

Cluster Server Agent for Dell EMC Storage Compellent Configuration Guide

Windows

7.0

Veritas InfoScale™ Availability Agents

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Introducing the agent for Dell EMC SC

This chapter includes the following topics:

- [About the agent for Dell EMC SC](#)
- [Supported software](#)
- [Dell EMC SC agent functions](#)
- [Typical Dell EMC SC setup in a VCS cluster](#)

About the agent for Dell EMC SC

The InfoScale Availability agent for Dell EMC Storage Compellent (SC) provides support for application failover and recovery in the environments where data is replicated between Dell EMC SC arrays.

The agent monitors and manages the state of replicated Dell EMC SC devices that are attached to VCS nodes. The agent ensures that the system that has the Dell SC resource online also has safe and exclusive access to the configured devices.

The agent for Dell EMC SC supports the following:

- Global clusters that run VCS.
- Volumes for synchronous replication with High Availability and High Consistency modes.

Supported software

For information on the software versions that the InfoScale (VCS) agent for Dell SC supports, see the Veritas Services and Operations Readiness Tools (SORT) site:

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

Dell EMC SC agent functions

The VCS agent for Dell EMC SC monitors and manages the state of replicated Dell EMC Storage Compellent devices that are attached to VCS nodes.

Table 1-1 Agent functions

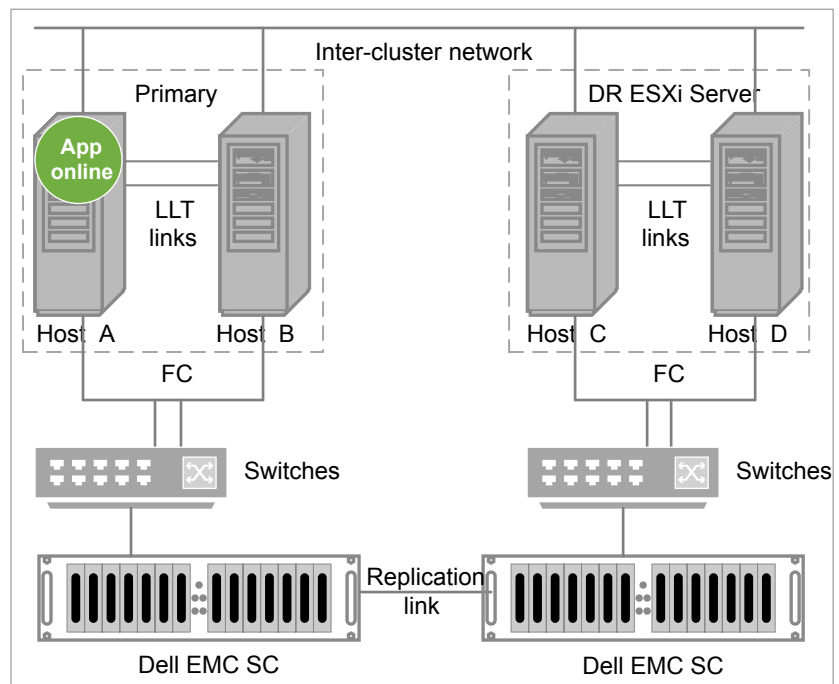
| Function | Description |
|----------|--|
| online | <p>This operation makes the volumes writable for the application.</p> <p>If all the local volumes are in the Replication Source state and the replication link is in the UP state, the agent creates a lock file on the local host. The lock file indicates that the resource is online.</p> <p>If all the local volumes are in the Replication Destination state, the agent runs the Dell SC command to perform the activation and the restore operations.</p> <p>Thereafter, the agent performs the Save Restore Point and Validate Restore Point operations.</p> <ul style="list-style-type: none"> ■ For all volumes in the DOWN state, the agent runs the Dell SC command to activate the volumes. The agent runs the command only if the AutoTakeover attribute is set to 1. ■ During the Activation operation, the agent waits until the data is completely synchronized between the primary and the secondary sites. After the synchronization is complete, it changes the state of the volume to Replication Source. <p>If the replication state is Paused or Pausing, the agent one of takes the following actions based on the value of the PauseTakeover attribute:</p> <ul style="list-style-type: none"> ■ If PauseTakeover is set to 0, the agent faults the resource. ■ If PauseTakeover is set to 1, the agent performs the activation and the restore operations. <p>Warning: This operation may result in incomplete data synchronization.</p> <ul style="list-style-type: none"> ■ If PauseTakeover is set to 2, the agent only performs the activation operation. <p>Note: If you want to begin replication from this site, you must perform the restore operation manually.</p> <p>If the IsVMEEnvironment attribute is set, the agent attaches the disk attach to the guest VM. It then records the newly generated VMDK file and the disk path information in the VMDiskFileName attribute.</p> |
| offline | <p>Removes the lock file on the local host. The agent does not run any Dell SC commands because taking the resource offline is not indicative of the intention to give up the devices.</p> <p>If the IsVMEEnvironment attribute is set, the agent detaches the disk from the guest VM based on the value of the VMDiskFileName attribute.</p> |
| monitor | <p>Verifies that the lock file exists. If the lock file exists, the monitor entry point reports the status of the resource as online. If the lock file does not exist, the monitor entry point reports the status of the resource as offline.</p> |

