

Veritas™ Resiliency Platform 1.0: Solutions for VMware

Veritas Resiliency Platform: Solutions for VMware

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Overview of Resiliency Platform

This chapter includes the following topics:

- [About Veritas Resiliency Platform](#)
- [About Resiliency Platform features and components](#)
- [Resiliency Platform capabilities](#)
- [About permissions for operations in the console](#)

About Veritas Resiliency Platform

Veritas Resiliency Platform offers a unified approach for visibility and control of IT service continuity for applications, virtual machines, and complex, multi-tier business services across a global landscape.

Resiliency Platform has the following core capabilities:

Recovery	Resiliency Platform provides a disaster recovery (DR) solution using data centers on premises in different geographical locations. The management console simplifies recovery, with single-click rehearsal and recovery operations.
Visibility	The console Dashboard provides visibility into the health of applications, virtual machines, and multi-tier business services.
Orchestration	Resiliency Platform can assist in data center day-to-day workload automation activities. For instance, virtual machines or IT services can be started and stopped for maintenance.

About Resiliency Platform features and components

The following is a brief introduction to Veritas Resiliency Platform key components and features. Administrators responsible for deploying and configuring Resiliency Platform need to understand these in more detail.

resiliency domain	The logical scope of a Resiliency Platform deployment. It can extend across multiple data centers.
Resiliency Manager	The component that provides resiliency capabilities within a resiliency domain. It is composed of loosely coupled services, a distributed data repository, and a management console. The Resiliency Manager is deployed as a virtual appliance.
Infrastructure Management Server (IMS)	The component that discovers, monitors, and manages the asset infrastructure within a data center. The IMS transmits information about the asset infrastructure to the Resiliency Manager. The IMS is deployed as a virtual appliance. To achieve scale, multiple IMSs can be deployed in the same data center.
data center	For a disaster recovery use case, the resiliency domain must contain at least two data centers in different locations, a production data center and recovery data center. Each data center has a Resiliency Manager and one or more IMSs.
asset infrastructure	The data center assets that you add to the IMS for discovery and monitoring. The asset infrastructure can include hosts (Windows or Linux servers), virtualization servers for Hyper-V and VMware, and enclosures (storage arrays). Once the asset infrastructure is discovered by the IMS, the discovered virtual machines or applications are listed in the console as assets to manage or protect.
resiliency group	The unit of management and control in Resiliency Platform. You organize related assets into a resiliency group and manage and monitor them as a single entity.

virtual business service (VBS) A multi-tier business service where each VBS tier hosts one or more resiliency groups. A VBS lets you group multiple services as a single unit for visualization, automation, and controlled start and stop in the desired order. VBS uses the vertical grouping mechanism to group the multiple services. You can also migrate/takeover the entire VBS.

Resiliency Platform capabilities

Resiliency Platform helps you monitor and manage disaster recovery across multiple data centers. It provides the following capabilities.

Table 1-1 Resiliency Platform capabilities

Capability	More information
Protecting and managing virtual machines as a single entity.	See “Managing and monitoring virtual machines” on page 17.
Displaying an overview of your resiliency domain including the number and health of your resiliency groups.	See “About the Resiliency Platform Dashboard” on page 30. See “Displaying resiliency group information and status” on page 22.
Starting and stopping resiliency groups for maintenance.	See “Starting a resiliency group” on page 26. See “Stopping a resiliency group” on page 27.
Configuring disaster recovery for a resiliency group	See “Configuring disaster recovery for a resiliency group” on page 46.
Rehearsing disaster recovery	See “Ensuring the disaster recovery readiness of your Resiliency Platform assets using the rehearse operation” on page 50.
Migrating a resiliency group	See “Migrating a resiliency group of virtual machines” on page 53.
Taking over a resiliency group	See “Taking over a resiliency group of virtual machines” on page 54.
Viewing reports	See “Viewing reports” on page 33.
Managing activities and resiliency plans	See “Managing activities” on page 55. See “Managing resiliency plans” on page 57.

About permissions for operations in the console

Users that are configured for Resiliency Platform have permission by default to view the web console but not to perform any operations. Permissions for operations must be assigned separately by a Resiliency Platform administrator, who assigns the appropriate personas to users or groups. A persona is a role with access to a set of operations. The administrator can further limit the scope of some operations by selecting the objects, such as resiliency groups, to which the user has access.

For example, an administrator can assign one user the permission to perform operations on resiliency group RG1 and assign another user the permission to perform operations on RG2. If more resiliency groups are added later, the administrator needs to update permissions to assign access to the new resiliency groups.

Some objects, such as resiliency plans or virtual business services, can include multiple resiliency groups. To perform an operation on such an object, a user must have access to all its resiliency groups. Otherwise, the operation fails.

For more information on setting up user access to operations, refer to the *Veritas Resiliency Platform Deployment Guide*.

Managing VMware virtual machines using Resiliency Platform

This chapter includes the following topics:

- [About managing VMware virtual machines using Resiliency Platform](#)

About managing VMware virtual machines using Resiliency Platform

You can use Veritas Resiliency Platform to manage and protect your VMware virtual machines configured in the resiliency domain.

The unit of management and control in Veritas Resiliency Platform is the resiliency group. Related virtual machines are organized into a resiliency group and managed and protected as a single entity.

See [“About resiliency groups”](#) on page 16.

Note: Make sure you install VMware tools for VMware virtual machines.

Using Resiliency Platform capabilities to perform workload management tasks on virtual machines

The Resiliency Platform capabilities allow you to perform the tasks required for routine maintenance activities. For example, stop a resiliency group that contains a set of related virtual machines, update the required software components, and then restart the resiliency group.

Using Resiliency Platform to protect your VMware virtual machines

Resiliency Platform provides disaster recovery operations for VMware virtual machines. For example, migrate your resiliency group to another data center or perform the rehearse (fire-drill) operation to ensure that your infrastructure is adequately prepared for protection in the event of disaster. The replication required for these operations is provided by storage array.

See [“VMware virtual machines disaster recovery - an overview of key steps”](#) on page 41.

The detailed information about resiliency group management, virtual machine disaster recovery operations, and Resiliency Platform supported replication technologies is provided in the subsequent chapters of this guide.

Managing resiliency groups

This chapter includes the following topics:

- [About resiliency groups](#)
- [Managing and monitoring virtual machines](#)
- [Protecting virtual machines](#)
- [Displaying resiliency group information and status](#)
- [Displaying resiliency group details](#)
- [Modifying a resiliency group](#)
- [Starting a resiliency group](#)
- [Stopping a resiliency group](#)
- [Deleting a resiliency group](#)

About resiliency groups

In Veritas Resiliency Platform, you organize related assets into a resiliency group that you can protect and manage as a single entity.

For example, you can organize several applications into a resiliency group and name it `SQL_Server_Group`. Then, when you perform an operation on `SQL_Server_Group` from the Resiliency Platform console, all the applications in the group are affected. For example, if you start `SQL_Server_Group`, all the applications in the group start. Similarly, you can organize virtual machines into a resiliency group and perform operations that affect all the virtual machines in the group.

Note: A resiliency group must contain similar types of objects, either all applications or all virtual machines. It cannot contain a mix of the two.

