

Cluster Server Agent for HP Storage Works EVA Continuous Access Installation and Configuration Guide

Windows

5.0

Cluster Server Agent for HP EVA Continuous Access Installation and Configuration Guide

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Introducing the agent for HP EVA Continuous Access

This chapter includes the following topics:

- [About the agent for HP EVA Continuous Access](#)
- [Supported software](#)
- [Supported hardware](#)
- [Typical HP EVA Continuous Access setup in a VCS cluster](#)
- [HP EVA Continuous Access agent functions](#)

About the agent for HP EVA Continuous Access

The Cluster Server agent for HP Storage Works EVA Continuous Access provides support for application failover and recovery. The agent provides this support in environments that use HP Enterprise Virtual Array Continuous Access (EVA CA) to manage replication relationships in real time over a storage area network (SAN).

The agent manages all the replication relationships between the virtual disks of the two EVA storage arrays.

The agent for HP EVA Continuous Access enables a Data replication (DR) group to failover, thereby enabling a reversal of the replication direction of a DR group when EVA CA is configured in a VCS environment.

The agent monitors and manages the state of replicated virtual disks within EVA arrays that are attached to VCS nodes. Storage System Scripting Utility (SSSU) is

installed on each of the VCS cluster nodes from where the EVA arrays can be monitored. SSSU communicates with the Command View EVA management server.

You can use the agent in replicated data clusters and in global clusters that run VCS.

The agent supports both synchronous and asynchronous modes.

Supported software

For information on the software versions that the agent for HP EVA Continuous Access supports, see the Symantec Operations Readiness Tools (SORT) site: <https://sort.symantec.com/agents>.

Supported hardware

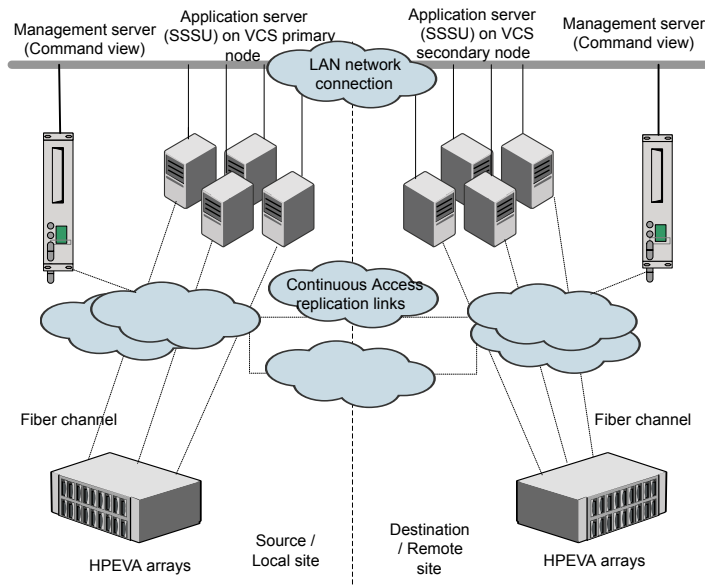
The agent supports HP EVA Continuous Access on HP Storage Works Enterprise Virtual Arrays EVA 4400 and EVA 4100/6100/8100.

It also supports Command view 8.0 or later on the management server and Storage System Scripting Utility (SSSU) on application servers.

Typical HP EVA Continuous Access setup in a VCS cluster

[Figure 1-1](#) displays a typical cluster setup in a HP EVA Continuous Access environment.

Figure 1-1 Typical clustering setup for the agent



Clustering in a HP EVA Continuous Access environment typically consists of the following hardware infrastructure:

- EVA (4100, 4400...) arrays with SAN (Storage Area Network) / Fiber Channel (FC connectivity) between them attached to a Windows server (Command View Management server) and application servers (Linux systems).
- A fabric connection between the local and remote arrays and a software (DR group) connection between the source and destination virtual disks.
- A data replication (DR) group is a logical container that includes LUNs from EVA arrays.
- The virtual disks in the DR group fail over together, replicate to the same specified destination storage array, share a write history log (DR group log), preserve write order within the data replication collection groups, and share a log disk.
- All virtual disks used for replication must belong to a DR group, and a DR group must contain at least one virtual disk.
- Network heartbeating between the two data centers to determine their health; this network heartbeating could be LLT or TCP/IP.
 See [“About cluster heartbeats”](#) on page 21.

- In a replicated data cluster environment, all hosts are part of the same cluster. You must connect them with the dual and dedicated networks that support LLT.
- In a global cluster environment, you must attach all hosts in a cluster to the same EVA array.

HP EVA Continuous Access agent functions

The agent for HP EVA Continuous Access handles the reversal of replication relationship of a DR group when Enterprise Virtual Array Continuous Access (EVA CA) is configured in a VCS environment.

The agent performs the following functions:

online

Checks if the role or mode of the DR group is source or destination.

If the role or mode of the DR group is source, the online function:

- Creates a lock file on the local host to indicate that the resource is online. This makes the devices writeable for the application.

