

Symantec™ ApplicationHA User's Guide

Solaris on Oracle VM Server for SPARC

6.0

Symantec™ ApplicationHA User's Guide

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Introducing Symantec ApplicationHA

This chapter includes the following topics:

- [What is Symantec ApplicationHA](#)
- [Which applications can I monitor?](#)
- [Components of the Symantec ApplicationHA setup](#)
- [Symantec ApplicationHA user privileges](#)
- [Symantec ApplicationHA agents](#)
- [About Symantec ApplicationHA licensing](#)

What is Symantec ApplicationHA

Symantec ApplicationHA provides monitoring capabilities for applications running inside logical domains in the Oracle VM Server for SPARC virtualization environment. Symantec ApplicationHA adds a layer of application awareness to the core high availability (HA) functionality offered by Veritas™ Cluster Server (VCS) in the control domain.

Symantec ApplicationHA is based on VCS and uses similar concepts such as agents, resources, and service groups. However, it does not include the high availability cluster components such as the Group Membership and Atomic Broadcast (GAB), Low Latency Transport (LLT), Asynchronous Monitoring Framework (AMF), and Veritas Fencing (VxFEN). Symantec ApplicationHA has a lightweight server footprint that allows faster installation and configuration.

Key benefits include the following:

- Out of the box integration with VCS.

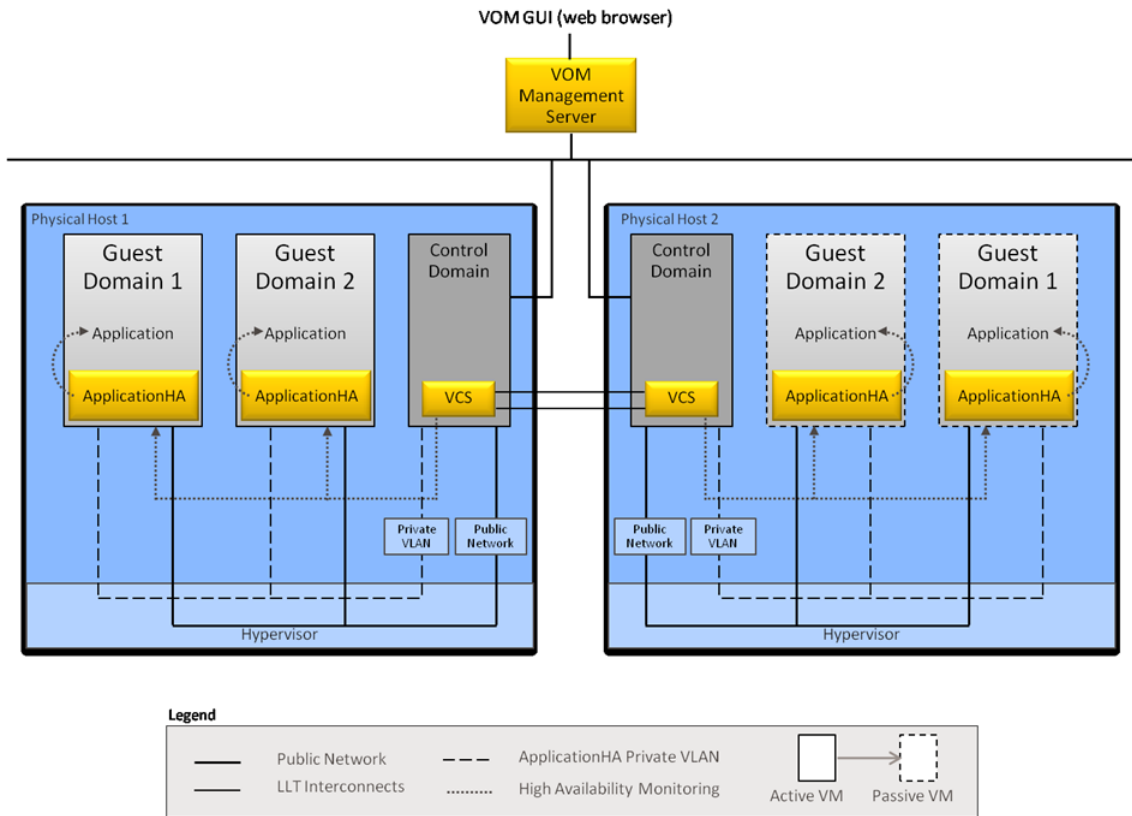
- Full visibility and control over applications with the ability to start, stop, and monitor applications running inside guest domains.
- High availability of the application as well as the guest domain inside which the application runs.
- Graded application fault-management responses such as:-
 - Application restart
 - ApplicationHA-initiated, graceful internal reboot (soft reboot) of a guest domain
 - VCS-initiated, external reboot (hard reboot) of guest domain
 - Failover of the guest domain to another VCS node.
- Standardized way to manage applications using a single interface that is integrated with the Veritas Operations Manager (VOM) console.
- Specialized Application Maintenance mode, in which ApplicationHA allows you to intentionally take an application out of its purview for maintenance or troubleshooting.

How ApplicationHA is deployed in the Oracle VM Server for SPARC environment

Oracle VM Server for SPARC is a virtualization and partitioning solution supported on Oracle Solaris CoolThreads technology-based servers. Oracle VM Server for SPARC lets you create multiple virtual systems called logical domains, on a single physical host.

In the Oracle VM Server for SPARC virtualization environment, ApplicationHA provides high availability of applications running on guest domains. Veritas Cluster Server (VCS) provides high availability of the guest domains that run on the physical host.

The following figure illustrates how ApplicationHA and VCS are deployed in a typical Oracle VM Server for SPARC virtualization environment.



When you install the Oracle VM Server for SPARC software, the first logical domain that you create in a physical host is the control domain. For the other logical domains on the same physical host, this document uses the term “guest domains”.

ApplicationHA is installed on the guest domain, and provides high availability to a configured application running on the guest domain. VCS is installed on the control domain, as part of a Storage Foundation Cluster File Server High Availability (SFCFSHA) stack installation. VCS provides high availability to the guest domain where the configured application runs.

To ensure application-aware monitoring of guest domains, you must enable VCS support for ApplicationHA.

See [“Enabling VCS support for ApplicationHA”](#) on page 30.

When you enable VCS to support ApplicationHA, a private VLAN is created between monitored guest domains and the VCS node (control domain). The private VLAN facilitates heartbeat communication between VCS in the control domain and ApplicationHA in the guest domains.

Veritas Operations Manager (VOM) provides you with a centralized management console (GUI) to administer application monitoring with ApplicationHA.

For more information on how VCS monitors guest domains for high availability, see the *SFHA Virtualization Solutions Guide for Solaris*.

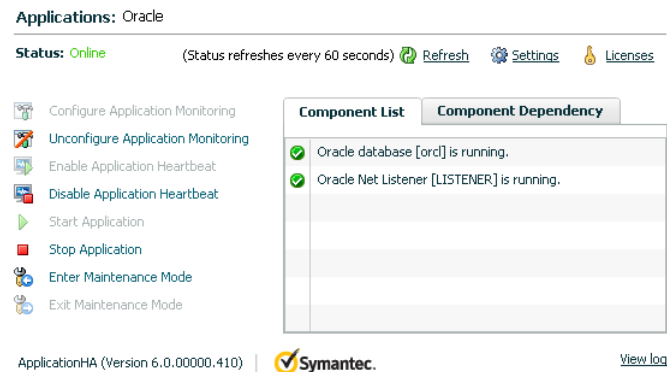
How Symantec ApplicationHA works with VCS

Symantec ApplicationHA installed in guest domains communicates directly with VCS installed in the control domain. Symantec ApplicationHA conveys the application health status to VCS in the form of a heartbeat. If VCS does not receive the heartbeat from a particular guest domain within a specified interval, VCS either restarts that guest domain or fails it over to another physical host.

You can monitor an application running on a guest domain by using Veritas Operations Manager (VOM). An ApplicationHA add-on for VOM integrates the ApplicationHA tab with VOM.

The ApplicationHA tab is the primary interface for performing the application monitoring operations on a guest domain. From this tab, you configure application monitoring and then monitor and control the configured application on the guest domain. After configuring application monitoring, the ApplicationHA tab displays the state of the application and the component dependencies.

The following figure displays the ApplicationHA tab where Oracle is configured for monitoring.



How Symantec ApplicationHA detects application failures

Symantec ApplicationHA architecture uses the agent framework to monitor the state of the applications and their dependent components running inside the guest domains. Symantec ApplicationHA agents monitor the overall health of the

configured applications by running specific commands, tests, or scripts. For more details, see the agent functions section of the application-specific agent guides or the generic agent guide distributed with ApplicationHA.

The ApplicationHA Heartbeat agent is auto-configured in the guest domain when you configure application monitoring. The Heartbeat agent sends the application heartbeat to VCS in the control domain. Symantec ApplicationHA uses the application heartbeat as the communication medium to convey the status of the application to VCS.

If an application fails, the application agents attempt to restart the application for a configurable number of times. If the agents are unable to start the application, ApplicationHA tries to reboot the guest domain. After the guest domain is restarted, Symantec ApplicationHA attempts to start the application and its dependent components in a predefined order.

Which applications can I monitor?

