Symantec™ ApplicationHA Agent for WebSphere Application Server Configuration Guide

Linux on KVM

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Symantec

Symantec™ ApplicationHA Agent for WebSphere Application Server Configuration Guide

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Chapter 1

Introducing the WebSphere Application Server agent

This chapter includes the following topics:

- About the Symantec agent for WebSphere Application Server
- About installing and removing the ApplicationHA agent for WebSphere Application Server
- Supported software
- WebSphere Application Server agent functions

About the Symantec agent for WebSphere Application Server

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

The Symantec agent for WebSphere Application Server provides high availability for WebSphere Application Server in a virtual machine.

The agent supports the following types of WebSphere Application Server instances:

- Deployment Manager
- Node Agent
- Application Server

About installing and removing the ApplicationHA agent for WebSphere Application Server

When you install or uninstall Symantec ApplicationHA, the ApplicationHA agent for WebSphere Application Server is automatically installed or removed. For more information, see the *Symantec ApplicationHA Installation and Upgrade Guide*.

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 WebSphere Application Server is automatically installed or removed. For more information, see the *Symantec ApplicationHA Agent Pack Installation Guide*.

Supported software

The Symantec ApplicationHA agent for WebSphere Application Server supports the following software versions:

- Symantec ApplicationHA agent for WebSphere Application Server can be installed and run inside virtual machines that have Symantec ApplicationHA 6.0 installed.
- The following versions of the Veritas Operations Manager components are supported:
  - Veritas Operations Manager Management Server 4.1 or later
  - Veritas Operations Manager managed host for Linux: 4.1 or later
  - Veritas Operations Manager Add-on for Symantec ApplicationHA Management

Supported application versions

Table 1-1 lists the WebSphere Application Server versions that Symantec ApplicationHA 6.0 currently supports on virtual machine.

Table 1-1 Supported application versions

Application	Version
WebSphere Application Server	7.x and 8.0

Supported virtualization environments

Symantec ApplicationHA can be installed and run inside virtual machines in a KVM virtualization environment, running Red Hat Enterprise Linux (RHEL) 6, Update 1 in the physical host.

Supported operating systems on virtual machines

Table 1-2 shows the supported operating systems for Symantec ApplicationHA 6.0.

Table 1-2 Supported guest operating systems

Operating systems	Levels	Kernel version
Red Hat Enterprise Linux 5	U3 or later	2.6.18-128.el5
Red Hat Enterprise Linux 6	Base or later	2.6.32-71.el6

Note: 64-bit operating systems are only supported.

If your system is running a lower level of Red Hat Enterprise Linux, than indicated in Table 1-2, you must upgrade it before attempting to install Symantec ApplicationHA. Consult the Red Hat documentation for more information on upgrading or reinstalling your operating system.

Symantec supports only Red Hat distributed kernel binaries.

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

WebSphere Application Server 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 is responsible for starting a WebSphere Application Server instance. The online function performs the following tasks:

- Verifies that the WebSphere Application Server instance is not already online.
- Determines the version of the WebSphere Application Server software.

- Starts the WebSphere Application Server instance by executing the appropriate start script, which is supplied by the WebSphere Application Server installation program. The script executed depends upon the type of server being started.

Server Type	Start Command
Deployment Manager	`WAS_HOME/binDir/startManager.sh`
Node Agent	`WAS_HOME/binDir/startNode.sh`
Application Server	`WAS_HOME/binDir/startServer.sh`

Note: WAS_HOME is the location where WebSphere Application Server is installed.

Offline

The offline function is responsible for stopping a WebSphere Application Server instance. The offline function performs the following tasks:

- Verifies that the WebSphere Application Server instance is not already offline.
- Determines the version of the WebSphere Application Server.
- Stops the WebSphere Application Server instance by executing the appropriate stop script, which is supplied by the WebSphere Application Server installation program. The script executed depends upon the type of server being stopped.

Server Type	Stop Command
Deployment Manager	`WAS_HOME/binDir/stopManager.sh`
Node Agent	`WAS_HOME/binDir/stopNode.sh`
Application Server	`WAS_HOME/binDir/stopServer.sh`

Monitor

The monitor function is responsible for monitoring the state of WebSphere Application Server instances on all nodes in the cluster.

