP NetWeaver

This chapter includes the following topics:

- [About configuring the agent for SAP NetWeaver](#)
- [Agent attributes for SAP NetWeaver](#)
- [Uniquely identifying SAP server instances](#)
- [Monitoring an SAP instance](#)
- [Configuring the execution period for agent functions](#)
- [Configuring the VCS preonline trigger](#)
- [Executing a custom monitor program](#)

About configuring the agent for SAP NetWeaver

To provide high availability for Veritas Agent for SAP NetWeaver components in the VCS environment, you must first configure the VCS resources of type Process.

After installing the Agent for SAP NetWeaver, you can create and configure an SAP resource. Before you configure a resource, review the attributes table that describes the SAP resource type and its attributes.

Agent attributes for SAP NetWeaver

[Table 3-1](#) shows the required attributes for configuring an SAP instance.

Table 3-1 Required Attributes

Required attributes	Description
EnqSrvResName	<p>Name of the VCS resource that is running the Standalone Enqueue server instance or SAP Central Services. The Enqueue Replication server instance uses this attribute to query the state of the resource that is running the Standalone Enqueue server instance, whenever a fault occurs.</p> <p>The preonline trigger script also uses this attribute in case of a Standalone Enqueue server fail over. The script uses this attribute to identify the appropriate node on which the Enqueue Replication server instance is running.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: SAPEC4ASCS_srv</p>
EPPProgramTimeout	<p>The amount of time reserved for graceful clean-up activities that the clean operation performs on an SAP instance, before returning control to the VCS engine.</p> <p>See “Configuring the execution period for agent functions” on page 26.</p> <p>Type and dimension: integer-scalar</p> <p>Default: 10</p> <p>Example: 20</p>
InstName	<p>Uniquely identifies an SAP server instance, along with the SAPSID attribute. The last two characters of this attribute specify the value of the InstID attribute. The InstID and SAPSID attributes together uniquely identify an SAP instance.</p> <p>Some examples include the following:</p> <ul style="list-style-type: none"> ■ DVEBMGS00: SAP BASIS Central instance ■ DVBGS02 : SAP BASIS Central instance minus Enqueue and Message servers ■ ASCS03: SAP ABAP Standalone Enqueue server ■ REP04: SAP ABAP Enqueue Replication server ■ D05: SAP ABAP Dialog instance ■ JC06: SAP Java Central instance ■ SCS07: SAP Java Central Services instance ■ J08: SAP Java Dialog instance ■ ERS10: SAP Enqueue Replication server <p>See “Uniquely identifying SAP server instances” on page 25.</p> <p>Type and dimension: string-scalar</p> <p>Example: DVEBMGS00</p> <p>Default: ""</p>

Table 3-1 Required Attributes (*continued*)

Required attributes	Description
InstProfile	<p>Full path to the instance profile of the SAP server instance. SAP Java instances, Enqueue Replication server instances, and Standalone Enqueue server instances use this attribute during second-level monitoring.</p> <p>Typically, the instance profile is located in the <drive>:\usr\sap\<SAPSID>\SYS\profile directory. The format of the profile name is <SAPSID>_InstName_VIRTUAL_HOSTNAME. Path names following the Unified Naming Convention (UNC) are also valid for this attribute.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example 1: c:\usr\sap\EP1\SYS\profile\EP1_SCS02_SAPEP1SCS</p> <p>Example 2: \\SAPEP1SCS\sapmnt\EP1\SYS\profile\EP1_REP03_SAPEP1REP</p> <p>Example 3: \\SAPEP1SCS\sapmnt\EP1\SYS\profile\EP1_JC00_SAPEP1CI</p>
InstType	<p>SAP server instance type. Valid values include the following:</p> <ul style="list-style-type: none"> ■ CENTRAL: SAP Central instance ■ DIALOG: SAP Dialog instance ■ ENQUEUE: SAP Standalone Enqueue server instance ■ ENQREP: SAP Enqueue Replication server instance ■ AENQUEUE: SAP Standalone Enqueue server instance Add-In (ABAP) ■ AENQREP: SAP Enqueue Replication server instance Add-In (ABAP) ■ JENQUEUE: SAP Central Services instance Add-In (Java) ■ JENQREP: SAP Enqueue Replication server instance Add-In (Java) <p>Type and dimension: string-scalar</p> <p>Default: CENTRAL</p> <p>Example: DIALOG</p>
ProcMon	<p>The list of SAP processes that the monitor function must monitor during a first-level check of an SAP instance.</p> <p>See “Monitoring an SAP instance” on page 25.</p> <p>Type and dimension: vector</p> <p>Default: ""</p> <p>Example: disp+work.exe msg_server.exe</p>

Table 3-1 Required Attributes (*continued*)

Required attributes	Description
ResLogLevel	<p>The logging detail performed by the Agent for SAP NetWeaver for the resource. Valid values include the following:</p> <p>INFO: Logs error messages.</p> <p>TRACE: Logs error and trace messages. TRACE is very verbose and should only be used during initial configuration or for troubleshooting and diagnostic operations.</p> <p>Type and dimension: string-scalar</p> <p>Default: INFO</p> <p>Example: TRACE</p>
SAPAdmin	<p>Windows user name used to start the SAP instance. This user must be dedicated to all the SAP instances within an SAP system. The format is <i>sapsidadm</i>.</p> <p>Note: Do not include the domain name when specifying this attribute. Use the SAPAdminDomain attribute to specify domain information.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: ec4adm</p>
SAPAdminDomain	<p>Windows domain name to which the SAPAdmin user belongs.</p> <p>Note: If SAPAdmin does not belong to a Windows domain, use the cluster localization settings to specify the local computer name for each system.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: VRTSGPS</p>
SAPAdminPassword	<p>Password for the SAPAdmin user.</p> <p>Use the <code>vcsencrypt -agent</code> command to encrypt the password. If you are using the VCS GUI, the GUI automatically encrypts the password.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: vxfgh28skbsj</p>

Table 3-1 Required Attributes (*continued*)

Required attributes	Description
SAPHost	<p>Virtual IP host name (LANMAN name) under which the SAP instance is to run.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: sap04smcsaw</p>
SAPHome	<p>The absolute path to the SAP base directory. This attribute is used to locate programs that the Agent for SAP NetWeaver uses for start, stop, and clean functions.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example 1: c:\usr\sap\EC4\SYS\exe\run</p> <p>Example 2: c:\usr\sap\EC4\ASCS01\exe</p>
SAPMonHome	<p>The directory that defines the location of the sapinfo.exe, jcmmon.exe, or ensmon.exe commands. The Agent for SAP NetWeaver uses these commands for second-level monitoring.</p> <p>This functionality is not part of the base SAP installation. Hence, the value of this attribute may be different from the SAPHome attribute.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: C:\usr\sap\sapinfo\rfcsdk\bin</p>
SAPServiceUser	<p>Windows user name used to start the SAP Windows service for an SAPSID. This user must be dedicated to all the SAP services under one SAP system, and must not be used by any other SAP service or instance under a different SAP system, even in the same cluster.</p> <p>Note: Do not include the domain name in the value for this attribute. Use the SAPAdminDomain attribute to specify domain information.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: SAPServiceEC4</p>

Table 3-1 Required Attributes (*continued*)

Required attributes	Description
SAPSID	<p>SAP system name. This attribute starts with an alphabetic character and is exactly 3 characters in length. Ensure that the alphabetic characters used in this attribute are in uppercase only. SAPSID is defined during the SAP installation.</p> <p>See “Uniquely identifying SAP server instances” on page 25.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: EC4</p>

[Table 3-2](#) shows the optional attributes for configuring an SAP instance.

Table 3-2 Optional attributes

Optional attributes	Description
MonitorProgram	<p>The full pathname and command-line arguments for an externally provided monitor program.</p> <p>See “Executing a custom monitor program” on page 30.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example 1: <drive>:\usr\sap\EC4\ASCS00\work\myMonitor.exe</p> <p>Example 2: <drive>:\usr\sap\EC4\ASCS00\work\myMonitor.exe arg1 arg2</p>
SecondLevelMonitor	<p>Used to enable second-level monitoring. Second-level monitoring is a deeper, more thorough state check of the SAP instance. The numeric value specifies how often the monitoring routines must run. 0 means never run the second-level monitoring routines, 1 means run routines every monitor interval, 2 means run routines every second monitor interval, and so on.</p> <p>Based on the type of installation, the agent uses the SAP supplied sapinfo.exe, jcmmon.exe, or ensmon.exe commands to perform second-level monitoring.</p> <p>Note: Exercise caution while setting SecondLevelMonitor to large numbers. For example, if the MonitorInterval is set to 60 seconds and the SecondLevelMonitor is set to 100, then sapinfo.exe is executed every 100 minutes, which may not be as often as intended. For maximum flexibility, no upper limit is defined for SecondLevelMonitor.</p> <p>Type and dimension: integer-scalar</p> <p>Default: 0</p> <p>Example: 1</p>

Uniquely identifying SAP server instances

You can virtualize an SAP instance using a cluster. Using shared disk and virtual IP addresses, you can manage a large set of SAP instances in a single cluster. For example, Dialog and Central instances can run on separate cluster nodes or can run concurrently on a single node.

In cases such as multiple instances running concurrently on a single node, the agent for SAP NetWeaver must be able to uniquely identify each SAP instance on a single host system.

To uniquely identify each SAP instance, set the SAPSID and InstName attributes such that the combined values of SAPSID and the last two characters of InstName are unique for each SAP instance.

Differentiating SAP instances is important when the Agent for SAP NetWeaver must kill the processes of a non-responsive or failed instance. In absence of unique names for each server, the agent may kill processes for more than one SAP instance during a clean operation.

Monitoring an SAP instance

The monitor function performs process level check to ensure the proper functioning of an SAP instance.

The ProcMon attribute specifies the processes that must be running successfully for a particular SAP instance type. The monitor function uses this list of processes to scan the process table, and verify that the processes are running successfully.

[Table 3-3](#) contains valid values for the ProcMon attribute.

Table 3-3 Valid values for the ProcMon attribute

SAP instance type	SAP Architecture Type
CENTRAL	For ABAP: disp+work.exe msg_server.exe For Java: jcontrol.exe For Add-in: disp+work.exe Note: msg_server.exe jcontrol.exemsg_server.exe is not applicable for a Central instance, if a Standalone Enqueue server instance is configured.
DIALOG	For ABAP: disp+work.exe For Java: jcontrol.exe For Add-in: disp+work.exe jcontrol.exe

Table 3-3 Valid values for the ProcMon attribute *(continued)*

SAP instance type	SAP Architecture Type
ENQUEUE	For ABAP (a Standalone Enqueue server instance only): msg_server.exe enserver.exe For Java: msg_server.exe enserver.exe
ENQREP	For ABAP: enrepserver.exe For Java: enrepserver.exe
AENQUEUE	For Add-in (a Standalone Enqueue server instance only): msg_server.exe enserver.exe
AENQREP	For Add-in: enrepserver.exe
JENQUEUE	For Add-in: msg_server.exe enserver.exe
JENQREP	For Add-in: enrepserver.exe

The monitor function takes a snapshot of the running process table. The function compares the processes that the ProcMon attribute specifies, to the set of running SAP processes. If any process is missing, the function declares the SAP instance as offline, and bypasses further monitor operations.

Configuring the execution period for agent functions

An agent function is allocated an execution period using the respective time-out attributes: OnlineTimeout, OfflineTimeout, MonitorTimeout, and CleanTimeout.

If an agent function executes a program, for example sapinfo.exe, the program must execute within the allocated execution period. If the program is unable to execute within the allocated period, the agent function cancels and terminates the execution of the program.

The agent function requires an allocated time to gracefully exit and terminate a program. The EPPProgramTimeout attribute specifies the period in which the agent function can cancel a running program.

For example, if EPPProgramTimeout is set to 10 and MonitorTimeout is set to 60, the monitor function cancels a program execution if the program does not complete within 50 seconds of the start of the monitor function.

Configuring the VCS preonline trigger

The behavior of the SAP Standalone Enqueue and SAP Enqueue Replication servers in a clustered environment has the following requisites:

- If a Standalone Enqueue server instance fails, the server must fail over to the node where the Enqueue Replication server instance is online.
The Standalone Enqueue server instance examines the shared memory, and locates a replicated copy of the lock state table. The instance uses the replicated copy to initialize the original lock state table.
After the Standalone Enqueue server instance initiates its internal lock buffer, the Replication server instance must go down and must switch to another node in the cluster.
- If the Enqueue Replication server instance fails, the instance must fail over to such a node in the cluster that does not have an Enqueue server instance in ONLINE state.