Table 1-1 Agent functions (*continued*)

| Function | Description |
|----------|---|
| open | <p>Removes the lock file on the host where the entry point is called. This operation prevents potential concurrency violation if the service group fails over to another node.</p> <p>Note: The agent does not remove the lock file if the agent was started after running the following command:</p> <pre>hastop [-all -local] -force</pre> |
| clean | Determines whether it is safe to fault the resource if the online function fails or times out. |

Typical Dell EMC SC setup in a VCS cluster

The following figure displays a typical cluster setup in a Dell SC environment.



VCS clusters using Dell SC for replication uses the following hardware infrastructure:

- The primary array has one or more source volumes. A Fibre Channel directly attaches the volumes in the array to the cluster node.
- The secondary array has one or more destination volumes. A Fibre Channel directly attaches these volumes to a cluster node. The destination volumes are paired with the source volumes in the source array. The destination volumes and arrays must be at a significant distance to survive a disaster that may occur at the source site.
- 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 global cluster environment, you must attach all hosts in a cluster to the same Dell EMC SC array.

Installing and removing the agent for Dell EMC SC

This chapter includes the following topics:

- [Before you install the agent for Dell EMC SC](#)
- [Installing the agent for Dell EMC SC](#)
- [Removing the agent for Dell EMC SC](#)

Before you install the agent for Dell EMC SC

Before you install the VCS agent for Dell EMC SC, ensure that you:

- Install and configure VCS on all nodes in the cluster.
- Set up replication and the required hardware infrastructure.

Note: For VCS 7.0, make sure that the Microsoft Visual C++ 2010 SP1 (x64) and the Microsoft Visual C++ 2010 SP1 (x86) re-distributable packages are installed on the systems where you need to install the agent pack.

See [“Typical Dell EMC SC setup in a VCS cluster”](#) on page 8.

Installing the agent for Dell EMC SC

You must install the Dell EMC SC agent on each node in the cluster. In global cluster environments, install the agent on each node in each cluster.

To install the VCS agent for Dell EMC SC 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 Veritas Services and Operations Readiness Tools (SORT) site: <https://sort.veritas.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 following directory:

| | |
|-------------------------|--|
| Windows Server 2012 x64 | cd1\windows\w2k12x64\vcs\replication\dellsc_agent\agent_version\pkgs |
|-------------------------|--|

| | |
|----------------------------|--|
| Windows Server 2012 R2 x64 | cd1\windows\w2k12r2x64\vcs\replication\dellsc_agent\agent_version\pkgs |
|----------------------------|--|

- 5 Double-click **vrtsvcsdellsc.msi**.

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

Removing the agent for Dell EMC SC

Note: Do not attempt to remove the agent if the service groups that access the shared storage are online.

To remove the agent for Dell SC that was installed from an agent pack release

- 1 Open the Programs and Features window, select Cluster Server Agent for Dell EMC Storage Compellent (or **vrtsvcsdellsc.msi**), and click **Uninstall**.
- 2 Follow the wizard instructions to complete the uninstallation.

Note: When you uninstall the agent pack, all the agent binaries for Dell SC are removed. If you need the agent binaries that were part of the base release, you must manually repair the base release.

Note: After removing the agent for Dell SC, if old agent binaries that were part of the base release are required, you will need to manually repair the base release. This is required because removing the agent pack binaries remove all agent binaries of Dell SC.