If the role or mode of the DR group is destination, the online function performs the following checks:

- If the replication link is broken and the value of the AutoTakeover attribute is set to 1, it runs the `failover` command.
- If the replication is suspended and the value of the SplitTakeover attribute is set to 1, it runs the `failover` command.
- If the replication mode or write mode is asynchronous, it is set to synchronous so that the secondary becomes up-to-date. While the log merges or full copy is performed, the online function waits for synchronization to complete till the OnlineTimeout expires. If the secondary is up-to-date, it runs the `failover` command.

Note: The HP Command View Storage System Scripting Utility (SSSU) does not allow DR group failover when replication is suspended and the write mode is synchronous. Hence, in the case of synchronous replication even when the replication is suspended and the attribute SplitTakeover is set to 1, the agent will fail to bring the EVACA resource online if the DR group role is "destination."

After a successful failover, the online function creates the lock file. If the online function changed the write mode of the DR group, it tries to restore it. In short, if the write mode was changed to the synchronous mode, after the failover attempt, it tries to revert to the asynchronous mode.

| | |
|-----------------|---|
| offline | Removes the online lock file from the host. The agent does not run any commands because taking the resource offline is not indicative of the intention to give up the devices. |
| monitor | Verifies that the lock file exists. If the lock file exists, the monitor function reports the status of the resource as online. If the lock file does not exist, the monitor function reports the status of the resource as offline. There is no detailed monitoring. |
| clean | Determines if it is safe to fault the resource if the online function fails or times out. Removes the lock file. |
| open | Removes the lock file if none of the parent resources or parent service groups are online. |
| info | Modifies or adds the resource information of the EVACA resource for attribute ReplicationStatus. This includes DR group role, write mode, operational state. If the write mode is synchronous, it also includes failsafe setting (i.e. enabled or disabled). |
| changeWriteMode | Changes the write mode of the source DR Group. Typically, it can be used to revert back the write mode to asynchronous, in case the online function failed to do so. |

Installing and removing the agent for HP EVA Continuous Access

This chapter includes the following topics:

- [Before you install the agent for HP EVA Continuous Access](#)
- [Installing the agent for HP EVA Continuous Access](#)
- [Removing the agent for HP EVA Continuous Access](#)

Before you install the agent for HP EVA Continuous Access

Before you install the Cluster Server agent for HP EVA Continuous Access, ensure that you install and configure the VCS on all nodes in the cluster.

Set up replication and the required hardware infrastructure. For information about setting up Oracle RAC environment, refer to the *Storage Foundation for Oracle RAC Configuration and Upgrade Guide*.

See [“Typical HP EVA Continuous Access setup in a VCS cluster”](#) on page 9.

Installing the agent for HP EVA Continuous Access

You must install the HP EVA Continuous Access agent on each node in the cluster. In global cluster environments, install the agent on each node in each cluster.

To install the Cluster Server agent for HP EVA Continuous Access from the Agent Pack release

- 1 Log on to any node in the cluster.
Ensure that the logged on user has the domain administrative privileges.
- 2 Download the Agent Pack from the Symantec Operations Readiness Tools (SORT) site: <https://sort.symantec.com/agents>.

You can download the complete Agent Pack zip file or the individual agent zip file.
- 3 Uncompress the file to a temporary location.
- 4 If you downloaded the complete Agent Pack zip file, navigate to the directory containing the package for the platform running in your environment.

| | |
|------------------------|--|
| Windows 2003 x86 | <code>cdI\windows\w2k3x86\vcs\replication\ hp_eva_ca_agent\vcs_version\version_agent\pkgs</code> |
| Windows 2003 (IA64) | <code>cdI\windows\w2k3IA64\vcs\replication\ hp_eva_ca_agent\vcs_version\version_agent\ pkgs</code> |
| Windows 2003 (x64) | <code>cdI\windows\w2k3x64\vcs\replication\ hp_eva_ca_agent\vcs_version\version_agent\pkgs</code> |
| Windows 2008 x86 | <code>cdI\windows\w2k8x86\vcs\ replication\ hp_eva_ca_agent\vcs_version\version_agent\pkgs</code> |
| Windows 2008 IA64 | <code>cdI\windows\w2k8IA64\vcs\replication\ hp_eva_ca_agent\vcs_version\version_agent\ pkgs</code> |
| Windows 2008 x64 | <code>cdI\windows\w2k8x64\vcs\replication\ hp_eva_ca_agent\vcs_version\version_agent\pkgs</code> |

- 5 Double-click **vrtsvcsevacca.msi**.

Follow the instructions that the install program provides, to complete the installation of the agent.

On successful installation of the agent, the install program adds the agent types file automatically.

Removing the agent for HP EVA Continuous Access

This section describes steps for uninstalling the agent. Do not attempt to remove the agent if service groups accessing the shared storage are online.

To remove the agent for HP EVA Continuous Access that was installed from an Agent Pack release

- 1 Open the Windows Control Panel and click **Add or Remove Programs** or **Uninstall a Program**.
- 2 Select Cluster Server Agent for HP Storage Works EVA Continuous Access or VRTSvcsevaca.
- 3 Click the **Remove** or **Uninstall** button.
- 4 Follow the instructions the installer provides to complete the uninstallation.

Configuring the agent for HP EVA Continuous Access

This chapter includes the following topics:

- [Configuration concepts for the agent](#)
- [Before you configure the agent for HP EVA Continuous Access](#)
- [Configuring the agent for HP EVA Continuous Access](#)

Configuration concepts for the agent

Review the resource type definition and the attribute definitions for the agent.

