# Veritas™ Cluster Server Agent for IBM DS6000/8000 Metro Mirror and Global Mirror Installation and Configuration Guide

Windows Server 2003, Windows Server 2008

5.0

Symantec™

# Veritas Cluster Server Agent for IBM DS6000/8000 Metro Mirror and Global Mirror Installation and Configuration Guide

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forums/storage-and-clustering-documentation

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Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level

- Hardware information

- Available memory, disk space, and NIC information

- Operating system

- Version and patch level

- Network topology

- Router, gateway, and IP address information

- Problem description:

    - Error messages and log files

    - Troubleshooting that was performed before contacting Symantec

    - Recent software configuration changes and network changes

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- Product registration updates, such as address or name changes

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| Asia-Pacific and Japan | customercare_apac@symantec.com |
| Europe, Middle-East, and Africa | semea@symantec.com |
| North America and Latin America | supportsolutions@symantec.com |

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forums/storage-and-clustering-documentation

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# Introducing the Veritas agent for IBM DS6000/8000 Metro Mirror and Global Mirror

This chapter includes the following topics:

- About the agent for IBM DS6000/8000 Metro Mirror and Global Mirror
- Supported software
- Typical IBM DS6000/8000 Metro Mirror and Global Mirror in a VCS cluster
- IBM Metro Mirror agent functions
- IBM Global Mirror agent functions

## About the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

The Veritas agent for IBM DS6000/8000 Metro Mirror and Global Mirror provides support for application failover and recovery. The agent provides this support in environments that use Metro Mirror and Global Mirror to replicate data between IBM DS6000 and DS8000 arrays.

The agent monitors and manages the state of replicated DS8000 and DS6000 volumes that are attached to VCS nodes. The agent ensures that the system that has the Metro Mirror and Global Mirror resource online also has safe and exclusive access to the configured volumes.

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

The agent supports Metro Mirror (i.e. synchronous replication) as well as Global Mirror (i.e. asynchronous replication).

---

**Note:** On Windows, replication LUNs and FlashSnap LUNs must not be visible to the host at the same time.

---

# Supported software

For information on the software versions that the agent for IBM DS6000/8000 Metro Mirror and Global Mirror supports, see the Symantec Operations Readiness Tools (SORT) site: https://sort.symantec.com/agents.

# Typical IBM DS6000/8000 Metro Mirror and Global Mirror in a VCS cluster

Figure 1-1 displays a typical cluster setup in a Metro Mirror and Global Mirror environment.

**Figure 1-1**     Typical clustering setup for the agent



Clustering in a Metro Mirror and Global Mirror environment typically consists of the following hardware infrastructure:

- The primary array (array1) has one or more primary hosts. A Fibre Channel or SCSI directly attaches these hosts to the IBM DS6000/8000 array that contains the Metro Mirror/Global Copy source volumes.

- The secondary array (array2) has one or more secondary hosts. A Fibre Channel or SCSI directly attaches these hosts to a IBM DS6000/8000 array that contains Metro Mirror/Global Copy target volumes. The target volumes are paired with the primary volumes in the primary array (array 1). The secondary hosts and arrays must be at a significant distance to survive a disaster that may occur at the primary side.

  For Global Mirror, additional Flash Copy volumes have to be paired with the Global Copy source volumes as documented in the *IBM DS6000/8000 Command Line Interface Users Guide.*

  ---

  **Note:** On Windows, you must not include the flashcopy devices in the volume group or connect to the host.

  ---

- IBM supports only a single Global Mirror master session per replicated array pair. This limits the VCS configuration to a single resource of type GlobalMirror for all cluster nodes attached to the same array pair.

  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 30.

- 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 IBM DS6000/8000 array.

# IBM Metro Mirror agent functions

The Veritas agent for IBM Metro Mirror monitors and manages the state of replicated DS6000 or DS8000 devices that are attached to VCS nodes.