Configuring the agent for Dell EMC SC

This chapter includes the following topics:

- [Configuration concepts for the Dell EMC SC agent](#)
- [Before you configure the agent for Dell EMC SC](#)
- [Configuring the agent for Dell EMC SC](#)

Configuration concepts for the Dell EMC SC agent

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

Resource type definition for the Dell EMC SC agent

The DELLSC resource type represents the Dell EMC SC agent.

```
type DELLSC (  
    static int ActionTimeout = 120  
    static keylist SupportedActions = {UpdateReplicationState,  
        UpdateDeviceID, AttachDisk, DetachDisk }  
    static int NumThreads = 1  
    static int OfflineMonitorInterval = 30  
    static int OpenTimeout = 180  
    static int AgentReplyTimeout = 30  
    static il8nstr ArgList[] = { AttachDiskDetail IsVMEEnvironment  
        VolumeName, VolumeFolderPath, EsxServerName, ServerFolderPath,  
        StorageCenterName, DellCtrlHostName, UserName, Password, Port,  
        SdkPath, AutoTakeover, PauseTakeover, LinkMonitor,  
        DegradeTakeover, PowerShellPath}
```

```

str VolumeName
str VolumeFolderPath
str EsxServerName
str ServerFolderPath
str StorageCenterName
str DellCtrlHostName
str UserName = "Admin"
str Password = "Admin@123"
int Port = 3033
str SdkPath = "C:\\PS_SDK\\DellStorage.ApiCommandSet.psdl"
int AutoTakeover = 0
int PauseTakeover = 0
int LinkMonitor = 1
int DegradeTakeover = 0
str VolumeDeviceId
str ReplicationState
str VMDiskFileName
int IsVMEEnvironment
str AttachDiskDetail{}
str PowerCLIPath = "C:\\Program Files (x86)\\VMware\\
    Infrastructure\\vSphere PowerCLI\\Scripts\\
    Initialize-PowerCLIEnvironment.ps1"
str PowerShellPath = "C:\\Windows\\System32\\WindowsPowerShell\\
    v1.0\\powershell.exe"
str SCSIControllerName = "SCSI controller 1"
)

```

Attribute definitions for the Dell EMC SC agent

Review the agent attributes before you configure the service group. You must specify the appropriate values for the required attributes. The optional attributes are used for specific configurations, and you may specify their values accordingly.

Table 3-1 Required attributes

| Attribute | Description |
|--|--|
| Name: VolumeName Type: String Dimension: Scalar | Name of the volume that is to be replicated. |

Table 3-1 Required attributes (*continued*)

| Attribute | Description |
|---|--|
| Name: StorageCenterName Type: String Dimension: Scalar | Name of the Storage Center. |
| Name: DellCtrlHostName Type: String Dimension: Scalar | Host name or IP address of the system that hosts the Dell Enterprise Manager. |
| Name: UserName Type: String Dimension: Scalar | User name to connect to Dell Storage Manager. |
| Name: Password Type: String Dimension: Scalar | Encrypted password for the user to connect to Dell Storage Manager. |
| Name: SdkPath Type: String Dimension: Scalar | The Dell Storage SDK path. |
| Name: PauseTakeover Type: Integer Dimension: Scalar | Determines how the agent behaves when the replication is in the PAUSED state: <ul style="list-style-type: none"> ■ If set to 1, the agent brings the DELLSC resource online. ■ If set to 0, the agent takes no further action in this context. Default: 0 Example: 1 |
| Name: PowerShellPath Type: String Dimension: Scalar | The Windows PowerShell path on the node. |
| Name: IsVMEnvironment Type: Integer Dimension: Scalar | Indicates to the agent whether a LUN must be mapped or attached to a guest VM after failover. Set this attribute in a VMWare environment where VCS is configured on a guest VM. The valid values are: <ul style="list-style-type: none"> ■ 0: Do not map the LUN to guest VM after failover. ■ 1: Map the LUN to guest VM after failover. |