Resource type definition for the agent

The EVACA resource type represents the HP EVA Continuous Access agent in VCS.

```
type EVACA (
    static keylist SupportedActions = { changeWriteMode }
    static int OfflineMonitorInterval = 0
    static int InfoInterval = 300
    static int OnlineTimeout = 600
    static int OpenTimeout = 180
    static int RestartLimit = 1
    static str ArgList[] = { ManagementServer, UserName,
        StandbyManagementServer, StandbyUserName, LocaleEVAName,
```



```

DRGroupName, SSSUPath, SSSUPWDPATH, SplitTakeover, AutoTakeover }
str ManagementServer
str UserName = "hpadmin"
str StandbyManagementServer
str StandbyUserName = "hpadmin"
str LocalEVAName
str DRGroupName
str SSSUPath
str SSSUPWDPATH
int SplitTakeover = 0
int AutoTakeover = 1
)

```

Attribute definitions for the agent

Review the description of the agent attributes.

Required attributes

You must assign values to required attributes.

| | |
|-------------------|--|
| Management server | <p>Specifies the name of the Command View management server.</p> <p>Type-dimension: string-scalar</p> |
| UserName | <p>Specifies the user name to access the management server.</p> <p>The default value is: hpadmin.</p> <p>Type dimension: string-scalar</p> |
| LocalEVAName | <p>Specifies the name of the local Enterprise Virtual Array (EVA).</p> <p>Type-dimension: string-scalar</p> |
| DRGroupName | <p>Specifies the data replication group name.</p> <p>Type-dimension: string-scalar</p> |
| SSSUPath | <p>Specifies the path to the Storage System Scripting Utility (SSSU) along with the binary name.</p> <p>Type-dimension: string-scalar</p> |
| SSSUPWDPATH | <p>Specifies the path to the SSSU password file — sssu.pw.</p> <p>Type-dimension: string-scalar</p> |

Optional attributes

Optionally assign values to these attributes.

| | |
|-------------------------|--|
| StandbyManagementServer | <p>Specifies the name of the standby Command View management server. When executing any agent functions, the agent uses this server name in the following circumstance:</p> <ul style="list-style-type: none"> ■ if the local array is actively managed by this server, and not by the management server that is specified in the Management server attribute. <p>Type-dimension: string-scalar</p> |
| StandbyUserName | <p>Specifies the user name that is required to connect to the standby Command View management server.</p> <p>The default value is "hpadmin"</p> <p>Type-dimension: string-scalar</p> |
| AutoTakeover | <p>Indicates whether the failover should occur when the replication link is broken.</p> <p>The default value is 1.</p> <p>Type-dimension: integer-scalar</p> |
| SplitTakeover | <p>Indicates whether the failover should occur when the replication link is suspended.</p> <p>The default value is 0.</p> <p>Type-dimension: integer-scalar</p> |

Required attributes

You must assign values to required attributes.

| | |
|-------------------|--|
| Management server | <p>Specifies the name of the Command View management server.</p> <p>Type-dimension: string-scalar</p> |
| UserName | <p>Specifies the user name to access the management server.</p> <p>The default value is: hpadmin.</p> <p>Type dimension: string-scalar</p> |

| | |
|--------------|--|
| LocalEVAName | Specifies the name of the local Enterprise Virtual Array (EVA). Type-dimension: string-scalar |
| DRGroupName | Specifies the data replication group name. Type-dimension: string-scalar |
| SSSUPath | Specifies the path to the Storage System Scripting Utility (SSSU) along with the binary name. Type-dimension: string-scalar |
| SSSUPWDPPath | Specifies the path to the SSSU password file — sssu.pw. Type-dimension: string-scalar |

Optional attributes

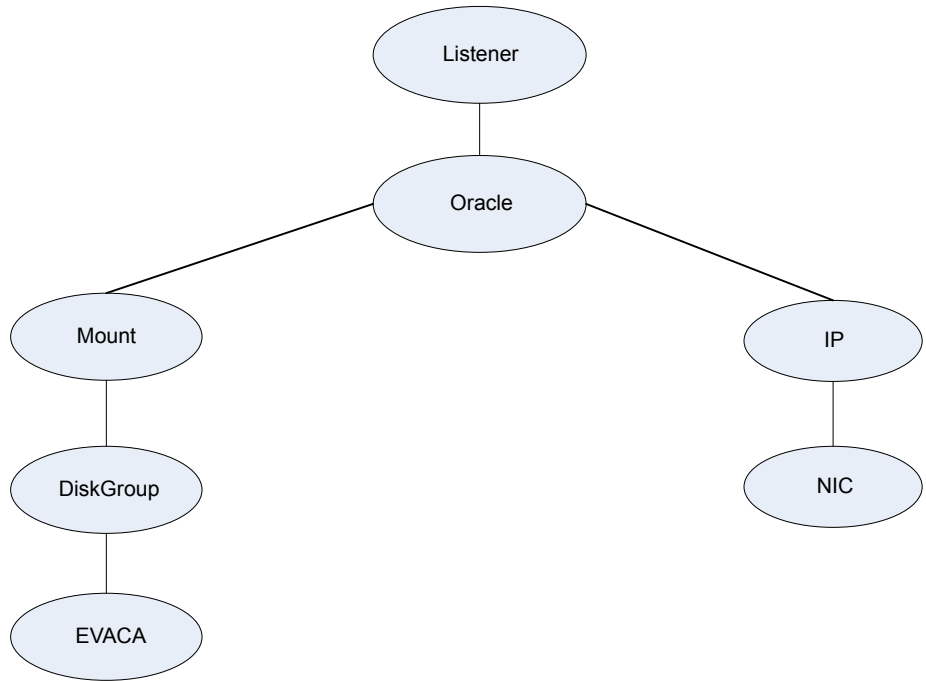
Optionally assign values to these attributes.