You can create a resiliency group in the following ways:

- You can create a resiliency group without enabling disaster recovery for it. You can manage and monitor the group, start it, and stop it, edit it, and so on. See [“Managing and monitoring virtual machines”](#) on page 17.
- You can create a resiliency group and enable disaster recovery for it. This is known as a protected resiliency group. You can work with this resiliency group just like a managed and monitored group, and you have additional features associated with disaster recovery. See [“Protecting virtual machines”](#) on page 19.

Guidelines for creating resiliency groups

Resiliency groups are most useful when the assets in the group share common characteristics.

If you create a resiliency group of virtual machines, you can select virtual machines based on one or more of the following:

- They reside on the same virtualization server.
- They all consume storage from the same replication consistency group (Symmetrix Remote Data Facility (SRDF) device group or NetApp volume).

Managing and monitoring virtual machines

A resiliency group lets you manage and monitor a group of assets as a single entity. For example, when you start a resiliency group, you start all the assets in the group.

You can create a resiliency group from virtual machines or applications, but not a mix of both.

You can organize any group of virtual machines into a resiliency group. However, the virtual machines often have a common characteristic. For example, they are all members of the same consistency group or they have the same virtualization server or hypervisor.

To create a resiliency group from virtual machines

1 Prerequisites

The asset infrastructure for the virtual machines must be added to the Infrastructure Management Server (IMS) and IMS discovery must be complete.

For more information on adding asset infrastructure, refer to the *Veritas Resiliency Platform Deployment Guide*.

2 Navigate



Assets > Resiliency Groups tab > Manage & Monitor Virtual Machines or Applications

Or

Assets > Unmanaged tab > Manage & Monitor Virtual Machines or Applications

3 Display a list of virtual machines

On the **Select Assets** screen, use one or more of the following drop-downs to filter your list of virtual machines:

Asset Type	Select Virtual Machine .
Data Center	The data center in which the virtual machine is located.
Virtualization	The virtualization type.

4 Filter the list of virtual machines (optional)

Group By	Organize the virtual machines by virtualization server or replication consistency group.
Search	If you have a long list of virtual machines, use the Search field to filter the list.
show assets in resiliency group	When you select this check box, the list of virtual machines is updated with a Resiliency Group column. If a virtual machine is already a member of a resiliency group, this column displays the name of the group.

5 Select the virtual machines

To include a virtual machine in your new resiliency group, drag it from the list and drop in the **Selected Instances** area. To unselect a virtual machine from the **Selected Instances** area, you can drag it back to the list of virtual machines. When you select all the assets you need, click **Next**.

6 Create the resiliency group

Review the list of virtual machines that form your new resiliency group. If you need to make any changes, click **Back** return to the **Select Assets** screen. When you are ready, name the resiliency group and click **Submit**.

7 Verify

On the confirmation screen, click **Done**.

A screen is displayed showing detailed information about the new resiliency group. It includes the following:

- The active data centers, replication type, and replication state.
- Controls to modify, delete, start, and stop the resiliency group.
- The disaster recovery readiness of the resiliency group. You can configure disaster recovery from this screen.
- A list of the virtual machines in the resiliency group.
- A list of risks (if any) to the resiliency group.

Click **Activities** (bottom pane), and click **Details** to view the details of this task in a graphical representation.

More information is available on troubleshooting discovery of virtual machines.

See [“Troubleshooting discovery of assets”](#) on page 70.

Protecting virtual machines

Veritas Resiliency Platform lets you protect your virtual machines by creating a resiliency group and setting up disaster recovery for the group in a single set of steps.

Note: Even if you create a resiliency group without disaster recovery (using the Manage & Monitor Virtual Machines option), you can still configure disaster recovery later. On the **Assets** page, **Resiliency Groups** tab, right click the resiliency group and select **Configure DR**.

See [“Configuring disaster recovery for a resiliency group”](#) on page 46.

To protect virtual machines

1 Prerequisites

The virtual machines you use to create the resiliency group must reside in two data centers: the active data center and the recovery data center. The asset infrastructure for the virtual machines must be added to the Infrastructure Management Server (IMS) at the appropriate data center and IMS discovery of the virtual machines must be complete.

For more information on adding asset infrastructure, refer to the *Veritas Resiliency Platform Deployment Guide*.

2 Navigate



Assets > Resiliency Groups tab > Protect Virtual Machines

You can also access the **Protect Virtual Machines** wizard from the **Quick Action** menu.

3 Display a list of virtual machines

On the **Select Assets** screen, use one or more of the following drop-downs to filter your list of virtual machines:

Data Center	The data center in which the virtual machine is located.
Virtualization	The virtualization type.

4 Filter the list of virtual machines (optional)

Group By Organize the virtual machines by virtualization server or replication consistency group.

Search If you have a long list of virtual machines, use the **Search** field to filter the list.

show assets in resiliency group When you select this check box, the list of virtual machines is updated with a **Resiliency Group** column. If a virtual machine is already a member of a resiliency group, this column displays the name of the group.

5 Select the virtual machines

To include a virtual machine in your new resiliency group, drag it from the list and drop in the **Selected Instances** area. If you change your mind, you can drag it back to the list of virtual machines. When you select all the assets you need, click **Next**.

6 Under **Manage Assets** screen, create the resiliency group.

Review the list of virtual machines that form your new resiliency group. If you need to make any changes, click **Back** return to the **Select Assets** screen. When you are ready, name the resiliency group and click **Next**.

7 Under **Configure DR** screen, configure DR for the selected resiliency group.

When you have configured DR for the resiliency group, click **Next**.

8 Select your disaster recovery data center

The **Select DR Datacenter** screen identifies your active data center, and lists the data centers you can select for disaster recovery. When you select a disaster recovery data center for your resiliency group, make sure that the data center has copies of the same virtual machines. Select the check box for the data center you want use and click **Next**.

9 Confirm that there are virtual machines at the recovery data center that match the virtual machines in your resiliency group.

In the **VM Selection** screen, verify the VM configurations for the production data center and recovery data center.

10 Complete the configuration

The **Summary** screen lists the following:

- The data center in which the resiliency group is located
- The recovery data center you specified
- The number of virtual machines in the recovery data center that you need to enable

Optionally, you can use the **Summary** screen to apply customized network settings, provided the subnets across the data centers are mapped.

If the configuration information is accurate and complete, click **Submit**.

11 Verify

On the confirmation screen, click **Done**.

The **Resiliency Group** tab is displayed, showing the new resiliency group.

You can use the **Quick Actions** drop-down list to perform other Veritas Resiliency Platform tasks.


More information is available on troubleshooting discovery of virtual machines.

See [“Troubleshooting discovery of assets”](#) on page 70.

Displaying resiliency group information and status

You can display resiliency group information and status in the following ways:

Table 3-1 Displaying resiliency group information and status

Location	Level of detail	Useful for
Resiliency Platform Dashboard	Lowest. Displays the number of resiliency groups under Resiliency Platform control and the total number of groups in error, at risk, and healthy.	Getting a quick overview of the resiliency group population and health throughout Resiliency Platform. See “About the Resiliency Platform Dashboard” on page 30.
 Assets > Resiliency Groups tab	Medium. Lists all your resiliency groups in one place.	Seeing what is in each of your data centers, the state of the groups, whether disaster recovery is configured, and so on.
Resiliency group-specific screen	Highest. Lists each asset in the resiliency group, their type, and state.	Getting detailed information on a resiliency group and its underlying assets. This screen can help you decide whether to start, stop, edit, or delete a group. See “Displaying resiliency group details” on page 24.