To facilitate proper failover behavior, you must configure the VCS preonline trigger. The VCS preonline trigger calls an external preonline trigger utility, `sapnw04preonline.exe`. The initiated preonline trigger performs the steps necessary for correct failover behavior of the Enqueue servers. The `sapnw04preonline.exe` utility is located in the `%VCS_HOME%\bin\SAPNW04` directory.

To configure the VCS preonline trigger script

- 1** Go to the %VCS_HOME%\bin\Trigger directory.

2 Add these lines to the preonline file:

If you are configuring the preonline file for the first time, this file may not exist. Skip to step 3.

```

#-----
# Start sapnw04 preonline trigger.
#-----
# Perl preonline.pl <system> <group> <whyonlining>
<systemwheregroupfaulted>
my $system = $ARGV[0];
my $group = $ARGV[1];
my $whyonlining = $ARGV[2];
my $systemwheregroupfaulted = undef;
my $sArgs = join(' ', @ARGV);
VCSAG_LOG_MSG("I", "Arguments [$sArgs]", 15041);
if(defined $ARGV[3]) {
    $systemwheregroupfaulted = $ARGV[3];
}
$SAPPreOnlineTrigger =
sprintf("%s\\bin\\SAPNW04\\sapnw04preonline.exe", $vcs_home);
VCSAG_LOG_MSG("I", "The trigger command is
[$SAPPreOnlineTrigger]", 15041);
if(defined $systemwheregroupfaulted)
{
    VCSAG_LOG_MSG("I", "The group is faulted on syetem =
[$systemwheregroupfaulted]", 15042);
    $CMD = sprintf("\"%s\" %s %s %s %s", $SAPPreOnlineTrigger,
    $system, $group, $whyonlining, $systemwheregroupfaulted);
}
else {
    $CMD = sprintf("\"%s\" %s %s %s", $SAPPreOnlineTrigger, $system,
    $group, $whyonlining);
}
system($CMD);
my $exit_value = $? >> 8;
VCSAG_LOG_MSG("I", "The exit code from the trigger:
[$exit_value].", 15046, $exit_value);
if($exit_value == 0) {
    VCSAG_LOG_MSG("I", "The PreOnline Trigger for SAP excuted
succesfully.", 15046);
    exit;}elseif($exit_value == 1) {
    VCSAG_LOG_MSG("I", "The PreOnline Trigger for SAP FAILED.",
    15047);

```

```

exit;
}
else {
VCSAG_LOG_MSG("I", "Unknown PreOnline trigger.", 15048);
}
#-----
# End sapnw04 preonline trigger.
#-----
.
.
# give control back to HAD.
if (defined $ARGV[3]) {
    \"$vcs_home\\bin\\hagrp\" -online -nopre $ARGV[1] -sys
$ARGV[0] -checkpartial $ARGV[3]`;
    exit;
}
    \"$vcs_home\\bin\\hagrp\" -online -nopre $ARGV[1] -sys
$ARGV[0]`;
    exit;

```

Skip to step [4](#).

- 3** If the preonline file does not exist, copy the sample preonline trigger file from the %VCS_HOME%\bin\Sample_Triggers directory, in to the %VCS_HOME%\bin\Triggers directory. Go back to step [2](#) to make changes in the preonline file.

A sample_sapnw04preonline file is also available in the %VCS_HOME%\bin\Sample_Triggers directory. You can copy this file in the %VCS_HOME%\bin\Triggers directory, rename the file to preonline, and use this file.

- 4** Set the preonline trigger attribute to true for the Service Groups to which the Standalone Enqueue server and Enqueue Replication server instances belong.

Executing a custom monitor program

The monitor operation executes a custom monitor program to perform a user-defined SAP instance server state check.

The monitor operation executes the MonitorProgram if the following conditions are true:

- The MonitorProgram attribute value is set to a valid executable program.

- The first level process check indicates that the SAP server instance is online.
- The SecondLevelMonitor attribute is either set to 0 (false), or SecondLevelMonitor is set to 1 (true) and the second-level check indicates that the SAP server instance is online.

This feature allows cluster administrators to define custom programs that can further determine the state of the SAP server.

The monitor operation interprets the program exit code as follows:

110 or 0	SAP server instance is ONLINE
100 or 1	SAP server instance is OFFLINE
99	SAP server instance is UNKNOWN
Any other value	SAP server instance is UNKNOWN

To ensure that the custom monitor program is always available to the agent application, Symantec recommends storing the file in a directory that is available on an online SAP system.

Configuring the service groups for SAP server

This chapter includes the following topics:

- [About the configuration process](#)
- [Setting up SAP systems for clustering](#)
- [Setting up a pre-installed SAP R/3 system](#)
- [Fresh SAP installation: Installing an SAP ABAP system](#)
- [Fresh SAP installation: Installing an SAP Java system](#)
- [Fresh SAP installation: Installing a Java Add-In system \(ABAP + Java\)](#)
- [Installing an SAP Enqueue Replication server](#)
- [Clustering an SAP instance](#)
- [Creating and adding domain groups and users](#)
- [Creating and adding local groups and users](#)

About the configuration process

While various methods and procedures can be used to install and configure the service groups in an SAP server, Symantec recommends the following general process:

- [Allocate shared disk resource for the SAP node](#)
Symantec recommends installing each SAP node to be clustered on a separate, dedicated shared disk resource (e.g. LUN). Work with the appropriate

administrative group in your organization to obtain a shared disk resource for the SAP node.

- Create disk group, volumes, and a file system

A disk group contains volumes and file system (mount resource). All SAP R/3 directories are placed in these volumes.

Create a disk group, volumes, and a file systems using the shared disk resources allocated for the SAP node.

You can use the Veritas Volume Manager to create the disk group, volumes, and file system.

Obtaining a dedicated virtual IP address and host name

Obtain a dedicated virtual IP address and host name for the SAP node IP network configuration. The SAP instance uses this network address and host name exclusively, and is regardless of the system in the cluster running the instance.

Note: Ensure that you map the virtual IPs in the DNS, or the hosts file on each system.

Creating cluster service group and supporting resources

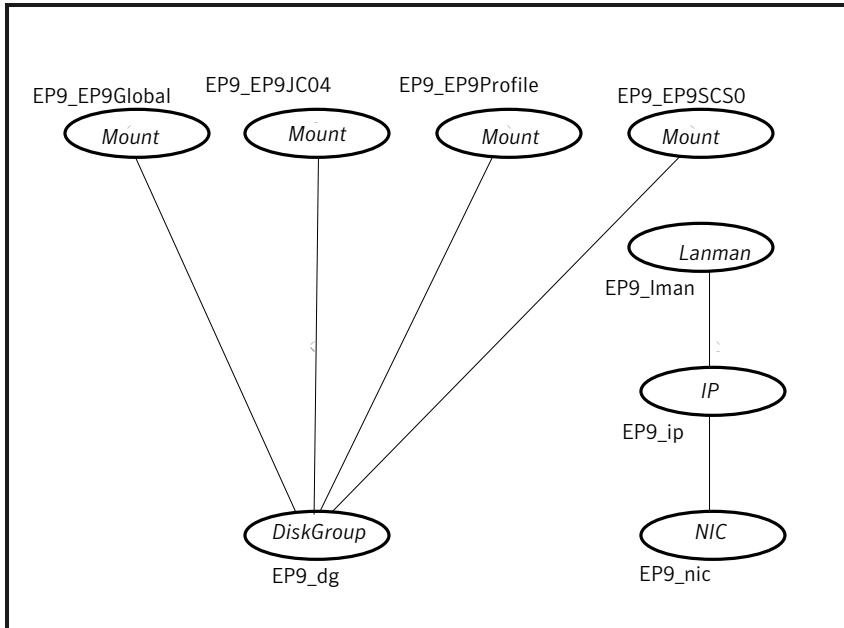
Create a cluster service group that contains the resources supporting the SAP node. Create appropriate cluster resources.

Create links to place the shared disk and networking objects, that were previously placed under the cluster control.

Test the Service Group configuration by placing it online.

[Figure 4-1](#) shows a sample service group configuration.

Figure 4-1 Sample service group configuration



Installing the software for the SAP instance

See [“Setting up SAP systems for clustering”](#) on page 36.

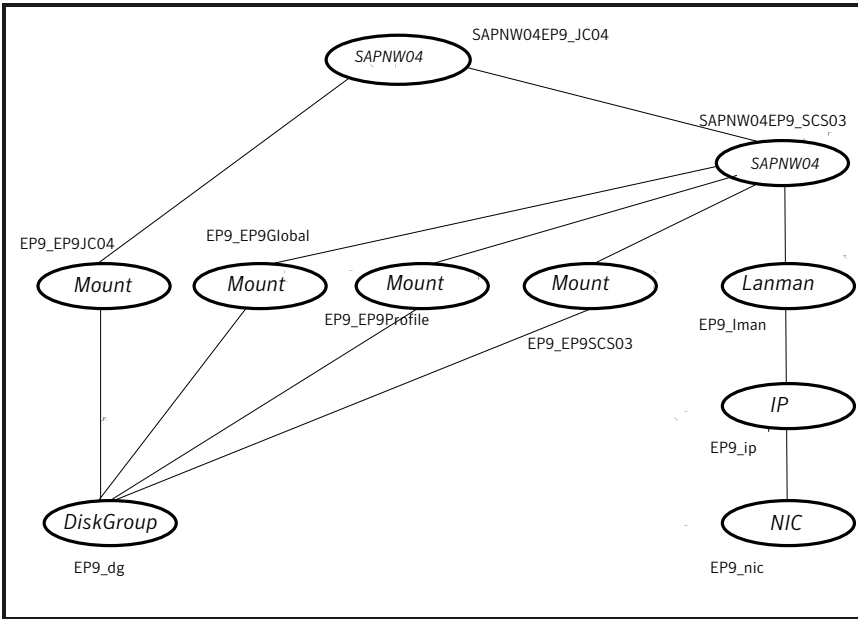
Ensure that SAP runs successfully on all nodes of the cluster before placing the SAP instance under the cluster control.

Placing the SAP instance under cluster control

After the SAP installation is complete, create a cluster resource using the agent for SAP NetWeaver.

[Figure 4-2](#) shows a service group in which the SAP instance is under the cluster control.

Figure 4-2 SAP instance under cluster control



Setting up SAP systems for clustering

This topic describes the procedure to install and configure SAP on a Windows system, so that you can cluster the system in a Veritas Cluster Server (VCS) environment. Symantec recommends installing and clustering a database server for SAP to minimize SAP system downtime. An SAP system downtime may happen due to database unavailability.

In this installation, it is assumed that you are setting up the system on two or more nodes, and clustering these nodes in a VCS environment.

Note: Symantec strongly recommends that a trained SAP consultant must be involved in performing the installation procedure.

Setting up a pre-installed SAP R/3 system

If you have a previously installed SAP stem, the system can be of the following types:

- A domain administrator installed the system with a virtual hostname.

- A domain administrator installed the system with a local hostname.
- A local administrator installed the system with a virtual hostname.
- A local administrator installed the system with a local hostname.

For a domain administrator that has installed the SAP system using a virtual hostname.

See [“Clustering an SAP instance”](#) on page 68.

For all other types, perform the following procedures as applicable:

- [Converting a local installation into a domain installation](#)
- [Converting the local environment into a virtual environment](#)

Converting a local installation into a domain installation

If a local administrator has installed the SAP system, convert the installation into a domain installation.

To convert a local installation into a domain installation

- 1 Ensure that the necessary user accounts and user groups such as *sapsidadm*, *SAPserviceSAPSID*, and so on, exist in the domain controller.

For details about creating user accounts and user groups in the domain controller:

See [“Creating and adding domain groups and users”](#) on page 75.

- 2 Add these domain user accounts to the SAP server, and assign these accounts to the group of local administrators for the SAP server.

For details about adding local groups and users:

See [“Creating and adding local groups and users”](#) on page 78.

- 3 The SAP services, such as *SAP<SAPSID>_<xx>* and *SAPOScol*, use a user to begin execution.

Change the user of these services as follows:

- Stop the SAP system and its services.
 - For each service, right-click the service, and select **Properties**.
 - In the Service Properties dialog box, click the Logon tab.
 - Change the user of the service to the domain user that you created in step 1.
- 4 Ensure that the *sapmnt* and *saploc* directories are shared, and are accessible by the domain user.

Perform the following steps in the order presented:

- Right-click the <drive>:\usr\sap directory, and select **Properties**.
- In the Properties dialog box, click the Sharing tab.
- Click **Share this folder**.
- Enter sapmnt in the Share name field.
- Click **Permissions**.
- In the Permissions for sapmnt dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the sapmnt directory.
- Click **OK** in the Permissions for sapmnt dialog box.
- In the Properties dialog box, click **New Share**.
- In the New Share dialog box, enter saploc in the Share name field.
- Click **OK** in the New Share dialog box.
- Click **Permissions**.
- In the Permissions for saploc dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the saploc directory.
- Click **OK** in the Permissions for saploc dialog box.
- Click **OK** in the Properties dialog box.