| | |
|-------------------------|--|
| StandbyManagementServer | Specifies the name of the standby Command View management server. When executing any agent functions, the agent uses this server name in the following circumstance: <ul style="list-style-type: none"> ■ if the local array is actively managed by this server, and not by the management server that is specified in the Management server attribute. Type-dimension: string-scalar |
| StandbyUserName | Specifies the user name that is required to connect to the standby Command View management server. The default value is "hpadmin" Type-dimension: string-scalar |
| AutoTakeover | Indicates whether the failover should occur when the replication link is broken. The default value is 1. Type-dimension: integer-scalar |
| SplitTakeover | Indicates whether the failover should occur when the replication link is suspended. The default value is 0. Type-dimension: integer-scalar |

Sample configuration for the agent

Figure 3-1 shows the dependency graph for a VCS service group with a resource of type EVACA.

Figure 3-1 Sample configuration for the HP EVA Continuous Access agent



The DiskGroup resource depends on the EVACA resource.

You can configure a resource of type EVACA as follows in main.cf:

```
EVACA hp-eva-res (  
    ManagementServer = "10.209.64.46"  
    UserName = Administrator  
    LocalEVAName = EVA  
    DRGroupName = DR01  
    SSSUPath = "C:\\SSSU\\windows\\sssu_win_amd64.exe"  
    SSSUPWDPath = "C:\\Users\\eva_admin"  
)
```

Before you configure the agent for HP EVA Continuous Access

Before you configure the agent, review the following information:

- Verify that you have installed the agent on all systems in the cluster.
- Verify the hardware setup for the agent.
 See [“Typical HP EVA Continuous Access setup in a VCS cluster”](#) on page 9.
- Make sure that the cluster has an effective heartbeat mechanism in place.
 See [“About cluster heartbeats”](#) on page 21.
- The agent for HP EVA Continuous Access uses Command View Manager username and password to connect to the management server. This is required by the SSSU commands. The agent leverages the SSSU password file, instead of passing the password in each SSSU command it executes. You must add the Command View username to the password file before leveraging agent functionality.

You must do this by running the `SSSU -a` command on each cluster node, after installing SSSU on VCS nodes. This command requires the management server name, user name, and password as parameters. After you run this command successfully, specify the same management server name and user name when you are configuring the EVACA resource. Similarly, if you are using a standby management server, you must add this server's user name to the SSSU password file on each VCS cluster node.

See [“HP EVA Continuous Access agent functions”](#) on page 11.

About cluster heartbeats

In a replicated data cluster, ensure robust heartbeating by using dual, dedicated networks over which the Low Latency Transport (LLT) runs. Additionally, you can configure a low-priority heartbeat across public networks.

In a global cluster, VCS sends ICMP pings over the public network between the two sites for network heartbeating. To minimize the risk of split-brain, VCS sends ICMP pings to highly available IP addresses. VCS global clusters also notify the administrators when the sites cannot communicate.

About configuring system zones in replicated data clusters

In a replicated data cluster, you can prevent unnecessary HP EVA Continuous Access failover or failback by creating system zones. VCS attempts to fail over applications within the same system zone before failing them over across system zones.

Configure the hosts that are attached to an array as part of the same system zone to avoid unnecessary failover.

Modify the SystemZones attribute using the following command:

```
hagrp -modify grpname SystemZones hosta 0 hostb 0 hostc 1 hostd 1
```

The variable grpname represents the service group in the cluster.

About preventing split-brain

Split-brain occurs when all heartbeat links between the primary and secondary hosts are cut. In this situation, each side mistakenly assumes that the other side is down. You can minimize the effects of split-brain by ensuring that the cluster heartbeat links pass through a similar physical infrastructure as the replication links. When you ensure that both pass through the same infrastructure, if one breaks, so does the other.

Configuring the agent for HP EVA Continuous Access

You can configure clustered application in a disaster recovery environment by:

- Converting their devices to HP EVA Continuous Access devices
- Synchronizing the devices
- Adding the HP EVA Continuous Access agent to the service group

Configure EVA volumes as resources of type EVACA.

After configuration, the application service group must follow the dependency diagram.

See [“Sample configuration for the agent”](#) on page 20.

Note: You must not change the replication state of devices from primary to secondary and from secondary to primary, outside of a VCS setup. The agent for HP Storage Works EVA Continuous Access fails to detect a change in the replication state if the role reversal is done externally and RoleMonitor is disabled.