Most applications can be placed under Symantec ApplicationHA control provided the following guidelines are met:

- Defined start, stop, and monitor procedures exist.

The application to be monitored must have defined procedures for starting, stopping, and monitoring, as follows:

- | | |
|-----------------|--|
| Start procedure | The application must have a command to start it and all the dependent components and resources it may require. Symantec ApplicationHA brings up the required resources in a specific order and then brings up the application using the defined start procedure. |
| Stop procedure | The application must have a command to stop it and all the dependent components and resources. Symantec ApplicationHA stops the application using the defined stop procedure, and then stops the required resources in an order that is reverse of the order in which they were started. |

Monitor procedure The application must have a monitor procedure that determines if the specified application instance is healthy. The application must allow individual monitoring of unique instances. For example, in a database environment, the monitoring application can connect to the database server and perform SQL commands to verify read and write access to the database.

The closer a test comes to matching what a user does, the better the test is in discovering problems. You should balance the level of monitoring between ensuring that the application is up and minimizing monitor overhead.

- **Ability to restart the application in a known state**

When the application is stopped, it must close out all tasks, store data properly, and then exit. When Symantec ApplicationHA attempts to restart the application, it should be able to start from the last known state. In case of a server crash, the application must be able to recover gracefully.

Commercial databases such as Sybase and Oracle are good examples of well-written, crash-tolerant applications. On any client request, the client is responsible for holding the request until it receives acknowledgement from the server. When the server receives a request, it is placed in a special redo log file. The database confirms that the data is saved before it sends an acknowledgement to the client.

After a server crashes, the database recovers to the last-known committed state by mounting the data tables and applying the redo logs. This returns the database to the time of the crash. The client resubmits any outstanding client requests that are unacknowledged by the server, and all others are contained in the redo logs.

Components of the Symantec ApplicationHA setup

A Symantec ApplicationHA setup in the Oracle VM Server for SPARC virtualization environment comprises of the following components:

- [Symantec ApplicationHA guest components for guest domains](#)
- [VCS in the virtualization infrastructure](#)
- [VOM add-on for Symantec ApplicationHA Management](#)

Symantec ApplicationHA guest components for guest domains

The Symantec ApplicationHA guest components are installed separately on the guest domains where you wish to monitor applications. The guest components

include the configuration wizard and the ApplicationHA agents that are used for configuring and monitoring applications.

The guest components also include the Veritas Storage Foundation Messaging Service (xprtld). This service communicates the status of the applications running on the guest domain and displays it in the ApplicationHA tab of the Veritas Operations Manager console.

VCS in the virtualization infrastructure

Veritas Cluster Server by Symantec (VCS) is installed as part of a Storage Foundation Cluster File System High Availability (SFCFSHA) stack installation on the control domain. VCS is installed on control domains in more than one physical host, to form a VCS cluster. As a result, VCS provides high availability in the infrastructure layer of the Oracle VM Server for SPARC virtualization environment on such physical hosts. VCS mainly ensures high availability of the guest domains on which ApplicationHA monitors configured applications.

For more information on how ApplicationHA and VCS are integrated in the Oracle VM Server for SPARC virtualization environment:

See “[How ApplicationHA is deployed in the Oracle VM Server for SPARC environment](#)” on page 12.

For more information on how to install VCS as part of an SFCFSHA installation, see the *SFCFSHA Installation Guide*.

VOM add-on for Symantec ApplicationHA Management

The Veritas Operations Manager (VOM) Add-on for ApplicationHA Management is installed on the VOM Management Server. You must also add as managed hosts to VOM, the guest domains where you want ApplicationHA to monitor applications. The ApplicationHA tab then appears on the VOM console for the respective guest domain, and lets you administer application monitoring with ApplicationHA in the Oracle VM Server for SPARC environment.

Symantec ApplicationHA user privileges

Symantec ApplicationHA provides a set of privileges that are available when using VOM Console to manage ApplicationHA. These privileges define the application monitoring operations that a user can perform on the guest domains. You can create roles and then assign privileges to the roles or assign privileges to the existing roles that are available in the virtualization environment. Application monitoring operations are enabled or disabled depending on the privileges that

are assigned to the VOM user account. For example, the Admin privilege is required for configuring application monitoring on a guest domain.

VOM administrators can use these privileges to configure access control in an application monitoring environment.

Symantec ApplicationHA provides the following privileges:

- **View Application Monitoring State (Guest)**
Can view the application monitoring status on the guest domain. The Guest cannot perform any ApplicationHA operations.
- **Control Application Monitoring (Operator)**
Can perform all the ApplicationHA operations that include start and stop configured applications, enable and disable application monitoring, specify the application monitoring configuration settings, enter and exit application monitoring maintenance mode, and view application monitoring status.
The Operator cannot configure or unconfigure application monitoring on the guest domain.
- **Configure Application Monitoring (Admin)**
Can perform all ApplicationHA operations that include configure and unconfigure application monitoring, start and stop configured applications, enable and disable application monitoring, specify the application monitoring configuration settings, enter and exit application monitoring maintenance mode, and view application monitoring status.

Symantec ApplicationHA agents

Agents are application-specific modules that plug into the ApplicationHA framework that manages applications and resources of predefined resource types on a system. The agents are installed when you install Symantec ApplicationHA guest components. These agents start, stop, and monitor the resources configured for the applications and report state changes. If an application or its components fail, ApplicationHA restarts the application and its resources on the guest domain.

Symantec ApplicationHA agents are classified as follows:

- **Infrastructure agents**
Agents such as NIC, IP, and Mount are classified as infrastructure agents. Infrastructure agents are automatically installed as part of the ApplicationHA installation on guest domains.
For more details about the infrastructure agents, refer to the *Veritas Cluster Server 6.0 Bundled Agents Reference Guide (Solaris)*.
- **Application agents**

Application agents are used to monitor third party applications such as Oracle. These agents are packaged separately and are available in the form of an agent pack that gets installed when you install Symantec ApplicationHA guest components.

The ApplicationHA agent pack is released on a quarterly basis. The agent pack includes support for new applications as well as fixes and enhancements to existing agents. You can install the agent pack on an existing ApplicationHA guest components installation.

Refer to the Symantec Operations Readiness Tools (SORT) Web site for information on the latest agent pack availability.

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

Refer to the agent-specific configuration guide for more details about the application agents.

About Symantec ApplicationHA licensing

Symantec ApplicationHA is a licensed product. Licensing for Symantec ApplicationHA is applicable for ApplicationHA guest components and is based on the server operating systems in use.

An evaluation license key is embedded in the product. This license key is valid only for a period of 2 months. If you are installing ApplicationHA for the first time, you can use the embedded license key or procure a permanent license key and enter the same while installing the product.

You can add or view the license keys from a guest domain that has ApplicationHA guest components installed. You can add a license key through the command line or the ApplicationHA tab. For more information:

See “[About managing ApplicationHA licenses](#)” on page 55.

Working with VOM

This chapter includes the following topics:

- [About Veritas Operations Manager](#)
- [Adding guest domains and physical hosts to VOM](#)
- [Accessing the ApplicationHA tab](#)
- [Configuring Symantec ApplicationHA access control using VOM](#)

About Veritas Operations Manager

Veritas Operations Manager (VOM) provides you with a single, centralized management console for the Veritas Storage Foundation and High Availability products. You can use it to monitor, visualize, and manage storage resources and generate reports about them. VOM lets administrators centrally manage diverse datacenter environments.

A typical VOM deployment consists of a Management Server and the managed hosts. The managed host can be a physical or virtual system, that runs on any platform that VOM supports.

For more information on installing the VOM Management Server, see the *Veritas Operations Manager Installation Guide*.

Adding guest domains and physical hosts to VOM

When you click a particular guest domain on the Veritas Operations Manager (VOM) console, for the ApplicationHA tab to be visible, you must add the guest domain as a managed host to VOM.

Symantec recommends that you also add as a managed hosts to VOM. the physical hosts that run the required guest domain. This step helps you determine which guest domain is running on which physical host, especially when a failover occurs.

To add a guest domain to VOM

- 1 On the Veritas Operations Manager console, click **Settings > Host Management**.
- 2 Click **Actions > Add Host(s)**.
- 3 On the **Add (Host)s** page, in the appropriate fields, specify the IP address, user name, and the password that you want to set for the managed host.
- 4 Click **Next**.

Note: You can use the same steps to add a physical host to VOM.

Accessing the ApplicationHA tab

To administer an application on a guest domain that is running in the Oracle VM Server for SPARC 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 guest domain where you want to perform administrative actions.
- 4 Click the **ApplicationHA** tab.

Configuring Symantec ApplicationHA access control using VOM

The security or access control model in Veritas Operations Manager (VOM) is based on security groups. Security groups define privileges for user groups inside business entities, by using pre-defined user roles in VOM.

For example, Unices users can form a Unix security group, where the authentication mechanism is UNIX password authentication.

A business entity is a grouping construct for objects in VOM. The objects can be physical systems or virtual systems added to VOM as managed hosts. Using business entities, these objects are grouped for purposes such as reporting, alerting, and access control.

VOM defines three roles for access to ApplicationHA systems:

- Admin
- Operator
- Guest

For more details on the tasks and privileges of each role:

See “[Symantec ApplicationHA user privileges](#)” on page 17.

