

Veritas[™] Cluster Server Application Note: SRDF replication in a VCS for VMware ESX environment

ESX

5.1 Maintenance Pack 1



Veritas Cluster Server Application Note: SRDF replication in a VCS for VMware ESX environment

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VCS Application Note: SRDF replication in a VCS for VMware ESX environment

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About SRDF replication in a VCS for VMware ESX environment

This application note guides you in using VCS for VMware ESX by Symantec to provide a disaster recovery solution for virtual machines using SRDF replication.

For assistance with setup and maintenance contact Symantec Professional Services.

Prerequisites

Review the following information, before you begin the configuration:

- Advanced to expert skills in the following areas:
 - VMware ESX Server
 - EMC SRDF replication technology including the EMC Solutions Enabler
 - VCS
 - VCS agents for replication technologies
 - VCS for VMware ESX
- Prepare the documentation for the required software and hardware.
- Prepare the license information for the required software.

Requirements

Review the following requirements for a SRDF replication in a VCS for VMware ESX environment:

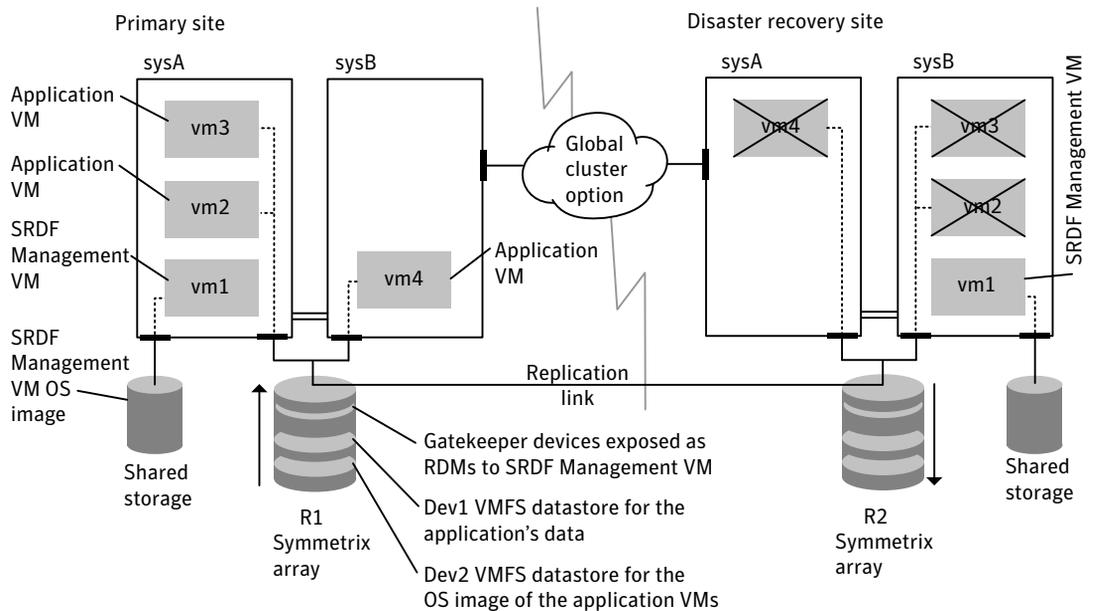
- VMware ESX Server version 3.0.x
- Veritas Cluster Server 5.0 MP2 for RedHat Linux (or a later MP if available)
- VCS for VMware ESX 5.1 MP1 (or a later MP if available)
- Veritas Cluster Server Agent for EMC SRDF version VRTSvcse-5.0.02.0-GA_RHEL4 from the AgentPack-3Q2007-GA agent pack release
- Veritas Cluster Server for EMC SRDF patch VRTSvcse_5.0.02.0+e1164889 for RedHat Linux.
<http://entsupport.symantec.com/docs/296211>
- EMC Solutions Enabler version 6.4.2 for Redhat Enterprise Linux 4

Configuration overview

With VCS solutions for VMware ESX and EMC SRDF replication technology, you can enable applications in virtual machines to fail over between sites using SRDF arrays for data replication. The following configuration overview uses a two-site (primary and disaster recovery) model.

Each site has physical and virtual machines that are dedicated to monitoring and managing applications and arrays. These configuration instructions presume a fresh installation, but do not preclude a reconfiguration of an existing configuration.

Figure 2-1 The configuration overview for the primary and disaster recovery sites, where service groups are online on the primary site



Configuring the sites

On the primary and disaster recovery sites for your physical nodes, configure VCS for VMware ESX running on ESX Server hosts. To allow for failover between nodes, a two physical node cluster is the recommended minimum at each site. For more information on installing and configuring VCS for VMware ESX, refer to the *Veritas Cluster Server for VMware ESX Implementation Guide*. The application virtual machines in the cluster run the applications. The cluster also contains a virtual machine that you configure to manage the Symmetrix arrays. This virtual machine is called the SRDF Management virtual machine.

Configuring the storage

On the primary and disaster recovery sites, perform the following:

- Configure gatekeeper devices on the Symmetrix arrays.
- Provision shared non-replicated storage on each site for the operating system image of the SRDF Management virtual machines.
- Provision storage for the operating system images of the application virtual machine on the Symmetrix arrays (R1 and R2 devices).
- Provision storage for the application data for the application virtual machines on the Symmetrix arrays (R1 and R2 devices).

Configuring the SRDF Management virtual machine

The SRDF Management virtual machine runs the EMC Solutions Enabler. You use the SRDF Management virtual machine to manage the Symmetrix array. An instance of single-node VCS running on the SRDF Management virtual machine manages replication using the VCS SRDF resources. The SRDF Management virtual machine runs RedHat Linux 4. Install the SRDF Management virtual machine on each site.

