Symantec™ ApplicationHA Generic Agent Configuration Guide

AIX on IBM PowerVM

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Symantec

Symantec™ ApplicationHA Generic Agent Configuration Guide

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Chapter 1

Generic Application agent for Symantec ApplicationHA

This chapter includes the following topics:

- About the generic agent

About the generic agent

The generic agent brings the custom applications online, takes them offline, and monitors their status. Use it to specify different executables for the online, offline, and monitor routines for different programs. The executables must exist locally on the managed LPAR. You can use this agent to provide high availability for applications that are not by default supported by ApplicationHA.

For the list of supported applications, see *Symantec ApplicationHA Installation Guide*.

An application runs in the default context of root.

You can monitor the application in the following ways:

- Use the monitor program
- Specify a list of processes
- Specify a list of process ID files
- Any combination of the above

Note: ApplicationHA Custom Application wizard configures only the monitor program. For more details on how to specify the list of processes or process ID files: See "Writing custom monitor programs to monitor multiple processes using PID files" on page 30.

Agent functions

Online	Runs the command or script that you specify in the value of the StartProgram attribute. Runs the command with the specified parameters in the context of the specified user. To bring the resource online, the agent function performs the command: `su [-] user -c command_to_online_resource`
Offline	Runs the command or script that you specify in the value of the StopProgram attribute. Runs the command with the specified parameters in the context of the specified user. To take the resource offline, the agent function performs the command: `su [-] user -c command_to_offline_resource`
Monitor	If you specify the MonitorProgram attribute, the agent executes the user defined MonitorProgram in the user-specified context. If you specify the PidFiles attribute, the routine verifies that the process ID that is found in each listed file is running. If you specify the MonitorProcesses attribute, the routine verifies that each listed process is running in the context of the user you specify. Use any combination among these attributes (MonitorProgram, PidFiles, or MonitorProcesses) to monitor the application. If any of the processes that are specified in either PidFiles or MonitorProcesses is determined not to be running, the monitor returns OFFLINE. If the process terminates ungracefully, the monitor returns OFFLINE and failover occurs. To monitor the resource, the agent function performs the command: `su [-] user -c command_to_monitor_resource`
imf_init	Initializes the agent to interface with the asynchronous monitoring framework (AMF) kernel driver. This function runs when the agent starts up.
imf_getnotification	Gets notification about resource state changes. This function runs after the agent initializes with the AMF kernel driver. The agent continuously waits for notification and takes action on the resource upon notification.

imf_register	Registers the resource entities, which the agent must monitor, with the AMF kernel driver. For example, the function registers the PID for online monitoring of a process. This function runs for each resource after the resource goes into steady state (online or offline). The Application agent uses IMF for the processes configured with PidFiles and the MonitorProcesses attribute.
Clean	Terminates processes specified in PidFiles or MonitorProcesses. Ensures that only those processes (that are specified in the MonitorProcesses attribute) running with the user ID specified in the User attribute are killed. If the CleanProgram is defined, the agent executes the CleanProgram. To forcefully stop the resource, the agent function performs the command: `su [-] user -c command_to_clean_resource` Note that the agent uses the `su -` option only when the attribute UseSUDash is enabled (1). The UseSUDash attribute is disabled (0) by default.
Action	The various functions of the action entry point are as follows: ■ program.vfd Checks the availability of the specified program and the execution permissions for the specified program. ■ user.vfd Checks the existence of the specified user on the host. ■ cksum.vfd Checks the existence of the same binary on all nodes. ■ propcv [For internal use only] Invokes the AMF call with arguments to decide whether to allow or prevent processes from starting for an application resource, outside the VCS control, in the cluster. The StartProgram and the processes configured under MonitorProcesses, registered with AMF for offline monitoring, are prevented from starting on the offline node. This helps prevent concurrency violation at an early stage. ■ getcksum Returns the checksum of the specified program

For all agent functions on AIX: If the User attribute is set to a non-root user, the agent checks if this non-root user has any home directory that exists and is accessible. If this non-root user has a home directory and is accessible, then it does the command: `su - user -c command`. If this non-root user does not have a home

directory or the home directory is unaccessible, then it uses the command: `su user -c command`.

State definitions

ONLINE	Indicates that all processes that are specified in the PidFiles and the MonitorProcesses attribute are running and that the MonitorProgram returns ONLINE.
OFFLINE	Indicates that at least one process that are specified in the PidFiles attribute or MonitorProcesses is not running, or that the MonitorProgram returns OFFLINE.
UNKNOWN	Indicates an indeterminable application state or invalid configuration.

