



VCS/DR with SRDF on IBM VIO servers

Using the VCS SRDF agent to provide DR on IBM VIO servers

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VCS

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Introduction

The Veritas Cluster Server (VCS) SRDF agent, in conjunction with VCS, provides high availability and disaster recovery capabilities in setups that use EMC Symmetrix arrays for replication. For the agent to run successfully on AIX LPAR or DLPAR virtualization technologies, you can either use remote SYMAPI servers or N_Port ID Virtualization (NPIV) capable FC HBAs.

- Using the VCS SRDF agent to provide DR on IBM VIO servers when NPIV is not enabled
The agent uses SYMCLI commands to control the EMC Symmetrix array. However, these commands do not work as-is in configurations that use virtualized hosts such as IBM DLPARs hosted on top of a VIO server (if NPIV is not enabled). This is because the virtualized hosts do not have direct access to the physical devices provisioned on the array. This white paper describes how to use the SRDF agent in such virtualized setups. This procedure uses the remote operations mode of the SYMCLI and requires a separate SYMAPI Server license.
- Using the VCS SRDF agent in an NPIV-enabled environment
The VCS SRDF agent version 5.0.13.0 supports the AIX Virtual I/O server (VIOS) environment where VIOS is configured with NPIV capable FC adapters connected to a NPIV-capable SAN. With NPIV, the VIO client environment is transparent to VCS, and the agent behaves the same way as it would in a regular physical AIX server.
This white paper describes sample test cases that show the behavior of the SRDF agent version 5.0.13.0 in an NPIV environment.

Using the VCS SRDF agent to provide DR on IBM VIO servers when NPIV is not enabled

About using SRDF Remote Operations with VCS on DLPARs

DLPARs that have direct access to the Symmetrix array, for example, through a dedicated HBA or a virtual port on an NPIV-enabled HBA, will work like a typical physical server. SRDF remote operations are not needed in such cases.

However, in case of DLPARs that do not have such direct access to the Symmetrix array, you must configure SRDF Remote Operations in order to be able to run SYMCLI commands from the DLPAR. Configuring SRDF in Remote Operations mode involves the following two tasks:

1. Configuring the DLPAR as an SRDF Remote Operations (RO) client.

2. Identifying a node to be used as the SRDF Remote Operations (RO) server. This node can be the VIO server itself or some other node that has direct access to the Symmetrix array.

Prerequisites for setting up the SRDF Remote Operations server

1. Before you set up the SRDF RO server, you must obtain a 'SYMAPI server' license. This license is needed for the RO server.
2. You must also install the latest EMC Solutions Enabler software on the DLPARs and the RO server.

Configuring the SRDF Remote Operations server

This section describes the procedure for configuring the SRDF RO server.

Note: The RO server can be the VIO server itself or some other host that has direct physical access to the Symmetrix array.

To configure the SRDF RO server:

1. Mask in the devices to the VIO servers and the external node, that is, the Remote Operations (RO) server.
2. On the VIO server, map the appropriate physical devices to the corresponding client partition IDs.
3. Enable the RO server:
 - a. Install SYMCLI.
 - b. Install the "SYMAPI server" license.
 - c. Edit the options file (`/var/symapi/config/options`) and add or modify the following line
`SYMAPI_SERVER_SECURITY_LEVEL = SECURE`
Note: Although all modes are supported, Symantec recommends the SECURE mode.
 - d. Start the SYMAPI server daemon:
`stordaemon start storsrvd`

Configuring the SRDF Remote Operations client

To configure the DLPAR as an SRDF Remote Operations (RO) client:

1. Edit the netcnfg file (`/var/symapi/config/netcnfg`) and add the following line:
`SYMAPI_SERVER - TCPIP <server name> <server IP address> 2707 SECURE.`

In the above line, 'server' refers to the RO server

Example: SYMAPI_SERVER - TCP/IP thor389 10.182.4.89 2707 SECURE.

Note: Symantec does not recommend the NONSECURE mode.

