

# Symantec™ High Availability Agent for SAP NetWeaver Installation and Configuration Guide

AIX, HP-UX, Linux, Solaris

5.0

# Symantec High Availability Agent for SAP NetWeaver Installation and Configuration Guide

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# Contents

Technical Support .....	4	
Chapter 1	Introducing the Symantec High Availability Agent for SAP NetWeaver .....	11
	About the Symantec High Availability agent for SAP NetWeaver .....	11
	What's new in this agent .....	12
	Supported software .....	12
	How the agent makes SAP NetWeaver highly available .....	12
	High availability for SAP NetWeaver instances running in Solaris zones .....	13
	SAP NetWeaver agent functions .....	13
	Online .....	14
	Offline .....	14
	Monitor .....	15
	Clean .....	15
	Typical SAP server configuration in a VCS cluster .....	16
	Setting up SAP NetWeaver in a VCS cluster .....	17
Chapter 2	Installing and configuring SAP NetWeaver for high availability .....	18
	About SAP NetWeaver .....	18
	SAP system components .....	19
	SAP architecture .....	19
	Single Point of Failures (SPOF) .....	23
	About SAPCPE .....	23
	Uniquely identifying SAP NetWeaver server instances .....	24
	Monitoring an SAP instance .....	25
	About installing SAP NetWeaver for high availability .....	26
	About configuring SAP NetWeaver for high availability .....	27
	Configuring SAP server instances for cluster support .....	27
	Synchronizing accounts and services .....	27
	Removing physical host dependencies from environment setup scripts .....	28
	Removing physical host dependencies from profile file names .....	29

Removing physical host dependencies from profiles .....	30
Installing SAP using SAPINST_USE_HOSTNAME .....	30
Clustering shared file systems .....	31
For Oracle databases only .....	31
For non-Oracle databases .....	31
For other application servers .....	31
Configuring the SAP NetWeaver agent for message server	
restart .....	32
Setting up zones on Solaris for SAP Enqueue and Enqueue Replication	
Servers .....	33
Configuring CCMS Monitoring Agent for SAP instance .....	36
Functional principle of CCMS Agents .....	36
Prerequisites for installing and registering the CCMS Monitoring	
Agent .....	38
Configuring CCMS Agents to work with the Symantec high	
availability agent for SAP NetWeaver .....	39
Configuring the Enqueue Replication Server for SAP NetWeaver .....	41

## Chapter 3      Installing, upgrading, and removing the agent for SAP NetWeaver .....

Before you install the Symantec High Availability agent for SAP	
NetWeaver .....	46
Prerequisites for enabling i18n support .....	47
Prerequisites for installing the agent to support Solaris	
zones .....	47
About the ACC library .....	48
Installing the ACC library .....	48
Installing the agent in a VCS environment .....	49
Installing the agent in a non-global zone on Solaris 11 .....	50
Uninstalling the agent in a VCS environment .....	51
Removing the ACC library .....	52
Upgrading the agent in a VCS environment .....	52

## Chapter 4      Configuring the agent for SAP NetWeaver .....

About configuring the Symantec High Availability agent for SAP	
NetWeaver .....	55
Importing the agent types files in a VCS environment .....	56
SAP NetWeaver agent attributes .....	57
Setting the SAPMonHome attribute .....	62
Executing a customized monitoring program .....	63
Preventing early faulting of Java and Add-in instances .....	64
Using Perl in the VCS 3.5 environment .....	64



	Copying ag_i18n_inc.pm module for VCS 3.5 .....	65
Chapter 5	Configuring the service groups for SAP NetWeaver using the CLI .....	66
	About configuring service groups for SAP NetWeaver .....	66
	Before configuring the service groups for SAP NetWeaver .....	67
	Configuring service groups for SAP NetWeaver .....	67
	Creating Service Groups for Enqueue and Enqueue Replication Server under Solaris non-global zones .....	69
	Mounting NFS file system inside Solaris non-global zone .....	79
	Generating environments file for SAP .....	81
	Configuring SAPNW04 preonline script .....	82
Chapter 6	Troubleshooting the agent for SAP NetWeaver .....	88
	Using the correct software and operating system versions .....	88
	Meeting prerequisites .....	89
	Configuring SAP server resources .....	89
	Starting the SAP server instance outside a cluster .....	89
	Reviewing error log files .....	91
	Using SAP server log files .....	91
	Reviewing cluster log files .....	91
	Using trace level logging .....	91
	Using trace level logging for preonline trigger .....	92
	Checks for an SAP Java Add-in instance .....	93
	Configuration checks for Solaris zones support .....	94
	Configuration checks for using the agent in the VCS 3.5 environment .....	94
	Handling the pkgadd and pkgrm script errors for Solaris non-global zones .....	95
Appendix A	Sample Configurations .....	97
	About sample configurations for the agent for SAP NetWeaver .....	97
	Sample agent type definition for SAP NetWeaver .....	97
	Sample SAP resource configuration .....	98
	Sample SAP Central instance .....	98
	Sample SAP Dialog instance .....	99
	Sample SAP Enqueue Server instance .....	99
	Sample SAP Enqueue Replication Server instance .....	100
	Sample service group configuration for ABAP and Java architectures .....	100

	Sample service group configuration for Add-in (ABAP + Java ) installation type .....	104
	Sample SAP NetWeaver service group configurations for Solaris zone support .....	107
	Sample service group dependency for SAP NetWeaver .....	111
Appendix B	Changes introduced in previous releases .....	113
	Changes introduced in previous releases .....	113
Index .....		115

# Introducing the Symantec High Availability Agent for SAP NetWeaver

This chapter includes the following topics:

- [About the Symantec High Availability agent for SAP NetWeaver](#)
- [What's new in this agent](#)
- [Supported software](#)
- [How the agent makes SAP NetWeaver highly available](#)
- [SAP NetWeaver agent functions](#)
- [Typical SAP server configuration in a VCS cluster](#)
- [Setting up SAP NetWeaver in a VCS cluster](#)

## About the Symantec High Availability agent for SAP NetWeaver

Symantec 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 Symantec High Availability agent for SAP NetWeaver provides high availability for SAP R/3 and SAP NetWeaver in a cluster. The agent for SAP NetWeaver is designed to support a wide range of SAP environments, including the traditional Basis architecture and the SAP J2EE Web Application Server architecture

(NetWeaver). The agent also supports standalone Enqueue servers in a distributed SAP installation.

See the Agent Pack Release Notes for the latest updates or software issues for this agent.

The Symantec High Availability agent for SAP NetWeaver brings SAP instances online, monitors the instances, and bring the instances offline. The agent monitors the system processes and server states, and can shutdown the server in case of a fault.

The SAP instances are as follows:

- Central instance
- Dialog instance
- Standalone Enqueue Server
- Enqueue Replication Server

The agent supports the following SAP Web Application Server architectures:

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

## What's new in this agent

The enhancement in this release of the SAP NetWeaver agent is as follows:

- The agent now also supports Solaris 11.

For information on the changes introduced in the previous releases:

See [“Changes introduced in previous releases”](#) on page 113.

## Supported software

For information on the software versions that the Symantec High Availability agent for SAP NetWeaver supports, see the Symantec Operations Readiness Tools (SORT) site: <https://sort.symantec.com/agents>.

## How the agent makes SAP NetWeaver highly available

The Symantec High Availability agent for SAP NetWeaver 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 the 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 instances.

## High availability for SAP NetWeaver instances running in Solaris zones

Solaris provides a means of virtualizing operating system services, allowing one or more processes to run in isolation from other activity on the system. Such a 'sandbox' is called a 'non-global zone'. Each zone can provide a rich and customized set of services. The processes that run in a 'global zone' have the same set of privileges that are available on a Solaris system today.

VCS provides high availability to applications running in non-global zones by extending the failover capability to zones. VCS is installed in a global zone, and all the agents and the engine components run in the global zone. For applications running within non-global zones, agents run script entry points inside the zones. If a zone configured under VCS control faults, VCS fails over the entire service group containing the zone.

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

See ["Setting up zones on Solaris for SAP Enqueue and Enqueue Replication Servers"](#) on page 33.

The Symantec High Availability agent for SAP NetWeaver is zone-aware and can monitor SAP instances running in non-global zones.

## SAP NetWeaver agent functions

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

## Online

The online function performs the following tasks:

- Performs a preliminary check to ensure that the SAP instance is not online on the specified node in the cluster.
- Removes any SAP processes that remain because of an unclean shutdown as follows:
  - If the SAP instance is Central, Dialog or [A|J]ENQREP, the `cleanipc` utility gets executed. Otherwise, the agent kills all relevant SAP processes.
  - If the `kill.sap` file exists in the `/usr/sap/SAPSID/InstName/work` directory, the function removes the file from the directory.
  - Removes the SE and CO locks files from the `/usr/sap/SAPSID/InstName/data` directory.
- Initiates the standard SAP error log process.
- Starts the SAP O/S Collector that pipes the standard output and standard error messages to the SAP error log file.
- Starts the SAP instance using the `sapstart` command.
- Ensures that the instance is fully initialized.

## Offline

The offline function performs the following tasks:

- Sends a SIGINT signal to the `sapstart` process, if the process exists. Otherwise, the function sends a SIGINT signal to all running processes that are relevant to the specified SAP instance.
- Waits for the SAP instance to go offline successfully.
- Ensures that no relevant SAP processes are running. If any processes remain, the operation kills the remaining processes using a SIGKILL signal.
- If the `kill.sap` file exists in the `/usr/sap/SAPSID/InstName/work` directory, the operation removes the file from the directory.
- Removes the SE and CO locks files from the `/usr/sap/SAPSID/InstName/data` directory.
- If the SAP instance is Central, Dialog, or [A|J]ENQREP the operation executes the `cleanipc` utility.
- Augments the SAP log, with the shutdown information.

## Monitor

The monitor function monitors the state of the SAP instance on all nodes in the cluster. The function performs the following tasks:

- Depending upon the search criteria that the ProcMon attribute specifies, the monitor function scans the process table to verify the SAP instance processes are running. For more information about setting the ProcMon attribute: See [“Monitoring an SAP instance”](#) on page 25.
- If the SecondLevelMonitor attribute is greater than 0, the monitor function performs a thorough health check of the SAP instance as follows:
  - For Central or Dialog instances, the function uses the following utilities to perform this check:

Server installation type	SAP utility used
SAP Web Application Server as ABAP	sapinfo and dpmon
SAP Web Application Server as Java	jcmon
SAP Web Application Server as Java Add-In	sapinfo, dpmon, jcmon and msprot

- For Enqueue Server and Enqueue Replication Server instances, the function uses the `ensmon` and `msprot` utilities.
- The monitor function executes a custom monitor utility.  
 See [“Executing a customized monitoring program”](#) on page 63.

## Clean

The clean function performs the following tasks:

- Sends a SIGINT signal to the `sapstart` process, if the process exists. Otherwise, the function sends a SIGINT signal to all running processes that are relevant to the specified SAP instance.
- Ensures that no relevant SAP processes are running. If any processes remain, the operation kills all the remaining processes using a SIGKILL signal.
- If the `kill.sap` file exists in the `/usr/sap/SAPSID/InstName/work` directory, the operation removes the file from the directory.
- Removes the SE and CO lock files from the `/usr/sap/SAPSID/InstName/data` directory.

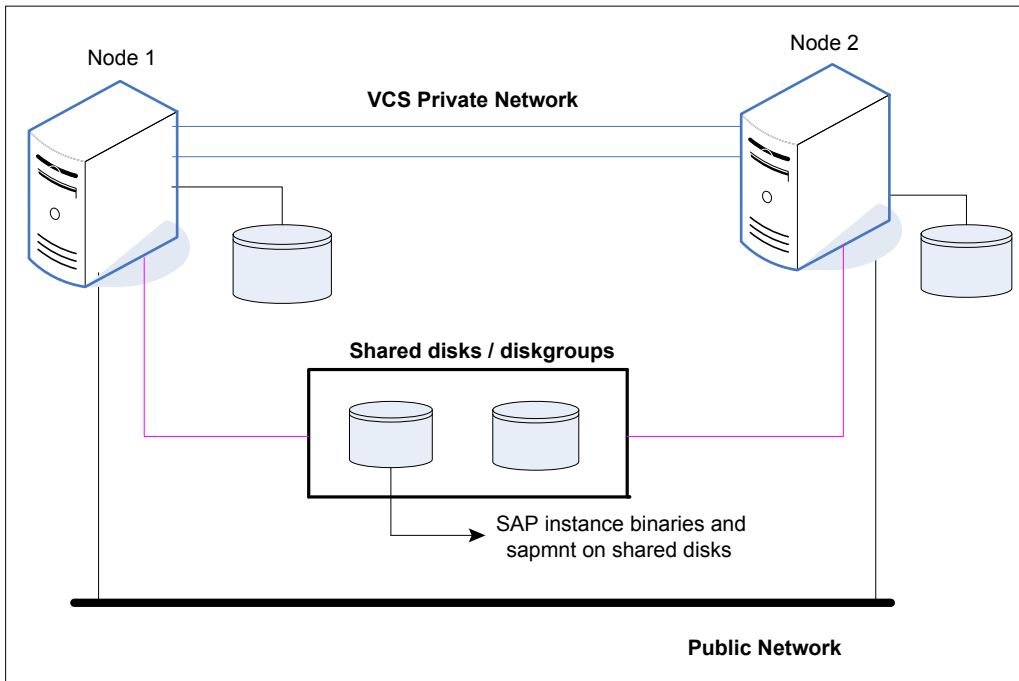
- If the SAP Instance is a Central, Dialog, or [A]JENQREP instance, the operation executes the `cleanipc` utility.
- Augments the SAP log.

## Typical SAP server configuration in a VCS cluster

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

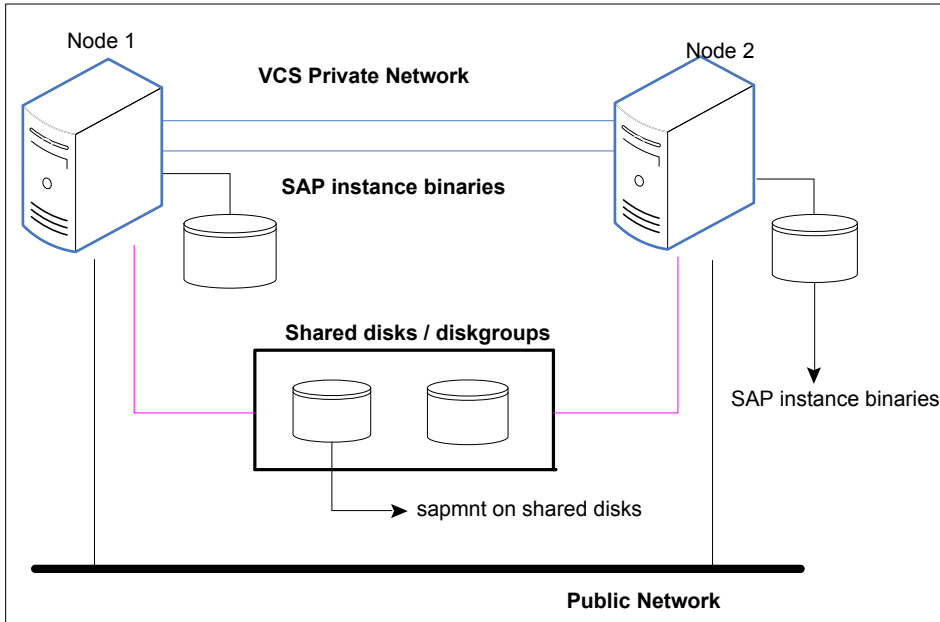
- VCS is installed and configured in a two-node cluster.
- The `sapmnt` directory is installed on shared storage and mounted on all the nodes in the cluster via Network File System (NFS) or Cluster File System (CFS).
- The SAP NetWeaver instance binaries are installed locally on both nodes or on shared disks.
- The Symantec High Availability agent for SAP NetWeaver is installed on the both nodes.

**Figure 1-1** depicts a configuration where SAP server instance binaries and `sapmnt` are installed completely on shared disks.





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



## Setting up SAP NetWeaver in a VCS cluster

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

- Set up a VCS cluster.  
Refer to the *Symantec Cluster Server Installation Guide* for more information on installing and configuring VCS.
- Install and configure SAP NetWeaver for High Availability.  
See [“About installing SAP NetWeaver for high availability”](#) on page 26.  
See [“About configuring SAP NetWeaver for high availability”](#) on page 27.
- Install the Symantec High Availability agent for SAP NetWeaver.  
See [“Installing the agent in a VCS environment”](#) on page 49.
- Configure the service groups for SAP NetWeaver.  
See [“About configuring service groups for SAP NetWeaver”](#) on page 66.

# Installing and configuring SAP NetWeaver for high availability

This chapter includes the following topics:

- [About SAP NetWeaver](#)
- [Uniquely identifying SAP NetWeaver server instances](#)
- [Monitoring an SAP instance](#)
- [About installing SAP NetWeaver for high availability](#)
- [About configuring SAP NetWeaver for high availability](#)
- [Configuring SAP server instances for cluster support](#)
- [Clustering shared file systems](#)
- [Configuring the SAP NetWeaver agent for message server restart](#)
- [Setting up zones on Solaris for SAP Enqueue and Enqueue Replication Servers](#)
- [Configuring CCMS Monitoring Agent for SAP instance](#)
- [Configuring the Enqueue Replication Server for SAP NetWeaver](#)

## About SAP NetWeaver

All SAP NetWeaver components (example, BI, XI, EP ) run on top of the SAP NetWeaver Application Server.

The following SAP system installations are possible with SAP NetWeaver Application Server (AS):

- SAP NetWeaver Application Server ABAP (ABAP only)
- SAP NetWeaver AS Java (Java only)
- SAP NetWeaver Application Server Add-In (ABAP and Java)

Depending on the SAP NetWeaver component to be installed, the Web Application Server type is determined. For example, SAP NetWeaver EP 6.0 requires a Java stack, hence SAP NetWeaver AS Java (or Add-In) needs to be installed. SAP NetWeaver XI 3.0 requires SAP NetWeaver AS Add-In.

## 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 Instance (DVEBMGSxx or JCxx)
- Central Services Instance (SCSxx or ASCSxx)
- Enqueue Replication Server (ERSxx)
- Dialog Instance (Dxx or Jxx)
- 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 NetWeaver AS ABAP	Central Instance Dialog Instance	ABAP Dispatcher	<ul style="list-style-type: none"> <li>■ Controls program that manages the resources of the R/3 applications.</li> <li>■ Balances assignment of the transaction load to the work processes.</li> <li>■ Manages buffers in main memory.</li> <li>■ Manages connections with the presentation level.</li> <li>■ Organizes the communication processes.</li> </ul>
		ABAP Work processes	<ul style="list-style-type: none"> <li>■ Acts as a service offered by a server and requested by a client</li> <li>■ Acts as a special program in charge of some specific tasks.</li> </ul>
	Central Services Instance	ABAP Enqueue Service	<ul style="list-style-type: none"> <li>■ Manages logical locks.</li> <li>■ Ensures server synchronization.</li> </ul>
		ABAP Message Service	<ul style="list-style-type: none"> <li>■ Central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.</li> <li>■ Provides cluster state information to SAP Web Dispatcher.</li> <li>■ Keeps a list of application servers that can be reached within the system.</li> </ul>
	Enqueue Replication Instance	ABAP Enqueue Replication Service	Enables the lock table to be replicated on a second server, the replication server.
SAP NetWeaver AS Java	Central Instance	Java Dispatcher	Receives client requests and forwards them to the server processes accordingly.
		Java Server Processes	Processes the requests and holds the session data.
		SDM	The Software Deployment Manager (SDM) is a tool with which you can manage and deploy software packages (Software Deployment Archives and Software Component Archives) that you receive from SAP to the Web AS Java.
	Dialog Instance	Java Dispatcher	Receives client requests and forwards them to the server processes accordingly.