Configuring service groups

On each site, two VCS clusters are required for SRDF replication in a VCS for VMware ESX environment. One cluster runs in a virtual machine, and is a single-node cluster. The other cluster runs in the ESX Server hosts. These service groups are described as follows:

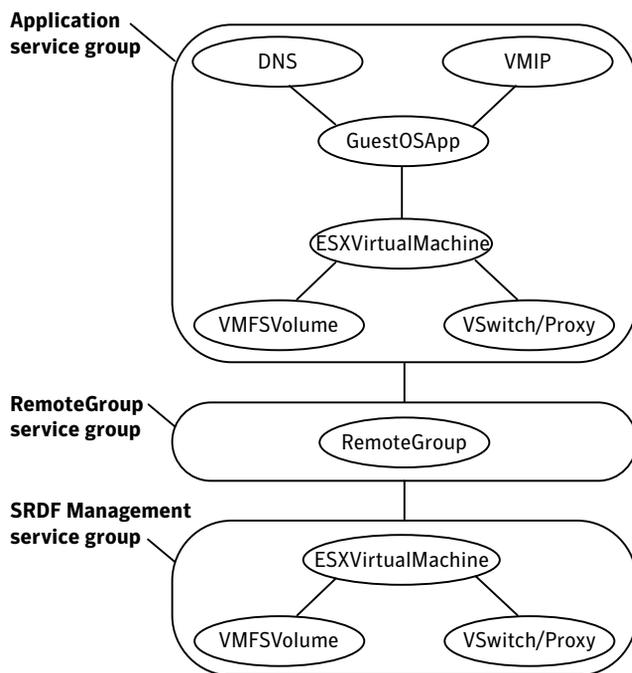
- [“The three-tier service group running on the ESX Server hosts”](#) on page 10
- [“Setting group dependencies”](#) on page 12
- [“The SRDF service group in the SRDF Management virtual machine”](#) on page 12
- [“Tying the service group behavior together”](#) on page 13

The three-tier service group running on the ESX Server hosts

The cluster that runs in the ESX Server hosts has a three-tier service group. These service groups consist of an application service group, a RemoteGroup service group, and an SRDF service group.

- **Application service group**
The service group, or groups, for the applications that runs in the application virtual machines.
See “[The Application service groups](#)” on page 11.
- **The RemoteGroup service group**
Consists of the RemoteGroup resource that manages (brings online, takes offline, and monitors) the SRDF service group, which runs in the SRDF Management virtual machine.
See “[The RemoteGroup service group](#)” on page 11.
- **The SRDF Management virtual machine service group**
This is the service group that manages the SRDF Management virtual machine.
See “[SRDF Management service group](#)” on page 12.

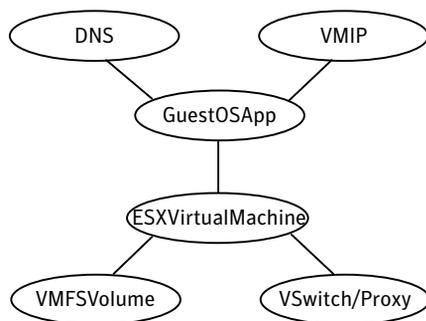
Figure 2-2 The service groups and resources running on the ESX Server nodes



The Application service groups

The Application service groups contain the resources for the application virtual machines and the applications that run in the virtual machines. Typically an application service group consists of a GuestOSApp resource (to represent the application), an ESXVirtualMachine resource (to represent the virtual machine), one or more VMFSVolume resources, and a VSwitch or a Proxy resource. The ESXVirtualMachine resource monitors and manages the virtual machines that run the applications. Note that the Application service groups are global groups.

Figure 2-3 The application service group



Several VMFS resources can exist in the application service groups. These resources exist for application data and the OS image of the virtual machine that SRDF replicates from the primary site to the disaster recovery site.

The RemoteGroup service group

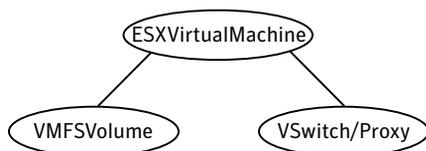
The VCS cluster on the ESX Server hosts also contains a service group that consists of the RemoteGroup resource that points to the SRDF service group that runs inside the SRDF virtual machine cluster. The RemoteGroup resource manages and represents the state of the SRDF service group. Note that the RemoteGroup service group is a global group.

See [“The SRDF service group in the SRDF Management virtual machine”](#) on page 12.

SRDF Management service group

The VCS cluster on the ESX Server hosts contains a service group that manages the SRDF Management virtual machine. This service group consists of an ESXVirtualMachine resource, a VMFSVolume resource and a VSwitch or Proxy resource. The ESXVirtualMachine resource in this service group monitors the virtual machine that run single-node VCS. Note that the SRDF Management service group is a local group.

Figure 2-4 The SRDF Management service group



The VMFSVolume resource for this service group monitors the operating system image of the virtual machine.

Setting group dependencies

You need to set the following group dependencies on the ESX Server hosts:

- Set the group dependency between the Application and the RemoteGroup service group to online global soft.
- Set the group dependency between RemoteGroup and SRDF Management virtual machine service group to online global firm.

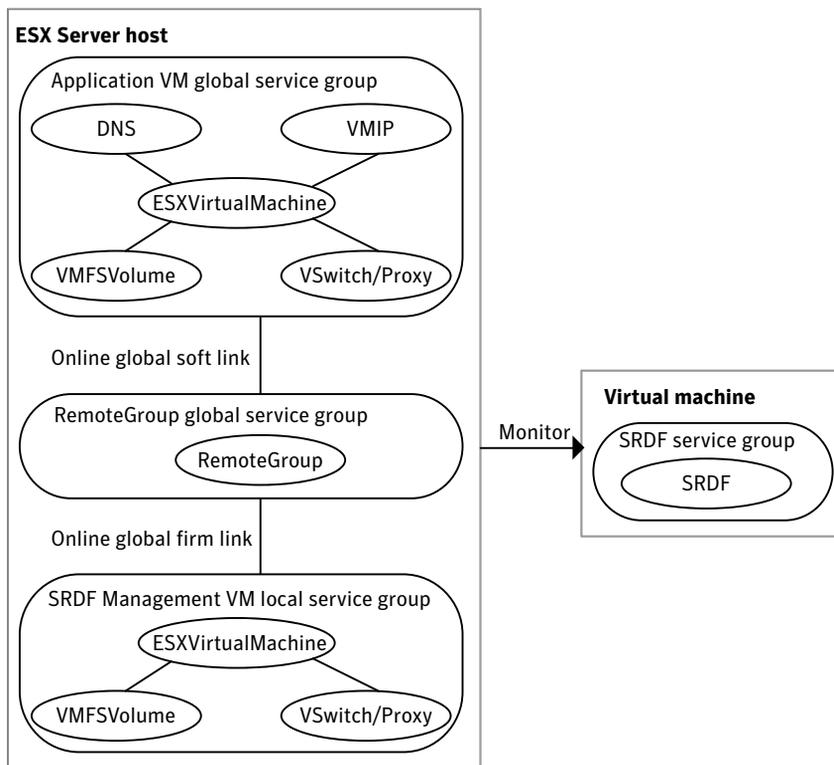
The SRDF service group in the SRDF Management virtual machine