- 5 Restart the SAP system and its services.

Converting the local environment into a virtual environment

If the SAP system uses a local hostname, you must convert the local environment of the system into a virtual environment.

Note: Ensure that a domain administrator has installed the SAP installation. If the installation is local, convert the installation into a domain installation.

See [“Converting a local installation into a domain installation”](#) on page 37.

To convert the local environment into a virtual environment

- 1 On all the nodes in the cluster, set the *sapsidadm* user environment variables.
Do the following tasks, in the order presented:
 - Open a command prompt window.

- At the command prompt, type `runas /profile /user:<domain>\<sapsid>adm regedit`.
 - In the Registry Editor dialog box, click **HKEY_CURRENT_USER > Environment**.
 - Set the environment variables.
 See [“Setting the environment variables”](#) on page 42.
- 2** On the drive where SAP is installed, access the DEFAULT.PFL file in the <drive>:\usr\sap\SAPSID\SYS\profile directory.
- Do the following tasks, in the order presented:
- Set the SAPDBHOST parameter as equal to the virtual hostname of the database server.
 - Set any references of the database server as equal to the virtual hostname of the database server.
 - Set all other references of the local hostname as equal to the virtual hostname of the SAP instance.
- 3** On the drive where SAP is installed, access the START profile in the <drive>:\usr\sap\SAPSID\SYS\profile directory.
- Do the following tasks, in the order presented:
- Rename the `START_InstName_RealHostname` file to reflect the virtual hostname of the SAP instance.
 The filename becomes `START_InstName_VirtualHostname`.
 - Set the SAPGLOBALHOST parameter as equal to the virtual hostname of the Central instance.
 - Set the SAPLOCALHOST and SAPLOCALHOSTFULL parameters as equal to the virtual hostname of the instance.
 - Comment out the SAP commands that initiate the database. The appropriate database agent must initiate the database.
 - Change all other references of the local hostname as equal to the virtual hostname of the instance.
- 4** On the drive where SAP is installed, access the instance profile in the <drive>:\usr\sap\SAPSID\SYS\profile directory.
- Do the following tasks, in the order presented:
- Rename the `SAPSID_InstName_RealHostname` file to reflect the virtual hostname of the SAP instance.
 The filename becomes `SAPSID_InstName_VirtualHostname`.

- Set the SAPGLOBALHOST parameter as equal to the virtual hostname of the Central instance.
 - Set the SAPLOCALHOST and SAPLOCALHOSTFULL parameters as equal to the virtual hostname of the instance.
 - Change all other references of the local hostname as equal to the virtual hostname of the instance.
- 5 On the drive where SAP is installed, access the igs.xml file in the <drive>:\usr\sap\SAPSID\InstName\igs\conf directory.
- Do the following tasks, in the order presented:
- Set the ip parameter in MUX as equal to the virtual hostname of the instance.
 - Set the gwhost parameter as equal to the virtual hostname of the instance.
 - Change all other references to the local hostname as equal to the virtual hostname of the instance.
- 6 On the drive in which SAP is installed, access the <drive>:\usr\sap\SAPSID\SYS\exe\run directory or <drive>:\usr\sap\SAPSID\InstName\exe directory.
- 7 Use the sapstartsrv.exe command to recreate the Windows service entry.
- 8 Perform either of these steps to recreate the service entry as follows:
- At the command prompt run the sapstartsrv.exe command.
 - In the SAP Service Install/Uninstall dialog box, enter the following values:

SID	<i>SAPSID</i>
NR	<i>InstID</i>
Startprofile	<ul style="list-style-type: none"> ■ For a global host: <drive>:\usr\sap\SAPSID\SYS\profile\START_ <i>InstName_Virtual_HostName</i> ■ For other hosts: \\<SAPGLOBALHOST>\sapmnt\<SAPSID>\ SYS\profile\START_<InstName>_<Virtual_ HostName>
User	<SAPAdminDomain>\SAPService<SAPSID>
Password	<SAPService<SAPSID> password>
Startup Type	Manual

Use Environment of user <SAPAdminDomain>\<sapsid>adm

■ Click **OK**.

■ Create the Windows service entry using the following command:

```
sapstartsrv.exe -r -q -s <SAPSID> -n <InstID> -U\  
<SAPAdminDomain>\SAPService<SAPSID> -P\ <SAPService<SAPSID>  
password> -p
```

■ For a global host, add the following lines:

```
<drive>:\usr\sap\<SAPSID>\SYS\profile\START_<InstName>_<V.HostName>  
-e <SAPAdminDomain>\<sapsid>adm
```

■ For other hosts, add the following lines:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile\START_<InstName>  
_<Virtual_HostName> -e <SAPAdminDomain>\<sapsid>adm
```

9 As and where applicable, backup the following directories by renaming the directories:

```
<drive>:\usr\sap\<SAPSID>\SYS  
<drive>:\usr\sap\<SAPSID>\SYS\profile  
<drive>:\usr\sap\<SAPSID>\SYS\global  
<drive>:\usr\sap\<SAPSID>\<InstName>
```

10 As and where applicable, create and mount a new shared volume for the following mount points:

```
<drive>:\usr\sap\<SAPSID>\SYS  
<drive>:\usr\sap\<SAPSID>\SYS\profile  
<drive>:\usr\sap\<SAPSID>\SYS\global  
<drive>:\usr\sap\<SAPSID>\<InstName>
```

- 11 Copy the file referenced in step 9 into the new volumes, as and where applicable.
- 12 On the nodes in the cluster where the files referenced in step 9, were not modified, recreate these directories:

```
<drive>:\usr\sap<SAPSID>\SYS
<drive>:\usr\sap<SAPSID>\SYS\profile
<drive>:\usr\sap<SAPSID>\SYS\global
<drive>:\usr\sap<SAPSID>\<InstName>
```

The SAP system is now ready for clustering. For details about clustering:
See “Clustering an SAP instance” on page 68.

Setting the environment variables

Table 4-1 lists the environment variables that you need to convert the local environment into a virtual environment.

The database server is a Microsoft SQL database server.

Table 4-1 Environment variables

Parameter name	Parameter type	Data
DBMS_TYPE	REG_SZ	MSS
MSSQL_DBNAME	REG_SZ	<SAPSID>
MSSQL_SCHEMA	REG_SZ	<sapsid>
MSSQL_SERVER	REG_SZ	<DBHost>\<DBInstance>
PATH	REG_EXPAND_SZ	<Path to all SAP instances' binaries in the SAP system> Separate each instance path with ;.
SAPGLOBALHOST	REG_SZ	<SAPGLOBALHOST>
SAPLOCALHOST	REG_SZ	<SAPLOCALHOST>
TEMP	REG_EXPAND_SZ	C:\WINDOWS\TEMP
TMP	REG_EXPAND_SZ	C:\WINDOWS\TEMP

Note: For Oracle database, configure the the environment variables accordingly.

Fresh SAP installation: Installing an SAP ABAP system

This section describes the procedure to install an SAP system with ABAP architecture in a highly available environment. The procedure assumes that VCS is installed on the system.

Installing an SAP ABAP ASCS instance

This section is applicable for SAP NetWeaver 04s only. Follow these steps to install an SAP ABAP ASCS instance.

To install an SAP ABAP ASCS instance

- 1 Log in as a user that has domain administrator rights.
- 2 Create a VCS Service Group with IP and Lanman resources.

For details about creating VCS Service Groups, refer to the VCS user documentation.
- 3 Before beginning to install the SAP ABAP ASCS instance, bring the Service Group online.
- 4 On the node that has the Service Group online, start the SAP installation.

Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

`<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>`

where:

<Virtual Host Name> is the virtual lanman name that you created in step 2.
- 5 From the installation GUI, select **High-Availability System > Based on AS ABAP > Central Services Instance for ABAP (ASCS)** and follow the instructions to complete the installation.

Installing an SAP ABAP Central instance

Follow these steps to install an SAP ABAP Central instance.

To install an SAP ABAP Central instance

- 1 Log in as a user that has domain administrator rights.
- 2 Create a VCS Service Group with IP and Lanman resources.

For details about creating VCS Service Groups, refer to the VCS user documentation.

- 3 Before beginning to install the Central instance, bring the Service Group online.
- 4 On the node that has the Service Group online, start the SAP installation.
Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual lanman name that you created in step 2.

Follow the instructions in the SAP installation GUI, and complete the SAP Central instance installation.

Installing the SAP Central instance populates the `SAPGLOBALHOST` parameter. This step is not applicable for SAP NetWeaver 04s.

To install an SAP ABAP Central instance for SAP NetWeaver 04s

- 1 Select **High-Availability System > Based on AS ABAP > Central Instance** from the SAP installation GUI and follow the instructions to complete the installation.
- 2 Under **SAP System Parameters**, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

Installing an SAP ABAP Database instance

On the node where the database is up and running, begin the SAP database instance installation.

Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run the following command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual hostname of the system on which the database is running.

Follow the instructions in the SAP installation GUI, and complete the SAP Database instance installation.

Installing an SAP ABAP Dialog instance

Follow these steps to install an SAP ABAP Dialog instance.

To install SAP ABAP Dialog instance

- 1 Log in as a user that has domain administrator rights.
- 2 Create a VCS Service Group with IP and Lanman resources.
 For details about creating VCS Service Groups, refer to the VCS user documentation.
- 3 Before beginning to install the Dialog instance, bring the Service Group online.
- 4 On the node that has the Service Group online, start the SAP installation.

Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual lanman name that you created in step 2.

Follow the instructions in the SAP installation GUI, and complete the SAP Dialog instance installation.

To install an SAP ABAP Dialog instance for SAP NetWeaver 04s

- 1 Select **High-Availability System > Based on AS ABAP > Dialog Instance** from the SAP installation GUI and follow the instructions to complete the installation.
- 2 Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

For details about clustering:

See [“Clustering an SAP instance”](#) on page 68.

Installing an SAP ABAP Standalone Enqueue server

The Standalone Enqueue server is shipped along with the standard SAP installation, but the `sapinst.exe` file does not install and configure the Enqueue server. You must configure the server separately, after installing the SAP Central instance.

This section is applicable for the versions lesser than SAP NetWeaver 04s.

Assume the following:

- Central instance is DVEBMGS<xx>.
- SAP system name is EC4.
- Virtual hostnames of the Standalone Enqueue server and application server instances are SAPEC4ASCS and SAPEC4CI respectively.
- Instance numbers for the Standalone Enqueue server and application server instances are 10 and 12 respectively.

You must first split the Central instance into two instances. For example, split DVEBMGS<xx> into two instances, ASCS<xx> and DVBGS<yy>. The ASCS<xx> instance includes all the centralized components.

The ASCS<xx> instance is an Enqueue server instance, and the DVBGS<yy> instance is an application server instance.

To install and configure a SAP ABAP Standalone Enqueue server

- 1 Make two copies of the start and instance profiles of the Central instance.
- 2 Name the start profiles as follows:
 - START_DVBGS12_SAPEC4CI
start profile for an application server instance
 - START_ASCS10_SAPEC4ASCS
start profile for a Standalone Enqueue server instance
- 3 In the START_DVBGS12_SAPEC4CI profile, do the following:
 - Change the values of the following parameters:

INSTANCE_NAME	DVBGS12
SAPGLOBALHOST	SAPEC4ASCS
SAPLOCALHOST	SAPEC4CI
SAPSYSTEM	12
DIR_INSTANCE	c:\usr\sap\EC4\DVBGS12
DIR_EXECUTABLE	\$(DIR_INSTANCE)\exe
DIR_LIBRARY	\$(DIR_INSTANCE)\exe
DIR_PROFILE	\\SAPEC4ASCS\sapmnt\EC4\SYS\profile
DIR_GLOBAL	\\SAPEC4ASCS\sapmnt\EC4\SYS\global

DIR_CT_RUN \\SAPEC4ASCS\sapmnt\EC4\SYS\exe\run

■ **Remove the following lines:**

```
_DB=strdbs.cmd
Start_Program_02=immediate $(DIR_EXECUTABLE)\$( _DB) EC4
_MS=msg_server.exe
Start_Program_03=local $(DIR_EXECUTABLE)\$( _MS) pf=$(DIR_PROFILE)\
EC4_DVEBMGS10_SAPEC4ASCS
_DW=disp+work.exe
Start_Program_04=local $(DIR_EXECUTABLE)\$( _DW) pf=$(DIR_PROFILE)\
EC4_DVEBMGS10_SAPEC4ASCS
_IGS=igswd.exe
Start_Program_06=local $(DIR_INSTANCE)\igs\bin\$( _IGS)
-dir=$(DIR_INSTANCE)\igs -mode=all -sysname=EC4 -sysno=10
```

■ **Add the following lines:**