The agent performs the following functions:

**Table 1-1**     Agent functions

| Function | Description |
|----------|-------------|
| online | If the state of all local devices is read-write enabled i.e. "FULL DUPLEX" or "SUSPENDED", the agent creates a lock file on the local host. The lock file indicates that the resource is online. |
| | If the local devices are target devices with "TARGET FULL DUPLEX" state, the agent runs the failoverpprc command to make the volumes writable. This operation makes the devices writable for the application. After successful execution of this command, the agent creates a lock file on the local host. If the AutoFailback attribute is set to 1, the agent executes the failback command to reverse the direction of replication. |
| offline | Removes the lock file from the host. The agent does not run any Metro Mirror 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. |
| open | Removes the lock file on the host where the function is called. This operation prevents potential concurrency violation if the service group fails over to another node. |
| | Note that the agent does not remove the lock file if the agent was started after running the hastop -force command. |
| clean | Determines if it is safe to fault the resource if the online function fails or times out. |
| | The agent checks if a management operation was in progress when the online thread timed out. If the operation was killed, the devices are left in an unusable state. |
| actions/failback | Performs a failback from the original secondary side to merge any changed tracks from the original secondary to the original primary. |

# IBM Global Mirror agent functions

The Veritas agent for IBM Global Mirror monitors and manages the state of replicated DS6000 or DS8000 devices that are attached to VCS nodes.

The agent performs the following functions:

**Table 1-2**        Agent functions

| Action | Description |
|---|---|
| online | If the state of all local devices is read-write enabled i.e. the devices are in "Copy Pending" or "Suspended" state, the agent creates a lock file on the local host. The lock file indicates that the resource is online. |
| | If the original primary volumes are still accessible, the agent runs a `gmstop`command followed by a `failback` command to reverse the direction of replication. The agent then restarts the global session using the `gmstart` command. |
| offline | Removes the lock file from the host. Moreover, the agent stops the Global Mirror session to support a graceful redirection of the replication link. |
| 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. |
| open | Removes the lock file on the host where the function is called. This operation prevents potential concurrency violation if the service group fails over to another node. |
| | Note that the agent does not remove the lock file if the agent was started after running the `hastop -force` command. |
| clean | Determines if it is safe to fault the resource if the online function fails or times out. |
| | The agent checks if a management operation was in progress when the online thread timed out. If the operation was killed, the devices are left in an unusable state. |
| actions/ failback | Performs a `failback` from the original secondary side to merge any changed tracks from the original secondary to the original primary. |
| actions/GMStart | Performs a `gmstart` on the primary side to restart Global Mirror snapshots. |
| actions/GMStop | Performs a `gmstop` on the primary side to suppress Global Mirror snapshots. |
| actions/GMStatus | Reports the current state of the replicated global mirror volumes. |

# Installing and removing the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

This chapter includes the following topics:

■ Before you install the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

■ Installing the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

■ Removing the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

## Before you install the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

Set up your cluster. For information about installing and configuring VCS, see the *Symantec Cluster Server Installation Guide*.

Set up replication and the required hardware infrastructure.

See "Typical IBM DS6000/8000 Metro Mirror and Global Mirror in a VCS cluster" on page 13.

# Installing the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

You must install the IBM DS6000/8000 Metro Mirror and Global Mirror 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 IBM DS6000/8000 Metro Mirror and Global Mirror 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 2008 x64 | `cd1\windows\w2k8x64\vcs\replication\`<br>`metro_mirror_agent\`*`vcs_version`*`\`*`version_agent`*`\`<br>`pkgs` |
| Windows 2008 IA64 | `cd1\windows\w2k8IA64\vcs\replication\`<br>`metro_mirror_agent\`*`vcs_version`*`\`*`version`*`_agent\`<br>`pkgs` |
| Windows 2003 x64 | `cd1\windows\w2k3x64\vcs\`<br>`replication\metro_mirror_agent\`*`vcs_version`*`\`<br>*`version`*`_agent\pkgs` |
| Windows 2003 x86 | `cd1\windows\w2k3x86\vcs\`<br>`replication\metro_mirror_agent\`*`vcs_version`*`\`<br>*`version`*`_agent\pkgs` |
| Windows 2003 IA64 | `cd1\windows\w2k3IA64\vcs\`<br>`replication\metro_mirror_agent\`*`vcs_version`*`\`<br>*`version`*`_agent\pkgs` |

**5** Double-click **vrtsvcsi.msi**.

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

If any VCS version earlier to version 6.0 release is installed, remove or uninstall the Veritas Cluster Server Enerprise Agent for IBM DS6000/8000 Metro Mirror and Global Mirror or VRTSvcsmm.