2. Edit the options file (/var/symapi/config/options) and set security to SECURE:
SYMAPI_SERVER_SECURITY_LEVEL = SECURE
3. To verify the configuration, you can set the following two environment variables before running the SYMCLI commands in remote mode:

```
export SYMCLI_CONNECT=SYMAPI_SERVER
```

```
export SYMCLI_CONNECT_TYPE=REMOTE
```

Note: These environment variables are set only to verify the RO server configurations; the VCS SRDF agent automatically sets these environment variables when it runs SYMCLI commands.

Sample setup

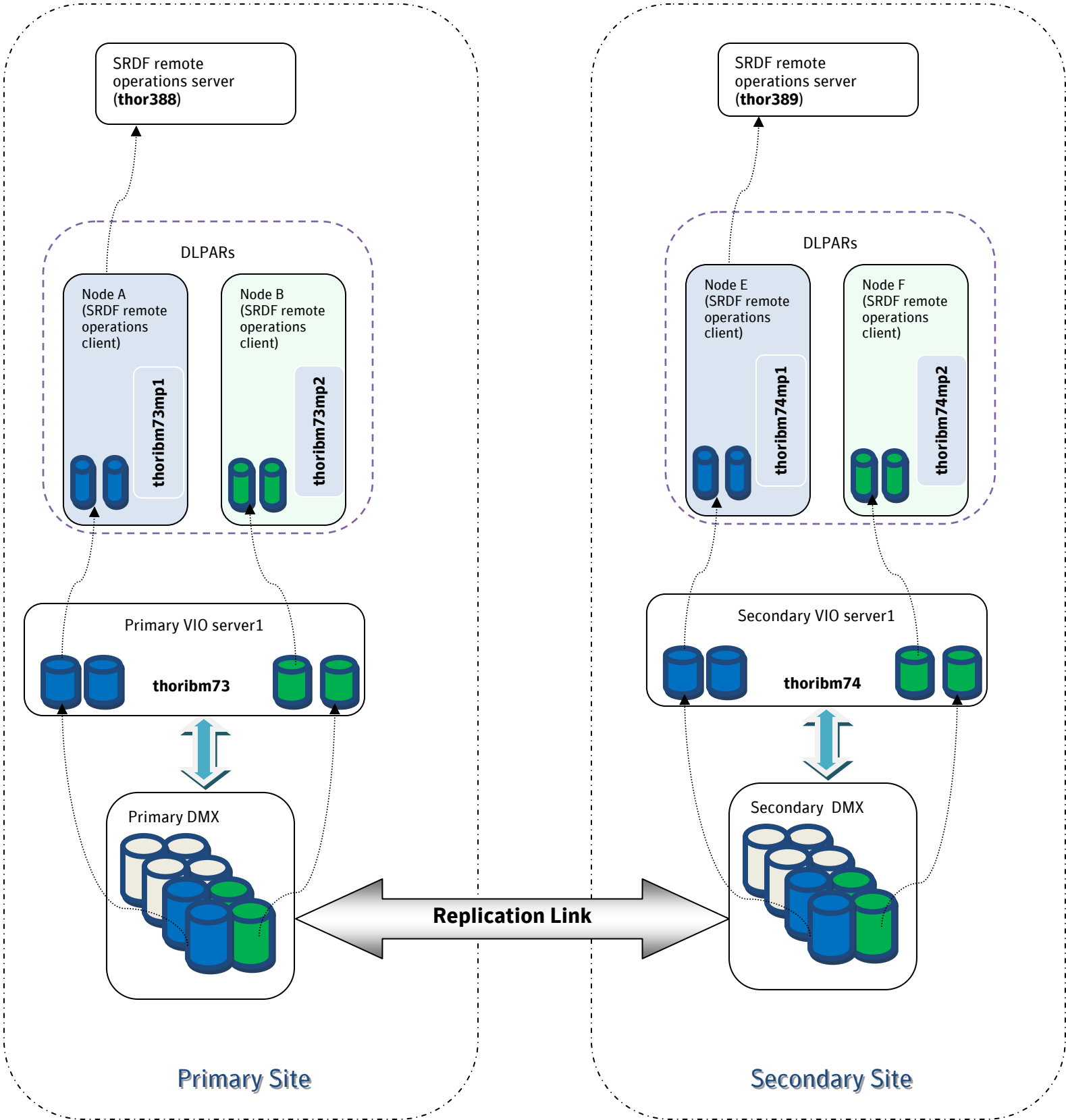
Consider the example of a setup that uses two datacenters—primary site and secondary site—with SRDF replication between the sites.