Configuring the agent manually in a global cluster

Configuring the agent manually in a global cluster involves the following tasks:

To configure the agent in a global cluster

- 1 Start Cluster Manager and log on to the cluster.
- 2 Add a resource of type EVACA at the bottom of the service group.
- 3 Configure the attributes of the EVACA resource.
- 4 If the service group is not configured as a global service group, configure the service group using the Global Group Configuration Wizard.
- 5 If the user, who is specified in the username attribute, is not already added to the SSSU password file, you must run the `sssu -a` command from the command line to do so. You must provide the same values for the management server name and user name, as configured in the resource's attributes, before using the agent functionality.

See [“HP EVA Continuous Access agent functions”](#) on page 11. .

- 6 Repeat step 2 through step [To configure the agent in a global cluster](#) for each service group in each cluster that uses replicated data.
- 7 The configuration must be identical on all cluster nodes, both primary and disaster recovery.

Configuring the agent manually in a replicated data cluster

Configuring the agent manually in a replicated data cluster involves the following tasks:

To configure the agent in a replicated data cluster

- 1 Start Cluster Manager and log on to the cluster.
- 2 In each service group that uses replicated data, add a resource of type EVACA at the bottom of the service group.
- 3 Configure the attributes of the EVACA resource. Note that some attributes must be localized to reflect values for the hosts that are attached to different arrays.
- 4 If the user, who is specified in the username attribute, is not already added to the SSSU password file, you must run the `sssu -a` command from the command line to do so. You must provide the same values for the management server name and user name, as configured in the resource's attributes, before using the agent functionality.

See [“HP EVA Continuous Access agent functions”](#) on page 11. .

- 5 Set the SystemZones attribute for the service group to reflect which hosts are attached to the same array.

Testing VCS disaster recovery support with HP EVA Continuous Access

This chapter includes the following topics:

- [How VCS recovers from various disasters in an HA/DR setup with HP EVA Continuous Access](#)
- [Testing the global service group migration](#)
- [Testing disaster recovery after host failure](#)
- [Testing disaster recovery after site failure](#)
- [Performing failback after a node failure or an application failure](#)
- [Performing failback after a site failure](#)

How VCS recovers from various disasters in an HA/DR setup with HP EVA Continuous Access

This section covers the failure scenarios and how VCS responds to the failures for the following DR cluster configurations:

| | |
|--------------------------|--|
| Global clusters | <p>When a site-wide global service group or system fault occurs, VCS failover behavior depends on the value of the ClusterFailOverPolicy attribute for the faulted global service group. The Cluster Server agent for HP EVA Continuous Access ensures safe and exclusive access to the configured HP EVA Continuous Access devices.</p> <p>See “Failure scenarios in global clusters” on page 25.</p> |
| Replicated data clusters | <p>When service group or system faults occur, VCS failover behavior depends on the value of the AutoFailOver attribute for the faulted service group. The VCS agent for HP EVA Continuous Access ensures safe and exclusive access to the configured HP EVA Continuous Access devices.</p> <p>See “Failure scenarios in replicated data clusters” on page 29.</p> |

Refer to the *Cluster Server Administrator’s Guide* for more information on the DR configurations and the global service group attributes.

Failure scenarios in global clusters

[Table 4-1](#) lists the failure scenarios in a global cluster configuration and describes the behavior of VCS and the agent in response to the failure.

Table 4-1

Failure scenarios in a global cluster configuration with the Cluster Server agent for HP EVA Continuous Access

| Failure | Description and VCS response |
|---------------------|--|
| Application failure | <p>Application cannot start successfully on any hosts at the primary site.</p> <p>VCS response at the secondary site:</p> <ul style="list-style-type: none">■ Causes global service group at the primary site to fault and displays an alert to indicate the fault.■ Does the following based on the ClusterFailOverPolicy global service group attribute:<ul style="list-style-type: none">■ Auto or Connected—VCS automatically brings the faulted global group online at the secondary site.■ Manual—No action. You must bring the global group online at the secondary site. <p>Agent response:</p> <ul style="list-style-type: none">■ The agent does the following:<ul style="list-style-type: none">■ Write enables the devices at the secondary site.■ In case the replication is suspended and the value of the SplitTakeover attribute is set to 0, no action is taken by agent.■ In case the write mode is asynchronous, the agent sets it to synchronous and waits for the replicated data at the secondary side to become up-to-date.■ Swaps the Source/Destination role of the DR Group.■ Restarts the replication from the Source DR group on the secondary site to the Destination DR group at the primary site. <p>See "Performing failback after a node failure or an application failure" on page 35.</p> |

Table 4-1 Failure scenarios in a global cluster configuration with the Cluster Server agent for HP EVA Continuous Access (*continued*)