The following section broadly describes the steps to assign a role to a user. For the detailed steps, and for more information on security groups and business entities, see the *Veritas Operations Manager Administrators's Guide*.

To assign a role to a user

- 1 Create a business entity with one or more ApplicationHA systems.
- 2 Create a security group for the VOM user.
 - a. Specify the name of the security group. The name of the security group must exactly match the name of the group on the VOM Management Server, to which the user belongs.
 - b. From the available list of roles, select a role for the security group.
 - c. Select **Selected Business Entities** as scope of the role, and specify the business entity that you created for ApplicationHA systems in step 1.

Now any user that is part of the user group for which you configured a security group in step 2, can access the ApplicationHA systems with the defined role.

Configuring application monitoring with Symantec ApplicationHA

This chapter includes the following topics:

- [About configuring application monitoring with Symantec ApplicationHA](#)
- [Before configuring application monitoring](#)

About configuring application monitoring with Symantec ApplicationHA

ApplicationHA enables you to configure application monitoring for third party applications, in a virtualization environment.

For details refer to the respective agent configuration guide. You can download the guides from here:

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

Consider the following before you proceed:

- You can configure application monitoring on a guest domain using the Symantec ApplicationHA Configuration Wizard. The wizard is launched when you click **Configure Application Monitoring** on the ApplicationHA tab in Veritas Operations Manager (VOM).
- Apart from the application monitoring configuration, the configuration wizard also sets up the other components required for Symantec ApplicationHA to successfully monitor the applications.

You must first configure application monitoring using the configuration wizard before using VOM or VCS commands to add additional components or modify the existing configuration.

- You can use the wizard to configure monitoring for only one application per guest domain.
To configure another application using the wizard, you must first unconfigure the existing application monitoring configuration.

Note: When you configure or unconfigure application monitoring, it does not affect the state of the application. The application runs unaffected on the guest domain.

- After you have configured monitoring for an application using the wizard, you can configure monitoring for additional applications from VOM or the command line.

For more information on how to use Veritas Cluster Server commands or VOM to configure additional applications, see the following technical note:
<http://www.symantec.com/docs/TECH159846>

- If you clone a guest domain on which you have configured application monitoring, you must reconfigure application monitoring on the cloned guest domain.
- If a configured application fails, Symantec ApplicationHA attempts to restart the component on the guest domain. If the component does not start, ApplicationHA reboots the operating system. If the application still does not start, ApplicationHA communicates with VCS to take corrective action. ApplicationHA then stops the other configured components in a predefined order. This prevents the other components from getting corrupted due to a machine reboot.
Thus, a single failed component can bring down other healthy components running on the guest domain. You must take this behavior into consideration while configuring application monitoring on a guest domain.

Before configuring application monitoring

Note the following prerequisites before configuring application monitoring on a guest domain:

- Verify that you have installed the Veritas Operations Manager (VOM) Management Server and the VOM add-on for ApplicationHA Management on the VOM Management Server.

You can also perform the application monitoring operations directly from a browser window by using the following URL:

```
https://<logicalDomainNameorIPAddress>:5634/vcs/admin/  
application_health.html?priv=ADMIN
```

- Verify that you have installed Symantec ApplicationHA on the required guest domains.
Refer to the *Symantec ApplicationHA Installation Guide* for instructions.
- Verify that the logged-on user has administrative privileges on the guest domain where you wish to configure application monitoring.
- Verify that you have appropriate user privileges on Veritas Operations Manager.
- Verify that the virtual machines on which you want to monitor applications are added as managed hosts to VOM.
- Verify that the ApplicationHA Application Monitoring Configuration Wizard has administrative credentials on the guest domain for logging on, configuring, and administering applications on the guest domain.
- If you have configured a firewall, ensure that your firewall settings allow access to ports used by Symantec ApplicationHA installer, wizard, services, and VOM. Refer to the *Symantec ApplicationHA Installation Guide* for a list of ports and services used.

Configuring VCS support for ApplicationHA

This chapter includes the following topics:

- [About VCS support for ApplicationHA](#)
- [Enabling VCS support for ApplicationHA](#)
- [About auto-registration of guest domains with VCS node](#)
- [Configuring VCS support for ApplicationHA using custom values](#)
- [Configuring VCS support for ApplicationHA using default values](#)
- [Configuring VCS support for ApplicationHA using a response file](#)
- [Configuring VCS settings for ApplicationHA](#)
- [Disabling VCS settings for ApplicationHA](#)

About VCS support for ApplicationHA

If you install Veritas Cluster Server (VCS) in the virtualization infrastructure layer and enable VCS to support ApplicationHA, you can administer application-aware monitoring of guest domains by using VCS.

As part of application-aware monitoring of guest domains, VCS performs the following actions, based on the application health status determined by ApplicationHA:

1. VCS restarts guest domains if an application that is configured for monitoring with ApplicationHA faults. VCS restarts the guest domain only if ApplicationHA is unable to bring the application back online by restarting

the application or by initiating a graceful internal restart of the guest domain (soft reboot).

2. VCS fails over a guest domain to another node in the same VCS cluster. VCS fails over the guest domain only if the guest domain restart fails to bring a faulted application online. For successful failover, both the source and destination nodes must fulfill certain requirements of storage space and network connectivity. For more information on permissions and ports and firewall settings for application-aware monitoring of virtual machines, refer the *Symantec ApplicationHA Installation Guide*.
3. VCS supports the live migration of guest domains to another node in the same VCS cluster. VCS does not initiate any fault-management actions during such migration.

VCS supports the domain migration of guest domains to another node in the same VCS cluster. VCS does not initiate any fault-management actions during such migration.

Enabling VCS support for ApplicationHA

To leverage the clustering capabilities of Veritas Cluster Server (VCS) to support ApplicationHA, you must run the `enable_applicationha` script on each VCS node (control domain).

The script sets up a private network between the VCS node and each guest domain. Using this private network, ApplicationHA communicates application fault status to the VCS cluster.

You can also use the script to activate the auto-registration feature of a VCS cluster. For more information on the auto-registration feature:

See [“About auto-registration of guest domains with VCS node”](#) on page 31.

Note: See [“How ApplicationHA is deployed in the Oracle VM Server for SPARC environment”](#) on page 12.. Also, to understand how VCS is deployed in the Oracle VM Server for SPARC environment, you must read the *Veritas Storage Foundation™ and High Availability Solutions Virtualization Guide for Solaris*

You can use one of the following methods to configure VCS support for ApplicationHA.

- **Configuring VCS support for ApplicationHA**
See [“Configuring VCS support for ApplicationHA using custom values”](#) on page 31.

- Autoconfiguring VCS support for ApplicationHA
See “[Configuring VCS support for ApplicationHA using default values](#)” on page 33.
- Configuring VCS support for ApplicationHA using response files
See “[Configuring VCS support for ApplicationHA using a response file](#)” on page 33.

About auto-registration of guest domains with VCS node

In the Oracle VM Server for SPARC virtualization technology, the auto-registration feature automatically sets up communication between the VCS node (control domain) and all the guest domains where ApplicationHA is configured. Auto-registration also sets up a VCS resource (LDom resource) for VCS to monitor the guest domains. These steps enable VCS to take application-aware administrative actions such as start, stop, or fail over guest domains.

Note: Enabling auto-registration is an optional step. Before you enable auto-registration, you must set up a private VLAN.

Configuring VCS support for ApplicationHA using custom values

To manually configure VCS to support ApplicationHA:

- 1 Navigate to the following location and run the `enable_applicationha` script:

```
/opt/VRTSvcs/bin/utls
```
- 2 When prompted, specify the value of some of the following private VLAN configuration parameters. Some of the following parameters may automatically be set to default values.

The following table lists each parameter and its description:

Private VLAN configuration parameter	Description
Private VLAN ID	<p>Specifies a unique identifier to distinguish private communication between the guest domains and the VCS node (control domain). This identifier ensures that communication over the designated private network neither interferes with, nor is visible from the public network connecting the guest domains and the VCS node.</p> <p>You can specify a private VLAN ID between 2 and 4094. The default value is 123.</p>
Physical NIC on the physical host/frame	<p>Specifies the NIC that the private VLAN uses for communication between the VCS node (control domain) and the guest domains.</p> <p>You can specify even a public NIC on the physical host. You cannot specify a NIC that is used as:</p> <ul style="list-style-type: none">■ LLT heartbeat interface■ Loopback interface■ Bridge interface
Logical domains	<p>Specifies the guest domains that must be added to the private VLAN. The script lists all guest domains that are not added to the VLAN. You can specify all or some of the listed guest domains. Once you specify a guest domain, the script creates a virtual interface for the guest domain to communicate over the private VLAN.</p>
Network	<p>Specifies the network that the virtual interfaces must use for the private VLAN. You must specify the network in the following format:</p> <p>X.Y.0.0</p> <p>Where the values of a and b lie between 1 and 254. The network you specify must not be already in use by the physical host/frame.</p> <p>The default network is 192.168.0.0</p>

3 To troubleshoot the configuration, see the following log file:

`/var/VRTSvcs/log/applicationha_utils.log`

Configuring VCS support for ApplicationHA using default values

When you configure VCS support for ApplicationHA, if you want to set default values for all configuration parameters, use the `autoconfigure` option of the `enable_applicationha` script.

