

Symantec™ ApplicationHA Agent for SAP NetWeaver and SAP HANA Configuration Guide

Linux on VMware

6.2

Symantec™ ApplicationHA Agent for SAP NetWeaver and SAP HANA Configuration Guide

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Contents

Technical Support	4
Chapter 1	
Introducing the ApplicationHA Agent for SAP NetWeaver and SAP HANA	10
About the Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA	10
About installing and removing the ApplicationHA agent for SAP NetWeaver and SAP HANA	11
Supported software	11
Supported VMware versions	12
Supported guest operating systems for SAP NetWeaver	12
Supported guest operating systems for SAP HANA	13
How Symantec ApplicationHA makes SAP NetWeaver and SAP HANA highly available	14
Agent functions	15
Online	15
Offline	15
Monitor	16
Clean	16
Executing a customized monitoring program	17
Setting up SAP NetWeaver and SAP HANA for ApplicationHA	17
Chapter 2	
Installing and configuring SAP NetWeaver for high availability	19
About SAP NetWeaver	19
SAP system components	20
Uniquely identifying SAP NetWeaver instances	20
Monitoring an SAP instance	21
Integrating ApplicationHA and SAP NetWeaver by using the SAP library and connector script	22
Enabling the <sid>adm user to run ApplicationHA commands in read-write mode	23
Configuring sapstartsrv and ApplicationHA with saphascriptco.so	23

	Typical SAP server configuration in a VMware virtualization scenario	23
Chapter 3	Installing and configuring SAP HANA for high availability	25
	About SAP HANA	25
	Uniquely identifying SAP HANA instances	26
	Prerequisites for installing SAP HANA with Symantec ApplicationHA	26
	Monitoring an SAP HANA instance	26
Chapter 4	Configuring application monitoring with Symantec ApplicationHA for SAP NetWeaver	28
	About configuring application monitoring with ApplicationHA	28
	Before configuring application monitoring for SAP NetWeaver	29
	Launching the Symantec ApplicationHA Configuration Wizard	30
	Configuring application monitoring for SAP NetWeaver	31
Chapter 5	Configuring application monitoring with Symantec ApplicationHA for SAP HANA	35
	About configuring application monitoring with ApplicationHA	35
	Before configuring application monitoring for SAP HANA	36
	Launching the Symantec ApplicationHA Configuration Wizard	37
	Configuring application monitoring for SAP HANA	38
Chapter 6	Troubleshooting the agent for SAP NetWeaver and SAP HANA	42
	Using the correct software and operating system versions	42
	Reviewing error log	42
	Using SAP Netweaver log files	42
	Using SAP HANA trace files	43
	Reviewing ApplicationHA log files	43
	Using trace level logging	43
Appendix A	Resource type definitions	45
	About the resource type and attribute definitions	45
	Resource type definition for SAP NetWeaver and SAP HANA	45
	SAPNW agent attributes	46

Appendix B	Detail monitoring	50
	Setting the PATH variable	50
	Setting up detail monitoring for ApplicationHA agent for SAP NetWeaver and SAP HANA	50

Introducing the ApplicationHA Agent for SAP NetWeaver and SAP HANA

This chapter includes the following topics:

- [About the Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA](#)
- [About installing and removing the ApplicationHA agent for SAP NetWeaver and SAP HANA](#)
- [Supported software](#)
- [How Symantec ApplicationHA makes SAP NetWeaver and SAP HANA highly available](#)
- [Agent functions](#)
- [Executing a customized monitoring program](#)
- [Setting up SAP NetWeaver and SAP HANA for ApplicationHA](#)

About the Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA

The Symantec ApplicationHA 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 ApplicationHA agent for SAP NetWeaver and SAP HANA provides high availability for SAP NetWeaver and SAP HANA database in a virtual machine. The agent brings SAP instances online, monitors the instances, and brings the instances offline. The agent monitors the system processes and server states, and can shut down the server in case of a fault.

The agent supports the following SAP instance types:

- Central Services Instance
- Application Server Instance
- Enqueue Replication Server Instance
- SAP HANA Database Instance

The agent supports the following deployments of SAP NetWeaver systems:

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

The Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA enables you to integrate ApplicationHA with SAP NetWeaver 7.x with SAP Kernel 7.20 DCK by using an SAP-provided library (saphascriptco.so) and a Symantec-provided cluster connector script (sap_symc_cluster_connector). This integration enables the SAP sapstartsrv component to communicate SAP instance status changes that are carried out by SAP clients to ApplicationHA.

The agent supports the following deployments of SAP HANA systems:

- Single-node SAP HANA systems

About installing and removing the ApplicationHA agent for SAP NetWeaver and SAP HANA

When you run the installer or uninstall program that accompanies the quarterly Agent Pack release of High Availability agents from Symantec, the latest version of the ApplicationHA agent for SAP NetWeaver and SAP HANA is automatically installed or removed. For more information, see the *Symantec ApplicationHA Agent Pack Installation Guide*.

Supported software

The Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA supports the following software versions:

- Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA can be installed and run inside virtual machines that have Symantec ApplicationHA 6.2 installed.
- The following versions of the Veritas Operations Manager components are supported:
 - Veritas Operations Manager Management Server 6.0 or later
 - Veritas Operations Manager managed host for Linux: 6.0 or later

Supported VMware versions

The following VMware Servers and management clients are currently supported:

- VMware ESX Server version 4.1 Update 3, 5.0 Update 2, and 5.1
- VMware ESXi Server version 5.0 Update 2, 5.1 Update 1 and 5.5
- VMware vCenter Server version 4.1 Update 2, 5.0, 5.1, and 5.5

Note: VMware Fault Tolerance is not supported in case of vCenter Server 4.1

- VMware vSphere Client version 4.1 Update 2, 5.0, 5.1, and 5.5
- VMware vCenter Site Recovery Manager (SRM) 5.0 and 5.1

Note: SAP supports only certain VMware versions for use with SAP HANA. Please refer to SAP documentation for VMware versions supported with SAP HANA.