# Removing the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

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 Metro Mirror and Global Mirror 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 VCS Agent for IBM DS6000/8000 Metro Mirror and Global Mirror or VRTSvcsi.

**3**  Click the **Remove** or **Uninstall** button.

**4**  Follow the instructions the installer provides to complete the uninstallation.

---

**Note:** For Win IA64 and Win x64 architectures, you must manually delete the agent directory if it is not removed after the uninstallation.

---

# Configuring the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

This chapter includes the following topics:

- Configuration concepts for the Metro Mirror agent

- Configuration concepts for the IBM Global Mirror agent

- Before you configure the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

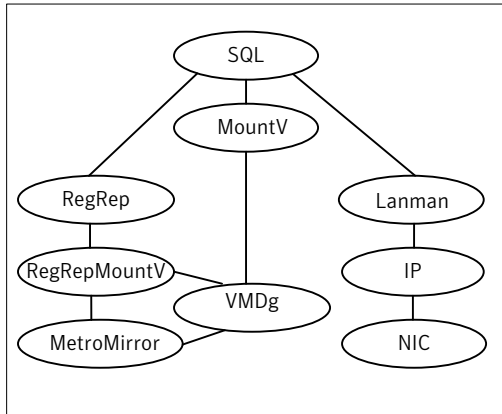- Configuring the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

## Configuration concepts for the Metro Mirror agent

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

### Sample configuration for the Metro Mirror agent

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

**Figure 3-1**        Sample configuration for the Metro Mirror and Global Mirror agent



The DiskGroup resource depends on the MetroMirror resource.

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

```
MetroMirror ora_mmir (
    DSCliHome = "C:\Program Files\ibm\dscli"
    HMC1 = "ds8000c.example.com"
    User = admin
    PasswdFile = "C:\Program Files\ibm\dscli\ds_pwfile"
    LocalStorageImageID = "IBM.2107-75FA120"
    RemoteStorageImageID = "IBM.2107-75FA150"
    VolIds = { 1260, 1261 }
    )
```

This resource manages the following objects:

■  A group of two Metro Mirror volumes: 1260 and 1261 on the local array with the storage image ID IBM.2107-75FA120.

■  The HMC ds800c.example.com manages the local array.

■  The Metro Mirror target volumes are on the remote array with the storage image ID IBM.2107-75FA150.

■  The password file, created using the `managepwfile` DSCLI command, is located at the following path:
   C:\Program Files\ibm\dscli\ds_pwfile

# Resource type definition for the Metro Mirror agent

The Metro Mirror resource type represents the IBM Metro Mirror agent in VCS.

```
type MetroMirror (
    static keylist SupportedActions = { MMStatus, failback, PreSwitch }
    static int MonitorInterval = 300
    static int ActionTimeout = 150
    static int NumThreads = 1
    static int OpenTimeout = 180
    static str AgentDirectory = "C:\\Program Files\\VERITAS\\Cluster
    server\\bin\\MetroMirror"
    static str ArgList[] = { DSCliHome, HMC1, HMC2, User, PasswdFile,
    LocalStorageImageID, RemoteStorageImageID, VolIds, DSMon,
    AutoFailback }
    str DSCliHome = "C:\\Program Files\\IBM\\DSCLI"
    str HMC1
    str HMC2
    str User = admin
    str PasswdFile = "C:\\security.dat"
    str LocalStorageImageID
    str RemoteStorageImageID
    str VolIds[]
    int DSMon = 0
    boolean AutoFailback = 1
    temp str VCSResLock
    )
```

# Attribute definitions for the Metro Mirror agent

Review the description of the agent attributes.

## Required attributes

You must assign values to required attributes.