The primary site, has a single VIO server (thoribm73) that contains 2 DLPARs—thoribm73mp1 and thoribm73mp2. We need to bring thoribm73mp1 and thoribm73mp2 under VCS control. At this site, host thor388 is used as the RO server.

Similarly, the secondary site has a single VIO server (thoribm74) that contains 2 DLPARs—thoribm74mp1 and thoribm74mp2. We need to bring thoribm74mp1 and thoribm74mp2 under VCS control. At this site the host thor389 is used as the RO server.

The following figure depicts a sample setup using this configuration:

SRDF remote operations setup with VIO server



Setting up the sites

To set up the primary site:

1. Mask the required SRDF devices from the local DMX array (DMX800) to the VIO server (thoribm73) as well as the RO server.
2. Map the SRDF devices from the VIO server to the DLPAR.
Run `cfgmgr` and `lsdev -Cc disk` and make sure that you see the new devices.
Note: If you do not mask in the SRDF devices to the VIO server, you will not be able to perform this operation.
3. Set up thoribm73mp1 and thoribm73mp2 (the DLPAR) in RO client mode.
4. Set up thor388 in RO server mode.

Note: To set up the secondary site, perform these steps at the secondary site as well.

Configuring multiple Remote Operations server for redundancy

To configure the VCS SRDF agent with RO servers:

1. Configure a setup with RO servers and update the `netcnfg` file on the DLPAR accordingly.

Example:

```
SYMAPI_SERVER1 - TCPIP thor390 10.182.4.89 2707 SECURE
SYMAPI_SERVER2 - TCPIP thor391 10.182.4.90 2707 SECURE
SYMAPI_SERVER3 - TCPIP thor392 10.182.4.91 2707 SECURE
```

In the above example, thor390, thor391 and thor392 have been configured as redundant SRDF RO servers at the same site.

2. The VCS SRDF agent has a vector-type attribute called `SymapiServers`. You can use this attribute to add multiple RO servers. Use the `SymapiServers` attribute to add all the remote SYMAPI service names in the VCS SRDF resource configuration.

Example:

```
SYMAPI_SERVER1
SYMAPI_SERVER2
SYMAPI_SERVER3
```

Note: You need to set the `SymapiServers` attribute only if you need to use SRDF Remote Operations.

If you set the `SymapiServers` attribute for multiple RO servers, the VCS SRDF agent first tries to set the `SYMCLI_CONNECT` environment variable for the first RO server. In the

above example, the first RO server is SYMAPI_SERVER1. If this server responds, the agent uses this RO server for executing SYMCLI commands. If the first RO server does not respond, the agent tries to set the SYMCLI_CONNECT environment variable for the second RO server (SYMAPI_SERVER2 in the above example). If this server also fails to respond, the agent tries for the next RO server, and so on.

If none of the RO servers respond, then the agent reports a fault and logs the following message:

```
None of the Symapi Servers specified for this resource are
currently available. Please check whether the correct Symapi
Servers are configured in the symapi configuration options
file. The resource will not go online until then.
```

Note: If the SymapiServers attribute is set and if none of the RO servers are reachable, the agent will not run SYMCLI commands using the local mode (non-remote operations mode).