In some cases, the script may prompt you to specify values for certain attributes.

Note: In case, the VCS cluster is secure, you must manually copy the credential file `/var/VRTSvcs/vcsauth/data/ApplicationVM.cred` to the `/var/tmp/` directory on all configured virtual machines. For security reasons, ensure that only the superuser has permissions to access this file.

To autoconfigure VCS support for ApplicationHA

- 1 Navigate to the following location:

```
/opt/VRTSvcs/bin/utils/
```

- 2 Run the following command:

```
# enable_applicationha -autoconfigure
```

Configuring VCS support for ApplicationHA using a response file

The `enable_applicationha` script supports response files. If you want to use the script as a non-interactive activity, you can specify custom values for the script parameters in a response file.

To use a response file to enable VCS support for ApplicationHA:

- 1 Create a response file by setting variables.

For more information:

See [“Response file variables to enable VCS support for ApplicationHA”](#) on page 34.

See [“Sample response file for configuring VCS support for ApplicationHA”](#) on page 35.

- 2 Run the following command:

```
# enable_applicationha -responsefile file
```

Where *file* is the name of the file you created in step 1.

Response file variables to enable VCS support for ApplicationHA

Table 4-1 Infrastructure variables

Parameter	Description
CFG{SYSTEMS}	Specifies the VCS node (control domain) where the script must run. You can specify only a local node.
CFG{UPGRADE}	Specifies whether the script must enable VCS support for ApplicationHA. To enable VCS support, you must set the value to 1.
CFG{VLANID}	Specifies a unique identifier for the private network between the VCS node (control domain) and the guest domain.
CFG{DHCPCONFIGFILE}	Specifies the DHCP server configuration file on the VCS node (control domain) if anything other than default.
CFG{USE_CURRENT_VLAN}	Specifies whether an existing VLAN on the VCS node may be used for the private VLAN
CFG{NIC}	Specifies the NIC to be used for the private VLAN
CFG{NETWORK}	Specifies the network name that is required when using the private VLAN
CFG{USE_CURRENT_NETWORK}	Specifies whether a network currently configured over the VCS node (control domain) must be used to create the private VLAN with guest domains.

Table 4-1 Infrastructure variables (*continued*)

Parameter	Description
CFG{AUTOREGISTRATION}	Specifies whether the autoregistration option must be used (that is, all specified guest domains must be configured with default values), while enabling VCS support for ApplicationHA.
CFG{AUTOREGISTRATION_OPTION}	Specifies the mode of autoregistration. Set the value to 1 to specify the DHCP mode of autoregistration.

Table 4-2 Virtual Machine variables

Parameter	Description
CFG{ACTIVATE_VLAN_ALL}	Specifies if all guest domains must be added to the private network. To add all guest domains to the private network, set this parameter value to 1.
CFG{ACTIVATE_VLAN_GUESTS}	Specifies the guest domains that must be added to the private network. You can specify multiple guest domains by using a list in which names of the guest domains are separated by a space “ ”. Note: Do not use this parameter in your response file if you set the ACTIVATE_VLAN_ALL parameter to 1.
CFG{REMOVE_VM_ALL}	Specifies if all guest domains must be removed from the private VLAN. To remove the guest domains from the private VLAN, set the value of this parameter to 1.
CFG{REMOVE_VM_GUESTS}	Specifies the guest domains that must be removed from the private VLAN. You can specify multiple guest domains by using a list in which names of the guest domains are separated by a space “ ”.

Sample response file for configuring VCS support for ApplicationHA

Review the response file variables and their definitions and then create a response file.

See [“Response file variables to enable VCS support for ApplicationHA”](#) on page 34.

Following is a sample response file:

```
our %CFG;  
$CFG{SYSTEMS}="appvcs01";  
$CFG{VLANID}="123";  
$CFG{AUTOREGISTRATION}="1";  
$CFG{ACTIVATE_VLAN_ALL}="1";  
$CFG{NIC}="eth0";  
$CFG{UPGRADE}="1";  
$CFG{NETWORK}="192.168.0.0";  
$CFG{AUTOREGISTRATION_OPTION}="1";
```

Configuring VCS settings for ApplicationHA

Configuring Veritas Cluster Server (VCS) settings enables VCS to take specified actions, such as restarting the guest domain, if the guest domain does not send an application heartbeat within a configurable time interval.

VCS monitors the guest domain through the LDom agent. The default monitoring frequency for the guest domain is 60 seconds. In case of a heartbeat failure, the default action is to restart the guest domain. You can configure the number of such attempts to restart. For more information, see the descriptions of the `RestartLimit` and `ToleranceLimit` attributes in the table below.

To configure VCS settings

Note: The values that you set in this procedure apply to all guest domains running on a control domain.

- 1 In the Veritas Operations Manager (VOM) Console, click **Manage > Server > Hosts**.
- 2 In the right pane, click the hostname/IP address of the VCS node where you want to configure monitoring settings.
- 3 In the **Service Groups** tab, click the name of the service group that contains the LDom resource

- 4 To change the restart settings of the virtual machine, perform the following steps:
 - a. In the **Resources** tab, click the resource name of the virtual machine resource.
 - b. In the **All attributes** tab, right-click the following attribute, and from the context-menu select **Edit Attribute**:

Attribute	Description
RestartLimit	Specifies the number of times that VCS attempts to restart the virtual machine, before declaring it as faulted, and taking the next configured corrective action .

- 5 To change the monitoring settings of the virtual machine, perform the following steps:
 - a. In the **Resources** tab, click the resource **Type** (that is, LDom)
 - b. In the **All attributes** tab, right-click the attribute that you want to edit, and from the context-menu, select **Edit Attribute** for changing settings for the following attributes:

Attribute	Description
MonitorInterval	Specifies the time in seconds after which the VCS virtualization agent checks for the state of the guest domain, if the current state is Online.
OfflineMonitorInterval	Specifies the time in seconds after which the VCS virtualization agent checks for the state of the guest domain, if the current state is Offline/Faulted.
ToleranceLimit	Specifies the number of monitor intervals for which VCS must wait for the heartbeat from a guest domain to resume after a heartbeat failure, before declaring the guest domain Offline.
OnlineRetryLimit	Specifies the number of times that the VCS virtualization agent tries to restart a guest domain that fails to start. The default value is 0.
OnlineWaitLimit	Specifies the number of monitor intervals for which VCS waits for a guest domain to come online after it is started, before reporting a fault.

Disabling VCS settings for ApplicationHA

You can disable Veritas Cluster Server (VCS) settings if you do not want VCS to restart a guest domain in case of a heartbeat failure.

To disable VCS settings

- 1 In the Veritas Operations Manager (VOM) Console, click **Manage > Servers > Hosts**.
- 2 Click the hostname/IP address of the VCS node where you want to unconfigure monitoring settings.
- 3 In the **Service Groups** tab, click the name of the service group that contains the LDom resource.
- 4 On the **All attributes** page, right-click the **ManageFaults** attribute , and from the context-menu select **Edit Attribute**
- 5 Set the value of the attribute to **None**.

Attribute	Description
ManageFaults	Enables VCS to restart a guest domain, if the guest domain fails. The default value 'ALL' enables VCS actions. You can set the value 'NONE' to disable VCS actions.

Administering application monitoring

This chapter includes the following topics:

- [Administering application monitoring using the ApplicationHA tab](#)
- [Administering application monitoring settings](#)
- [About ApplicationHA-initiated guest domain restarts](#)

Administering application monitoring using the ApplicationHA tab

Symantec ApplicationHA provides an interface, the ApplicationHA tab, to configure and control application monitoring. The ApplicationHA tab is integrated with the Veritas Operations Manager.

Use the ApplicationHA tab to perform the following tasks:

- Configure and unconfigure application monitoring
- Start and stop configured applications
- Enable and disable application heartbeat
- Enter and exit maintenance mode

To view the ApplicationHA tab, launch the Veritas Operations Manager console, navigate to the guest domain on which you want to monitor an application. For more information: See [“Accessing the ApplicationHA tab”](#) on page 22.

Note: You can also perform the application monitoring operations directly from a browser window using the following URL:

https://<HostName_or_IP>:5634/vcs/admin/application_health.html?priv=ADMIN
where <HostName_or_IP> is the virtual host name or the IP address.

To configure or unconfigure application monitoring

Use the ApplicationHA tab to configure or unconfigure an application monitoring configuration from the virtual machine. This may be required in case you wish to re-create the configuration or configure another application using the wizard.

You can click the following links:

- Click **Configure Application Monitoring** to launch the Symantec ApplicationHA Configuration Wizard. Use the wizard to configure application monitoring.
- Click **Unconfigure Application Monitoring** to delete the application monitoring configuration from the virtual machine.
Symantec ApplicationHA removes all the configured resources for the application and its services.

Note that this does not uninstall Symantec ApplicationHA from the virtual machine. This only removes the configuration. The unconfigure option removes all the application monitoring configuration resources from the virtual machine.

To view the status of configured applications

Under the Component List tab of the VOM console, the Description box in the ApplicationHA displays the status of the configured application and the associated services.