This section discusses the second method of displaying resiliency group information and status: using the **Assets** page. The **Assets** page gives you a quick overview of all your resiliency groups.

To display resiliency group information and status

1 Navigate



Assets > Resiliency Groups tab

2 Review information and status

- For a quick health check of your resiliency groups, review the colored boxes above the table. Click on a box to show only the resiliency groups in that category; for example, click the green square to display only the resiliency groups that are healthy.

Blue	The total number of resiliency groups
Yellow	The number of resiliency groups at risk
Green	The number of resiliency groups that are healthy

By default, the table lists all resiliency groups. Use the drop-list and search field to filter your results, and click on a table heading to sort the groups. In the table, the key fields are **State**, **DR Status**, and **Replication Type**. Possible states are:

State	Online - The assets within the resiliency group are running.
	Partial - One or more of the assets in the resiliency group are offline.
	Offline - The assets in the resiliency group are powered off or not running.
DR Status	Configured - The resiliency group has been configured for disaster recovery.
	Not Configured - Disaster recovery is not configured for the group. Configure it as soon as possible.
Replication Type	Resiliency Platform supports several replication technologies. If no replication type is shown, consider configuring replication.

3 Display detailed information on a resiliency group (optional)

To display detailed information about a resiliency group, click its row in the table.

See [“Displaying resiliency group details”](#) on page 24.

Displaying resiliency group details

You can display detailed information on each of your resiliency groups. You can use a resiliency group-specific screen to answer questions as such the following:

- What is the overall health of the resiliency group?
- Is it configured for disaster recovery (DR)?
- What are its underlying assets and their current state?
- If DR is configured for the resiliency group, what is the replication lag time between sites?

To display details on a single resiliency group

1 Navigate



Assets > Resiliency Groups tab

2 Sort and select your resiliency group

On the **Resiliency Groups** tab, use the drop-down list, **Search** field, and table headings to filter your list of resiliency groups.

3 Display the resiliency group-specific screen

Double-click the table row for the resiliency group you are interested in.

The resiliency group-specific screen is read-only. You can display and sort information on the screen, but you cannot update it. The screen is divided into the following areas:

Table 3-2 Resiliency group details screen

This part of the screen ...	Displays ...
Top	Resiliency group's health and status. It identifies the data centers at which the resiliency group is active, its replication state and type, and whether the resiliency group is configured for disaster recovery. This part of the screen displays the number of alerts that are associated with the resiliency group.
Middle	A table with the assets that make up the resiliency group. You can use links above the table to sort the assets by data center, and you can use the table headings to sort the assets by Name , Type , or State .
Bottom	If the resiliency group is configured for disaster recovery, this portion of the screen displays the replication lag between the production data center and the recovery data center, and the recovery time. Note that the recovery time is available only after the rehearse operation is complete.

You also can display information on your resiliency groups in the following ways:

- For a high-level view of resiliency group health, use the Resiliency Platform Dashboard.
See [“About the Resiliency Platform Dashboard”](#) on page 30.
- For a list of your resiliency groups and a quick view of which ones are up, configured, and so on, use the **Assets > Resiliency Group** tab.
See [“Displaying resiliency group information and status”](#) on page 22.

Modifying a resiliency group

You can modify resiliency group information including the group name as well as change the underlying assets on which the resiliency group is based.

Note: If you modify a resiliency group that has been configured for disaster recovery, you must reconfigure it.

To modify resiliency group information

1 Prerequisites

Determine the potential impact modifying the resiliency group may have on users.

If necessary, notify users of the upcoming change.

2 Navigate



Assets > Resiliency Groups tab

3 Select

Use the on-screen filters, **Search** field, and table heading sort feature to locate your resiliency group.

4 Edit

Do one of the following:

- Right click on the resiliency group row and select **Modify**.
- On the right side of the resiliency group row, click on the vertical ellipsis and select **Modify**

The steps for editing the resiliency group are the same as creating it.

When editing a resiliency group made up of virtual machines, note the following:

- If the resiliency group is configured for disaster recovery, Resiliency Platform proceeds to the Protect VM wizard.
- When the number of virtual machines on the replicated volume changes, edit the resiliency group to add or remove the virtual machines.

See [“Managing and monitoring virtual machines”](#) on page 17.

Starting a resiliency group

When you start a resiliency group, you start all the underlying assets in it.

To start a resiliency group

1 Navigate



Assets > Resiliency Groups tab

2 Select

Use the on-screen filters, **Search** bar, and table heading sort feature to locate your resiliency group.

3 Start the resiliency group.

Do one of the following:

- Right click on the resiliency group row and select **Start**.
- On the right side of the resiliency group row, click on the vertical ellipsis and select **Start**.

4 On the **Start Resiliency Group** screen, select the data center in which to start the group and click **Submit**.

5 Confirm

Click **Done**.

6 Notify

If necessary, notify users after you start the resiliency group.

To display a record and a graphic representation of what you did, click the **Recent Activities** at the bottom of the page, find your task, and click **Details**.

Stopping a resiliency group

When you stop a resiliency group, you stop all the assets that make up the group.

A typical reason for stopping a resiliency group would be to update or perform maintenance in one of the underlying assets.

To stop a resiliency group

1 Prerequisites

- Make sure that you are aware of all the assets in the resiliency group, and the potential affect on users if you shut them down.
- Choose a time for stopping the resiliency group that minimizes any disruption of service.

- If necessary, notify users before stop the resiliency group.

2 Navigate



Assets > Resiliency Groups tab

3 Select

Use the on-screen filters, **Search** field, and table heading sort feature to locate your resiliency group.

4 Stop the resiliency group.

Do one of the following:

- Right click on the resiliency group row and select **Stop**.
- On the right side of the resiliency group row, click on the vertical ellipsis and select **Stop**

5 On the **Stop Resiliency Group** screen, select the data center in which to stop the resiliency group and click **Submit**.

6 Confirm

Click **Done**.

To display a record and a graphic representation of what you did, click the **Recent Activities** at the bottom of the page, find your task, and click **Details**.

Deleting a resiliency group

When you delete a resiliency group from Resiliency Platform management, you can no longer monitor, manage, or protect it from the Resiliency Platform console. Deleting the resiliency group from Resiliency Platform has no affect on the underlying assets.

To delete a resiliency group

1 Prerequisites

Determine the potential affect of deleting the resiliency group. What is the benefit (if any) to deleting it from Resiliency Platform management? Does this benefit outweigh the fact that the group can no longer be monitored, managed, or protected through Resiliency Platform?

If necessary, notify users of the upcoming change.

2 Navigate



Assets > Resiliency Groups tab

3 Select

Use the state drop-down list, **Search** field, and table heading sort feature to locate the resiliency group.

4 Remove

Do one of the following:

- Right click on the resiliency group row and select **Delete**.
- On the right side of the resiliency group row, click on the vertical ellipsis and select **Delete**.