Using the VCS SRDF agent in an NPIV-enabled environment

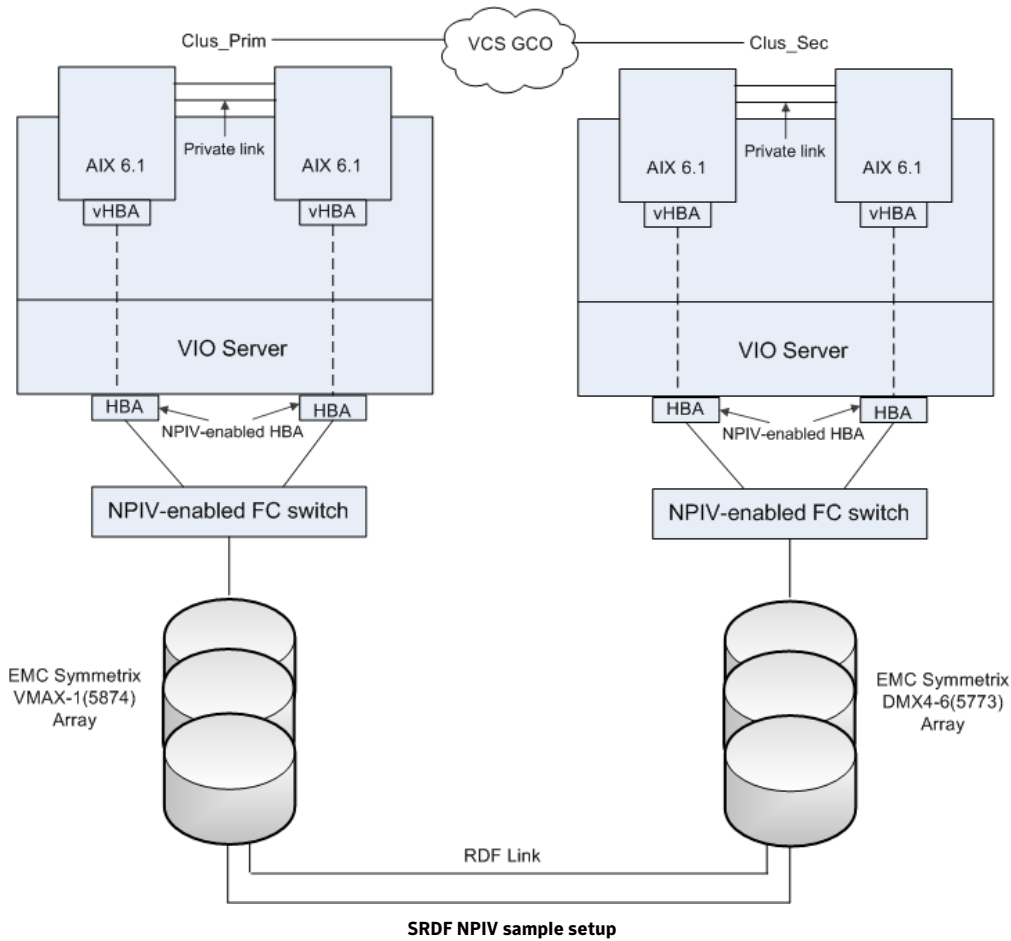
Introduction to NPIV

Normally, an N_Port, which is an end node port on the Fibre Channel fabric, has a single N_Port_ID and World Wide Port Name (WWPN) associated with it. NPIV technology allows a single N_Port to have multiple N_Port IDs and WWPNs.

In a server virtualization environment, NPIV allows each virtual machine to have its own unique Fibre Channel (FC) WWPN. This unique WWPN enables multiple virtual machines to share a single physical HBA. By providing a unique virtual HBA port, storage administrators can implement SAN best practices such as zoning for individual virtual machines (VMs).

Administrators can also take advantage of SAN management tools, simplifying migration of VMs and their storage resources.

Case 1: Testing the behavior of the VCS SRDF agent in an NPIV configuration



This figure depicts a sample setup using NPIV configuration inside a typical VCS Global Cluster Option setup. This example uses two datacenters – a 2-node primary site and a 2-node secondary site, with SRDF replication between the two sites.