The screenshot displays the ApplicationHA console interface. At the top, it shows "Applications: Oracle" and "Status: Online" with a refresh icon and a note "(Status refreshes every 60 seconds)". Below this are navigation icons for "Configure Application Monitoring", "Unconfigure Application Monitoring", "Enable Application Heartbeat", "Disable Application Heartbeat", "Start Application", "Stop Application", "Enter Maintenance Mode", and "Exit Maintenance Mode". The main area is divided into two tabs: "Component List" and "Component Dependency". Under "Component List", two entries are shown: "Oracle database [orcl] is running." and "Oracle Net Listener [LISTENER] is running.", both with green checkmarks. At the bottom, it shows "ApplicationHA (Version 6.0.00000.410) | Symantec." and a "View log" link.

For example, if you have configured monitoring for Oracle, the Description displays the following information:

```
Oracle Net Listener [Listener] is running.
```

The Description box also displays the state of the configured application and its components. The following states are displayed:

online	Indicates that the services and processes are running on the virtual machine.
offline	Indicates that the services and processes are not running on the virtual machine.
partial	Indicates that either the services and processes are being started on the virtual machine or ApplicationHA was unable to start one or more of the configured services or processes.
faulted	Indicates that the configured services or components have unexpectedly stopped running

Click **Refresh** to see the most current status of the configured components. The status is refreshed every 60 seconds by default.

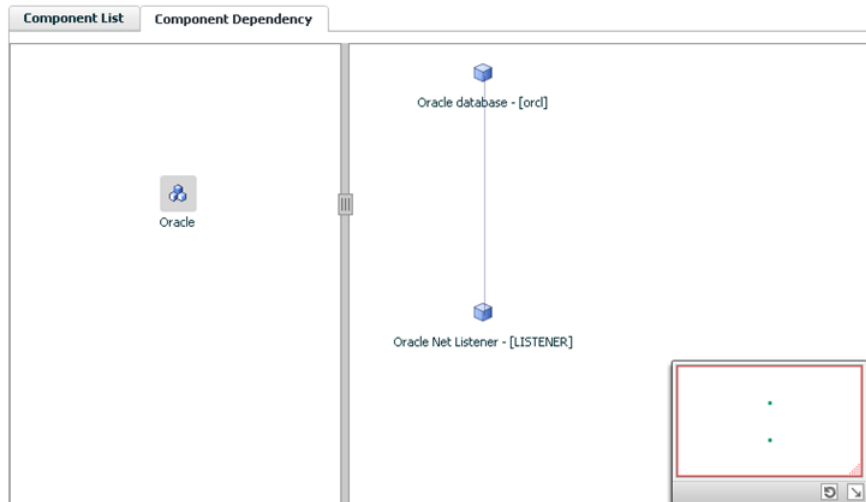
To view component dependency

ApplicationHA monitors a configured application for high availability by monitoring the status of its components. Inter-related components form a component group. The status of the application depends on the component groups.

The Component Dependency tab of the Veritas Operations Manager console illustrates this dependency between the application and its components

To access the Component Dependency tab perform the following step:

- In the ApplicationHA tab of the VOM client GUI, click **Component Dependency**. A component dependency graph appears. The graph indicates which component depends on which other component to be up and running.



The above figure illustrates the component dependency for Oracle Database.

The left pane indicates the component groups, while the right pane indicates the components of the selected component group. A vertical line joining two components indicates that for the component at the higher level to be running, the component at the lower level must be running.

The track pad, at the left-bottom corner helps you navigate through complex component dependency graphs.

The Component Dependency graph also uses various icons to indicate component groups and components as well as their status. If you roll the mouse over a component, a tooltip highlights the name and the state of the component.

For example, in the above figure the Oracle component group is selected in the left pane and the components, Oracle Net Listener and Oracle database, appear in the right pane. For the Oracle database to be running, Oracle Net Listener must be up and running.

To start or stop applications

Use the following options on the ApplicationHA tab to control the status of the configured application and the associated components:

- Click **Start Application** to start a configured application. Symantec ApplicationHA attempts to start the configured application and its components in the required order. The configured resources are also brought online in a predefined order.

- Click **Stop Application** to stop a configured application that is running on the virtual machine.
Symantec ApplicationHA begins to stop the configured application and its components gracefully. The configured resources are also taken offline in the pre-defined order.

To enable or disable application heartbeat

The VCS LDom agent uses the heartbeat information that VCS captures as a proxy for guest domain availability. This allows VCS to automatically restart individual guest domains that have lost their ability to heartbeat either due to application failure or due to guest domain failure.

The ApplicationHA tab allows you to control the application heartbeat on the guest domains.

Use the following options on the ApplicationHA tab to control the configured application heartbeat:

- Click **Enable Application Heartbeat** to enable the heartbeat communication between the configured applications running on the guest domain and VCS. The application heartbeat is enabled by default when an application is configured for monitoring.
- Click **Disable Application Heartbeat** to disable the heartbeat communication between the configured applications running on the guest domain and VCS. If you disable application heartbeat, VCS does not restart the guest domain when application in the guest domain fails.

To suspend or resume application monitoring

After configuring application monitoring you may want to perform routine maintenance tasks on those applications. These tasks may or may not involve stopping the application but may temporarily affect the state of the applications and its dependent components. If there is any change to the application status, Symantec ApplicationHA may try to restore the application state. This may potentially affect the maintenance tasks that you intend to perform on those applications.

If stopping the application is not an option, you can suspend application monitoring and create a window for performing such maintenance tasks. When application monitoring is suspended, ApplicationHA freezes the application configuration, disables the application heartbeat, and stops sending the heartbeat to VCS.

The ApplicationHA tab provides the following options:

- Click **Enter Maintenance Mode** to suspend the application monitoring for the applications that are configured on the guest domain. During the time the monitoring is suspended, Symantec ApplicationHA does not monitor the state of the application and its dependent components. The ApplicationHA tab does not display the current status of the application. If there is any failure in the application or its components, ApplicationHA takes no action.
- Click **Exit Maintenance Mode** to resume the application monitoring for the applications configured on the guest domain. You may have to click the **Refresh** link in the ApplicationHA tab to see the current status of the application. When application monitoring is restarted from a suspended state, ApplicationHA does not enable the application heartbeat. Click **Enable Application Heartbeat** to enable it.
If you have made changes to the application that is being monitored, then those changes may not reflect in the application monitoring configuration. In such cases, you may have to unconfigure and reconfigure the application monitoring.

Administering application monitoring settings

The ApplicationHA view provides a set of options that you can use to control the way Symantec ApplicationHA handles application monitoring, application and dependent component faults, and application recovery on the guest domain. The view also provides a set of options that you can use to configure ApplicationHA to restart the guest domain. These configuration settings are applicable on a per guest domain basis. The settings apply to all the applications that Symantec ApplicationHA monitors on the guest domain.

The following settings are available:

- **App.StartStopTimeout**
When you click the **Start Application** or **Stop Application** links in the ApplicationHA view, Symantec ApplicationHA initiates an orderly start or stop of the application and its dependent components. This option defines the number of seconds Symantec ApplicationHA must wait for the application to start or stop. If the application does not respond in the stipulated time, an error is displayed in the ApplicationHA view.
A delay in the application response does not indicate that the application or its dependent component has faulted. Parameters such as workload, system performance, and network bandwidth may affect the application response. Symantec ApplicationHA continues to wait for the application response even after the timeout interval is over. If the application fails to start or stop, ApplicationHA takes the necessary action depending on the other configuration settings.

AppStartStopTimeout value can vary between 0 and 600. The default is 30 seconds.

- **App.RestartAttempts**

This option defines the number of times Symantec ApplicationHA should try to restart a failed application or its dependent component. If an application fails to start in the specified number of attempts, Symantec ApplicationHA stops the application heartbeat and communicates the fault to VCS.

AppRestartAttempts value can vary between 1 and 6. The default is 1.

- **App.ShutdownGraceTime**

This option defines the number of seconds Symantec ApplicationHA should wait before communicating the application fault to VCS.

If a configured application or its dependent component fails, Symantec ApplicationHA tries to restart the component for the configured number of times. If the component fails to start, Symantec ApplicationHA stops the application heartbeat and communicates the fault to VCS. VCS may then restart the guest domain depending on the configuration settings.

An abrupt shutdown may affect the other healthy application components running on the machine. If those components require more time to stop, Symantec ApplicationHA may not be able to stop them gracefully in time before the reboot is initiated. For such cases, you can use

AppShutdownGraceTime to delay the guest domain reboot so that Symantec ApplicationHA stops all the application components gracefully.

When an application fails to start, Symantec ApplicationHA initiates a graceful shutdown of all the healthy applications being monitored on the guest domain and waits for time specified in this option. A guest domain reboot takes place only after all the application components are shut down gracefully or at the end of the grace time, whichever is earlier.

This setting is applicable to the heartbeat service group that is created when you configure application monitoring using the Symantec ApplicationHA Configuration Wizard. Internally, it sets the DelayBeforeAppFault attribute of the Heartbeat agent resource (VCSAppMonHBRes) in the configuration.

AppShutDownGraceTime value can vary between 0 and 600. The default is 300 seconds.