The monitor function performs the following tasks:

- First-level monitoring quickly checks for the existence of the system process (the Java virtual machine) that represents the WebSphere Application Server instance. It determines the process existence by scanning the system process table and searching for strings in the process command line that uniquely identify the JVM process associated with the WebSphere Application Server

instance. These search strings include the values specified in agent attributes WAS_HOME, WAS_NODE, and ServerName.

- If second-level monitoring is enabled (if SecondLevelMonitor > 0), the monitor function performs a deeper, more thorough state check of WebSphere Application Server. Second-level monitoring uses the IBM-supplied utility program serverStatus.sh. The output from this program is parsed to confirm the server is running.
  When enabled, the integer value specified in attribute SecondLevelMonitor determines how frequently the program is executed. For example, if SecondLevelMonitor is set to 1, the monitor function executes serverStatus.sh during each monitor interval. If SecondLevelMonitor is set to 3, the monitor function executes serverStatus.sh every third monitor interval. This mechanism lets you control the system load generated by monitoring.
  The serverStatus.sh script spawns a Java program that establishes a connection to WebSphere Application Server. Spawning a JVM every monitor interval places additional load on the system. If performance is more important than a second-level state check, then consider disabling second-level monitoring and only performing the first-level process check.
- The monitor function executes a custom monitor program specified in the attribute MonitorProgram. This program does not execute if either the first- or second-level monitor reports that the instance is offline. You can omit second-level monitoring, and attempt running a custom monitor check immediately after first-level monitoring.

Note: You cannot configure second-level or detail monitoring by using the ApplicationHA wizard. To enable detail monitoring, see Appendix B (Detail monitoring) of this guide.

This feature allows ApplicationHA administrator to define custom programs that determine the state of WebSphere Application Server. For example, the administrator may want to test the status of a J2EE component running inside the server and ensure that the underlying application is functioning properly.
See "WebSphere Application Server agent attributes" on page 28.

Clean

The clean function removes any WebSphere Application Server instance processes remaining after a fault event or after an unsuccessful attempt to online or offline the instance.

The clean function performs the following tasks:

- Kills the process that starts the WebSphere Application Server instance. It is unlikely that this process exists, but it needs to be removed if for some reason it still exists during clean.
- Kills the process that stops the WebSphere Application Server instance. It is unlikely this process exists, but it needs to be removed if for some reason it still exists during clean.
- Kills the JVM process for the WebSphere Application Server instance. This process is identified by searching the system process table using the values specified in attributes WAS_HOME, WAS_NODE, and ServerName.

Chapter 2

Configuring application monitoring with ApplicationHA

This chapter includes the following topics:

- About configuring application monitoring with ApplicationHA
- Before configuring application monitoring for WebSphere Application Server
- Accessing the ApplicationHA tab
- Configuring application monitoring for WebSphere Application Server

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 Application Monitoring Configuration Wizard.
- The Application Monitoring Configuration Wizard is launched when you click **Configure Application Monitoring** in the ApplicationHA tab of the Veritas Operations Manager (VOM) console.
- 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 Veritas Cluster Server (VCS) commands.
  For more information read the following technote:
  http://www.symantec.com/docs/TECH159846
- After configuring WebSphere Application Server for monitoring, if you create another WebSphere Application Server instance, this new instance is 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 WebSphere Application Server

Ensure that you complete the following tasks before configuring application monitoring for WebSphere Application Server on a virtual machine:

- Install the Veritas Operations Manager (VOM) Management Server and install the VOM add-on for ApplicationHA on the VOM Management Server. For more information on working with VOM, see the *Symantec ApplicationHA User's Guide*. For information on Accessing the ApplicationHA tab: See "Accessing the ApplicationHA tab" on page 17.
- Install ApplicationHA guest components on the virtual machine that you need to monitor.
- 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 Guide* for a list of ports and services used.

Accessing the ApplicationHA tab

To administer an application on a virtual machine that is running in the KVM environment, you must access the ApplicationHA tab of the Veritas Operations Manager (VOM) console.

In the ApplicationHA tab, you can perform administrative actions such as:

- Start an application
- Stop an application
- Configure application monitoring
- Unconfigure application monitoring
- Enable application heartbeat
- Disable application heartbeat
- Enter maintenance mode
- Exit maintenance mode

To access the ApplicationHA tab

1. On the Veritas Operations Manager console, click **Manage** > **Servers** > **Hosts**.
2. In the left pane, in the **License** list box, select the **ApplicationHA** check box.
3. In the right pane, click the virtual machine where you want to perform administrative actions.
4. Click the **ApplicationHA** tab.