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

Architecture	Component	Service	Functions
		Java Server Processes	Processes the requests and holds the session data.
	Central Services Instance	Java Enqueue Service	<ul style="list-style-type: none"> <li>■ Manages logical locks.</li> <li>■ Ensures server synchronization.</li> </ul>
		Java Message Service	<ul style="list-style-type: none"> <li>■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.</li> <li>■ Provides cluster state information to SAP Web Dispatcher.</li> <li>■ Keeps a list of application servers that can be reached within the system.</li> </ul>
	Enqueue Replication Instance	Java Enqueue Replication Service	Enables the lock table to be replicated on a second server, the replication server.
SAP NetWeaver AS Add-In	Central Instance (ABAP and Java)	ABAP Dispatcher	<ul style="list-style-type: none"> <li>■ Controls program that manages the resources of R/3 applications.</li> <li>■ Balances the assignments of the transaction load to the work processes.</li> <li>■ Manages buffer in main memory.</li> <li>■ Connects to the presentation level.</li> <li>■ Organizes the communication processes.</li> </ul>
		ABAP Work processes	<ul style="list-style-type: none"> <li>■ Acts as a service offered by a server and requested by a client.</li> <li>■ Manages the programs that handle specific tasks.</li> </ul>
		Java Dispatcher	<ul style="list-style-type: none"> <li>■ Receives client requests and accordingly forwards them to the server for further processing.</li> </ul>
		Java Server Processes	<ul style="list-style-type: none"> <li>■ Handles the client-server processes and maintains the session data.</li> </ul>
		SDM	<ul style="list-style-type: none"> <li>■ Manages the software packages received from SAP and deploys them on Web AS Java.</li> </ul>

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

Architecture	Component	Service	Functions
	Dialog Instance (ABAP and Java)	ABAP Dispatcher	<ul style="list-style-type: none"> <li>■ Controls the programs that manages the resources of R/3 applications.</li> <li>■ Balances assignment of the transaction load to the work processes.</li> <li>■ Manages buffer in main memory.</li> <li>■ Connection with the presentation level.</li> <li>■ Organizes the communication processes.</li> </ul>
		ABAP Work processes	<ul style="list-style-type: none"> <li>■ Acts as a service offered by a server and requested by a client.</li> <li>■ Acts as a special program in charge of some specific tasks.</li> </ul>
		Java Dispatcher	Receives client requests and forwards them to the server processes accordingly.
		Java Server Processes	Processes the requests and holds the session data.
	Central Services Instance ABAP	ABAP Enqueue Service	<ul style="list-style-type: none"> <li>■ Manages logical locks</li> <li>■ Ensures server synchronization</li> </ul>
		ABAP Message Service	<ul style="list-style-type: none"> <li>■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.</li> <li>■ Provides cluster state information to SAP Web Dispatcher</li> <li>■ Keeps a list of application servers that can be reached within the system.</li> </ul>
	Central Services Instance Java	Java Enqueue Service	<ul style="list-style-type: none"> <li>■ Manages logical locks.</li> <li>■ Ensures server synchronization.</li> </ul>
		Java Message Service	<ul style="list-style-type: none"> <li>■ Acts as a central service for cluster internal communication, such as event notifications, broadcasts, exchange of cache content, and so on.</li> <li>■ Provides cluster state information to SAP Web Dispatcher</li> <li>■ Keeps a list of application servers that can be reached within the system.</li> </ul>

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

Architecture	Component	Service	Functions
	Enqueue Replication Instance ABAP	ABAP Enqueue Replication Service	Enables the lock table to be replicated on a second server, the replication server.
	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 Instance
- Dialog Instance
- Central Services Instance
- Network File System

[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
Central Instance/Dialog Instance	Switch-over solutions
SAP Central File System	<ul style="list-style-type: none"><li>■ Cluster File System (CFS) by switch-over solution</li><li>■ NFS file share</li><li>■ Hardware based highly available Storage Solution</li></ul>

## About SAPCPE

SAPCPE is a generic tool developed by SAP. The SAP startup framework launches this tool before starting the actual instance.

SAPCPE is used in every high availability setup to automate the synchronization of binaries and executables from a central location (/sapmnt/<SID>/exe) to the

instance specific local disks (/usr/sap/<SID>/<InstName>/exe). The SAPCPE tool requires the list of target files to enable this synchronization.

## Uniquely identifying SAP NetWeaver 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 server instances in a single cluster.

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

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

Instance names often include an instance ID suffix which is an integer between 00-99. For example, a Central 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:

<b>SAP Instance name</b>	<b>SAP Instance type</b>
DVEBMGS00	SAP BASIS Central instance - ABAP
DVBGS01	SAP BASIS Central instance without Enqueue and ABAP Message Server
JC02	SAP Central instance - Java
ASCS03	SAP Standalone Enqueue Server or SAP Central Services-ABAP
SCS04	SAP Central Services - Java
D05	SAP Dialog instance - ABAP
J06	SAP Dialog instance - Java
ERS07	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.



---

**Note:** The instance name for Enqueue Replication Server can be REP or ERS. These two names can be interchangeably used to represent the Enqueue Replication Server.

---

## 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 installation type	SAP instance type	Value of ProcMon attribute
ABAP	Central	dw ms* ig co se gwrdr icman are optional
ABAP	Dialog	dw ig se gwrdr icman are optional
ABAP	Enqueue Server	en ms
ABAP	Enqueue Replication Server	er OR enr**
Java	Central	jc ig is optional
Java	Dialog	jc ig is optional
Java	Enqueue Server	en ms
Java	Enqueue Replication Server	er OR enr**
Add-In (ABAP +Java)	Central	dw jc ig co se gwrdr icman are optional

Table 2-3 Values of ProcMon attribute (continued)

SAP installation type	SAP instance type	Value of ProcMon attribute
Add-In (ABAP +Java)	Dialog	dw jc ig se gwrđ icman are optional
Add-In (ABAP +Java)	Enqueue Server-ABAP	en ms
Add-In (ABAP +Java)	Enqueue Replication Server-ABAP	er OR enr**
Add-In (ABAP +Java)	Enqueue Server- Java	en ms
Add-In (ABAP +Java)	Enqueue Replication Server-Java	er OR enr**

\* If a standalone Enqueue Server is configured, then ‘ms’ is not part of ProcMon attribute.

\*\* For Enqueue Replication Server, either one of the values er or enr is valid at a time, based on the Enqueue Replication Server configuration. See [“Configuring the Enqueue Replication Server for SAP NetWeaver ”](#) on page 41.

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 UNIX processes. If any process is missing, the operation declares the SAP instance as offline, and bypasses further monitor operations.

# About installing SAP NetWeaver for high availability

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

SAP instance on a shared disk	Install the SAP instance binaries and sapmnt on shared disks.
SAP instance on a local disk	Install the SAP instance binaries on each node and sapmnt on shared disks.

---

**Note:** sapmnt includes the global directory, profile directory and the exe directory for the SAP system.

---

When installing SAP NetWeaver, ensure that the login\_id, id\_name, group\_id, and group\_name for the sidadm is the same on all the nodes.

The user `sidadm` and the group `'sapsys'` must be local and not Network Information Service (NIS and NIS+) users.

For more details, refer to the SAP product documentation.

## About configuring SAP NetWeaver for high availability

The guidelines for configuring SAP NetWeaver 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 environment. 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` tool to load the executables from central file share to instance specific directory.

## Configuring SAP server instances for cluster support

This section describes pointers to configure an SAP server instance to run properly with a cluster.

### Synchronizing accounts and services

Synchronize user and group accounts as follows:

- Ensure that you synchronize the SAPAdmin account user name, UNIX uid, the group name, and UNIX gid across all nodes in the cluster.
- Verify that you either place the SAPAdmin account home directory on shared storage, or copy the home directory contents to each node.  
If you copy the home directory and place on each node, ensure that you sync the contents over time, and guarantee that the SAP environment is consistent from node to node.

Synchronize services as follows:

- Ensure that the `/etc/services` entries are consistent on all cluster nodes.

## Removing physical host dependencies from environment setup scripts

You can create a node-independent set of script files that can setup the SAP environment. You can run these files on each node in the cluster to setup identical SAP environment on all nodes.

---

**Note:** Verify that the Bourne shell and C-shell versions on each node are identical.

---

An example of a Bourne shell script to create such script files for a SAP APO module follows.

```
#!/bin/sh
# -----
# Setup the environment file list and
# determine the name of the local system
# -----
ENVFILELIST=".sapenv .apoenv .j2eeenv .dbenv"
LOCALHOSTNAME='uname -n'
# -----
# Create the backup directory
# -----
if [ ! -d ./backup ]
then
    echo "Create backup Directory"
    mkdir ./backup
fi
# -----
# loop thru the env file list and
# copy the environment setup file making
# a backup of the original
# -----
for i in $ENVFILELIST
do
    FILENAME="./${i}_${LOCALHOSTNAME}.sh"
    if [ -f ${FILENAME} ]
    then
        echo "Making backup of $FILENAME"
        cp $FILENAME ./backup/$FILENAME
        echo "Changing file name to be host independent"
        mv $FILENAME ${i}_ALLHOSTS.sh
    fi
done
```

You can also create a master environment setup script file that sources all separate setup scripts, such as `.sapenv`, `.apoenv`, `.j2eeenv`, `.dbenv`, and so on. You can configure the `EnvFile` attribute so that each agent operation uses this master script to setup the SAP environment.

A script to configure SAPAdmin accounts to use the Bourne shell as default, is provided as an example.

```
# -----
# Set the environment file list
# Determine the OS
# -----
ENVFILELIST=".sapenv .apoenv .j2eeenv .dbenv"
# -----
# loop thru the env file list and source
# the os dependent env file
# -----
for i in $ENVFILELIST
do
FILENAME="${HOME}/${i}_ALLHOSTS.sh"
if [ -f $FILENAME ]
then
. $FILENAME
fi
done
```

## Removing physical host dependencies from profile file names

Ensure that the start and instance profile names in `/usr/sap/SAPSID/SYS/profile` append the virtual host names, instead of machine dependent host name values.

An example of a profile directory populated with start and instance profiles, appended with virtual host names are as follows.

```
bash-3.00$ ls -l /sapmnt/ERP/profile/
-rw-r--r-- 1 erpadm sapsys 481 Feb 21 15:09 DEFAULT.PFL
-rw-r--r-- 1 erpadm sapsys 904 Feb 6 15:53 ERP_ASCS20_saperpasc
-rw-r--r-- 1 erpadm sapsys 420 Feb 21 15:10 ERP_D22_saperpdi
-rw-r--r-- 1 erpadm sapsys 485 Feb 20 17:56 ERP_DVEBMGS21_saperpci
-rw-r--r-- 1 erpadm sapsys 1199 Feb 6 16:22 ERP_ERS23_saperpers
-rw-r--r-- 1 erpadm sapsys 1469 Feb 5 16:40 START_ASCS20_saperpasc
-rw-r--r-- 1 erpadm sapsys 1988 Feb 21 15:10 START_D22_saperpdi
-rw-r--r-- 1 erpadm sapsys 2363 Feb 20 17:56 START_DVEBMGS21_saperpci
-rw-r--r-- 1 erpadm sapsys 1353 Feb 6 17:22 START_ERS23_saperpers
```

## Removing physical host dependencies from profiles

---

**Note:** Changing the physical hostname to a virtual hostname is supported for Web AS ABAP installation type only. Please refer SAP notes 8307, 757692, 803018 and relevant notes while making changes.

---

Removing physical host dependencies from profiles involves the following steps:

- Edit the start profile `/sapmnt/SAPSID/profile/START_InstName_VirtualHostName` to replace all physical hostnames with their equivalent virtual hostname.
- Edit the instance profile `/sapmnt/SAPSID/profile/SAPSID_InstName_VirtualHostName` as follows:

- Add the following lines:

```
SAPGLOBALHOST = VirtualHostName
SAPLOCALHOST = VirtualHostName
SAPLOCALHOSTFULL = VirtualHostName
```

- Replace all physical hostnames with the equivalent virtual host name.
- Edit the default profile `/usr/sap/SAPSID/SYS/profile/DEFAULT.PFL` as follows:
  - Set `SAPDBHOST` equal to the virtual hostname of the database server.
  - Replace all instances of the physical hostname of the SAP Central instance, with the equivalent virtual host name.
  - Verify that all physical hostnames are replaced with equivalent virtual hostnames.

## Installing SAP using `SAPINST_USE_HOSTNAME`

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

---

**Note:** Before installing an SAP system, refer to the relevant SAP installation documentation.

---

### To install SAP using SAPINST\_USE\_HOSTNAME

- 1 In the master DVD, navigate to the directory where the sapinst tool is present.
- 2 Launch the SAPInst GUI using the following command:

```
sapinst SAPINST_USE_HOSTNAME=VirtualHostName
```

- 3 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.

## Clustering shared file systems

Depending upon the database that you use with the SAP application, you can decide upon the architecture of the file system that the SAP Central instance shares with the database or with other application servers.

### For Oracle databases only

The SAP Central instance runs on a separate machine, while the Oracle database is mounted on `/oracle/SAPSID` by default. The database has its own `/oracle/SAPSID` file system, but also requires SAP executables. These executables are usually NFS-mounted from SAP Central File Share `/sapmnt/SAPSID/exe`.

Symantec recommends the following:

- maintaining local copies of `/oracle/SAPSID` and `/sapmnt/SAPSID/exe` on the Central instance and the database, instead of sharing them through NFS.
- keeping database files on shared disk.
- controlling the `/oracle/SAPSID` and `/sapmnt/SAPSID/exe` file systems through the operating system, instead of the cluster.

### For non-Oracle databases

The database requires SAP executables. These executables are usually NFS-mounted from Central File Share `/sapmnt/SAPSID/exe`.

### For other application servers

The application servers require `/usr/sap/trans`, `/sapmnt/SAPSID/global`, and `/sapmnt/SAPSID/profile` to be NFS-mounted from the Central instance. You must therefore share these resources using NFS.

Symantec recommends to maintain a local copy of `/sapmnt/SAPSID/exe`, instead of sharing the resource through NFS. For more information, refer to the SAP white paper, *SAP Web Application Server in Switchover Environments (UNIX Platforms)*.

## Configuring the SAP NetWeaver agent for message server restart

In case the message server process fails, the Symantec High Availability agent for SAP NetWeaver supports the message server restart through `sapstart`.

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 `START` profile for (A)SCS instance and set the new profile parameters.

---

**Note:** Restart of enqueue server process "en" is not supported by the Symantec High Availability agent for SAP NetWeaver.

---

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 with instance name `ASCS00` and `SAPSID ERP`

```
Restart_Program_00 = local $(_MS)
pf=$(DIR_PROFILE)/ERP_ASCS00_saperpasc
```

By default `sapstart` restarts the message server without any delay. To determine under which circumstances a program must be restarted, `sapstart` uses a signal mask.

The default signal mask consists of the following signals:

- SIGABRT
- SIGBUS
- SIGFPE
- SIGILL
- SIGPIPE
- SIGSEGV
- SIGSYS
- SIGXCPU



## ■ SIGXFSZ

This mask is extendable using the parameter `SignalMask_xx`. This parameter consists of a list separated by commas which define the additional signals required by `sapstart`.

For more information on how to set signal mask and additional information on the restart process of a program through `sapstart`, refer to SAP Note 768727 and related notes.

---

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

---

# Setting up zones on Solaris for SAP Enqueue and Enqueue Replication Servers

The Symantec High Availability agent for SAP NetWeaver now supports Enqueue and Enqueue Replication servers running inside Solaris non-global zones.

An example of creating a zone for SAP Enqueue/Enqueue Replication on Solaris is shown as follows.

**Step1: Create the zone.**

```
bash-3.00# zonecfg -z enqueue_zone1
enqueue_zone1: No such zone configured
Use 'create' to begin configuring a new zone.
zonecfg:enqueue_zone1> create

zonecfg:enqueue_zone1> set zonepath=/export/zones/enqueue_zone1
```

**Step2: Add all the required loop back file systems (LOFS) to the zone configuration.**

```
zonecfg:enqueue_zone1> add fs
zonecfg:enqueue_zone1:fs> set dir=/usr/sap/ERP
zonecfg:enqueue_zone1:fs> set special=/usr/sap/ERP
zonecfg:enqueue_zone1:fs> set type=lofs
zonecfg:enqueue_zone1:fs> end
zonecfg:enqueue_zone1> add fs
zonecfg:enqueue_zone1:fs> set dir=/usr/sap/trans
zonecfg:enqueue_zone1:fs> set special=/usr/sap/trans
zonecfg:enqueue_zone1:fs> set type=lofs
zonecfg:enqueue_zone1:fs> end
zonecfg:enqueue_zone1> add fs
```

```
zonecfg:enqueue_zone1:fs> set dir=/usr/sap/ccms
zonecfg:enqueue_zone1:fs> set special=/usr/sap/ccms
zonecfg:enqueue_zone1:fs> set type=lofs
zonecfg:enqueue_zone1:fs> end
zonecfg:enqueue_zone1> add fs
zonecfg:enqueue_zone1:fs> set dir=/usr/sap/tmp
zonecfg:enqueue_zone1:fs> set special=/usr/sap/tmp
zonecfg:enqueue_zone1:fs> set type=lofs
zonecfg:enqueue_zone1:fs> end
```

**Step 3: Add the network information to the zone configuration.**

```
zonecfg:enqueue_zone1> add net
zonecfg:enqueue_zone1:net> set address=10.212.98.193
zonecfg:enqueue_zone1:net> set physical=bge0
zonecfg:enqueue_zone1:net> end
```

**Step 4: Add a comment for the zone. This step is optional.**

```
zonecfg:enqueue_zone1> add attr
zonecfg:enqueue_zone1:attr> set name=comment
zonecfg:enqueue_zone1:attr> set type=string
zonecfg:enqueue_zone1:attr> set value="This is
enqueue_zone1 zone for SAP System ERP."
zonecfg:enqueue_zone1:attr> end
```

**Step 5: Verify and commit the zone configuration.**

```
zonecfg:enqueue_zone1> verify

zonecfg:enqueue_zone1> commit

zonecfg:enqueue_zone1> exit
```

```
bash-3.00# zoneadm list -cv
```

ID	NAME	STATUS	PATH
0	global	running	/
-	enqueue_zone1	configured	/export/zones/enqueue_zone1

**Step 6: Install the zone.**

```
bash-3.00# zoneadm list -cv
```

ID	NAME	STATUS	PATH
0	global	running	/
-	enqueue_zone1	configured	/export/zones/enqueue_zone1

```
bash-3.00# zoneadm -z enqueue_zone1 install
Preparing to install zone <enqueue_zone1>.
Creating list of files to copy from the global zone.
Copying <6208> files to the zone.
Initializing zone product registry.
Determining zone package initialization order.
Preparing to initialize <1420> packages on the zone.
Initialized <1420> packages on zone.
Zone <enqueue_zone1> is initialized.
Installation of <113> packages was skipped.
Installation of these packages generated warnings: <VRTSat>
The file </export/zones/enqueue_zone1/root/var/sadm/system/\
logs/install_log> contains a log of the zone installation.
```

```
bash-3.00# zoneadm list -cv
```

ID	NAME	STATUS	PATH
0	global	running	/
-	enqueue_zone1	installed	/export/zones/enqueue_zone1

### Step 7: Configure the zone.

To configure the zone for the first time do the following. Login to the zone console from the first terminal with the following command:

```
bash-3.00# zlogin -C enqueue_zone1
[Connected to zone 'enqueue_zone1' console]
```

Now, from the second terminal, start the zone.

```
bash-3.00# zoneadm -z enqueue_zone1 boot
```

You will see the following message on the first terminal.

```
[NOTICE: Zone booting up]

SunOS Release 5.10 Version Generic_118833-36 64-bit
Copyright 1983-2006 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
Hostname: enqueue_zone1
Loading smf(5) service descriptions: 25/25

Select a Language

0. English
1. Japanese
2. Korean
```

3. Simplified Chinese
4. Traditional Chinese

Please make a choice (0 - 4), or press h or ? for help:

For more information on setting up zones, refer to the *Solaris 10 Administration Guide*.