Table 3-2 Optional attributes

| Attribute | Description |
|--|--|
| Name: VolumeFolderPath Type: String Dimension: Scalar | Folder path on the volume that is to be replicated. |
| Name: EsxServerName Type: String Dimension: Scalar | Name of the ESXi server on which to map the volume. Note: The name must be identical to the name that appears on the Servers Folder list that is present on the Dell Storage Manager Data Collector. |
| Name: Port Type: String Dimension: Scalar | Port number on which to connect to Dell Storage Manager. |
| Name: AutoTakeover Type: Integer Dimension: Scalar | <p>Specifies whether the agent should automatically perform a RestorePointActivation operation on the local devices if they are in the Down state.</p> <p>If the AutoTakeover attribute is set to 1, it allows the Dell EMC SC agent to fail over the service group to the DR site even when the replication is in the Down state. The Down state indicates that the replication link is broken, which means that the secondary devices are not in sync with the primary devices or that the secondary devices may have invalid data. Hence, the default value of the AutoTakover attribute set to 0, so that the failover can proceed only with the consent of the administrator.</p> <p>The agent performs the RestorePointActivation operation only when synchronous replication is configured with the High Availability mode. For more information, refer to the Dell EMC Storage Compellent documentation.</p> <p>You may encounter a scenario wherein the restore point of an ongoing replication is in the degraded state and the array at the primary site goes down. The replication may fail with the “no replication found” error. In this scenario, you can bring the service group that contains the DELLSC resource online at the secondary site if DegradeTakeover is enabled.</p> <p>The value of AutoTakeover determines what operations are allowed at the secondary site:</p> <ul style="list-style-type: none"> ■ If set to 1, the agent allows the DELLSC resource to be brought online or taken offline. ■ If set to 0, the agent faults the DELLSC resource. <p>Default: 0</p> <p>Example: 1</p> |

Table 3-2 Optional attributes (*continued*)

| Attribute | Description |
|--|---|
| Name: LinkMonitor Type: Integer Dimension: Scalar | <p>Specifies whether the agent should check the state of replication while the resource is going online.</p> <ul style="list-style-type: none"> ■ If set to 1, the agent checks the state of replication and brings the resource online only if the state is UP. ■ If set to 2, the agent checks the link and the replication state at every monitor cycle. <p>Note: This attribute is used only on the node where the volume is already the replication source.</p> <p>Default: 1</p> <p>Example: 2</p> |
| Name: DegradeTakeover Type: Integer Dimension: Scalar | <p>Determines how the agent behaves when the replication is in the DEGRADED state.</p> <ul style="list-style-type: none"> ■ If set to 1, the agent brings the DELLSC resource online. ■ If set to 0, the agent takes no further action in this context. <p>You may encounter a scenario wherein the restore point of an ongoing replication is in the degraded state and the array at the primary site goes down. The replication may fail with the “no replication found” error.</p> <p>In this scenario, this attribute determines how the agent behaves when the restore point is in the DEGRADED state:</p> <ul style="list-style-type: none"> ■ If set to 1, the agent brings the DELLSC resource online at secondary site. ■ If set to 0, the agent faults the DELLSC resource. <p>Default: 0</p> <p>Example: 1</p> |

Table 3-2 Optional attributes (*continued*)

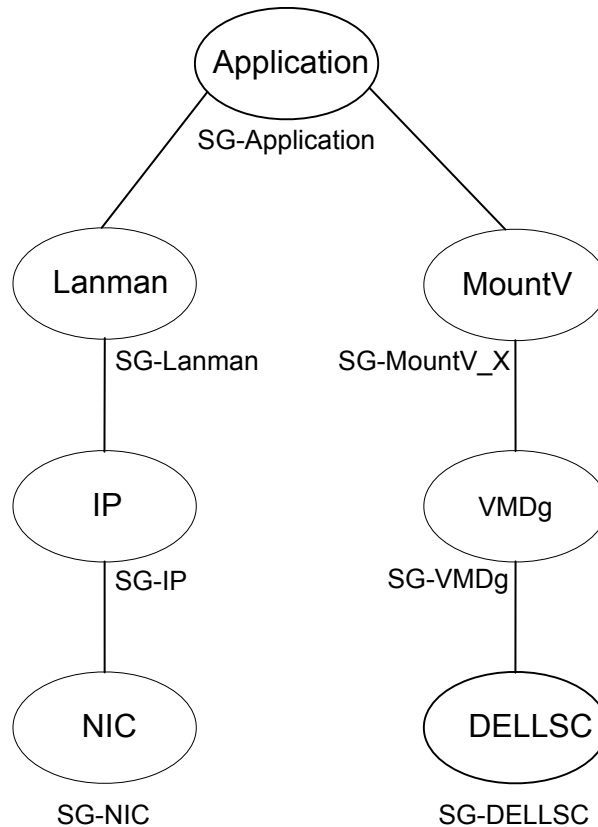
| Attribute | Description |
|--|---|
| Name: AttachDiskDetail{} Type: String Dimension: Vector | <p>Contains key-value pairs of information, which the agent uses to attach a LUN to a guest VM after the online operation.</p> <p>The valid keys are:</p> <ul style="list-style-type: none"> ■ VCenterHost IP of VMWare vCenter Server that manages the VMs and the ESXi hosts centrally. ■ VMHost Name of ESXi server that hosts the VMs. ■ UserName A user name with the appropriate credentials to log in to the VMware vCenter Server. ■ EncPassword Encrypted password for the user name. Note: Use the <code>vcseencrypt -password</code> command to encrypt the password. ■ VMGuest Guest VM on which VCS is configured. |
| Name: SCSIControllerName Type: String Dimension: Scalar | <p>Name of the SCSI controller to which the disk will be attached.</p> <p>Note: Veritas recommends that you do not use the SCSI controller 0 to attach a disk.</p> |
| Name: PowerCLIPath Type: String Dimension: Scalar | <p>Complete path of the VMware PowerCLI file, which includes the file name, <code>Initialize-PowerCLIEnvironment.ps1</code>.</p> |
| Name: VMDiskFileName Type: String Dimension: Scalar | <p>Attribute contain disk file name generated after disk attachment to guest VM. Agent uses this attribute during OFFLINE / switch operation to detach disk from VM.</p> <p>Note: Veritas recommends that you modify this attribute using the <code>hares -modify resourceName</code> command if a disk is attached outside of VCS control. Doing so helps the agent to recognize and detach the disk during offline or the switch operation.</p> |