Configuring application monitoring for WebSphere Application Server

Perform the following steps to configure monitoring for WebSphere Application Server on a virtual machine.

To configure application monitoring for WebSphere Application Server

1. In the ApplicationHA tab of theVeritas Operations Manager console, click **ConfigureApplication Monitoring**.

   This launches the Application Monitoring Configuration Wizard.
2. Review the information on the Welcome screen and then click **Next**.

   The wizard lists all the supported applications for the system.
3. Select WebSphere Application Server, and then click **Next**.

4 Enter the WAS HOME directory name and then click **Add**.

5 Review the selected WAS HOME and then click **Next**.

The WebSphere Application Server Instance Selection screen appears.

Note: The wizard may take some time to discover the WebSphere Application Server instances. The response time depends on the execution of WebSphere-supplied commands.

---

6 Select the WebSphere Application Server instances that you want to monitor and then click **Configure**.

7 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 **View Logs** to check the details of the failure.

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

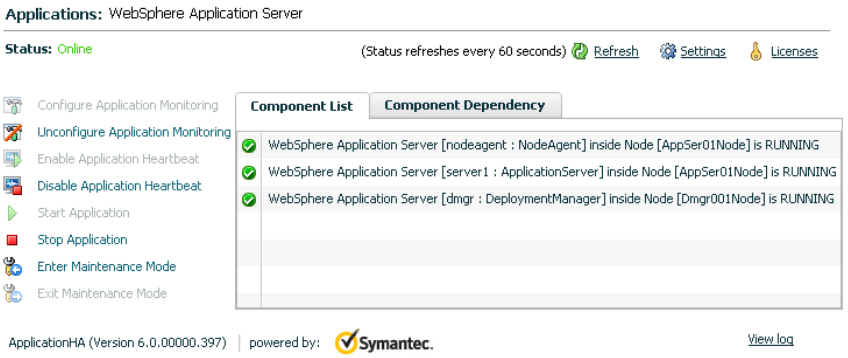
---

8 Click **Finish** to complete the wizard.

This completes the application monitoring configuration.

9 To view the status of the configured application on a virtual machine, on the Veritas Operations Manager console, navigate to the appropriate virtual machine, and then click the **ApplicationHA** tab.

The ApplicationHA view appears.

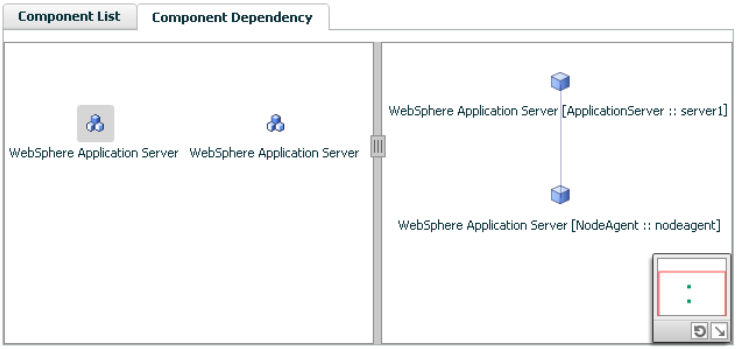


By default, the Component List tab appears. The tab lists each component of the configured application and the status description of each component.

For more information on viewing and administering applications through the Veritas Operations Manager, see the *Symantec ApplicationHA User's Guide*.

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

The component dependency graph appears.



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*.

Chapter 3

Troubleshooting the WebSphere Application Server agent

This chapter includes the following topics:

- Starting the WebSphere Application Server instance outside ApplicationHA control
- Reviewing error log files
- Defining additional environment variables for a WebSphere Application Server instance

Starting the WebSphere Application Server instance outside ApplicationHA control

If you face problems while working with an instance, you must disable the instance within the ApplicationHA framework. A disabled instance is not under the control of the ApplicationHA framework, and so you can test the WebSphere Application Server instance independent of the ApplicationHA framework.

You can then restart the WebSphere Application Server instance outside the ApplicationHA framework.

Note: When you restart the application instance outside ApplicationHA control, use the same parameters that the agent attributes define within the ApplicationHA framework.

A sample procedure to start a WebSphere Application Server instance outside the ApplicationHA framework, is illustrated as follows.