On the **Delete Resiliency Group** screen, click **Submit**. On the confirmation screen, click **Done**.

Monitoring and reporting on assets status

This chapter includes the following topics:

- [About the Resiliency Platform Dashboard](#)
- [Understanding asset types](#)
- [Displaying an overview of your assets](#)
- [Viewing reports](#)

About the Resiliency Platform Dashboard

The Resiliency Platform Dashboard gives you an overview of your resiliency domain. Use the Dashboard to answer questions such as the following:

- Which of my data centers have Resiliency Platform managed assets?
- What is the mix of my assets by type and platform?
- Which assets are configured for disaster recovery?

The Dashboard has the following areas:

Global View	<p>A world map that identifies the data centers that contain Resiliency Platform managed assets. Lines between data centers indicate that replication takes place between the locations.</p> <p>Mouse over an icon for basic Resiliency Platform platform configuration and asset configuration information for that data center. Click More for detailed information and recent activity.</p>
Resiliency Groups and Virtual Business Services summaries	<p>The upper right section of the dashboard displays total number of resiliency groups and virtual business services in the resiliency domain, as well as those at risk and normal.</p> <p>Click a square in either the Resiliency Groups or Virtual Business Services summary to display a tab of detailed information.</p>
Virtual Machines by Type and Platform	<p>Displays a summary of virtual machines in all data centers or information on a single data center. Use the drop-down list to filter your results. The summary lists the virtual machine types by percentage and the platform types by number.</p>
Applications by Type	<p>Displays a summary of application types in all data centers or in a single data center. Use the drop-down list to filter your results.</p>
Top Resiliency Groups by Replication Lag	<p>Ranks the resiliency groups according to how long it takes the recovery data center to be in sync with the active data center.</p>
Virtual Machines and Applications by Recovery Readiness	<p>Displays the percentage of virtual machines and applications that are unprotected or unmanaged.</p> <p>Use the drop-down list to filter your results.</p>

You can use the Assets icon in the navigation pane to display more detailed information on resiliency groups.

See [“Displaying resiliency group information and status”](#) on page 22.

Understanding asset types

On the Resiliency Platform console Assets page, assets are classified as follows.

Asset	Description
Resiliency Group	A group of applications or virtual machines under Resiliency Platform control. You can use Resiliency Platform to start and stop the resiliency group, as well as protect and manage it.
Virtual Business Service	A collection of resiliency groups logically grouped for a specific business purpose.
Unmanaged	An application or virtual machine that Resiliency Platform discovers in your environment, but that is not under Resiliency Platform management. You cannot use any Resiliency Platform features with these assets until they become a part of a resiliency group.

Displaying an overview of your assets

The **Assets** page gives you an overview of all your resiliency groups and virtual business services (VBSs). You can also click links on the page to create resiliency groups and VBSs.

To access the **Assets** page, go to the navigation pane on the left side of the screen, and click:



The **Assets** page is organized into the following categories:

- Managed resiliency groups, which are groups under Resiliency Platform control, but that do not have disaster recovery configured.
See [“Managing and monitoring virtual machines”](#) on page 17.

For managed and protected resiliency groups, the screen also displays the following:

- The number of resiliency groups that are based on virtual machines and the number that are based on applications
- The number of unmanaged virtual machines or applications; that is, the assets that Resiliency Platform is aware of but that are not managed or protected in resiliency groups.

For VBSs, the screen displays the following:

- The number of VBSs that are created from virtual machines and the number that are created from physical assets.
- The number of resiliency groups within the VBSs that are protected and the number that are only managed (not protected).

Viewing reports

Veritas Resiliency Platform provides a console for viewing the following reports:

Resiliency Groups by Datacenter	Provides details about the resiliency groups in the data centers across all sites. See “Viewing the Resiliency Groups by Datacenter report” on page 33.
VM Inventory	Provides the platform distribution and the OS distribution details of the virtual machines that are deployed in the data centers in the form of a pie chart. See “Viewing the VM Inventory report” on page 34.
Virtual Server Inventory	Provides information of the virtual servers across data centers. See “Viewing the Virtual Infrastructure Inventory report” on page 35.
Migrate and Takeover	Provides a summary report of the last migrate and takeover operations performed on the resiliency groups. See “Viewing the Migrate and Takeover report” on page 36.
Rehearse	Provides a summary report of the rehearse operations performed on the resiliency groups. See “Viewing the Rehearse report” on page 36.

Viewing the Resiliency Groups by Datacenter report

This report provides details about the resiliency groups in the data centers across all sites.

The **Resiliency Group Data Center Distribution** bar graph shows site wise distribution of the resiliency groups. It also shows the status such as online or offline.

The **Data Center Details** table displays the following information:

- Data center name
- Location details
- Name of the resiliency group
- Type of the resiliency group
- Replication status of the resiliency group
- Disaster recovery configuration status
- Status of the resiliency group such as online or offline.

To view the data center details report

1 Navigation

Click **Reports** (menu bar) > **Inventory**.

2 Click **Run** or **Schedule** on the **Resiliency Groups by Datacenter** report to receive the report on the specified email address.

For more information on configuring email settings, refer to the *Deployment Guide*.

Viewing the VM Inventory report

This report provides platform distribution and OS distribution details about the virtual machines that are deployed in the data centers in the form of a pie chart.

The following information about the virtual machines is displayed in a table.

- Name of the virtual machine
- Name of the virtualization server
- Platform information
- Virtualization technology
- State of the virtual machine
- Memory allocated on the virtual machine
- Number of V Processors and N Processors

To view the VM Inventory report**1** Navigation

Click **Reports** (menu bar) > **Inventory Reports**.

2 Click **Run** or **Schedule** on the **VM Inventory** report to receive the report on the specified email address.

For more information on configuring email settings, refer to the *Deployment Guide*.

See [“Viewing reports”](#) on page 33.

Viewing the Virtual Infrastructure Inventory report

This report provides information about the virtual infrastructure inventory across data centers.

The **Platform Distribution** and **Distribution By Type** pie charts show the platform and OS distribution of the virtual servers across all data centers.

The following information about the virtual servers is displayed in a table.

- Name of the vServer
- Platform information
- Data center name
- Associated IMS name
- Type of vServer
- Memory allocated on the vServer
- Number of CPUs
- Number of cores

To view the Virtual Infrastructure Inventory report**1** Navigation

Click **Reports** (menu bar) > **Inventory Reports**.

2 Click **Run** or **Schedule** on the **Virtual Infrastructure Inventory** report to receive the report on the specified email address.

For more information on configuring email settings, refer to the *Deployment Guide*.

See [“Viewing reports”](#) on page 33.

Viewing the Migrate and Takeover report

This report provides a summary of the last migrate and takeover operations that were performed on the resiliency groups.

The **Migrate and Takeover** pie chart shows the percentage of successful and failed operations.

The **Resiliency Groups at Risk** displays the list of resiliency groups on which the operations had failed. The **Last Migrate/Takeover Details** table displays the list of resiliency groups on which the operations were performed.

You can view the following information in these tables:

- Resiliency group name on which the operation was performed.
- Operation name; migrate or takeover.
- Start time of the operation.
- Duration of the operation.
- Target data center name.
- Source data center name.
- The data center on which the resiliency group is currently active.