Similarly, configure another zone with name “enqueue\_zone2” on the second node, a zone with name “enqueue\_zone3” on the third node, and so on, if you have more than three nodes in your cluster configuration and would like to use all the systems for Enqueue and Enqueue Replication server failover targets.

---

**Note:** Alternatively, create a zone with same name on all the systems where you intend to run the Enqueue and Enqueue Replication Server and ensure that you have different hostnames for all zones.

---

After installing and configuring a zone on each of the cluster nodes where Enqueue and Enqueue Replication Server is running, you must configure Symantec Cluster Server to run under Solaris non-global zones.

Also, ensure that the zone and the Enqueue server have different IPs. This is required because the Enqueue server (that is, the application running inside the zone) fails over between the zones, but the zone itself does not failover.

## Configuring CCMS Monitoring Agent for SAP instance

CCMS agents are independent processes with an interface through RFC to a central monitoring system and an interface to the shared memory.

The monitoring architecture of CCMS agents provide an infrastructure for monitoring your IT environment and its components. The data monitored is stored in the shared memory of every server, with a running SAP instance or a running agent.

You can have the read and write access to the monitored data from the central monitoring system, using the following:

- A defined ABAP interface, in case of an SAP instance.
- The CCMS agent, in case of any server on which the agent is installed and active.

## Functional principle of CCMS Agents

The CCMS agents process the following tasks simultaneously:

- Collect data automatically.
- Process requests as an RFC server.
- Send data to the central system as an RFC client.

The runtime information for the monitoring objects is stored in monitoring segments.

The following CCMS agents monitor either the local process memory or local shared memory for SAP instance.

- SAPCCMSR: Monitors components on which there is no active SAP instance.
- SAPCCMSR-j2ee: Monitors SAP Java and ABAP + Java components.
- SAPCCM4X: Monitors ABAP instances with SAP Basis 4.x or higher.
- SAPCM3X: Monitors SAP instances with SAP Basis 3.x

A CCMS agent communicates with the central monitoring system using RFC.

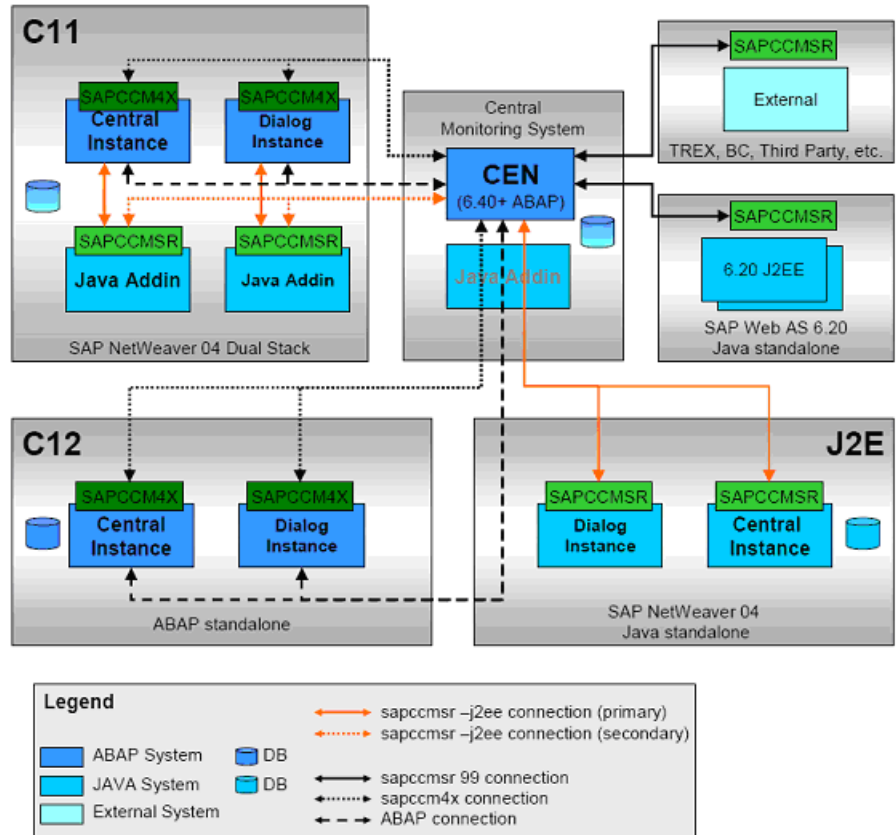
As an RFC server, it provides access to the data in the monitoring segment. For example, you can access this data using transaction RZ20. The agent then automatically creates the local configuration file and the RFC destination in the central system during its registration.

As an RFC client, it independently sends alerts and values for the monitoring attributes to the central monitoring SAP System (push technology). This data is then stored in a cache to allow the system for quick display or is triggered to central auto-reaction methods. This improves performance since the central monitoring system no longer needs to periodically query the agents.

## Possible Central Monitoring Scenarios with CCMS Agents

[Figure 2-1](#) shows the central monitoring scenarios possible with different SAP NetWeaver components like ABAP, Java and Add-In (dual stack).

**Figure 2-1** Central monitoring scenarios possible with different SAP NetWeaver components



## Prerequisites for installing and registering the CCMS Monitoring Agent

Ensure that you meet the following prerequisites to install and register the CCMS Monitoring Agent:

- Make sure that you have a Central Monitoring System (CEN) configured. If possible, use a dedicated SAP system as CEN.
- Check if the CSMREG user is created in the central monitoring system. If not, perform the following steps.
  - In central monitoring system, call the transaction RZ21 and choose **Technical Infrastructure > Configure Central System > Create CSMREG User**.

- Enter the login credentials for this user.
- Choose CSMREG.
- In the central monitoring system, generate the connection data in a CSMCONF file.  
 To generate this data, perform the following steps:
  - In the central monitoring system, call the transaction RZ21 and choose **Technical Infrastructure > Configure Central System > Create CSMCONF Start File for Agents**.
  - Save the file in a central location.

## Configuring CCMS Agents to work with the Symantec high availability agent for SAP NetWeaver

The Symantec high availability agent for SAP NetWeaver supports the following SAP CCMS agents:

SAPCCMSR -j2ee      Monitors SAP Java and ABAP+Java components

SAPCCM4X              Monitors ABAP instances with SAP Basis 4.x or later

To install and register the CCMS agents with Central Monitoring System refer to, <http://service.sap.com/monitoring>.

After you install and register the CCMS agent with Central Monitoring System, perform the following steps to configure the CCMS agent with the Symantec high availability agent for SAP NetWeaver.

### To configure the CCMS agent with the Symantec High Availability agent for SAP NetWeaver

- 1 Log on to the host of SAP instance as <sid>adm.
- 2 Stop the SAP instance for which you are configuring the CCMS agent.

- 3 Using the following command, stop the CCMS agent, if already started.

```
sapccm4x -stop pf=<Instance_Profile_Path>
```

or

```
sapccmsr -stop -j2ee pf=<Instance_Profile_Path>
```

---

**Note:** The <Instance\_Profile\_Path> specifies the profile of the monitored instance. The default value is

```
/usr/sap/<SID>/SYS/profile/<SID>_<InstName>_<VHost>.
```

---



- 4 Add the CCMS Agent's start specific information to SAP Instance's START profile. To do this, edit the Start Profile of the SAP Instance as follows:

For sapccm4x, add the following lines at the end of the START profile:

```
#-----
# Start CCMS sapccm4x agent
#-----
_CM = cm.sap$(SAPSYSTEMNAME)_$(INSTANCE_NAME)
Execute_xx = local rm -f $_CM
Execute_yy = local ln -s -f $(DIR_EXECUTABLE)/sapccm4x $_CM
Start_Program_zz = local $_CM -DCCMS pf=$(DIR_PROFILE)/ \
$(SAPSYSTEMNAME)_$(INSTANCE_NAME)_$(SAPLOCALHOST)

#-----
```

For sapccmsr, add the following lines at the end of the START profile:

```
#-----
# Start CCMS sapccmsr agent
#-----
_CS = cs.sap$(SAPSYSTEMNAME)_$(INSTANCE_NAME)
Execute_xx = local rm -f $_CS
Execute_yy = local ln -s -f $(DIR_EXECUTABLE)/sapccmsr $_CS
Start_Program_zz = local $_CS -DCCMS pf=$(DIR_PROFILE)/ \
$(SAPSYSTEMNAME)_$(INSTANCE_NAME)_$(SAPLOCALHOST)-j2ee

#-----
```

Where,

xx, yy and zz denotes the next available number for the programs in the start profile.

- 5 Start the SAP instance.

An additional connection route gets set between the monitored SAP instance and the Central Monitoring System using the CCMS agent SAPCCM4X or SAPCCMSR

## Configuring the Enqueue Replication Server for SAP NetWeaver

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

- 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 host A and 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 *sidadm*:

Create the directory structure as follows:

```
/usr/sap/PLL/ERS11/exe
```

```
/usr/sap/PLL/ERS11/log
```

```
/usr/sap/PLL/ERS11/data
```

```
/usr/sap/PLL/ERS11/work
```

- Copy the following binaries from (A)SCS instance exe directory into the ERS instance exe directory:

- enqt
- enrepserver
- ensmon
- libicudata.so.30
- libcui18n.so.30
- libicuuc.so.30
- libsapu16\_mt.so
- librfcum.so
- sapcpe
- sapstart
- sapstartsrv
- sapcontrol

---

**Note:** The binary extensions vary for different operating systems. The naming conventions followed in the above binaries are applicable to Solaris platform.

---

For each binary, ensure that the access and execute permissions are correctly set for *sidadm*.

- Create a sapcpe list file `ers.lst` with the following names.
  - `cleanipc`
  - `enqt`
  - `enrepserver`
  - `ensmon`
  - `libsapu16_mt.so`
  - `libicudata.so.30`
  - `libcui18n.so.30`
  - `libicuuc.so.30`
  - `libsapu16.so`
  - `librfcum.so`
  - `sapcpe`
  - `sapstart`
  - `sapstartsrv`
  - `sapcontrol`
  - `stopsap`
  - `ers.lst`

The binary extensions may vary for different operating systems

- Create a new start profile in `/usr/sap/PLL/SYS/profile`.

```
SAPSYSTEMNAME = PLL
SAPSYSTEM = 11
INSTANCE_NAME = ERS11
#-----
# Special settings for this manually set up instance
#-----
SCSID = 01
DIR_EXECUTABLE = $(DIR_INSTANCE)/exe
DIR_PROFILE = $(DIR_INSTALL)/profile
DIR_CT_RUN = $(DIR_EXE_ROOT)/run
```

```

SAPGLOBALHOST = sapscshost
SAPLOCALHOST = sapershost

SETENV_00 = PATH=$(DIR_INSTANCE)/exe:$(PATH)
SETENV_01 = LD_LIBRARY_PATH=$(DIR_EXECUTABLE):$(LD_LIBRARY_PATH)
SETENV_02 = SHLIB_PATH=$(DIR_LIBRARY):$(SHLIB_PATH)
SETENV_03 = LIBPATH=$(DIR_LIBRARY):$(LIBPATH)
_PF = $(DIR_PROFILE)/PLL_ERS11_sapershost

#-----
# Copy SAP Executables
#-----

_CPARG0 = list:$(DIR_EXECUTABLE)/ers.lst
Execute_00 = immediate $(DIR_EXECUTABLE)/sapcpe$(FT_EXE) \

    $(_CPARG0) pf=$(_PF)

#-----
# Start enqueue replication server
#-----

_ER = er.sap$(SAPSYSTEMNAME)_$(INSTANCE_NAME)
Execute_01 = immediate rm -f $(_ER)
Execute_02 = local ln -s -f $(DIR_EXECUTABLE)/enrepserver $(_ER)
Start_Program_00 = local $(_ER) pf=$(_PF) 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.

- Create an instance profile in /usr/sap/SID/SYS/profile directory  
 For example, if you have an (A)SCS instance with the following parameters.  
 SCS SAPSID = PLL  
 SCS INSTNO = 01  
 SCS HOST = sapscshost  
 Protect it with an ERS instance as follows  
 ERS SAPSID = PLL  
 ERS INSTNO = 11  
 ERS HOST = sapershost  
 An instance profile PLL\_ERS11\_sapershost would look like:

```
#-----
# System settings
#-----
SAPSYSTEMNAME = PLL
SAPSYSTEM = 11
INSTANCE_NAME = ERS11
SCSID = 01
SAPGLOBALHOST = sapscshost
SAPLOCALHOST = sapershost
#-----
# Special settings for this manually set up instance
#-----
DIR_EXECUTABLE = $(DIR_INSTANCE)/exe
DIR_CT_RUN = $(DIR_EXE_ROOT)/run
#-----
# Settings for enqueue monitoring tools (enqt, ensmon)
#-----
enqueue/process_location = REMOTESA
rdisp/enqname = $(rdisp/myname)
#-----
# Standalone enqueue details from (A)SCS instance
#-----
enqueue/serverhost = $(SAPGLOBALHOST)
enqueue/serverport = 32$(SCSID)
enqueue/serverinst = $(SCSID)
enqueue/poll_interval = 0
enqueue/poll_timeout = 120
enqueue/enrep/inactive_actio = sleep
enqueue/table_size = 4096
```

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 or 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.

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

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

This chapter includes the following topics:

- [Before you install the Symantec High Availability agent for SAP NetWeaver](#)
- [About the ACC library](#)
- [Installing the ACC library](#)
- [Installing the agent in a VCS environment](#)
- [Uninstalling the agent in a VCS environment](#)
- [Removing the ACC library](#)
- [Upgrading the agent in a VCS environment](#)

## Before you install the Symantec High Availability agent for SAP NetWeaver

You must install the Symantec High Availability agent for SAP NetWeaver on all the systems that will host SAP server service groups.

Ensure that you meet the following prerequisites to install the agent for SAP NetWeaver.

- Install and configure Symantec Cluster Server.  
For more information on installing and configuring Symantec Cluster Server, refer to the *Symantec Cluster Server Installation Guide*.

- Remove any previous version of this agent.  
 To remove the agent,  
 See [“Uninstalling the agent in a VCS environment”](#) on page 51.
- Install the latest version of ACC Library.  
 To install or update the ACC Library package, locate the library and related documentation in the Agent Pack tarball:  
 See [“Installing the ACC library”](#) on page 48.
- On Solaris 11, ensure that the pkg:/compatibility/ucb package is installed on the system.

## Prerequisites for enabling i18n support

Perform the following steps to enable i18n support to the agent:

- Install ACCLib version 5.1.2.0 or later.  
 See [“Installing the ACC library”](#) on page 48.
- For VCS 5.0 and earlier releases, copy the latest ag\_i18n\_inc.pm module from the following location on the agent pack disc.

---

**Note:** Review the readme.txt for instructions to copy this module.

---

VCS 5.0	cd1/platform/arch_dist/vcs/application/i18n_support/5.0
VCS 4.1	cd1/platform/arch_dist/vcs/application/i18n_support/4.1
VCS 4.0	cd1/platform/arch_dist/vcs/application/i18n_support/4.0

where *arch\_dist* takes the following values:

'sol\_sparc' for Solaris SPARC

'sol\_x64' for Solaris x64

'generic' for HP-UX and Linux

---

**Note:** *arch\_dist* is not applicable to AIX.

---

## Prerequisites for installing the agent to support Solaris zones

Ensure that you meet the following prerequisites to install the agent for SAP NetWeaver:

- Install SAP NetWeaver to support Solaris zones. Refer to the SAP note 870652.

- Install and configure the VCS environment to support Solaris zones. Refer to the VCS user documentation for details.
- Remove any previous version of this agent.

---

**Note:** If you are installing the agent under Solaris non-global zone, ensure that the non-global zone is in a running state.

---

## About the ACC library

The operations of a VCS agent depend on a set of Perl modules known as the ACC library. The library must be installed on each system in the cluster that runs the agent. The ACC library contains common, reusable functions that perform tasks, such as process identification, logging, and system calls.

Instructions to install or remove the ACC library on a single system in the cluster are given in the following sections. The instructions assume that the agent's tar file has already been extracted.

## Installing the ACC library

Install the ACC library on each system in the cluster that runs an agent that depends on the ACC library.

### To install the ACC library

- 1 Log in as superuser.
- 2 Download ACC Library.

You can download either the complete Agent Pack tar file or the individual ACCLib tar file from the Symantec Operations Readiness Tools (SORT) site (<https://sort.symantec.com/agents>).

- 3 If you downloaded the complete Agent Pack tar file, navigate to the directory containing the package for the platform running in your environment.

AIX	<code>cd1/aix/vcs/application/acc_library/version_library/pkggs</code>
HP-UX	<code>cd1/hpux/generic/vcs/application/acc_library/version_library/pkggs</code>
Linux	<code>cd1/linux/generic/vcs/application/acc_library/version_library/rpms</code>
Solaris	<code>cd1/solaris/dist_arch/vcs/application/acc_library/version_library/pkggs</code>

where *dist\_arch* is `sol_sparc` or `sol_x64`.



- 4 If you downloaded the individual ACCLib tar file, navigate to the pkgs directory (for AIX, HP-UX, and Solaris), or rpms directory (for Linux).
- 5 Install the package. Enter **Yes** if asked to confirm overwriting of files in the existing package.

```
AIX          # installp -ac -d VRTSacclib.bff VRTSacclib

HP-UX        # swinstall -s `pwd` VRTSacclib

Linux        # rpm -i \
              VRTSacclib-VersionNumber-GA_GENERIC.noarch.rpm

Solaris      # pkgadd -d VRTSacclib.pkg
```

## Installing the agent in a VCS environment

Install the agent for SAP NetWeaver on each node in the cluster.

### To install the agent in a VCS environment

- 1 Download the agent from the Symantec Operations Readiness Tools (SORT) site: <https://sort.symantec.com/agents>.  
  
You can download either the complete Agent Pack tar file or an individual agent tar file.
- 2 Uncompress the file to a temporary location, say /tmp.

- 3 If you downloaded the complete Agent Pack tar file, navigate to the directory containing the package for the platform running in your environment.

```
AIX      cd1/aix/vcs/application/sap_agent/
          vcs_version/version_agent/pkggs

HP-UX    cd1/hpux/generic/vcs/application/sap_agent/
          vcs_version/version_agent/pkggs

Linux    cd1/linux/generic/vcs/application/sap_agent/
          vcs_version/version_agent/rpms

Solaris   cd1/solaris/dist_arch/vcs/application/sap_agent/
          vcs_version/version_agent/pkggs
          where, dist_arch is sol_x64 or sol_sparc
```

If you downloaded the individual agent tar file, navigate to the pkgs directory (for AIX, HP-UX, and Solaris), or rpms directory (for Linux).

- 4 Log in as superuser.
- 5 Install the package.