The cluster that runs in the SRDF Management virtual machine as a single-node cluster has the EMC Solutions Enabler installed on the virtual machine. This cluster consists of the SRDF service group with an SRDF resource. You must create a matching SRDF service group that consists of an SRDF resource for each and every device group that is configured on the SRDF Management virtual machine.

Tying the service group behavior together

Each site in the GCO environment runs the three service groups (Application, RemoteGroup and SRDF Management virtual machine service group) on the ESX hosts and the one Service Group (SRDF service group) in the single-node cluster running in the SRDF Management virtual machines.

Figure 2-5 The service groups interrelationship



To explain further, here is the order in which each operation happens. At each site:

- VCS on VMware ESX on the ESX Server hosts comes up. It brings the Application, RemoteGroup and SRDF Management virtual machines service groups online.
- Booting the virtual machine in the SRDF Management virtual machine service group brings up the single-node VCS in the virtual machine.

Configuration overview

- When RemoteGroup service group starts to go online, it brings the RemoteGroup resource online, which then brings the SRDF service group online.
- Once the RemoteGroup resource in RemoteGroup service group comes online, the Application service group is brought online. The group dependency between the Application and the RemoteGroup service group is set to online global soft.
- If the virtual machine in the Application service group goes down for any reason, VCS for VMware ESX on the ESX hosts brings it back online. The Application service group can fail over between the nodes in the ESX cluster.
- If the SRDF Management virtual machine goes down for any reason, VCS for VMware ESX on the ESX hosts brings it back online. The SRDF Management virtual machine service group can fail over between the nodes in the VCS for VMware ESX cluster. The group dependency between RemoteGroup and SRDF Management virtual machine service group is set to online global firm.
- No group dependency exists between the Application and the SRDF Management virtual machine service groups.

Configuring the environment

The following configuration steps are a general guide to setting up SRDF in your VCS for VMware ESX environment. Perform the following procedures in the following order:

- [“Configuring the ESX Server hosts”](#) on page 16
- [“Configuring the SRDF Management virtual machine on primary and disaster recovery sites”](#) on page 17
- [“Installing single-node VCS on the SRDF Management virtual machine”](#) on page 18
- [“Installing VCS on the ESX Server hosts”](#) on page 18
- [“Enabling disaster recovery for application virtual machines”](#) on page 19

Once you have completed these tasks, review and perform the following as needed:

- [“Required additional configuration tasks”](#) on page 21
- [“Additional configuration and management considerations”](#) on page 21

Configuring the ESX Server hosts

To configure the ESX Server hosts

- 1 Connect the physical systems to the Symmetrix arrays at the primary and disaster recovery sites.
- 2 Install the VMware ESX Server software on the physical systems at the primary and disaster recovery sites.
- 3 Choose the devices on the arrays that you want to use to store the operating system image of the guest operating systems.

You also need to choose where you want to store the application data for the applications that run inside of the virtual machines. To find the mapping between the vmhba name and the Symmetrix device name for a Symmetrix device, use the `/opt/VRTSvcs/bin/hastorage` utility. Invoke the `hastorage -srdf -getAllLuns` command from the ESX console. The output of the command resembles:

```
$ hastorage -srdf -getAllLuns  
  
vmhba1:0:0:0;000;;527  
vmhba1:0:157:0;01A;/dev/sdbo;527  
vmhba1:0:158:0;01B;/dev/sdbp;527  
vmhba1:0:5:0;041;/dev/sdcv;527  
vmhba1:0:6:0;042;/dev/sddc;527
```

In the above output, the first field is the vmhba name. The second field is the Symmetrix device name. The third field is the access name for the device, and the last field is the Symmetrix ID for the Symmetrix array.

- 4 Configure the application virtual machines on the Symmetrix devices that you chose in [step 3](#). Install the following:
 - The guest operating systems
 - VMware Tools
 - The applications that you want to run the in guest operating systems

Configuring the SRDF Management virtual machine on primary and disaster recovery sites

To configure the SRDF Management virtual machine

- 1 Configure the SRDF Management virtual machine on the local, shared non-replicated storage.
- 2 Install the virtual machine's guest operating system (RHEL 4) at the primary and disaster recovery sites.
- 3 Install the EMC Solutions Enabler in the SRDF Management virtual machine at the primary and disaster recovery sites.
- 4 Using the EMC Solutions Enabler CLI, choose the devices on the arrays that you want to use as gatekeeper devices for the SRDF Management virtual machine at the primary and disaster recovery sites. Use the `symgate define` command to create the gatekeeper devices.
- 5 Using the ESX console, allocate the gatekeeper device as an RDM (raw device mapping) for the SRDF Management virtual machine. Once the gatekeeper devices are visible through the SRDF Management virtual machine, you can configure the R1 and R2 devices for SRDF replication.
- 6 On the SRDF Management virtual machines, create the RDF1 and RDF2 device groups respectively at the primary and disaster recovery sites.
- 7 Add the R1 and R2 devices (from [step 3](#) on page 16) that you want to use to store the guest operating system image of the application virtual machines to the RDF1 and RDF2 device groups respectively.
- 8 Make sure that the data on the devices is replicating between the primary and disaster recovery sites.