To view the migrate and takeover report

1 Navigation

Click **Reports** (menu bar) > **Risk Assessment**.

2 Click **Run** or **Schedule** on the **Migrate and Takeover Report** to receive the report on the specified email address.

For more information on configuring email settings, refer to the *Veritas Resiliency Platform Deployment Guide*.

See [“Viewing reports”](#) on page 33.

Viewing the Rehearse report

This report provides a summary of the latest rehearse operations that were performed on the resiliency groups.

The **Rehearse Summary** pie chart shows the percentage of successful and failed operations.

The **Resiliency Groups at Risk** displays the list of resiliency groups on which the rehearse operation had failed. The **Last Rehearse Details** table displays the list of resiliency groups on which the rehearse operation were performed.

You can view the following information in these tables:

- Resiliency group name on which the operation was performed.
- Operation name, rehearse.
- Start time of the operation.
- Duration of the operation.
- Target data center name.
- Source data center name.
- The data center on which the resiliency group is currently active.

To view the rehearse report

1 Navigation

Click **Reports** (menu bar) > **Risk Assessment**.

2 Click **Run** or **Schedule** on the **Rehearse Report** to receive the report on the specified email address.

For more information on configuring email settings, refer to the *Veritas Resiliency Platform Deployment Guide*.

See [“Viewing reports”](#) on page 33.

Using Resiliency Platform for disaster recovery

This chapter includes the following topics:

- [About disaster recovery using Resiliency Platform](#)
- [Understanding the role of resiliency groups in disaster recovery operations](#)

About disaster recovery using Resiliency Platform

A comprehensive disaster recovery strategy ensures that your mission-critical IT functions can continue during and after a disaster and any unforeseen risk can be mitigated to the extent possible.

The Veritas Resiliency Platform lets you perform disaster recovery operations on your critical IT services. This section introduces you to the key features of Resiliency Platform:

- Monitoring of data center assets - storage, virtual machines, and applications.
- Making business services more resilient by providing the ability to perform disaster recovery operations on virtual machines and applications. For example, migrate, takeover, and rehearse.
- Ability to group your virtual machines or applications in resiliency groups based on your production environment and business needs.
- Resiliency plan (a sequential execution of predefined steps) to automate site-level recovery operations on your IT infrastructure in an event of downtime.
- Auto-discovery and real-time tracking for recovery objectives, such as replication lag.

- Ability to perform non-disruptive testing on your virtual machines and applications to ensure that your infrastructure is adequately prepared for protection in an event of disaster.
- Reporting capabilities providing details about resiliency health of applications and virtual machines.

See [“Understanding the role of resiliency groups in disaster recovery operations”](#) on page 39.

Understanding the role of resiliency groups in disaster recovery operations

To perform disaster recovery operations on virtual machines or applications, first they must be placed in a resiliency group, which is the unit of failover in Veritas Resiliency Platform.

You can configure resiliency groups without enabling them for disaster recovery. You can perform start/stop operations on resiliency groups that are not enabled for DR. However, you cannot perform disaster recovery operations on a resiliency group without first enabling the resiliency group for disaster recovery. You can enable disaster recovery at the time you create the resiliency group, or later.

After you enable and configure disaster recovery on a resiliency group, you can proceed with DR-specific tasks on the resiliency group, such as migrate and takeover.

Note: Another Resiliency Platform entity, virtual business service (VBS), lets you further group these resiliency groups, and lets you perform ordered start and stop operations on the resiliency groups. You can configure one or more resiliency groups at each tier of your VBS. Refer to the *Resiliency Platform: Solutions for Virtual Business Services* guide for more information on VBS configurations and the disaster recovery operations for VBS.

See [“About resiliency groups”](#) on page 16.

VMware virtual machines disaster recovery

This chapter includes the following topics:

- [Understanding virtual machine disaster recovery](#)
- [Limitations for virtual machine disaster recovery](#)
- [VMware virtual machines disaster recovery - an overview of key steps](#)

Understanding virtual machine disaster recovery

A resiliency group represents a logical collection of virtual machines or applications representing a business service. Starting or stopping a resiliency group starts or stops the virtual machines or applications that are part of it. To perform disaster recovery (DR) operations, you must first enable disaster recovery for each resiliency group by performing the Configure DR operation. Once the Configure DR operation is successful, you can perform operations such as migrate, takeover, and rehearse.

See [“VMware virtual machines disaster recovery - an overview of key steps”](#) on page 41.

Limitations for virtual machine disaster recovery

The following table lists the limitations of virtual machines disaster recovery using Resiliency Platform:

Table 6-1

Limitations	Descriptions
Replication limitations	<p>The following are the replication-based limitations of virtual machines:</p> <ul style="list-style-type: none"> ■ Only synchronous and asynchronous mode of replications are supported in EMC SRDF. ■ Only Consistency Group (SRDF device group) based replications are supported. ■ Does not support composite group based replications and individual disk or device file based replication.
Virtualization Host-level limitations	Multipathing and DR operations of Snapshot, clone, and renamed virtual machines are not supported.

VMware virtual machines disaster recovery - an overview of key steps

This section lists the key steps required to configure the disaster recovery of VMware virtual machines using Veritas Resiliency Platform.

Table 6-2 VMware virtual machines disaster recovery - an overview of key steps

Action	Description	Refer to
Set up your replication environment	Set up your VMware environment and storage arrays for replication.	<p>For EMC SRDF-based replication: See “Configuring VMware virtual machines disaster recovery using EMC SRDF replication” on page 63.</p> <p>For NetApp SnapMirror based replication: See “Configuring VMware disaster recovery using NetApp SnapMirror” on page 66.</p>
Add the asset infrastructure	Add the asset infrastructure to the Infrastructure Management Server (IMS) using the Resiliency Platform web console.	Refer to the <i>Veritas Resiliency Platform Deployment Guide</i> .

Table 6-2 VMware virtual machines disaster recovery - an overview of key steps *(continued)*

Action	Description	Refer to
Configure your assets for disaster recovery	Group the required virtual machines in a resiliency group and enable disaster recovery for the resiliency group.	See “Protecting virtual machines” on page 19. See “Configuring disaster recovery for a resiliency group” on page 46.
DR operations	Perform the required DR operations: Migrate, takeover, and rehearse.	See “Ensuring the disaster recovery readiness of your Resiliency Platform assets using the rehearse operation” on page 50. See “Performing rehearsal cleanup” on page 52. See “Migrating a resiliency group of virtual machines” on page 53. See “Taking over a resiliency group of virtual machines” on page 54.

Preparing for disaster recovery operations

This chapter includes the following topics:

- [Configuring subnet information for a data center](#)
- [Setting up subnet mapping between production and recovery data centers](#)
- [Setting up virtual switch mapping between production and recovery data centers](#)
- [Configuring disaster recovery for a resiliency group](#)
- [Viewing the details of a disaster recovery-enabled resiliency group](#)

Configuring subnet information for a data center

To configure subnet information for a data center

1 Navigate



Settings (menu bar)

Under **Infrastructure Settings**, click **Infrastructure**



Click the vertical ellipsis next to the data center name, then click **DNS & Network Settings > Subnets** tab.