Table 3-3 Internal attributes

| Attribute | Description |
|--|--|
| Name: ReplicationState Type: String Dimension: Scalar | The agent uses this attribute to store latest replication state. |
| Name: VolumeDeviceId Type: String Dimension: Scalar | The agent uses this attribute to store the volume device IDs for the configured volumes. |
| Name: ServerFolderPath Type: String Dimension: Scalar | The agent uses this attribute to store the folder path on the ESX server. |

Sample configuration for the Dell EMC SC agent

The following figure depicts the dependency graph for VCS service group with the DELLSC resource type.



You can configure a resource of type DELLSC in the `main.cf` file as follows:

```

DELLSC demc_res (
  VolumeName = shc
  VolumeFolderPath = "Agent_Test/"
  EsxServerName = EVESXZ2R17P-13
  StorageCenterName = EVZ2R20DELLSAN01
  DellCtrlHostName = "10.217.22.33"
  Password = bjcNfnOnkNpjBhcHdhE
  SdkPath = "C:\\DellStoragePowerShellSDK_v3_5_1_9\\
    DellStorage.ApiCommandSet.psd1"
  VolumeDeviceId = 6000d3100048d1000000000000000019d
  ReplicationState = Up
  VMDiskFileName @VCSPRIMNODE1 =
    "[EVESXZ2R17P-13-DISK] VCS_PRI_NODE1/VCS_PRI_NODE1_2.vmdk"

```

```
IsVMEEnvironment = 1
AttachDiskDetail @VCSPRIMNODE1 = { UserName = root,
    EncPassword = CMCoDQfQFkCQjORqEOg,
    VCenterHost = "10.217.20.96",
    VMHost = "10.217.20.96",
    VMGuest = VCS_PRIM_NODE1 }
AttachDiskDetail @VCSPRIMNODE2 = { VMHost = "10.217.20.96",
    VCenterHost = "10.217.20.96",
    UserName = root,
    EncPassword = CMCoDQfQFkCQjORqEOg,
    VMGuest = VCS_PRIM_NODE2 }
SCSIControllerName = "SCSI controller 1"
PowerCLIPath = "C:\\Program Files (x86)\\VMware\\
    Infrastructure\\PowerCLI\\Scripts\\
    Initialize-PowerCLIEnvironment.ps1"
)
```

Before you configure the agent for Dell EMC SC

Before you configure the agent, review the following information:

- Verify that you have installed the agent on all the cluster nodes.
- Verify the hardware setup for the agent.
See [“Typical Dell EMC SC setup in a VCS cluster”](#) on page 8.
- Make sure that the cluster has an effective heartbeat mechanism in place.
See [“About cluster heartbeats”](#) on page 21.
- Verify that the clustering infrastructure is in place. If you plan to configure the agent in a global cluster, make sure the global service group for the application is configured. For more information, refer to the *Cluster Server Administrator's Guide*.

About cluster heartbeats

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 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.

Sometimes you cannot place the heartbeats alongside the replication links. In this situation, a possibility exists that the cluster heartbeats are disabled, but the replication link is not. A failover transitions the original Source to Destination and Destination to Source. In this case, the application faults because its underlying volumes become write-disabled, causing the service group to fault. VCS tries to fail it over to another host, causing the same consequence in the reverse direction. This phenomenon continues until the group comes online on the final node. You can avoid this situation by setting up your infrastructure such that loss of heartbeat links also means the loss of replication links.

