# Veritas™ High Availability Agent for SAP WebAS Installation and Configuration Guide

## Windows Server 2003 (x64, IA64), Windows Server 2008 (x64)

## 5.0

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# Veritas High Availability Agent for SAP WebAS Installation and Configuration Guide

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Symantec Corporation
350 Ellis Street
Mountain View, CA 94043

http://www.symantec.com

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# Contents

# Introducing the Veritas High Availability Agent for SAP WebAS

This chapter includes the following topics:

## About the High Availability agent for SAP WebAS

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

The Veritas agent for SAP WebAS provides high availability for SAP NetWeaver 7.1 in a cluster. The agent for SAP WebAS is designed to support a wide range of

SAP NetWeaver environments which include SAP NetWeaver CE 7.1, SAP NetWeaver Mobile 7.1, and SAP NetWeaver PI 7.1.

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

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

The Veritas agent for SAP WebAS brings SAP instances online, monitors the instances, and bring the instances offline. The agent monitors the system processes and server states, and can shutdown the server in case of a failover.

The agent supports the following SAP instance types:

- Central Services Instance
- Application Server Instance
- Enqueue Replication Server Instance

The agent supports the following SAP Web Application Server Usage Types:

- ABAP
- Java
- Add-In (ABAP + Java)

# What’s new in this release

The following change was made for this release:

- Enhanced second level monitoring for SAPWeb Application server as Java. Now the agent uses sapcontrol.exe utility provided by SAP to check the status of application server running as Java.

# Supported software

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

| | |
|---|---|
| Veritas Cluster Server | VCS 5.0, 5.1, 5.1SP1<br>**Note:** In the software disc, no separate agent is provided for VCS 5.1 and 5.1SP1. For VCS 5.1 and 5.1SP1 use the agent provided for VCS 5.0 |
| Operating Systems | ■ Microsoft Windows Server 2003 (x64)<br>■ Microsoft Windows Server 2003 (IA64)<br>■ Microsoft Windows Server 2008 (x64) |
| SAP WebAS | 7.1 |

| | |
|---|---|
| SAP Applications | NetWeaver PI 7.1, Mobile 7.1, and CE 7.1<br>**Note:** All Enhancement Packages (EhP) for PI 7.1, Mobile 7.1 and CE 7.1 are supported. |

# How the agent makes SAP WebAS highly available

The Veritas agent for SAP WebAS continuously monitors the SAP instance processes to verify that they function properly.

The agent provides the following levels of application monitoring:

- Primary or Basic monitoring
  This mode has Process check and Health check monitoring options. With the default Process check option, the agent verifies that the SAP instance processes are present in the process table. Process check cannot detect whether processes are in hung or stopped states.
- Secondary or Detail monitoring
  In this mode, the agent runs a utility to verify the status of SAP instance. The agent detects application failure if the monitoring routine reports an improper function of the SAP instance processes. When this application failure occurs, the SAP instance service group fails over to another node in the cluster.
  Thus, the agent ensures high availability for SAP instance.

# Agent 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 SAP*SAPSID_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. SAP*SAPSID_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 SAP*SAPSID_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 APPSERV instances, the function uses the following utilities to perform this check:

| **Server type** | **SAP utility used** |
|---|---|
| SAPWeb Application Server as ABAP | sapinfo.exe |
| SAPWeb Application Server as Java | sapcontrol.exe |
| SAPWeb Application Server as Add-In | sapinfo.exe and sapcontrol.exe |

  - 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 57.

### Clean

- Uses SAP's sapsrvkill.exe utility to stop all processes of the particular SAP instance.
- Stops SAP*SAPSID_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 SAPService*SAPSID* or *sapsid*adm user.

## Typical SAP WebAS configuration in a VCS cluster

A typical SAP WebAS configuration in a VCS cluster has the following characteristics:

- VCS is installed and configured in a two-node cluster.
- The SAP WebAS instance binaries are installed locally on both nodes or on shared disks.
- The Veritas agent for SAP WebAS is installed on the both nodes.
- The *drive*:\usr\sap directory is shared with name sapmnt and saploc.

**Figure 1-1** depicts a configuration where SAP WebAS instance binaries and SYS are installed completely on shared disks.

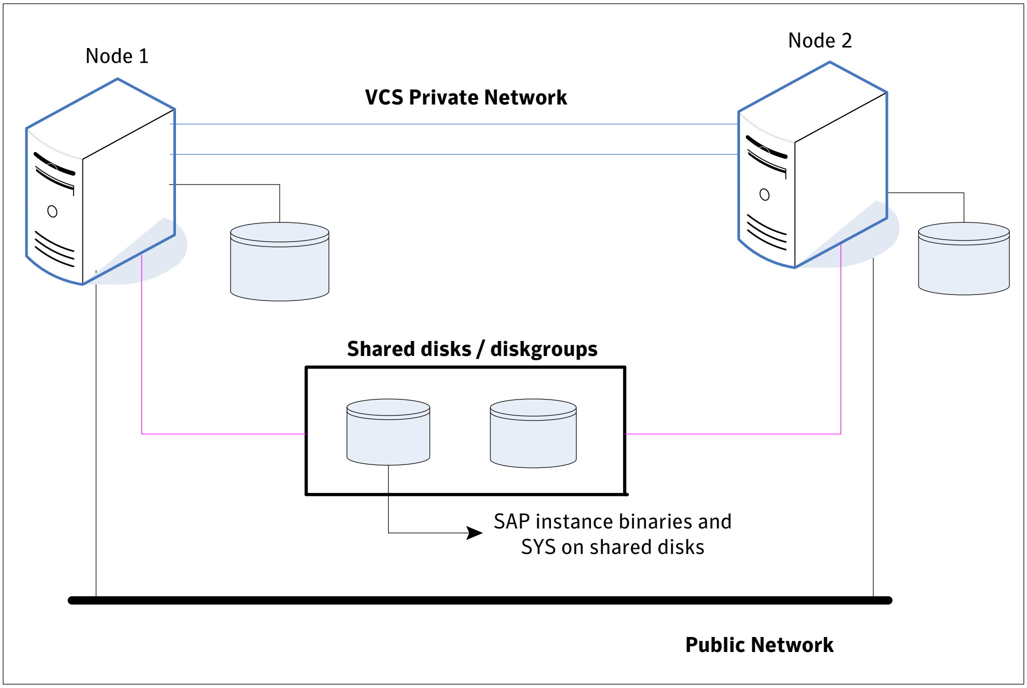
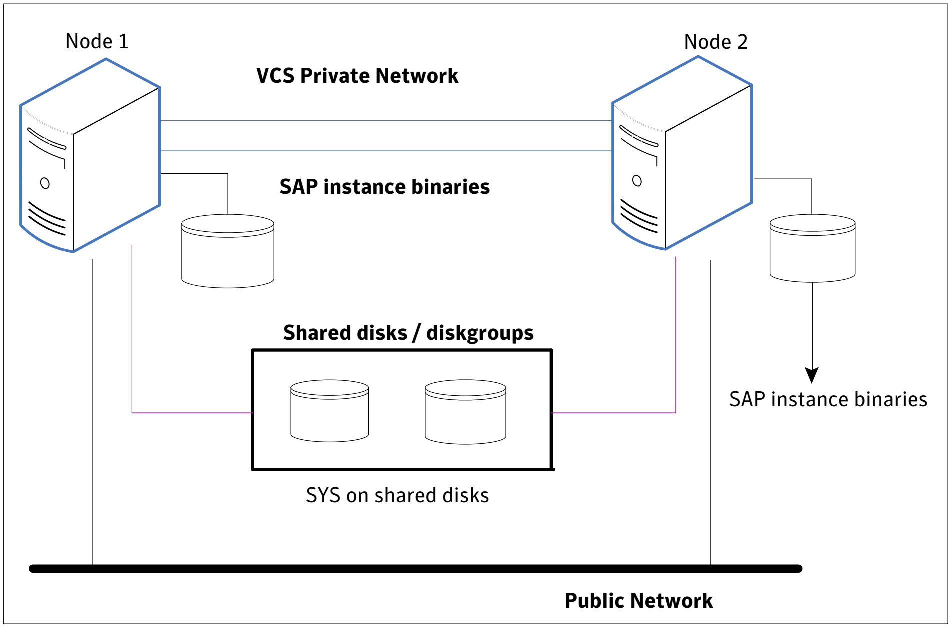

Node 1
Node 2
VCS Private Network
Shared disks / diskgroups
SAP instance binaries and SYS on shared disks
Public Network

**Figure 1-2** depicts a configuration where SAP WebAS instance binaries are installed locally on each node and SYS is installed on shared disks.



# Setting up SAP WebAS in a VCS cluster

Follow the steps below to set up SAP WebAS in a cluster:

- Set up a VCS cluster.
  Refer to *Veritas Storage Foundation™ and High Availability Solutions Installation and Upgrade Guide* for more information on installing and configuring VCS.
- Install and configure SAP WebAS for High Availability.
- Install the Veritas High Availability agent for SAP WebAS.
  See "Installing the VCS agent for SAP WebAS" on page 45.
- Configure the service groups for SAP WebAS.
  See "About configuring service groups for SAP WebAS" on page 59.

Chapter 2

# Installing and configuring the SAP WebAS for high availability

This chapter includes the following topics:

## About SAP Web Application Server

All SAP NetWeaver components (example, PI, CE) run on top of the SAP Web Application Server.

The following three usage types are possible with SAP WebAS:

- SAP WebAS ABAP (ABAP only)
- SAP WebAS Java (Java only)
- SAP WebAS Add-In (ABAP and Java)

Depending on the SAP NetWeaver component to be installed, the Web Application Server installation type is determined. For example, SAP NetWeaver PI requires SAP WebAS Add-In (ABAP + Java) usage type.

## SAP system components

An SAP application instance has multiple services or components which are typically deployed across multiple servers.

SAP identifies the following services as critical to the application environment, representing potential single points of failure:

- Database Instance
- Central Services Instance (SCSxx or ASCSxx)
- Enqueue Replication Server (ERSxx)
- Network File System (NFS) or Common Internet File System (CIFS) services

Where xx takes the value of an SAP Instance number ranging from 00 to 99.

## SAP architecture

Table 2-1 lists the different SAP architectures and its components.

**Table 2-1** SAP architecture

| Architecture | Component | Service | Functions |
|---|---|---|---|
| SAP WebAS ABAP | Application Server | ABAP Dispatcher | ■ Controls program that manages the resources of the R/3 applications.<br>■ Balances assignment of the transaction load to the work processes.<br>■ Manages buffers in main memory.<br>■ Manages connections with the presentation level.<br>■ Organizes the communication processes. |

**Table 2-1** SAP architecture *(continued)*

| Architecture | Component | Service | Functions |
|---|---|---|---|
| | | ABAP Work processes | ■ Acts as a service offered by a server and requested by a client<br>■ Acts as a special program in charge of some specific tasks. |
| | Central Services Instance | ABAP Enqueue Service | ■ Manages logical locks.<br>■ Ensures server synchronization. |
| | | ABAP Message Service | ■ Central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.<br>■ Provides cluster state information to SAP Web Dispatcher.<br>■ Keeps a list of application servers that can be reached within the system. |
| | Enqueue Replication Instance | ABAP Enqueue Replication Service | Enables the lock table to be replicated on a second server, the replication server. |
| SAP WebAS Java | Application Server | Java Server Processes | Processes the requests and holds the session data. |
| | Central Services Instance | Java Enqueue Service | ■ Manages logical locks.<br>■ Ensures server synchronization. |
| | | Java Message Service | ■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.<br>■ Provides cluster state information to SAP Web Dispatcher.<br>■ Keeps a list of application servers that can be reached within the system. |
| | Enqueue Replication Instance | Java Enqueue Replication Service | Enables the lock table to be replicated on a second server, the replication server. |

**Table 2-1** SAP architecture *(continued)*

| Architecture | Component | Service | Functions |
|---|---|---|---|
| SAP WebAS Add-In | Application Server | ABAP Dispatcher | ■ Controls program that manages the resources of R/3 applications.<br>■ Balances the assignments of the transaction load to the work processes.<br>■ Manages buffer in main memory.<br>■ Connects to the presentation level.<br>■ Organizes the communication processes. |
| | | ABAP Work processes | ■ Acts as a service offered by a server and requested by a client.<br>■ Manages the programs that handle specific tasks. |
| | | Java Server Processes | ■ Handles the client-server processes and maintains the session data. |
| | Central Services Instance ABAP | ABAP Enqueue Service | ■ Manages logical locks<br>■ Ensures server synchronization |
| | | ABAP Message Service | ■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.<br>■ Provides cluster state information to SAP Web Dispatcher<br>■ Keeps a list of application servers that can be reached within the system. |
| | Central Services Instance Java | Java Enqueue Service | ■ Manages logical locks.<br>■ Ensures server synchronization. |
| | | Java Message Service | ■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.<br>■ Provides cluster state information to SAP Web Dispatcher<br>■ Keeps a list of application servers that can be reached within the system. |
| | Enqueue Replication Instance ABAP | ABAP Enqueue Replication Service | Enables the lock table to be replicated on a second server, the replication server. |

**Table 2-1** SAP architecture *(continued)*

| Architecture | Component | Service | Functions |
|---|---|---|---|
| | Enqueue Replication Instance Java | Java Enqueue Replication Service | Enables the lock table to be replicated on a second server, the replication server. |

## Single Point of Failures (SPOF)

In a distributed SAP environment, the following components are critical for application availability. Hence, these components need to be protected.