Supported guest operating systems for SAP NetWeaver

[Table 1-1](#) shows the supported operating systems for this release.

Table 1-1 Supported guest operating systems

Operating systems	Levels	Kernel version
Oracle Linux 5	Update 5, 6, 7, 8, 9	2.6.18-194.el5
		2.6.18-238.el5
		2.6.18-274.el5
		2.6.18-308.el5
		2.6.18-348.el5

Table 1-1 Supported guest operating systems (*continued*)

Operating systems	Levels	Kernel version
Oracle Linux 6 Note: Installation from vSphere Client menu is not supported on OL 6.	Update 3 , 4	2.6.32-279.el6 2.6.32-358.el6
Red Hat Enterprise Linux 5	Update 5, 6, 7, 8, 9	2.6.18-194.el5 2.6.18-238.el5 2.6.18-274.el5 2.6.18-308.el5 2.6.18-348.el5
Red Hat Enterprise Linux 6	Update 3, 4, 5	2.6.32-279.el6 2.6.32-358.el6
SUSE Linux Enterprise 11	SP 2 SP 3	3.0.13-0.27.1 3.0.76-0.11.1

Note: 64-bit operating systems are only supported.

If your system is running a lower level of either Red Hat Enterprise Linux, SUSE Linux Enterprise Server, or Oracle Linux, than indicated in [Table 1-1](#), you must upgrade it before attempting to install Symantec ApplicationHA. Consult the Red Hat, SUSE, or Oracle documentation for more information on upgrading or reinstalling your system.

Symantec supports only Oracle, Red Hat, and SUSE distributed kernel binaries.

Symantec products operate on subsequent kernel and patch releases provided the operating systems maintain kernel ABI (application binary interface) compatibility.

Supported guest operating systems for SAP HANA

The following operating systems are supported for SAP HANA.

- SUSE Linux Enterprise Server (SLES) 11 SP2
- SUSE Linux Enterprise Server (SLES) for SAP Applications 11 SP2 and SP3
- Red Hat Enterprise Linux (RHEL) 6.5 for SAP HANA

Note: 64-bit operating systems are only supported.

For more information on the supported software refer to Symantec Operations Readiness Tool (SORT):

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

If your system is running a lower level of either Red Hat Enterprise Linux or SUSE Linux Enterprise Server, as indicated in the above list, you must upgrade it before attempting to install Symantec ApplicationHA. Please refer SAP documentation for more information on upgrading or reinstalling your system.

Symantec supports only Red Hat, and SUSE distributed kernel binaries.

Symantec products operate on subsequent kernel and patch releases provided the operating systems maintain kernel ABI (application binary interface) compatibility.

How Symantec ApplicationHA makes SAP NetWeaver and SAP HANA highly available

The Symantec ApplicationHA agent for SAP NetWeaver and SAP HANA continuously monitors the SAP instance processes to verify that they function properly.

The agent provides the following level 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 an 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 agent tries to restart the SAP instance. If it further fails, a virtual machine reboot is triggered. Thus, the agent ensures high availability for the SAP instance.

Note: By default, the ApplicationHA wizard configures any SAP instance for basic monitoring. To enable secondary monitoring, use CLI / Veritas Operations Manager.

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 for the corresponding SAPSTARTSRV resource or if the StopService attribute is set to 1.
 - If the SAP instance is APPSERV, ENQREP or HANA, the cleanipc utility gets executed. Otherwise, the agent kills all relevant SAP processes.
 - If the kill.sap and/or shutdown.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 for SAP NetWeaver instances.
- Starts the sapstartsrv process for Web-based SAP Management console.
- Starts the SAP instance using the `sapcontrol` command.
- Ensures that the instance is fully initialized.

Offline

The offline function performs the following tasks:

- Checks if the SAP Instance is already offline.
- Executes the `sapcontrol` command to stop the relevant instance process.
- 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 and/or shutdown.sap file exists in the /usr/sap/SAPSID/InstName/work directory, the operation removes the file from the directory for the corresponding SAPSTARTSRV resource or if the StopService attribute is set to 1.

- Removes the SE and CO locks files from the `/usr/sap/SAPSID/InstName/data` directory for the corresponding SAPSTARTSRV resource or if the `StopService` attribute is set to 1.
- If the SAP instance is APPSERV, ENQREP or HANA, the operation executes the `cleanipc` utility for the corresponding SAPSTARTSRV resource or if the `StopService` attribute is set to 1.
- Augments the SAP log for SAP NetWeaver instances, 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:
- If the `LevelTwoMonitorFreq` attribute is greater than 0, the monitor function performs a thorough health check of the SAP instance as follows:
 - For APPSERV and HANA instances, the function uses the `sapcontrol` utility.
 - For Enqueue Server and Enqueue Replication Server instances, the function uses the `ensmon` utility.
- The monitor function executes a custom monitor utility.

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` and/or `shutdown.sap` file exists in the `/usr/sap/SAPSID/InstName/work` directory, the operation removes the file from the directory for the corresponding SAPSTARTSRV resource or if the `StopService` attribute is set to 1.
- Removes the SE and CO lock files from the `/usr/sap/SAPSID/InstName/data` directory for the corresponding SAPSTARTSRV resource or if the `StopService` attribute is set to 1.