Chapter 2

Configuring the generic Application agent

This chapter includes the following topics:

- About configuring application monitoring with ApplicationHA
- Before configuring application monitoring for custom applications
- Accessing the Symantec High Availability view
- Configuring application monitoring for custom applications

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 managed LPAR using the Symantec ApplicationHA Configuration Wizard.
- The Symantec ApplicationHA Configuration Wizard is launched when you click **Configure Application Monitoring** in the Symantec High Availability view of the Veritas Operations Manager (VOM) Management Server console.
- In this release, the wizard allows you to configure monitoring for only one application per managed LPAR.
  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 managed LPAR, using Symantec Cluster Server (VCS) commands.
  For more information read the following technote:
  http://www.symantec.com/docs/TECH159846
- After configuring custom applications for monitoring, if you create another instance of the application, 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 custom applications

Ensure that you complete the following tasks before configuring application monitoring for custom applications on a managed LPAR:

- Install Veritas Operations Manager (VOM) Management Server. For more information on working with VOM, see the *Symantec ApplicationHA User's Guide*. For information on accessing the Symantec High Availability view: See "Accessing the Symantec High Availability view " on page 13.
- Install ApplicationHA guest components on the managed LPAR that you need to monitor.
- Assign ApplicationHA - Configure Application Monitoring (Admin) privileges to the logged-on user on the managed LPAR where you want to configure application monitoring.
- Install the application and the associated components that you wish to monitor on the managed LPAR.
- 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 Symantec High Availability view

To administer an application on a managed LPAR that is running in the IBM PowerVM environment, you must access the Symantec High Availability view of the Veritas Operations Manager (VOM) Management Server console.

From the Symantec High Availability view, 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 Symantec High Availability view

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 managed LPAR.
4. Right-click the required managed LPAR, and then click **Manage ApplicationHA**.

   The Symantec High Availability view appears.

Configuring application monitoring for custom applications

Perform the following steps to configure monitoring for custom applications on a managed LPAR.

To configure application monitoring for custom applications

1. In the Symantec High Availability view of the Veritas Operations Manager Management Server Console, click **Configure Application Monitoring**.

   This launches the Symantec ApplicationHA 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 **Custom Application**, and then click **Next**.

   The Program Selection screen appears.

4 To specify the application components to monitor, click **Add Component**.

The **Application Component Parameters** dialog box appears.

5 Specify the names of the program scripts and the user name by using which the application must be administered.

Note: The wizard automatically populates the **Display Name** for the specified component. You can, however, edit the information in this field. Also, ensure that you specify a user with valid credentials and adequate privileges on the managed LPAR (guest) where you configure the generic agent. Else, application monitoring may fail.

---

6 Click **OK**.

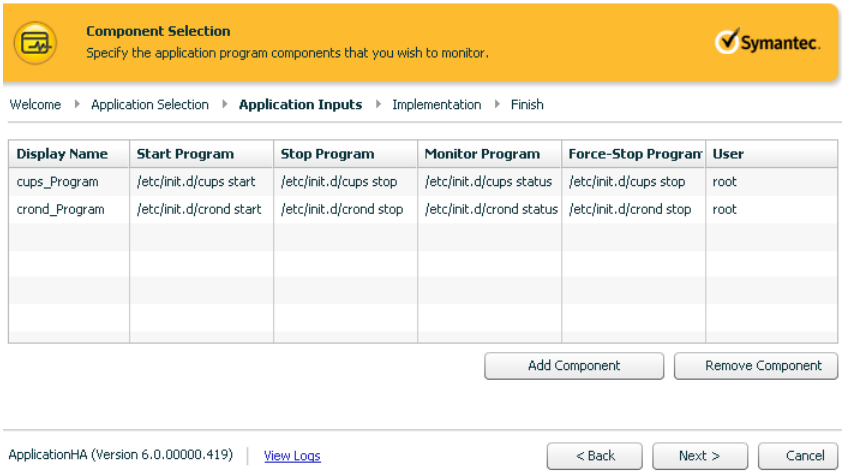
The specified component appears on the Program Selection screen.

7 To specify more application components for monitoring, repeat step 4 to step 6. Else, click **Next**.

The Define Start Stop Order screen appears. The screen lists the previously selected components.

8 In the Parent Component list, click a component.

The other components you specified in steps 4 to 7 appear in the Components list.



9 To set up dependency with the specified parent component, in the Components list, click a component. Repeat this step for all parent components.

10 Click **Configure**.

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.