Installing single-node VCS on the SRDF Management virtual machine

To install single-node VCS on the SRDF Management virtual machine

- 1 Install VCS as a single-node cluster for the guest operating system on the SRDF Management virtual machine at the primary and disaster recovery sites. Do not install `vcsvm-tools` on this virtual machine.
- 2 Install the Veritas Cluster Server Agent for EMC SRDF on the SRDF Management virtual machine at the primary and disaster recovery sites.
- 3 Apply the point patch for VCS Agent for EMC SRDF on the SRDF Management virtual machine.
- 4 Configure a service group with the SRDF resource on the SRDF Management virtual machine at the primary and disaster recovery site. Each and every device group requires a matching VCS service group with a single SRDF resource. Refer to the following `main.cf` examples:
 - See [“Primary site configuration in the SRDF Management virtual machine for the SRDF service group”](#) on page 27.
 - See [“Disaster recovery site configuration in the SRDF Management virtual machine for the SRDF service group”](#) on page 27.

Installing VCS on the ESX Server hosts

To install VCS on the ESX Server hosts

- 1 Install VCS for VMware ESX on the ESX Server hosts at the primary and disaster recovery sites.
- 2 Configure the SRDF Management virtual machine service group on the VCS for VMware ESX hosts at the primary and disaster recovery site. This makes the SRDF Management virtual machine highly available on each site. You can use the Veritas Virtualization Manager (VVM) wizard to make this virtual machine highly available.

For more information on making the virtual machine highly available using VVM, refer to the *Veritas Cluster Server Implementation Guide*'s chapter on Configuring virtual machines for high availability.

Enabling disaster recovery for application virtual machines

To enable disaster recovery for application virtual machines

- 1 Configure the Application service groups for every virtual machine that requires HA/DR.
 - a Use the Veritas Virtualization Manager (VVM) wizard to make this virtual machine highly available. Do not use the VVM wizard for disaster recovery for this virtual machine. You must configure the disaster recovery-related services manually in the following steps ([step b](#) through [step 4](#)).
 - b Install vcsvm-tools inside of the virtual machine for application monitoring and HA/DR.
For more information on installing vcsvm-tools, refer to the *Veritas Cluster Server Implementation Guide*'s section on Configuring applications in virtual machines.
 - c Manually configure the VMIP and DNS resources, as described in: [“The application service group”](#) on page 11.
For more information on installing the VMIP and DNS resources, refer to the *Veritas Cluster Server Implementation Guide* and the *Veritas Cluster Server Bundled Agents Reference Guide*.
 - d Perform this step once for your entire VCS/ESX cluster, if you have already performed this, you need not repeat this step. Add the RescanBeforeOnline attribute to the VMFSVolume resource type definition.

```
$ /opt/VRTSvcs/bin/haattr -add VMFSVolume RescanBeforeOnline  
-boolean 0
```

```
$ /opt/VRTSvcs/bin/hatype -modify VMFSVolume ArgList -add  
RescanBeforeOnline
```

- e You must also set the value of the RescanBeforeOnline attribute of all the VMFSVolume resources in this service group to 1.

```
$ /opt/VRTSvcs/bin/hares -modify vmfsvolumeresourcenam  
RescanBeforeOnline 1
```

- 2 Create the RemoteGroup service group.
 - a You must set the value of the RestartLimit of RemoteGroup resource type to 1 (or higher).

```
$ /opt/VRTSvcs/bin/hatype -modify RemoteGroup RestartLimit 1
```
 - b You must set the value of the OfflineWaitLimit of RemoteGroup resource type to 1.

```
$ /opt/VRTSvcs/bin/hatype -modify RemoteGroup OfflineWaitLimit 1
```
 - c Configure the RemoteGroup service group that manages the SRDF service group running in the SRDF Management virtual machine.
 - d Add a RemoteGroup resource inside the service group that you created in [step c](#). When you add the RemoteGroup resource, point it to the appropriate SRDF service group that you created in the SRDF Management virtual machine, as displayed in [Figure 2-5](#) on page 13.
 - e Inside the RemoteGroup resource, as a best practice, configure the User attribute with a custom VCS user (for example rgruser1). This user must have group administrator privileges for the SRDF service group that this remote group points to.
- 3 Set the group dependency between the Application group and RemoteGroup service group as the VCS service group dependency type: online global soft. You can use the `/opt/VRTSvcs/bin/hagrps` command options to create this dependency. For more information on the `hagrps` command, refer to the *Veritas Cluster Server User's Guide*.
- 4 Set the group dependency between the RemoteGroup service group and SRDF Management virtual machine service group as the VCS service group dependency type: online global firm. You can use the `/opt/VRTSvcs/bin/hagrps` command options to create this dependency. For more information on the `hagrps` command, refer to the *Veritas Cluster Server User's Guide*.

Refer to the following main.cf examples:

 - See [“Primary site configuration on the ESX Server hosts for the Application, RemoteGroup, and SRDF Management virtual machine service groups”](#) on page 28.
 - See [“Disaster recovery site configuration on the ESX Server hosts for the Application, RemoteGroup, and the SRDF Management virtual machine service groups”](#) on page 33.

Required additional configuration tasks

Perform the following tasks after you have finalized the storage configuration:

- Do not set the value of the `AutoStartList` attribute for the SRDF service groups in the SRDF Management virtual machine.
- Set the value for the `ManualOpts` attribute to 1 for the SRDF service groups in the SRDF Management virtual machine.
- Set the value of the `ControlMode` attribute to `OnOff` for the `RemoteGroup` resource.
- Ensure that the `uuid.action = "keep"` entry is present in the `.vmx` file for the application and SRDF Management virtual machines.

Additional configuration and management considerations

The following sections contains some general guidelines.

- Do not install `vcsvm-tools` when installing Linux into the SRDF Management virtual machine.
- The VMware/SRDF service group structure does not allow application virtual machines to use the `hagrps -switch` command to fail over to remote cluster. You can, however, execute a combination of `hagrps -offline` and `hagrps -online` commands so that the service group dependencies are not violated.
For more information on service group dependencies, refer to the *Veritas Cluster Server User's Guide*.
- If your `RemoteGroup` resource faults on the site, log into the SRDF Management virtual machine. Clear any faults on the SRDF resource. Then clear the faults on the `RemoteGroup` resource, and bring the `RemoteGroup` resource online.