```
_CP=sapcpe.exe
Start_Program_01=immediate $(DIR_EXECUTABLE)\$( _CP)
pf=$(DIR_PROFILE)\EC4_DVBGS12_SAPEC4CI
_DW=disp+work.exe
Start_Program_04=local $(DIR_EXECUTABLE)\$( _DW)
pf=$(DIR_PROFILE)\EC4_DVBGS12_SAPEC4CI
_IGS=igswd.exe
Start_Program_06=local $(DIR_INSTANCE)\igs\bin\$( _IGS)
-dir=$(DIR_INSTANCE)\igs -mode=all -sysname=EC4 -sysno=12
```

4 In the START_ASCS10_SAPEC4ASCS profile, do the following:

■ **Change the values of the following parameters:**

SAPGLOBALHOST	SAPEC4ASCS
SAPLOCALHOST	SAPEC4ASCS
INSTANCE_NAME	ASCS10
SAPSYSTEM	10
DIR_EXECUTABLE	c:\usr\sap\EC4\ASCS10\exe
DIR_LIBRARY	c:\usr\sap\EC4\ASCS10\exe
DIR_PROFILE	c:\usr\sap\EC4\SYS\profile

DIR_GLOBAL	c:\usr\sap\EC4\SYS\global
DIR_CT_RUN	C:\usr\sap\EC4\SYS\exe\run

■ Remove the following lines:

```
_DB=strdbs.cmd
Start_Program_02=immediate $(DIR_EXECUTABLE)\$( _DB) EC4
_MS=msg_server.exe
Start_Program_03=local $(DIR_EXECUTABLE)\$( _MS)
pf=$(DIR_PROFILE)\EC4_DVEBMGS10_SAPEC4ASCS
_DW=disp+work.exe
Start_Program_04=local $(DIR_EXECUTABLE)\$( _DW)
pf=$(DIR_PROFILE)\EC4_DVEBMGS10_SAPEC4ASCS
_IGS=igswd.exe
Start_Program_06=local $(DIR_INSTANCE)\igs\bin\$( _IGS)
-dir=$(DIR_INSTANCE)\igs -mode=all -sysname=EC4 -sysno=10
```

■ Add the following lines:

```
_CP = sapcpe.exe
Start_Program_00 = immediate $(DIR_EXECUTABLE)\$( _CP)
pf=$(DIR_PROFILE)\EC4_ASCS10_SAPEC4ASCS
_MS=msg_server.exe
Start_Program_01=local $(DIR_EXECUTABLE)\$( _MS)
pf=$(DIR_PROFILE)\EC4_ASCS10_SAPEC4ASCS
_EN = ensERVER.exe
Start_Program_02 = local $(DIR_EXECUTABLE)\$( _EN)
pf=$(DIR_PROFILE)\EC4_ASCS10_SAPEC4ASCS
```

5 Name the instance profiles as follows:

- EC4_DVBGS12_SAPEC4CI
instance profile of the application server instance
- EC4_ASCS10_SAPEC4ASCS
instance profile of the Standalone Enqueue server instance

6 In the EC4_DVBGS12_SAPEC4CI profile, do the following:

- Change the values of the following parameters:

INSTANCE_NAME	DVBGS12
SAPSYSTEM	12

SAPGLOBALHOST	SAPEC4ASCS
SAPLOCALHOST	SAPEC4CI
DIR_GLOBAL	\\SAPEC4ASCS\sapmnt\EC4\SYS\global
DIR_PROFILE	\\SAPEC4ASCS\sapmnt\EC4\SYS\profile
DIR_INSTANCE	C:\usr\sap\EC4\DV BGS12
DIR_EXECUTABLE	\$(DIR_INSTANCE)\exe
DIR_CT_RUN	\\SAPEC4ASCS\sapmnt\EC4\SYS\exe\run
DIR_TRANS	\\SAPEC4ASCS\sapmnt\trans

- Remove the following line.

```
rdisp/wp_no_enq=1
```

- Change the value of PORT in the following line.

```
icm/server_port_0=PROT=HTTP,PORT=8012
```

7 In the EC4_ASCS10_SAPEC4ASCS profile, do the following:

- Change the values of the following parameters:

INSTANCE_NAME	ASCS10
SAPGLOBALHOST	SAPEC4ASCS
SAPLOCALHOST	SAPEC4ASCS
SAPSYSTEM	10

- Remove the following lines:

```
rdisp/wp_no_dia=2
rdisp/wp_no_btc=2
rdisp/wp_no_vb=1
rdisp/wp_no_vb2=1
rdisp/wp_no_enq=1
rdisp/wp_no_spo=1
PHYS_MEMSIZE=512
DIR_TRANS=C:\usr\sap\trans
icm/server_port_0=PROT=HTTP,PORT=8010
```

■ Add the following lines:

```
rdisp/myname = SAPEC4ASCS_EC4_10
enqueue/server/threadcount = 1
ipc/shm_psize_34 = 0
enqueue/table_size = 4096
enqueue/dequeue_wait_answer = FALSE
enqueue/process_location = LOCAL
enqueue/encni/port = 3210
rdisp/enqname = $(rdisp/myname)
enqueue/snapshot_pck_ids = 100
rdisp/mshost=SAPEC4ASCS
rdisp/msserv = 3610
ms/server_port_0=PROT=HTTP, PORT=8110
```

8 In the DEFAULT.PFL file, do the following:

■ Remove the following lines:

```
SAPDBHOST=SAPEC4ASCS
rdisp/accept_remote_trace_level=0
rdisp/sna_gateway=SAPEC4ASCS
rdisp/sna_gw_service=sapgw10
rslg/collect_daemon/listen_port=37
rslg/collect_daemon/talk_port=13
rdisp/bufrefmode=sendoff,exeauto
dbms/type=mss
dbs/mss/server=SAPNWDB\SQLINST01
dbs/mss/schema=ec4
dbs/mss/dbname=EC4
```

■ Add these lines:

```
SAPDBHOST=SAPNWDB #virtual hostname of the database server
rdisp/accept_remote_trace_level=0
rdisp/sna_gateway=SAPEC4CI
rdisp/sna_gw_service=sapgw12
rslg/collect_daemon/listen_port=37
rslg/collect_daemon/talk_port=13
rdisp/bufrefmode=sendon,exeauto
dbms/type=mss
dbs/mss/server=SAPNWDB\SQLINST01
dbs/mss/schema=ec4
dbs/mss/dbname=EC4
```

```
enqueue/process_location = REMOTESA
enqueue/serverhost = SAPEC4ASCS
enqueue/serverinst = 10
enqueue/encni/port = 3210
```

The Standalone Enqueue server is now configured and is ready for clustering. For details about clustering:

See [“Clustering an SAP instance”](#) on page 68.

Installing an SAP ABAP Enqueue Replication server

Follow the instructions here to install and configure an SAP ABAP Enqueue Replication server.

See [“Installing an SAP Enqueue Replication server”](#) on page 64.

Fresh SAP installation: Installing an SAP Java system

This section describes the procedure to install an SAP system with Java architecture in a highly available environment. The procedure assumes that VCS is installed on the system.

Perform the instance installation in the order presented as follows.

Installing an SAP Java Central Services instance

This section explains the steps to install an SAP Java Central Services instance.

To install an SAP Java Central Services instance

- 1 Log in as a user that has domain administrator rights.
- 2 Create a VCS Service Group with IP and Lanman resources.
 For details about creating VCS Service Groups, refer to the VCS user documentation.
- 3 Before beginning to install the SAP Java Central Services instance, bring the Service Group online.

- 4
- On the node that has the Service Group online, start the SAP installation.
- Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run the following command:

SAP NetWeaver 04s	<code><path>\sapinst.exe</code> <code>SAPINST_USE_HOSTNAME=<Virtual Host Name></code>
Other SAP versions	<code><path>\sapinst.exe</code> <code>SAPINST_USE_HOSTNAME=<Virtual Host Name></code> <code>product_ha.catalog</code>

where:

<Virtual Host Name> is the virtual lanman name that you created in step 2.

- 5
- From the installation GUI, select one of the following options and follow the instructions to complete the installation.

SAP NetWeaver 04s	High-Availability System > Based on AS Java > Central Services Instance (SCS)
Other SAP versions	SAP Java Central Services Instance

Installing an SAP Java Database instance

This section is applicable for SAP NetWeaver 04s only. Follow these steps to install an SAP Java Database instance.

To install an SAP Java Database instance

- 1 On the node where the database is up and running, begin the SAP database instance installation.

Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run the following command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual hostname of the system on which the database is running.

- 2 From the installation GUI, select **High-Availability System > Based on AS Java > Database Instance** and follow the instructions to complete the installation.

Installing an SAP Java Central instance

Ensure that you install an SAP Java Central Services instance before installing a Central instance.

See [“Installing an SAP Java Central Services instance”](#) on page 51.

For SAP NetWeaver 04s, use the following command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

For other versions, use the following command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>  
product_ha.catalog
```

Select the option for SAP Java Central instance from the installation GUI, and follow the instructions to complete the installation.

When prompted for the SCS instance host name, enter the virtual host name of the SAP Java Central Services instance.

For SAP NetWeaver 04s, do the following:

- Select High-Availability System > Based on AS Java > Central Instance from the SAP installation GUI and follow the instructions to complete the installation.
- Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

Installing an SAP Java Dialog instance

This section explains the steps to install an SAP Java Dialog instance.

To install an SAP Java Dialog instance

Install the Java Dialog instance.

See [“Installing an SAP ABAP Dialog instance”](#) on page 45.

For SAP NetWeaver 04s, use the following command:

```
<Path_to_SAPInst>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

For other SAP versions, use the following command:

```
<Path_to_SAPInst>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>  
product_ha.catalog
```

Select the option for SAP Java Dialog instance from the installation GUI, and follow the instructions to complete the installation.

When prompted for the Central instance host name, enter the virtual host name of the SAP Java Central Services instance.

For SAP NetWeaver 04s, do the following:

- Select High-Availability System > Based on AS Java > Dialog Instance from the SAP installation GUI and follow the instructions to complete the installation.
- Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

For details about clustering:

See [“Clustering an SAP instance”](#) on page 68.

Installing an SAP Java Enqueue Replication server

Follow the instructions to install and configure an SAP Java Enqueue Replication server.

See [“Installing an SAP Enqueue Replication server”](#) on page 64.

Fresh SAP installation: Installing a Java Add-In system (ABAP + Java)

This section describes the procedure to install an SAP system in which a Java Add-In is added to the ABAP architecture in a highly available environment. The procedure assumes that VCS is installed on the system.

Perform the instance installation in the order presented as follows.

Installing an SAP Add-In ASCS instance

This section is applicable for SAP NetWeaver 04s only. Follow the instructions to install an SAP Add-In ASCS instance.

See [“Installing an SAP ABAP ASCS instance”](#) on page 43.

From the installation GUI, select High-Availability System > Based on AS ABAP and AS Java > Central Services Instance for ABAP (ASCS) and follow the instructions to complete the installation.

Installing an SAP Add-In SCS instance

This section is applicable for SAP NetWeaver 04s only. Follow the instructions to install an SAP Add-In SCS instance. Use the IP and Lanman resources that you created for the SAP Add-In ASCS instance.

See [“Installing an SAP Add-In ASCS instance”](#) on page 55.

To install an SAP Add-In SCS instance

- 1 Log in as a user that has domain administrator rights.
- 2 Before beginning to install the SAP Add-In SCS instance, bring the Service Group in which the SAP Add-In ABAP instance is installed, online.
- 3 On the node that has the Service Group online, start the SAP installation. Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where: *<Virtual Host Name>* is the virtual lanman name.

- 4 From the installation GUI, select **High-Availability System > Based on AS ABAP > Central Services Instance (SCS)** and follow the instructions to complete the installation.

Installing an SAP ABAP Central instance for an Add-In system

Follow the instructions to install an SAP ABAP Central instance.

See [“Installing an SAP ABAP Central instance”](#) on page 43.

For SAP NetWeaver 04s, do the following:

- Select High-Availability System > Based on AS ABAP and AS Java > Central Instance from the installation GUI, to install an SAP Add-In Central instance.
- Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

Installing an SAP ABAP Database instance for an Add-In system

Install an SAP ABAP Database instance.

See [“Installing an SAP ABAP Database instance”](#) on page 44.

For SAP NetWeaver 04s, do the following:

- Select High-Availability System > Based on AS ABAP and AS Java > Database Instance from the installation GUI, to install an SAP Add-In Database instance.
- Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

Installing a Java Add-In for a Central instance

For SAP NetWeaver 04s, this section is not applicable if you select the High-Availability option while installing the SAP ABAP Central instance for an Add-In system.

After installing the SAP ABAP Central and Database instance, follow these steps to install a Java Add-In for the Central instance.

To install a Java Add-In for a Central instance

- 1 Log in as a user that has domain administrator rights.
- 2 Bring the service group, which you created in the SAP ABAP Central instance for an Add-In system, online.
 See [“Installing an SAP ABAP Central instance for an Add-In system”](#) on page 56.
- 3 On the node that has the Service Group online, start the Java Add-In system installation.

Do not double-click the **sapinst.exe** file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual lanman name of the SAP Add-In Central instance.

Select **Java Add-In for ABAP > Java System Finalization** from the installation GUI, and follow the instructions to complete the installation.

Installing an SAP ABAP Dialog instance for an Add-In system

Install an SAP ABAP dialog instance.

See [“Installing an SAP ABAP Dialog instance”](#) on page 45.

For SAP NetWeaver 04s, do the following:

- Select High-Availability System > Based on AS ABAP and AS Java > Dialog Instance from the installation GUI, to install an SAP Add-In Dialog instance.
- Under SAP System Parameters, specify the virtual SCS host name in the Profile Directory field. For example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile
```

Installing a Java Add-In for a Dialog instance

For SAP NetWeaver 04s, this section is not applicable if you select the High-Availability option while installing the SAP ABAP Dialog instance for an Add-In system.