- Database Instance
- Central Services Instance
- Enqueue Replication Server

Table 2-2 lists the possibilities to eliminate the single point of failures.

**Table 2-2** Possibilities to secure the single point of failures

| Single Point of Failure | Technical Possibilities to eliminate the SPOF |
|---|---|
| Central Database | Switch-over solutions |
| Central Services | Set up an Enqueue Replication Server controlled by a switch-over solution |
| Enqueue Replication Server | Switch-over solutions |
| SAP Central File System | Switch-over solutions |

# Uniquely identifying SAP WebAS 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 WebAS instances in a single cluster.

For multiple instances running concurrently on a single node, the agent must be able to uniquely identify each SAP WebAS instance on that system.

Each instance has a unique instance name. The instance names may follow the conventional form. For example, additional application server instances begin with 'D', and Primary application server instances are typically named DVEBMGS.

Instance names often include an instance ID suffix which is an integer between 00-99. For example, an application server instance with an instance ID = 00 may have an instance name of DVEBMGS00.

The SAPSID and InstName form a unique identifier that can identify the processes running for a particular instance.

Some examples of SAP instances are given as follows:

| InstName | InstType |
|---|---|
| DVEBMGS00 | SAP Application Server - ABAP (Primary) |
| D01 | SAP Application Server - ABAP (Additional) |
| ASCS02 | SAP Central Services - ABAP |
| J03 | SAP Application Server - Java |
| SCS04 | SAP Central Services - Java |
| ERS05 | SAP Enqueue Replication Server |

Differentiating SAP instances is important to identify each instance uniquely. When the agent kills 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 operation 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 operation uses this list of processes to scan the process table, and verify that the processes are running successfully.

Table 2-3 lists valid values of the ProcMon attribute

**Table 2-3** Values of ProcMon attribute

| SAP usage type | SAP instance type | Value of ProcMon attribute |
|---|---|---|
| ABAP | ENQREP | enrepserver.exe |
| Java | APPSERV | jstart.exe<br>igswd.exe and icman.exe are optional |

**Table 2-3** Values of ProcMon attribute *(continued)*

| SAP usage type | SAP instance type | Value of ProcMon attribute |
|---|---|---|
| Java | ENQUEUE | enserver.exe<br>msg_server.exe<br>gwrd.exe is optional |
| Java | ENQREP | enrepserver.exe |
| Add-In (ABAP + Java) | APPSERV | disp+work.exe<br>jstart.exe<br>igswd.exe, icman.exe and gwrd.exe are optional |
| Add-In (ABAP +Java) | ENQUEUE (ABAP) | enserver.exe<br>msg_server.exe |
| Add-In (ABAP +Java) | ENQREP (ABAP) | enrepserver.exe |
| Add-In (ABAP +Java) | ENQUEUE (Java) | enserver.exe<br>msg_server.exe<br>gwrd.exe is optional |
| Add-In (ABAP +Java) | ENQREP (Java) | enrepserver.exe |

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

# About installing SAP WebAS for high availability

You can install SAP NetWeaver 7.10 in the following ways, in a VCS environment:

| | |
|---|---|
| SAP instance on shared disk | Install the SAP instance binaries and SYS directory on shared disks |
| SAP instance on shared disk | Install the SAP instance binaries on local disk and SYS directory on shared disks |

When installing SAP NetWeaver, ensure that the login_name, group_name for the *sid*adm and SAPService*SID* is the same on all the nodes.

For more details refer to SAP documentation.

# About configuring SAP WebAS for high availability

The guidelines for configuring SAP NetWeaver 7.10 for high availability are as follows:

- In a service group, keep the single point of failure as minimal as possible and watch the application startup time.
- Assign a virtual hostname to the component within the switchover envionment. Since the physical hostname changes with the switchover, this is a must have requirement.
- Based on the expected failover time configure the reconnection parameters for all software components and enable its automatic reconnection.
- Configure sapcpe to copy the instance specific executables and binaries from a central file system to the instance executable directory, during the instance startup.

# Setting up SAP systems for clustering

This topic describes the procedure to install and configure SAP NetWeaver 7.10 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.

# Installing SAP system using Virtual Hostname

SAP system can be installed in HA environment directly using virtual hostnames. To install SAP system using virtual hostname, perform the following steps:

**Note:** Before installing SAP system refer to SAP Installation documentation.

**To install SAP instances using Virtual Hostname**

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

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

   ---

   **Note:** 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.

   ---
5. Navigate to the directory where sapinst.exe tool is present in the Master DVD.

   At the command prompt, run the following 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.
6. From the installation GUI, select **High Availability System >Based on [AS ABAP/AS Java/AS ABAP and AS Java]** based on the usage type of system you are planning to install and follow the instructions to complete the installation.

# Configuring the SAP WebAS agent for message server restart

In case the message server process fails, the Veritas High Availability agent for SAP WebAS supports the message server restart through SAP service (SAP*SID_InstID*) process sapstartsrv.exe

In case of unexpected termination, to avail the advantage of this restart technology without failing over the entire (A)SCS instance, the SAP administrator must modify the Instance profile for (A)SCS instance and set the new profile parameters.

---

**Note:** Restart of enqueue server process "enserver.exe" is not supported by the Veritas High Availability agent for SAP WebAS.

---

To restart message server, use the following syntax in the start profile:

```
Restart_Program_xx = local program name program arguments
```

For example following is the modified syntax for message server

```
Restart_Program_02 = local $(_MS) pf=$(_PF)
```

By default sapstartsrv.exe restarts the message server without any delay.

For more information on how to restart process of a program through sapstartsrv.exe, refer to SAP Note 729945 and related notes.

---

**Note:** Symantec recommends to carefully study the SAP note before you modify the profile files for (A)SCS instance.

---

# Configuring the Enqueue Replication Server for SAP WebAS

You can either manually configure or use SAPInst to configure the Enqueue Replication Server for SAP WebAS.

## Configuring the Enqueue Replication Server manually

Perform the following steps to manually configure the Enqueue Replication Server for SAP WebAS:

- Enable replication in the (A)SCS instance by adding the following parameter to the instance profile of (A)SCS instance (SAPSID_InstName_VirtualHostname).
  `enque/server/replication = true`
  You have to restart the (A)SCS instance to make the change effective. Assume a two-node software failover cluster (running on the physical hosts hostAand host B) and a clustered (A) SCS instance with the following parameters.
  SCS SAPSID = PLL
  SCS INSTNO = 01
  SCS HOST = sapscshost (virtual host name)
  This instance (namely, the enqueue server's lock table) should be protected with an ERS instance as follows:
  ERS SAPSID = PLL
  ERS INSTNO = 11 (a free instance number)
  ERS HOST = sapershost (virtual hostname)

- On one of the physical host ( host A or host B) perform the following steps as user *sid*adm or domain administrator:
  Create the directory structure as follows:
  *drive*:\usr\sap\PLL\ERS11\exe
  *drive*:\usr\sap\PLL\ERS11\log
  *drive*:\usr\sap\PLL\ERS11\data
  *drive*:\usr\sap\PLL\ERS11\work
- Copy all the binaries from (A)SCS instance exe directory into the ERS instance exe directory
- Create a new ERS instance profile in *drive*:\usr\sap\PLL\SYS\profile.

```
SAPSYSTEMNAME = PLL
SAPSYSTEM = 11
INSTANCE_NAME = ERS11

DIR_CT_RUN = $(DIR_EXE_ROOT)\$(OS_UNICODE)\NTAMD64
DIR_INSTANCE = <drive>:\usr\sap\$(SAPSYSTEMNAME)\$(INSTANCE_NAME)
DIR_EXECUTABLE = $(DIR_INSTANCE)\exe
DIR_PROFILE = $(DIR_INSTALL)/profile
_PF = $(DIR_PROFILE)\PLL_ERS11_sapershost

SAPGLOBALHOST = sapscshost
SAPLOCALHOST = sapershost

#------------------------------------------------------------------
# Copy SAP Executables
#------------------------------------------------------------------
_CPARG0 = list:$(DIR_CT_RUN)/scs.lst
Start_Program_01 = immediate $(DIR_CT_RUN)\sapcpe$(FT_EXE) pf=$(_PF)
$(_CPARG0)
#-------------------------------------------------------------------
# Settings for enqueue monitoring tools (enqt, ensmon)
#-------------------------------------------------------------------
enque/process_location = REMOTESA
rdisp/enqname = $(rdisp/myname)

#-------------------------------------------------------------------
# standalone enqueue details from (A)SCS instance
#-------------------------------------------------------------------
SCSID = 01
SCSHOST = sapscshost
enque/serverinst = $(SCSID)
```

```
enque/serverhost = $(SCSHOST)
enque/serverport = 32$(SCSID)

enque/enrep/poll_interval = 0
enque/enrep/poll_timeout = 120
enque/enrep/inactive_action = sleep

#-------------------------------------------------------------------
# Start enqueue replication server
#-------------------------------------------------------------------
_ER = $(DIR_EXECUTABLE)\enrepserver$(FT_EXE)
Start_Program_02 = local $(_ER) pf=$(_PFL) NR=$(SCSID)
```

For DIR_CT_RUN in this ERS profile, take the value DIR_CT_RUN from the (A)SCS instance profile. If the (A)SCS instance has not configured DIR_CT_RUN in its profiles, take the value specified for DIR_EXECUTABLE from the (A)SCS instance profile.
It is essential that the binaries from (A)SCS and ERS instance are from the same binary set.

- 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 starts successfully.
- The SAP instance is now ready for clustering and Control the life time of Enqueue Replication Server using VCS.

## Configuring the Enqueue Replication Server using SAPInst

Perform the following steps to configure the Enqueue Replication Server for SAP NetWeaver 7.10, using SAPInst:

- Install Enqueue Replication Server using SAPInst with virtual hostname.

  ```
  # sapinst SAPINST_USE_HOSTNAME=VirtualHostName
  ```

- Modify the Enqueue Replication Instance profile *drive*:\usr\sap\*SAPSID*\SYS\profile\SAPSID_InstName_VHostName
  - Add the following lines under the section "standalone enqueue details from (A)SCS instance" in the profile file.
    enque/poll_interval = 0
    enque/poll_timeout = 120
    enque/enrep/inactive_actio = sleep
    enque/table_size = 4096

- Delete the following lines from the profile file.

  ```
  Autostart = 1
  enque/enrep/hafunc_implementation
  ```

- Change the Restart_Program_00 to Start_Program_00 Under "Start enqueue replication server" section.

  ```
  Start_Program_00 = local $(_ER) pf=$(_PFL) NR=$(SCSID)
  ```

- Control the life time of Enqueue Replication Server using switchover solution.

# Clustering an SAP instance

This section describes the procedure for clustering an SAP instance.

To cluster an SAP instance, you must first configure the node that hosts the SAP Central Service Instance ([A]SCS) and then configure all other nodes that you want to cluster.

## Configuring the first node in the cluster

Perform the following tasks on the node on which you installed SAP, the first time.

- Set the SAP Service to manual.
- Create the cluster service group for SAP instance.

**To configure the first node in the cluster**

1. Stop the SAP Central Services Instance.
2. Stop the SAP instance Windows service

   `SAP`*`SAPSID_No`*

3. In the instance profile, set the AUTOSTART equal to 0.
4. Configure the SAP*SAPSID_No* service as follows:
   - Open services.msc. Click **Start** > **Run** and enter service.msc.
   - On the Services panel, right-click the SAP*SAPSID_No* service, and select **Properties**.
   - On the General tab, select **Manual** from the Startup type drop-down list.
   - Click **OK**.
   - Close and exit the Services panel.

## Configuring all other nodes in the cluster

Perform the following tasks on the other remaining cluster nodes:

- Create the required SAP users and groups.
- Set the system and user environment for the SAP system.
- Enter the required port numbers in the Windows services files.
- Install Host Agent using sapinst.exe.
- Create the Windows service for the SAP instance.