Any subnets already added for the data center are listed. You can modify or remove them, or add a new subnet.

- 2 To add a new subnet, click **Add** and specify the IP address for the subnet and gateway. Optionally, select the virtualization servers that are part of the subnet.
- 3 Click **Add** at the bottom of the form.

Setting up subnet mapping between production and recovery data centers

The subnet mapping operation eliminates the need to manually apply an IP address for each virtual machine at the recovery (DR) data center. After you have configured subnet mapping successfully, the IP addresses are computed programmatically, and applied to the virtual machines.

Note: When you clone your virtual machines, ensure that you assign appropriate hostname and IP address to the cloned virtual machines.

Use the **Recovery Automation** option on the Resiliency Platform web console to map your production data center's subnet with the recovery (DR) data center's subnet. Note that the subnets will be discovered only when the virtual machines are running. If a virtual machine is down at the recovery data center, subnets will not be discovered.

To set up subnet mapping between production and recovery data centers

- 1 Navigate



Recovery Automation (navigation pane)

- 2 Click **Subnet** in the **Network Mapping** page.
- 3 Click **Create Pair**.
- 4 In the **Configure Subnet Mapping - Select Subnet** page, select the subnet that should be the part of your subnet pair. You can organize the subnet into **Host** or **Datacenter** group using the **Group By** drop-down menu. Click **Next**.
- 5 In the **Configure Subnet Mapping - Pair Subnet**, select the other member of your subnet pair, and click **Submit**. The created subnet pair is listed in the **Network Mapping** page.

Setting up virtual switch mapping between production and recovery data centers

Using virtual switch mapping, you can map the virtual switch of a virtualization server at the production data center to the virtual switch of another virtualization server configured at the recovery data center.

To set up virtual switch mapping between production and recovery data centers

- 1 Navigate



Recovery Automation (navigation pane)

- 2 Click **Virtual Switch** in the **Network Mapping** page.
- 3 Click **Create Pair**.
- 4 In the **Configure Virtual Switch Mapping - Select Source Virtual Switch** page, select the virtual switch that should be the part of your virtual switch pair. Click **Next**.

- 5 In the **Configure Virtual Switch Mapping - Select destination Virtual Switch** page, select the other member of your virtual switch pair, and then click **Next**. The created virtual switch pair is listed in the **Network Mapping** page.

Note: You need to map the virtual local area network (VLAN) IDs of the primary site with the VLAN IDs of the DR site. You need to manually enter the VLAN IDs of the DR site.

- 6 In the **Configure Virtual Switch Mapping - Select VLAN pairs**, you need to manually enter the virtual local area network (VLAN) IDs of the DR data center to map the VLAN IDs of the production data center with the DR data center, and then click **Submit**.

Configuring disaster recovery for a resiliency group

When configuring disaster recovery (DR), Veritas Resiliency Platform searches the complete storage stack from the virtual machines to the replicated volumes. It also detects the complete network settings of each member of the resiliency group and applies the Subnet, VSwitch, PortGroup mappings details to the current network settings that needs to be applied after Migration in the disaster recovery data center. The Resiliency Platform stores and uses this configuration at the time of disaster recovery operations, such as, Migrate, Takeover, or Rehearse.

Note: If there are any changes to the storage stack, or network settings in any of the resiliency group members, please make sure to re-run the DR Configuration wizards so that the latest storage and network configuration snapshot are recorded.

After the configuration snapshot is recorded and stored, Veritas Resiliency Platform copies the virtual machine configurations into a folder (.vrp) on the replicated datastore. This folder hosts data center-specific copies of the virtual machines. This allows the user to have separate configurations across the two data centers for the same virtual machines.

Use this procedure to configure disaster recovery (DR) for a selected resiliency group. A successful DR configuration enables takeover, migrate, and rehearse operations.

To configure disaster recovery for a resiliency group

1 Navigate



Assets (navigation pane)

Resiliency Groups

2 Double-click the desired resiliency group.

3 In the resiliency group details page, click **Configure DR**.

4 In the **Select DR Data center** page, select the target data center, and click **Next**.

See [“Configuring disaster recovery - DR data center selection”](#) on page 47.

5 The **VM Selection** page displays the matching virtual machines available at the DR data center. Click **Next**.

6 In the **Summary** page, review the information on virtual machine pairing and network customization.

See [“Configuring disaster recovery - Summary”](#) on page 48.

7 Click **Submit** to complete the disaster recovery operation for the resiliency group.

8 Post configuration, verify whether the **DR Status** column on the resiliency group details page displays the status of the resiliency group as **CONFIGURED**.

9 After you have successfully configured the resiliency group for DR operations, Resiliency Platform invokes a workflow which initializes the virtual machines for DR operations.

Ensure that this operation is successfully completed by checking in **Current** or **Completed** activities page. The operation will be listed as "**Process for initializing resiliency group for DR operations.**"

See [“Viewing activities”](#) on page 55.

Configuring disaster recovery - DR data center selection

This page lists all data centers that are currently configured in your environment. Select the appropriate data center for the disaster recovery of the resiliency group.

Table 7-1 DR data center selection panel options

Field	Description
Name	Displays the name of the disaster recovery data center.
Location	Displays the geographical location of the disaster recovery data center.

See [“Configuring disaster recovery for a resiliency group”](#) on page 46.

Configuring disaster recovery - Summary

This page displays the information on virtual machines pairing and the network customization for the virtual machines.

Table 7-2 Configuring disaster recovery - Summary

Field	Description
Matching Virtual Machines found in the Recovery Site	Displays the number of virtual machines at the recovery data center that match with the production data center's virtual machines. This pairing is based on virtual machine IDs.
Virtual Machines to be enabled in the Recovery Site	Displays the number of virtual machines that you need to create or register at the DR data center.
Network Customization	Select this check box to apply preconfigured network settings for the virtual machines. The network customization includes the subnet and vSwitch pairing from production to recovery data center. The IP addresses for the virtual machines at the recovery data center will be applied based on the subnet mappings. Note: The customization is applicable only if DHCP is not configured for the data center.

See [“Configuring disaster recovery for a resiliency group”](#) on page 46.

Viewing the details of a disaster recovery-enabled resiliency group

The Veritas Resiliency Platform console provides information about a resiliency group for which disaster recovery (DR) operation is configured successfully. The information includes the state of the replication for the resiliency group (for example, synchronized), used replication technology (for example, EMC SRDF), associated alerts, the details about the applications or the virtual machines in the resiliency group, replication lag, recovery time, and so on.

Note that for virtual machines, the recovery time is available only after the rehearse operation is complete.

To view the details of a disaster recovery-enabled resiliency group

1 Navigate



Assets (navigation pane)

Resiliency Groups

2 On the resiliency groups tab, double-click the resiliency group for which disaster recovery is already configured. That is, the **DR Status** column shows the status of the resiliency group as **Configured**.

See [“Displaying resiliency group details”](#) on page 24.