- **VM.GracefulRebootPolicy**

Use this option to enable or disable ApplicationHA-initiated guest domain restart policy. This option defines whether or not ApplicationHA restarts the guest domain in response to application and component failures. When a configured application or component fails, ApplicationHA attempts to restart the failed components. If the component fails to start, ApplicationHA then takes the next corrective action.

If this policy is disabled, and an application or component fails, then ApplicationHA stops sending the heartbeat to VCS. As a result VCS can then restart the guest domain.

If this policy is enabled, ApplicationHA itself invokes a native operating system command to restart the guest domain.

VM.GracefulRebootPolicy value can be Enabled (1) or Disabled (0). The default value is Disabled.

ApplicationHA uses the following command to initiate a soft reboot:

```
# /usr/sbin/reboot
```

To display a broadcast message that tells users about the soft-internal reboot in progress, perform the following steps:

1. In the Veritas Operations Manager (VOM) console, click **Manage > Server > Hosts**.
2. In the right pane, click the hostname/IP address of the guest domain where you want to update the soft reboot command.
3. In the **Service Groups** tab, click on the infrastructure service group name, that is VCSAppMonHBSG.
4. In the **Resources** tab, click the heartbeat resource name, that is VCSAppMonHBRes.
5. In the All attributes tab, right-click the following attribute, and from the context-menu select **Edit Attribute**:

Attribute	Description
VMGracefulRebootCmd	Specifies the command that ApplicationHA to perform soft reboot of the guest domain.

You can set the following value for the attribute to display a custom message message “ApplicationHA initiated soft reboot” on the console:

```
/usr/sbin/shutdown -y -i6 -g0 ApplicationHA initiated soft reboot
```

■ **VM.GracefulRebootAttempts**

This option defines the number of times ApplicationHA attempts to restart the guest domain gracefully if the configured application or component becomes unresponsive. The number of restart attempts is time bound and is defined by the option VM.GracefulRebootTimeSpan. The restart attempts count is reset after the reboot time span elapses.

For example, if the reboot attempts value is 4, the time span value is 1 hour, and ApplicationHA has restarted the guest domain once, then the restart attempt count is 3 (initial set value of 4 minus one reboot) for the remaining period of the 1-hour interval. The restart attempts count is reset to 4 at the beginning of the next 1-hour span.

If the restart attempts are exhausted and the application or component fails within the reboot time span again, ApplicationHA stops the application heartbeat and communicates the fault to VCS. Depending on the configuration, VCS may then restart or fail over the guest domain.

VM.GracefulRebootAttempts value can vary between 1 and 10. The default value is 1.

- VM.GracefulRebootTimeSpan

This option defines the time interval, in hours, during which ApplicationHA can gracefully restart the guest domain for the number of times defined by the option VM.GracefulRebootAttempts.

VM.GracefulRebootTimeSpan value can vary between 1 and 24. The default value is 1 hour.

Note: These attribute values are not affected due to a hard restart by VCS. The configuration remains in effect even after VCS reboots the guest domain.

To modify the application monitoring configuration settings

- 1 Launch the Veritas Operations Manager (VOM) console, and navigate to the guest domain where you have configured application monitoring.

For more information on navigating the VOM console, See [“Accessing the ApplicationHA tab”](#) on page 22.

- 2 Select the **ApplicationHA** tab and then click the **Settings** link to display the Settings dialog box.
- 3 Specify the values for the available options displayed in the Settings box and then click **OK**.

The specified values are updated in the configuration and they take effect immediately.

About ApplicationHA-initiated guest domain restarts

When you configure application monitoring, ApplicationHA uses a heartbeat to communicate the application status to VCS in the virtualization infrastructure layer. If the application or its component fails, ApplicationHA attempts to restart it. If the application does not start, depending on the configuration, ApplicationHA initiates a soft reboot of the guest domain. If the application does not come online after the soft reboot, ApplicationHA stops sending the heartbeat to VCS. Depending on the configuration, VCS in the infrastructure layer then performs a hard restart of the guest domain.

A hard restart has various implications and may not be the desired solution at all times. It may prove to be counter productive in several cases, including the following:

- The guest domain itself is running fine but the application is unable to get the required resources
- The other applications and tools running on the machine may either hang or take longer time to recover or restart after an abrupt shut down
- A hard restart can be potentially disruptive if there are multiple critical applications running on the guest domain

A soft reboot or an operating system driven restart is graceful and allows for a more orderly shutdown of applications and tools running on the machine and can help reduce potential disruption to critical applications. ApplicationHA provides this layer of application control wherein you can configure ApplicationHA itself to restart the guest domain using native operating system commands. Note that the soft reboot of the guest domain by ApplicationHA is disabled by default.

ApplicationHA provides attributes that you can use to configure ApplicationHA to restart the guest domain.

See [“Administering application monitoring settings”](#) on page 44.

Does ApplicationHA-initiated reboot affect VCS HA?

ApplicationHA-initiated reboot works independently of high availability provided by VCS installed in the virtualization infrastructure layer. It is not intended to replace VCS in the infrastructure layer. It is useful in cases where there is a need to first bring down other healthy applications and dependent components before actually restarting the guest domain.

ApplicationHA-initiated reboot complements VCS in the infrastructure layer by offering an additional layer of control that helps in building customized application management and recovery plans in virtualization environments.

ApplicationHA-initiated reboot can co-exist with VCS in the infrastructure layer. You can configure both ApplicationHA-initiated reboot and VCS in the infrastructure layer as part of your recovery plan. ApplicationHA-initiated reboot can act as the first line of action against application failures. If a graceful restart does not resolve the application failures, then depending on the reboot configuration settings, ApplicationHA stops the application heartbeat and VCS in the infrastructure layer then takes control of the guest domain.

Administering VCS support for ApplicationHA

This chapter includes the following topics:

- [About administering VCS support for ApplicationHA](#)
- [Configuring a new guest domain for application-aware monitoring](#)
- [Unconfiguring application-aware monitoring of a guest domain](#)
- [Viewing configuration details of a guest domain](#)
- [Viewing connection details of a guest domain](#)
- [Putting a control domain into maintenance mode](#)

About administering VCS support for ApplicationHA

When you enable VCS support for ApplicationHA, VCS extends its ability to externally reboot a faulted virtual machine or fail over a faulted machine to another node in the VCS cluster.

When you enable VCS support for ApplicationHA, guest domains that are configured for application monitoring with ApplicationHA, are registered with VCS. As part of the registration, a VCS resource is created on each guest domain. If a resource already exists (for application-status agnostic monitoring of the guest domain), VCS uses the same resource to execute ApplicationHA tasks.

You can perform the following administrative tasks using VCS to monitor configured guest domains:

- [Configuring a new guest domain for application-aware monitoring](#)

See “[Configuring a new guest domain for application-aware monitoring](#)” on page 50.

- Unconfiguring application-aware monitoring of a guest domain
See “[Unconfiguring application-aware monitoring of a guest domain](#)” on page 51.
- Viewing configuration details of a guest domain
See “[Viewing configuration details of a guest domain](#)” on page 52.
- Viewing connection details of a guest domain
See “[Viewing connection details of a guest domain](#)” on page 53.
- Putting a control domain into maintenance mode
See “[Putting a control domain into maintenance mode](#)” on page 54.

Configuring a new guest domain for application-aware monitoring

If you add a new guest domain to an existing ApplicationHA configuration, the new guest domain is not automatically configured for application-aware monitoring by VCS. You must add the new guest domain to the private network (VLAN) between the configured guest domains and control domain. You can do so by running the `enable_applicationha` script with the following options.

Note: You must perform the following steps on each VCS node (control domain) in the cluster where you added new guest domains for application-aware monitoring.

To add a new virtual machine to the private VLAN

- 1 If you want to configure all the newly created guest domains for application-aware monitoring, run the following command:

```
# enable_applicationha -addvm ALL
```

The procedure for configuring all newly-created guest domains is complete.

If you want to configure only some new guest domains to the cluster, run the following command:

```
# enable_applicationha -addvm
```

- 2 Review the displayed list of new guest domains and specify the names of only those guest domains that you want to configure for application-aware monitoring, by using the following command:

```
# enable_applicationha -addvm vm1 vm2 ...
```

Where *vm1*, *vm2* are the names of the guest domains that you want to add to the VCS cluster.

When you perform the above step/s, the guest domains that are configured for monitoring with ApplicationHA, are automatically registered with the private VLAN when you run the above commands.

Unconfiguring application-aware monitoring of a guest domain

If you want to perform some maintenance activities on a certain guest domain, you may want to suspend application-aware monitoring of that guest domain by VCS. This prevents VCS from taking any fault-management steps during the maintenance activity.

You can achieve this by removing the guest domain from the private VLAN between configured guest domains and the VCS node (control domain).

Note: You must perform the following steps on each VCS node (control domain) in the cluster where you want to suspend guest domains application-aware monitoring of guest domains by VCS.

To remove a guest domain from the private VLAN

- 1 If you want to remove all registered guest domains from the private VLAN, run the following command:

```
# enable_applicationha -delvm ALL
```

The procedure to remove all guest domains from the private VLAN is complete. If you want to remove certain guest domains from the VCS cluster, run the following command:

```
# enable_applicationha -delvm
```

- 2 Review the displayed list of registered guest domains in the private VLAN, and specify those guest domains that you want to remove from the private VLAN:

```
# enable_applicationha -delvm vm1 vm2
```

Where *vm1*, *vm2* are the names of the guest domains where you want to suspend application-aware monitoring by VCS.