**To configure all other nodes in the cluster**

1. Login as a domain administrator.
2. Create the following local groups.
   - SAP_*SAPSID*_LocalAdmin
   - SAP_SAP_LocalAdmin
   - SAP_LocalAdmin
3. Add the SAP_*SAPSID*_GlobalAdmin domain group to the SAP_*SAPSID*_LocalAdmin and SAP_LocalAdmin group.
4. Add the SAP_SAP_GlobalAdmin domain group to the SAP_SAP_LocalAdmin and SAP_LocalAdmin
5. Add the SAP_*SAPSID*_GlobalAdmin and SAP_SAP_GlobalAdmin domain group to the local Administrators group.

   For details on creating and adding a new local group and users:

   See "Creating and adding local groups and users" on page 39.
6. Click **Start** > **Programs** > **Administrative Tools** > **Local Security Policy** > **Local Policies** > **User Right Assignment**.
7. Add the following privileges for the *sapsid*adm user.
   - Act as a part of the Operating System (SeTcbPrivilege)
   - Replace a process-level token (SeAssignPrimaryTokenPrivilege)
   - Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)
8. Add the following privileges for the SAPService*SAPSID* user.
   - Log on as a Service (SeServiceLogonRight).
   - Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)
   - Access this computer from the network (SeNetworkLogonRight)

- Deny Logon Locally and Deny Log on through Terminal Services (SeDenyInteractiveLogOnRight)

9. Change the *sapsid*adm user environment as follows:
   - At the command prompt enter,
     `runas /profile /user:domain\sapsidadm regedit`
   - On the Registry Editor panel, click **HKEY_CURRENT_USER** > **Environment**.
   - Modify the user environment based on your Database, SAP Usage Type and SAPSID.

   For example, the following table depicts the registry environment with Oracle database (PI1) and Add-In installation with SAPSID PI1.

| **Name** | **Type** | **Data** |
|---|---|---|
| Default | REG_SZ | value not set |
| DBMS_TYPE | REG_SZ | ora |
| dbs_ora_schema | REG_SZ | SAPSR3 |
| dbs_ora_tnsname | REG_SZ | PI1 |
| JAVA_HOME | REG_SZ | C:\j2sdk1.4.2_19-x64 |
| NLS_LANG | REG_SZ | AMERICAN_AMERICA.UTF8 |
| ORACLE_HOME | REG_EXPAND_SZ | E:\oracle\PI1\102 |
| ORACLE_SID | REG_EXPAND_SZ | PI1 |
| PATH | REG_EXPAND_SZ | E:\usr\sap\PI1\SYS\exe\uc\NTAMD64;\<br>\sappi1scs\sapmnt\PI1\SYS\exe\uc\NTAMD64;<br>E:\oracle\PI1\102\BIN |
| SAPDATA_HOME | REG_EXPAND_SZ | E:\oracle\PI1 |
| SAPEXE | REG_SZ | \\sapi1scs\sapmnt\PI1\SYS\exe\uc\NTAMD64 |
| SAPLOCALHOST | REG_SZ | sappi1aas |
| SAPSYSTEMNAME | REG_SZ | PI1 |
| TEMP | REG_EXPAND_SZ | E:\usr\sap\PI1\tmp |
| TMP | REG_EXPAND_SZ | E:\usr\sap\PI1\tmp |

| Name | Type | Data |
|---|---|---|
| TNS_ADMIN | REG_EXPAND_SZ | \\sappi1scs\sapmnt\PI1\SYS\profile\oracle |

10 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 Number
```

where,

The value for <*No.*> is the value of an Instance ID.

11 Move the Service Group from the first node to the node that you are currently configuring and ensure that the *`drive`*`:\usr\sap` directory is shared with the names, `sapmnt` and `saploc`.

See “Creating sapmnt and saploc share directories” on page 40.

12 Install SAP Host Agent with SAPInst. Follow the steps below to install the SAP Host agent.

- In the Master DVD, navigate to the directory containing the sapinst.exe tool.
- Double-click the sapinst.exe file to launch the SAP installation GUI.
- Select **High Availability System** > **Based on [AS ABAP/AS Java/AS ABAP and AS Java]** > **Host Agent** based on the usage type of system you installed.
- Follow the instructions to complete the installation.

13 Create the SAP*SAPSID_No* service as follows:

- At the command prompt, navigate 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* |

| | |
|---|---|
| Profile | If, SAPLOCALHOST=SAPGLOBALHOST, then enter the value as:<br>*drive*:\usr\sap\*SAPSID*\SYS\profile\*SAPSID_InstName_VirtualHostName*<br>If, SAPLOCALHOST is not equal to SAPGLOBALHOST, then enter the value as:<br>\\*SAPGLOBALHOST*\sapmnt*SAPSID*\SYS\profile\*SAPSID_InstName_VirtualHostName* |
| User | *domain*\SAPService*SAPSID* |
| Password | *SAPServiceSAPSID password* |
| Startup type | manual |
| Use Environment of User | *domain*\*sapsid*adm |

14 Click **OK**.

15 Reregister the type library as follows:

- At the command prompt, navigate to the *Drive*:\*Path*\SAP\hostctrl\exe 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**.

16 Create registry entries for the SAP*SAPSID_No* service.

For example,

| Name | Type | Data |
|---|---|---|
| Default | REG_SZ | value not set |
| EventMessageFile | REG_SZ | \\\\sappi1scs\sapmnt\PI1\SYS\exe\<br>uc\NTAMD64\sapevents.dll |
| TypesSupported | REG_DWORD | 0x00000007(7) |

17 If an SAP Microsoft Management Console (MMC) is not configured on the node, register the SAP MMC using the following steps:

- Access the file sapmmcX64u.msi or sapmmcIA64u.msi from Kernel Install DVD depending on the OS architecture.
- Install SAP MMC by executing the msi package.

**Note:** Symantec recommends that you cluster the SAP Central Services instances for both ABAP and Java in an Add-In Usage Type in the same service group.

Also, cluster the Enqueue Replication servers for both ABAP and Java in an Add-In Usage Type in a single Service Group.

# 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* | This user account is required to start the SAP system. This account has the local user right to log on as a service.<br>This account does not allow interactive logon. You need not set an expiry date for the password. However, you must change the password at next logon option. |

## 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 | These are Local groups created and maintained on an application server. A local group has rights only to the system on which the group is located.<br>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, *drive*:\usr\sap\trans. This directory allows transports to take place between systems.<br>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 new domain groups and users

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 on to Domain Controller.
2. Click **Start** > **Programs** > **Administrative Tools** > **Active Directory Users and Computers**.

   Alternatively,

   - Click **Start** > **Run**.
   - In the Open field, enter mmc.
   - 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<br>Specify this value using the exact and correct uppercase and lowercase. |
| Group scope | Global |
| Group type | Security |

5 Click **OK**.

## Creating SAP system users, *sapsid*adm and SAPService*SAPSID*

Follow the steps below to create the SAP system users:

### To create the SAP system users

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 Click **Next**.

4 Enter the password and confirm the password.

5 Select **Password never expires**.

Ensure that no other option is selected.

6 Click **Next**.

7 Click **Finish**.

### Adding the *sapsid*adm user to the SAP_*SAPSID*_GlobalAdmin Group

**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**.

   ---

   **Note:** By default, this user is also a member of the Domain Users group.

   ---

5. Click **OK**.

### To add the SAPService*SAPSID* user to the SAP_*SAPSID*_GlobalAdmin Group

**To add the *SAPSID* service 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**.
5. Remove the user from the Domain users group.
   - 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
   - Click **OK**
   - 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.

---

**Note:** This procedure may vary for Windows Server 2008

---

**To create a local group**

1. Click **Start** > **ControlPanel** > **Administrativetools** > **ComputerManagement**.
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** on the Select Users, Computers, or Groups dialog box.
8. Click **OK** on the New Group dialog box

**To add a domain group to a local group**

1. Click **Start** > **ControlPanel** > **Administrativetools** > **ComputerManagement**.
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.

## Creating sapmnt and saploc share directories

Ensure that the sapmnt and saploc directories are shared, and are accessible by the SAP system Administrator.

**To create the sapmnt and saploc share directories on Windows Server 2003**

1. Right-click the *drive*:\usr\sap directory, and select **Properties**.
2. In the Properties dialog box, click the **Sharing** tab.
3. Click **Share this folder**.
4. Enter sapmnt in the Share name field.

5. Click **Permissions**.
6. In the Permissions for sapmnt dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the sapmnt directory.
7. Click **OK** in the Permissions for sapmnt dialog box.
8. In the Properties dialog box, click **New Share**.
9. In the New Share dialog box, enter saploc in the Share name field.
10. Click OK in the New Share dialog box.
11. Click **Permissions**.
12. In the Permissions for saploc dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the saploc directory.
13. Click **OK** in the Permissions for saploc dialog box.
14. Click **OK** in the Properties dialog box.

**To create the sapmnt and saploc share directories on Windows Server 2008**

1. Right-click the *drive*:\usr\sap directory, and select properties.
2. On the Properties dialog box, click the **Sharing** tab.
3. Click **Advanced Sharing**.
4. Select **Share this folder** option.
5. Enter *sapmnt* in the Share name field.
6. Click **Permissions**.
7. In the Permissions for sapmnt dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the sapmnt directory.
8. Click **OK** in the Permissions for sapmnt dialog box.
9. In the Properties dialog box, click Advanced Sharing.
10. On the Advanced Sharing dialog box, click **Add**.
11. On the New Share dialog box, enter *saploc* in the Share name field.
12. Click **OK** in the New Share dialog box.
13. Click **Permissions**.
14. In the Permissions for saploc dialog box, ensure that the Administrators and SAP_LocalAdmin user groups have full control for the saploc directory.
15. Click **OK** in the Permissions for saploc dialog box.
16. Click **OK** in the New Share dialog box.

17 Click **OK** in the Advanced Sharing dialog box.

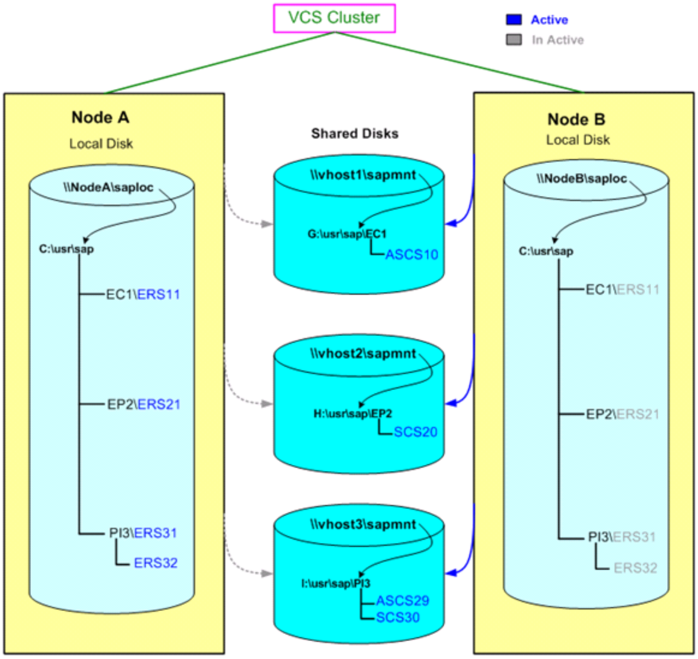
18 Click **Close** in the Properties dialog box.

# Configuring the SAP systems on Windows Server 2008

The File Share feature functions differently on Windows Server 2008, as compared to Windows Server 2003. On Windows Server 2008, you can only access file shares pointing to local disks with the physical computer name. To be able to define file shares pointing to shared disks, a "client access point" (one IP address associated with one network name cluster resource) must already exist in the failover cluster service group to which the shared disk belongs. Since you can only access file shares pointing to shared disks with the network name that belongs to the same failover cluster service group, you can create multiple file shares with the same file share name (for example, sapmnt) in a failover cluster environment, assuming the file shares belong to different cluster service groups.

Figure 2-1 shows a typical SAP system installation on a Windows Server 2008 system under VCS environment.

**Figure 2-1** Typical SAP system installation (using multiple sapmnt file shares) on a Windows Server 2008 system under VCS environment



For sample service group configurations on Windows Server 2008,

See “Sample service group configurations for SAP system on Windows Server 2008” on page 81.

Chapter 3

# Installing, upgrading, and removing the agent for SAP WebAS

This chapter includes the following topics:

## Before you install the agent for SAP WebAS

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

- Install and configure Veritas Cluster Server.
- Remove any previous version of this agent.
  See "Removing the VCS agent for SAP WebAS" on page 47.

## Installing the VCS agent for SAP WebAS

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

---

**Note:** Ensure that you have uninstalled the previous version of this agent, if installed.

---

Also note that the agents for both, SAP NetWeaver and SAP WebAS are combined in a single package. Thus, if you install either of the agent, the other agent gets installed by default.

**To install the VCS agent for SAP WebAS**

1. Log on to any node in the cluster.

   Ensure that the logged on user has the domain administrative privileges.

2. Download the complete agent pack tarball from FileConnect site:

   https://fileconnect.symantec.com/

   Alternatively,

   Download the individual agent tarball from the Symantec Veritas Operations Services (VOS) site:

   https://vos.symantec.com/home

3. Uncompress the file to a temporary location.

4. If you downloaded the complete Agent Pack tarball, navigate to the directory containing the package for the platform running in your environment.

| | |
|---|---|
| Windows 2003 (IA64) | *cd1*/windows/w2k3IA64/vcs/application/sapwebas_agent/*vcs_version*/*version*_agent |
| Windows 2003 (x64) | *cd1*/windows/w2k3x64/vcs/application/sapwebas_agent/*vcs_version*/*version*_agent |
| Windows 2008 (x64) | *cd1*/windows/w2k8x64/vcs/application/sapwebas_agent/*vcs_version*/*version*_agent |

5. Double-click the Setup.exe file to begin the installation.

   You may see a pkgs directory here. Do not start the installation by executing the vrtsvcssap.msi file in this directory.

6. On the Veritas Product Installer screen, click **Veritas High Availability Agents 5.0.2.0 for SAP NetWeaver**.

7. On the Welcome screen, click **Next**.

8. On the Computer Selection dialog box, in the **Computer** field, enter the node name on which you want to install the agents for SAP NetWeaver.

   Alternatively,

   - Browse to select the nodes from the domain in which you want to install the agents for SAP NetWeaver. Select the nodes and click **OK**.

- Click **Add**.
- Click **Next**.

9 On the Validation screen, view the installation status on each of the selected node and click **Next**.

---

**Note:** An error is displayed, if you have a previous version of this agent installed.

---

10 On the Report screen review the summary report and click **Install**.

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

# Removing the VCS agent for SAP WebAS

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

---

**Note:** The agent for SAP NetWeaver and SAP WebAS are combined in a single package. Thus, removing one agent package will remove the other by default.

---

**To uninstall the VCS agent for SAP WebAS**

1 Ensure that all clustered SAP resources are offline.

2 From the cluster, remove all the resources that use the agents for SAP WebAS.

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**.
  - Double-click **Add/Remove Programs**.
  - From the list of programs, select **Veritas High Availability Agents 5.0.2.0 for SAP NetWeaver**.

4 Click **Change/Remove**.

5 Follow the instructions that the uninstall program provides, to complete the uninstallation of the agents for SAP WebAS.

# Upgrading the agent for SAP WebAS

Perform the following steps to upgrade the agent with minimal disruption, in a VCS environment.

**To upgrade the agent in a VCS environment**

1. Login as domain administrator.
2. Verify that your path is *drive*:\Program Files\Veritas\Cluster Server\bin
3. Persistently freeze all the service groups that host the application.

   C:\> hagrp –freeze *GroupName* -persistent
4. Stop the cluster services forcibly.

   C:\> hastop -all –force
5. Ensure that the agent operations are stopped on all the nodes.
6. Take a back up of the main.cf and types.cf

   ```
   C:\> copy drive:\> Program Files\Veritas\Cluster
   Server\conf\config\main.cf drive:\>backup\main.cf
   ```

   ```
   C:\> copy drive:\> Program Files\Veritas\Cluster
   Server\conf\config\types.cf drive:\>backup\types.cf
   ```
7. Uninstall the agent package from all the nodes.

   See "Removing the VCS agent for SAP WebAS" on page 47.
8. Install the new agent on all the nodes.

   See "Installing the VCS agent for SAP WebAS" on page 45.
9. Navigate to *drive*:\> Program Files\Veritas\Cluster Server\conf\config\types.cf file and verify if any duplicate type definitions exists for Weblogic on all the nodes.

   If duplicate type definitions exist, remove old type definition from types.cf file and save the file.

   **Note:** To identify the old type definition, compare the new type definition file with the old (backed up) types.cf file.

10 Check for the changes in the resource values required, if any, due to the new agent types definition.

---

**Note:** To note the list of changed attributes, compare the new type definition file with the old type definition file.

---

11 Start VCS on all nodes in the cluster.