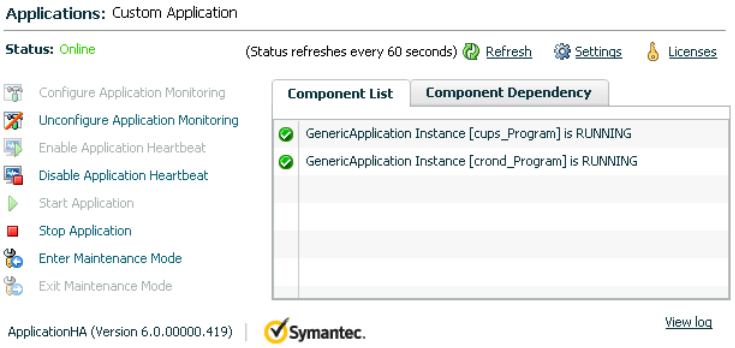
---

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

This completes the application monitoring configuration. See "Sample configuration for custom processes" on page 24.

12 To view the status of the configured application on a managed LPAR, on the Veritas Operations Manager Management Server console, right-click the appropriate managed LPAR and then click **Manage ApplicationHA**.

The Symantec High Availability view appears.

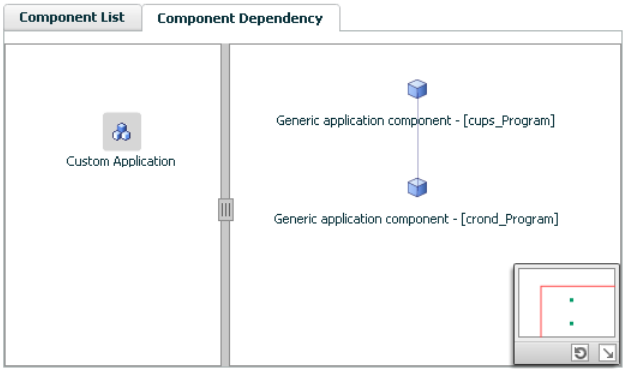


By default, the Component List tab appears. The tab lists each component of the configured application and the status description of each component.

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

13 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*.

Appendix A

Resource type definitions

This appendix includes the following topics:

- Resource type definition
- Agent attributes

Resource type definition

```
type Application (
        static keylist SupportedActions = { "program.vfd",
        "user.vfd", "cksum.vfd", getcksum, propcv }
        static str ArgList[] = { User, StartProgram, StopProgram,
        CleanProgram, MonitorProgram, PidFiles, MonitorProcesses,
        EnvFile, UseSUDash, State, IState }
        static int ContainerOpts{} = { RunInContainer=1, PassCInfo=0 }
        static int IMF{} = { Mode = 3, MonitorFreq = 1,
        RegisterRetryLimit = 3 }
        static str IMFRegList[] = { MonitorProcesses, User, PidFiles,
        MonitorProgram, StartProgram, LevelTwoMonitorFreq }
        static int LevelTwoMonitorFreq = 1
        str User = "root"
        str StartProgram
        str StopProgram
        str CleanProgram
        str MonitorProgram
        str PidFiles[]
        str MonitorProcesses[]
        str EnvFile
        boolean UseSUDash = 0
)
```

Agent attributes

Table A-1 Required attributes

Required attribute	Description
StartProgram	The executable, which starts the application. Specify the complete path of the executable. Applicable command line arguments follow the name of the executable and have spaces separating them. **Note:** The agent logs the return value of the StartProgram executable. The agent does not treat a non-zero return value as failure of execution and brings the resource online. **Note:** Do not use the opening and closing ({ }) brace symbols in this string. **Note:** In the script, specify a return value that is between 0 and 255. Type and dimension: string-scalar Example: "/usr/sbin/sample_app start"
StopProgram	The executable, which stops the application. Specify the complete path of the executable. Applicable command line arguments follow the name of the executable and have spaces separating them. **Note:** The agent logs the return value of the StopProgram executable. The agent does not treat a non-zero return value as failure of execution and takes the resource offline. **Note:** Do not use the opening and closing ({ }) brace symbols in this string. **Note:** In the script, specify a return value that is between 0 and 255. Type and dimension: string-scalar Example: "/usr/sbin/sample_app stop"
At least one of the following attributes: ■ MonitorProcesses ■ MonitorProgram ■ PidFiles	See Table A-2 on page 21.