Once you remove a guest domain or multiple guest domains from the private VLAN by using the above steps, they do not automatically register with the private VLAN as per the autoregistration feature.

If you want to restart application-aware monitoring on such guest domains, you must repeat the steps described in the following topic:

See [“Configuring a new guest domain for application-aware monitoring ”](#) on page 50.

Viewing configuration details of a guest domain

You can view the configuration details, including infrastructure parameters such as NIC and VLAN ID, of various guest domains associated with a VCS node (control domain).

- To view configuration details of all guest domains associated with a VCS node (control domain), run the following command:

```
# enable_applicationha -status
```

You can also view the configuration details of a specific guest domain from the command line. The output displays status in terms of “Registered” or “Not Registered”. The ‘Registered’ status implies that the infrastructure for

application-aware monitoring of that guest domain is created. However, the guest domain may not be connected to the VCS node (control domain).

- To view the registration details of selected guest domains, run the following command:

```
# enable_applicationha -status vm1 vm2 ...
```

Where *vm1*, *vm2* are names of guest domains of which you want to view configuration details.

Viewing connection details of a guest domain

You can view the connection details of a guest domain from the VCS node (control domain).

- To view the connection state of a guest domain, run the following command:

```
# hasys -value VirtGuest ConnectionState
```

Where *VirtGuest* is the host name of the guest domain.

The host name of the guest domain is reflected in the "CEInfo" attribute of the LDom resource corresponding to the guest domain. To get this information, use the command:

```
# hares -value virt_name CEInfo
```

Where *virt_name* is the name of guest domain. In the output, the name that corresponds to the key *CESystem*, is the host name of the guest domain.

The following table lists each connection state value and its description.

Connection state	Description
CONNECTED	The guest domain is connected to the control domain.
NOT RESPONDING	The guest domain has stopped responding to the VCS cluster. VCS does not take any fault-management steps.
DISCONNECTED	The guest domain is not connected to the VCS cluster. Depending on the previous state of the guest domain, VCS takes fault-management steps.

Connection state	Description
DISABLED	The connection between the guest domain and the control domain is disabled. VCS does not perform any application-aware monitoring of the guest domain.

- To determine the VCS node (control domain) to which a guest domain is connected, run the following command. At any given time, a guest domain is connected to only one VCS node:

```
# hasys -value VirtGuest ControllerNode
```

Where *VirtGuest* is the host name of the guest domain

Putting a control domain into maintenance mode

You can use the `enable_applicationha` script to put a VCS node (control domain), that is configured to support ApplicationHA, into maintenance mode.

You can do so by using the following command:

```
# enable_applicationha -reset
```

This configuration step resets the ApplicationHA configuration on the VCS node where you run the script. You can put all the nodes in a VCS cluster, one by one, into maintenance mode.

When you put the last node into maintenance mode, global ApplicationHA settings such as IP addresses and DHCP resources are also deleted across the VCS cluster.

ApplicationHA, however, continues to monitor applications on the configured guest domains

Managing Symantec ApplicationHA licenses

This chapter includes the following topics:

- [About managing ApplicationHA licenses](#)
- [Managing ApplicationHA licenses through ApplicationHA tab](#)

About managing ApplicationHA licenses

When the embedded, two-month, evaluation license key expires, you may want to add a permanent license key.

You can add or view the license key from any guest domain that has ApplicationHA guest components installed. You can use one of the following methods to manage the licenses:

- From the command line, run the following commands:

To view an existing license:

```
/opt/VRTS/bin/vxlicrep
```

To install a new license:

```
/opt/VRTS/bin/vxlicinst
```

- When you run the CPI installer to install or upgrade ApplicationHA, you can specify a new license key.
- Connect to the Veritas Operations Manager console and select the guest domain for which you want to update the licenses. Select the **ApplicationHA** tab and click **Licenses**. Use this path to manage licenses for the local guest domain. See [“Managing ApplicationHA licenses through ApplicationHA tab”](#) on page 56.

Managing ApplicationHA licenses through ApplicationHA tab

Perform the following steps to manage ApplicationHA licenses through the ApplicationHA tab.

To manage the ApplicationHA licenses

- 1 Connect to the Veritas Operations Manager.
- 2 In the Veritas Operations Manager console, click **Manage > Servers > Hosts**.
- 3 In the left pane, in the **License** list box, select the **ApplicationHA** check box.
- 4 In the right pane, click the guest domain where you want to perform administrative actions.
- 5 Click the **ApplicationHA** tab and then click **Licenses**.
- 6 On the License Management panel, enter the new license key in the **Enter license key** text box and then click **Add**.
- 7 Click **Close**.

Troubleshooting Symantec ApplicationHA configuration

This appendix includes the following topics:

- [ApplicationHA view logging](#)
- [Symantec ApplicationHA tab does not display the application monitoring status](#)
- [Symantec ApplicationHA Configuration Wizard displays blank](#)
- [Faulted guest domain does not fail over](#)
- [ApplicationHA-initiated reboot does not broadcast any message on console](#)
- [LDom group faults on all systems](#)
- [ApplicationHA fails to restart an application](#)
- [Soft reboot of a guest domain is not triggered](#)
- [Hard reboot of a guest domain is not triggered](#)
- [VCS cannot fail over guest domain](#)
- [Unconfiguring monitoring does not restore default application monitoring settings](#)
- [VCS may fail over an online guest domain](#)
- [Unconfiguring application-aware monitoring on a guest domain may fail](#)
- [ApplicationHA does not restart a failed application](#)

- User is unable to add a guest domain to private VLAN for monitoring
- User is unable to add virtual network interface device to guest domain
- A guest domain intermittently displays “NOT RESPONDING” status
- A guest domain is unable to connect to VCS node
- Disconnected guest domain does not immediately appear faulted
- Configured guest domain appears to be disconnected from VCS

ApplicationHA view logging

The ApplicationHA view generates log files that are appended by letters. The log files are segregated based on operations and configuration settings, as follows:

- Operations and wizard logging

ApplicationHA logs operations logs include the Symantec ApplicationHA Configuration Wizard logs and logs related to the various operations performed from the ApplicationHA view.

Operations logs are located at: `/var/VRTSvcs/log`

For example: `/var/VRTSvcs/log/AppControlOperations_A.log`

The Symantec ApplicationHA Configuration Wizard also maintains in-memory logs that are available only during the time the wizard is running. These logs are maintained on a per session basis. The in-memory logs are purged after the wizard is closed. These logs are not stored in any file or directory.

- Configuration settings logging

Application monitoring configuration settings related changes are logged separately and are available at:

`/var/VRTSvcs/log`

For example: `/var/VRTSvcs/log/AppControlSettings_A.log`

These settings are accessible from the Settings link on the ApplicationHA view.

- ApplicationHA view logging

The ApplicationHA view also maintains in-memory logs of the operations performed from the view. These logs are available only until the time the logs window is open. To view the current logs, click the **View Logs** link available on the right hand side in the ApplicationHA view. A window appears within the view. This window displays the details of the operations performed.

Symantec ApplicationHA tab does not display the application monitoring status

The Symantec ApplicationHA tab in the Veritas Operations Manager (VOM) console may either display a HTTP 404 Not Found error or may not show the application health status at all.

Verify the following conditions and then refresh the ApplicationHA tab in the VOM console:

- Verify that the ApplicationHA add-on is configured in VOM.
- Verify that the Veritas Storage Foundation Messaging Service (xpirtld process) is running on the guest domain.

To verify xpirtld process is running, run the following command:

```
# /usr/bin/svcs svc:/system/xpirtld:default
```

If the process has stopped, run the following command:

```
# svcadm enable svc:/system/xpirtld:default
```

- Verify that ports 14152, 14153, and 5634 are not blocked by a firewall.
- Log out of VOM and then login again. Then, verify that the Symantec ApplicationHA plugin is installed and enabled.

If the problem persists, perform the following steps in the VOM console:

Click **Settings > Host Management**.

Right-click the host where you want to view the monitoring status, and from the context menu click **Refresh Host(s)**.

Symantec ApplicationHA Configuration Wizard displays blank

The Symantec ApplicationHA Configuration Wizard may fail to display the wizard panels. The window may appear blank.

Workaround

You must re-launch the wizard.

Faulted guest domain does not fail over

When VCS attempts to fail over a faulted guest domain to another VCS node, the guest domain displays following error message:

```
"primary-vcsw" not found
```

Workaround

Ensure that VCS on the current node is enabled for ApplicationHA support.

ApplicationHA-initiated reboot does not broadcast any message on console

ApplicationHA-initiated reboot uses the default reboot command to reboot the guest domain. If you want to alert a user with a broadcast message on the virtual machine console at the time of reboot, you can use the VM.GracefulRebootPolicy attribute.

For more information

See [“Administering application monitoring settings”](#) on page 44.
(2586314)

LDom group faults on all systems

When you configure an application or modify the configuration, the LDom group faults on all control domains:

Workaround

This may be due to an application misconfiguration.

From the control domain, perform the following steps:

1. Clear the LDom service group fault.
2. Start the guest domain outside VCS control.
3. Modify the application monitoring configuration.
4. Unfreeze the service group from the control domain.