```
C:\> hastart
```

12 Start the agent on all nodes, if not started.

```
C:\> haagent -start SAPWebAS -sys SystemName
```

Optionally, start the SAPNW04 agent,

```
C:\> haagent -start SAPNW04 -sys SystemName
```

13 Unfreeze the service groups once all the resources come to an online steady state.

```
C:\> hagrp -unfreeze GroupName -persistent
```

# Configuring the agent for SAP WebAS

This chapter includes the following topics:

## About configuring the agent for SAP WebAS

To provide high availability for SAP NetWeaver 7.10 components in the VCS environment, you must first configure the VCS resources of type SAPWebAS.

After installing the Agents for SAP NetWeaver, you can create and configure the SAP resources. Before you configure a resource, review the attributes table that describes the SAPWebAS resource type and its attribute definitions.

See “Agent attributes for SAPWebAS” on page 51.

## Agent attributes for SAPWebAS

Table 4-1 shows the required attributes for configuring a SAP WebAS instance.

**Table 4-1** Required attributes

| Required attributes | Description |
|---|---|
| ResLoglevel | The logging detail performed by the agent for the resource. The valid values are:<br>INFO: Logs error messages<br>TRACE: Logs error and trace messages. TRACE is very verbose and should only be used during initial configuration or for troubleshooting and diagnostic operations.<br>Type and dimension: string-scalar<br>Default: INFO<br>Example: TRACE |
| SAPAdmin | 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 *sapsid*adm.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: pil adm |
| SAPAdminDomain | Windows domain name to which the SAPAdmin user belongs.<br>**Note:** If SAPAdmin does not belong to a Windows domain, use the cluster localization settings to specify the local computer name for each system.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: SYMCORP |
| SAPAdminPassword | Password for the SAPAdmin user.<br>Use the vcsencrypt -agent command to encrypt the password. If you are using the VCS GUI, the GUI automatically encrypts the password.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: vxfgh28skbsj |

**Table 4-1** Required attributes *(continued)*

| Required attributes | Description |
|---|---|
| SAPHost | Virtual IP host name (LANMAN name) for the SAP instance. If the instance is installed with location hostname, use the local system name as this attribute value.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: sappi1scs |
| SAPHome | 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.<br>Example 1: C:\usr\sap\PI1\DVEBMSG00\exe<br>Example 2: C:\usr\sap\PI1\ASCS01\exe<br>Default: No default value |
| SAPServiceUser | 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.<br>**Note:** Do not include the domain name in the value for this attribute. Use the SAPAdminDomain attribute to specify domain information.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: SAPServicePI1 |
| SAPSID | 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.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: PI1 |

**Table 4-1** Required attributes *(continued)*

| Required attributes | Description |
|---|---|
| InstType | String identifier that classifies and describes the SAP server instance type. The InstType values are not case sensitive.<br>The valid values are:<br>APPSERV: SAP Application Server<br>ENQUEUE: SAP Central Services<br>ENQREP: SAP Enqueue Replication Server<br>Type and dimension: string-scalar<br>Default: APPSERV<br>Example: ENQUEUE |
| InstName | 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.<br>Some examples include the following:<br>■ ASCS03: SAP Central Services (ABAP)<br>■ SCS07: SAP Central Services (Java)<br>■ DVEBMGS00: SAP Primary Application Server (ABAP)<br>■ D05: SAP Additional Application Server (ABAP)<br>■ J06: SAP (Primary/Additional) Application Server (Java)<br>■ ERS04: SAP Enqueue Replication server<br>Type and dimension: string-scalar<br>Default: ""<br>Example: DVEBMGS00 |
| InstProfile | Specifies the full path and file name of the SAP Instance Profile. Typically the InstProfile is found in `C:\usr\sap\SAPSID\SYS\profile` and has a name of `SAPSID_InstName_hostname`.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: C:\usr\sap\PI1\SYS\profile\PI1_DVEBMGS00_sappi1pas |

**Table 4-1** Required attributes *(continued)*

| Required attributes | Description |
|---|---|
| ProcMon | The list of SAP processes that the monitor function must monitor during a first-level check of an SAP instance. The entries in this list are separated using a space and can be specified in any order. The valid values are:<br>APPSERV: disp+work.exe igswd.exe jstart.exe gwrd.exe icman.exe<br>ENQUEUE: msg_server.exe enserver.exe gwrd.exe<br>ENQREP: enrepserver.exe<br>Type and dimension: vectar-scalar<br>Default: No default value<br>Example: disp+work.exe |
| SAPMonHome | The directory that defines the location of the sapinfo.exe or ensmon.exe commands. The agent for SAP WebAS uses these commands for second-level monitoring.<br>This functionality is not a part of the base SAP installation. Hence, the value of this attribute may be different from the SAPHome attribute.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: C:\usr\sap\sapinfo\rfcsdk\bin |
| EnqSrvResName | Specifies the SAP Central Services instance resource name in VCS. This attribute is set for only Enqueue Replication Server (ERS) and will be used by both Enqueue and Enqueue Replication Servers to query others status during startup and failover.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example: SAPPI1SCS_scs |

Table 4-2 shows the required attributes for configuring a SAP WebAS instance.

**Table 4-2** Optional attributes

| Attribute | Description |
|---|---|
| SecondLevelMonitor | Used to enable second-level monitoring and specify the interval for the same. Second-level monitoring is a deeper, more thorough state check of the configured SAP instance. The numeric value specifies how often the second-level monitoring routines are 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.<br>**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 is executed every 100 minutes, which may not be as often as intended. For maximum flexibility, no upper limit is defined for SecondLevelMonitor.<br>Type and dimension: integer-scalar<br>Default: 0<br>Example: 1 |
| MonitorProgram | Full path and file name of an external, user-supplied monitor program. If specified, the monitor function executes this file to perform an additional server state check. There are no restrictions for what actions the external monitor program performs, to determine the state of a SAP instance server. The only constraint is that the external monitor program must return one of the following integer values:<br>■ 0 (server is online)<br>■ 110 (server is online)<br>■ 100 (server is offline)<br>■ 1 (server is offline)<br>■ 99 or any thing else (server state is unknown)<br>**Note:** Symantec recommends storing the external monitor program in the shared disk directory to ensure the file is always available on the online system. Arguments are supported.<br>Type and dimension: string-scalar<br>Default: No default value<br>Example 1: C:\usr\sap\PI1\DVEBMGS00\work\mymonitor.bat<br>Example 2: C:\usr\sap\PI1\DVEBMGS00\work\mymonitor.exe arg1 arg2 |

# Setting the SAPMonHome attribute

The SAPMonHome attribute contains the absolute path to the directory that contains the binary used for second level monitoring process.

The binaries that are used during second-level monitoring for different SAP usage types and SAP instances are as follows:

- For ABAP application Server: sapinfo.exe

  sapinfo.exe is not a standard binary shipped by SAP with installation media. Customers need to download the latest rfcsdk kit from the following site: http://service.sap.com/swdc -> Support Packages and Patches -> Entry by Application Group -> Additional Components.

  For more information on selecting the right RFCSDK for your SAP application, refer to SAP notes 1005832, 825494 and 413708.
- For Add-In (ABAP + Java) application server: sapinfo.exe
- For Enqueue and Enqueue Replication Server: ensmon.exe

**Note:** For Java application server and java component of Add-In application server the agent uses the sapcontrol.exe utility prepsent in SAPHome.

# 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. By default these values are set to 300, 300, 60 and 60 respectively.

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. You must set these timeout attributes to appropriate values depending on the time required for SAP applications. You can modify these values with the following command.