| Failure | Description and VCS response |
|--------------|---|
| Host failure | <p>All hosts at the primary site fail.</p> <p>VCS response at the secondary site:</p> <ul style="list-style-type: none"> ■ Displays an alert to indicate the primary cluster fault. ■ Does the following based on the ClusterFailOverPolicy global service group attribute: <ul style="list-style-type: none"> ■ Auto—VCS automatically brings the faulted global group online at the secondary site. ■ Manual or Connected—No action. You must bring the global group online at the secondary site. <p>Agent response:</p> <ul style="list-style-type: none"> ■ The agent does the following: <ul style="list-style-type: none"> ■ Write enables the devices at the secondary site. ■ In case the replication is suspended and the value of the SplitTakeover attribute is set to 0, no action is taken by agent. ■ In case the write mode is asynchronous, the agent sets it to synchronous and waits for the replicated data at the secondary side to become up-to-date. ■ Swaps the Source/Destination role of the DR Group. ■ Restarts the replication from the Source DR group on the secondary site to the Destination DR group at the primary site. <p>See “Performing failback after a node failure or an application failure” on page 35.</p> |
| Site failure | <p>All hosts and the storage at the primary site fail.</p> <p>VCS response at the secondary site:</p> <ul style="list-style-type: none"> ■ Displays an alert to indicate the cluster fault. ■ Does the following based on the ClusterFailOverPolicy global service group attribute: <ul style="list-style-type: none"> ■ Auto—VCS automatically brings the faulted global group online at the secondary site. ■ Manual or Connected—No action. You must bring the global group online at the secondary site. <p>Agent response: The agent does the following based on the value of the AutoTakeover attribute of the EVACA resource:</p> <ul style="list-style-type: none"> ■ 1—The agent issues the <code>failover</code> command to make the EVACA devices write-enabled at the secondary site. ■ 0—No action is taken by the agent. The EVACA resource is faulted. <p>See “Performing failback after a site failure” on page 36.</p> |

Table 4-1 Failure scenarios in a global cluster configuration with the Cluster Server agent for HP EVA Continuous Access (*continued*)

| Failure | Description and VCS response |
|--------------------------|--|
| Replication link failure | <p>Replication link between the arrays at the two sites fails.</p> <p>VCS response: No action.</p> <p>Agent response: The agent does the following based on the value of the AutoTakeover attribute of the EVACA resource:</p> <ul style="list-style-type: none"> ■ 1—The agent issues the <code>failover</code> command to make the EVACA devices write-enabled at the secondary site. ■ 0—No action is taken by the agent. The EVACA resource is faulted. |
| Network failure | <p>The network connectivity and the replication link between the sites fail.</p> <p>VCS response at the secondary site:</p> <ul style="list-style-type: none"> ■ VCS at each site concludes that the remote cluster has faulted. ■ Does the following based on the ClusterFailOverPolicy global service group attribute: <ul style="list-style-type: none"> ■ Manual or Connected—No action. You must confirm the cause of the network failure from the cluster administrator at the remote site and fix the issue. ■ Auto—VCS brings the global group online at the secondary site which may lead to a site-wide split brain. This causes data divergence between the devices on the primary and the secondary arrays. <p>When the network (wac and replication) connectivity restores, you must manually resync the data.</p> <p>Note: Symantec recommends that the value of the ClusterFailOverPolicy attribute is set to Manual for all global groups to prevent unintended failovers due to transient network failures.</p> <p>Agent response: Similar to the site failure.</p> |
| Storage failure | <p>The array at the primary site fails.</p> <p>VCS response at the secondary site:</p> <ul style="list-style-type: none"> ■ Causes the global service group at the primary site to fault and displays an alert to indicate the fault. ■ Does the following based on the ClusterFailOverPolicy global service group attribute: <ul style="list-style-type: none"> ■ Auto or Connected—VCS automatically brings the faulted global service group online at the secondary site. ■ Manual—No action. You must bring the global group online at the secondary site. <p>Agent response: Similar to the site failure</p> |

Failure scenarios in replicated data clusters

[Table 4-2](#) lists the failure scenarios in a replicated data cluster configuration, and describes the behavior of VCS and the agent in response to the failure.

Table 4-2 Failure scenarios in a replicated data cluster configuration with VCS agent for HP EVA Continuous Access

| Failure | Description and VCS response |
|---------------------|---|
| Application failure | <p>Application cannot start successfully on any hosts at the primary site.</p> <p>VCS response:</p> <ul style="list-style-type: none"> ■ Causes the service group at the primary site to fault. ■ Does the following based on the AutoFailOver attribute for the faulted service group: <ul style="list-style-type: none"> ■ 1—VCS automatically brings the faulted service group online at the secondary site. ■ 2—You must bring the service group online at the secondary site. <p>Agent response:</p> <ul style="list-style-type: none"> ■ The agent does the following: <ul style="list-style-type: none"> ■ Write enables the devices at the secondary site. ■ In case the replication is suspended and the value of the SplitTakeover attribute is set to 0, no action is taken by agent. ■ In case the write mode is asynchronous, the agent sets it to synchronous and waits for the replicated data at the secondary side to become up-to-date. ■ Swaps the Source/Destination role of the DR Group. ■ Restarts the replication from the Source DR group on the secondary site to the Destination DR group at the primary site. <p>See “Performing failback after a node failure or an application failure” on page 35.</p> |