Rehearsing DR operations to ensure DR readiness

This chapter includes the following topics:

- [Ensuring the disaster recovery readiness of your Resiliency Platform assets using the rehearse operation](#)
- [Rehearse operations in VMware virtual machines](#)
- [Performing rehearsal cleanup](#)

Ensuring the disaster recovery readiness of your Resiliency Platform assets using the rehearse operation

Use the **Rehearse** option on the Veritas Resiliency Platform console to perform the disaster recovery rehearsal, which verifies the ability of your configured resiliency group to fail over to the disaster recovery (DR) data center during disaster. A rehearsal is a zero-downtime test that mimics the configuration, application data, storage, replication, and the fail over behavior of your resiliency group.

Note: You can perform the Rehearsal operation only on the DR data center.

To perform the rehearse operation

1 Navigate



Assets (navigation pane)

Resiliency Groups

- 2 Double-click the resiliency group for which DR is already configured. That is, the **DR Status** column shows the status of the resiliency group as CONFIGURED.
- 3 On the resiliency group details page, click **Rehearse**.
- 4 Select the recovery data center and then click **Submit**.

Rehearse operations in VMware virtual machines

Rehearse operations with EMC SRDF based replication:

- Device group should be associated with the snapshot LUNs. Veritas Resiliency Platform supports Timefinder Snap and Timefinder Clone.
- When the rehearse operations is initiated, Veritas Resiliency Platform creates point in time snapshots as part of rehearsal operations, since it cannot work with existing snapshots.

Note: If there are any active snapshots that are in progress present, you need to terminate the snapshots and refresh the asset discovery.

- The datastores on the snapshot device are attached on the DR host.
- Veritas Resiliency Platform registers the virtual machines in the production data center for rehearsal. They have identical configuration as DR virtual machines, except these virtual machines consume storage from the datastore mounted using the snapshot volumes. And these virtual machines will be disconnected from the network and will be unregistered during cleanup.

Rehearse operations with NetApp SnapMirror based replication:

- NetApp SnapMirror based replication uses FlexClone for the Rehearse operation, and so NetApp storage server must be enabled with the FlexClone license.
- When the rehearse operations is initiated, Veritas Resiliency Platform creates a point in time volume snapshot as part of the rehearsal operations. The snapshot volume is exported and mounted on the DR host.

Note: Rehearse operations breaks any ongoing replication between the source and destination storage server as the FlexClone operation cannot be performed on the destination read-only volume. SnapMirror replication resumes after the rehearsal cleanup operation.

- Veritas Resiliency Platform registers the virtual machines in the production data center for rehearsal. They have identical configuration as DR virtual machines, except these virtual machines consume storage from the datastore that is mounted using the snapshot volumes. And these virtual machines will be disconnected from the network and will be unregistered during cleanup.

See [“Ensuring the disaster recovery readiness of your Resiliency Platform assets using the rehearse operation”](#) on page 50.

Performing rehearsal cleanup

After you have performed the rehearse operation successfully to verify the ability of your configured resiliency group to fail over on to the disaster recovery data center, you can use the rehearsal cleanup operation to clean up the rehearsal virtual machine in the resiliency group. All temporary objects created during the rehearsal operation are now deleted.

To perform rehearsal cleanup

- 1 Navigate



Assets (navigation pane)

Resiliency Groups

- 2 Double-click the resiliency group for which DR is already configured. That is, the **DR Status** column shows the status of the resiliency group as CONFIGURED.
- 3 Click **Rehearse Cleanup**.
- 4 Select the data center, and then click **Submit**.

Performing disaster recovery operations

This chapter includes the following topics:

- [Migrating a resiliency group of virtual machines](#)
- [Taking over a resiliency group of virtual machines](#)

Migrating a resiliency group of virtual machines

Migration refers to a planned activity involving graceful shutdown of virtual machines at the production data center and starting them at the recovery data center. In this process, replication ensures that consistent virtual machine data is made available at the recovery data center. In Veritas Resiliency Platform, the migration of virtual machines is achieved by grouping them in a resiliency group, configuring disaster recovery for the resiliency group, and thereafter performing the migrate operation on this resiliency group.

To migrate virtual machines

1 Navigate



Assets (navigation pane)

Resiliency Groups

- 2 Double-click the resiliency group for which DR is already configured. That is, the **DR Status** column shows the status of the resiliency group as CONFIGURED.

- 3 On the resiliency group details page, click **Migrate**.
- 4 Select the target data center and then click **Submit**.

Taking over a resiliency group of virtual machines

Takeover is an activity initiated by a user when the production data center is down due to any **disaster or natural calamities**, and the virtual machines need to be restored at the recovery data center to provide business continuity. The user starts the virtual machines at the recovery data center with the available data. Since it is an unplanned event, the data available at the recovery data center may not be updated. You need to evaluate the tolerable limit of data loss, and accordingly take the necessary action - start the virtual machines with the available data, or first use any other available data backup mechanism to get the latest copy of data, and thereafter start the virtual machines. The takeover operation brings up the virtual machines at the recovery data center using the last recovered checkpoint.

To perform takeover operation on virtual machines

- 1 Navigate



Assets (navigation pane)

Resiliency Groups

- 2 Double-click the resiliency group for which DR is already configured. That is, the **DR Status** column shows the status of the resiliency group as CONFIGURED.
- 3 On the resiliency group details page, click **Takeover**.
- 4 Select the target data center, and then click **Submit**.

Managing activities and resiliency plans

This chapter includes the following topics:

- [Managing activities](#)
- [Managing resiliency plans](#)

Managing activities

Using the Veritas Resiliency Platform console, you can view the sub task information for a task or an operation that is performed on the console.

See [“Viewing activities”](#) on page 55.

See [“Aborting a running activity”](#) on page 56.

Viewing activities

Using the Veritas Resiliency Platform console, you can view the sub task information for a task or an operation that is performed on the console. You can view the details on the **Activities** page. Details such as the status of the operation (in-progress, finished, or failed), start and end time, and the objects on which the operation was performed are displayed. You can view these details for a currently running task and for the completed tasks. On the **Current** page you can abort a running task.

Click on a currently running task, to view the details in a graphical representation. The steps that are completed are shown in green color along with the success icon. The ongoing steps are in blue color with the loader image, and the future steps are in gray. Expand **Execution Details** to view all the sub-tasks that comprise the task.

To view activities**1** Navigate

Do one of the following:



Activities (menu bar).

2 Choose either of the following:

- Select **Current** to view the currently running tasks.
- Select **Completed** to view the historical tasks.

To view recent activities, click **Recent Activities** on the bottom pane.

See [“Aborting a running activity”](#) on page 56.

Aborting a running activity

Using the Veritas Resiliency Platform console, you can abort a task or an operation which is currently running. You can abort an operation that is executed using a resiliency plan or from the console. When you abort an operation, the sub task which is in progress is completed and then the process is aborted. The status of the sub tasks which were already completed does not change.

For example, the migrate resiliency group operation has approximately six sub tasks. If you abort the operation while the first sub task, Stop Virtual Machine, is in progress, then the Stop Virtual Machine sub task is completed and the remaining sub tasks are skipped. If you restart the migrate operation, it starts from the beginning.

To abort an activity**1** Navigate

Do one of the following:



Activities. Skip to Step 2

Recent Activities (bottom pane). Click **Abort** on the required task.