```
hatype -modify TypeName attribute_name attribute_value
```

Example: C:\> hatype -modify SAPWebAS OnlineTimeout 600

# Executing a custom monitor program

The monitor function executes a custom monitor program to perform a user-defined SAP WebAS state check.

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

- The specified utility is a valid executable file.
- The first level process check indicates that the SAP Web AS instance is online.
- The SecondLevelMonitor attribute is either set to 0 or 1, and the second level check indicates that the SAP Web AS instance is online.
- The SecondLevelMonitor attribute is set to greater than 1, but the second level check is deferred for this monitoring cycle

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 shared directory that is available on an online node.

# Preventing early faulting of Java and Add-In instances

When you start a SAP Java or a SAP Add-In Application Server Instance, SAP automatically starts processes such as jstart.exe. Depending upon the available resources, starting these processes takes some finite time.

The agent for SAP WebAS allows enough time for SAP to start these processes successfully. The agent checks the status of these processes in definite intervals. While checking the status of these processes, if the processes are missing, the agent pauses for a time period that is equal to one-tenth of the value of the MonitorTimeout attribute before re-checking the status of the processes.

Symantec strongly recommends that the administrator set the MonitorTimeout attribute, such that the agent gives enough time for these processes to restart if a failure occurs.

For example, if an add-in server instance takes 9 seconds to restart a failed jstart process, you must set the value of the MonitorTimeout attribute to at least 90 seconds.

# Configuring the service groups for SAP WebAS

This chapter includes the following topics:

## About configuring service groups for SAP WebAS

Configuring the SAP WebAS service group involves creating the SAP service group, its resources, and defining attribute values for the configured resources. You must have administrator privileges to create and configure a service group.

You can configure the service groups using one of the following:

- The Cluster Manager (Java console)
- The command-line

## Before configuring the service groups for SAP WebAS

Before you configure the SAP WebAS service group, you must perform the following:

- Verify that VCS is installed and configured on all nodes in the cluster where you will configure the service group.

Refer to *Veritas Storage Foundation™ and High Availability Solutions Installation and Upgrade Guide* for more information on installing and configuring VCS.

- Verify that SAP NetWeaver 7.10 is installed and configured identically on all nodes in the cluster.
  See "About installing SAP WebAS for high availability" on page 25.
  See "About configuring SAP WebAS for high availability" on page 26.
- Verify that the Veritas agents for SAP NetWeaver is installed on all nodes in the cluster.
  See "Installing the VCS agent for SAP WebAS" on page 45.

# Configuring service groups with SAPWebAS agent

While setting up a cluster, you must always ensure that the cluster has some spare capacity to handle the SAP NetWeaver failover scenarios. For example, in case of a backend database failure, the cluster must be able to run another database instance in conjunction with other running applications. Review the information about data protection.

See *Veritas Storage Foundation™ and High Availability Solutions Installation and Upgrade Guide*

The cluster should thus be able to provide application failover by encapsulating the resources required for an application into a service group. A service group is a virtualized application that can switch between the cluster nodes. It contains a set of dependent resources, such as disk groups, disk volumes, file systems, IP addresses, NIC cards, and dependent application processes. It also includes logic about the dependencies between the application components.

These service groups should thus be configured such that the cluster can start, stop, monitor, and switch the service groups between the nodes, depending upon the server or resource faults. An administrator should also be proactively able to move a service group between cluster nodes to perform preventative maintenance or apply patches.

**To configure the service groups**

1. Change the cluster configuration to read/write mode.

   ```
   C:\> haconf -makerw
   ```

2. Create a service group for SAP NetWeaver 7.10

   ```
   C:\> hagrp -add SAP710-PI1SCS
   ```

   For more details refer to, *Veritas Cluster Server Administrator's Guide*

3. Modify the SystemList attribute for the group, to add systems.

   ```
   C:\> hagrp -modify SAP710-PI1SCS SystemList vcswin74 0 vcswin75
   1
   ```

4. Create resources for NIC, IP, Lanman,VMDg and MountV in the service group.

   ```
   C:\> hares -add SAP710-PI1SCS_nic NIC SAP710-PI1SCS
   ```

   ```
   C:\> hares -add SAP710-PI1SCS_ip IP SAP710-PI1SCS
   ```

   ```
   C:\> hares -add SAP710-PI1SCS_lanman Lanman SAP710-PI1SCS
   ```

   ```
   C:\> hares -add SAP710-PI1SCS_mnt MountV SAP710-PI1SCS
   ```

   ```
   C:\> hares -add SAP710-PI1SCS_vmdg VMDg SAP710-PI1SCS
   ```

   For more details on creating and modifying resource attributes for NIC, IP, Lanman, VMDg and MountV refer to, *Veritas Cluster Server Bundled Agents Reference Guide*.

5. Create links between the resources.

   ```
   C:\> hares -link SAP710-PI1SCS_ip SAP710-PI1SCS_nic
   ```

   ```
   C:\> hares -link SAP710-PI1SCS_lanman SAP710-PI1SCS_ip
   ```

   ```
   C:\> hares -link SAP710-PI1SCS_mnt SAP710-PI1SCS_vmdg
   ```

6. Create SAPWebAS resource for applications based on SAP NetWeaver 7.10

   ```
   C:\> hares -add SAP710-PI1SCS_scs SAPWebAS SAP710-PI1SCS
   ```

   Based on the SAP instance you are clustering, modify the resource attributes.

   See "Agent attributes for SAPWebAS" on page 51.

7. Create resource dependencies for SAPWebAS resource.

   The SAPWebAS resource depends on the Lanman and MountV resources.

   ```
   C:\> hares -link SAP710-PI1SCS_scs SAP710-PI1SCS_lanman
   ```

   ```
   C:\> hares -link SAP710-PI1SCS_scs SAP710-PI1SCS_mnt
   ```

8. Verify the final resource dependencies for SAP server group.

```
   Group              Parent                 Child
SAP710-PI1SCS   SAP710-PI1SCS_scs     SAP710-PI1SCS_lanman
SAP710-PI1SCS   SAP710-PI1SCS_scs     SAP710-PI1SCS_mnt
SAP710-PI1SCS   SAP710-PI1SCS_ip      SAP710-PI1SCS_nic
SAP710-PI1SCS   SAP710-PI1SCS_lanman  SAP710-PI1SCS_ip
SAP710-PI1SCS   SAP710-PI1SCS_mnt     SAP710-PI1SCS_vmdg
```

9. Save the cluster configuration.

```
C:\> haconf -dump -makero
```

# Configuring SAPWebAS preonline script

In a clustered environment, the SAP administrator installs and configures the SAP Enqueue and SAP Enqueue Replication server. The SAP Enqueue and Enqueue Replication Servers have the following requisites:

- If an Enqueue server instance fails, the server must failover to the node in which the Enqueue Replication server instance is running.
- If the Enqueue Replication server instance fails, the instance must failover to a node where Enqueue Server is NOT running.

The SAPWebAS preonline script facilitates proper Enqueue server failover behavior. The existing VCS preonline script calls the SAPWebAS preonline script.

The SAPWebAS preonline script performs the following tasks:

- If the service group for which the script is running does not have an Enqueue server or an Enqueue Replication server resource, the script returns the control back to the VCS preonline script.
- If the service group has an Enqueue server or Enqueue Replication server resource, the script determines the node on which the online operation can be performed. The script also ensures that the online operation does not execute the VCS preonline script again.

To accomplish this failover behavior, you must configure the VCS preonline script.

The VCS preonline trigger calls an external preonline trigger utility, sapwebaspreonline.exe. The initiated preonline trigger performs the steps necessary for correct failover behavior of the Enqueue servers. The sapwebaspreonline.exe utility is located in the %VCS_HOME%\bin\SAPWebAS directory.

**To configure SAPWebAS preonline script**

**Step 1**: Navigate to the %VCS_HOME%\bin\Trigger directory.

**Step 2**: Add the following lines to the preonline file:

**Note:** If you are configuring the preonline file for the first time, this file may not exist. You can thus skip this step.

```
#----------------------------------------------------------------
# Start sapwebas 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];
}
my $SAPWebASPreOnlineTrigger = sprintf("%s\\bin\\SAPWebAS\\
sapwebaspreonline.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", $SAPWebASPreOnlineTrigger,
 $system, $group, $whyonlining, $systemwheregroupfaulted);
}
else {
 $CMD = sprintf("\"%s\" %s %s %s", $SAPWebASPreOnlineTrigger, $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 executed
successfully.", 15046);
 exit;
}
elsif($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 sapwebas 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;
```

**Step 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.

Revert back to step 2 to make changes in the preonline file. A sample sapwebaspreonline 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 then use this file.

**Step 4**: Set the preonline trigger attribute to true for the Service Groups to which the Enqueue and Enqueue Replication server instances belongs.

For VCS 5.0 use the following command:

```
C:\> hagrp -modify service_group PreOnline 1
```

For VCS 5.1 use the following command on each system:

```
C:\> hagrp -modify service_group PreOnline 1 -sys system
```

The preonline script is now configured to facilitate Enqueue and Enqueue Replication server behavior. You can view the logs in the VCS engine log, engine_A.log.

---

**Note:** Once the preonline trigger is configured, you may see unexpected behavior while manually switching or performing online operations on the Enqueue Replication service group. This behavior is a result of the control logic within the preonline trigger that protects the Enqueue lock table. For system maintenance, if you prefer to perform manual operations on the service groups, you can do so by disabling the preonline trigger.

To disable the preonline trigger, use the following command:

For VCS 5.0,

```
C:\> hagrp -modify service_group PreOnline 0
```

For VCS 5.1 use the following command on each system

```
C:\> hagrp -modify service_group PreOnline 0 -sys system
```

---

Chapter 6

# Troubleshooting the agent for SAP WebAS

This chapter includes the following topics:

## 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 WebAS, double check that you meet the prerequisite requirements. For a list of prerequisites:

See “Before you install the agent for SAP WebAS” on page 45.

# Configuring SAP WebAS resources

Before using an SAP WebAS resource, ensure that you configure the agent attributes correctly. For more information,

See “Agent attributes for SAPWebAS” on page 51.

# Starting the SAP WebAS outside a cluster

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 WebAS independent of the cluster framework. Refer to the cluster documentation for information about disabling a resource. You can then restart the SAP WebAS 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.

---

A sample procedure to start a SAP WebAS outside the cluster framework, is illustrated as follows:

**To start a SAP instance outside the cluster framework, using SAP MMC**

1. Log in to the system as a *sapsid*adm user.
2. Use the SAP Microsoft Management Console (MMC) to start the SAP instance.

   Ensure that the SAP instance starts successfully. If the instance starts successfully outside the cluster, you can attempt to start it inside the cluster framework.

**To start a SAP instance outside the cluster framework, using the command prompt**

1. Log in to the system as a *sapsid*adm user.
2. Start the SAP Windows service SAP*SAPSID_xx* for SAP instance, using the following command:.

   ```
   drive\> net start SAPSAPSID_xx
   ```

3. Use the startsap.exe utility to start the SAP instance. Enter,

   ```
   drive\>usr\sap\SAPSID\InstName\exe\startsap.exe name=SAPSID
   nr=InstID sapdiahost=virtual_hostname
   ```

   Ensure that the SAP instance starts successfully. If the instance starts successfully outside the cluster, you can attempt to start it inside the cluster framework.

# Common Problems with Veritas agent for SAP WebAS

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.

---

**Note:** Starting 2010Q1 agent pack release, the agents for SAP NetWeaver and SAPWebAS are combined into a single package. Thus, if an earlier version of VCS agent for SAP NetWeaver is already installed on the system the agents for SAP WebAS may not get installed. Ensure that you remove the older versions of the agent before you begin to install the agent pack from 2010Q1 agent pack release.

---

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

See “Before you install the agent for SAP WebAS” on page 45.

## 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 as COM Typelibrary Only.

**To re-register the SAP services**

1. At the command prompt, navigate to *drive*\Program Files\SAP\hostcntl\exe 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 WebAS fails to bring online 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 WebAS outside a cluster" on page 68.

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

See "Reviewing SAP WebAS agent log files" on page 72.

## 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 69.

Then attempt to bring the SAP instance online.

## In case of an Enqueue server failure, the 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 Enqueue server instance, this problem may occur. Ensure that the value of InstID passed to the Enqueue Replication server process, enrepserver.exe in the start profile, belongs to the correct Enqueue server instance.

## The ensmon.exe command returns exit code 4 for a 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:

```
enque/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 Enqueue server instance is down. When the 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 Enqueue server instance.

## The 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 SAPWebAS preonline script” on page 62.

This problem also occurs if the InstType attribute is not set properly. Also make sure that you configured EnqSrvResName attribute for Enqueue Replication Server (ERS) Instance resource.

## 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.

## Agent fails to start after installation

Ensure that you have installed Visual Studio 8 redistributable for Visual studio runtime on your system. Since the agent is compiled with Microsoft.VC80.CRT version='8.0.50727.762', it fails to start if Visual Studio 8 redistributable is not installed.

To verify if Visual Studio 8 redistributable is installed, access `<system drive>:\WINDOWS\WinSxS`. If a folder similar to `<arch>_Microsoft.VC80.CRT_<random_number>_8.0.50727.762_<random_number>` exists, it confirms that the required redistributable is installed.

For example,

`amd64_Microsoft.VC80.CRT_1fc8b3b9a1e18e3b_8.0.50727.762_x-ww_9d1c6ce0`

In case if the redistributable is not installed, download the Visual studio re-distributables for VS 2005 SP1 with version VC80.CRT_8.0.50727.762 from microsoft site at the following locations:

For x64 (amd64)

http://www.microsoft.com/downloads/details.aspx?familyid=EB4EBE2D-33C0-4A47-9DD4-B9A6D7BD44DA&displaylang=en

For IA64 (Intel64)

http://www.microsoft.com/downloads/details.aspx?familyid=747AAD7C-5D6B-4432-8186-85DF93DD51A9&displaylang=en

# Reviewing SAP WebAS agent log files

If you are facing problems while using the Veritas agent for SAP WebAS 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 WebAS, 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\SAPWebAS_A.txt.

# Reviewing error log files

If you face problems while using SAP NetWeaver instance or the agent for SAP WebAS, use the log files described in this section to investigate the problems.