SRDF configured with VCS for VMware ESX example

The following example has three physical systems in the primary site, with three virtual machines clustered within those systems. The disaster recovery site, on the other hand, has one physical system. Both the primary and secondary sites must run their own copy of the SRDF Management virtual machine. All of the application virtual machines are configured on replicated storage, and online on one site at a time.

Primary site setup

Physical systems (sysA, sysB, sysC):

- sysA running VMware ESX server, 3.0.1
- sysB running VMware ESX server, 3.0.1
- sysC running VMware ESX server, 3.0.1

VCS on physical systems sysA, sysB, and sysC:

- VCS for VMware ESX version 5.1 MP1

Virtual machines (srdf_mgmtvm, sles9sp3_64, w2k3_32):

- srdf_mgmtvm running RHEL4
This is the copy of the SRDF Management virtual machine running and managing the SRDF array on this site.
- sles9sp3_64 running SLES9 with an Oracle database configured in this virtual machine
- w2k3_32 running Windows 2003 with Exchange Server configured in this virtual machine

SRDF Management virtual machine (srdf_mgmtvm):

- srdf_mgmtvm
EMC Solutions Enabler installed in the SRDF Management virtual machine:

- Version 6.4.2

VCS on SRDF Management virtual machine:

- VCS version 5.0 MP2

Veritas Cluster Server Agent for EMC SRDF installed in SRDF Management virtual machine:

- VRTSvcse-5.0.02.0-GA_RHEL4
- The Veritas Cluster Server for EMC SRDF agent patch VRTSvcse_5.0.02.0+e1164889 for RedHat Linux

Disaster recovery site setup

Physical systems (sysX):

- sysX running VMware ESX server, 3.0.1

VCS on physical systems sysX:

- VCS for VMware ESX version 5.1 MP1

Virtual machines (srdf_mgmtvm2, sles9sp3_64, w2k3_32):

- srdf_mgmtvm2 running RHEL4

This is the copy of the SRDF Management virtual machine running and managing the SRDF array on this site.

- sles9sp3_64 is configured with SLES9 and an Oracle database in this virtual machine

This virtual machine is ready to fail over across sites, and its service group is in an OFFLINE state on this site.

- w2k3_32 is configured with Windows 2003 and an Exchange Server in this virtual machine

This virtual machine is ready to fail over across sites, and its service group is in an OFFLINE state on this site.

SRDF Management virtual machine (srdf_mgmtvm2):

- srdf_mgmtvm2

EMC Solutions Enabler installed in the SRDF Management virtual machine:

- Version 6.4.2

VCS on SRDF Management virtual machine:

- VCS version 5.0 MP2

Veritas Cluster Server Agent for EMC SRDF installed in SRDF Management virtual machine:

- VRTSvcse-5.0.02.0-GA_RHEL4
- The Veritas Cluster Server for EMC SRDF agent patch
VRTSvcse_5.0.02.0+e1164889 for RedHat Linux

Performing the installation and configuration

You need to perform several different procedures to configure the environment. Use the procedures as described in:

[“Configuring the environment”](#) on page 15

After configuring the environment, return to perform the test scenarios.

Test scenarios

In the following scenarios, sysA, sysB, and sysC are located at the primary site. sysX is located at the disaster recovery site. The scenarios follow:

- [“Scenario 1—Failing over the RemoteGroup service group to another ESX Server host in the ESX cluster”](#) on page 24
- [“Scenario 2—Failing over the Application service group to another ESX Server host in the ESX cluster”](#) on page 24
- [“Scenario 3—Failing over the RemoteGroup and Application service groups to the disaster recovery site”](#) on page 25
- [“Scenario 4—Faulting the SRDF Management virtual machine service group”](#) on page 25
- [“Scenario 5—Faulting the RemoteGroup service group”](#) on page 25
- [“Scenario 6—Faulting the Application virtual machine service groups”](#) on page 26
- [“Scenario 7—Simulating site failure”](#) on page 26

Scenario 1—Failing over the RemoteGroup service group to another ESX Server host in the ESX cluster

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Fail over the RemoteGroup service group to sysA. This should not cause the SRDF Management virtual machine service group and the Application virtual machine service groups to go offline.

Scenario 2—Failing over the Application service group to another ESX Server host in the ESX cluster

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Fail over one of the Application service groups to sysB. This should not cause the SRDF Management virtual machine service group and RemoteGroup service group to go offline.

Scenario 3—Failing over the RemoteGroup and Application service groups to the disaster recovery site

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Bring the Application virtual machine service groups offline. Bring the RemoteGroup service group offline. Bring the RemoteGroup service group online on the disaster recovery site (sysX). Bring the Application virtual machine service groups online on the disaster recovery site.

Scenario 4—Faulting the SRDF Management virtual machine service group

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Power off the SRDF Management virtual machine through a VMware utility. This should cause the SRDF Management virtual machine service group to fault and the RemoteGroup to go offline. Once the SRDF Management virtual machine service group fails over to another system (sysB/sysC), the RemoteGroup service group comes online. During this test the Application virtual machine service groups remain online.

Scenario 5—Faulting the RemoteGroup service group

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Bring the SRDF service group running in the SRDF Management VM offline. This should cause the RemoteGroup service group to fault. The Application virtual machine service groups, however, remain online. Clear the RemoteGroup service group fault and bring it online on the same node. This brings the SRDF service group online.

Scenario 6—Faulting the Application virtual machine service groups

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysB
- The Application virtual machine service groups on sysC

Fail over the SRDF device group manually to the disaster recovery (sysX) site using SYMCLI. This causes the Application virtual machine service groups to fault. The GCO alert is generated, which says that the Application virtual machine service groups could not be failed over within the primary cluster. Manually fail over the RemoteGroup service group and Application virtual machine service groups to disaster recovery site.