ApplicationHA fails to restart an application

A configured application fails to restart on a guest domain.

Workaround

Verify the value of 'App.RestartAttempts' attribute from the **Settings** menu of the option in the ApplicationHA tab of Veritas Operations Manager:

1. Verify if the value is greater than 0.
2. Verify if the application was restarted by ApplicationHA very recently. The value of the App.RestartAttempts attribute is effective only if the application has been up and running for a configurable period of time.

Soft reboot of a guest domain is not triggered

ApplicationHA fails to restart a guest domain even if the configured application running on the guest domain fails.

Workaround

In the Settings menu on the ApplicationHA tab of Veritas Operations Manager, ensure that the value of the VM.GracefulRebootPolicy attribute is set to 'Enabled'. Ensure that ApplicationHA has not exceeded the number of restart attempts specified in the VM.GracefulRebootAttempts attribute.

Hard reboot of a guest domain is not triggered

When a configured application fails on a guest domain, VCS fails to externally reboot the guest domain.

Workaround

- Verify that VCS on the physical host is enabled for ApplicationHA support.
- Ensure that the guest domain is added to the private VLAN of the control domain.
- Ensure that the state of the guest domain in the control domain is 'Connected'. For more information on viewing the connection state of a guest domain: See [“Viewing connection details of a guest domain”](#) on page 53.
- Ensure that the value of the RestartLimit attribute is greater than 0 for the resource corresponding to the guest domain.

VCS cannot fail over guest domain

VCS is unable to fail over a guest domain even if an application running on the guest domain fails, and other fault-management steps also fail.

Workaround

- Verify if VCS is enabled for ApplicationHA support on all control domain.
- Verify if the faulted guest domain is part of the private VLAN of the control domain.
- Verify if the connection state of the guest domain with the control domain is 'Connected'.
For more information, viewing the connection state of a guest domain:
See [“Viewing connection details of a guest domain”](#) on page 53.

Unconfiguring monitoring does not restore default application monitoring settings

When you unconfigure application monitoring on a guest domain, the factory settings for ApplicationHA attributes, such as App.RestartAttempts and VM.GracefulRebootPolicy, are not automatically restored. Instead, the values that you configured before unconfiguring application monitoring on that guest domain, are restored.

Workaround

This is expected behavior. When you reconfigure application monitoring on the guest domain, if you want to set ApplicationHA to default values, you must manually reset the default values from the ApplicationHA tab.

VCS may fail over an online guest domain

If a logical domain comes online, but the LDom resource does not come online, VCS fails over the guest domain.

The following error message appears in the VCS error log:

```
LDom resource name is disconnected. Returning OFFLINE.
```

Workaround

- 1 Ensure that ApplicationHA is configured and able to start on the guest domain after a reboot.
- 2 If ApplicationHA takes unusually long to start on the guest domain, increase the OnlineWaitLimit for the LDom resource type.

For more information on setting this attribute, See [“Configuring VCS settings for ApplicationHA”](#) on page 36.

- 3 If you do not want to monitor the guest domain with ApplicationHA, unconfigure application-aware monitoring on the guest domain.

For more information, See [“Unconfiguring application-aware monitoring of a guest domain”](#) on page 51.

Unconfiguring application-aware monitoring on a guest domain may fail

If you want to stop application-aware monitoring by VCS on a guest domain, you can do so by running the following command on the guest domain:

```
# enable_applicationha -delvm vm1
```

Where *vm1* is the host name of the guest domain where you want to stop application-aware monitoring by VCS. In some cases, this command may fail. (2575354)

Workaround

- 1 Unconfigure application monitoring from the ApplicationHA tab on VOM console, and then retry.
- 2 If step 1 fails, run the following command on the guest domain and then retry:

```
# /opt/VRTSvcs/bin/utlils/remove_ip
```

ApplicationHA does not restart a failed application

If a configured application fails, ApplicationHA must restart it as configured. In some cases, this may fail.

Workaround

- Ensure that the value of App.RestartAttempts attribute for the guest domain is greater than 0. You can review the value from the **Settings** option in the ApplicationHA tab of the VOM console.

- Ensure that ApplicationHA did not recently restart the application. If ApplicationHA recently restarted the application, then there may be a certain lag in time before the full value of `App.RestartAttempts` is restored. During this lag, if a fault re-occurs, ApplicationHA may not restart the application.

User is unable to add a guest domain to private VLAN for monitoring

To be able to monitor a guest domain for high availability with VCS, you must add the new guest domain to the private VLAN between guest domains and the associated VCS node (control domain). In some cases, this task may fail.

Workaround

- 1 From the guest domain configuration, verify if ID 31 for the PCI device is already in use.

Run one of the following commands on the guest domain:

```
# virsh edit VirtName
```

or

```
# virsh dumpxml VirtName
```

Where *VirtName* is the name of the guest domain. If the device using this ID is not a network interface with “primary-vcsw” as the switch, then you must assign the device to a ID lesser than 31.

Perform this step, and then add the guest domain to the private VLAN.

- 2 If the first step does not work, and the guest domain is running, shut down the guest domain, and then add it to the private VLAN.

User is unable to add virtual network interface device to guest domain

When you enable VCS support for ApplicationHA the script adds the virtual network interface device to the guest domain. This step may sometimes fail.

Workaround

- 1 From the guest domain configuration, verify if ID 31 is already in use. Use the following command:

```
# ldm list-bindings VirtName
```

Where *VirtName* is the name of the guest domain. If the ID is in use and the device using the ID is not the virtual switch primary-vcsw, you must assign a ID lesser than 31 to the device.

- 2 If the first step does not work and the guest domain is running, shut down the guest domain, and then configure the guest domain for autoregistration.

A guest domain intermittently displays “NOT RESPONDING” status

If you query the connection status of a guest domain from the command line, the guest domain intermittently displays the status “NOT RESPONDING”. This may occur if:

- The guest domain is overloaded
- The control domain is overloaded

As a result, there is a delay in sending heartbeats from the guest domain to VCS in the control domain. You must increase the timeout value for the hearbeats.

Workaround

To increase the timeout value of the heartbeat:

1. Log into the control domain.

Use the following command to modify the “IAATimeout” value for the guest domain:

```
# hasys -modify <GuestName> IAATimeout HigherTimeoutValue
```

Where, GuestName refers to the hostname visible from within the guest domain, and HigherTimeoutValue is a new considerably higher timeout value in seconds.

A guest domain is unable to connect to VCS node

If a guest domain is not connected to the control domain, and if heartbeats between the two are enabled, then the guest domain tries to connect to the VCS node after every 30 seconds. If no VCS node exists, the following message appears:

No VCS server available for connection

Workaround

To ensure connectivity between the guest domain and VCS, perform the following steps:

- Ensure that the VCS node (control domain) associated with the guest domain is enabled to support ApplicationHA
- Ensure that the guest domain is added to the ApplicationHA private VLAN.
For more information:
Viewing configuration details of a virtual machineSee [“Viewing configuration details of a guest domain”](#) on page 52.

Disconnected guest domain does not immediately appear faulted

When there is loss of connectivity between the guest domain and control domain, VCS sets the connection status to NOT RESPONDING. The guest domain status is moved to Faulted only after the ResponseTimeout period has lapsed.

Workaround

You can reset the ResponseTimeout attribute by executing the following steps:

1. Login to the control domain.
2. Run the following command:

```
# hasys -modify GuestName ResponseTimeout lower_timeout_value
```

Where GuestName is the host name of the control domain and lower_timeout_value is the new, lower timeout value that you want to set.

Configured guest domain appears to be disconnected from VCS

Even if you configure an application for monitoring on a guest domain, and enable application heartbeat, the guest domain appears to be not connected to the VCS cluster (control domain).

Workaround

1. Check the connection status after some time. The communication between ApplicationHA on the guest domain and VCS on control domain may take some time to be detected by the VCS cluster.

2. Ensure that VCS on the control domain is enabled to support ApplicationHA. To view the configuration status of the associated control domain:
See [“Viewing configuration details of a guest domain”](#) on page 52.
3. On the control domain, perform the following verification steps:
 - Verify that the `clusext` process `/opt/VRTSvcs/bin/clusext -core` is running. If this process is not running, wait for VCS to automatically start the process.
 - Verify that the VCS cluster level attribute `EnableVMAutoDiscovery` is set to 1.
 - Verify that the `primary-vcsw` device is up with an IP address. If the device is not up, check the state of the resource `“VCSVLANS_G_IP”`. If the state is `OFFLINE` or `FAULTED`, bring the service group that contains the resource online.
 - Verify that the DHCP server is started. If the DHCP server is not running, check the state of the `VCSVLANS_G_DHCP` resource on the system. If the state is `OFFLINE` or `FAULTED`, bring online the service group that contains the resource.
4. On the guest domain, perform the following verification steps:
 - Verify that the `VCSAppMonCERes` resource inside the guest domain is online. If this resource is not online, bring online the service group that contains this resource.
 - Verify that one of the interfaces on the guest domain has an IP address plumbed from the network that was selected when VCS was configured to support ApplicationHA. If no such interface is visible on the guest domain, other than the physical interface, it is possible that the interface was not hot plugged into guest domain.

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