## Using SAP NetWeaver instance files

If a SAP server is facing problems, you can access the server log files to further diagnose the problem. The SAP log files are located in the *drive*\usr\sap\SAPSID\InstName\work directory.

## Reviewing cluster log files

In case of problems while using the agent for SAP WebAS, you can access the engine log file for more information about a particular resource. The engine log file is located at *drive*:\Program Files\VERITAS\Cluster Server\log\engine_A.txt.

Additionally, you can also refer to the latest SAPWebAS agent log files located at *drive*:\Program Files\VERITAS\Cluster Server\log\SAPWebAS_A.txt.

**Note:** Include both these log files while addressing the problem to Symantec support team.

## Using trace level logging

The ResLogLevel attribute controls the level of logging that is written in a cluster log file for each SAP Web AS 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 are produced. Symantec recommends that you localize the ResLogLevel attribute for a particular resource.

**Warning:** You may consider to temporarily increase the timeout values for SAPWebAS for debugging purposes. After the debugging process is complete, you can revert back 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. 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. Note the time before you begin to operate the identified resource.

5. Test the identified resource. The function reproduces the problem that you are attempting to diagnose.
6. Note the time when the problem is reproduced.
7. Set the ResLogLevel attribute back to INFO for the identified resource:

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

8. Review the contents of the log file. Use the time noted in Step 4 and Step 6 to diagnose the problem.

   You can also contact Symantec support for more help.

# Checks for an SAP Add-In Usage Types

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

- The SAP resources running the ABAP and Java Central Services instances are in the same Service Group.
- The SAP resources running the ABAP and Java Enqueue Replication server instances, are in the same Service Group.

  **Note:** Symantec recommends to configure the Central Services and Enqueue Replication server instances for an Add-In usage type in different service groups to minimize the SPOFs in a service group.

- Ensure the following:
  - The EnqSrvResName attribute of the Java Enqueue Replication server instance is set to the VCS resource that is running the corresponding Java Central Services instance (SCS).
  - The EnqSrvResName attribute of the ABAP Enqueue Replication server instance is set to the VCS resource that is running the corresponding ABAP Central Services instance (ASCS).

# Sample Configurations

This appendix includes the following topics:

- About the sample configuration for the agent for SAP WebAS
- Sample agent type definition for SAP WebAS
- Sample SAP resource configuration
- Sample service group configuration for ABAP and Java Usage types
- Sample service group configurations for SAP system on Windows Server 2008
- Sample service group dependency for SAP WebAS

## About the sample configuration for the agent for SAP WebAS

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 WebAS. For more information about these resource types, see the *Veritas Cluster Server Bundled Agents Reference Guide*.

## Sample agent type definition for SAP WebAS

This section provides the sample agent type definition for SAP WebAS.

```
type SAPWebAS (
 static i18nstr ArgList[] = { ResLogLevel, SAPAdmin, SAPAdminDomain,
 SAPAdminPassword,
 SAPHome, SAPHost, SAPMonHome, SAPServiceUser, SAPSID, InstName,
 InstProfile,
 InstType, ProcMon, EnqSrvResName, MonitorProgram, SecondLevelMonitor}
 str ResLogLevel = INFO
 str SAPAdmin
 str SAPAdminDomain
 str SAPAdminPassword
 str SAPHome
 str SAPHost
 str SAPMonHome
 str SAPServiceUser
 str SAPSID
 str InstName
 str InstProfile
 str InstType = APPSERV
 str ProcMon[]
 str EnqSrvResName
 str MonitorProgram
 int SecondLevelMonitor = 0
)
```

# Sample SAP resource configuration

Given the number of possible SAP resource configurations, this section provides sample working examples that configure a specific SAP instance for Add-In installations.

## Sample SAP primary application server instance

An excerpt of the main.cf file for a SAP primary application server instance is as follows.

```
SAPWebAS SAP710-PI1PAS_sap (
  SAPAdmin = pi1adm
  SAPAdminDomain = ISV-DOMAIN
  SAPAdminPassword = HVNtKVkRWnINjNKnL
  SAPHome = "E:\\usr\\sap\\PI1\\DVEBMGS22\\exe"
  SAPHost = sappi1pas
  SAPMonHome = "E:\\usr\\sap\\rfcsdk\\bin"
  SAPServiceUser = SAPServicePI1
  SAPSID = PI1
  InstName = DVEBMGS22
  InstType = APPSERV
  InstProfile = "\\\\sappi1scs\\sapmnt\\PI1\\SYS\\profile\\
  PI1_DVEBMGS22_sappi1pas"
  ProcMon = { "disp+work.exe", "jstart.exe" }
  )
```

## Sample SAP additional application server instance

An excerpt of the main.cf file for a SAP additional application server instance is as follows:

```
SAPWebAS SAP710-PI1PAS_sap (
  SAPAdmin = pi1adm
  SAPAdminDomain = ISV-DOMAIN
  SAPAdminPassword = HVNtKVkRWnINjNKnL
  SAPHome = "E:\\usr\\sap\\PI1\\D23\\exe"
  SAPHost = sappi1aas
  SAPMonHome = "E:\\usr\\sap\\rfcsdk\\bin"
  SAPServiceUser = SAPServicePI1
  SAPSID = PI1
  InstName = D23
  InstType = APPSERV
  InstProfile = "\\\\sappi1scs\\sapmnt\\PI1\\
  SYS\\profile\\PI1_D23_sappi1aas"
  ProcMon = { "disp+work.exe", "jstart.exe" }
  )
```

## Sample SAP Central Services instance

An excerpt of the main.cf file for an SAP Central Services instance is as follows.

```
SAPWebAS SAP710-PI1SCS_scs (
  Critical = 0
  SAPAdmin = pi1adm
  SAPAdminDomain = ISV-DOMAIN
  SAPAdminPassword = HVNtKVkRWnINjNKnL
  SAPHome = "E:\\usr\\sap\\PI1\\ASCS20\\exe"
  SAPHost = sappi1scs
  SAPMonHome = "E:\\usr\\sap\\PI1\\ASCS20\\exe"
  SAPServiceUser = SAPServicePI1
  SAPSID = PI1
  InstName = ASCS20
  InstProfile = "\\\\sappi1scs\\sapmnt\\PI1\\SYS\\profile\\
  PI1_ASCS20_sappi1scs"
  InstType = ENQUEUE
  ProcMon = { "msg_server.exe", "enserver.exe" }
  SecondLevelMonitor = 1
  )
```

## Sample SAP Enqueue Replication server instance

An excerpt of the main.cf file for a SAP Enqueue Replication server instance is as follows.

```
SAPWebAS SAP710-PI1ERS_ers (
  Critical = 0
  SAPAdmin = pi1adm
  SAPAdminDomain = ISV-DOMAIN
  SAPAdminPassword = HVNtKVkRWnINjNKnL
  SAPHome = "E:\\usr\\sap\\PI1\\ERS24\\exe"
  SAPHost = sappi1ers
  SAPMonHome = "E:\\usr\\sap\\PI1\\ERS24\\exe"
  SAPServiceUser = SAPServicePI1
  SAPSID = PI1
  InstName = ERS24
  InstProfile = "\\\\sappi1scs\\sapmnt\\PI1\\SYS\\profile\\
  PI1_ERS24_sappi1ers"
  InstType = ENQREP
  ProcMon = { "enrepserver.exe" }
  EnqSrvResName = SAP710-PI1SCS_scs
  SecondLevelMonitor = 1
  )
```

# Sample service group configuration for ABAP and Java Usage types

The service group configuration in a cluster depends on some common characteristics that must be part of the configuration design.

These characteristics include the following:

- The SAP application server must be dependent on the database server
- Each SAP instance (Application Server, Enqueue, and Enqueue Replication) should have a separate virtual IP address assigned to facilitate network transparency.
- Each SAP instance (Application Server, Enqueue and Enqueue Replication) should be placed on shared disk to facilitate cluster node transparency.

- Common file systems to include the profile, global and transaction file systems should be managed from one or more shared disk objects. These systems must be available to the SAP application via UNC path with SAPGLOBALHOST.

Figure A-1 shows the service group configuration for Application Server

**Figure A-1** Service group configuration for Application Server

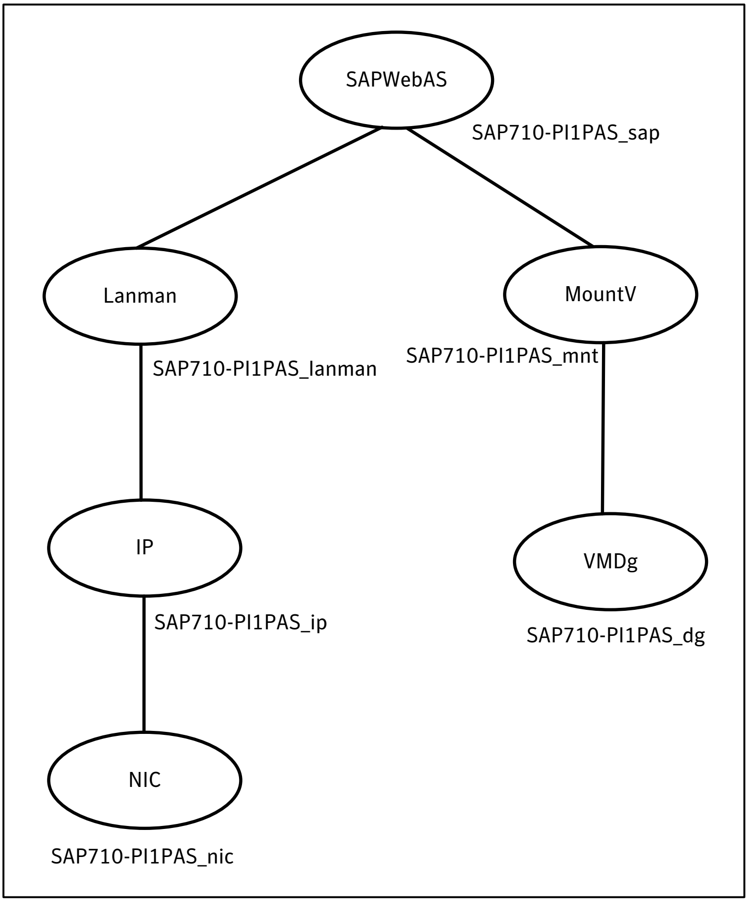


Figure A-2 shows the service group configuration for SAP Central services instance

**Figure A-2** Service group configuration for SAP Central services instance

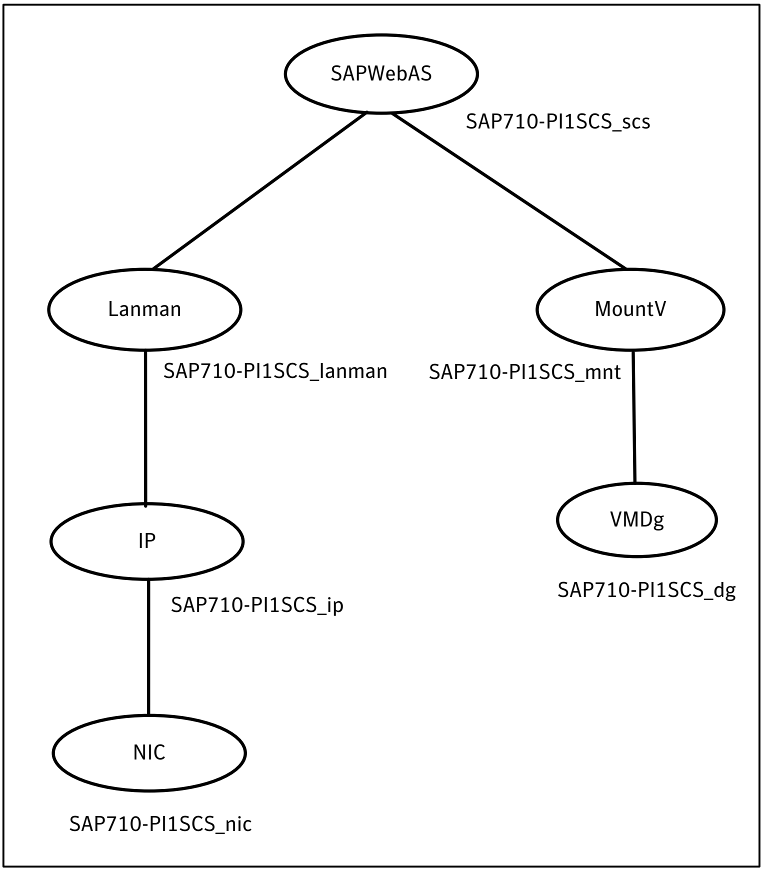
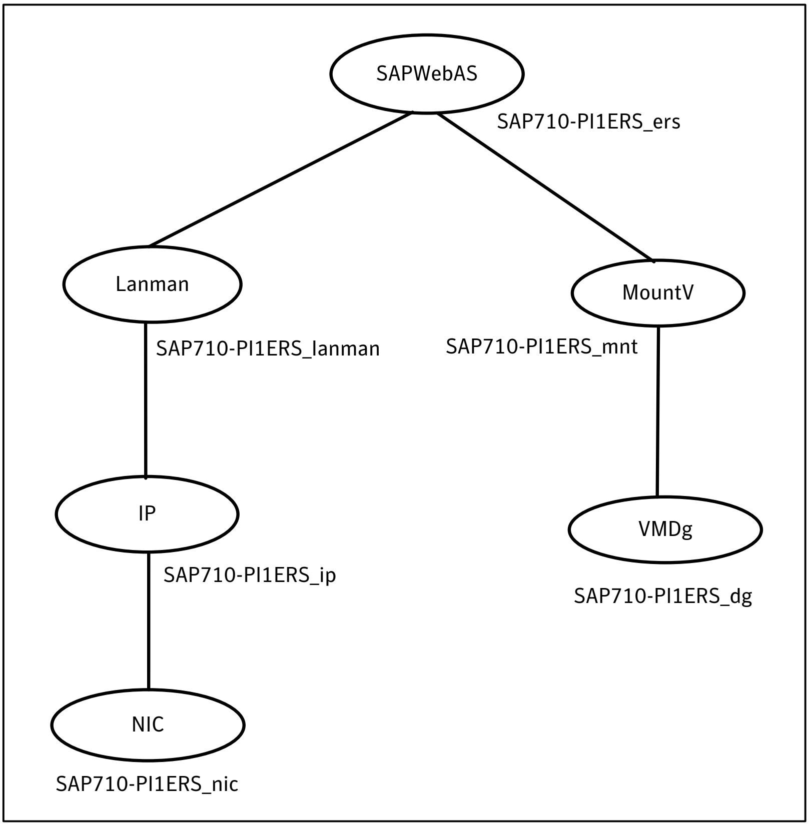