A VIO server is created on the physical blade server and two LPARs are created on top of each VIO server.

The VCS SRDF agent is installed on both the nodes in each cluster and a VCS global service group is configured.

The use of NPIV in this configuration allows the LPARs direct access to the Symmetrix device, thus eliminating the need to configure SYMAPI server – client configuration.

The VCS SRDF agent runs successfully in this configuration. Local switchover and switchback operations and remote switchover and switchback operations are successful.

Benefits of this configuration:

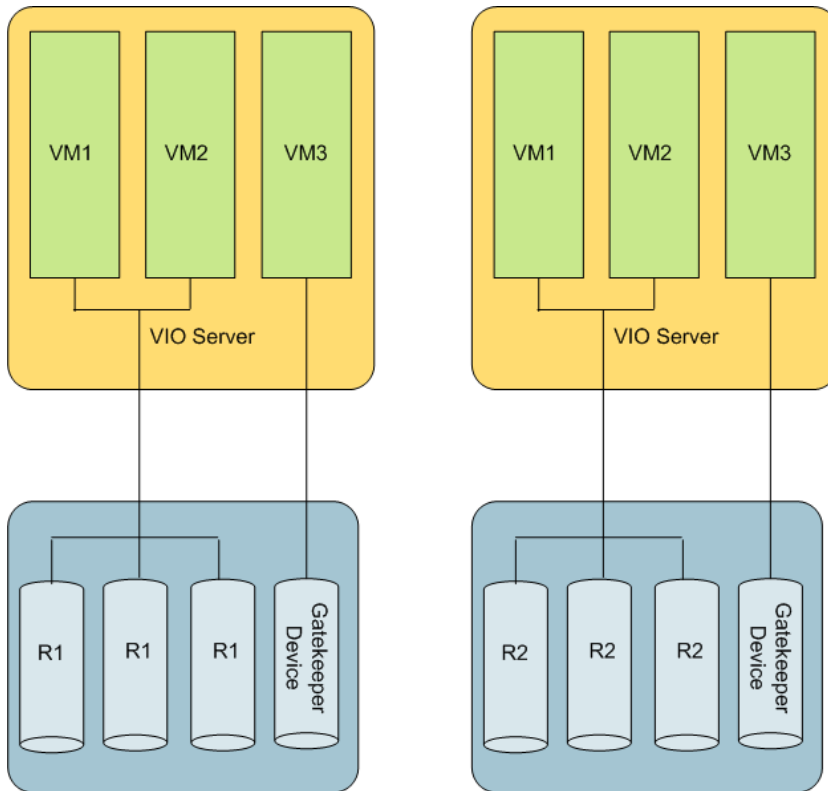
- Eliminates the need for an RO server machine.
- Eliminates the need to configure a SYMAPI server-client configuration, because the LPARs have direct access to the Symmetrix physical devices.

Case 2: Testing the behavior of the VCS SRDF agent with NPIV configuration, when the agent is installed on only one node in a multiple-node cluster.

Sample setup

This sample setup uses two datacenters – a 3-node primary site and a 3-node secondary site, with SRDF replication between the two sites.

Each of the sites has a VIO server that contains 3 LPARs – VM1, VM2 and VM3 – that are under VCS control.



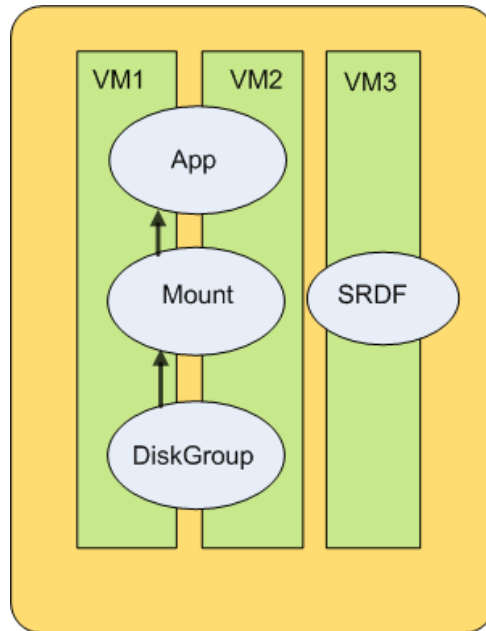
Setting up the primary and secondary sites