- If the SAP Instance is APPSERV, ENQREP or HANA, the operation executes the cleanipc utility for the corresponding SAPSTARTSRV resource or if the StopService attribute is set to 1.
- Augments the SAP log for SAP NetWeaver instances.

Executing a customized monitoring program

The monitor function can execute a customized monitoring utility to perform an additional SAP application 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 NetWeaver or SAP HANA instances is online.
- The LevelTwoMonitorFreq attribute is set to greater than 1, but the second level check is deferred for this monitoring cycle.
- The LevelTwoMonitorFreq attribute is set to either 0 or 1, and the second level check indicates that the SAP NetWeaver or SAP HANA instance is online.

The monitor function interprets the utility exit code as follows:

110 or 0	SAP instance is online
100 or 1	SAP instance is offline
99	SAP instance is unknown
Any other value	SAP instance is unknown

Setting up SAP NetWeaver and SAP HANA for ApplicationHA

Follow the steps below to set up SAP NetWeaver and SAP HANA in virtualization scenario for ApplicationHA:

- Set up a virtualization environment for ApplicationHA. Refer to the *Symantec ApplicationHA Installation and Upgrade Guide* for more information on installing and configuring ApplicationHA.
- Install and configure SAP NetWeaver and SAP HANA for ApplicationHA. See [“About SAP NetWeaver”](#) on page 19.

See [“About SAP HANA”](#) on page 25.

Installing and configuring SAP NetWeaver for high availability

This chapter includes the following topics:

- [About SAP NetWeaver](#)
- [Uniquely identifying SAP NetWeaver instances](#)
- [Monitoring an SAP instance](#)
- [Integrating ApplicationHA and SAP NetWeaver by using the SAP library and connector script](#)
- [Typical SAP server configuration in a VMware virtualization scenario](#)

About SAP NetWeaver

SAP NetWeaver is the central foundation for the entire SAP software stack. It also provides a platform for other NetWeaver components (Portal, XI, and so on), as well as for ABAP and Java applications.

The installation options for SAP NetWeaver are:

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

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

SAP system components

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

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

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

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

Uniquely identifying SAP NetWeaver 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 NetWeaver 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, additional application server instances begin with 'D', and primary application server instances are typically named DVEBMGS.

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

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

Some examples of SAP instances are given as follows:

InstName	InstType
DVEBMGS00	SAP Application Server - ABAP (Primary)
D01	SAP Application Server - ABAP (Additional)
ASCS02	SAP Central Services - ABAP

InstName	InstType
J03	SAP Application Server - Java
SCS04	SAP Central Services - Java
ERS05	SAP Enqueue Replication Server
SMDA97	Solution Manager Diagnostics Agent

Differentiating SAP instances is important to identify each instance uniquely. When the agent kills the processes of a non-responsive or failed instance in the absence of unique names for each server, the agent may kill processes for more than one SAP instance during a clean operation.

Monitoring an SAP instance

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

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

[Table 2-1](#) lists valid values of the ProcMon attribute

Table 2-1 Values of ProcMon attribute

SAP installation type	SAP instance type	Value of ProcMon attribute
ABAP	APPSERV	dw ig co se gwrn icman are optional
ABAP	ENQUEUE	en ms
ABAP	ENQREP	er
Java	APPSERV	jc ig is optional
Java	ENQUEUE	en ms
Java	ENQREP	er
Add-In (ABAP +Java)	APPSERV	dw jstart ig co se gwrn icman are optional

Table 2-1 Values of ProcMon attribute (*continued*)

SAP installation type	SAP instance type	Value of ProcMon attribute
Add-In (ABAP +Java)	Enqueue Server - ABAP	en ms
Add-In (ABAP +Java)	Enqueue Server - Java	en ms
Add-In (ABAP +Java)	Enqueue Rep - ABAP	er
Add-In (ABAP +Java)	Enqueue Rep - Java	er

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.

Integrating ApplicationHA and SAP NetWeaver by using the SAP library and connector script

This section is applicable to SAP NetWeaver 7.x with SAP Kernel 7.20 DCK.

Note: This section is not applicable to SAP HANA.

In a typical ApplicationHA environment, when an SAP administrator changes the status of an SAP instance by means of an SAP client, such as sapcontrol or startsap, then ApplicationHA performs the following actions:

- When the administrator stops the SAP instance, ApplicationHA detects a fault and performs the clean operation.
- When the administrator starts the SAP instance, ApplicationHA detects that the instance is brought online outside of ApplicationHA control.

To ensure that ApplicationHA detects the correct status of SAP instances when the status of instances are intentionally changed outside of ApplicationHA control, sapstartsrv must be able to communicate with ApplicationHA. When communication between sapstartsrv and ApplicationHA is enabled, sapstartsrv can inform ApplicationHA when an SAP client is used to start or stop an assigned SAP instance.

The following components are involved in enabling communication between sapstartsrv and ApplicationHA:

- SAP clients, such as sapcontrol, startsap, SAP Management Console, and so on. All these clients must use the web-service interface of sapstartsrv.

- The sapstartsrv server process that is responsible for starting, stopping, and retrieving information from the SAP instance.
- The SAP-provided library saphascriptco.so.
- The Symantec-provided cluster connector script sap_symc_cluster_connector.
- Symantec ApplicationHA.

Note: Communication between ApplicationHA and sapstartsrv can be enabled when the SAP Kernel version is 7.20 or later with patch level 100 and the new directory structure of SAP Kernel 7.20 is used.