```
AIX      # installp -ac -d VRTSsapnw04.rte.bff VRTSsapnw04.rte

HP-UX    # swinstall -s `pwd` VRTSsapnw04

Linux    # rpm -ihv \
          VRTSsapnw04-AgentVersion-GA_GENERIC.noarch.rpm

Solaris   # pkgadd -d . VRTSsapnw04
```

- 6 After installing the agent package, you must import the agent type configuration file. See [“Importing the agent types files in a VCS environment”](#) on page 56.

## Installing the agent in a non-global zone on Solaris 11

To install the SAP NetWeaver agent in a non-global zone on Solaris 11:

- Ensure that the ACClibrary package, VRTSaclib, is installed in the non-global zone.

To install VRTSacclib in the non-global zone, run the following command from the global zone:

```
# pkgadd -R /zones/zone1/root -d VRTSacclib.pkg
```

- To install the agent package in the non-global zone, run the following command from the global zone:

```
# pkgadd -R zone-root/root -d . VRTSsapnw04
```

For example: # pkgadd -R /zones/zone1/root -d . VRTSsapnw04

## Uninstalling the agent in a VCS environment

You must uninstall the agent for SAP NetWeaver from a cluster while the cluster is active.

### To uninstall the agent in a VCS environment

- 1 Log in as a superuser.
- 2 Set the cluster configuration mode to read/write by typing the following command from any node in the cluster:

```
# haconf -makerw
```

- 3 Remove all SAP server resources from the cluster. Use the following command to verify that all resources have been removed:

```
# hares -list Type=SAPNW04
```

- 4 Remove the agent type from the cluster configuration by typing the following command from any node in the cluster:

```
# hatype -delete SAPNW04
```

Removing the agent's type file from the cluster removes the include statement for the agent from the main.cf file, but the agent's type file is not removed from the cluster configuration directory. You can remove the agent's type file later from the cluster configuration directory.

- 5 Save these changes. Then set the cluster configuration mode to read-only by typing the following command from any node in the cluster:

```
# haconf -dump -makero
```

- 6 Use the platform's native software management program to remove the agent for SAP NetWeaver from each node in the cluster.

Execute the following command to uninstall the agent:

AIX	# installp -u VRTSsapnw04.rte
HP-UX	# swremove VRTSsapnw04
Linux	# rpm -e VRTSsapnw04
Solaris	# pkgrm VRTSsapnw04

## Removing the ACC library

Perform the following steps to remove the ACC library.

### To remove the ACC library

- 1 Ensure that all agents that use ACC library are removed.
- 2 Run the following command to remove the ACC library package.

AIX	# installp -u VRTSaccclib
HP-UX	# swremove VRTSaccclib
Linux	# rpm -e VRTSaccclib
Solaris	# pkgrm VRTSaccclib

## Upgrading the agent in a VCS environment

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

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

- 1 Persistently freeze the service groups that host the application.

```
# hagrpfreeze GroupName -persistent
```

- 2 Stop the cluster services forcibly.

```
# hstop -all -force
```

- 3 Ensure that the agent operations are stopped on all the nodes.

```
# ps -ef | grep SAPNW04
```

- 4 Uninstall the agent package from all the nodes. Use the platform's native software management program to remove the agent for SAP NetWeaver from each node in the cluster.

Execute the following command to uninstall the agent:

```
AIX # installp -u VRTSsapnw04.rte
```

```
HP-UX # swremove VRTSsapnw04
```

```
Linux # rpm -e VRTSsapnw04
```

```
Solaris # pkgrm VRTSsapnw04
```

- 5 Install the new agent on all the nodes.

See [“Installing the agent in a VCS environment”](#) on page 49.

- 6 Copy the new SAPNW04Types.cf file from the agent's conf directory, to the VCS conf directory /etc/VRTSvcs/conf/config.

```
VCS 4.x ■ AIX /etc/VRTSvcs/conf/sample_SAPNW04/
        ■ HP-UX SAPNW04Types.cf
        ■ Linux
        ■ Solaris
```

```
VCS 5.x ■ AIX /etc/VRTSagents/ha/conf/SAPNW04/
        ■ HP-UX SAPNW04Types.cf
        ■ Linux
```

```
VCS 5.0 ■ Solaris /etc/VRTSagents/ha/conf/SAPNW04/
        SPARC SAPNW04Types50.cf
        and x64
```

VCS 5.1     ■ Solaris     /etc/VRTSagents/ha/conf/SAPNW04/  
                   SPARC     SAPNW04Types51.cf  
                   and x64

---

**Note:** If you are using Solaris SPARC or Solaris x64, copy the SAPNW04Types50.cf file for VCS 5.0 (and its intermediate Maintenance Packs) and SAPNW04Types51.cf file for VCS 5.1

---

- 7 Check for the changes in the resource values required, if any, due to the new agent types file.

---

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

---

- 8 Start the cluster services.

```
# hastart
```

- 9 Start the agent on all nodes, if not started.

```
# haagent -start SAPNW04 -sys SystemName
```

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

```
# hagrps -unfreeze GroupName -persistent
```

# Configuring the agent for SAP NetWeaver

This chapter includes the following topics:

- [About configuring the Symantec High Availability agent for SAP NetWeaver](#)
- [Importing the agent types files in a VCS environment](#)
- [SAP NetWeaver agent attributes](#)
- [Setting the SAPMonHome attribute](#)
- [Executing a customized monitoring program](#)
- [Preventing early faulting of Java and Add-in instances](#)
- [Using Perl in the VCS 3.5 environment](#)
- [Copying ag\\_i18n\\_inc.pm module for VCS 3.5](#)

## About configuring the Symantec High Availability agent for SAP NetWeaver

After installing the Symantec High Availability agent for SAP NetWeaver, you must import the agent type configuration file. After importing this file, review the attributes table that describes the resource type and its attributes, and then create and configure SAP server resources.

To view the sample agent type definition and service groups configuration:

See [“About sample configurations for the agent for SAP NetWeaver”](#) on page 97.

# Importing the agent types files in a VCS environment

To use the agent for SAP NetWeaver, you must import the agent types file into the cluster.

You can import the agent types file using the Symantec Cluster Server (VCS) graphical user interface or via the command line interface.

To import the agent types file using the VCS graphical user interface

- 1 Start the Cluster Manager (Java Console) and connect to the cluster on which the agent is installed.
- 2 Click **File > Import Types**.
- 3 In the Import Types dialog box, select the following file:

VCS 4.x	■ AIX	/etc/VRTSvcs/conf/sample_SAPNW04/
	■ HP-UX	SAPNW04Types.cf
	■ Linux	
	■ Solaris	
VCS 5.x or later	■ AIX	/etc/VRTSagents/ha/conf/SAPNW04/
	■ HP-UX	SAPNW04Types.cf
	■ Linux	
VCS 5.0	Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPNW04/SAPNW04Types50.cf
VCS 5.1 or later	Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPNW04/SAPNW04Types51.cf

- 4 Click **Import**.
- 5 Save the VCS configuration.

The SAP agent type is now imported to the VCS engine.

You can now create SAP server resources. For additional information about using the VCS GUI, refer to the *Symantec Cluster Server Administrator's Guide*.

To import the agent types file using the command line interface (CLI):

- 1 Log on to any one of the systems in the cluster as the superuser.
- 2 Create a temporary directory.

```
# mkdir ./temp
# cd ./temp
```



### 3 Copy the sample file Types.cf.

VCS 4.x	■ AIX	/etc/VRTSvcs/conf/sample_SAPNW04/
	■ HP-UX	SAPNW04Types.cf
	■ Linux	
	■ Solaris	
VCS 5.x or later	■ AIX	/etc/VRTSagents/ha/conf/SAPNW04/
	■ HP-UX	SAPNW04Types.cf
	■ Linux	
VCS 5.0	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPNW04/ SAPNW04Types50.cf
VCS 5.1 or later	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPNW04/ SAPNW04Types51.cf

The following example assumes VCS 5.0 is installed on AIX:

```
# cp /etc/VRTSagents/ha/conf/SAPNW04/SAPNW04Types.cf .
```

### 4 Create a dummy main.cf file:

```
# echo 'include "SAPNW04Types.cf"' > main.cf
```

### 5 Create the SAP resource type as follows:

```
# hacf -verify .
# haconf -makerw
# sh main.cmd
# haconf -dump
```

The SAP agent type is now imported to the VCS engine.

You can now create SAP server resources. For additional information about using the VCS CLI, refer to the *Symantec Cluster Server Administrator's Guide*.

## SAP NetWeaver agent attributes

[Table 4-1](#) shows the required attributes for configuring a SAP NetWeaver instance.

**Table 4-1** Required attributes

Required attributes	Description
EnqSrvResName	<p>The name of the standalone ENQUEUE server cluster resource. This attribute is used only by an Enqueue Replication Server. Using this attribute the replication server queries the ENQUEUE server resource state while searching for a fail over target and vice a versa.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: SAP70_ERPASCS_sapnw04</p>
EnvFile	<p>The absolute path to the file that must be sourced with the UNIX shell. You must source this file to set the environment before executing SAP scripts for online, offline, monitor, and clean operations.</p> <p>Supported shell environments are ksh, sh, and csh.</p> <p><b>Note:</b> Ensure that the syntax of this file is in accordance with the user shell that the SAPAdmin attribute specifies. Review the information on how to generate environments file for SAP.</p> <p>See <a href="#">“Generating environments file for SAP”</a> on page 81.</p> <p>Symantec recommends that you store this file on shared disk so that the file is always available to an online system.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: /usr/sap/ERP/DVEBMGS00/saperp.env</p>
InstName	<p>Identifies a SAP server instance. Review the information about setting this attribute:</p> <p>See <a href="#">“Uniquely identifying SAP NetWeaver server instances”</a> on page 24.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: DVEBMGS00</p>

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

Required attributes	Description
InstType	<p>An identifier that classifies and describes the SAP server instance type. Valid values are:</p> <ul style="list-style-type: none"> <li>■ CENTRAL: SAP Central instance</li> <li>■ DIALOG: SAP Dialog instance</li> <li>■ ENQUEUE: Standalone Enqueue Server instance or SAP Central Services instance for ABAP only or Java only installation</li> <li>■ AENQUEUE: ABAP SAP Standalone Enqueue instance for an Add-In installation</li> <li>■ JENQUEUE: Java SAP Standalone Enqueue instance for an Add-In installation</li> <li>■ ENQREP: SAP Enqueue Replication Server for an Add-In installation for ABAP only or Java only installation</li> <li>■ AENQREP: ABAP SAP Enqueue Replication Server for an Add-In installation</li> <li>■ JENQREP: Java SAP Enqueue Replication Server for an Add-In installation</li> </ul> <p><b>Note:</b> The value of this attribute is not case-sensitive.</p> <p>Type and dimension: string-scalar</p> <p>Default: CENTRAL</p> <p>Example: DIALOG</p>
ProcMon	<p>The list of SAP processes to monitor. The entries in this list are separated using space and can be specified in any order. Review the information about how the monitor operation uses this attribute:</p> <p>See <a href="#">"Monitoring an SAP instance"</a> on page 25.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: dw se jc</p>
ResLogLevel	<p>The logging detail performed by the agent for the resource. Valid values are:</p> <p>ERROR: Only logs error messages.</p> <p>WARN: Logs above plus warning messages.</p> <p>INFO: Logs above plus informational messages.</p> <p>TRACE: Logs above plus trace messages. TRACE is very verbose and should only be used during initial configuration or for troubleshooting and diagnostic operations.</p> <p>Type and dimension: string-scalar</p> <p>Default: INFO</p> <p>Example: TRACE</p>

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

Required attributes	Description
SAPAdmin	<p>SAP System administrator for SAPSID. This user name is usually a concatenation of the SAPSID attribute and the adm string 'sidadm'.</p> <p>Storing SAPAdmin in system naming services is not supported, for example: NIS, NIS+ and LDAP servers. The agent operations use this user name to execute their respective core subroutines.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: erpadm</p>
SAPMonHome	<p>The location of the directory that contains the binary used for second level monitoring process. Review the information about setting the SAPMonHome attribute.</p> <p>See <a href="#">“Setting the SAPMonHome attribute”</a> on page 62.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: /usr/sap/ERP/SYS/exe/runU</p>
SAPSID	<p>SAP system name.</p> <p>This attribute must have three alpha-numeric characters, and must begin with an alphabet. The value of this attribute is defined during the SAP installation. Review the information about setting this attribute:</p> <p>See <a href="#">“Uniquely identifying SAP NetWeaver server instances”</a> on page 24.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: ERP</p>
StartProfile	<p>The full path to the SAP Instance Start Profile.</p> <p>The Start Profile is found in /usr/sap/SAPSID/SYS/profile directory, with the file name START_<i>InstName_virtualhostname</i>. The virtual hostname must resolve into a valid IP address that is used to cluster the SAP instance.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: /usr/sap/ERP/SYS/profile/START_DVEBMGS00_saperpci</p>

[Table 4-2](#) lists the optional attributes.

**Table 4-2** Optional attributes

Optional attribute	Description
MonitorProgram	<p>Absolute path name of an external, user-supplied monitor executable. Review the information about setting this attribute:</p> <ul style="list-style-type: none"> <li>■ See <a href="#">“Executing a customized monitoring program”</a> on page 63.</li> <li>■ See <a href="#">“Setting the SAPMonHome attribute”</a> on page 62.</li> </ul> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example 1: /usr/sap/ERP/DVEBMGS00/work/myMonitor.sh</p> <p>Example 2: /usr/sap/ERP/DVEBMGS00/work/myMonitor.sh arg1 arg2</p>
SecondLevelMonitor	<p>Used to enable second-level monitoring. Second-level monitoring is a deeper, more thorough state check of the SAP instance. The numeric value specifies how often the monitoring routines must run. 0 means never run the second-level monitoring routines, 1 means run routines every monitor interval, 2 means run routines every second monitor interval, and so on.</p> <p><b>Note:</b> 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.</p> <p>Type and dimension: integer-scalar</p> <p>Example: 1</p> <p>Default: 0</p>
ContainerName	<p>Specify this attribute to define the non-global zone support for VCS 5.0 on Solaris. It defines the name of the non-global zone.</p> <p>For more information refer to, <i>Symantec Cluster Server Administrator's Guide</i>.</p> <p>Type and dimension: string-scalar</p> <p>Example: sap700ci-zone</p> <p>Default: ""</p>

Table 4-2 Optional attributes (*continued*)

Optional attribute	Description
ContainerInfo	<p>Specify this attribute for VCS 5.1 on Solaris. It specifies if you can use the service group with the container.</p> <p>Assign the following values to the ContainerInfo attribute:</p> <ul style="list-style-type: none"><li>■ Name: The name of the container. For example, sap700ci-zone</li><li>■ Type: The type of the container. Set this to zone.</li><li>■ Enabled: If you want to enable the container, specify the value as 1. Else specify it as 0.</li></ul> <p>For more details refer to, <i>Symantec Cluster Server Administrator's Guide</i>.</p> <p>Type and dimension: string-association</p> <p>Example: {Name = sap700ci-zone, Type = Zone, Enabled = 1}</p>

## 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 installation types and SAP instances are as follows:

- For ABAP: sapinfo and dpmon  
sapinfo is not a standard binary shipped by SAP with installation media. You 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.  
Copy the sapinfo binary and the needed libraries, if any, to SAP Instance specific directory /usr/sap/SAPSID/InstName/exe.  
Also, ensure that the binaries and the libraries are copied to the SAP system central location /sapmnt/SAPSID/exe and the names of the binaries and libraries are listed in the Instance specific sapcpe binary list file (For example, instance.lst).
- For Java: jcmmon
- For Add-In (ABAP + Java): sapinfo, dpmon, jcmmon, and msprot
- For Enqueue and Enqueue Replication Server: ensmon and msprot

Table 4-3 shows recommended values for the SAPMonHome attribute.

**Table 4-3** Recommended values for SAPMonHome attribute

SAP installation type and instance	Format	Value of the SAPMonHome attribute
SAP ABAP For all instances	Unicode and non-Unicode	/usr/sap/SAPSID/SYS/exe/run
SAP Java For all instances	Unicode	/usr/sap/SAPSID/SYS/exe/run
SAP Java Add-In When InstType is equal to CENTRAL, DIALOG, AENQUEUE, or AENQREP	Unicode and non-Unicode	/usr/sap/SAPSID/SYS/exe/run
SAP Java Add-In When InstType is equal to JENQUEUE or JENQREP	Unicode and non-Unicode	/usr/sap/SAPSID/SYS/exe/runU

## Executing a customized monitoring program

The monitor function can execute a customized monitoring utility to perform an additional SAP server state check.

The monitor function executes the utility specified in the MonitorProgram attribute if the following conditions are satisfied:

- The specified utility is a valid executable file.
- The first-level process check indicates that the SAP server instance is online.
- The SecondLevelMonitor attribute is either set to 0 or 1, and the second-level check indicates that the SAP server 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 function interprets the utility 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 customized utility is always available to the agent, 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 instance, SAP automatically starts processes such as `jc` and `jlaunch`. Depending upon the available resources, starting these processes takes some finite time.

The agent for SAP NetWeaver 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 `jc` process, you must set the value of the `MonitorTimeout` attribute to at least 90 seconds.

## Using Perl in the VCS 3.5 environment

The agent for SAP NetWeaver uses Perl for performing the agent operations. VCS 3.5 does not include the required version of Perl as part of the standard installation. With the agent for SAP Netweaver, you require Perl version 5.8.6 or later.

You must separately install Perl version 5.8.6 on the system. You must also create a symbolic link that points to the Perl distribution that you installed.

### To create a symbolic link for Perl distribution

- 1 Install Perl version 5.8.6 or later.
- 2 Stop VCS.
- 3 Remove the symbolic link that the VCS 3.5 installer creates:

```
rm /opt/VRTSvc/bin/perl5
```



- 4 Create a new symbolic link from /opt/VRTSperl/bin/perl to the new Perl distribution that you installed in step 1.

For example, if the Perl binary is present in the /usr/local/bin/perl directory:

```
ln -s /usr/local/bin/perl /opt/VRTSperl/bin/perl
```

- 5 Restart VCS.

## Copying ag\_i18n\_inc.pm module for VCS 3.5

The Veritas agent for SAP NetWeaver 5.0 uses VCS unified logging for log messages. Unified messaging is not available on VCS 3.5. The perl module ag\_i18n\_inc.pm helps in using unified logging in VCS 3.5 for SAP NetWeaver agent.

Use the following procedure to copy the ag\_i18n\_inc.pm module:

### To copy the ag\_i18n\_inc.pm module

- 1 Verify if you have ag\_i18n\_inc.pm and ag\_i18n\_inc\_v35.pm files under /opt/VRTS/.ACCLib/compat directory.
- 2 If you have only ag\_i18n\_inc\_v35.pm, then copy it to ag\_i18n\_inc.pm

```
# cp /opt/VRTS/.ACCLib/compat/ag_i18n_inc_v35.pm  
/opt/VRTS/.ACCLib/compat/ag_i18n_inc.pm
```

# Configuring the service groups for SAP NetWeaver using the CLI

This chapter includes the following topics:

- [About configuring service groups for SAP NetWeaver](#)
- [Before configuring the service groups for SAP NetWeaver](#)
- [Configuring service groups for SAP NetWeaver](#)
- [Creating Service Groups for Enqueue and Enqueue Replication Server under Solaris non-global zones](#)
- [Mounting NFS file system inside Solaris non-global zone](#)
- [Generating environments file for SAP](#)
- [Configuring SAPNW04 preonline script](#)

## About configuring service groups for SAP NetWeaver

Configuring the SAP NetWeaver 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)
- Veritas Operations Manager
- The command-line

See [“Configuring service groups for SAP NetWeaver”](#) on page 67.

## Before configuring the service groups for SAP NetWeaver

Before you configure the SAP server service group, you must:

- Verify that VCS is installed and configured on all nodes in the cluster where you will configure the service group.  
Refer to the *Symantec Cluster Server Installation Guide* for more information.
- Verify that SAP NetWeaver is installed and configured identically on all nodes in the cluster.  
See [“About installing SAP NetWeaver for high availability”](#) on page 26.  
See [“About configuring SAP NetWeaver for high availability”](#) on page 27.
- Verify that the Symantec High Availability agent for SAP NetWeaver is installed on all nodes in the cluster.  
See [“Installing the agent in a VCS environment”](#) on page 49.
- Verify that the type definition for the Symantec High Availability agent for SAP NetWeaver is imported into the VCS engine.  
See [“Importing the agent types files in a VCS environment”](#) on page 56.

## Configuring service groups for SAP NetWeaver

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.

See *Symantec Cluster Server Installation Guide*.

The cluster should 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 faults 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.

**Perform the following steps to add a service group for SAP NetWeaver.**

- 1 Create a service group for SAPNW.