Scenario 7—Simulating site failure

Bring the following service groups online:

- The SRDF Management virtual machine service group on sysA and sysX
- The RemoteGroup service group on sysX
- The Application virtual machine service groups on sysX

Power off the physical machine (sysX) at the disaster recovery site to simulate site failure. Make sure that you can migrate the RemoteGroup service group and Application virtual machine service groups to the primary site after the disaster recovery site failure.

Main.cf files for primary and disaster recovery sites

This section contains the following sections:

- [“Primary site configuration in the SRDF Management virtual machine for the SRDF service group”](#) on page 27
- [“Disaster recovery site configuration in the SRDF Management virtual machine for the SRDF service group”](#) on page 27
- [“Primary site configuration on the ESX Server hosts for the Application, RemoteGroup, and SRDF Management virtual machine service groups”](#) on page 28
- [“Disaster recovery site configuration on the ESX Server hosts for the Application, RemoteGroup, and the SRDF Management virtual machine service groups”](#) on page 33

Primary site configuration in the SRDF Management virtual machine for the SRDF service group

```
// --- From the main.cf on srdf management vm on vcs_sitel ---

include "types.cf"
include "SRDFTypes.cf"

cluster srdf_mgmtvm (
    UserNames = { admin = diJB, rgr_devgrp1 = ennHnj }
    Administrators = { admin }
)
system srdf_mgmtvm (
)

group devgrp1 (
    SystemList = { sysAvml = 0 }
    Administrators = { rgr_devgrp1 }
)
SRDF srdf1 (
    GrpName = devgrp1
)

// --- End of main.cf on srdf management vm on vcs_sitel ---
```

Disaster recovery site configuration in the SRDF Management virtual machine for the SRDF service group

```
// --- From the main.cf on srdf management vm on vcs_sitel ---

include "types.cf"
include "SRDFTypes.cf"

cluster srdf_mgmtvm2 (
    UserNames = { admin = diJB, rgr_devgrp1 = ennHnj }
    Administrators = { admin }
)
system srdf_mgmtvm2 (
)

group devgrp1 (
    SystemList = { sysAvml = 0 }
    Administrators = { rgr_devgrp1 }
)
SRDF srdf1 (
    GrpName = devgrp1
)

// --- End of main.cf on srdf management vm on vcs_site2 ---
```

Primary site configuration on the ESX Server hosts for the Application, RemoteGroup, and SRDF Management virtual machine service groups

```
// --- From the main.cf on vcs_site1 ---

include "types.cf"
cluster vcs_site1 (
    UserNames = { admin = ElmElgLimHmMkumGlj }
    ClusterAddress = "10.182.7.61"
    WACPort = 16666
    Administrators = { admin }
)
remotecollege vcs_site2 (
    ClusterAddress = "127.0.0.1"
    WACPort = 16667
)
heartbeat Icmp (
    ClusterList = { vcs_site2 }
    Arguments @vcs_site2 = { "127.0.0.1" }
)
system sysA (
)
system sysB (
)
system sysC (
)
group ClusterService (
    SystemList = { sysA = 0, sysB = 1, sysC = 0 }
    PrintTree = 0
    AutoStartList = { sysA, sysC }
)
Application wac (
    StartProgram = "/opt/VRTSvcs/bin/wacstart"
    StopProgram = "/opt/VRTSvcs/bin/wacstop"
    MonitorProcesses = { "/opt/VRTSvcs/bin/wac" }
    RestartLimit = 3
)
IP gcoip (
    Device = vswif0
    Address = "10.182.148.117"
    NetMask = "255.255.252.0"
)
wac requires gcoip
```

```
group Network-Infra (
  SystemList = { sysC = 0, sysB = 1, sysA = 2 }
  PrintTree = 0
  Parallel = 1
)
Phantom net-ph (
)
VSwitch vswitch-res0 (
  VirtualSwitch = vSwitch0
)
net-ph requires vswitch-res0
group sles9sp3_64 (
  SystemList = { sysA = 0, sysB = 1, sysC = 2 }
  PrintTree = 0
  ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
  Authority = 1
)
DNS dnsRes_sles9sp3_64 (
  Domain = "example.com"
  Alias = sles9sp3_64
  Hostname = thoropt64v5
  IPAddress = "10.182.150.45"
  TSIGKeyFile = "/var/tsig/Ktsig.+157+02782.key"
)
ESXVirtualMachine esxVM_sles9sp3_64 (
  CfgFile = "/vmfs/volumes/476e24d3-85fd1ea-b01f-0015c5eaf19d/sles9sp3_64/sles9sp3_64.vmx"
  VCserver = thorpc135v6
  username = Administrator
  password = drjPirFpmRhpErg
  sslcert = "/var/ssl/vic.keystore"
  esxhostdomain = "veritas.com"
  vmname = sles9sp3_64
)
GuestOSApp Oracle_esxVM_sles9sp3_64 (
  VMwareResName = esxVM_sles9sp3_64
)
GuestOSApp Netlsnr_esxVM_sles9sp3_64 (
  VMwareResName = esxVM_sles9sp3_64
)
Proxy vSwitch_sles9sp3_64 (
  TargetResName = vswitch-res0
)
VMFSVolume vmFSVol_sles9sp3_64 (
  Volume = {
    "/vmfs/volumes/476e24d3-85fd1ea-b01f-0015c5eaf19d" }
)
```

```
VMIP vmipRes_sles9sp3_64 (