Table 4-2 Failure scenarios in a replicated data cluster configuration with VCS agent for HP EVA Continuous Access (*continued*)

| Failure | Description and VCS response |
|--------------|---|
| Host failure | <p>All hosts at the primary site fail.</p> <p>VCS response:</p> <ul style="list-style-type: none"> Causes the service group at the primary site to fault. Does the following based on the AutoFailOver attribute for the faulted service group: <ul style="list-style-type: none"> 1—VCS automatically brings the faulted service group online at the secondary site. 2—You must bring the service group online at the secondary site. <p>Agent response:</p> <ul style="list-style-type: none"> The agent does the following: <ul style="list-style-type: none"> Write enables the devices at the secondary site. In case the replication is suspended and the value of the SplitTakeover attribute is set to 0, no action is taken by agent. In case the write mode is asynchronous, the agent sets it to synchronous and waits for the replicated data at the secondary side to become up-to-date. Swaps the Source/Destination role of the DR Group. Restarts the replication from the Source DR group on the secondary site to the Destination DR group at the primary site. <p>See “Performing failback after a node failure or an application failure” on page 35.</p> |
| Site failure | <p>All hosts and the storage at the primary site fail.</p> <p>VCS response:</p> <ul style="list-style-type: none"> Causes the service group at the primary site to fault. Does the following based on the AutoFailOver attribute for the faulted service group: <ul style="list-style-type: none"> 1—VCS automatically brings the faulted service group online at the secondary site. 2—You must bring the service group online at the secondary site. <p>Agent response: The agent does the following based on the value of the AutoTakeover attribute of the EVACA resource:</p> <ul style="list-style-type: none"> 1—The agent issues the <code>failover</code> command to make the EVACA devices write-enabled at the secondary site. 0—No action is taken by the agent. The EVACA resource is faulted. <p>See “Performing failback after a site failure” on page 36.</p> |

Table 4-2 Failure scenarios in a replicated data cluster configuration with VCS agent for HP EVA Continuous Access (*continued*)

| Failure | Description and VCS response |
|--------------------------|--|
| Replication link failure | <p>Replication link between the arrays at the two sites fails.</p> <p>VCS response: No action.</p> <p>Agent response: The agent does the following based on the value of the AutoTakeover attribute of the EVACA resource:</p> <ul style="list-style-type: none"> ■ 1—The agent issues the <code>failover</code> command to make the EVACA devices write-enabled at the secondary site. ■ 0—No action is taken by the agent. The EVACA resource is faulted. |
| Network failure | <p>The LLT and the replication links between the sites fail.</p> <p>VCS response:</p> <ul style="list-style-type: none"> ■ VCS at each site concludes that the nodes at the other site have faulted. ■ Does the following based on the AutoFailOver attribute for the faulted service group: <ul style="list-style-type: none"> ■ 2—No action. You must confirm the cause of the network failure from the cluster administrator at the remote site and fix the issue. ■ 1—VCS brings the service group online at the secondary site which leads to a cluster-wide split brain. This causes data divergence between the devices on the arrays at the two sites. <p>When the network (LLT and replication) connectivity is restored, VCS takes all the service groups offline on one of the sites and restarts itself. This action eliminates concurrency violation where in the same group is online at both the sites.</p> <p>Note: Symantec recommends that the value of the AutoFailOver attribute is set to 2 for all service groups to prevent unintended failovers due to transient network failures.</p> <p>Agent response: Similar to the site failure.</p> |
| Storage failure | <p>The array at the primary site fails.</p> <p>VCS response:</p> <ul style="list-style-type: none"> ■ Causes the service group at the primary site to fault and displays an alert to indicate the fault. ■ Does the following based on the AutoFailOver attribute for the faulted service group: <ul style="list-style-type: none"> ■ 1—VCS automatically brings the faulted service group online at the secondary site. ■ 2—You must bring the service group online at the secondary site. <p>Agent response: Similar to the site failure</p> |

Testing the global service group migration

After you configure the Cluster Server agent for HP EVA Continuous Access, verify that the global service group can migrate to hosts across the sites. Depending on your DR configuration, perform one of the following procedures.

To test the global service group migration in global cluster setup

- 1 Fail over the global service group from the primary site to the secondary site.

Perform the following steps:

- Switch the global service group from the primary site to any node in the secondary site.

```
hagrp -switch global_group -any -clus cluster_name
```

VCS brings the global service group online on a node at the secondary site.

- Verify that the EVACA devices at the secondary site are write-enabled, and the DR group role is Source.

- 2 Fail back the global service group from the secondary site to the primary site.

Perform the following steps:

- Switch the global service group from the secondary site to the primary site.

```
hagrp -switch global_group -any -clus cluster_name
```

VCS brings the global service group online at the primary site.

- Verify that the EVACA devices at the secondary site are write-enabled, and the DR group role is Source.

To test service group migration in replicated data cluster setup

- 1 Fail over the service group from the primary site to the secondary site.

Perform the following steps:

- Switch the service group from the primary site to any node in the secondary site.

```
hagrp -switch service_group -to sys_name
```

VCS brings the service group online on a node at the secondary site.

- Verify that the EVACA devices at the secondary site are write-enabled, and the DR group role is Source.

- 2 Fail back the service group from the secondary site to the primary site.

Perform the following steps:

- Switch the service group from the secondary site to any node in the primary site.

```
hagrp -switch service_group -to sys_name
```

VCS brings the service group online on a node at the primary site.

- Verify that the EVACA devices at the primary site are write-enabled, and the DR group role is Source.

Testing disaster recovery after host failure

Review the details on host failure and how VCS and the Cluster Server agent for HP EVA Continuous Access behave in response to the failure.

See [“Failure scenarios in global clusters”](#) on page 25.

See [“Failure scenarios in replicated data clusters”](#) on page 29.

Depending on the DR configuration, perform one of the following procedures to test how VCS recovers after all hosts at the primary site fail.