**Table 3-1**　　　Required attributes

| Attribute | Description |
|-----------|-------------|
| DSCliHome | Path to the DS8000 command line interface. |
|           | Type-dimension: string-scalar |
|           | Default is: C:\\Program Files\\ibm\\dscli. |
| HMC1 | IP address or host name of the primary management console. |
|      | Type-dimension: string-scalar |

**Table 3-1** Required attributes *(continued)*

| Attribute | Description |
|---|---|
| User | User name for issuing DSCLI commands from the command line. This is an optional attribute. |
| | Default is: admin. |
| | Type-dimension: string-scalar |
| PasswdFile | Specifies the password file that contains your password. See the `managepwfile` DSCLI command for information on how to generate a password file. This is an optional attribute. |
| | Default is: C:\\security.dat |
| | Type-dimension: string-scalar |
| LocalStorageImageID | The image ID of the local storage, which consists of manufacturer, type and serial number. For example, IBM.2107-75FA120 |
| | Type-dimension: string-scalar |
| RemoteStorageImageID | The image ID of the remote storage, which consists of manufacturer, type and serial number. For example, IBM.3108-75GB248 |
| | Type-dimension: string-scalar |
| VolIds | IDs of local DS8000 Metro Mirror volumes that the agent manages. |
| | Type-dimension: string-keylist |

## Optional attributes

Configuring these attributes is optional.

**Table 3-2** Optional attributes

| Attribute | Description |
|---|---|
| HMC2 | IP address or host name of the secondary management console. |
| | Type-dimension: string-scalar |

**Table 3-2** Optional attributes *(continued)*

| Attribute | Description |
|---|---|
| DSMon | Checks the state of the replicated volumes as part of monitor function. |
| | Possible values are as follows: |
| | Default is 0 |
| | 1 when the resource is supposed to be online and lock file exists. |
| | 2 when the resource is supposed to be offline and lock file is removed. |
| | 3 = always |
| | Type-dimension: scalar-integer |
| AutoFailBack | Executes failback as part of the online function to reactivate the replication link. This potentially overwrites data at the former primary site if the replication link was down during the failover. Therefore, AutoFailBack can be suppressed by setting this attribute to 0. In this case, the replication has to be restarted by using the failback action. |
| | Type-dimension: scalar-boolean |
| | Default is 1 |

## Internal attributes

These attributes are for internal use only. Do not modify their values.

**Table 3-3** Internal attribute

| Attribute | Description |
|---|---|
| VCSResLock | The agent uses the VCSResLock attribute to guarantee serialized management in case of a parallel application. |
| | Type-dimension: temporary string-scalar |

# Configuration concepts for the IBM Global Mirror agent

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

# Resource type definition for the Global Mirror agent

The GlobalMirror resource type represents the IBM Global Mirror agent in VCS.

```
type GlobalMirror (
    static keylist SupportedActions = { GMStatus, failback, PreSwitch,
    GMStart, GMStop }
    static int MonitorInterval = 300
    static int ActionTimeout = 150
    static int NumThreads = 1
    static int OpenTimeout = 180
    static str AgentDirectory = "C:\\Program Files\\VERITAS\\Cluster
    server\\bin\\GlobalMirror"
    static str ArgList[] = { DSCliHome, HMC1, HMC2, User, PasswdFile,
    LocalStorageImageID, LocalLSS, RemoteStorageImageID, RemoteLSS,
    GMSession, VolIds, DSMon, AutoFailback }
    str DSCliHome = "C:\\Program Files\\IBM\\DSCLI"
    str HMC1
    str HMC2
    str User = admin
    str PasswdFile = "C:\\security.dat"
    str LocalStorageImageID
    str LocalLSS
    str RemoteStorageImageID
    str RemoteLSS
    str GMSession
    str VolIds[]
    int DSMon = 0
    boolean AutoFailback = 1
    temp str VCSResLock
)
```

# Attribute definitions for the Global Mirror agent

Review the description of the agent attributes.