Enabling the <sid>adm user to run ApplicationHA commands in read-write mode

Ensure that read and execute permissions are set for the /opt/VRTS/bin directory:

```
chmod +rx /opt/VRTS/bin/
```

To be able to run ApplicationHA commands in read-write mode, the <sid>adm user must run the following halogin command from each node in the cluster.

```
/opt/VRTS/bin/halogin admin <PASSWORD>
```

Configuring sapstartsrv and ApplicationHA with saphascriptco.so

Set the following parameters in each SAP instance profile that is read by sapstartsrv.

```
service/halib = $(DIR_CT_RUN)/saphascriptco.so
```

```
service/halib_cluster_connector =  
/opt/VRTSagents/ha/bin/SAPNW/sap_symc_cluster_connector
```

Note: Restart the sapstartsrv process for each SAP instance after modifying its profile.

Typical SAP server configuration in a VMware virtualization scenario

A typical SAP server configuration in a VMware virtualization scenario has the following characteristics:

- The sapmnt directory is installed for SAP NetWeaver on shared storage and mounted on the virtual machines via Network File System (NFS).
- The SAP NetWeaver application server instance binaries are installed locally.

Installing and configuring SAP HANA for high availability

This chapter includes the following topics:

- [About SAP HANA](#)
- [Uniquely identifying SAP HANA instances](#)
- [Monitoring an SAP HANA instance](#)

About SAP HANA

SAP HANA is a modern, in-memory database and platform that can be deployed on premise or cloud. The SAP HANA platform is a flexible data source and in-memory data platform that allows users to analyze large volumes of data in real time. It also acts as a development platform that provides infrastructure and tools for building high-performance applications based on SAP HANA Extended Application Services (SAP HANA XS).

It is the foundation of various SAP HANA editions, such as the SAP HANA Platform Edition, which provides core database technology, and the SAP HANA Enterprise Edition, which bundles additional components for data provisioning. The SAP HANA Platform Edition integrates a number of SAP components, such as the SAP HANA database, SAP HANA studio, and SAP HANA clients.

Uniquely identifying SAP HANA instances

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

Each instance has a unique instance name (InstName) and SAP System ID (SID). The instance names may follow the conventional form. For example, SAP HANA instance are typically named HDB. The SAPSID and InstName form a unique identifier that can identify the processes running for a particular instance.

Instance names often include an instance ID suffix which is an integer between 00-99. For example, a SAP HANA instance with an instance ID = 06 may have an instance name of HDB06.

Some examples of SAP HANA instance is given as follows:

InstName	InstType
HDB06	SAP HANA Database Instance

Differentiating SAP HANA instances is important to identify each instance uniquely. When the agent kills the processes of a non-responsive or failed instance in the absence of unique names for each server, the agent may kill processes for more than one SAP HANA instance during a clean operation.

Prerequisites for installing SAP HANA with Symantec ApplicationHA

The following criteria must be set while installing SAP HANA instances:

- SAP HANA instance must be installed with the host name of the virtual machine.
- SAP HANA instance must be installed with the default path (/hana/shared).

Note: For information on installing SAP HANA, please refer to SAP documentation.

Monitoring an SAP HANA instance

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

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

[Table 3-1](#) lists valid values of the ProcMon attribute

Table 3-1 Values of ProcMon attribute

SAP installation type	SAP instance type	Value of ProcMon attribute
HANA	HANA	<p>hdb</p> <p>hdbstatisticserver hdbpreprocessor hdbcompileservice hdbxsengine sapwebdisp_hdb are optional.</p> <p>Note: The values for hdbnamserver and hdbindexserver need not be specified in the ProcMon attribute. These processes will be monitored by default.</p>
HANA	SAPSTARTSRV	sapstartsrv

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 HANA instance as offline, and bypasses further monitor operations.

Configuring application monitoring with Symantec ApplicationHA for SAP NetWeaver

This chapter includes the following topics:

- [About configuring application monitoring with ApplicationHA](#)
- [Before configuring application monitoring for SAP NetWeaver](#)
- [Launching the Symantec ApplicationHA Configuration Wizard](#)
- [Configuring application monitoring for SAP NetWeaver](#)

About configuring application monitoring with ApplicationHA

This chapter describes the steps to configure application monitoring with ApplicationHA in a virtualization environment.

Consider the following points before you proceed:

- You configure an application for monitoring on a virtual machine using the Symantec ApplicationHA Configuration Wizard.
- You can launch the Symantec ApplicationHA Configuration Wizard from the VMware vSphere Client or from the Veritas Operations Manager Management

Server console. See “[Launching the Symantec ApplicationHA Configuration Wizard](#)” on page 30.

- In this release, the wizard allows you to configure monitoring for only one application per virtual machine.
 To configure another application using the wizard, you must first unconfigure the existing application monitoring.
- After you have configured monitoring for an application using the wizard, you can configure monitoring for other applications residing in the same virtual machine, using Symantec Cluster Server (VCS) commands.
 For more information read the following technote:
<http://www.symantec.com/docs/TECH159846>
- After configuring SAP for monitoring, if you create another SAP application server instance, these new components are not monitored as part of the existing configuration.
 In such a case, you must first unconfigure the existing configuration and then reconfigure the application using the wizard. You can then select all the instances for monitoring.