To test disaster recovery for host failure in global cluster setup

- 1 Halt the hosts at the primary site.

The value of the ClusterFailOverPolicy attribute for the faulted global group determines the VCS failover behavior.

- Auto—VCS brings the faulted global service group online at the secondary site.
- Manual or Connected—You must bring the global service group online at the secondary site.

On a node in the secondary site, run the following command:

```
hagrp -online -force global_group -any
```

- 2 Verify that the global service group is online at the secondary site.

```
hagrp -state global_group
```

- 3 Verify that the EVACA devices at the secondary site are write-enabled, and the DR group role is Source.

To test disaster recovery for host failure in replicated data cluster setup

- 1 Halt the hosts at the primary site.

The value of the AutoFailOver attribute for the faulted service group determines the VCS failover behavior.

- 1—VCS brings the faulted service group online at the secondary site.
- 2—You must bring the service group online at the secondary site.
On a node in the secondary site, run the following command:

```
hagrp -online service_group -to sys_name
```

- 2 Verify that the service group is online at the secondary site.

```
hagrp -state global_group
```

- 3 Verify that the EVACA devices at the secondary site are write-enabled, and the DR group role is Source.

Testing disaster recovery after site failure

Review the details on site failure and how VCS and the Cluster Server agent for HP EVA Continuous Access behave in response to the failure.

See [“Failure scenarios in global clusters”](#) on page 25.

See [“Failure scenarios in replicated data clusters”](#) on page 29.

Depending on the DR configuration, perform one of the following procedures to test the disaster recovery in the event of site failure.

To test disaster recovery for site failure in global cluster setup

- 1 Halt all nodes and the arrays at the primary site.

If you cannot halt the array at the primary site, then disable the replication link between the two arrays.

The value of the ClusterFailOverPolicy attribute for the faulted global group determines the failover behavior of VCS.

- Auto—VCS brings the faulted global group online at the secondary site.
- Manual or Connected—You must bring the global group online at the secondary site.

On a node in the secondary site, run the following command:

```
hagrp -online -force global_group -any
```

- 2 Verify that the EVACA devices at the secondary site are write-enabled, and the device state is Source.
- 3 Verify that the global service group is online at the secondary site.

```
hagrp -state global_group
```

To test disaster recovery for site failure in replicated data cluster setup

- 1 Halt all hosts and the arrays at the primary site.

If you cannot halt the array at the primary site, then disable the replication link between the two arrays.

The value of the `AutoFailOver` attribute for the faulted global service group determines the VCS failover behavior.

- 1—VCS brings the faulted global service group online at the secondary site.
- 2—You must bring the global service group online at the secondary site. On a node in the secondary site, run the following command:

```
hagrp -online service_group -sys sys_name
```

- 2 Verify that the EVACA devices at the secondary site are write-enabled, and the device state is Source.
- 3 Verify that the global service group is online at the secondary site.

```
hagrp -state global_group
```

Performing failback after a node failure or an application failure

Review the details on node failure and application failure and how VCS and the agent for HP EVA Continuous Access behave in response to these failures.

See [“Failure scenarios in global clusters”](#) on page 25.

See [“Failure scenarios in replicated data clusters”](#) on page 29.

After the nodes at the primary site are restarted, you can perform a failback of the global service group to the primary site. Depending on your DR configuration, perform one of the following procedures.

To perform failback after a node failure or an application failure in global cluster

- 1 Switch the global service group from the secondary site to any node in the primary site.

```
hagrp -switch global_group -any -clus cluster_name
```

VCS brings the global service group online at the primary site.

- 2 Verify that the EVACA devices at the primary site are write-enabled, and the DR group role is Source.

To perform failback after a host failure or an application failure in replicated data cluster

- 1 Switch the global service group from the secondary site to any node in the primary site.

```
hagrp -switch service_group -to sys_name
```

VCS brings the global service group online on a node at the primary site.

- 2 Verify that the EVACA devices at the primary site are write-enabled, and the DR group role is Source.

Performing failback after a site failure

After a site failure at the primary site, the hosts and the storage at the primary site are down. VCS brings the global service group online at the secondary site and the HP EVA Continuous Access agent write enables the secondary devices.

Review the details on site failure and how VCS and the agent for HP EVA Continuous Access behave in response to the failure.

See [“Failure scenarios in global clusters”](#) on page 25.

See [“Failure scenarios in replicated data clusters”](#) on page 29.

When the hosts and the storage at the primary site are restarted and the replication link is restored, you can perform a failback of the global service group to the primary site.

To perform failback after a site failure in global cluster

- 1 Take the global service group offline at the secondary site. On a node at the secondary site, run the following command:

```
hagrp -offline global_group -any
```

- 2 Bring the global service group online at the primary site. On a node in the primary site, run the following command:

```
hagrp -online global_group -any
```

This again swaps the role of the Source and the Destination DR group.

To perform failback after a site failure in replicated data cluster

- 1** Take the global service group offline at the secondary site. On a node in the secondary site, run the following command:

```
hagrp -offline service_group -sys sys_name
```

- 2** Bring the global service group online at the primary site. On a node in the primary site, run the following command:

```
hagrp -online service_group -sys sys_name
```

This again swaps the role of the Source and the Destination DR group.

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