```
# hagrps -add SAP70-ERPASCS
```

For more details on creating a service group refer to, *Symantec Cluster Server Administrator's Guide*.

- 2 Modify the SystemList attribute for the group, to add systems.

For example,

```
# hagrps -modify SAP70-ERPASCS SystemList vcssx074 0 vcssx075 1
```

- 3 Create resources for NIC, IP, DiskGroup, Volume and Mount in the service group

For example,

```
# hares -add SAP70-ERPASCS_nic NIC SAP70-ERPASCS
```

```
# hares -add SAP70-ERPASCS_ip IP SAP70-ERPASCS
```

For more details on creating and modifying resource attributes for NIC, IP, DiskGroup, Volume and Mount refer to, *Bundled Agents Reference Guide*

- 4 Create links between the resources.

For example,

```
# hares -link SAP70-ERPASCS_ip SAP70-ERPASCS_nic
```

- 5 Create SAPNW04 resource for SAP NetWeaver.

For example,

```
# hares -add SAP70-ERPASCS_ascs SAPNW04 SAP70-ERPASCS
```

Based on the SAP instance you are clustering, modify the resource attributes. For more information on agent attributes,

See [“SAP NetWeaver agent attributes”](#) on page 57.

- 6

Create resource dependencies for SAPNW04 resource.
- The SAPNW04 resource depends on the IP and Mount resources.

# hares -link SAP70-ERPASCS\_ascs SAP70-ERPASCS\_ip
- 7

Verify the final resource dependencies for SAP server group.
- For example,

# hares -dep

Group	Parent	Child
SAP70-ERPASCS	SAP70-ERPASCS_ascs	SAP70-ERPASCS_mnt
SAP70-ERPASCS	SAP70-ERPASCS_ascs	SAP70-ERPASCS_ip
SAP70-ERPASCS	SAP70-ERPASCS_ip	SAP70-ERPASCS_nic
SAP70-ERPASCS	SAP70-ERPASCS_mnt	SAP70-ERPASCS_vol
SAP70-ERPASCS	SAP70-ERPASCS_vol	SAP70-ERPASCS_dg

# Creating Service Groups for Enqueue and Enqueue Replication Server under Solaris non-global zones

Note that for SAP Enqueue and Enqueue Replication Servers under Solaris non-global zones only the Enqueue or the Enqueue Replication server running inside the non-global zone fail over, in case of any faults in the application or zone.

Perform the following to create service groups for Enqueue and Enqueue Replication Server under Solaris non-global zones.

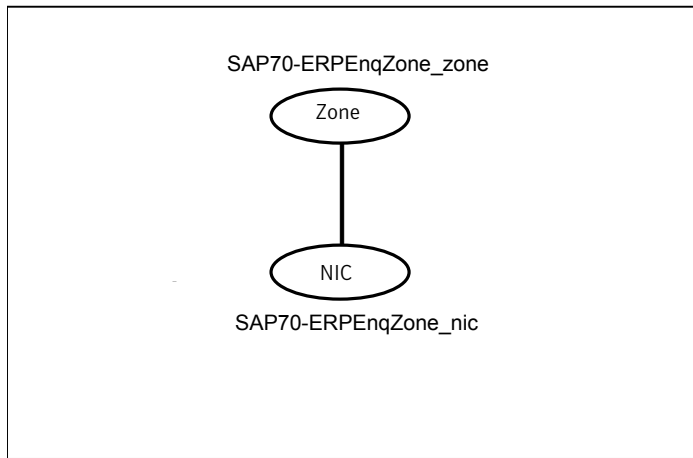
Step 1: Configure a parallel service group for zone resource.

The following figure shows the zone service group configuration for Enqueue and Enqueue Replication Server. This service group is a parallel service group with localized ZoneName attribute for each cluster system.

---

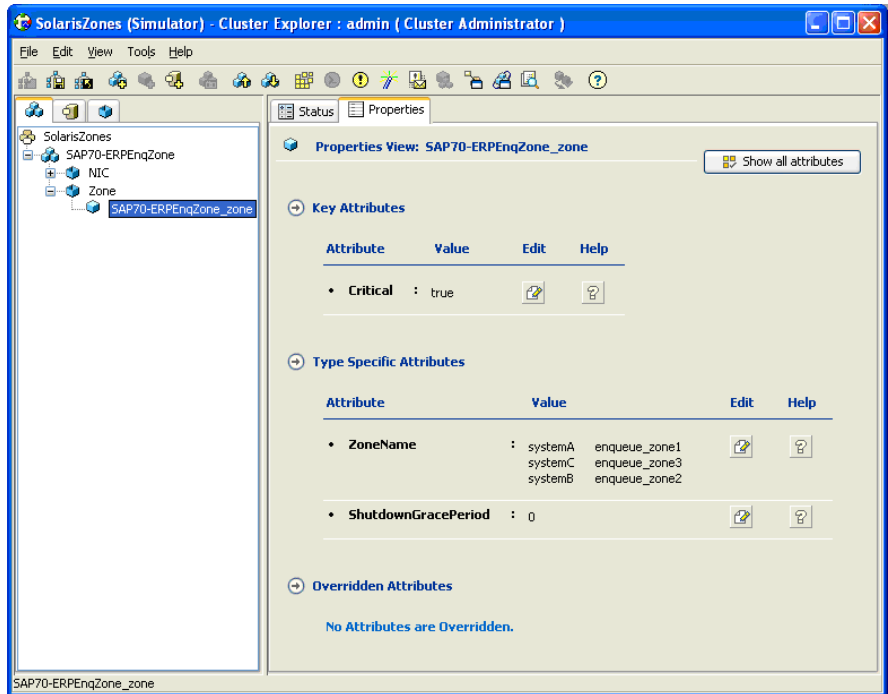
**Note:** If you have created zones for Enqueue and Enqueue Replication Server with same name on all the systems, it is not required to localize the ZoneName attribute.

---



You need not have the IP resource configured for the IP used for zone. When you start the zone, the IP is brought online automatically. When the zone is shut down, the IP is taken offline automatically.

The following figure shows the properties view for the zone service group.



Following is the sample main.cf for Zone service group.

```
group SAP70-ERPEnqZone (
  SystemList = { systemA = 0, systemB = 1, systemC = 2 }
  Parallel = 1
)

NIC SAP70-ERPEnqZone_nic (
  Device = bge0
  NetworkType = ether
)

Zone SAP70-ERPEnqZone_zone (
  ZoneName @systemA = enqueue_zone1
  ZoneName @systemB = enqueue_zone2
  ZoneName @systemC = enqueue_zone3
)

requires group SAP70-ERPEnqZone online global soft
SAP70-ERPEnqZone_mnt requires SAP70-ERPEnqZone_zone
```

SAP70-ERPEnqZone\_zone requires SAP70-ERPEnqZone\_nic

```
// resource dependency tree
//
// group SAP70-ERPEnqZone
// {
//   Mount SAP70-ERPEnqZone_mnt
//   {
//     Zone SAP70-ERPEnqZone_zone
//     {
//       NIC SAP70-ERPEnqZone_nic
//     }
//   }
// }
```

Perform the following steps to configure zones on each cluster node:

- Set up the non-global zone configuration.

```
hazonesetup servicegroup_name zoneres_name zone_name password
systems
```

**Example:** hazonesetup SAP70-ERPEnqZone SAP70-ERPEnqZone\_zone  
 enqueue\_zone1 XXXXX vcssun70

**For Solaris 11 zones:**

```
hazonesetup -g servicegroup_name -r zoneres_name -z zone_name
-p password -s systems
```

- Verify the non-global zone configuration

```
hazoneverify servicegroup_name
```

**Example:** hazoneverify SAP70-ERPEnqZone

Whenever you make a change that effects the zone configuration, run the hazonesetup command to reconfigure the zones in VCS.

Make sure that the zone configuration files are consistent on all nodes at all times. The file is located at /etc/zones/zone\_name.xml.

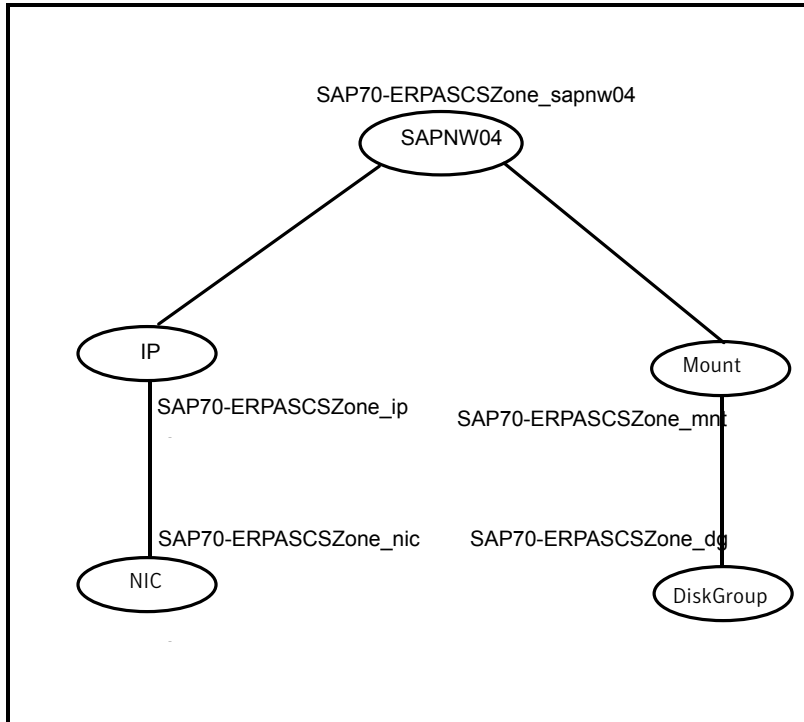
Make sure that the application is identical on all nodes. If you update the application configuration on one node, apply the same updates to all nodes.

Step 2: Create the service group for Enqueue Server.

After you configure the service group for zone resource, you can configure the service groups for Enqueue server.



The following figure shows the resource dependencies for Enqueue Server.



The service group is a failover service group with localized attribute ContainerName for its IP and SAPNW04 type resources.

The sample main.cf for the Enqueue Service group is as follows:

```

include "types.cf"
include "SAPMaxDBTypes.cf"
include "SAPNW04Types50.cf"

cluster SolarisZones (
  UserNames = { admin = ElmElgLimHmKumGlj }
  ClusterAddress = "127.0.0.1"
  Administrators = { admin }
)

system systemA (
)
  
```

```

system systemB (
)

system systemC (
)

group SAP70-ERPASCSZone (
  SystemList = { systemA = 0, systemB = 1, systemC = 2 }
)

DiskGroup SAP70-ERPASCSZone_dg (
  DiskGroup = saperpascs_dg
)

IP SAP70-ERPASCSZone_ip (
  Device = bge0
  Address = "10.212.98.200"
  NetMask = "255.255.254.0"
  ContainerName @systemA = enqueue_zone1
  ContainerName @systemB = enqueue_zone2
  ContainerName @systemC = enqueue_zone3
)

Mount SAP70-ERPASCSZone_mnt (
  MountPoint = "/usr/sap/ERP/ASCS20"
  BlockDevice = "/dev/vx/dsk/saperpascs_dg/saperpascs_vol"
  FSType = vxfs
  FsckOpt = "-y"
)

NIC SAP70-ERPASCSZone_nic (
  Device = bge0
  NetworkType = ether
)

SAPNW04 SAP70-ERPASCSZone_sapnw04 (
  EnvFile = "/home/erpadm/saperp.env"
  InstName = ASCS00
  InstType = ENQUEUE
  ProcMon = "ms en"
  SAPAdmin = erpadm
  SAPMonHome = "/usr/sap/ERP/ASCS20/exe"
  SAPSID = ERP

```

```

StartProfile = "/usr/sap/ERP/SYS/profile/START_ASCS20_saperpascs"
ContainerName @systemA = enqueue_zone1
ContainerName @systemB = enqueue_zone2
ContainerName @systemC = enqueue_zone3
)

requires group SAP70-ERPEnqZone online local firm
SAP70-ERPASCSSZone_mnt requires SAP70-ERPASCSSZone_dg
SAP70-ERPASCSSZone_ip requires SAP70-ERPASCSSZone_nic
SAP70-ERPASCSSZone_sapnw04 requires SAP70-ERPASCSSZone_mnt
SAP70-ERPASCSSZone_sapnw04 requires SAP70-ERPASCSSZone_ip

// resource dependency tree
//
// group SAP70-ERPASCSSZone
// {
//   SAPNW04 SAP70-ERPASCSSZone_sapnw04
//   {
//     Mount SAP70-ERPASCSSZone_mnt
//     {
//       DiskGroup SAP70-ERPASCSSZone_dg
//     }
//     IP SAP70-ERPASCSSZone_ip
//     {
//       NIC SAP70-ERPASCSSZone_nic
//     }
//   }
// }

```

**Step 3: Perform the following steps to authenticate Enqueue Server service group under zones with VCS.**

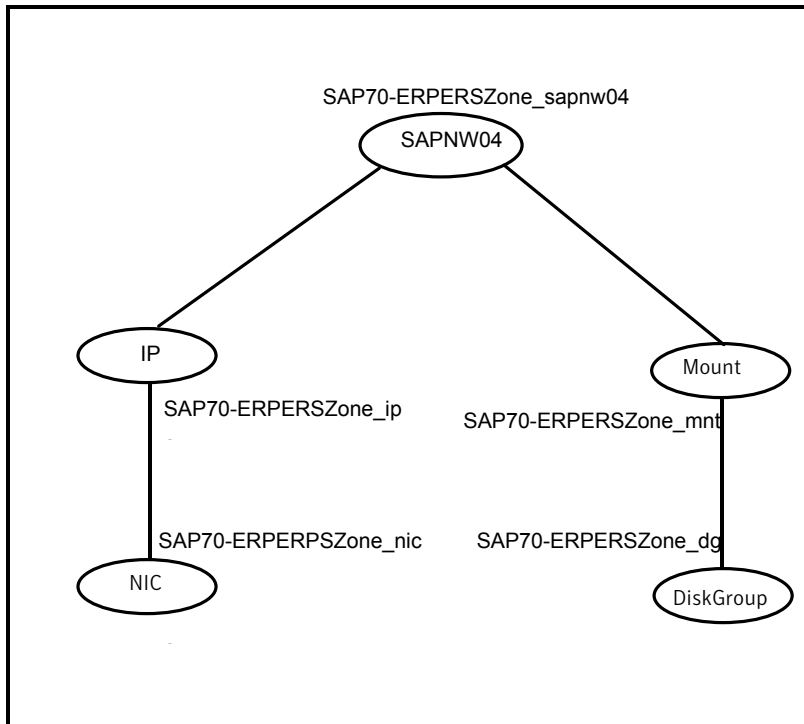
- **Authenticate zones under VCS configuration, using the following command:**  
`#hazonesetup servicegroup_name zoneresource_name zonename password systems`  
 For example,  
`# hazonesetup SAP70-ERPASCSSZone SAP70-ERPEnqZone_zone enqueue_zone1 XXXXX vcssx074`
- **Verify the non-global zone configuration, using the following command.**  
`# hazoneverify servicegroup_name`  
 For example,  
`# hazoneverify SAP70-ERPASCSSZone`

- Repeat the above two steps on all the nodes where Enqueue Server Service Group is configured.

Step 4: Create the service group for Enqueue Replication Server.

After you configure the service group for zone resource and Enqueue Server, you can configure the service group for Enqueue Replication server.

The following figure shows the resource dependencies for Enqueue Replication Server.



The service group is a failover service group with localized ContainerName attribute for its IP and SAPNW04 type resources.

The sample main.cf for Enqueue Replication Server group is shown as follows.

```

include "types.cf"
include "SAPMaxDBTypes.cf"
include "SAPNW04Types50.cf"

cluster SolarisZones (
  UserNames = { admin = ElmElgLimHmMkumGlj }

```

```

ClusterAddress = "127.0.0.1"
Administrators = { admin }
)

system systemA (
)

system systemB (
)

system systemC (
)

group SAP70-ERPERSZone (
  SystemList = { systemA = 0, systemB = 1, systemC = 2 }
)

DiskGroup SAP70-ERPERSZone_dg (
  DiskGroup = saperpers_dg
)

IP SAP70-ERPERSZone_ip (
  Device = bge0
  Address = "10.212.98.202"
  NetMask = "255.255.254.0"
  ContainerName @systemA = enqueue_zone1
  ContainerName @systemB = enqueue_zone2
  ContainerName @systemC = enqueue_zone3
)

Mount SAP70-ERPERSZone_mnt (
  MountPoint = "/usr/sap/ERP/ERS23"
  BlockDevice = "/dev/vx/dsk/saperpers_dg/saperpers_vol"
  FSType = vxfs
  FsckOpt = "-y"
)

NIC SAP70-ERPERSZone_nic (
  Device = bge0
  NetworkType = ether
)

SAPNW04 SAP70-ERPERSZone_sapnw04 (

```

```

EnqSrvResName = SAP70-ERPASCSSZone_sapnw04
EnvFile = "/home/erpadm/saperp.env"
InstName = ERS23
InstType = ENQREP
ProcMon = er
SAPAdmin = erpadm
SAPMonHome = "/usr/sap/ERP/ERS23/exe"
SAPSID = ERP
StartProfile = "/usr/sap/ERP/SYS/profile/START_ERS23_saperpers"
ContainerName @systemA = enqueue_zone1
ContainerName @systemB = enqueue_zone2
ContainerName @systemC = enqueue_zone3
)

```

```

requires group SAP70-ERPEnqZone online local firm
SAP70-ERPERSZone_sapnw04 requires SAP70-ERPERSZone_ip
SAP70-ERPERSZone_sapnw04 requires SAP70-ERPERSZone_mnt
SAP70-ERPERSZone_ip requires SAP70-ERPERSZone_nic
SAP70-ERPERSZone_mnt requires SAP70-ERPERSZone_dg

```

```

// resource dependency tree
//
// group SAP70-ERPERSZone
// {
//   SAPNW04 SAP70-ERPERSZone_sapnw04
//   {
//     IP SAP70-ERPERSZone_ip
//     {
//       NIC SAP70-ERPERSZone_nic
//     }
//     Mount SAP70-ERPERSZone_mnt
//     {
//       DiskGroup SAP70-ERPERSZone_dg
//     }
//   }
// }

```

**Step 5: Perform the following steps to authenticate Enqueue Replication Server service group under zones with VCS.**

- **Authenticate zones under VCS configuration, using the following command:**  
*#hazonesetup servicegroup\_name zoneresource\_name zonename password systems*

For example,

```
# hazonesetup SAP70-ERPERSZone SAP70-ERPEnqZone_zone  
enqueue_zone1 XXXXX vcssx074
```

- Verify the non-global zone configuration, using the following command.  