After installing an SAP ABAP Dialog instance, follow these steps to install a Java Add-In for the Dialog instance.

To install a Java Add-In for a Dialog instance

- 1 Bring the dialog instance that you installed in the Java Add-In for a Dialog instance, online.

See [“Installing a Java Add-In for a Dialog instance”](#) on page 57.

- 2 Begin the installation. Do not double-click the `sapinst.exe` file to launch the SAP installation GUI. Use the `SAPINST_USE_HOSTNAME` parameter to launch the SAP installation GUI in a virtual environment. At the command prompt, run this command:

```
<path>\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

where:

<Virtual Host Name> is the virtual lanman name of the SAP Add-In Central instance.

Select **Java Add-In for ABAP > Dialog Instance Finalization** from the installation GUI, and follow the instructions to complete the installation.

For details about clustering:

See [“Clustering an SAP instance”](#) on page 68.

Installing an SAP Add-In Standalone Enqueue server

For SAP NetWeaver 04s, this section is not applicable if you select the High-Availability option in the SAP installation GUI. For SAP NetWeaver 04s, the procedure to install an SAP Add-In Standalone Enqueue server is integrated with the SAPInst tool.

For other SAP versions, in an SAP Add-In system, you require the following:

- A Standalone Enqueue server and a message server with ABAP architecture.
- A Standalone Enqueue server and a message server with Java architecture.
This Enqueue server is shipped as part of the SAP installation.

For high availability, you must isolate the ASCS instance. To isolate the ASCS instance, you must split the Central instance into two instances. One instance includes the dialog, update, background, and spool work processes, while the other instance becomes a disconnected ASCS instance, containing the message and the Enqueue servers.

If you restart this disconnected ASCS instance on the Central Services instance host, the instance is relocated on the Central Services instance host.

The remaining instance on the Central instance host must not be renamed as `DVBGS<xx>`. Renaming this instance may lead to problems with an existing J2EE

Add-In system, or with an awaiting J2EE installation. In addition, the path names are firmly connected to various points in the J2EE engine. Therefore, this instance name must not be changed. For more information, refer to SAP note 821904.

Before you install an SAP Add-In Standalone Enqueue server, assume the following:

- The original Central instance is DVEBMGS<xx>, and the instance is split into the following instances:

ASCS<yy>	SAP Add-In Standalone Enqueue server instance
DVEBMGS<xx>	Application server instance

- The value of SAPSID is XI1.
- The virtual host name of the Central and Standalone Enqueue server is SAPXI1ASCS.
- The instance numbers of the Central and Standalone Enqueue server instances are 41 and 42 respectively.

To install and configure an SAP Add-In Standalone Enqueue server

- 1 Make a copy of the start profile of the Central instance.

Name the start profiles as follows:

- START_DVEBMGS41_SAPXI1ASCS
The start profile for the application server instance
- START_ASCS42_SAPXI1ASCS
The start profile for the Standalone Enqueue server

- 2 In the START_DVEBMGS41_SAPXI1ASCS profile, do the following:

- Change the values of the following parameters:

DIR_EXECUTABLE	C:\usr\sap\XI1\SYS\exe\run
DIR_LIBRARY	C:\usr\sap\XI1\SYS\exe\run
DIR_INSTANCE	C:\usr\sap\XI1\DVEBMGS41
DIR_GLOBAL	C:\usr\sap\XI1\SYS\global
DIR_PROFILE	C:\usr\sap\XI1\SYS\profile
DIR_CT_RUN	C:\usr\sap\XI1\SYS\exe\runU

- Remove the following lines:

```
_DB=strdbs.cmd
Start_Program_02=immediate $(DIR_EXECUTABLE)\$( _DB) XI1
_MS=msg_server.exe
Start_Program_03=local $(DIR_EXECUTABLE)\$( _MS)
pf=$(DIR_PROFILE)\XI1_DVEBMGS41_SAPXI1ASCS
```

3 In the START_ASCS42_SAPXI1ASCS profile, do the following:

■ Change the values of the following parameters:

SAPGLOBALHOST	SAPXI1ASCS
SAPLOCALHOST	SAPXI1ASCS
INSTANCE_NAME	ASCS42
SAPSYSTEM	42
DIR_EXECUTABLE	C:\usr\sap\XI1\ASCS42\exe
DIR_LIBRARY	C:\usr\sap\XI1\ASCS42\exe
DIR_INSTANCE	C:\usr\sap\XI1\ASCS42
DIR_GLOBAL	C:\usr\sap\XI1\SYS\global
DIR_PROFILE	C:\usr\sap\XI1\SYS\profile
DIR_CT_RUN	C:\usr\sap\XI1\SYS\exe\runU

■ Remove the following lines:

```
_DB=strdbs.cmd
Start_Program_02=immediate $(DIR_EXECUTABLE)\$( _DB) XI1
_MS=msg_server.exe
Start_Program_03=local $(DIR_EXECUTABLE)\$( _MS)
pf=$(DIR_PROFILE)\XI1_DVEBMGS41_SAPXI1ASCS
_DW=disp+work.exe
Start_Program_04=local $(DIR_EXECUTABLE)\$( _DW)
pf=$(DIR_PROFILE)\XI1_DVEBMGS41_SAPXI1ASCS
_IGS=igswd.exe
Start_Program_06=local $(DIR_INSTANCE)\igs\bin\$( _IGS)
-dir=$(DIR_INSTANCE)\igs -mode=all -sysname=XI1 -sysno=41
```

■ Add the following lines:

```
_CP = sapcpe.exe
Start_Program_00 = immediate $(DIR_EXECUTABLE)\$_CP)
list:$(DIR_CT_RUN)\instance.lst pf=$(DIR_PROFILE)\
XI1_ASCS42_SAPXI1ASCS
_MS=msg_server.exe
Start_Program_01=local $(DIR_EXECUTABLE)\$_MS)
pf=$(DIR_PROFILE)\XI1_ASCS42_SAPXI1ASCS
_EN = ensver.exe
Start_Program_02 = local $(DIR_EXECUTABLE)\$_EN)
pf=$(DIR_PROFILE)\XI1_ASCS42_SAPXI1ASCS
```

4 Make a copy of the instance profile of the Central instance.

Name the profiles as follows:

- XI1_DVEBMGS41_SAPXI1ASCS

The instance profile for the Standalone Enqueue server instance

- XI1_ASCS42_SAPXI1ASCS

The instance profile for the application server instance

5 In the XI1_DVEBMGS41_SAPXI1ASCS profile, do the following:

- Change the values of the following parameters:

SAPGLOBALHOST	SAPXI1ASCS
SAPLOCALHOST	SAPXI1ASCS
INSTANCE_NAME	DVEBMGS41
SAPSYSTEM	41
DIR_EXECUTABLE	C:\usr\sap\XI1\SYS\exe\run
DIR_LIBRARY	C:\usr\sap\XI1\SYS\exe\run
DIR_INSTANCE	C:\usr\sap\XI1\DVEBMGS41
DIR_GLOBAL	C:\usr\sap\XI1\SYS\global
DIR_PROFILE	C:\usr\sap\XI1\SYS\profile
DIR_CT_RUN	C:\usr\sap\XI1\SYS\exe\runU

- Remove the following line:

```
rdisp/wp_no_enq = 1
```

- Add the following line:

```
enqueue/serverinst = 42
```

- Change the value of PORT in the following line:

```
ms/server_port_0 = PROT=HTTP, PORT=8142
```

6 In the XI1_ASCS42_SAPXI1ASCS profile, do the following:

- Change the values of the following parameters:

SAPGLOBALHOST	SAPXI1ASCS
SAPLOCALHOST	SAPXI1ASCS
INSTANCE_NAME	ASCS42
SAPSYSTEM	42
DIR_EXECUTABLE	C:\usr\sap\XI1\ASCS42\exe
DIR_GLOBAL	C:\usr\sap\XI1\SYS\global
DIR_PROFILE	C:\usr\sap\XI1\SYS\profile
DIR_CT_RUN	C:\usr\sap\XI1\SYS\exe\runU

- Remove the following lines:

```
rdisp/wp_no_dia = 2
rdisp/wp_no_btc = 2
rdisp/wp_no_vb = 1
rdisp/wp_no_vb2 = 1
rdisp/wp_no_enq = 1
rdisp/wp_no_spo = 1
PHYS_MEMSIZE = 512
DIR_TRANS = C:\usr\sap\trans
rdisp/start_icman = TRUE
icm/server_port_0 = PROT=HTTP, PORT=8041
exe/j2ee = $(DIR_INSTANCE)/j2ee/os_libs/jcontrol.exe
rdisp/j2ee_start_control = 1
rdisp/j2ee_start = 1
rdisp/j2ee_timeout = 600
rdisp/frfc_fallback = on
icm/HTTP/j2ee_0 = PREFIX=/,HOST=localhost,CONN=0-500,PORT=54100
jstartup/trimming_properties = off
```

```
jstartup/protocol = on
exe/jlaunch = $(DIR_INSTANCE)/j2ee/os_libs/jlaunch.exe
jstartup/vm/home = C:\Program Files\j2sdk1.4.2_10
INSTANCE_PROPERTIES =
$(DIR_INSTANCE)/j2ee/cluster/instance.properties
SDM_PROPERTIES = $(DIR_INSTANCE)/SDM/program/config/
sdm_jstartup.properties
jstartup/instance_properties =
$(INSTANCE_PROPERTIES);$(SDM_PROPERTIES)
ms/server_port_0 = PROT=HTTP, PORT=8141
```

■ Add the following lines:

```
rdisp/msserv = 3642
enqueue/table_size = 4096
enqueue/deque_wait_answer = FALSE
enqueue/serverinst = 42
enqueue/process_location = LOCAL
enqueue/encni/port = 3242
rdisp/myname = SAPXI1ASCS_XI1_42
rdisp/enqname = $(rdisp/myname)
enqueue/snapshot_pck_ids = 100
ms/server_port_0 = PROT=HTTP, PORT=8142
enqueue/server/threadcount = 1
ipc/shm_psize_34 = 0
```

7 In the DEFAULT.PFL file, do the following:

- Make SAPDBHOST equal to SAPNWDB, the virtual host name of the database server.
- Change the value of PORT in this line.