Before configuring application monitoring for SAP NetWeaver

Ensure that you complete the following tasks before configuring application monitoring for SAP NetWeaver on a virtual machine:

- Install ApplicationHA Console.
- Install ApplicationHA guest components on the virtual machine that you need to monitor.
- Install VMware Tools on the virtual machine. Install a version that is compatible with VMware ESX server.
- Install the VMware vSphere Client.
- Assign ApplicationHA - Configure Application Monitoring (Admin) privileges to the logged-on user on the virtual machine where you want to configure application monitoring.
- Install the application and the associated components that you wish to monitor on the virtual machine.
- If you have configured a firewall, ensure that your firewall settings allow access to ports used by ApplicationHA installer, wizards, and services.

Refer to the *Symantec ApplicationHA Installation and Upgrade Guide* for a list of ports and services used.

Launching the Symantec ApplicationHA Configuration Wizard

You can launch the Symantec ApplicationHA Configuration Wizard using:

- VMware vSphere Client: [To configure application monitoring for SAP](#)
- Veritas Operations Manager (VOM) Management Server console: [To launch the wizard from the VOM Management Server console](#)

To configure application monitoring for SAP

- 1 Launch the VMware vSphere Client and connect to the VMware vCenter Server that hosts the virtual machine.

The vSphere Client is used to configure and control application monitoring.

- 2 From the vSphere Client's Inventory view in the left pane, select the virtual machine where you want to configure application monitoring for SAP.
- 3 From the vSphere Client's Management view in the right pane, click the **Symantec High Availability** tab.

The Symantec High Availability view displays the status of all the supported applications that are installed on the selected virtual machine.

- 4 In the Symantec High Availability view, click **Configure Application Monitoring**.

This launches the Symantec ApplicationHA Configuration Wizard.

To launch the wizard from the VOM Management Server console

- 1 Log on to the VOM Management Server console.
 - 2 Select the Server perspective and expand Manage in the left pane.
 - 3 Expand the Organization, or Uncategorized Hosts to navigate to the virtual machine.
 - 4 Right-click the required virtual machine, and then click **Manage ApplicationHA**.
- The Symantec High Availability view appears.
- 5 Click **Configure Application Monitoring**.

This launches the Symantec ApplicationHA Configuration Wizard.

Configuring application monitoring for SAP NetWeaver

Perform the following steps to configure monitoring for SAP NetWeaver on a virtual machine.

To configure application monitoring for SAP NetWeaver

- 1 Launch the Symantec ApplicationHA Configuration Wizard. See [“Launching the Symantec ApplicationHA Configuration Wizard”](#) on page 30.
- 2 Review the information on the Welcome screen and then click **Next**.

The wizard lists all the supported applications for the system.

- 3 Select SAP, and then click **Next**.

The SAP Instance Selection screen shows SAP NetWeaver instances.

Application Selection
 Select the application that you want to monitor.

Welcome > **Application Selection** > Application Inputs > Implementation > Finish

Search:

Supported Applications	Description:
Apache	Configure application monitoring for SAP HANA and SAP application servers running on a virtual machine. <ul style="list-style-type: none"> Monitor and control the availability of SAP HANA and SAP application server instances Perform a graceful start and stop of SAP HANA and SAP application server instances
Custom Application	
DB2 Database Server	
JBoss Application Server	
MySQL Server	
Oracle	
SAP	
WebSphere Application Server	
WebSphere MQ	

The latest Agent Pack release may extend this wizard to more applications. To avail of the extended wizard support, download the Agent Pack from the SORT website:
<http://sort.symantec.com/agents>

[Diagnostic information](#) < Back Next > Cancel

- 4 Select the SAP instances that you want to monitor and then click **Next**.

- 5 The wizard performs the application monitoring configuration tasks. The ApplicationHA Configuration screen displays the status of each task.
After all the tasks are complete, click **Next**.

Note: If the configuration tasks fail, click **Diagnostic information** to check the details of the failure.

You then have to run the wizard again to configure the application monitoring.

- 6 Click **Finish** to complete the wizard.
This completes the application monitoring configuration.

- 7
- To view the status of the configured application on a virtual machine, in the inventory view of the vSphere Client, click the appropriate virtual machine, and then click the **Symantec High Availability** tab.

The Symantec High Availability view appears.

Applications: SAP

Status: Online

(Status refreshes every 60 seconds)

Refresh

Settings

Licenses

Configure Application Monitoring

Unconfigure Application Monitoring

Enable Application Heartbeat

Disable Application Heartbeat

Start Application

Stop Application

Enter Maintenance Mode

Exit Maintenance Mode

Component List

Component Dependency

✓	SAP_HAN_HDB00_nic_res is ONLINE
✓	SAP_HAN_HDB00_ip_res is ONLINE
✓	SAP_HAN_HDB00_res is ONLINE
✓	SAP_HAN_HDB00_sapstartsrv_res is ONLINE

ApplicationHA (Version 6.1.1.000)

Symantec.

[Diagnostic information](#)

By default, the Component List tab appears. The tab lists each component of the configured application and the status description of each component.

For more information on viewing and administering applications by using the vSphere Client, see the *Symantec ApplicationHA User's Guide*.

- 8 To view component dependency for the monitored application, click the **Component Dependency** tab.

The component dependency graph appears.


Applications: SAP

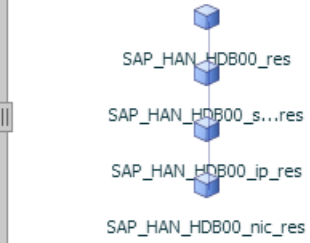
Status: Online (Status refreshes every 60 seconds) [Refresh](#) [Settings](#) [Licenses](#)

- [Configure Application Monitoring](#)
- [Unconfigure Application Monitoring](#)
- [Enable Application Heartbeat](#)
- [Disable Application Heartbeat](#)
- [Start Application](#)
- [Stop Application](#)
- [Enter Maintenance Mode](#)
- [Exit Maintenance Mode](#)

Component List

Component Dependency


SAP



The graph illustrates the dependencies between a selected component group (an application or a group of inter-related components) and its components for the configured application. The left pane displays component groups and/or configured applications. The right pane displays components of the selected component group or application.