```
# hazoneverify servicegroup_name
```

For example,

```
# hazoneverify SAP70-ERPERSZone
```
- Repeat the above two steps on all the nodes where Enqueue Server Service Group is configured.

## Mounting NFS file system inside Solaris non-global zone

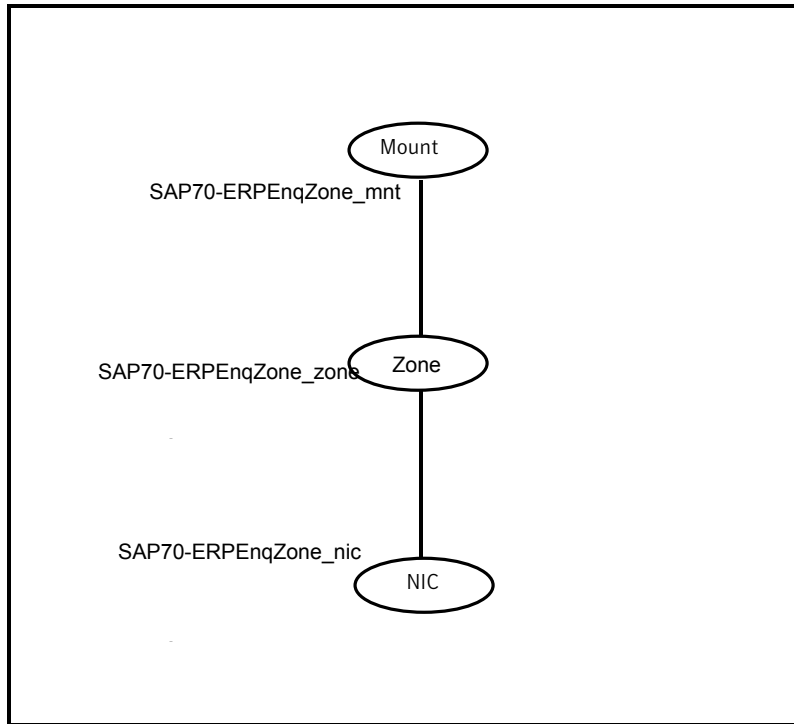
For SAP to function inside Solaris non-global zones the SAP central file system must be available inside the zone. To achieve this, share the SAP central file system on all the client machines using Network File Systems (NFS). One system exports and shares the central file system and others access the file system using NFS mount.

This process is tricky in Solaris non-global zones. If you mount the central file system in the global zone using NFS and try to access it in the non-global zone using loop back filesystem (lofs), NFS will not allow this. Due to limitations in NFS protocol you cannot loop back file system (lofs) for already NFS mounted file system.

To overcome this issue, you must mount the central file system directly inside the non-global zone using NFS. Alternatively, you can use Veritas Cluster File Systems (CFS).

Following is the sample service group for the Zone resource with NFS mount in the non-global zone with localized ContainerName attribute.

**Figure 5-1** Service group for the Zone resource with NFS mount



```

include "types.cf"

group SAP70-ERPEnqZone (
  SystemList = { systemA = 0, systemB = 1, systemC = 2 }
  Parallel = 1
)

Mount SAP70-ERPEnqZone_mnt (
  MountPoint = "/sapmnt/ERP"
  BlockDevice = "saperpnfs:/export/sapmnt/ERP"
  FSType = nfs
  MountOpt = rw
  ContainerName @systemA = enqueue_zone1
  ContainerName @systemB = enqueue_zone2
  ContainerName @systemC = enqueue_zone3
)

NIC SAP70-ERPEnqZone_nic (

```



```

Device = bge0
NetworkType = ether
)

Zone SAP70-ERPEnqZone_zone (
  ZoneName @systemA = enqueue_zone1
  ZoneName @systemB = enqueue_zone2
  ZoneName @systemC = enqueue_zone3
)

requires group SAP70-ERPENFS online global soft
SAP70-ERPEnqZone_mnt requires SAP70-ERPEnqZone_zone
SAP70-ERPEnqZone_zone requires SAP70-ERPEnqZone_nic

// resource dependency tree
//
// group SAP70-ERPEnqZone
// {
//   Mount SAP70-ERPEnqZone_mnt
//   {
//     Zone SAP70-ERPEnqZone_zone
//     {
//       NIC SAP70-ERPEnqZone_nic
//     }
//   }
// }

```

## Generating environments file for SAP

Symantec recommends using a custom generated environments file to configure the EnvFile attribute of the SAPNW04 agent. The steps to generate the environments file for SAP applications are given as follows.

### To generate the environments file for SAP applications

- 1 Login as *SAPAdmin* user.

```
su - erpadm
```

- 2 Capture the environment with the following command.

```
env > /home/erpadm/saperp.env
```

- 3 Adopt this file according to the *SAPAdmin* user shell environment.

For example, if the generated file contains environments for bash shell and SAPAdmin user shell is C shell, convert the file to C shell environments with the following steps:

- Edit the `saperp.env` file to add string 'setenv' at the beginning of each line.
  - Replace the '=' with space " " in the file.
- 4 Copy the `saperp.env` file to shared directory and use it as the SAP instance's environments file in `EnvFile` attribute. Ensure that the permissions are set properly for user *SAPAdmin*.

```
chmod 755 saperp.env
```

## Configuring SAPNW04 preonline script

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

- If a standalone 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 SAPNW04 preonline script facilitates proper Enqueue server failover behavior. The existing VCS preonline script calls the SAPNW04 preonline script.

The SAPNW04 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.

**To configure the VCS preonline script in the VCS 4.x and 5.0 environments**

- 1 Create a symlink for the preonline script to the monitor script by running the following commands.

---

**Note:** You need to create this link only if the package installer has failed to create it.

---

4.x	<pre>cd /opt/VRTSvc/bin/SAPNW04 ln -s /opt/VRTSvc/bin/SAPNW04/monitor preonline</pre>
5.x	<pre>cd /opt/VRTSagents/ha/bin/SAPNW04 ln -s /opt/VRTSagents/ha/bin/SAPNW04/monitor preonline</pre>

- 2 Navigate to the \$VCS\_HOME/bin/triggers directory.

- 3 In the preonline file, add these lines to integrate the call to the SAPNW04 preonline trigger, in the main trigger script.

If you do not find the preonline file, proceed to step 4.

```
eval 'exec /opt/VRTSperl/bin/perl -Sw $0 ${1+"$@"}'
    if 0;
use strict;
use vars;
my $vcs_home = $ENV{"VCS_HOME"};
if (!defined ($vcs_home)) {
    $vcs_home="/opt/VRTSvcs";
}
use ag_i18n_inc;
VCSAG_SET_ENVS();
if (!defined $ARGV[0]) {
    VCSAG_LOG_MSG ("W",
"Failed to continue; undefined system name", 15028);
    exit;
} elsif (!defined $ARGV[1]) {
    VCSAG_LOG_MSG ("W",
"Failed to continue; undefined group name", 15031);
    exit;
}
# Add the SAPNW04 Trigger Call here...
#-----
# Define variables..
#-----
my $sCmd = '/opt/VRTSvcs/bin/SAPNW04/preonline';
```

For VCS 5.0, the value of \$sCmd must be equal to  
/opt/VRTSagents/ha/bin/SAPNW04/preonline.

```
my $sResLogLevel = 'TRACE'; # Define logging level..
my @lsCmdArgs = ( @ARGV, $sResLogLevel ); # Insert logging level..
my $sArgs = join ( ' ', @lsCmdArgs);
my $iExitCode = undef;
#-----
# Pass control to preonline, if it exists..
#-----
if ( -x $sCmd ) {
    VCSAG_LOG_MSG ("I", "Preonline Cmd [$sCmd]
    Args [$sArgs]", 15031);
```

```

system ( $sCmd, @lsCmdArgs );
#-----
# Exit if successful..
#-----
exit $iExitCode unless ( $iExitCode = $?>> 8 );
}
# give control back to HAD.
if (defined $ARGV[3]) {
    system("$vcs_home/bin/hagrp -online -nopre $ARGV[1] -sys
$ARGV[0] -checkpartial $ARGV[3]");
    exit;
}
system("$vcs_home/bin/hagrp -online -nopre $ARGV[1]
-sys $ARGV[0]");
exit;

```

**4** If the VCS preonline trigger script is not present, you can do the following:

- Pick the sample preonline script present in the following directory.

4.x                      /etc/VRTSvcs/conf/sample\_SAPNW04

5.x                      /etc/VRTSagents/ha/conf/SAPNW04

- Copy this file in the \$VCS\_HOME/bin/triggers directory.

- Ensure that the file is executable, and accessible to the "root" user.
- 5 For the service group, set the preonline flag to True.

For 4.x and 5.0 use,

```
hagrp -modify service_group PreOnline 1
```

For 5.1 use,

```
hagrp -modify service_group PreOnline 1 -sys system
```

The preonline script is now configured to facilitate Enqueue server behavior. To configure the logging level used in the preonline script, you can set the ResLogLevel attribute in the preonline wrapper. You can then view the logs in the VCS engine log, /var/VRTSvcs/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 4.x and 5.0,

```
# hagrp -modify service_group PreOnline 0
```

For VCS 5.1 use the following command on each system

```
# hagrp -modify service_group PreOnline 0 -sys system
```

---

### To configure the VCS preonline script in the VCS 3.5 environment

- 1 For the service group, set the preonline flag to true.

```
hagrp -modify service_group PreOnline 1
```

- 2 Go to the /opt/VRTSvcs/bin/triggers directory.

- 3 In the preonline file, add these lines to integrate the call to the SAPNW04 preonline trigger:

In the main trigger script, after the #Put your code here... line, add these lines:

```
# Add the SAPNW04 Trigger Call here...
#-----
# Define variables..
#-----
my $sCmd = '/opt/VRTSvcs/bin/SAPNW04/preonline';
my $sResLogLevel = 'INFO';           # Define logging level..
my @lsCmdArgs = ( @ARGV, $sResLogLevel ); # Insert logging level..
my $iExitCode = undef;

#-----
# Pass control to preonline, if it exists..
#-----
if ( -x $sCmd ) {
    system ( $sCmd, @lsCmdArgs );

    #-----
    # Exit if we were successful..
    #-----
    exit $iExitCode unless ( $iExitCode = $?>> 8 );
}
```

- 4 If the VCS 3.5 preonline trigger script is not present, you can do the following:

- Pick the sample preonline script present in the /opt/VRTSvcs/bin/sample\_triggers directory. Copy this file in the /opt/VRTSvcs/bin/triggers directory.
- Ensure that the file is executable, and accessible to the "root" user.
- Create a symlink for the preonline script to the monitor script by running these commands:
 

```
cd /opt/VRTSvcs/bin/SAPNW04
ln -s /opt/VRTSvcs/bin/SAPNW04/monitor preonline
```

The preonline script is now configured to facilitate Enqueue server behavior in the VCS 3.5 environment. To configure the logging level used in the preonline script, you can set the ResLogLevel attribute in the preonline wrapper. You can then view the logs in the VCS engine log, /var/VRTSvcs/log/engine\_A.log.

# Troubleshooting the agent for SAP NetWeaver

This chapter includes the following topics:

- [Using the correct software and operating system versions](#)
- [Meeting prerequisites](#)
- [Configuring SAP server resources](#)
- [Starting the SAP server instance outside a cluster](#)
- [Reviewing error log files](#)
- [Checks for an SAP Java Add-in instance](#)
- [Configuration checks for Solaris zones support](#)
- [Configuration checks for using the agent in the VCS 3.5 environment](#)
- [Handling the pkgadd and pkgrm script errors for Solaris non-global zones](#)

## Using the correct software and operating system versions

Ensure that no issues arise due to incorrect software and operating system versions.

For information on the software versions that the agent for SAP NetWeaver supports, see the Symantec Operations Readiness Tools (SORT) site:

<https://sort.symantec.com/agents>.



## Meeting prerequisites

Before installing the agent for SAP NetWeaver, double check that you meet the prerequisites.

For example, you must install the ACC library on VCS before installing the agent for SAP NetWeaver.

See [“Before you install the Symantec High Availability agent for SAP NetWeaver”](#) on page 46.

## Configuring SAP server resources

Before using SAP server resources, ensure that you configure the resources properly. For a list of attributes used to configure all SAP server resources, refer to the agent attributes.

See [“SAP NetWeaver agent attributes”](#) on page 57.

## Starting the SAP server instance 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 server instance independent of the cluster framework. Refer to the cluster documentation for information about disabling a resource.

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

---

**Note:** While restarting the SAP instance outside the cluster framework, use the same parameters as that configured for the VCS SAP resource.

---

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

### To restart the SAP instance outside the cluster framework

- 1 Log in as superuser.
- 2 Ensure that the SAP database is up and running. Refer to the relevant database documentation or consult your database administrator for more information.

**3 Use the SAPAdmin attribute to log in to the SAP server.**

```
# su SAPAdmin
$ USER=SAPAdmin; LOGNAME=SAPAdmin; HOME=/home/SAPAdmin
$ export USER LOGNAME HOME
$ . EnvFile
```

For certain shell versions on AIX, LOGNAME is read-only.

**4 Start the SAP server to run the instance:**

```
$ sapstart pf=StartProfile
```

For SAP NetWeaver 2004s, execute the `sapstartsrv` command before executing the `sapstart` command:

```
$ sapstartsrv pf=StartProfile -D -u SAPAdmin
```

**5 Ensure that the SAP instance is running successfully by running the `grep` command for `InstName`.**

For example, for an SAP Central instance:

```
$ ps -ef | grep InstName
```

As a result, the following processes running on the system must be displayed.

- 'dw' processes for CENTRAL and DIALOG instances.
- 'en' and 'ms' processes for [A|J]ENQUEUE instance.
- 'er' or 'enr' process for [A|J]ENQREP instance.
- 'jc' processes for an SAP Java instance.

For example,

```
jc.sapSAPSID_InstNamepf=/usr/sap/SAPSID/SYS/profile/
SAPSID_InstName_VirtualHostName
```

- 'jcontrol' processes for an SAP Java Add-In instance, after you specify dw jc in the value of the ProcMon attribute.

For example:

```
jcontrol pf=/usr/sap/SAPSID/SYS/profile/
SAPSID_InstName_VirtualHostName
```

If the SAP instance is working outside the cluster framework, you can attempt to restart the SAP server within the framework.

# Reviewing error log files

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

## Using SAP server log 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 `/usr/sap/SAPSID/InstName/work` directory.

## Reviewing cluster log files

In case of problems while using the agent for SAP NetWeaver, you can access the engine log file for more information about a particular resource. The engine log file is located at `/var/VRTSvcs/log/engine_A.log`.

Additionally, you can also refer to the latest SAPNW04 agent log files located at `/var/VRTSvcs/log/SAPNW04_A.log`

---

**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 server resource. You can set this attribute to `TRACE`, which enables very detailed and verbose logging.

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

---

**Note:** Starting with version 5.1.1.0 of the ACC library, the `TRACE` level logs for any `ACCLib` based agent are generated locally at the location `/var/VRTSvcs/log/Agent_A.log`.

---



---

**Warning:** You may consider temporarily increasing the timeout values for `SAPNW04` 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.

## Using trace level logging for preonline trigger

While executing the preonline trigger, you can set the ResLogLevel attribute to TRACE, to enable detailed logging.

See [“Configuring SAPNW04 preonline script”](#) on page 82.

### To set the ResLogLevel attribute for preonline trigger

- 1 Go to the \$VCS\_HOME/bin/triggers directory.
- 2 Open the preonline file, and go to this section:

```
#-----
# Define variables..
#-----
my $sCmd = '/opt/VRTSagents/ha/bin/SAPNW04/preonline';
my $sResLogLevel = 'INFO'; # Define logging level..
my @lsCmdArgs = ( @ARGV, $sResLogLevel ); # Insert logging level..
my $sArgs = join ( ' ', @lsCmdArgs );
my $iExitCode = undef;
```

### 3 Edit the value of the ResLogLevel attribute:

```
#-----
# Define variables..
#-----
my $sCmd = '/opt/VRTSagents/ha/bin/SAPNW04/preonline';
my $sResLogLevel = 'TRACE'; # Define logging level..
my @lsCmdArgs = ( @ARGV, $sResLogLevel ); # Insert logging level..
my $sArgs = join ( ' ', @lsCmdArgs );
my $iExitCode = undef;
```

### 4 Save and close the preonline file.

You can view the logs in the VCS engine log at /var/VRTSvcs/log/engine\_A.log and the agent log at /var/VRTSvcs/log/SAPNW04\_A.log.

## Checks for an SAP Java Add-in instance

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

- The SAP resources running the ABAP and Java Standalone Enqueue server instances are in the same Service Group, preferably configured in different service groups.
- The SAP resources running the ABAP and Java Enqueue Replication server instances, are in the same Service Group, preferably configured in different service group.

---

**Note:** Symantec recommends to configure the ABAP Enqueue and Java Enqueue Replication server instances in different service groups.

---

- For the Standalone Enqueue server instances, the value of the InstType attribute is not ENQUEUE, if they are configured in the same VCS Service Group. The values are as follows:
  - For ABAP: AENQUEUE
  - For Java: JENQUEUE
- For the Enqueue Replication server instances, the value of the InstType attribute is not ENQREP, if they are configured in the same VCS Service Group. The values are as follows:
  - For ABAP: AENQREP

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

## Configuration checks for Solaris zones support

If you have configured VCS to support Solaris zones, ensure that you have followed all the configuration steps described in the following sections:

- Prerequisites for enabling Solaris zone support  
See [“Before you install the Symantec High Availability agent for SAP NetWeaver”](#) on page 46.
- Importing the types.cf file for Solaris zone support  
See [“Importing the agent types files in a VCS environment”](#) on page 56.
- Configuring the SAP resources for Solaris zone support  
See [“Setting up zones on Solaris for SAP Enqueue and Enqueue Replication Servers”](#) on page 33.

## Configuration checks for using the agent in the VCS 3.5 environment

On the HP-UX platform, if you are using VCS in the VCS 3.5 environment, ensure that you perform the following configuration steps:

- Install the correct version of Perl while using VCS in the VCS 3.5 environment.  
See [“Preventing early faulting of Java and Add-in instances”](#) on page 64.
- If you are using the preonline trigger, configure the preonline trigger file correctly.  
See [“Configuring SAPNW04 preonline script”](#) on page 82.

# Handling the pkgadd and pkgrm script errors for Solaris non-global zones

While installing or removing the agent in a Solaris non-global zone, you may experience the following errors:

For package installation

```
pkginstall: ERROR: postinstall script did not complete successfully
```

The `pkgadd` command used to install the agent package may throw this error message, if the Solaris non-global zone is in the installed state.

Workaround:

Ignore the error and boot the zone. Once the zone is booted, configure the preonline script for the resource.

For details on configuring the preonline script,

See [“Configuring SAPNW04 preonline script”](#) on page 82.

Alternatively, perform the following steps:

- Uninstall the agent package from the node.  
See [“Uninstalling the agent in a VCS environment”](#) on page 51.
- Boot the zone on the node.
- Install the package on the node.  
See [“Installing the agent in a VCS environment”](#) on page 49.
- Create the preonline link `/opt/VRTSagents/ha/bin/AgentName`  
See [“Configuring SAPNW04 preonline script”](#) on page 82.

For package uninstallation

```
pkgrm: ERROR: postremove script did not complete successfully
```

The `pkgrm` command used to uninstall the agent may throw this error message, if the Solaris non-global zone is in installed state.

Workaround:

Perform the following steps:

- Ignore the error and boot the zone.
- Check for any traces of the agent package in the following directories:
  - `/etc/VRTSagents/ha/conf/AgentName`
  - `/opt/VRTSagents/ha/bin/AgentName`

- `/opt/VRTS/messages/en/*AgentName.bmc`
- Remove the traces found, if any.



# Sample Configurations

This appendix includes the following topics:

- [About sample configurations for the agent for SAP NetWeaver](#)
- [Sample agent type definition for SAP NetWeaver](#)
- [Sample SAP resource configuration](#)
- [Sample service group configuration for ABAP and Java architectures](#)
- [Sample service group configuration for Add-in \(ABAP + Java \) installation type](#)
- [Sample SAP NetWeaver service group configurations for Solaris zone support](#)
- [Sample service group dependency for SAP NetWeaver](#)

## About sample configurations for the agent for SAP NetWeaver

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

## Sample agent type definition for SAP NetWeaver

After importing the agent types into the cluster, if you save the configuration on your system disk using the `haconf -dump` command, you can find the `SAPNW04Types.cf` file in the `/etc/VRTSvcs/conf/config` cluster configuration directory.

An excerpt from this file follows.