To start a WebSphere Deployment Manager outside the ApplicationHA framework

1. Using the user name specified in the User attribute, log into the host on which the WebSphere Deployment Manager application is to run.
2. Use the values specified in the agent attributes to start the WebSphere Deployment Manager.

   For example, assume that the WebSphere Deployment Manager environment is set as follows:

Attribute	Value
ServerType	DeploymentManager
ServerName	dmgr
WAS_NODE	was70c1dmsol
WAS_HOME	/ibm/was/v70
ServerProfile	Dmgr01 Specify this attribute for WebSphere version 6.0 and later

3. Go to specified directory.

   ```
   /ibm/was/v70/profiles/Dmgr01/bin
   ```

4. Using the startManager.sh script, start the Deployment Manager.

   ```
   /ibm/was/v70/profiles/Dmgr01/bin/startManager.sh
   ```

5. Ensure that the Deployment Manager Server starts successfully.

   If the Deployment Manager works properly outside the ApplicationHA framework, you can attempt to implement the server within the framework.

To start a WebSphere node agent outside the ApplicationHA framework

1. Using the user name specified in the User attribute, log into the host on which the WebSphere Node agent application is to run.
2. Use the values specified in the agent attributes to start the WebSphere Node agent.

   For example, assume that the WebSphere Node agent environment is set as follows:

Attribute	Value
ServerType	NodeAgent
ServerName	nodeagent
WAS_NODE	was70c1n1sol
WAS_HOME	/ibm/was/v70
ServerProfile	AppSrv01

3. Go to specified directory.

   `/ibm/was/v70/profiles/AppSrv01/bin`
4. Using the startNode.sh script, start the Node Agent:

   `/ibm/was/v70/profiles/AppSrv01/bin/startNode.sh`
5. Ensure that the Node Agent starts successfully.

   If the Node Agent works properly outside the ApplicationHA framework, you can attempt to implement the server within the framework.

Reviewing error log files

If you face problems while using the agent for WebSphere Application Server, use the log files described in this section to investigate the problems.

Reviewing cluster log files

In case of problems while using the agent for WebSphere Application Server, you can also access the engine log file for more information about a particular instance. The engine log files are located at the following location:

- The VCS engine log file is `/var/VRTSvcs/log/engine_A.log`

- WebSphere Application Server agent log file is `/var/VRTSvcs/log/WebSphere_A.log`
- ApplicationHA log file is `/var/VRTSvcs/log/AppControlOperations_A.log`

Reviewing agent log files

In case of problems while using the agent for WebSphere, you can access the agent log files for more information. The agent saves output of every entry point process in the temporary folder of the resource system. If the temporary folder is /tmp, the log files are saved using the following naming format:

`/tmp/.VRTSAgentName/`*`ResourceName_EntryPointName.Process_ID`*

For example, for a resource WAS50DeployMgr_dmgr:

`/tmp/.VRTSWebSphere/WAS50DeployMgr_dmgr.online.`*`Process_ID`*
`/tmp/.VRTSWebSphere/WAS50DeployMgr_dmgr.offline.`*`Process_ID`*
`/tmp/.VRTSWebSphere/WAS50DeployMgr_dmgr.clean.`*`Process_ID`*
`/tmp/.VRTSWebSphere/WAS50DeployMgr_dmgr.monitor.`*`Process_ID`*

If a resource, WAS50DeployMgr_dmgr is unable to bring a WebSphere Node Manager online, you can access the /tmp/.VRTSWebSphere/WAS50DeployMgr_dmgr.online.*Process_ID* for more information so that you can diagnose the problem.

Note: These files are overwritten each time you execute the corresponding agent function process. In case you want to save the information, make a copy of the files at another location.

Using trace level logging

The ResLogLevel attribute controls the level of logging that is written in a cluster log file for each WebSphere Application 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 instance.

To localize ResLogLevel attribute for an instance

1. ApplicationHA 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
  ```

2. Identify the resource for which you want to enable detailed logging.
3. Localize the ResLogLevel attribute for the identified resource:
   ```
   # hares -local Resource_Name ResLogLevel
   ```
4. Set the ResLogLevel attribute to TRACE for the identified resource:
   ```
   # hares -modify Resource_Name ResLogLevel TRACE -sys SysA
   ```
5. Note the time before you begin to operate the identified resource.
6. Test the identified resource. The function reproduces the problem that you are attempting to diagnose.
7. Note the time when the problem is reproduced.
8. Set the ResLogLevel attribute back to INFO for the identified resource:
   ```
   # hares -modify Resource_Name ResLogLevel INFO -sys SysA
   ```
9. 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.

Defining additional environment variables for a WebSphere Application Server instance

The WebSphere Application Server uses the `setupCmdLine.sh` file, which defines the required environment needed for WebSphere Application Server. The file is sourced in all the start, stop, and monitoring scripts used by the WebSphere Application Server agent.