Table A-2 Optional attributes

Optional attribute	Description
CleanProgram	The executable, which forcibly stops the application. Specify the complete path of the executable. Applicable command line arguments follow the name of the executable and have spaces separating them. **Note:** Symantec recommends to have the CleanProgram on the local storage so that in case of loss of storage connectivity ApplicationHA can take appropriate action to stop the application. **Note:** If the CleanProgram executable returns a non-zero value, the agent treats it as a clean failure and the resource will not fault. Type and dimension: string-scalar Example: "/usr/sbin/sample_app stop"
MonitorProcesses	A list of processes that you want monitored and cleaned. Each process name is the name of an executable. Qualify the executable name with its complete path if the path starts the executable. The process name must be the full command line argument that the `ps -u user -eo pid,comm` command displays for the process. Type and dimension: string-vector Example: { "/usr/bin/sh /user/app/process1", "/usr/bin/sh /user/app/process2" }
MonitorProgram	The executable, which monitors the application. Specify the complete path of the executable. Applicable command line arguments follow the name of the executable and have spaces separating them. MonitorProgram can return the following states: OFFLINE value is 100 or 1; ONLINE values range from 101 to 110 or 0 (depending on the confidence level); 110 equals confidence level of 100%. Any other value = UNKNOWN. If MonitorProgram is configured and not available, then resource state will be: ■ OFFLINE if the resource was in OFFLINE state and not waiting for any action. ■ UNKNOWN if the resource was in any other state or waiting for some action. **Note:** Do not use the opening and closing ({ }) brace symbols in this string. Type and dimension: string-scalar Example: "/usr/sbin/sample_app_monitor all"

Table A-2 Optional attributes *(continued)*

Optional attribute	Description
PidFiles	A list of PID (process ID) files that contain the PID of the processes that you want monitored and cleaned. These are application generated files. Each PID file contains one monitored PID. Specify the complete path of each PID file in the list. The process ID can change when the process restarts. If the application takes time to update the PID file, the agent's Monitor function may return an incorrect result. If incorrect results occur, increase the ToleranceLimit in the resource definition. Type and dimension: string-vector Example: "/etc/sample/sample_app.pid"
User	The user ID for running StartProgram, StopProgram, MonitorProgram, and CleanProgram. The processes that are specified in the MonitorProcesses list must run in the context of the specified user. Monitor checks the processes to make sure they run in this context. **Note:** If the configured user does not exist, the resource state will be UNKNOWN. Type and dimension: string-scalar Default: root Example: user1
EnvFile	The environment file that should get sourced before running any of the StartProgram, StopProgram, MonitorProgram or CleanProgram. **Note:** Make sure that the EnvFile adheres the default shell syntax of the configured user. Type and dimension: string-scalar Default: "" Example: /home/username/envfile

Table A-2 Optional attributes *(continued)*

Optional attribute	Description
UseSUDash	When the value of this attribute is 0, the agent performs an `su user` command before it executes the StartProgram, the StopProgram, the MonitorProgram, or the CleanProgram agent functions. When the value of this attribute is 1, the agent performs an `su - user` command before it executes the StartProgram, the StopProgram, the MonitorProgram or the CleanProgram agent functions. Type and dimension: boolean-scalar Default: 0 Example: 1

Appendix B

Sample configurations

This appendix includes the following topics:

- Sample configuration for custom processes

Sample configuration for custom processes

This section describes steps to configure custom processes for high availability by using Symantec ApplicationHA.

Let us assume the following:

- The sample custom application component, HttpServer, can be started, stopped, forcibly stopped, and monitored by using appropriate options of the following scripts, respectively: `/usr/local/apache2/bin/httpd start`, `/usr/local/apache2/bin/httpd stop`,`/usr/local/apache2/bin/httpd stop`, and `/usr/local/apache2/bin/monitor_httpd`. The `monitor_httpd`script is written to comply with the MonitorProgram attribute of custom applications.
- The sample custom application component, MyComponent1, can be started, stopped, forcibly stopped, and monitored by using the following scripts, respectively: `startMyComponent1`, `stopMyComponent1`, `forcestopMyComponent1`, and `monitorMyComponent1`. The `monitorMyComponent1` script is written to comply with the MonitorProgram attribute of custom applications.

See "Agent attributes" on page 20.

To configure application monitoring for an init process

1. In the Symantec High Availability view of the Veritas Operations Manager Management Server console, click **Configure Application Monitoring**. This launches the Symantec ApplicationHA 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 **Custom Application**, and then click **Next**.

The Program Selection screen appears.

4 To specify the httpd application details to monitor, click **Add Component**.

The **Application Component Parameters** dialog box appears.

Note: init processes such as httpd, do not require special monitor scripts. ApplicationHA uses the status option of the init script for monitoring. However you can also use your own program scripts to monitor such processes.

---

5 Enter the following values in the respective fields and then click **OK**:

Program to start the application	`/usr/local/apache2/bin/httpd -f /usr/local/apache2/conf/httpd.conf -k start`
Program to stop the application	`/usr/local/apache2/bin/httpd -f /usr/local/apache2/conf/httpd.conf -k stop`
Program to monitor the application	`/usr/local/apache2/bin/monitor_httpd`

6 To specify the application components to monitor, click **Add Component**.

The Application Component Parameters dialog box appears.