For more information on viewing component dependency for any configured application, see the *Symantec ApplicationHA User's Guide*.

Configuring application monitoring with Symantec ApplicationHA for SAP HANA

This chapter includes the following topics:

- [About configuring application monitoring with ApplicationHA](#)
- [Before configuring application monitoring for SAP HANA](#)
- [Launching the Symantec ApplicationHA Configuration Wizard](#)
- [Configuring application monitoring for SAP HANA](#)

About configuring application monitoring with ApplicationHA

This chapter describes the steps to configure application monitoring with ApplicationHA in a virtualization environment.

Consider the following points before you proceed:

- You configure an application for monitoring on a virtual machine using the Symantec ApplicationHA Configuration Wizard.
- You can launch the Symantec ApplicationHA Configuration Wizard from the VMware vSphere Client or from the Veritas Operations Manager Management

Server console. See “[Launching the Symantec ApplicationHA Configuration Wizard](#)” on page 37.

- In this release, the wizard allows you to configure monitoring for only one application per virtual machine.
To configure another application using the wizard, you must first unconfigure the existing application monitoring.

Note: Please check SAP documentation for restrictions regarding installations of additional applications or SAP HANA instances to a virtual machine running an SAP HANA instance.

- After you have configured monitoring for an application using the wizard, you can configure monitoring for other applications residing in the same virtual machine, using Symantec Cluster Server (VCS) commands.
For more information read the following technote:
<http://www.symantec.com/docs/TECH159846>
- After configuring SAP HANA for monitoring, if you create another SAP HANA server instance, these new components are not monitored as part of the existing configuration.
In such a case, you must first unconfigure the existing configuration and then reconfigure the application using the wizard. You can then select all the instances for monitoring.

Before configuring application monitoring for SAP HANA

Ensure that you complete the following tasks before configuring application monitoring for SAP HANA on a virtual machine:

- Install ApplicationHA Console.
- Install ApplicationHA guest components on the virtual machine that you need to monitor.
- Install VMware Tools on the virtual machine. Install a version that is compatible with VMware ESX server.
- Install the VMware vSphere Client.
- Assign ApplicationHA - Configure Application Monitoring (Admin) privileges to the logged-on user on the virtual machine where you want to configure application monitoring.

- Install the application and the associated components that you wish to monitor on the virtual machine.
- If you have configured a firewall, ensure that your firewall settings allow access to ports used by ApplicationHA installer, wizards, and services.
Refer to the *Symantec ApplicationHA Installation and Upgrade Guide* for a list of ports and services used.

Launching the Symantec ApplicationHA Configuration Wizard

You can launch the Symantec ApplicationHA Configuration Wizard using:

- VMware vSphere Client:
- Veritas Operations Manager (VOM) Management Server console:

To configure application monitoring for SAP HANA

- 1 Launch the VMware vSphere Client and connect to the VMware vCenter Server that hosts the virtual machine.

The vSphere Client is used to configure and control application monitoring.

- 2 From the vSphere Client's Inventory view in the left pane, select the virtual machine where you want to configure application monitoring for SAP HANA.
- 3 From the vSphere Client's Management view in the right pane, click the **Symantec High Availability** tab.

The Symantec High Availability view displays the status of all the supported applications that are installed on the selected virtual machine.

- 4 In the Symantec High Availability view, click **Configure Application Monitoring**.

This launches the Symantec ApplicationHA Configuration Wizard.

To launch the wizard from the VOM Management Server console

- 1 Log on to the VOM Management Server console.
- 2 Select the Server perspective and expand Manage in the left pane.
- 3 Expand the Organization, or Uncategorized Hosts to navigate to the virtual machine.

- 4 Right-click the required virtual machine, and then click **Manage ApplicationHA**.
The Symantec High Availability view appears.
- 5 Click **Configure Application Monitoring**.
This launches the Symantec ApplicationHA Configuration Wizard.

Configuring application monitoring for SAP HANA

Perform the following steps to configure monitoring for SAP HANA on a virtual machine.

To configure application monitoring for SAP HANA

- 1 Launch the Symantec ApplicationHA Configuration Wizard. See [“Launching the Symantec ApplicationHA Configuration Wizard”](#) on page 30.
- 2 Review the information on the Welcome screen and then click **Next**.
The wizard lists all the supported applications for the system.

- 3 Select SAP, and then click **Next**.

The SAP Instance Selection screen shows SAP HANA instances.

Application Selection
 Select the application that you want to monitor.

Welcome > **Application Selection** > Application Inputs > Implementation > Finish

Search:

Supported Applications	Description:
Apache	Configure application monitoring for SAP HANA and SAP application servers running on a virtual machine. <ul style="list-style-type: none"> Monitor and control the availability of SAP HANA and SAP application server instances Perform a graceful start and stop of SAP HANA and SAP application server instances
Custom Application	
DB2 Database Server	
JBoss Application Server	
MySQL Server	
Oracle	
SAP	
WebSphere Application Server	
WebSphere MQ	

The latest Agent Pack release may extend this wizard to more applications. To avail of the extended wizard support, download the Agent Pack from the SORT website:
<http://sort.symantec.com/agents>

[Diagnostic information](#) < Back Next > Cancel

- 4 Select the SAP HANA instances that you want to monitor and then click **Next**.
- 5 The wizard performs the application monitoring configuration tasks. The ApplicationHA Configuration screen displays the status of each task.
 After all the tasks are complete, click **Next**.