```
type SAPNW04 (
    static str ArgList[] = { ResLogLevel, State, IState,
        EnqSrvResName, EnvFile, InstName, InstType,
        MonitorProgram, ProcMon, SAPAdmin, SAPMonHome,
        SAPSID, SecondLevelMonitor, StartProfile }
    str ResLogLevel = INFO
    str EnqSrvResName
    str EnvFile
    str InstName
    str InstType = CENTRAL
    str MonitorProgram
    str ProcMon
    str SAPAdmin
    str SAPMonHome
    str SAPSID
    int SecondLevelMonitor = 0
    str StartProfile
)
```

## 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.

The four basic configurations include a Central instance, a Dialog instance, an Enqueue server and an Enqueue Replication server.

### Sample SAP Central instance

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

```
SAPNW04 SAP70-ERPCI_sapnw04 (
    EnvFile = "/usr/sap/ERP/saperp.env"
    InstName = DVEBMGS05
    InstType = CENTRAL
    MonitorProgram = "/home/erpadm/scripts/\
    MonitorProgram.sh"
    ProcMon = "dw ig se co"
    ResLogLevel = INFO
    SAPAdmin= erpadm
    SAPMonHome = "/usr/sap/ERP/sapinfo/rfcsdk/bin"
```

```
SAPSID = ERP
SecondLevelMonitor = 1
StartProfile = "/usr/sap/ERP/SYS/profile/\
START_DVEBMGS05_saperpci"
)
```

## Sample SAP Dialog instance

An excerpt of the main.cf file for a SAP Dialog instance is as follows.

```
SAPNW04 SAP70-ERPDI_sapnw04 (
    EnvFile = "/usr/sap/ERP/saperp.env"
    InstName = D006
    InstType = DIALOG
    MonitorProgram = "/home/erpadm/scripts/\
MonitorProgram.sh"
    ProcMon = "dw ig se"
    ResLogLevel = INFO
    SAPAdmin= erpadm
    SAPMonHome = "/usr/sap/ERP/sapinfo/rfcsdk/bin"
    SAPSID = ERP
    SecondLevelMonitor = 1
    StartProfile = "/usr/sap/ERP/SYS/profile/\
START_D06_saperpdi"
)
```

## Sample SAP Enqueue Server instance

An excerpt of the main.cf file for an SAP Enqueue Server instance is as follows.

```
SAPNW04 SAP70-ERPASCS_sapnw04 (
    EnvFile = "/usr/sap/ERP/saperp.env"
    InstName = ASCS04
    InstType = ENQUEUE
    MonitorProgram = "/home/erpadm/scripts/\
MonitorProgram.sh ASCS04"
    ProcMon = "ms en"
    ResLogLevel = INFO
    SAPAdmin= erpadm
    SAPMonHome = "/usr/sap/ERP/SYS/exe/run"
    SAPSID = ERP
    SecondLevelMonitor = 1
    StartProfile = "/usr/sap/ERP/SYS/profile/\
```

```

START_ASCS04_saperpascscs"
)

```

## Sample SAP Enqueue Replication Server instance

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