```
bash-3.00# cat
/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/bin/startServer.sh

#!/bin/sh

binDir=`dirname ${0}`

. ${binDir}/setupCmdLine.sh
```

```
${WAS_HOME}/bin/startServer.sh "$@"
```

By design, the WebSphere Application Server agent does not source the user's profile. If you need to export any additional environment variables, create an environment file with the required variables and source it in following scripts:

`startManager.sh, startNode.sh, startServer.sh, stopManager.sh, stopNode.sh, stopServer.sh, serverStatus.sh`

For example, append a line in `startServer.sh` in the following manner:

```
# Call User Environment here.

. <Path to env file>/setUserEnv.sh
```

Appendix A

Resource Type Definitions

This appendix includes the following topics:

- About the resource type and attribute definitions
- WebSphere Application Server 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 WebSphere Application Server

The ApplicationHA agent for WebSphere Application Server is represented by the WebSphere resource type in ApplicationHA.

```
type WebSphere (
   static boolean AEPTimeout = 1
   static str AgentFile = "/opt/VRTSvcs/bin/Script50Agent"
   static str AgentDirectory = "/opt/VRTSagents/ha/bin/WebSphere"
   static str ArgList [] = { ResLogLevel, State, IState,
   ServerName, WAS_NODE,
   WAS_HOME ,User, ServerProfile, ServerType, StartOptions,
   StopOptions, MonitorProgram, SecondLevelMonitor }
   str  ResLogLevel = "INFO"
   str  ServerName
   str  WAS_NODE
   str  WAS_HOME
   str  User
```