## Required attributes

You must assign values to required attributes.

| | |
|---|---|
| DSCliHome | Path to the DS8000 command line interface. |
| | Type-dimension: string-scalar |
| | Default is: C:\Program Files\ibm\dscli. |
| HMC1 | IP address or host name of the primary management console. |
| | Type-dimension: string-scalar |
| User | User name for issuing DSCLI commands from the command line. |
| | Default is: admin. |
| | Type-dimension: string-scalar |
| PasswdFile | Specifies the password file that contains your password. See the `managepwfile` DSCLI command for information on how to generate a password file. |
| | Type-dimension: string-scalar |
| LocalStorageImageID | The image ID of the local storage, which consists of manufacturer, type and serial number. For example, IBM.2107-75FA120 |
| | Type-dimension: string-scalar |
| LocalLSS | The logical subsystem ID where the local volumes reside. A two-digit hexadecimal number, for example, 0F. |
| | Type-dimension: string-scaler |
| RemoteStorageImageID | The image ID of the remote storage, which consists of manufacturer, type and serial number. For example, IBM.3108-75GB248 |
| | Type-dimension: string-scalar |
| RemoteLSS | The logical subsystem ID where the remote volumes reside. A two-digit hexa-decimal number, for example 0F. |
| | Type-dimension: string-scaler |
| GMSession | The Global Mirror master session ID. A two-digit hexa-decimal number, for example 0F. |
| | Type-dimension: string-scalar |
| VolIds | IDs of local DS8000 Metro Mirror volumes that the agent manages. |
| | Type-dimension: string-keylist |

## Optional attributes

Configuring these attributes is optional.

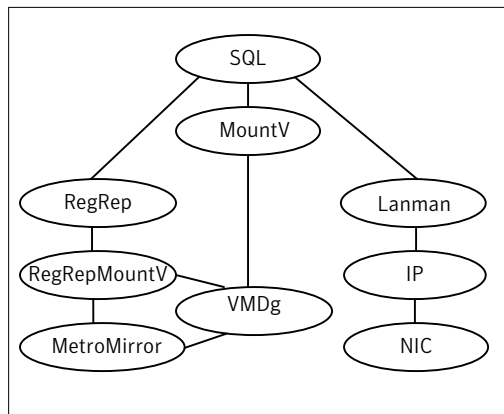| | |
|---|---|
| HMC2 | IP address or host name of the secondary management console. |
| | Type-dimension: string-scalar |

## Internal attributes

These attributes are for internal use only. Do not modify their values.

| | |
|---|---|
| VCSResLock | The agent uses the VCSResLock attribute to guarantee serialized management in case of a parallel application. |
| | Type-dimension: temporary string-scalar |

# Sample configuration for the Global Mirror agent

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

**Figure 3-2**         Sample configuration for the Metro Mirror and Global Mirror agent



The DiskGroup resource depends on the Global/Metro Mirror resource.

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

```
MetroMirror ora_mmir (
    DSCliHome = "C:\Program Files\ibm\dscli"
    HMC1 = "ds8000c.example.com"
```

```
        User = admin
        PasswdFile = "C:\Program Files\ibm\dscli\ds_pwfile"
        LocalStorageImageID = "IBM.2107-75FA120"
        RemoteStorageImageID = "IBM.2107-75FA150"
        VolIds = { 1260, 1261 }
)
```

This resource manages the following objects:

- A group of two Global Copy volumes: 1260 and 1261 on the local array with the storage image ID IBM.2107-75FA120 on logical subsystem 01.

- The HMC ds800c.example.com manages the local array.

- The Global Copy target volumes are on the remote array with the storage image ID IBM.2107-75FA150 on logical subsystem (LSS) 00.

- For the replication link, the Global Mirror master session with ID 1A is used.

- The password file, created using the `managepwfile` DSCLI command, is located at the following path:
  C:\Program Files\ibm\dscli\ds_pwfile

# Before you configure the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

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 IBM DS6000/8000 Metro Mirror and Global Mirror in a VCS cluster" on page 13.

- Make sure that Metro Mirror paths are configured in both directions between the source and the target LSS. Metro mirror role reversal fails if paths are not configured from the current target LSS to the current source LSS.