Note: If the configuration tasks fail, click **Diagnostic information** to check the details of the failure.

You then have to run the wizard again to configure the application monitoring.

- 6 Click **Finish** to complete the wizard.

This completes the application monitoring configuration.

- 7 To view the status of the configured application on a virtual machine, in the inventory view of the vSphere Client, click the appropriate virtual machine, and then click the **Symantec High Availability** tab.

The Symantec High Availability view appears.

Applications: SAP

Status: Online (Status refreshes every 60 seconds) Refresh Settings Licenses

Configure Application Monitoring

Unconfigure Application Monitoring

Enable Application Heartbeat

Disable Application Heartbeat

Start Application

Stop Application

Enter Maintenance Mode

Exit Maintenance Mode

Component List

Component Dependency

✓	SAP_HAN_HDB00_nic_res is ONLINE
✓	SAP_HAN_HDB00_ip_res is ONLINE
✓	SAP_HAN_HDB00_res is ONLINE
✓	SAP_HAN_HDB00_sapstartsrv_res is ONLINE

ApplicationHA (Version 6.1.1.000) Symantec Diagnostic information

By default, the Component List tab appears. The tab lists each component of the configured application and the status description of each component.

For more information on viewing and administering applications by using the vSphere Client, see the *Symantec ApplicationHA User's Guide*.

- 8 To view component dependency for the monitored application, click the **Component Dependency** tab.

The component dependency graph appears.

Applications: SAP

Status: Online (Status refreshes every 60 seconds) [Refresh](#) [Settings](#) [Licenses](#)

[Configure Application Monitoring](#)
[Unconfigure Application Monitoring](#)
[Enable Application Heartbeat](#)
[Disable Application Heartbeat](#)
[Start Application](#)
[Stop Application](#)
[Enter Maintenance Mode](#)
[Exit Maintenance Mode](#)

Component List

SAP

Component Dependency

ApplicationHA (Version 6.1.1.000) | Symantec.

[Diagnostic information](#)

The graph illustrates the dependencies between a selected component group (an application or a group of inter-related components) and its components for the configured application. The left pane displays component groups and/or configured applications. The right pane displays components of the selected component group or application.

For more information on viewing component dependency for any configured application, see the *Symantec ApplicationHA User's Guide*.

Troubleshooting the agent for SAP NetWeaver and SAP HANA

This chapter includes the following topics:

- [Using the correct software and operating system versions](#)
- [Reviewing error log](#)

Using the correct software and operating system versions

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

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

Reviewing error log

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

Using SAP Netweaver log files

If a SAP NetWeaver instance 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.

Using SAP HANA trace files

If a SAP HANA instance is facing problems, you can access the server trace files to further diagnose the problem. The SAP HANA trace files are located in the `/usr/sap/<SAPSID>/<InstName>/<hostname>/trace` directory.

For example:

```
/usr/sap/HDB/HDB00/saphana2/trace
```

Reviewing ApplicationHA log files

In case of problems while using the agent for SAP NetWeaver and SAP HANA, you can access log files. The ApplicationHA log files are located in the `/var/VRTSvcs/log` directory.

Using trace level logging

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

Note: The `TRACE` level logs are generated locally at the location `/var/VRTSvcs/log/SAPNW_A.log`.

Warning: You may consider temporarily increasing the timeout values for SAPNW for debugging purposes. After the debugging process is complete, you can revert back to the original timeout values. To change the timeout value, use CLI/Veritas Operation Manager. For more information, refer to the Veritas Cluster Server documentation.

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 may also contact your support provider for more help.

Resource type definitions

This appendix includes the following topics:

- [About the resource type and attribute definitions](#)
- [Resource type definition for SAP NetWeaver and SAP HANA](#)
- [SAPNW agent attributes](#)

About the resource type and attribute definitions

The resource type represents the configuration definition of the agent and specifies how the agent is defined in the configuration file. The attribute definitions describe the attributes associated with the agent. The required attributes describe the attributes that must be configured for the agent to function.

Resource type definition for SAP NetWeaver and SAP HANA

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 `SAPNWTypes.cf` file in the `/etc/VRTSvcs/conf/config` cluster configuration directory.

An excerpt from this file follows.

```
type SAPNW (  
  static str AgentFile = "/opt/VRTSvcs/bin/Script50Agent"  
  static str AgentDirectory = "/opt/VRTSagents/ha/bin/SAPNW"  
  static str ArgList[] = { ResLogLevel, State, IState, EnvFile,  
    SAPAdmin, InstProfile, InstType, ProcMon, EnqSrvResName,  
    MonitorProgram }  
  str ResLogLevel = INFO
```

```
str EnvFile
str SAPAdmin
str InstProfile
str InstType = APPSERV
str ProcMon
str EnqSrvResName
str MonitorProgram
boolean StopService = 0
)
```

SAPNW agent attributes

[Table A-1](#) shows the required attributes for configuring an SAP NetWeaver and SAP HANA server instance.

Note: In a virtual environment, all the required attributes are discovered by the Symantec ApplicationHA Configuration wizard.