To minimize the chances of split-brain, use the steward process.

Configuring the agent for Dell EMC SC

You can configure clustered application in a disaster recovery environment by adding the Dell EMC SC agent to the service group.

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

See [“Sample configuration for the Dell EMC SC agent”](#) on page 19.

Note: You must not change the replication state of volumes from Source to Destination and from Destination to Source, outside of a VCS setup. The agent for Dell EMC Storage Compellent fails to detect a change in the replication state if the role reversal is done externally.

Configuring the agent manually in a global cluster

The following procedure describes the tasks involved in configuring the agent manually in a global cluster.

To configure the agent in a global cluster

- 1 Start Cluster Manager (Java Console) and log on to the cluster.
- 2 Add a resource of type DELLSC at the bottom of the service group.
- 3 Configure the attributes of the DELLSC resource.

- 4 If the service group is not configured as a global service group, configure the service group using the Global Group Configuration Wizard.

Refer to the *Cluster Server Administrator's Guide* for more information.

- 5 Change the ClusterFailOverPolicy attribute from the default, if necessary. Veritas recommends keeping the default, which is Manual, to minimize the chance of failing over on a split-brain.
- 6 Repeat step 2 through step 5 for each service group in each cluster that uses replicated data.

Note: The configuration must be identical on all cluster nodes, both primary and disaster recovery.

Testing VCS disaster recovery support with Dell EMC SC

This chapter includes the following topics:

- [How VCS recovers from various disasters in an HA/DR setup with Dell EMC SC](#)
- [Failure scenarios in global clusters](#)
- [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 Dell EMC SC

This topic lists various failure scenarios and describes how VCS responds to the failures in the following DR cluster configurations.

Global clusters

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 Dell EMC SC agent ensures safe and exclusive access to the configured Dell EMC SC devices.

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

Refer to the *InfoScale Availability Administrator's Guide* for more information on the DR configurations and the global service group attributes.

Failure scenarios in global clusters

The following table 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 VCS agent for Dell EMC SC

| 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>See “Performing failback after a node failure or an application failure” on page 29.</p> |
| 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>See “Performing failback after a node failure or an application failure” on page 29.</p> |

Table 4-1 Failure scenarios in a global cluster configuration with the VCS agent for Dell EMC SC (*continued*)

| Failure | Description and VCS response |
|--------------------------|--|
| 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>See “Performing failback after a site failure” on page 30.</p> |
| Replication link failure | <p>Replication link between the arrays at the two sites fails.</p> <p>VCS response: No action.</p> |
| 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 is restored, you must manually resync the data.</p> <p>Note: Veritas 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> |

Table 4-1 Failure scenarios in a global cluster configuration with the VCS agent for Dell EMC SC (*continued*)

| Failure | Description and VCS response |
|-----------------|---|
| 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>If the array at the primary site fails and the restore point is in the DEGRADED state, the VCS response at the secondary site depends on the DegradeTakeover and the AutoTakeover attributes:</p> <ul style="list-style-type: none"> ■ If both the attributes are set to 1, you can bring the service group that contains the DELLSC resource online at the secondary site. Thereafter, the DELLSC resource receives a new volume device ID, and the agent allows it to be brought online or taken offline at the secondary site. <p>Note: Later, if you want to bring the service group online at the primary site, Veritas recommends that you first take the service group offline at the secondary site, manually perform the sync operation, and then bring the service group online at the primary site. Doing so prevents data inconsistencies that may otherwise occur.</p> <ul style="list-style-type: none"> ■ If DegradeTakeover is set to 1 and the AutoTakeover is set to 0, you can bring the service group that contains the DELLSC resource online at the secondary site only once. ■ If either DegradeTakeover is set to 0 or both the attributes are set to 0, the agent faults the DELLSC resource. |

Testing the global service group migration

After you configure the Cluster Server agent for Dell EMC SC, 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.

- 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.

Testing disaster recovery after host failure

Review the details on host failure and how VCS and the Cluster Server agent for Dell EMC SC behave in response to the failure.

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

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
```

Testing disaster recovery after site failure

Review the details on site failure and how VCS and the Cluster Server agent for Dell EMC SC behave in response to the failure.

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

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 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 Dell EMC SC behave in response to these failures.

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

After the nodes at the primary site are restarted, you can perform a failback of the global service group to the primary site. Perform the procedure that applicable to your DR configuration.

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

- ◆ 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.

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 Dell EMC SC agent activates the Destination volumes.

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

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
```