- Ensure that the replication paths are configured in both directions between the source and target LSS. GlobalMirror role reversal fails if paths are not configured from the current target LSS to the current source LSS.

- Make sure that the cluster has an effective heartbeat mechanism in place.
  See "About cluster heartbeats" on page 30.

- Set up system zones in replicated data clusters.
  See "About configuring system zones in replicated data clusters" on page 30.

- Generate the DSCLI password file. Use the `managepwfile` DSCLI command to do so.
- Reboot the node after the DSCLI software is installed on that node. The DSCLI installation sets some system environment variables that don't take effect until after a reboot. If these environment variables are not set, the Metro Mirror and Global Mirror will not function properly.

# 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.

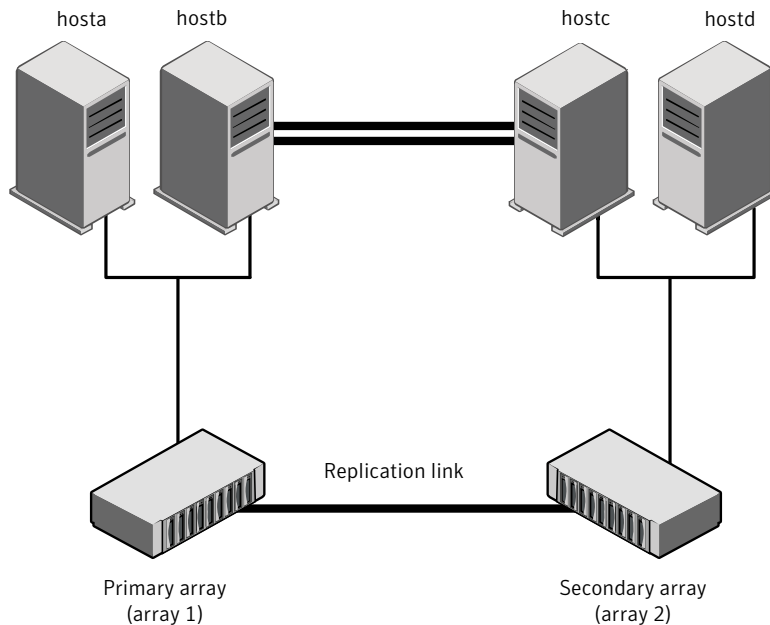# About configuring system zones in replicated data clusters

In a replicated data cluster, you can prevent unnecessary Metro Mirror and Global Mirror 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.

Figure 3-3 depicts a sample configuration where hosta and hostb are in one system zone, and hostc and hostd are in another system zone.

Use the SystemZones attribute to create these zones.

**Figure 3-3**    Example system zone configuration



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.

This command creates two system zones: zone 0 with hosta and hostb, zone 1 with hostc and hostd.

# Configuring the agent for IBM DS6000/8000 Metro Mirror and Global Mirror

You can adapt most clustered applications to a disaster recovery environment by:

- Converting their devices to Metro Mirror and Global Mirror devices
- Synchronizing the devices
- Adding the IBM DS6000/8000 Metro Mirror and Global Mirror agent to the service group

Configure IBM DS6000/8000 volumes as resources of type Global/Metro Mirror.

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

---

**Note:** You must not change the replication state of devices primary to secondary and viceversa, outside of a VCS setup. The agent for IBM DS6000/8000 Metro Mirror and Global Mirror fails to detect a change in the replication state if the role reversal is done externally, and RoleMonitor is disabled.

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## 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 (Java Console) and log on to the cluster.

2   If the agent resource type (Global/Metro Mirror) is not added to your configuration, add it. From the Cluster Explorer **File** menu, choose **Import Types** and select:

    *systemdrive*\Program Files\Veritas\cluster server\conf\
    Sample_Global/Metro Mirror\Global/Metro MirrorTypes.cf

3   Click **Import**.

4   Save the configuration.

5   Add a resource of type Global/Metro Mirror at the bottom of the service group.

6   Configure the attributes of the Global/Metro Mirror resource.

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

    See the *Veritas Cluster Server User's Guide* for more information.