To set up the primary and secondary sites, perform the following steps on each of the sites:

1. Make the Gatekeeper device visible only to LPAR VM3.
2. Assign R1 devices to VM1 and VM2. Ensure that you do not assign any physical device to VM3.
3. Install Solution Enabler (SYMCLI) only on VM3.
4. Create a device group only on VM3 and add R1 devices to this device group.
5. Install the VCS SRDF agent only on VM3.

Configuring the service groups on the primary and secondary sites

This figure depicts a sample service group configuration, where 2 service groups – SG1_SRDF and SG2_APP – are created.



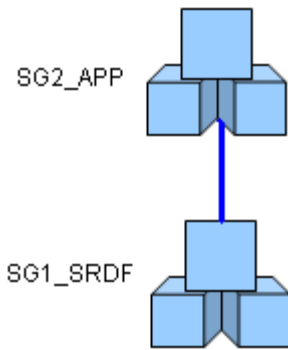
To configure service groups:

1. Create a service group, for example, SG1_SRDF and select the host on which the VCS SRDF agent is installed and which contains the SRDF resource. In this example, the host is VM3.
2. Create another service group, for example, SG2_APP and select the other two hosts that contain the DiskGroup, Mount, and App resources. In this example, the two hosts are VM1 and VM2.

Service group dependency and resource dependency

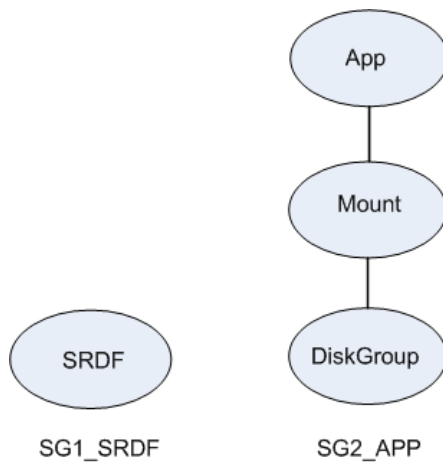
The following figure shows the dependency between the two service groups.

In this example, service group SG2_APP has an online global soft dependency on service group SG1_SRDF.



Service group dependency

The following figure shows that dependencies of the resources in a service group. In this example, because service group SG1_SRDF has only one resource, it does not have any resource dependency. Service group SG2_APP has three resources; resource DiskGroup is the child resource of Mount and Mount is the child resource of the App resource.



Resource dependency

To perform a remote switchover from the primary site to the secondary site.

1. Make sure that both service groups are configured with VCS GCO between two sites.
2. Take SG2_APP offline on the primary site.
3. Perform a remote switchover operation to switch over SG1_SRDF from the primary site to the secondary site.

4. Once SG1_SRDF is online on the host at the secondary site, bring SG2_APP online at the secondary site.

Benefits of this configuration

- Eliminates the need to install Solution Enabler on all the nodes in a cluster; Solution Enabler needs to be installed on only one node.
- Eliminates the need to install the VCS SRDF agent on all the nodes in a cluster; the agent needs to be installed on only one node.
- Eliminates the need to create Symmetrix device group on all the nodes in a cluster.

Disadvantage of this configuration

- Since there is a dependency between the two service groups, you must manually switch over the service groups to the secondary site (that is, the DR site).

Where to get more information

SRDF Remote Operations configuration

Refer to the *EMC Solutions Enabler Installation Guide* in the Solutions Enabler for more details on how to configure the Remote Operations clients and servers.

Customer service

Customer service information is available at the following URL:

www.symantec.com/techsupp

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