```
ms/server_port_0= PROT=HTTP, PORT=8142
```

■ Add the following lines:

```
enqueue/process_location= REMOTESA  
enqueue/serverhost= SAPXI1ASCS  
enqueue/serverinst= 42
```

- 8 Go to the following services file, and change the value of the message server port for the sapmsXI1 service to 3642/tcp:

Windows 2000 c:\WINNT\system32\drivers\etc\services

Windows 2003 c:\WINDOWS\system32\drivers\etc\services

The Java Add-In Enqueue server instance is configured and is ready for clustering.

See [“Clustering an SAP instance”](#) on page 68.

Installing and configuring an SAP Add-In Enqueue Replication server

Perform the following instructions to install and configure an SAP Add-In Enqueue Replication server for an ABAP system.

See [“Installing an SAP Enqueue Replication server”](#) on page 64.

Perform the following instructions to install and configure an SAP Add-In Enqueue Replication server for a Java System.

See [“Installing an SAP Enqueue Replication server”](#) on page 64.

Installing an SAP Enqueue Replication server

For a highly available clustering system, you must configure an Enqueue Replication server along with a Standalone Enqueue server.

Note: Before configuring the Enqueue Replication server, refer to SAP Note 1018968.

Before installing an Enqueue Replication server, install the Standalone Enqueue server depending on the type of system as follows:

- For an SAP ABAP system
See [“Installing an SAP ABAP Standalone Enqueue server”](#) on page 45.
- For an SAP Add-In system
See [“Installing an SAP Add-In Standalone Enqueue server”](#) on page 58.
- For an SAP Java system, you must install an SAP Java Central Services instance

See [“Installing an SAP Java Central Services instance”](#) on page 51.

Before you install the SAP Enqueue Replication Server, assume the following:

- The value of the SAPSID attribute is <sapsid>.
- The virtual hostname of the Standalone Enqueue server is <enq_server>. For an SAP Java system, consider <enq_server> as the SAP Java Central Services instance.
- The virtual hostname of the Enqueue Replication server is <rep_server>.
- The instance number of the Standalone Enqueue server is <xx>. For an SAP Java system, consider <xx> as the instance number of the SAP Java Central Services instance.
- The instance number of the Enqueue Replication server is <yy>. Ensure that the instance numbers for the shared memory segments of the Standalone Enqueue server and the Enqueue Replication server are the same. In case of a Standalone Enqueue server failure, this similarity facilitates the Enqueue lock table takeover.

To install and configure an SAP Enqueue Replication Server

- 1 Add the following line in the <sapsid>_(A)SCS<xx>_<enq_server> profile:

```
enqueue/server/replication = true
```

Restart the (A)SCS<xx> instance for the changes to take effect.

- 2 Make a copy of the START_(A)SCS<xx>_<enq_server> start profile, and rename the copy as START_REP<yy>_<rep_server>. This profile is the start profile for the Enqueue Replication server instance.
- 3 In the START_REP<yy>_<rep_server> profile, do the following:
 - Change the values of the following parameters.

SAPSYSTEM	<yy>
SCSID	<xx>
INSTANCE_NAME	REP<yy>
SAPGLOBALHOST	<enq_server>
SAPLOCALHOST	<rep_server>
DIR_INSTANCE	<drive>:\usr\sap\<sapsid>\INSTANCE_NAME
DIR_EXECUTABLE	<drive>:\usr\sap\<sapsid>\INSTANCE_NAME\exe

DIR_LIBRARY	<drive>:\usr\sap\<sapsid>\INSTANCE_NAME\exe
DIR_PROFILE	\\<enq_server>\sapmnt\<sapsid>\SYS\profile
DIR_GLOBAL	\\<enq_server>\sapmnt\<sapsid>\SYS\global

■ Remove the following lines:

```
_CP = sapcpe.exe
Start_Program_00 = immediate $(DIR_EXECUTABLE)\$_CP)
pf=$(DIR_PROFILE)\<sapsid>_(A)SCS<xx>_<enq_server>
_MS=msg_server.exe
Start_Program_01=local $(DIR_EXECUTABLE)\$_MS)
pf=$(DIR_PROFILE)\<sapsid>_(A)SCS<xx>_<enq_server>
_EN = ensrver.exe
Start_Program_02 = local $(DIR_EXECUTABLE)\$_EN)
pf=$(DIR_PROFILE)\<sapsid>_(A)SCS<xx>_<enq_server>
```

■ Add the following lines:

```
_CP = sapcpe.exe
Start_Program_00 = immediate $(DIR_EXECUTABLE)\$_CP)
pf=$(DIR_PROFILE)\<sapsid>_REP<yy>_<rep_server>
_ER = enrepsrver.exe
Start_Program_01 = local $(DIR_EXECUTABLE)\$_ER)
pf=$(DIR_PROFILE)\<sapsid>_REP<yy>_<rep_server> NR=$(SCSID)
```

- 4 Make a copy of the <sapsid>_(A)SCS<xx>_<enq_server> instance profile, and rename the copy as <sapsid>_REP<yy>_<rep_server>. This profile is the instance profile for the Enqueue Replication server instance.

- 5 In the <sapsid>_REP<yy>_<rep_server> profile, do the following:

■ Change the values of the following parameters:

SAPSYSTEM	<yy>
SCSID	<xx>
INSTANCE_NAME	REP<yy>
DIR_GLOBAL	\\<enq_server>\sapmnt\<sapsid>\SYS\global
DIR_PROFILE	\\<enq_server>\sapmnt\<sapsid>\SYS\profile
DIR_EXECUTABLE	<drive>:\usr\sap\<sapsid>\REP<yy>\exe

```

DIR_CT_RUN                \\<enq_server>\sapmnt\<sapsid>\SYS\exe\run
SAPGLOBALHOST             <enq_server>
SAPLOCALHOST              <rep_server>
SAPLOCALHOSTFULL          <rep_server>
    
```

■ Remove the following lines:

```

rdisp/myname = <enq_server>_<sapsid>_<xx>
enqueue/server/replication = true
enqueue/server/threadcount = 1
ipc/shm_psize_34 = 0
enqueue/table_size = 4096
enqueue/deque_wait_answer = FALSE
enqueue/process_location = LOCAL
enqueue/encni/port = 3210
rdisp/enqname = $(rdisp/myname)
enqueue/snapshot_pck_ids = 100
rdisp/mshost=<enq_server>
rdisp/msserv = 3610
ms/server_port_0=PROT=HTTP, PORT=8110
    
```

■ Add the following lines:

```

enqueue/process_location = REMOTESA
enqueue/serverhost = <enq_server>
enqueue/serverport = 32$(SCSID)
enqueue/serverinst = $(SCSID)
enqueue/enrep/poll_interval = 0
enqueue/enrep/poll_timeout = 120
enqueue/enrep/inactive_action = sleep
    
```

6 Create the following directory structure:

```

<drive>:\usr\sap\<sapsid>\REP<yy>\exe
<drive>:\usr\sap\<sapsid>\REP<yy>\log
<drive>:\usr\sap\<sapsid>\REP<yy>\data
<drive>:\usr\sap\<sapsid>\REP<yy>\work
    
```

7 From the (A)SCS instance directory, copy all binaries into the <drive>:\usr\sap\<sapsid>\REP<yy>\exe directory.

- 8 In the <drive>:\usr\sap\<sapsid>\REP<yy>\exe directory, create an sapcpe.exe list file. Name the list file as rep.lst.

The rep.lst file must contain the names of all the binary files in this directory. The list file must also include an entry as rep.lst.

- 9 Use the sapstartsrv.exe command to create an SAP Windows Service for the Enqueue Replication server instance.

Start the SAP instance for the Enqueue Replication server. Ensure that the instance is running successfully.

The SAP instance is now ready for clustering.

See “[Clustering an SAP instance](#)” on page 68.

Clustering an SAP instance

This section describes the procedure for clustering an SAP instance.

This procedure involves the following steps:

- Install the appropriate Windows Resource kit.
- In an SAP cluster installation, an additional directory, %WINDIR%\SapCluster, is created under the system directory. This directory contains all the SAP files that the cluster nodes require. These files are independent of the node that the SAP instance is running on. These files are database tools and program files that the operating system monitor, SAPOsCol uses.
The directory is added to the path variable of the user <sapsid>adm.
- You must first configure the node that is hosting the Central instance, and then configure all other nodes that you want to cluster.

Configuring the first node in the cluster

On the node in the cluster on which you installed SAP the first time, you must perform the following steps:

- Copy the required tools in to the SAPCluster directory.
- Set the SAPService to manual.
- Ensure that the SAPOsCol service is started from the SAPCluster directory.
- Create the SAP cluster group.

These steps are explained in detail in the following sections.

To configure the first node in the cluster

- 1 Stop the Central instance.
- 2 Add the following lines in the start and instance profiles of the Central instance:

```
DIR_INSTALL = <DISK>:\usr\sap\SID\SYS  
DIR_INSTANCE = <DISK>:\usr\sap<SAPSID>\<InstName>  
SAPLOCALHOST = <InstanceVirtualHostName>  
SAPLOCALHOSTFULL = <InstanceVirtualHostName>
```

- 3 In the start profile, make AUTOSTART as equal to 0.
- 4 Create the following directory:

```
%windir%\SapCluster
```

- 5 From the <disk>:\usr\sap<SAPSID>\<InstName>\exe directory, copy the following files into the %windir%\SapCluster directory:

```
sapevents.dll  
sapntchk.exe  
saposcol.exe  
sapstartsrv.exe
```

- 6 Change the <sapsid>adm user environment as follows:

- At the command prompt, type `runas /profile /user:<domain>\<sapsid>adm regedit.`
- In the Registry Editor screen, click **HKEY_CURRENT_USER > Environment**.
- Change the value of PATH to %PATH%;%windir%\SapCluster.

- 7 Stop the following SAP services:

```
saposcol  
SAP<SAPSID>_<No.>
```

- 8 Change the SAP service configuration by running the following command from the command prompt:

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

- 9 Configure the SAP<SAPSID>_<No.> service as follows:

- At the command prompt, go to the %windir%\SapCluster\ directory.
- Run the `sapstartsrv.exe` command.
- In the SAP Service Install/Uninstall dialog box, select **Register COM Typelibrary only** in the Operation field.
- Click **OK**.
- Click **Start > Run**.
- Enter `services.msc` in the Open field.
- In the Services dialog box, right-click the SAP<SAPSID>_<No.> service, and select **Properties**.
- Select Manual in the Startup type field.
- Click **OK**.
- Quit the Services dialog box.

10 Create the following registry keys:

- At the command prompt, type `runas /profile /user:<domain>\<sapsid>adm regedit`.
- In the Registry Editor screen, click **HKEY_LOCAL_MACHINE > System > CurrentControlSet > Services > EventLog > Application**.
- Create registry keys, SAPOsCol and SAP<SAPSID>_<No.>.
- Assign the following values to the registry entries of SAPOsCol and SAP<SAPSID>_<No.>:

TypesSupported	Type: REG_DWORD
	Data: 7
EventMessageFile	Type: REG_EXPAND_SZ
	Data: %windir%\SapCluster\SAPEVENTS.DLL

Configuring all other nodes in the cluster

Activities on all other nodes in the cluster involve the following steps:

- Create required users and groups.
- Copy the required tools in the SAPCluster directory.
- Set the system and user environment.

- Enter the required port numbers in the Windows services files.
- Create the SAPService and SAPOsCol services.

These steps are explained in detail in the following procedure.

To configure all other nodes in the cluster

- 1 Perform the following steps to ensure that the listed .dll files are available (for 32-bit Windows only):
 - Navigate to the NTPATCH directory.
 - Run the R3DLLINS.exe file to extract the files, msvcr71.dll, msvcp71.dll, mfc71.dll, and mfc71u.dll.
 - At the command prompt, enter the following command to extract the archive:

```
<drive>:\IM<xx>\SAPINST\NT\<platform>\sapinst.exe  
-extract
```

- Copy the .dll files from the SYSTEM directory to the %windir%\system32 directory.
- 2 Create local groups, SAP_<SAPSID>_LocalAdmin and SAP_LocalAdmin.
 - 3 Add the SAP_<SAPSID>_GlobalAdmin domain group to these local groups.
 - 4 Add the SAP_<SAPSID>_GlobalAdmin domain group to the local Administrators group.

For details about creating and adding new local groups and users:

See [“Creating and adding local groups and users”](#) on page 78.

- 5 Click **Start > Programs > Administrative Tools > Local Security Policy > Local Policies > User Right Assignment**.
- 6 Add the following privileges for the <sapsid>adm user.

```
Act as a part of the Operating System (SeTcbPrivilege)  
Replace a process-level token (SeAssignPrimaryTokenPrivilege)  
Increase Quotas for Windows 2000 (SeIncreaseQuotaPrivilege)  
Adjust memory quotas for a process for Windows Server 2003  
(SeIncreaseQuotaPrivilege)
```

7 Add the following privileges for the SAPService<SAPSID> user.

```
Log on as a Service (SeServiceLogonRight )
Access this computer from the network (SeNetworkLogonRight)
Deny Logon Locally and Deny Log on through Terminal Services
(SeDenyInteractiveLogOnRight)
```

8 Change the <sapsid>adm user environment as follows:

- At the command prompt, enter runas /profile
/user:<domain>\<sapsid>adm regedit.
- In the Registry Editor dialog box, click **HKEY_CURRENT_USER > Environment**.
- Create the user environment.
See [“Configuring the first node in the cluster”](#) on page 68.

9 From the first node in the cluster, copy the following service entries for the SAP instance, from the services file in the %windir%\system32\drivers\etc directory to the corresponding services file on all other nodes in the cluster:

```
sapdp<No.>      32<No.>/tcp # SAP System Dispatcher Port
sapdp<No.>s      47<No.>/tcp # SAP System Dispatcher Security Port
sapgw<No.>      33<No.>/tcp # SAP System Gateway Port
sapgw<No.>s      48<No.>/tcp # SAP System Gateway Security Port
sapms<SAPSID> 36<No.>/tcp # SAP System Message Port
```

Typically, the value of <No.> is the value of InstID.

10 Move the Service Group from the first node to the node that you are currently configuring.

11 Create the following directory:

```
%windir%\SapCluster
```

12 From the <disk>:\usr\sap\<SAPSID>\<InstName>\exe directory, copy these files into the %windir%\SapCluster directory.