8   Change the ClusterFailOverPolicy attribute from the default, if necessary. Symantec recommends keeping the default, which is Manual, to minimize the chance of failing over on a split-brain.

9   Repeat step 5 through step 8 for each service group in each cluster that uses replicated data.

10  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   If the agent resource type (Global/Metro Mirror) is not added to your configuration, add it. From the Cluster Explorer **File** menu, choose **Import Types** and select:

    *systemdrive*\Program Files\Veritas\Cluster Server\conf\
    config\Global/Metro MirrorTypes.cf.

3   Click **Import**.

4   Save the configuration.

5   In each service group that uses replicated data, add a resource of type Global/Metro Mirror at the bottom of the service group.

6   Configure the attributes of the Global/Metro Mirror resource.

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

# 4

# Managing and testing clustering support for IBM DS6000/8000 Metro Mirror and Global Mirror

This chapter includes the following topics:

- Typical test setup for the IBM DS6000/8000 Metro Mirror and Global Mirror agent

- Testing service group migration

- Testing host failure

- Performing a disaster test

- Performing the failback test

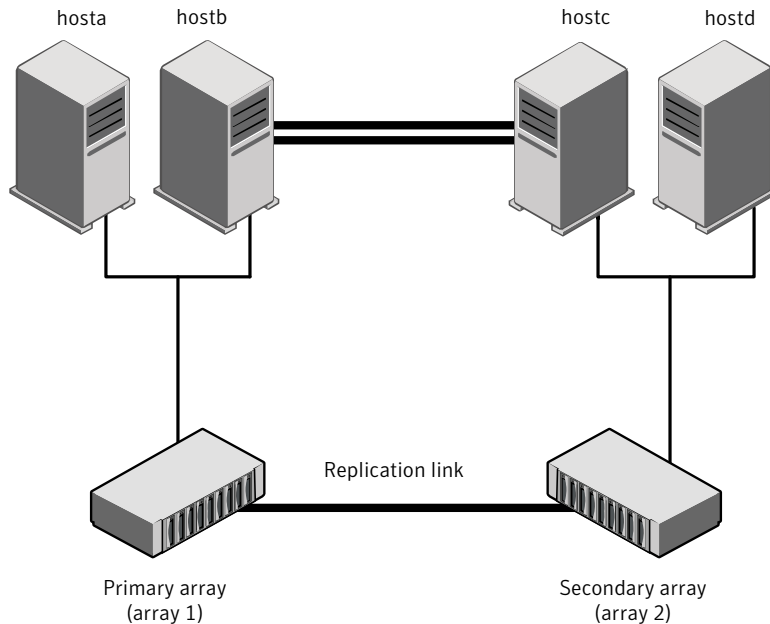## Typical test setup for the IBM DS6000/8000 Metro Mirror and Global Mirror agent

A typical test environment includes the following characteristics:

- Two hosts (hosta and hostb) are attached to the primary IBM DS6000/8000 array.

- Two hosts (hostc and hostd) are attached to the secondary IBM DS6000/8000 array.

- The application is running on host a and volumes in the local array are read-write enabled, in the FULL DUPLEX (Metro Mirror) or COPY PENDING (Global Mirror) state.

- A replicated data cluster has two dedicated heartbeat links.
  A global cluster has one network heartbeat.

Figure 4-1 depicts a typical test environment.

**Figure 4-1**     Typical test setup



# Testing service group migration

Verify the service group can migrate to different hosts in the cluster and across clusters.

**To perform the service group migration test**

1   In the Service Groups tab of the Cluster Explorer configuration tree, right-click the service group.

    Migrate the service group to a host that is attached to the same array.

2   Click **Switch To**, and click the system that is attached to the same array (hostb) from the menu.

    For Metro Mirror: The service group comes online on hostb and local volumes remain in the FULL DUPLEX state.

    For Global Mirror: The service group comes online on hostb and local volumes remain in the FULL DUPLEX/COPY PENDING state.