```
    str  ServerProfile
    str  ServerType
    str  StartOptions
    str  StopOptions
    str  MonitorProgram
    int  SecondLevelMonitor = 0
)
```

WebSphere Application Server agent attributes

Table A-1 shows the required attributes for the agent for WebSphere Application Server.

Table A-1 Required attributes

Required attribute	Description
ResLogLevel	The logging detail performed by the agent for the resource. Valid values are: ERROR: Only logs error messages. WARN: Logs above plus warning messages. INFO: Logs above plus informational messages. TRACE: Logs above plus trace messages. TRACE is very verbose and should only be used during initial configuration or for troubleshooting and diagnostic functions. Type and dimension: string-scalar Default: INFO Example: TRACE
SecondLevelMonitor	Specifies if second-level monitor is enabled and how frequently it is performed. Second-level monitor is a deeper, more thorough state check of the WebSphere resource, performed by executing the IBM-supplied utility program serverStatus.sh. The output from this program is parsed to confirm the server status is running. The integer value specified by this attribute determines how frequently the second-level monitor program is executed. For example, if SecondLevelMonitor is set to 1, the monitor function will execute serverStatus.sh during each monitor interval. A value of 3 executes the program every third monitor interval. If SecondLevelMonitor is set to 0, the monitor function will never perform the second-level monitor. Type and dimension: integer-scalar Default: 0 Example: 1

Table A-1 Required attributes *(continued)*

Required attribute	Description
ServerName	Contains the server name assigned to the WebSphere Application Server during its installation. In Network Deployment configurations, the default ServerName for Deployment Managers is dmgr and the default ServerName for the Node Agents is nodeagent, but these names are not mandatory. Type and dimension: string-scalar Default: "" Example: server1
ServerProfile	Server profile name of the WebSphere Application Server instance or complete path to the WebSphere Application Server profile. Type and dimension: string-scalar Default: "" Example 1: Dmgr01 Example 2: /WAS/AppSrv/profiles/AppSrv01/
ServerType	Type of WebSphere Application Server that the cluster will manage. Valid names are as follows: ■ DeploymentManager: Instance is a Deployment Manager. ■ NodeAgent: Instance is a Node Agent. ■ ApplicationServer: Instance is an Application Server, which may be a stand-alone server or may be part of a Network Deployment and is a member of a WebSphere Cell. The agent uses this value to determine how to manage the WebSphere Application Server within a cluster. Refer to the WebSphere documentation for a full explanation of the purposes and use of each WebSphere Application Server type. Type and dimension: string-scalar Default: "" Example: DeploymentManager
User	The UNIX user name used to run the programs that start, stop, and monitor the WebSphere instance, which include the program specified in the MonitorProgram attribute. IBM recommends using the root account, but you may use any account. If User is not set to root, the user name must be synchronized across the systems within the cluster. In other words, the user name must resolve to the same UID and have the same default shell on each system in the cluster. Type and dimension: string-scalar Default: "" Example: root

Table A-1 Required attributes *(continued)*

Required attribute	Description
WAS_HOME	The absolute path to the WebSphere Application Server or WebSphere Application Server Network Deployment root installation directory. This attribute is used to locate programs executed by the agent. It is also where the *binDir*/setupCmdLine.sh file resides. The value is also used to uniquely identify the ServerType processes. Using WAS_HOME to uniquely identify an Application Server's process IDs requires that WAS_HOME be unique compared to WAS_HOME for all other WAS instances in the cluster. **Note:** Both WAS_HOME and WAS_ND_HOME are defined as WAS_HOME in the standard environment file setupCmdLine.sh, which is supplied with WebSphere. Type and dimension: string-scalar Default: "" Example: /ibm/was
WAS_NODE	The WebSphere Node Name to which the server instance belongs. The Node Name is an administrative identifier that is internal to the WebSphere environment and is assigned when the node is installed. WebSphere requires that a Node Name must be unique within a WebSphere cell. Type and dimension: string-scalar Default: "" Example: was51c1n2

Table A-2 lists the optional attributes for the agent for WebSphere Application Server.

Table A-2 Optional attributes

Optional Attribute	Definition
MonitorProgram	The full pathname and command-line arguments for an externally-provided custom monitor program. The program is executed within the security context of the UNIX account specified in attribute User. The program must be completely self-contained and independent, and it must return one of the following exit codes: 110 or 0: The WebSphere Application Server is ONLINE. 100 or 1: The WebSphere Application Server is OFFLINE. All other: The WebSphere Application Server state is UNKNOWN. Symantec recommends storing the external monitor program on the shared storage device, in the directory specified by the WAS_HOME attribute, to ensure the file is always available on the online system. Type and dimension: string-scalar Default: "" Example: /usr/WAS/server1/bin/mymonitor.sh
StartOptions	The command-line options that are passed to the WebSphere start script when it is executed within the online function. Multiple options should be separated by a space. Refer to the WebSphere product documentation for a list and description of supported start options. Type and dimension: string-scalar Default: "" Example: "-replacelog -trace"
StopOptions	The command-line options that are passed to the WebSphere stop script when it is executed within the offline function. Multiple options should be separated by a space. Refer to the WebSphere product documentation for a list and description of supported stop options. Type and dimension: string-scalar Default: "" Example: "-replacelog -trace"

Appendix B

Detail Monitoring

This appendix includes the following topics:

- Setting the PATH variable
- Setting up detail monitoring for ApplicationHA agent for WebSphere Application Server

Setting the PATH variable

ApplicationHA 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 WebSphere Application Server

This section describes the procedure to enable and disable detail monitoring for WebSphere Application Server.

To enable detail monitoring for WebSphere Application Server

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 WAS_<CellName>_<NodeName>_SG
```

3 Enable detail monitoring for WebSphere Application Server instances by using the following ApplicationHA commands:

```
# hares -modify WAS_<CellName>_<NodeName>_<ServerName>_res
SecondLevelMonitor <frequency>
```

Note: For more information on SecondLevelMonitor attribute, See "WebSphere Application Server agent attributes" on page 28.

---

4 Save the configuration and unfreeze the service group.

```
# hagrp -unfreeze WAS_<CellName>_<NodeName>_SG

# haconf -dump -makero
```

To disable detail monitoring for WebSphere Application Server

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 WAS_<CellName>_<NodeName>_SG
```

3 Disable detail monitoring for ApplicationHA instances by using the following ApplicationHA commands:

```
# hares -modify WAS_<CellName>_<NodeName>_<ServerName>_res
SecondLevelMonitor 0
```

4 Save the configuration and unfreeze the service group.

```
# hagrp -unfreeze WAS_<CellName>_<NodeName>_SG

# haconf -dump -makero
```