```
sapevents.dll
sapntchk.exe
saposcol.exe
sapstartsrv.exe
```


- 13** Ensure that the <drive>:\usr\sap directory is shared with the names, sapmnt and saploc.

See “[Converting a local installation into a domain installation](#)” on page 37.

- 14** Create the saposcol service by running the following command at the command prompt:

```
sc create saposcol binPath= "%windir%\SapCluster\saposcol
service" start= auto obj= <domain>\SAPService<SAPSID> password=
<password_of_SAPService<SAPSID>> [DisplayName= SAPOsCol]
```

On Windows 2000, the sc.exe file is part of the Windows Resource Kit.

- 15** Create the SAP<SAPSID>_<No.> service as follows:

- At the command prompt, go to the <drive>:\usr\sap\<SAPSID>\<InstName>\exe directory.
- Run the sapstartsrv.exe command.
- In the SAP Service Install/Uninstall dialog box, enter the following values:

SID	<SAPSID>
NR	<InstanceNumber>
StartProfile	If SAPLOCALHOST=SAPGLOBALHOST, the value is <drive>:\usr\sap\<SAPSID>\profile\START_ <InstName>_<VirtualHostName> Else, the value is \\SAPGLOBALHOST\sapmnt\<SAPSID>\SYS\ profile\START_<InstName>_<VirtualHostName>
User	<domain>\SAPService<SAPSID>
Password	<SAPService<SAPSID> password>
Startup type	manual
Use Environment of User	<domain>\<sapsid>adm

- Click **OK**.

- 16** Reregister type library as follows:

- At the command prompt, go to the %windir%\SapCluster directory.
- Run the sapstartsrv.exe command.

- In the SAP Service Install/Uninstall dialog box, select **Register COM Typelibrary Only** in the Operation field.
 - Click **OK**.
- 17** Create registry entries for the SAP<SAPSID>_<No.> and saposcol services.
See [“Configuring the first node in the cluster”](#) on page 68.
- 18** If an SAP Microsoft Management Console (MMC) is not configured on the node, register SAP MMC using the following steps:
- Access the <DVD>:\SAPINST\NT\<platform>\MMC directory.
For SAP NetWeaver 04s, access the presentation DVD and go to the \SAPINST\NT\<platform>\MMC directory.
 - Extract the SAPMMCU.SAR (Unicode) archive.
- ```
sapcar -xvf
"<DVD>:\SAPINST\NT\<platform>\MMC\SAPMMCU.SAR"
```
- Copy the extracted files to the %windir%\system32 directory.  
If you are unable to copy librfc32u.dll, stop the SAP<SAPSID>\_<No.> service, and try again.
  - Register all sapmmc\*.dlls at the command prompt using this command for each file.
- ```
%windir%\system32\regsvr32 <dll_file_name>
```
- Create a desktop shortcut for %windir%\system32\sapmmc.msc.

Clustering an SAP Add-In instance

This section is not applicable for SAP NetWeaver 04s.

For an SAP Add-In system, clustering the Central instance and the Enqueue servers in different Service Groups is not possible. The path names and virtual hostnames are firmly connected to various points in the J2EE engine and therefore, you must not change the instance names and the virtual hostnames.

But when you cluster the Central instance and the Enqueue servers in the same Service Group, the down time increases whenever the Enqueue server fails. This increase is because the Central instance takes more time to shut down or restart. Another drawback is that whenever the Enqueue server fails, all user sessions connected to the Central instance are lost.

To resolve this issue, configure the Central instance outside the cluster environment. If you want to conduct SDM deployment tasks, bring the Central

instance online manually, on the same node on which the Service Group including the Enqueue servers is online. For all user operations, you can additionally install and use a dedicated Dialog instance.

Note: If you are clustering the Central instance, Symantec recommends that you cluster the Central instance, Java Central Services instance, and ABAP Standalone Enqueue server instance in the same Service Group. Symantec also recommends that you cluster the Enqueue Replication servers for ABAP and Java for an Add-In system in a single Service Group. Such a high availability configuration facilitates failover to another node in the cluster if a fault occurs.

For clustering this instance:

See [“Clustering an SAP instance”](#) on page 68.

Creating and adding domain groups and users

If you do not have domain administrator rights, you can perform the SAP instance installation and configuration as a domain user who is a member of the local administrator group.

User accounts

The SAPInst tool creates the following accounts for the SAP system administrator:

<sapsid>adm	This user account is the SAP system administrator account. This account enables interactive administration of the system.
SAPService<SID>	<p>This user account is required to start the SAP system. This account has the local user right to log on as a service.</p> <p>The advantage of setting up this additional account is that this account does not allow interactive logon. Therefore, abuse of the account can be prevented. You need not set an expiry date for the password and you can skip selecting the User must change password at next logon option.</p>

Groups

The SAPInst tool creates the following groups during domain installation:

- SAP_<SAPSID>_GlobalAdmin

This global group is a domain level SAP administration group for organizing SAP system administrators. This global group groups together the users at the domain level so that they can be placed in appropriate local groups.

- **SAP_<SAPSID>_LocalAdmin**

Local groups are created and maintained on an application server. A local group has rights only to the system on which the group is located.

The system on which the local group is located is part of a particular domain. The local group can contain users and global groups from this domain.

- **SAP_LocalAdmin**

Though this group is created on all hosts, creating this group on the transport host is necessary. Members of this group have full control over the transport directory, \usr\sap\trans. This directory 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.

Therefore, the <sapsid>adm and SAPService<SAPSID> users of all systems in the transport infrastructure are members of the SAP_LocalAdmin group. These users have the rights necessary to initiate and execute transports.

Adding groups

This section describes the procedure to add new domain groups and users. You can perform this procedure as a domain administrator only.

To create the SAP_<SAPSID>_GlobalAdmin Global group

- 1 Log in as a domain administrator.
- 2 Click **Start > Programs > Administrative Tools > Active Directory Users and Computers**.

If you are unable to find the following options:

- Click **Start > Run**.
- Enter mmc in the Open field.
- In the Console window, click **File > Add/Remove Snap-in**.
- In the Add/Remove Snap-in dialog box, click **Add**.
- In the Add Standalone Snap-in dialog box, select **Active Directory Users and Computers**.
- Click **Add**.
- Click **OK**.

- 3** In the Active Directory Users and Computers dialog box, right-click **Users**, and select **New > Group**.

- 4** In the New Object - Group dialog box, enter the following values:

Group Name	SAP_<SAPSID>_GlobalAdmin Specify this value using the exact and correct uppercase and lowercase.
Group scope	Global
Group type	Security

- 5** Click **OK**.

To create SAP system users, <sapsid>adm and SAPService<SAPSID>

- 1** In the Active Directory Users and Computers dialog box, right-click **Users**, and select **New > User**.

- 2** In the New Object - User dialog box, enter the following values for <sapsid>adm:

First name	NA
Initials	NA
Last name	NA
Full name	<sapsid>adm
User logon name	<sapsid>adm

- 3** In the New Object - User dialog box, enter the following values for SAPService<SAPSID>:

First name	NA
Initials	NA
Last name	NA
Full name	SAPService<SAPSID>
User logon name	SAPService<SAPSID>

- 4** Click **Next**.

- 5 Enter the password and confirm the password.
- 6 Select **Password never expires**.
Ensure that no other option is selected.
- 7 Click **Next**.
- 8 Click **Finish**.

To add the <sapsid>adm user to the SAP_<SAPSID>_GlobalAdmin Group

- 1 In the Active Directory Users and Computers dialog box, double-click <sapsid>adm under Users.
- 2 In the <sapsid>adm Properties dialog box, click **Member > Add**.
- 3 In the Select Groups dialog box, select SAP_<SAPSID>_GlobalAdmin.
- 4 Click **Add**.
By default, this user is also a member of the Domain Users group.
- 5 Click **OK** twice.

To add the SAPService<SAPSID> user to the SAP_<SAPSID>_GlobalAdmin Group

- 1 In the Active Directory Users and Computers dialog box, double-click SAPService<SAPSID> under Users.
- 2 In the SAPService<SAPSID> dialog box, click **Member > Add**.
- 3 In the Select Groups dialog box, select SAP_<SAPSID>_GlobalAdmin.
- 4 Click **Add**. SAP_<SAPSID>_GlobalAdmin appears in the Member of list.
- 5 This user must not be a member of the Domain Users group.
Remove the user from the Domain Users group as follows:
 - From the Member of list, select SAP_<SAPSID>_GlobalAdmin.
 - Select Set Primary Group.
 - Select Domain Users.
 - Click **Remove** to delete the Domain Users group from the Member of list.
- 6 Click **OK**.
- 7 Exit the Active Directory Users and Computers dialog box.

Creating and adding local groups and users

This section describes the procedure to add new local groups and users.

Assume that you are adding a local group, SAP_<SAPSID>_LocalAdmin.

To create a local group

- 1** Click **Start > Control Panel > Administrative tools > Computer Management**.
- 2** In the Computer Management dialog box, select **Local Users and Groups**.
- 3** Right-click **Group**, and select **New Group**.
- 4** In the New Group dialog box, enter SAP_<SAPSID>_LocalAdmin in the **Group name** field.
- 5** Click **Add**.
- 6** In the Select Users, Computers, or Groups dialog box, enter <domain>\SAP_<SAPSID>_GlobalAdmin in the **Object names** field.
- 7** Click **OK** in the Select Users, Computers, or Groups dialog box.
 SAP_<SAPSID>_LocalAdmin appears in the New Group dialog box.
- 8** Click **OK** in the New Group dialog box.

To add a domain group to a local group

- 1** Click **Start > Control Panel > Administrative tools > Computer Management**.
 Assume that you are adding the domain group, SAP_<SAPSID>_GlobalAdmin to the local Administrators group.
- 2** In the Computer Management Console, select **Local Users and Groups > Groups**.
- 3** In the right panel, double-click **Administrators**.
- 4** In the Administrators Properties dialog box, click **Add**.
- 5** In the Select Users, Computers, or Groups dialog box, enter <domain>\SAP_<SAPSID>_GlobalAdmin in the **Object names** field.
- 6** Click **OK** in the Select Users, Computers, or Groups dialog box.
- 7** Click **OK** in the Administrators Properties dialog box.

Troubleshooting the agent for SAP NetWeaver

This chapter includes the following topics:

- [Using correct software and operating system versions](#)
- [Meeting prerequisites](#)
- [Configuring SAP server resources](#)
- [Checks for an SAP Add-In system](#)
- [Starting the SAP server outside a cluster server](#)
- [Common Problems with Veritas agent for SAP NetWeaver](#)
- [Reviewing SAP NetWeaver agent log files](#)
- [Using trace level logging](#)

Using correct software and operating system versions

Ensure that no issues arise due to incorrect software and operating system versions. For the correct versions of operating system and software to be installed on the resource systems:

See [“Supported software”](#) on page 12.

Meeting prerequisites

Before installing the Veritas agent for SAP NetWeaver, double check that you meet the prerequisite requirements. For example, you must install the ACC library on VCS before installing the agent for SAP NetWeaver. For a list of prerequisites:

See [“Before you install the agent for SAP NetWeaver”](#) on page 15.

Configuring SAP server resources

Before using an SAP server resource, ensure that you configure the resource properly. For a list of resource types with which you can configure all SAP server resources:

See [“Agent attributes for SAP NetWeaver”](#) on page 19.

Checks for an SAP Add-In system

For an SAP Java Add-In instance, you must perform the following checks before further investigations:

- The SAP resources running the ABAP and Java Standalone Enqueue server instances, must be in the same Service Group as the SAP Central instance.
- The SAP resources running the ABAP and Java Enqueue Replication server instances, must be in the same Service Group.
- For the Standalone Enqueue server instances, the value of the InstType attribute must not be ENQUEUE.

The values must be as follows:

- For ABAP: AENQUEUE
- For Java: JENQUEUE

- For the Enqueue Replication server instances, the value of the InstType attribute must not be ENQREP.

The values must be as follows:

- For ABAP: AENQREP
- For Java: JENQREP

- Ensure the following:

- The EnqSrvResName attribute of the ABAP Enqueue Replication server instance is set to the VCS resource that is running the corresponding ABAP Standalone Enqueue server instance.

- The EnqSrvResName attribute of the Java Enqueue Replication server instance is set to the VCS resource that is running the corresponding Java Standalone Enqueue server instance.

Starting the SAP server outside a cluster server

If you face problems while working with a resource, you must disable the resource within the cluster framework. A disabled resource is not under the control of the cluster framework, and so you can test the SAP server independent of the cluster framework. Refer to the cluster documentation for information about disabling a resource.

You can then restart the SAP server outside the cluster framework.

Note: Use the same parameters that the resource attributes define within the cluster framework while restarting the resource outside the framework.

Follow one of these procedures to restart the SAP resource outside the framework.

To restart the SAP instance outside the framework using SAP MMC

- 1 Log in to the system as a *sapsidadm* user.
- 2 Use the SAP Microsoft Management Console (MMC) to start the SAP instance.
 Ensure that the SAP instance starts successfully. Then attempt to start the instance inside the cluster framework.

To restart the SAP instance outside the framework from the command prompt

- 1 Start the SAP Windows service for the SAPSAPSID_XX instance.
- 2 Use the startsap.exe utility to start the SAP instance:

```
startsap.exe name=SAPSID nr=InstID  
sapdiahost=virtual_hostname
```

Common Problems with Veritas agent for SAP NetWeaver

This section describes some problems that you may face while working with the Veritas Agent for SAP NetWeaver in a VCS environment.

Unable to install the Veritas Agent for SAP NetWeaver

If you are not able to install the Veritas Agent for SAP NetWeaver, check to see if previous versions of the agent are present in the system. If present, remove the older agents and attempt to install the agent again.

Also, ensure that you go through the prerequisites before installing SAP NetWeaver.

See [“Before you install the agent for SAP NetWeaver”](#) on page 15.

Agent installation terminates with an error

If the installation process terminates with the error "The InstallScript engine on this machine is older than the version required to run this setup", install the InstallShield driver 10 or later and begin with the installation process again.

For an ABAP or an Add-In system on Windows 2000 and 2003 (64-bit), the SAP Central or Dialog instance does not come up on the node on which the Enqueue server instance is online

If the virtual SAPGLOBALHOST and SAPLOCALHOST are different, but are online on the same node in the cluster, the disp+work.exe process does not work. The virtual SAPGLOBALHOST specifies the profile file names in UNC convention, which the disp+work.exe process does not accept and the problem occurs.

To resolve this issue, ensure that the SAP instances with different values for virtual SAPGLOBALHOST and SAPLOCALHOST do not come up on the same node in the cluster.

Unable to see an entry in the SAP MMC for an SAP instance

If you cannot see any entry for an SAP instance in the SAP MMC, you must re-register the SAP services.

To re-register the SAP services

- 1 At the command prompt, go to the %windir%\SapCluster directory.
- 2 Run the sapstartsrv.exe command.
- 3 In the SAP Service Install/Uninstall dialog box, select **Register COM Typelibrary Only** in the Operation field.

You must re-register the SAP services as described here whenever a change in the SAP service registration occurs.

The agent for SAP NetWeaver fails to bring an SAP instance resource through VCS

Attempt to start the SAP resource outside the VCS environment to ensure that the resource is working properly.

See [“Starting the SAP server outside a cluster server”](#) on page 83.

You can also view the log files to further diagnose the problem.

See [“Reviewing SAP NetWeaver agent log files”](#) on page 87.

Unable to connect: DB connection failed

Ensure that the database is up and running successfully. If the database is not functional, start the database. If applicable, start the client also. Then attempt to reconnect.

SAP instance does not come online, and the startsap.exe command exits with exit code -1

Check the SAP MMC to ensure that the entry for this SAP instance is present. If the entry is not present, add the SAP instance in the SAP MMC.

See [“Unable to see an entry in the SAP MMC for an SAP instance”](#) on page 84.

Then attempt to bring the SAP instance online.

In case of an Enqueue server failure, the Standalone Enqueue server instance fails to take over the lock table from the Enqueue Replication server instance

If the Enqueue Replication server instance does not recognize the correct Standalone Enqueue server instance, this problem may occur. Ensure that the value of InstID passed to the Enqueue Replication server process, enrepsrv.exe in the start profile, belongs to the correct Standalone Enqueue server instance.

The ensmon.exe command returns exit code 4 for a Standalone Enqueue server instance

If the Enqueue Replication server is not configured or is not online, this problem occurs. Ensure that if the Enqueue Replication server is configured, the instance is online.

If the Enqueue Replication server instance is not configured, disable the replication parameter in the Instance profile of the Enqueue server instance:

```
enqueue/server/replication = false
```

The return code of the ensmon.exe command is 8 for an Enqueue Replication server instance

The return code indicates that the Standalone Enqueue server instance is down. When the Standalone Enqueue server instance fails, the ensmon.exe command returns this code when the instance is switching over to the Enqueue Replication server instance to take over the instate lock table.

Check the state of the Standalone Enqueue server instance.

Enqueue Replication server does not terminate after enqueue failover

This problem occurs due to a race condition between the Enqueue and the Replication servers. To resolve the problem, make sure that your enrepsvr.exe is at the following patch level or a level later to it.

```
7.00: 98
6.40: 171
```

For more information refer to, SAP Note 1018968

The Standalone Enqueue server instance does not fail over to the correct Enqueue Replication server instance

This problem occurs if the preonline script is not configured properly. To configure the preonline script:

See [“Configuring the VCS preonline trigger”](#) on page 27.

This problem also occurs if the InstType attribute is not set properly. Ensure that the values of this attribute matches correctly.

[Table 5-1](#) shows the values for InstType attribute.

Table 5-1 Values for InstType attribute

Value of InstType for a Standalone Enqueue server instance	Corresponding value of InstType for an Enqueue Replication server instance
ENQUEUE	ENQREP
AENQUEUE	AENQREP
JENQUEUE	JENQREP

If the Enqueue Replication server instance faults, the instance is failing over to the node on which the Standalone Enqueue server instance is online

Whenever an Enqueue Replication server instance faults, it must never fail over to the node on which the corresponding Standalone Enqueue server instance is online. This problem occurs if the preonline script is not configured properly to take care of this failover behavior. To correctly configure the preonline script:

See [“Configuring the VCS preonline trigger”](#) on page 27.

This problem may also occur if the InstType attribute for both the server instances do not match correctly. Ensure that the values match correctly.

[Table 5-2](#) shows the values for InstType attribute.

Table 5-2 Matching values for InstType attribute

Value of InstType for a Enqueue Replication server instance	Corresponding value of InstType for a Standalone Enqueue server instance
ENQREP	ENQUEUE
AENQREP	AENQUEUE
JENQREP	JENQUEUE

In case of a resource fault, the Service Group does not fail over

If the resource is not set to critical, the Service Group may not fail over. To resolve the issue, set the resource to critical.

Unable to uninstall an older or current version of the Veritas Agent for SAP NetWeaver

If you are attempting to uninstall an existing Veritas Agent for SAP NetWeaver, ensure that you remove all configured SAP resources, before proceeding to remove the agent.

See [“Removing the VCS agent for SAP NetWeaver”](#) on page 17.

Reviewing SAP NetWeaver agent log files

If you are facing problems while using the Veritas agent for SAP NetWeaver or an SAP server instance, refer to the following sections to access the relevant files for information about the issue.

Using SAP instance log files

In case of problems while using the Veritas Agent for SAP NetWeaver, you can access the SAP instance log files for more information. These log files are located in the <drive>:\usr\sap\<SAPSID>\<InstName>\work directory.

Using SAP log files

If an SAP server is facing problems, you can access the agent log files to further diagnose the problem. The log file is <drive>:\Program Files\VERITAS\Cluster Server\log\SAPNW04_A.txt.

Using trace level logging

The ResLogLevel attribute controls the level of logging that is written in a VCS log file for each SAP server resource. You can set this attribute to TRACE, which enables very detailed and verbose logging.

If you set ResLogLevel to TRACE, a very high volume of messages is produced. Symantec recommends that you must localize the ResLogLevel attribute for particular resource only.

Note: You may consider to temporarily increase the timeout values for SAPNW04 for debugging purposes. After the debugging process is complete, you can revert to the original timeout values.

To localize ResLogLevel attribute for a resource

- 1 Identify the resource for which you want to enable detailed logging.
- 2 At the command prompt, localize the ResLogLevel attribute for the identified resource:

```
hares -local Resource_Name ResLogLevel
```

- 3 Set the ResLogLevel attribute to TRACE for the identified resource:

```
hares -modify Resource_Name ResLogLevel TRACE -sys SysA
```

- 4 Test the identified resource. The operation reproduces the problem that you are attempting to diagnose.

- 5** Set the ResLogLevel attribute back to INFO for the identified resource:

```
hares -modify Resource_Name ResLogLevel INFO -sys SysA
```

- 6** Review the contents of the VCS engine output log file.

You can also use the Java GUI to localize the ResLogLevel attribute. For more information, refer to the VCS documentation.

Sample Configurations

This appendix includes the following topics:

- [About the sample configuration for the agent for SAP NetWeaver](#)
- [Sample agent type definition](#)
- [Sample service group configuration](#)

About the sample configuration for the agent for SAP NetWeaver

The sample configuration depicts the resource types, resources, and resource dependencies within the Service Group. Review these dependencies carefully before configuring the agent for SAP NetWeaver. For more information about these resource types, see the *Veritas Cluster Server Bundled Agents Reference Guide*.

Sample agent type definition

The sample agent type definition for SAP NetWeaver is as follows:

```
type SAPNW04 (  
    static int CleanTimeout = 300  
    static int MonitorInterval = 120  
    static int MonitorTimeout = 100  
    static i18nstr ArgList[] = { SAPSID, SecondLevelMonitor,  
    EPPProgramTimeout, SAPHome, SAPMonHome, SAPHost, ProcMon,  
    SAPServiceUser, SAPAdminDomain, SAPAdmin, SAPAdminPassword,  
    ResLogLevel, InstType, InstName, InstProfile, EnqSrvResName,  
    MonitorProgram }  
    str SAPSID
```

```
int SecondLevelMonitor
int EPPProgramTimeout = 10
str SAPHome
str SAPMonHome
str SAPHost
str ProcMon[]
str SAPServiceUser
str SAPAdminDomain
str SAPAdmin
str SAPAdminPassword
str ResLogLevel = INFO
str InstType = CENTRAL
str InstName
str InstProfile
str EnqSrvResName
str MonitorProgram
)
```

Sample service group configuration

For some values of the InstType attribute, corresponding sample main.cf files are given.

InstType is equal to ENQUEUE

The sample main.cf file is as follows.

```
SAPNW04 SAPEC4ASCS_sap
(
    Critical = 0
    SAPSID = EC4
    SecondLevelMonitor = 5
    SAPHome = "C:\\usr\\sap\\EC4\\ASCS10\\exe"
    SAPMonHome = "C:\\usr\\sap\\EC4\\ASCS10\\exe"
    SAPHost = SAPEC4ASCS
    ProcMon = { "enserver.exe", "msg_server.exe" }
    SAPServiceUser = SAPServiceEC4
    SAPAdminDomain = ISV-DOMAIN
    SAPAdmin = ec4adm
    SAPAdminPassword = IWOUlWlQIoJOkOL
    InstType = AENQUEUE
    InstName = ASCS10
    InstProfile =
```

```
"C:\\usr\\sap\\EC4\\SYS\\profile\\EC4_ASCS10_SAPC4ASCS"
)
```

InstType is equal to CENTRAL

The sample main.cf file is as follows.

```
SAPNW04 SAPEC4CI_sap
(
    Critical = 0
    SAPSID = EC4
    SAPHome = "C:\\usr\\sap\\EC4\\DVBGS12\\exe"
    SAPMonHome = "C:\\usr\\sap\\EC4\\sapinfo\\rfcsdk\\bin"
    SAPHost = SAPEC4CI
    ProcMon = { "disp+work.exe" }
    SAPServiceUser = SAPServiceEC4
    SAPAdminDomain = ISV-DOMAIN
    SAPAdmin = ec4adm
    SAPAdminPassword = BPHnEPeJBhCHdHE
    InstName = DVBGS12
)
```

InstType is equal to ENQREP

The sample main.cf file is as follows.

```
SAPNW04 SAPEC4REP_sap
(
    Critical = 0
    SAPSID = EC4
    SecondLevelMonitor = 1
    SAPHome = "C:\\usr\\sap\\EC4\\REP11\\exe"
    SAPMonHome = "C:\\usr\\sap\\EC4\\REP11\\exe"
    SAPHost = SAPEC4REP
    ProcMon = { "enrepserver.exe" }
    SAPServiceUser = SAPServiceEC4
    SAPAdminDomain = ISV-DOMAIN
    SAPAdmin = ec4adm
    SAPAdminPassword = HVNtKVkPHnINjNK
    InstType = AENQREP
    InstName = REP11
    InstProfile =
"\\\\\\SAPEC4ASCS\\sapmnt\\EC4\\SYS\\profile\\EC4_REP11_SAPC4REP"
```

```
EnqSrvResName = SAPEC4ASCS_sap
)
```

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