Table A-1 Required attributes

Required attributes	Description
EnqSrvResName	<p>The name of the VCS resource for SAP Central Services (A)SCS Instance. This attribute is used by Enqueue and Enqueue Replication Server. Using this attribute the Enqueue server queries the Enqueue Replication Server resource state while determining the fail over target and vice a versa.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: SAP71-PI1SCS_sap</p>

Table A-1 Required attributes (*continued*)

Required attributes	Description
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>Note: 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>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/PI1/DVEBMGS00/sappi1.env</p>
InstType	<p>An identifier that classifies and describes the SAP server instance type. Valid values are:</p> <ul style="list-style-type: none">■ APPSERV: SAP Application Server■ ENQUEUE: SAP Central Services■ EBQREP: Enqueue Replication Server■ SMDAGENT: Solution Manager Diagnostics Agent■ HANA: HANA Database instance■ SAPSTARTSRV: SAPSTARTSRV service process <p>Note: The value of this attribute is not case-sensitive.</p> <p>Type and dimension: string-scalar</p> <p>Default: APPSERV</p> <p>Example: ENQUEUE</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>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: dw se jstart</p>

Table A-1 Required attributes (*continued*)

Required attributes	Description
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>
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 functions use this user name to execute their respective core subroutines.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example: pi1adm</p>
InstProfile	<p>The full path to the SAP Instance profile.</p> <p>The <i>SAPSID</i> is found in <i>/usr/sap/SAPSID/SYS/profile</i> directory. The value of the instance is <i>SAPSID_InstName_hostname</i>. The 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: <i>/usr/sap/PI1/SYS/profile/PI1_DVEBMGS00_sappi1pas</i></p>

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

Table A-2 Optional attributes

Optional attribute	Description
MonitorProgram	<p>Absolute path name of an external, user-supplied monitor executable.</p> <p>Type and dimension: string-scalar</p> <p>Default: ""</p> <p>Example 1: /usr/sap/PI1/DVEBMGS00/work/myMonitor.sh</p> <p>Example 2: /usr/sap/PI1/DVEBMGS00/work/myMonitor.sh arg1 arg2</p>
LevelTwoMonitorFreq	<p>This type-level attribute specifies the frequency at which the agent for this resource type must perform second-level or detailed monitoring. You can also override the value of this attribute at the resource level.</p> <p>The value indicates the number of monitor cycles after which the agent will monitor the SAP instance in detail. For example, the value 5 indicates that the agent will monitor the SAP instance in detail after every five online monitor intervals.</p> <p>The binaries that are used during second-level monitoring for different SAP usage types and SAP instances are as follows:</p> <ul style="list-style-type: none">■ For ABAP application server: sapcontrol■ For Java application server: sapcontrol■ For Add-In (ABAP + Java) application server: sapcontrol■ For Enqueue and Enqueue Replication Server: ensmon■ For SAP HANA: sapcontrol <p>Type and dimension: integer-scalar</p> <p>Default: 0</p>
StopService	<p>Specifies if the agent must stop SAP Start Service (sapstartsrv) for this instance.</p> <p>Valid values are:</p> <ul style="list-style-type: none">■ 1 - Stops SAP Start Service for this instance.■ 0 - Does not stop SAP Start Service for this instance. <p>Note: The StopService attribute must be set to 0 for the agent to be able to use SAP HA Library with SAP NetWeaver 7.x and SAP Kernel 7.20 DCK.</p> <p>Type and dimension: boolean-scalar</p> <p>Default: 0</p> <p>Example: 1</p>

Detail monitoring

This appendix includes the following topics:

- [Setting the PATH variable](#)
- [Setting up detail monitoring for ApplicationHA agent for SAP NetWeaver and SAP HANA](#)

Setting the PATH variable

VCS commands reside in the `/opt/VRTS/bin` directory. Add this directory to your PATH environment variable.

To set the PATH variable

- ◆ Perform one of the following steps:

For the Bourne Shell (sh or ksh), type:

```
$ PATH=/opt/VRTS/bin:$PATH; export PATH
```

For the C Shell (csh or tcsh), type:

```
$ setenv PATH :/opt/VRTS/bin:$PATH
```

Setting up detail monitoring for ApplicationHA agent for SAP NetWeaver and SAP HANA

This section describes the procedure to enable and disable detail monitoring for SAP NetWeaver and SAP HANA.

To enable detail monitoring for SAP NetWeaver and SAP HANA

- 1 Make the ApplicationHA configuration writable:

```
haconf -makerw
```

- 2 Freeze the service group to avoid automated actions by ApplicationHA in case of an incomplete configuration:

```
hagrp -freeze SAP_<SAPSID>_SG
```

- 3 Enable detail monitoring for SAP resources by using the following ApplicationHA commands:

```
hares -override SAP_<SAPSID>_res LevelTwoMonitorFreq
```

```
hares -modify SAP_<SAPSID>_res LevelTwoMonitorFreq <frequency>
```

- 4 Save the configuration and unfreeze the service group.

```
haconf -dump -makero
```

```
hagrp -unfreeze SAP_<SAPSID>_SG
```

To disable detail monitoring for SAP NetWeaver and SAP HANA

- 1 Make the ApplicationHA configuration writable:

```
haconf -makerw
```

- 2 Freeze the service group to avoid automated actions by ApplicationHA in case of an incomplete configuration:

```
hagrp -freeze SAP_<SAPSID>_SG
```

- 3 Enable detail monitoring for SAP resources by using the following ApplicationHA commands:

```
hares -modify SAP_<SAPSID>_res LevelTwoMonitorFreq 0
```

- 4 Save the configuration and unfreeze the service group.

```
haconf -dump -makero
```

```
hagrp -unfreeze SAP_<SAPSID>_SG
```