```

SAPNW04 SAP70-ERPERS_sapnw04 (
    EnvFile = "/usr/sap/ERP/saperp.env"
    InstName = ERS08
    InstType = ENQREP
    MonitorProgram = "/home/erpadm/scripts/\
MonitorProgram.sh ERS08"
    ProcMon = "er"
    ResLogLevel = INFO
    SAPAdmin= erpadm
    SAPMonHome = "/usr/sap/ERP/SYS/exe/run"
    SAPSID = ERP
    SecondLevelMonitor = 1
    StartProfile = "/usr/sap/ERP/SYS/profile/\
START_ERS08_saperpers"
)

```

## Sample service group configuration for ABAP and Java architectures

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 Central instance server or the Enqueue server must be dependent on the database server.
- Each SAP instance (Central, Dialog, Enqueue, and Enqueue Replication) should have a separate virtual IP address assigned to facilitate network transparency.
- Each SAP instance (Central, Dialog, 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 NFS or any application such as Veritas Foundation Suite's Cluster File System (CFS).

Figure A-1 shows a sample service group configuration for Central instance.

**Figure A-1** Service group configuration for Central instance

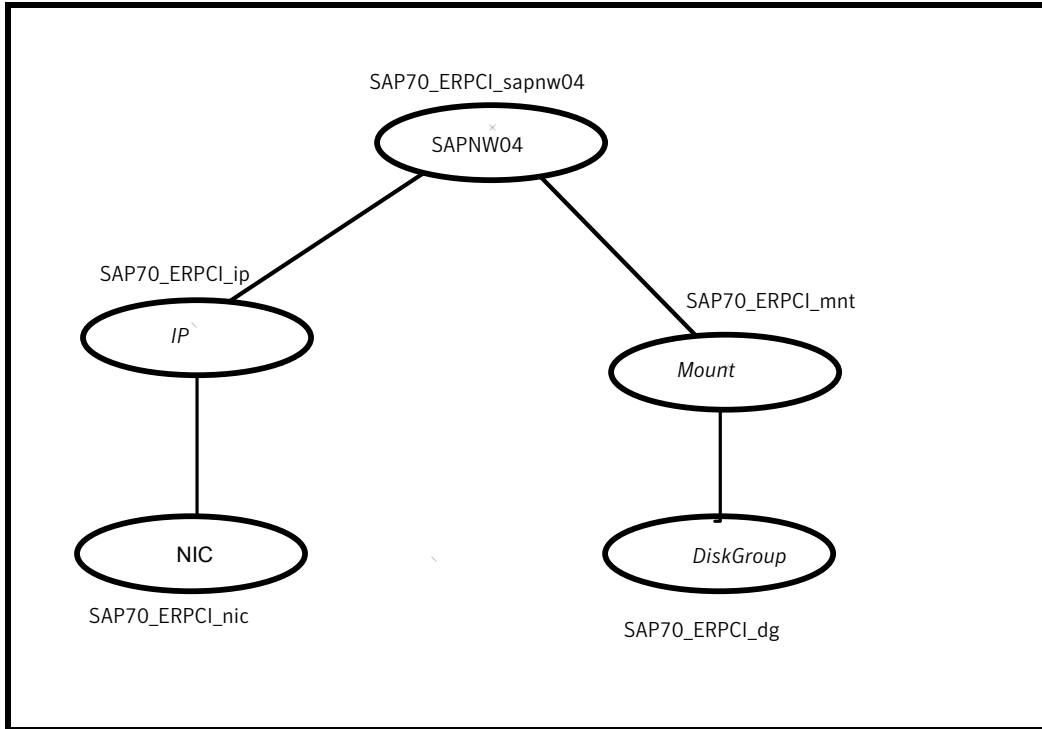


Figure A-2 shows a sample service group configuration for Dialog instance.

**Figure A-2** Service group configuration for Dialog instance

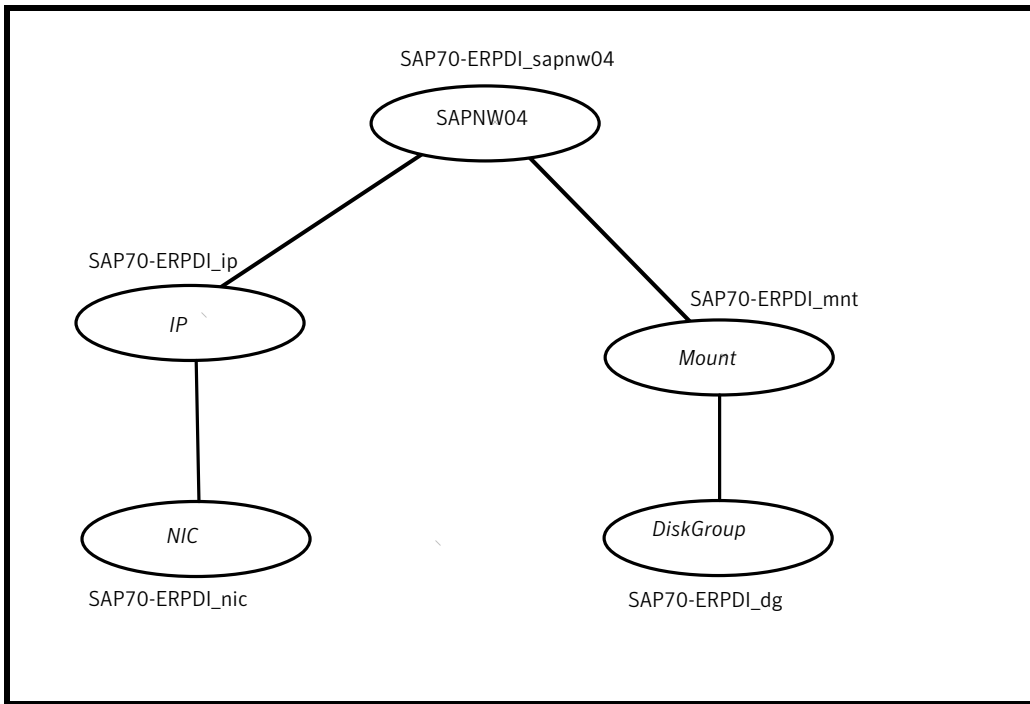


Figure A-3 shows a sample service group configuration for Enqueue Server instance.

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

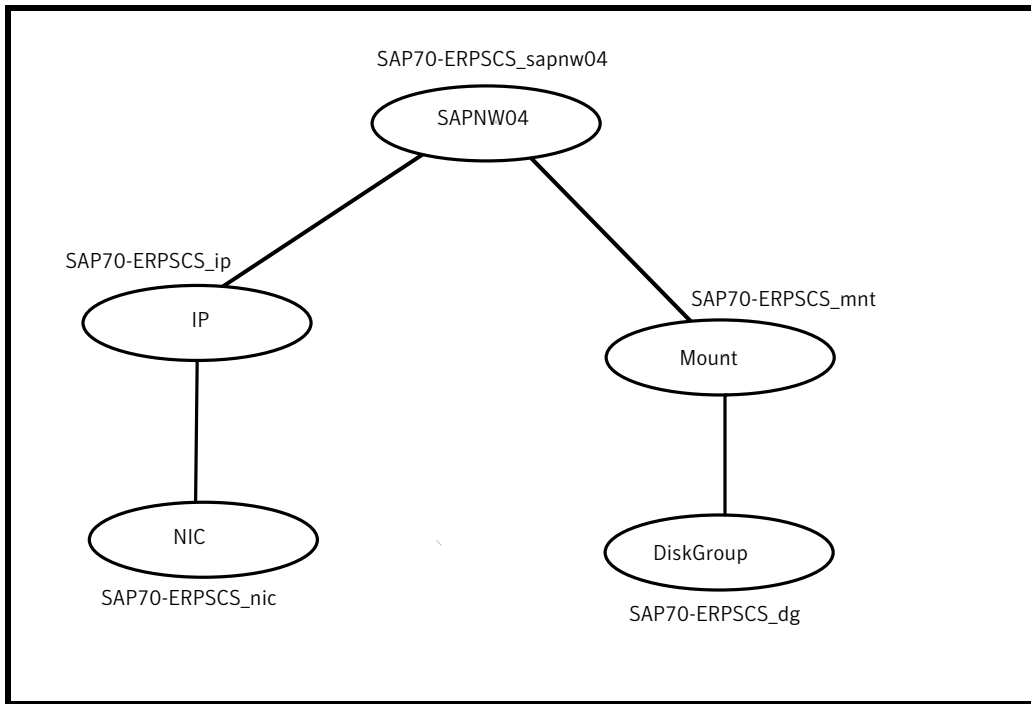
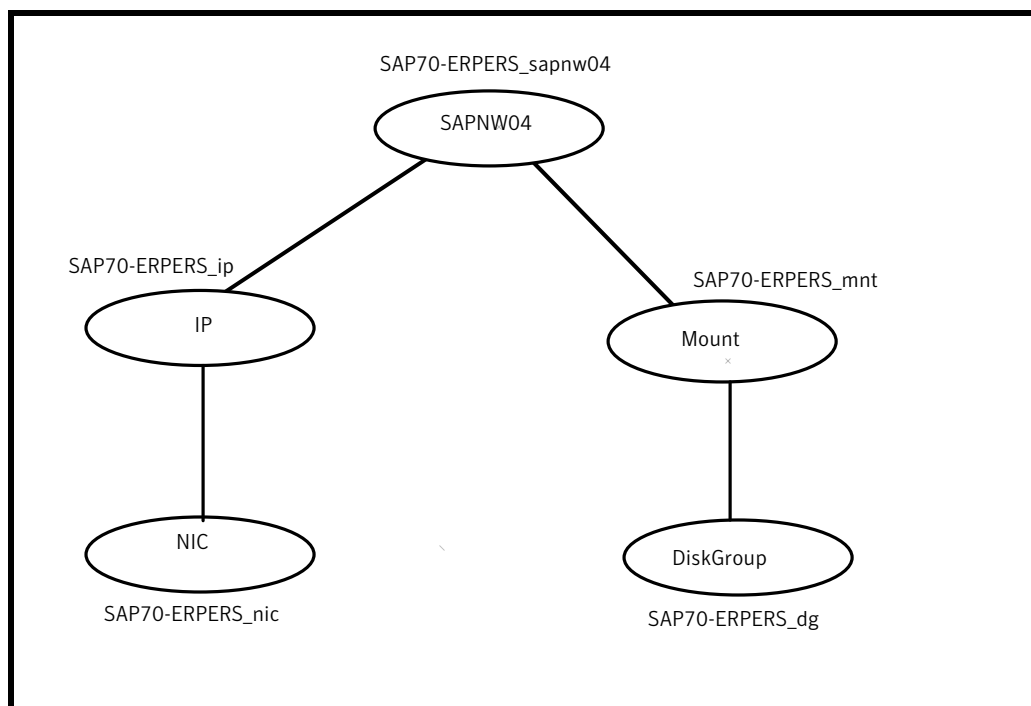


Figure A-4 shows a sample service group configuration for Enqueue Replication Server instance.

**Figure A-4** Service group configuration for Enqueue Replication Server instance



## Sample service group configuration for Add-in (ABAP + Java ) installation type

The characteristics of the configuration design for this installation type are as follows:

- The Central instance server, and Java and ABAP Enqueue server Service Group must be globally dependent on the database server Service Group.
- The Java and ABAP Enqueue servers and the Central instance must be optionally configured in one Service Group.

---

**Note:** Symantec recommends to configure Enqueue servers and Central instance in separate service groups.

---

- If Enqueue Servers are configured on different service groups, the ABAP and Java Enqueue Replication servers must be configured in two different service groups.



- To facilitate network transparency, the following holds true:
  - Each SAP server that hosts a Central or Dialog instance must have a separate virtual IP address.
  - The ABAP and Java Enqueue Server, and the Central instance optionally have the same Virtual IP address.

---

**Note:** Symantec recommends to have two different virtual IPs for Enqueue servers and Central instance.

---

- The ABAP and Java Enqueue Replication servers must have different virtual IP address, if they are configured in different service groups.
- To facilitate cluster node transparency, each SAP server that hosts a Central, Dialog, ABAP Enqueue, Java Enqueue, Java and ABAP Enqueue Replication instances must be placed on shared disk.
- Common file systems that include profile, global, and transaction file systems must be managed from one or more shared disk objects. These systems must be available to the SAP application through applications, such as NFS, Cluster File System, and so on.

Figure A-5 shows a sample service group configuration for Java Add-in Enqueue Server and Central instances.

**Figure A-5** Java Add-in Enqueue Server and Central instance configuration

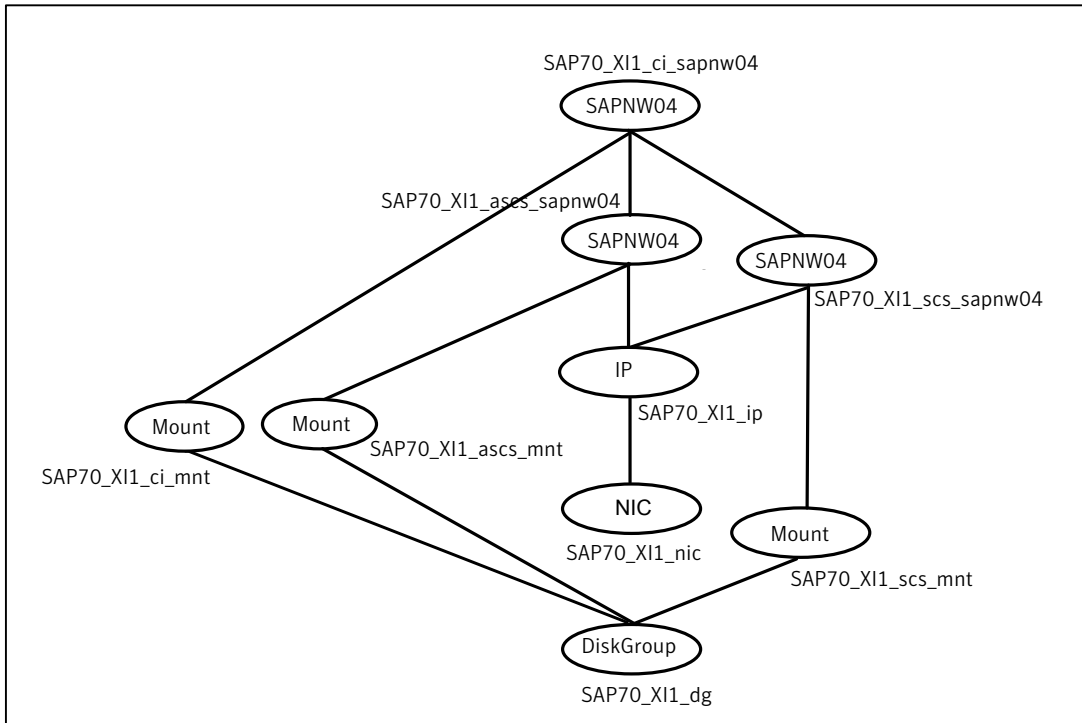
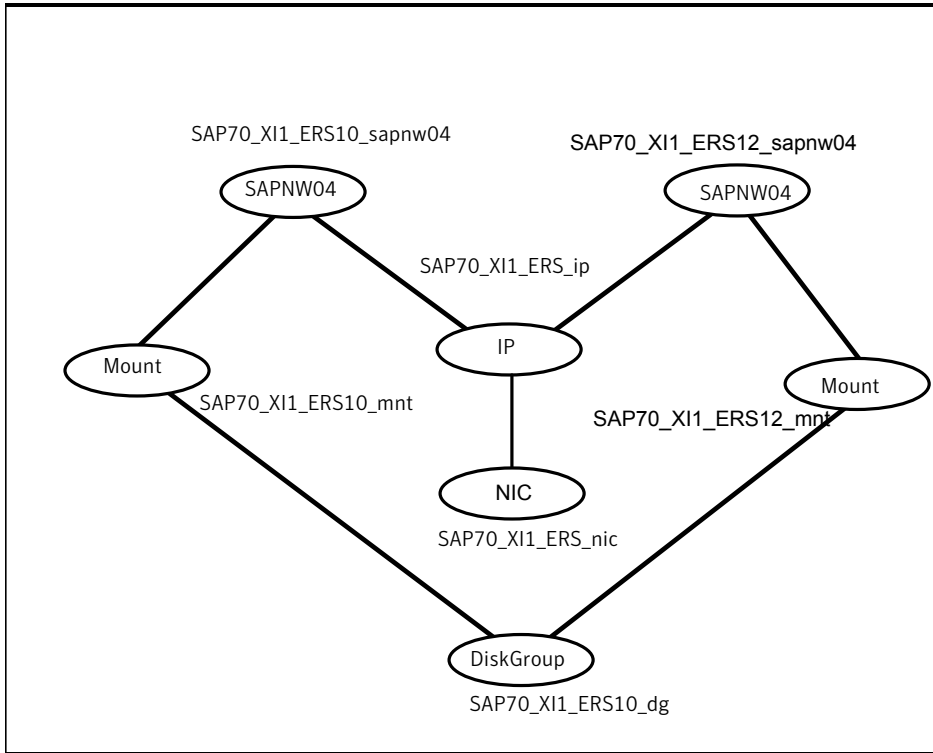


Figure A-6 shows a sample service group configuration for Java Add-in Enqueue Replication Server.

**Figure A-6** Java Add-in Enqueue Replication Server configuration



## Sample SAP NetWeaver service group configurations for Solaris zone support

This section includes sample service groups with Solaris zone support.

[Figure A-7](#) shows a service group with loop back file systems for Central and Database instances running in a non-global zone, and zone binaries are present on the local disk.

**Figure A-7** Service group with loop back file systems for Central and Database instances running in a non-global zone

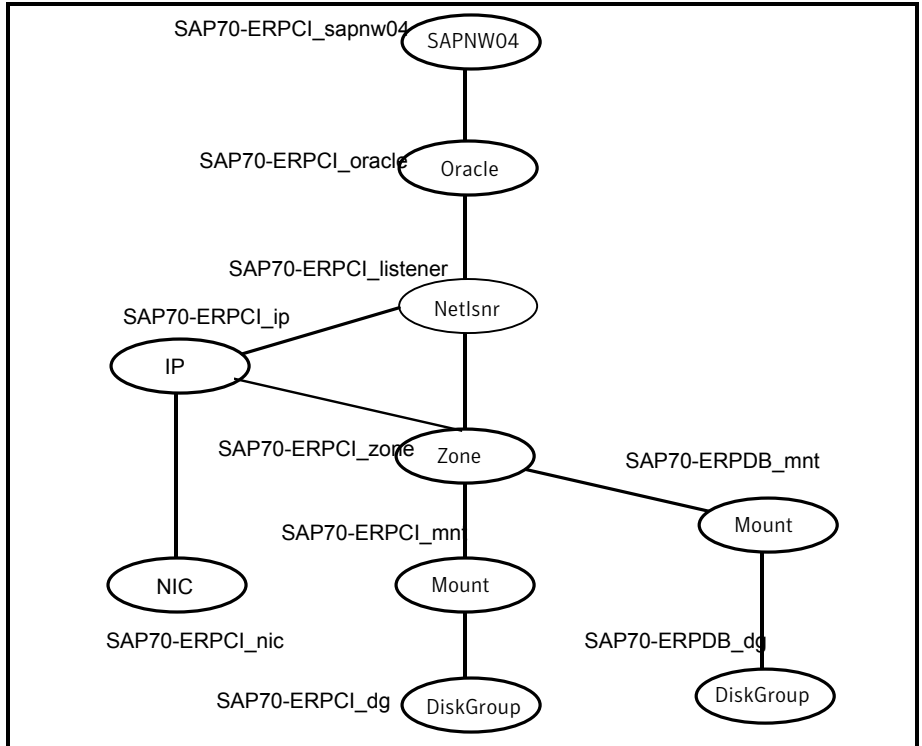


Figure A-8 shows a Service Group with loop back file systems for Central and Database instances running in a non-global zone, and the zone binaries are on the shared disk.

**Figure A-8** Service group with loop back file systems for Central and Database instances running in a non-global zone

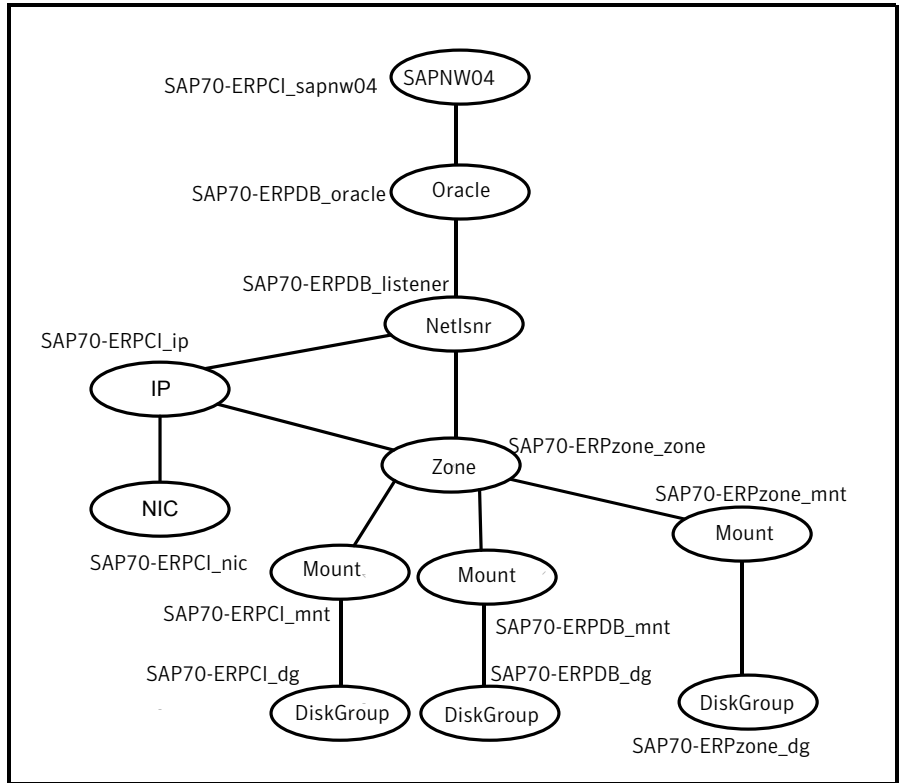


Figure A-9 shows a service group with a Central instance running in a local zone, and the zone binaries are on the shared disk.

**Figure A-9** Service group with a central instance running in a local zone

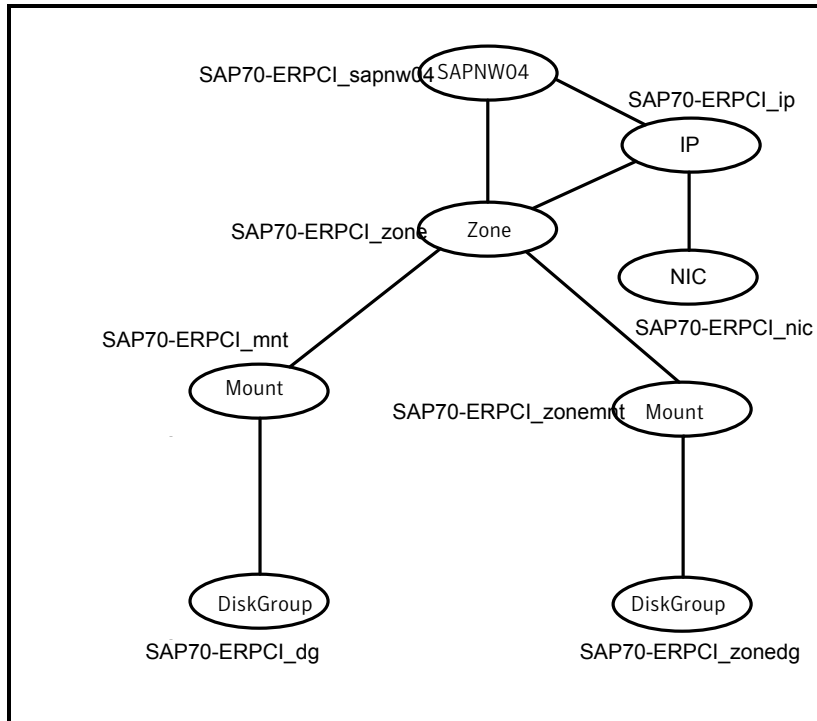
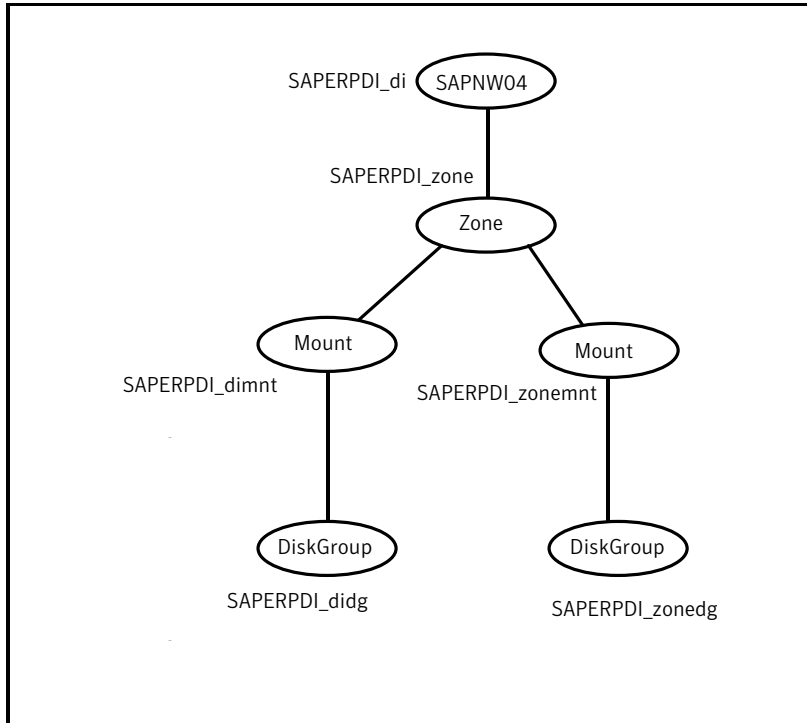


Figure A-10 shows a service group with a Dialog instance running in a local zone, and the zone binaries are on the shared disk.

**Figure A-10** Service group with a dialog instance running in a local zone

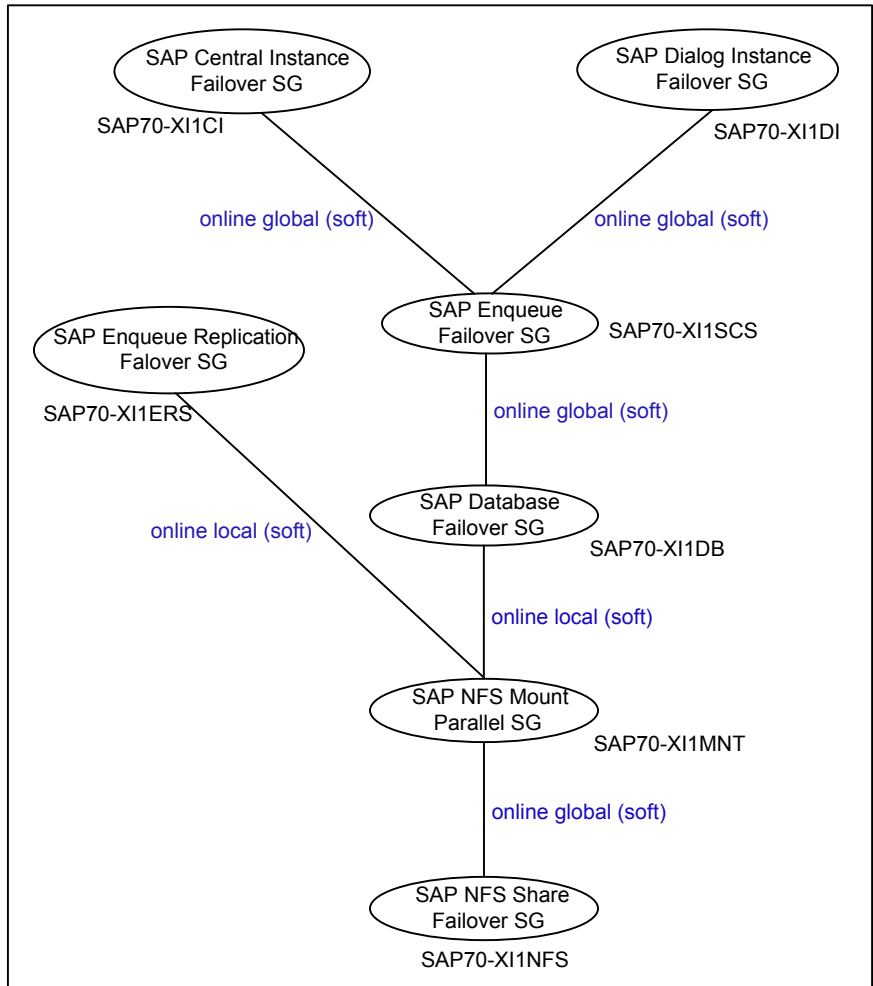


## Sample service group dependency for SAP NetWeaver

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

[Figure A-11](#) shows the sample service group dependency for SAP NetWeaver.

**Figure A-11** Sample service group dependency





# Changes introduced in previous releases

This appendix includes the following topics:

- [Changes introduced in previous releases](#)

## Changes introduced in previous releases

The enhancements in the previous releases of SAP NetWeaver agent are as follows:

- Added support for SAP Kernel 7.2.
- Added support for Red Hat Enterprise Linux (RHEL) 6.0 on Intel.
- Added support for Veritas Cluster Server (VCS) 6.0.
- Added support for AIX 7.1.
- The agent now detects the J2EE server crash during the first-level check of the Monitor operation .
- The agent has been modified to set the resource status as 'MONITOR TIMEDOUT' when the second-level monitoring commands are not executed within the provided time interval. Prior to this modification, the agent set the resource status as 'UNKNOWN'.
- Added second-level monitoring support for the 'ms' and 'dw' processes.
- Added support for Gateway and Internet Communication Manager (ICM) processes.
- Fixed issue that arose due to incorrect SAPMonHome validation during online of the resource. The agent was validating the SAPMonHome attribute in online if the SecondLevelMonitor is not set.

- Improved handling of PID files managed or maintained by the agent.
- Added support for VCS 5.1 on AIX, Linux, and Solaris.
- Removed support for Wizard on Solaris and Linux.
- Added support for creating and modifying SAP service groups using a wizard.
- Added support for CCMS agents; sapccm4x and sapccmsr.
- Added support for Internationalization (i18n).
- Added support for 'ig' (Internet Graphics Server) process.
- Agent supports Enqueue Server and Enqueue Replication Server inside Solaris 10 non-global zones.
- Agent supports Solaris x64 platform.
- Agent now supports 'ms' (Message Server) process restart.
- Added 'cleanipc' support for Enqueue Replication Server.
- Added support for HP-UX 11iv3
- Added support for RHEL 5.0 and SuSE 10.0
- Added support for Enhancement Packages for SAP NetWeaver.

# Index

## A

- about
  - configuring SAP NetWeaver for high availability 27
  - configuring service groups 66
  - installing SAP NetWeaver for high availability 26
- about ACC library 48
- ACC library
  - installing 48
  - removing 52
- agent
  - configuring service groups 67
  - configuring the agent for message server restart 32
  - functions 13
  - i18n support 47
  - importing agent types files 56
  - installing, VCS environment 49
  - overview 11
  - sample type definition 97
  - setting up zones on Solaris 33
  - uninstalling, VCS environment 51
  - upgrading 52
  - what's new 12
- agent attributes
  - ContainerInfo 62
  - ContainerName 61
  - EnqSrvResName 58
  - EnvFile 58
  - InstName 58
  - InstType 59
  - MonitorProgram 61
  - ProcMon 59
  - ResLogLevel 59
  - SAPAdmin 60
  - SAPMonHome 60
  - SAPSID 60
  - SecondLevelMonitor 61
  - StartProfile 60
- agent configuration file
  - importing 56

- agent functions
  - clean 15
  - monitor 15
  - offline 14
- agent installation
  - general requirements 46
  - requirements for Solaris zones 47
  - steps to install 49
- agent operations
  - online 14
- agent overview 18

## B

- before
  - configuring the service groups 67

## C

- CCMS Monitoring Agent
  - prerequisites 38
- CCMS Monitoring Agents
  - functional principle 36
- configuring
  - CCMS Agents to work with VCS agent for SAP NetWeaver 39
  - CCMS monitoring agent for SAP instance 36
  - Enqueue Replication Server 41
  - server instances for cluster support 27
- configuring monitor function 63
- copying ag\_i18n\_inc.pm module for VCS 3.5 65

## E

- executing custom monitor program 63

## G

- generating environments file for SAP 81

## L

- logs
  - reviewing cluster log files 91

logs *(continued)*  
 reviewing error log files 91  
 using SAP server logs 91  
 using trace level logging 91

## M

monitoring an SAP instance 25

## P

preonline script 82  
 configuring 83  
 preventing early faulting of Java and Add-In  
 instances 64

## S

Sample  
 service group dependency 111  
 sample SAP resource configuration 98  
 Central Instance 98  
 Dialog Instance 99  
 Enqueue Replication Server Instance 100  
 Enqueue Server Instance 99  
 Sample service group configuration (ABAP, Java)  
 active-active 101  
 sample service group configuration (ABAP, Java) 100  
 Sample service group configuration (Java Add-In)  
 Enqueue Replication server configuration 107  
 Standalone Enqueue server configuration 106  
 sample service group configuration Add-In (ABAP+  
 Java) 104  
 SAP server  
 configuring resources 89  
 starting instance outside cluster 89  
 setting  
 SAP server in a cluster 17  
 setting the SAPMonHome attribute 62  
 Solaris zone support  
 installation requirements 47  
 sample service group configurations 107  
 troubleshooting 94  
 starting the SAP server instance outside a cluster 89

## T

troubleshooting  
 configuration checks for Solaris zones support 94  
 meeting prerequisites 89  
 reviewing error log files 91  
 reviewing cluster log files 91

troubleshooting *(continued)*  
 reviewing error log files *(continued)*  
 using SAP server log files 91  
 using trace level logging 91  
 using correct software 88

## U

uninstalling agent, VCS environment 51  
 uniquely identifying SAP server instances 24  
 upgrading agent 52  
 using Perl in the VCS 3.5 environment 64