Figure A-3 shows the service group configuration for Enqueue Replication Server instance

**Figure A-3** Service group configuration for Enqueue Replication Server instance



# Sample service group configurations for SAP system on Windows Server 2008

This section provides the sample service group configurations and resource dependency diagrams for SAP systems on Windows Server 2008.

## Sample configuration for SAP Central Services Instances service group for Add-In installation Usage Type

This section provides the VCS main.cf for SAP Central Services Instances service group for Add-In installation Usage Type.

```
group SAP-PI3SCS (
 SystemList = { SysA = 0, SysB = 1 }
 )
 FileShare SAP-PI3SCS_sapmnt_FS (
  PathName = "\\usr\\sap"
  ShareName = sapmnt
  LanmanResName = SAP-PI3SCS_Lanman
  MountResName = SAP-PI3SCS_H_MountV
  UserPermissions = { "'SAP_LocalAdmin'" = FULL_CONTROL,
    "'Administrators'" = FULL_CONTROL,
    "'SYMCORP\\SAP_PI3_GlobalAdmin'" = FULL_CONTROL,
    "'SAP_PI3_LocalAdmin'" = FULL_CONTROL }
  )
 IP SAP-PI3SCS_IP (
  Address = "10.209.70.30"
SubNetMask = "255.255.252.0"
  MACAddress = "00-15-17-63-45-92"
  )
 Lanman SAP-PI3SCS_Lanman (
  VirtualName = sappi3scs
  IPResName = SAP-PI3SCS_IP
  )
 MountV SAP-PI3ASCS_MountV (
  MountPath = "I:\\usr\\sap\\PI3\\ASCS29"
  VolumeName = PI3ASCS_vol
  VMDGResName = SAP-PI3ASCS_VMDg
  )
 MountV SAP-PI3SCS_MountV (
  MountPath = "I:\\usr\\sap\\PI3\\SCS30"
  VolumeName = PI3SCS_vol
  VMDGResName = SAP-PI3SCS_VMDg
  )
 MountV SAP-PI3SCS_I_MountV (
  MountPath = "I:"
  VolumeName = PI3SCS_I_vol
  VMDGResName = SAP-PI3SCS_I_VMDg
  )
 MountV SAP-PI3SYS_MountV (
  MountPath = "I:\\usr\\sap\\PI3\\SYS"
  VolumeName = PI3SYS_vol
  VMDGResName = SAP-PI3SYS_VMDg
  )
 NIC SAP-PI3SCS_NIC (
  MACAddress = "00-15-17-63-45-92"
  )
 SAPWebAS SAP-PI3ASCS_SAPWebAS (
  SAPSID = PI3
  SAPHome = "I:\\usr\\sap\\PI3\\ASCS29\\exe"
  SAPMonHome = "I:\\usr\\sap\\PI3\\ASCS29\\exe"
  SAPHost = sappi3scs
  ProcMon = { "msg_server.exe", "enserver.exe" }
  SAPServiceUser = SAPServicePI3
  SAPAdminDomain = SYMCORP
  SAPAdmin = pi3adm
  SAPAdminPassword = AFkl41nmqdaou
  InstType = ENQUEUE
  InstName = ASCS29
  InstProfile = "I:\\usr\\sap\\PI3\\SYS\\profile\\PI3_ASCS29_sappi3scs"
  )
 SAPWebAS SAP-PI3SCS_SAPWebAS (
  SAPSID = PI3
  SAPHome = "I:\\usr\\sap\\PI3\\SCS30\\exe"
  SAPMonHome = "I:\\usr\\sap\\PI3\\SCS30\\exe"
SAPHost = sappi3scs
  ProcMon = { "msg_server.exe", "enserver.exe" }
  SAPServiceUser = SAPServicePI3
  SAPAdminDomain = SYMCORP
  SAPAdmin = pi3adm
  SAPAdminPassword = AFkl41nmqdaou
  InstType = ENQUEUE
  InstName = SCS30
  InstProfile = "I:\\usr\\sap\\PI3\\SYS\\profile\\PI3_SCS30_sappi3scs"
  )
 VMDg SAP-PI3SCS_I_VMDg (
  DiskGroupName = PI3SCS_I_dg
  )
 VMDg SAP-PI3ASCS_VMDg (
  DiskGroupName = PI3ASCS_dg
  )
 VMDg SAP-PI3SCS_VMDg (
  DiskGroupName = PI3SCS_dg
  )
 VMDg SAP-PI3SYS_VMDg (
  DiskGroupName = PI3SYS_dg
  )
 SAP-PI3SCS_sapmnt_FS requires SAP-PI3SCS_Lanman
```

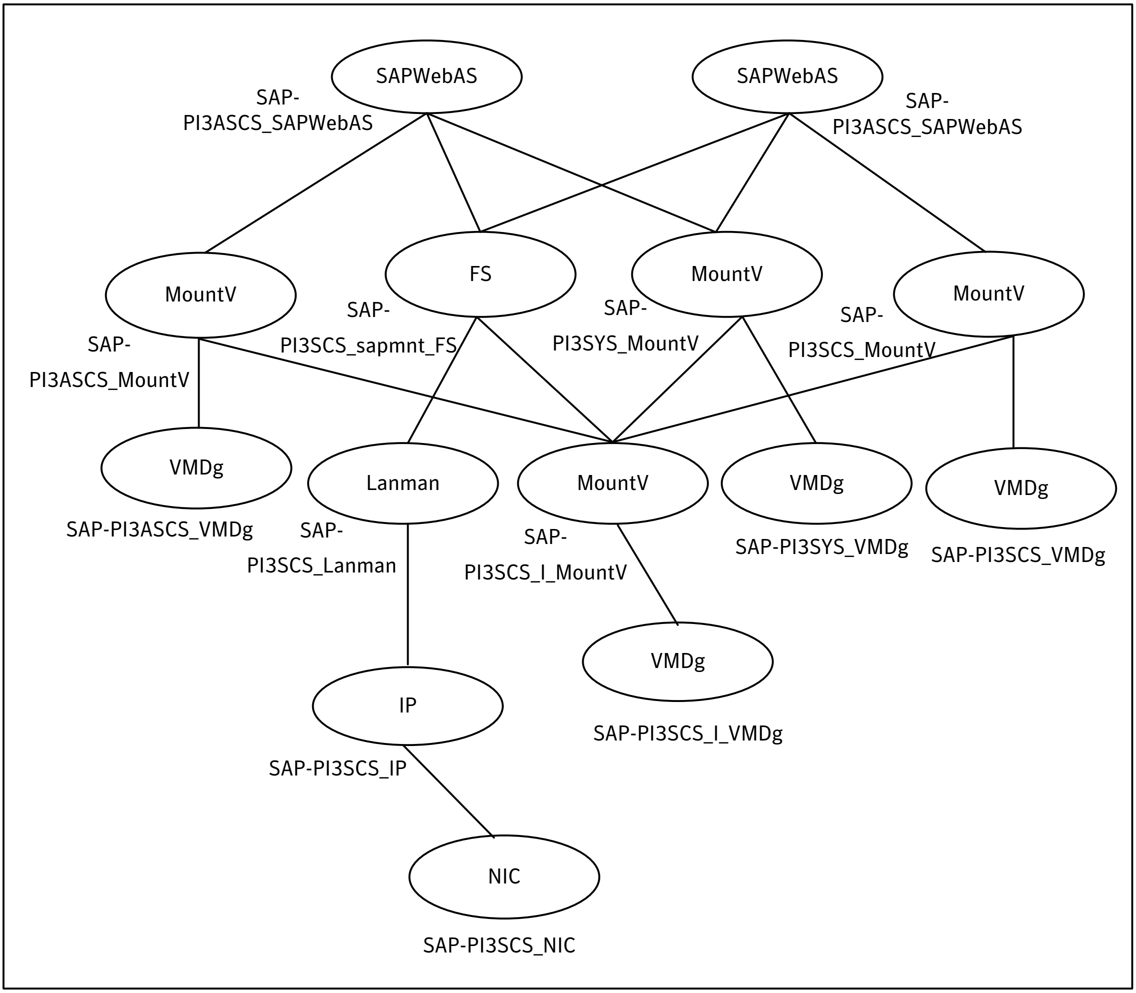
```
SAP-PI3SCS_sapmnt_FS requires SAP-PI3SCS_I_MountV
SAP-PI3SCS_IP requires SAP-PI3SCS_NIC
SAP-PI3SCS_Lanman requires SAP-PI3SCS_IP
SAP-PI3ASCS_MountV requires SAP-PI3SCS_I_MountV
SAP-PI3ASCS_MountV requires SAP-PI3ASCS_VMDg
SAP-PI3SCS_MountV requires SAP-PI3SCS_I_MountV
SAP-PI3SCS_MountV requires SAP-PI3SCS_VMDg
SAP-PI3SCS_I_MountV requires SAP-PI3SCS_I_VMDg
SAP-PI3SYS_MountV requires SAP-PI3SCS_I_MountV
SAP-PI3SYS_MountV requires SAP-PI3SYS_VMDg
SAP-PI3ASCS_SAPWebAS requires SAP-PI3SCS_sapmnt_FS
SAP-PI3ASCS_SAPWebAS requires SAP-PI3ASCS_MountV
SAP-PI3ASCS_SAPWebAS requires SAP-PI3SYS_MountV
SAP-PI3SCS_SAPWebAS requires SAP-PI3SCS_sapmnt_FS
SAP-PI3SCS_SAPWebAS requires SAP-PI3SCS_MountV
SAP-PI3SCS_SAPWebAS requires SAP-PI3SYS_MountV

// resource dependency tree
//
// group SAP-PI3SCS
// {
// SAPWebAS SAP-PI3ASCS_SAPWebAS
//     {
//     FileShare SAP-PI3SCS_sapmnt_FS
//         {
//         Lanman SAP-PI3SCS_Lanman
//             {
//             IP SAP-PI3SCS_IP
//                 {
//                 NIC SAP-PI3SCS_NIC
//                 }
//             }
//         MountV SAP-PI3SCS_I_MountV
//             {
//             VMDg SAP-PI3SCS_I_VMDg
//             }
//         }
//     MountV SAP-PI3ASCS_MountV
//         {
//         MountV SAP-PI3SCS_I_MountV
//             {
//             VMDg SAP-PI3SCS_I_VMDg
//             }
//          VMDg SAP-PI3ASCS_VMDg
//          }
//      MountV SAP-PI3SYS_MountV
//          {
//          MountV SAP-PI3SCS_I_MountV
//              {
//              VMDg SAP-PI3SCS_I_VMDg
//              }
//          VMDg SAP-PI3SYS_VMDg
//          }
//      }
// SAPWebAS SAP-PI3SCS_SAPWebAS
//      {
//      FileShare SAP-PI3SCS_sapmnt_FS
//          {
//          Lanman SAP-PI3SCS_Lanman
//              {
//              IP SAP-PI3SCS_IP
//                  {
//                  NIC SAP-PI3SCS_NIC
//                  }
//              }
//          MountV SAP-PI3SCS_I_MountV
//              {
//              VMDg SAP-PI3SCS_I_VMDg
//              }
//          }
//      MountV SAP-PI3SCS_MountV
//          {
//          MountV SAP-PI3SCS_I_MountV
//              {
//              VMDg SAP-PI3SCS_I_VMDg
//              }
//          VMDg SAP-PI3SCS_VMDg
//          }
//      MountV SAP-PI3SYS_MountV
//          {
//          MountV SAP-PI3SCS_I_MountV
//              {
//              VMDg SAP-PI3SCS_I_VMDg
//              }
//          VMDg SAP-PI3SYS_VMDg
//          }
//          }
//  }
```

## Sample resource dependency for SAP Central Services Instances service group for Add-In installation usage type

Figure A-4 shows the sample resource dependency diagram for SAP Central Services Instances service group for Add-In installation Usage Type on a Windows 2008 Server.