7 Enter the following values in the respective fields:

Program to start the application	`/home/user1/myapplication/bin/startMyComponent1`
Program to stop the application	`/home/user1/myapplication/bin/stopMyComponent1`
Program to monitor the application	`/home/user1/myapplication/bin/monitorMyComponent1`
Program to forcibly stop the application	`/home/user1/myapplication/bin/forcestopMyComponent1`
User name to use when administering the application	*username* The default user name is ‘root’

8 Click **OK**.

The specified component appears on the Program Selection screen.

9 If you want to specify more application components for monitoring, repeat step 4 to step 8.

If you want to define the relationship between httpd and MyApplication components, click **Next**. The Define Start Stop Order screen appears. The screen lists the previously selected components.

10 To bring the httpd program online first and then the MyApplication program, in the Parent Component list, click on startMyComponent1_Program.

11 In the Component list, click to check httpd_Program and then click **Configure**.

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**.

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

Appendix C

Sample scripts for custom application

This appendix includes the following topics:

- Sample scripts to start, stop, and monitor a custom application

Sample scripts to start, stop, and monitor a custom application

You can write your own scripts for the generic agent to bring a custom application online, take the custom application offline, and monitor the custom application's status. You can also modify the following sample scripts and use them, to start, stop, and monitor the custom application.

- Sample script to start a custom application:

```
#!/bin/sh
touch /tmp/sampleapp   # add any steps, if required
exit 0
```

  You can modify the sample start script to suit the custom application requirements. If you save the start script with the name `startsampleapp`, then to bring the custom application online, the agent function runs the following command:

  `su - root -c /root/customapp/startsampleapp`

- Sample script to stop a custom application:

```
#!/bin/sh
rm -f /tmp/sampleapp # add any steps, if required
exit 0
```

You can modify the sample stop script to suit the custom application requirements. If you save the stop script with the name `stopsampleapp`, then to bring down the custom application, the agent function runs the following command:

`su - root -c /root/customapp/stopsampleapp`

Note: The value of the return code for the start and stop scripts must be 0. No other return codes are supported.

- Sample script to monitor a custom application:

```
#!/bin/sh
APPLICATION_IS_ONLINE=110
APPLICATION_IS_OFFLINE=100
if [ -f /tmp/sampleapp ] ; then  # add any steps, if required
        exit $APPLICATION_IS_ONLINE
else
        exit $APPLICATION_IS_OFFLINE
fi
```

If you save the monitor script with the name `monitorsampleapp`, then to monitor the custom application, the agent function runs the following command:

`su - root -c/root/customapp/monitorsampleapp`

Appendix D

Custom monitor programs

This appendix includes the following topics:

- Writing custom monitor programs to monitor multiple processes
- Writing custom monitor programs to monitor multiple processes using PID files

Writing custom monitor programs to monitor multiple processes

The **Custom Application** option of the Application Monitoring Configuration Wizard does not allow you to monitor multiple processes. Perform the following steps to write a monitor program that can be used to monitor multiple processes using ApplicationHA.

To write a custom monitor program with process path names

1. Verify if each process is running by executing the following command:

   ```
   ps -ef | grep ProcessName
   ```

2. If all the processes are running, exit the monitor program with 110 as the return code.

   If any of the processes is not running, exit the monitor program with 100 as the return code.

3. Save this process in a shell script and assign execute permissions to the script.

4. In the **Application Component Parameters** dialog box of the Application Monitoring Configuration Wizard, enter the absolute path of the script in the **Monitor Program** field followed by the list of processes to monitor.

Writing custom monitor programs to monitor multiple processes using PID files

The **Custom Application** option of the Application Monitoring Configuration Wizard does not allow you to monitor multiple processes by using PID files. Perform the following steps to write a monitor program that can be used to monitor multiple processes using PID files in ApplicationHA.

To write a custom monitor program with PID files

1. Verify if process specified in each PID file is running by executing the following command:

   ```
   ps -ef | grep ProcessID
   ```

   Here, *ProcessID* is the content of the PID file.

2. If all the processes are running, exit the monitor program with 110 as the return code.

   If any of the processes is not running, exit the monitor program with 100 as the return code.

3. Save this process in a shell script and assign execute permissions to the script.

4. In the **Application Component Parameters** dialog box of the Application Monitoring Configuration Wizard, enter the absolute path of the script in the **Monitor Program** field followed by the list of PID files separated by a space.