    VMwareResName = esxVM_sles9sp3_64
    IPAddress = "10.182.150.45"
    MACAddress = "00:50:56:3a:1c:1a"
    NetMask = "255.255.248.0"
    Gateway = "10.182.144.1"
    DNS = { "10.182.9.163", "10.182.9.164" }
)
requires group srdf_devicegrp1 online global soft
dnsRes_sles9sp3_64 requires esxVM_sles9sp3_64
esxVM_sles9sp3_64 requires vSwitch_sles9sp3_64
esxVM_sles9sp3_64 requires vmFSVol_sles9sp3_64
Oracle_esxVM_sles9sp3_64 requires esxVM_sles9sp3_64
Netlsnr_esxVM_sles9sp3_64 requires esxVM_sles9sp3_64
vmipRes_sles9sp3_64 requires esxVM_sles9sp3_64

group srdf_devicegrp1 (
    SystemList = { sysA = 0, sysB = 1, sysC = 2 }
    PrintTree = 0
    ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
    Authority = 1
)
RemoteGroup rgr_devgrp1 (
    IPAddress = thorpc175v3
    Username = rgr_devgrp1
    Password = FTFRGTiTITMRuTHrJ
    GroupName = devgrp1
    VCSSysName = ANY
    ControlMode = OnOff
)
requires group srdf_mgmtvm online global firm

group srdf_mgmtvm (
    SystemList = { sysA = 0, sysB = 1, sysC = 2 }
    PrintTree = 0
)
ESXVirtualMachine esxVM_srdf_mgtvm (
    CfgFile = "/vmfs/volumes/476862fe-21fe259c-a1f2-000e0cb60ac4/thorpc275v2/thorpc275v2.vmx"
    VCserver = thorpc175
    username = root
    password = hppPi
    sslcert = "/etc/vmware/ssl/thorpc175.keystore"
    esxhostdomain = "veritas.com"
    vmname = thorpc275v2
)
Proxy vSwitch_srdf_mgmtvm (
    TargetResName = vswitch-res0
)
```

```
VMFSVolume vmfs_srdf_mgmtvm (
  Volume = {
    "/vmfs/volumes/476862fe-21fe259c-a1f2-000e0cb60ac4" }
)
esxVM_srdf_mgmtvm requires vSwitch_srdf_mgmtvm
esxVM_srdf_mgmtvm requires vmfs_srdf_mgmtvm

group w2k3_32 (
  SystemList = { sysA = 0, sysB = 1, sysC = 2 }
  PrintTree = 0
  ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
  Authority = 1
)
ESXVirtualMachine esxVM_w2k3_32 (
  CfgFile = "/vmfs/volumes/476cff6c-del90ef4-6bd3-0015c5eafbcd/w2k3_32a/w2k3_32a.vmx"
  VCserver = thorpcl35v6
  username = Administrator
  password = GUMsLUiSPuKShUJ
  esxhostdomain = "veritas.com"
  vmname = w2k3_32
)
GuestOSApp Default_Web_Site_W3SVC_IIS_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchProtocol_SMTPSVC_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchProtocol_W3SVC_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeIS_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeMGMT_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeMTA_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeSA_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
```

```
GuestOSApp ExchService_RESvc_XCH_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp GenericService_dmserver_GSV_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_GenericService_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLAgService2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLLapService2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLServer2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
Proxy vSwitch_w2k3_32 (
    TargetResName = vswitch-res0
)
VMFSVolume vmFSVol_w2k3_32 (
    Volume = {
        "/vmfs/volumes/476cff6c-de190ef4-6bd3-0015c5eafbcd/" }
)
VMIP vmipRes_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
    IPAddress = "10.182.150.47"
    MACAddress = "00:50:56:3a:1e:1b"
    NetMask = "255.255.248.0"
    Gateway = "10.182.144.1"
    DNS = { "10.180.9.163", "10.180.9.164" }
)
requires group srdf_devicegrp1 online global soft
esxVM_w2k3_32 requires vSwitch_w2k3_32
esxVM_w2k3_32 requires vmFSVol_w2k3_32
Default_Web_Site_W3SVC_IIS_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchProtocol_SMTPSVC_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchProtocol_W3SVC_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchService_MSEExchangeIS_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeMGMT_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeMTA_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeSA_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_RESvc_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
```

```
GenericService_dmserver_GSV_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_GenericService_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLAgService2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLOlapService2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLServer2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
vmipRes_esxVM_w2k3_32 requires esxVM_w2k3_32
```

```
// --- End of the main.cf on vcs_site1 ---
```