**Figure A-4** Sample resource dependency diagram for SAP Central Services Instances service group for Add-In installation Usage Type on a Windows 2008 Server



## Sample configuration for SAP Enqueue Replication Server Instances service group for Add-In installation Usage Type

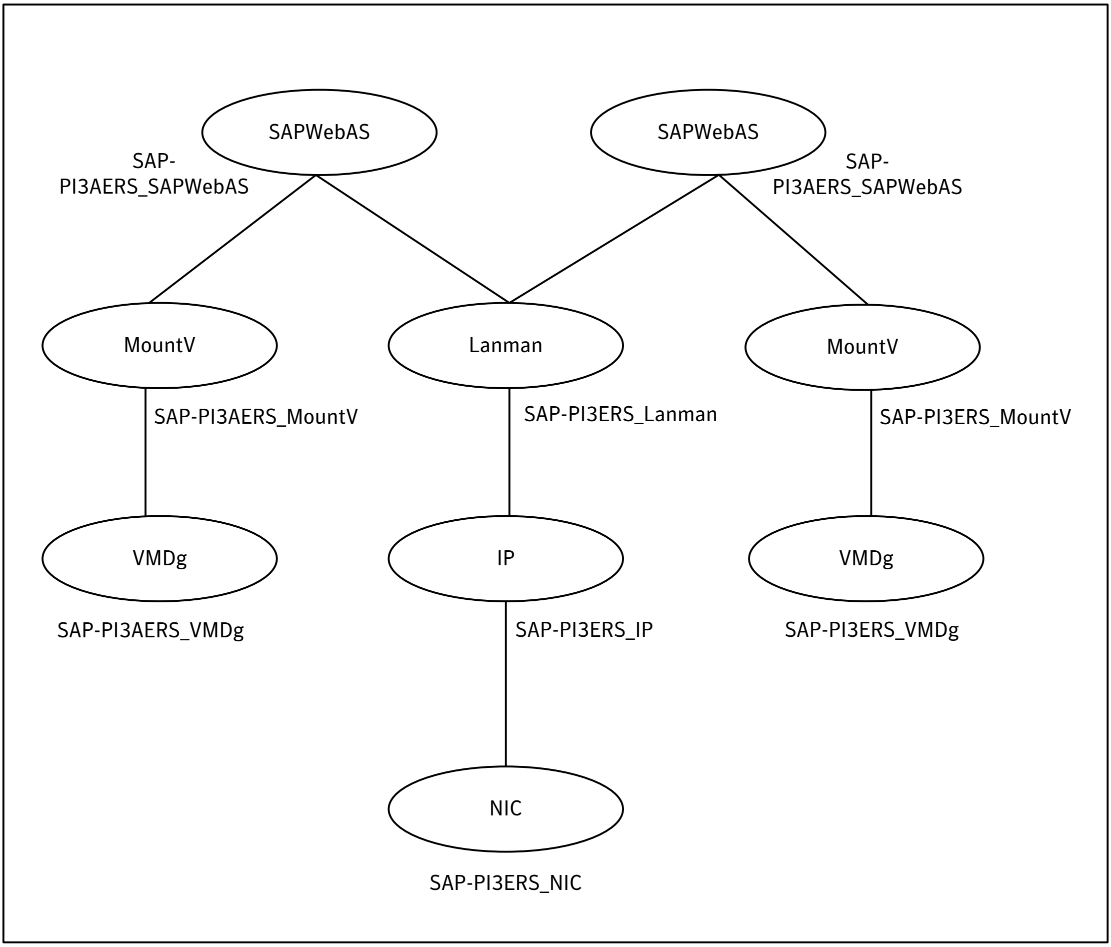
```
group SAP-PI3ERS (
 SystemList = { SysA = 0, SysB = 1 }
 )
 IP SAP-PI3ERS_IP (
  Address = "10.209.70.31"
  SubNetMask = "255.255.252.0"
  MACAddress = "00-15-17-63-45-92"
  )
 Lanman SAP-PI3ERS_Lanman (
  VirtualName = sappi3ers
IPResName = SAP-PI3ERS_IP
  )
 MountV SAP-PI3AERS_MountV (
  MountPath = "C:\\usr\\sap\\PI3\\ERS31"
  VolumeName = PI3AERS_vol
  VMDGResName = SAP-PI3AERS_VMDg
  )
 MountV SAP-PI3ERS_MountV (
  MountPath = "C:\\usr\\sap\\PI3\\ERS32"
  VolumeName = PI3ERS_vol
  VMDGResName = SAP-PI3ERS_VMDg
  )
 NIC SAP-PI3ERS_NIC (
  MACAddress = "00-15-17-63-45-92"
  )
 SAPWebAS SAP-PI3AERS_SAPWebAS (
  SAPSID = PI3
  SAPHome = "C:\\usr\\sap\\PI3\\ERS31\\exe"
  SAPMonHome = "C:\\usr\\sap\\PI3\\ERS31\\exe"
  SAPHost = sappi3ers
  ProcMon = { "enrepserver.exe" }
  SAPServiceUser = SAPServicePI3
  SAPAdminDomain = SYMCORP
  SAPAdmin = pi3adm
  SAPAdminPassword = AFkl41nmqdaou
  InstType = ENQREP
  InstName = ERS31
  InstProfile = "\\\\sappi3scs\\sapmnt\\
  PI3\\SYS\\profile\\PI3_ERS31_sappi3ers"
  EnqSrvResName = SAP-PI3ASCS_SAPWebAS
  )
 SAPWebAS SAP-PI3ERS_SAPWebAS (
  SAPSID = PI3
  SAPHome = "C:\\usr\\sap\\PI3\\ERS32\\exe"
  SAPMonHome = "C:\\usr\\sap\\PI3\\ERS32\\exe"
  SAPHost = sappi3ers
  ProcMon = { "enrepserver.exe" }
  SAPServiceUser = SAPServicePI3
  SAPAdminDomain = SYMCORP
  SAPAdmin = pi3adm
  SAPAdminPassword = AFkl41nmqdaou
  InstType = ENQREP
  InstName = ERS32
  InstProfile = "\\\\sappi3scs\\sapmnt\\
  PI3\\SYS\\profile\\PI3_ERS32_sappi3ers"
  EnqSrvResName = SAP-PI3SCS_SAPWebAS
  )
 VMDg SAP-PI3AERS_VMDg (
  DiskGroupName = PI3AERS_dg
  )
VMDg SAP-PI3ERS_VMDg (
  DiskGroupName = PI3ERS_dg
  )
 SAP-PI3ERS_IP requires SAP-PI3ERS_NIC
 SAP-PI3ERS_Lanman requires SAP-PI3ERS_IP
 SAP-PI3AERS_MountV requires SAP-PI3AERS_VMDg
 SAP-PI3ERS_MountV requires SAP-PI3ERS_VMDg
 SAP-PI3AERS_SAPWebAS requires SAP-PI3AERS_MountV
 SAP-PI3AERS_SAPWebAS requires SAP-PI3ERS_Lanman
 SAP-PI3ERS_SAPWebAS requires SAP-PI3ERS_MountV
 SAP-PI3ERS_SAPWebAS requires SAP-PI3ERS_Lanman

 // resource dependency tree
 //
 // group SAP-PI3ERS
 // {
 // SAPWebAS SAP-PI3AERS_SAPWebAS
 //     {
 //     MountV SAP-PI3AERS_MountV
 //         {
 //         VMDg SAP-PI3AERS_VMDg
 //         }
 //     Lanman SAP-PI3ERS_Lanman
 //         {
 //         IP SAP-PI3ERS_IP
 //             {
 //             NIC SAP-PI3ERS_NIC
 //             }
 //         }
 //     }
 // SAPWebAS SAP-PI3ERS_SAPWebAS
 //     {
 //     MountV SAP-PI3ERS_MountV
 //         {
 //         VMDg SAP-PI3ERS_VMDg
 //         }
 //     Lanman SAP-PI3ERS_Lanman
 //         {
 //         IP SAP-PI3ERS_IP
 //             {
 //             NIC SAP-PI3ERS_NIC
 //             }
 //         }
 //     }
 // }
```

## Sample resource dependency for SAP Enqueue Replication Server Instances service group for Add-In installation Usage Type

Figure A-5 shows the sample resource group dependency for SAP Enqueue Replication Server Instances service group for Add-In installation Usage Type

**Figure A-5** Sample resource group dependency for SAP Enqueue Replication Server Instances service group for Add-In installation Usage Type

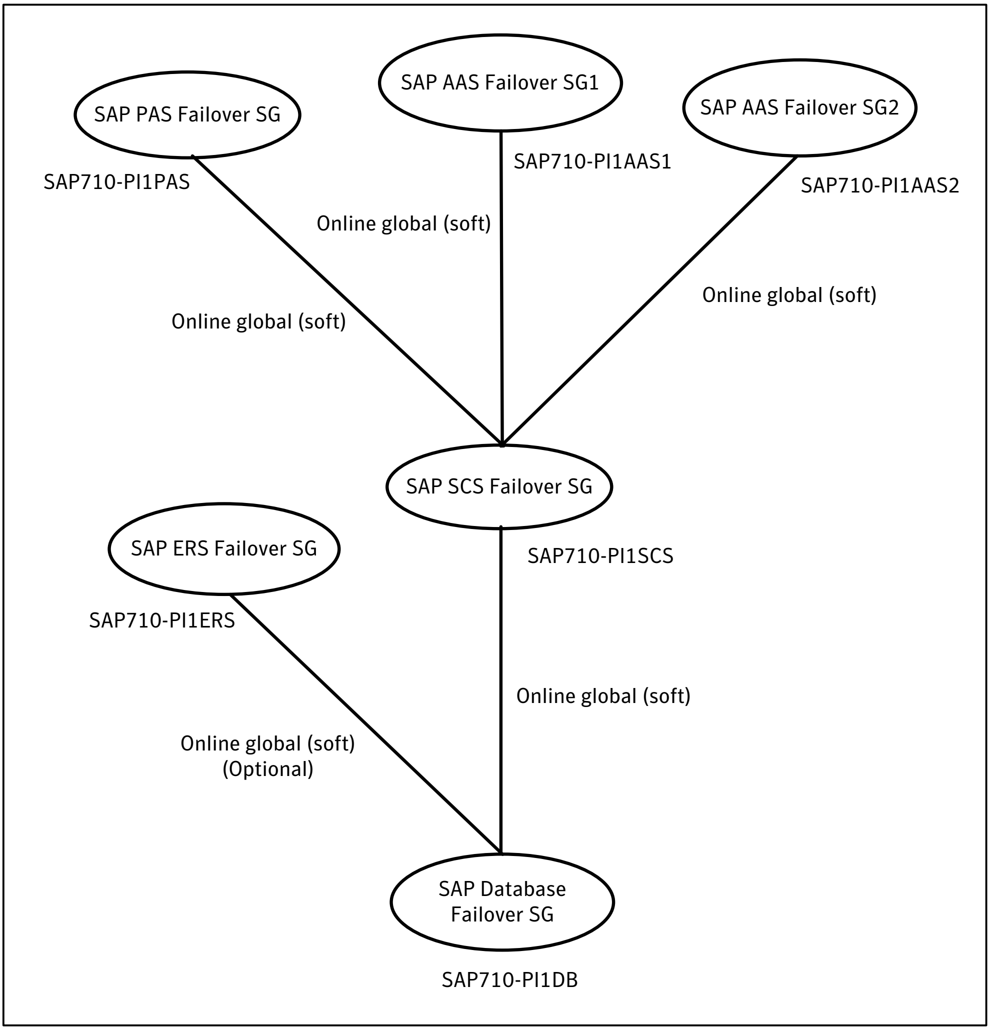


# Sample service group dependency for SAP WebAS

This section includes service groups that show the group dependency for SAP WebAS.

Figure A-6 shows the sample service group dependency

**Figure A-6** Sample service group dependency



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