3   In the Service Groups tab of the Cluster Explorer configuration tree, right-click the service group.

    Migrate the service group to a host that is attached to a different array.

4   Click **Switch To**, and click the system that is attached to another array (hostc) from the menu.

    For Metro Mirror: The service group comes online on hostc and the volumes there transition to the FULL DUPLEX state from the TARGET FULL DUPLEX state.

    For Global Mirror: The service group comes online on hostc and the volumes there transition to the FULL DUPLEX/COPY PENDING state from the TARGET FULL DUPLEX/TARGET COPY PENDING state.

5   In the Service Groups tab of the Cluster Explorer configuration tree, right-click the service group.

    Migrate the service group back to its original host.

6   Click **Switch To**, and click the system on which the group was initially online (hosta).

    The group comes online on hosta. The devices return to the original state in step 1.

# Testing host failure

In this scenario, the host where the application runs is lost. Eventually all the hosts in the system zone or cluster are lost.

**To perform the host failure test**

1   Halt or shut down the host where the application runs (hosta).

    For Metro Mirror: The service group fails over to hostb and devices are in the FULL DUPLEX state.

    For Global Mirror: The service group fails over to hostb and devices are in the FULL DUPLEX/COPY PENDING state.

2   Halt or shut down hostb.

    In a replicated data cluster, the group fails over to hostc or hostd depending on the FailOverPolicy attribute in the cluster.

    In a global cluster, a cluster down alert appears and gives you the opportunity to fail over the service group manually.

    For Metro Mirror: The logical drives transition their role from secondary to primary and start on the target host.

    For Global Mirror: In both environments, the devices transition from the TARGET FULL DUPLEX/TARGET COPY PENDING to the FULL DUPLEX/COPY PENDING state and start on the target host.

3   Power on the two hosts that were shut down.

4   Switch the service group to its original host when VCS starts.

    Do the following:

    ■   In the **Service Groups** tab of the Cluster Explorer configuration tree, right-click the service group.

    ■   Click **Switch To**, and click the system on which the service group was initially online (hosta).
        The service group comes online on hosta and devices swap roles again.

# Performing a disaster test

Test how robust your cluster is in case of a disaster.

**To perform a disaster test**

1    Shut down all hosts on the source side and shut down the source array.

     If you cannot shut down the primary IBM DS6000/8000 arrays, disconnect the metro mirror paths and simultaneously shut down the hosts. This action mimics a disaster scenario from the point of view of the secondary site.

2    For Metro Mirror: In a replicated data cluster, the service group fails over to hostc or hostd if all volumes were originally in the TARGET FULL DUPLEX state and no copy or synchronization was in progress at the time of disaster.

     For Global Mirror: In a replicated data cluster, the service group fails over to hostc or hostd if all volumes were originally in the TARGET FULL DUPLEX/TARGET COPY PENDING state.

3    In a global cluster, the administrator is notified of the failure. The administrator can then initiate the failover.

4    After the failover, the original target volumes go to the SUSPENDED state (Reason = "Host Source").

# Performing the failback test

You can set up your cluster for a failback test.

The failback test verifies the application can fail back to its original host after a failover to a remote site.

**To perform a failback test**

1    Reconnect the replication link and reboot the original primary hosts.

2    Take the service group offline.

     If you run this test in a replicated data cluster, type the following command from any host:

     *hagrp -offline grpname -any*

     If you run the test in a global cluster, type the command from hostc or hostd.

3    For Metro Mirror: Manually resynchronize the volumes using the failback action. After the resynchronization completes, the state of the original target volumes changes to FULL DUPLEX (Reason = "-"). The state of the original source volumes changes to TARGET FULL DUPLEX (Reason = "-").

**4**   For Global Mirror: Manually resynchronize the volumes using the failback action
and the StartGM action for Global Mirror. After the resynchronization completes,
the state of the original target volumes changes to FULL DUPLEX/COPY
PENDING (Reason = "-"). The state of the original source volumes changes
to TARGET FULL DUPLEX/TARGET COPY PENDING (Reason = "-").

**5**   Migrate the application back to the original primary site.

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