Disaster recovery site configuration on the ESX Server hosts for the Application, RemoteGroup, and the SRDF Management virtual machine service groups

```
// --- From the main.cf on vcs_site2 ---
```

```
include "types.cf"
cluster vcs_site2 (
    UserNames = { admin = ElmElgLimHmmKumGlj }
    ClusterAddress = "11.192.7.61"
    WACPort = 16667
    Administrators = { admin }
)
remotecluster vcs_site1 (
    ClusterAddress = "127.0.0.1"
    WACPort = 16666
)
heartbeat Icmp (
    ClusterList = { vcs_site1 }
    Arguments @vcs_site1 = { "127.0.0.1" }
)
system sysX (
)
group ClusterService (
    SystemList = { sysX = 0 }
    PrintTree = 0
    AutoStartList = { sysX }
)
Application wac (
    StartProgram = "/opt/VRTSvcs/bin/wacstart"
    StopProgram = "/opt/VRTSvcs/bin/wacstop"
    MonitorProcesses = { "/opt/VRTSvcs/bin/wac" }
    RestartLimit = 3
)
```

```
IP gcoip (
    Device = vswif0
    Address = "11.192.148.119"
    NetMask = "255.255.252.0"
)
wac requires gcoip

group Network-Infra (
    SystemList = { sysX = 0 }
    Parallel = 1
)
Phantom net-ph (
)
VSwitch vswitch-res0 (
    VirtualSwitch = vSwitch0
)
net-ph requires vswitch-res0

// resource dependency tree
//
// group Network-Infra
// {
//   Phantom net-ph
//     {
//       VSwitch vswitch-res0
//     }
// }

group sles9sp3_64 (
    SystemList = { sysX = 0 }
    PrintTree = 0
    ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
    Authority = 1
)
DNS dnsRes_sles9sp3_64 (
    Domain = "example.com"
    Alias = sles9sp3_64
    Hostname = thoropt64v5
    IPAddress = "11.192.150.45"
    TSIGKeyFile = "/var/tsig/Ktsig.+157+02782.key"
)
ESXVirtualMachine esxVM_sles9sp3_64 (
    CfgFile = "/vmfs/volumes/476e24d3-85fdalea-b01f-
0015c5eaf19d/sles9sp3_64/sles9sp3_64.vmx"
    VCserver = thorpc135v6
    username = Administrator
    password = drjPirFpmRhpErg
    sslcert = "/var/ssl/vic.keystore"
    esxhostdomain = "veritas.com"
    vmname = sles9sp3_64
)
```

```
GuestOSApp Oracle_esxVM_sles9sp3_64 (
    VMwareResName = esxVM_sles9sp3_64
)
GuestOSApp Netlsnr_esxVM_sles9sp3_64 (
    VMwareResName = esxVM_sles9sp3_64
)
Proxy vSwitch_sles9sp3_64 (
    TargetResName = vswitch-res0
)
VMFSVolume vmFSVol_sles9sp3_64 (
    Volume = {
        "/vmfs/volumes/476e24d3-85fdalea-b01f-0015c5eaf19d" }
)
VMIP vmipRes_sles9sp3_64 (
    VMwareResName = esxVM_sles9sp3_64
    IPAddress = "11.192.150.45"
    MACAddress = "00:50:56:3a:1c:1a"
    NetMask = "255.255.248.0"
    Gateway = "11.192.144.1"
    DNS = { "11.192.9.163", "11.192.9.164" }
)
requires group srdf_devicegrp1 online global soft
dnsRes_sles9sp3_64 requires esxVM_sles9sp3_64
esxVM_sles9sp3_64 requires vSwitch_sles9sp3_64
esxVM_sles9sp3_64 requires vmFSVol_sles9sp3_64
Oracle_esxVM_sles9sp3_64 requires esxVM_sles9sp3_64
Netlsnr_esxVM_sles9sp3_64 requires esxVM_sles9sp3_64
vmipRes_sles9sp3_64 requires esxVM_sles9sp3_64

group srdf_devicegrp1 (
    SystemList = { sysX = 0 }
    PrintTree = 0
    ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
    Authority = 1
)
RemoteGroup rgr_devgrp1 (
    IPAddress = thorpc175v3
    Username = rgr_devgrp1
    Password = FTFRGTiTITMRuTHrJ
    GroupName = devgrp1
    VCSSysName = ANY
    ControlMode = OnOff
)
requires group srdf_mgmtvm2 online global firm

group srdf_mgmtvm2 (
    SystemList = { sysX = 0 }
    PrintTree = 0
)
```

```
ESXVirtualMachine esxVM_srdf_mgtvm (
  CfgFile = "/vmfs/volumes/476862fe-21fe259c-a1f2-000e0cb60ac4/thorpc275v2/thorpc275v2.vmx"
  VCserver = thorpc175
  username = root
  password = hppPi
  sslcert = "/etc/vmware/ssl/thorpc175.keystore"
  esxhostdomain = "veritas.com"
  vmname = thorpc275v2
)
Proxy vSwitch_srdf_mgmtvm2 (
  TargetResName = vswitch-res0
)
VMFSVolume vmfs_srdf_mgmtvm2 (
  Volume = {
    "/vmfs/volumes/476862fe-21fe259c-a1f2-000e0cb60ac4" }
)
esxVM_srdf_mgtvm requires vSwitch_srdf_mgmtvm2
esxVM_srdf_mgtvm requires vmfs_srdf_mgmtvm2

group w2k3_32 (
  SystemList = { sysX = 0 }
  PrintTree = 0
  ClusterList = { vcs_site1 = 0, vcs_site2 = 1 }
  Authority = 1
)
ESXVirtualMachine esxVM_w2k3_32 (
  CfgFile = "/vmfs/volumes/476cff6c-de190ef4-6bd3-0015c5eafbcd/w2k3_32a/w2k3_32a.vmx"
  VCserver = thorpc135v6
  username = Administrator
  password = GUMsLUiSPuKShUJ
  esxhostdomain = "veritas.com"
  vmname = w2k3_32
)
GuestOSApp Default_Web_Site_W3SVC_IIS_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchProtocol_SMTPSVC_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchProtocol_W3SVC_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeIS_XCH_esxVM_w2k3_32 (
  Critical = 0
  VMwareResName = esxVM_w2k3_32
)
```

```

GuestOSApp ExchService_MSExchangeMGMT_XCH_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeMTA_XCH_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_MSExchangeSA_XCH_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp ExchService_RESvc_XCH_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp GenericService_dmserver_GSV_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_GenericService_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLAgService2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLOlapService2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
GuestOSApp MSSQLSERVER_SQLServer2005_SQL_esxVM_w2k3_32 (
    VMwareResName = esxVM_w2k3_32
)
Proxy vSwitch_w2k3_32 (
    TargetResName = vswitch-res0
)
VMFSVolume vmFSVol_w2k3_32 (
    Volume = {
        "/vmfs/volumes/476cff6c-de190ef4-6bd3-0015c5eafbcd/" }
)
VMIP vmipRes_esxVM_w2k3_32 (
    Critical = 0
    VMwareResName = esxVM_w2k3_32
    IPAddress = "11.192.150.47"
    MACAddress = "00:50:56:3a:1e:1b"
    NetMask = "255.255.248.0"
    Gateway = "11.192.144.1"
    DNS = { "10.180.9.163", "10.180.9.164" }
)
requires group srdf_devicegrp1 online global soft

```

```
esxVM_w2k3_32 requires vSwitch_w2k3_32
esxVM_w2k3_32 requires vmFSVol_w2k3_32
Default_Web_Site_W3SVC_IIS_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchProtocol_SMTPSVC_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchProtocol_W3SVC_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
ExchService_MSEExchangeIS_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeMGMT_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeMTA_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_MSEExchangeSA_XCH_esxVM_w2k3_32 requires
esxVM_w2k3_32
ExchService_RESvc_XCH_esxVM_w2k3_32 requires esxVM_w2k3_32
GenericService_dmserver_GSV_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_GenericService_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLAgService2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLOlapService2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
MSSQLSERVER_SQLServer2005_SQL_esxVM_w2k3_32 requires
esxVM_w2k3_32
vmipRes_esxVM_w2k3_32 requires esxVM_w2k3_32
```

```
// --- End of the main.cf on vcs_site2 ---
```