2 In the **Current** activities page, place your cursor on the activity that you want to abort. Do one of the following:

- Right click your mouse and click **Abort**.
- Click on the vertical ellipsis and select **Abort**

See [“Viewing activities”](#) on page 55.

Managing resiliency plans

Veritas Resiliency Platform provides a console for creating and customizing resiliency plans.

See [“About resiliency plans”](#) on page 57.

See [“Creating a new resiliency plan template”](#) on page 58.

See [“Editing a resiliency plan template”](#) on page 59.

See [“Deleting a resiliency plan template”](#) on page 59.

See [“Creating a new resiliency plan”](#) on page 60.

See [“Editing a resiliency plan”](#) on page 61.

See [“Deleting a resiliency plan”](#) on page 62.

See [“Executing a resiliency plan”](#) on page 62.

About resiliency plans

Using the Veritas Resiliency Platform console you can create customized resiliency plans. A resiliency plan is a customized set of tasks that you can run as a single operation. You add each task and the particular assets on which to run the task. If you intend to use the same sequence of tasks on different assets, you can create a resiliency template. You can save the template and use it to create multiple resiliency plans.

For example, you can create a resiliency plan template to migrate a resiliency group. Then you can add a resiliency group to the template to create a plan. You can create multiple plans using the same template.

You can create customized resiliency plans for the following tasks:

- Start a resiliency group.
- Stop a resiliency group.
- Rehearse a resiliency group.
- Clean rehearsal for a resiliency group.
- Migrate a resiliency group.
- Takeover a resiliency group.
- Manual task

In addition to the above listed tasks, you can also add a **Manual** task in the resiliency plan. This task temporarily pauses the operation letting you perform a task before proceeding further or validating a step before proceeding.

You do not have to create a template in order to create a resiliency plan. Resiliency plans can be created using blank templates.

Note: To create a plan for migrate, takeover, rehearse, or cleanup operation, configure disaster recovery task must be successful on the selected resiliency group.

See [“Creating a new resiliency plan template”](#) on page 58.

See [“Creating a new resiliency plan”](#) on page 60.

Creating a new resiliency plan template

Using the Veritas Resiliency Platform console, you can create a customized resiliency plan template for the following operations:

- Start and stop a resiliency group.
- Rehearse and rehearse cleanup of a resiliency group.
- Migrate and takeover a resiliency group.
- Manual task

To create a template, you need to drag and drop the required operation from the stencil into the canvas below. The arrow lets you connect various operations in the canvas.

For example, if you want to create a template to perform the Start Resiliency Group task, drag the operation from the top bar into the canvas. Now click on the arrow on the **Start** action box and drag the mouse to the **Start Resiliency Group** action box. Similarly you can drag the arrow from the **Start Resiliency Group** action box to the **End** action.

In addition to the above listed tasks, you can also add a Manual task in the resiliency plan. This task temporarily pauses the operation letting you perform a task before proceeding further.

To create a new resiliency plan template

1 Navigate

Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**

2 In the **Templates** section, click **New**.

- 3** In the **Create New Template** wizard panel, enter a name and a description for the template.
- 4** Drag and drop the required operation into the canvas. Connect the **Start** and **Stop** actions to the operation.
- 5** Click **Create**.

See [“About resiliency plans”](#) on page 57.

Editing a resiliency plan template

Using the Veritas Resiliency Platform console, you can edit an existing resiliency plan template.

You can add assets to these templates and create a customized resiliency plan. Any changes to the template do not affect the existing resiliency plans that you created from the template.

To edit a resiliency plan template

- 1** Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
- 2** In the **Templates** list, place your cursor on the row which you want to edit. Do one of the following:
 - Right click your mouse and click **Edit**.
 - Click on the vertical ellipsis and select **Edit**.
- 3** In the **Edit Template** wizard panel, edit the required actions and click **Save**.
The steps for editing the plan are the same as creating it.

See [“Creating a new resiliency plan template”](#) on page 58.

Deleting a resiliency plan template

Using the Veritas Resiliency Platform console you can delete an existing resiliency plan template.

You can add assets to these templates and create a customized resiliency plan. Deleting the template does not affect the existing resiliency plans that you created from the template.

To delete a resiliency plan template

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
- 2 In the **Templates** list, place your cursor on the row which you want to delete. Do one of the following:
 - Right click your mouse and click **Delete**.
 - Click on the vertical ellipsis and select **Delete**.
- 3 In the **Delete Template** panel click **Delete**.

See [“Creating a new resiliency plan template”](#) on page 58.

Creating a new resiliency plan

Using the Veritas Resiliency Platform console, you can create a new resiliency plan for the following operations. Resiliency plans can be created using an existing template or with a blank template. When you create a plan using a blank template, you need to create the plan and add the assets at the same time.

- Start and stop a resiliency group.
- Rehearse and rehearse cleanup of a resiliency group.
- Migrate and takeover a resiliency group.
- Manual task

Note: To create a plan for migrate, takeover, rehearse, or cleanup operation, disaster recovery must be configured successfully on the selected resiliency group or the VBS.

To create a new resiliency plan using blank template

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
- 2 In the **Saved Plans** section, click **New**.
- 3 In the **Create Saved Plan - Select Template** wizard panel, select **Blank Template**, and click **Next**.
- 4 In the **Add Assets** panel, enter name and description.
- 5 Drag and drop the required operation into the canvas. Connect the **Start** and **Stop** actions to the operation.

- 6 Click the pencil icon in the action box to add relevant assets. Select the data center whose assets you want to add to the template. Click **Add**.
- 7 Click **Submit**.

To create a new resiliency plan using predefined template

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
- 2 In the **Saved Plans** section, click **New**.
- 3 In the **Create Saved Plan - "Select Template"** wizard panel, select **Pre-defined Template**.
- 4 Select a template from the list and click **Next**.
- 5 In the **Add Assets** panel, name and description are pre-populated.
- 6 Click the pencil icon in the action box to add relevant assets. Select the data center whose assets you want to add to the template. Click **Add**.
- 7 Click **Submit**.

See ["About resiliency plans"](#) on page 57.

See ["Deleting a resiliency plan"](#) on page 62.

See ["Executing a resiliency plan"](#) on page 62.

Editing a resiliency plan

Using the Veritas Resiliency Platform console, you can edit a resiliency plan.

To edit a resiliency plan

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
- 2 In the **Saved Plans** list, place your cursor on the row which you want to edit. Do one of the following:
 - Right click your mouse and click **Edit**.
 - Click on the vertical ellipsis and select **Edit**.
- 3 In the **Edit Saved Plan** wizard panel, edit the required actions and click **Submit**.
 The steps for editing the plan are the same as creating it.

See ["Creating a new resiliency plan"](#) on page 60.

Deleting a resiliency plan

Using the Veritas Resiliency Platform console, you can delete a resiliency plan.

To delete a resiliency plan

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
 - 2 In the **Saved Plans** list, place your cursor on the row which you want to delete. Do one of the following:
 - Right click your mouse and click **Delete**.
 - Click on the vertical ellipsis and select **Delete**.
 - 3 In the **Delete Saved Plan** panel click **Delete**.
- See [“Creating a new resiliency plan”](#) on page 60.

Executing a resiliency plan

Using the Veritas Resiliency Platform console, you can execute a resiliency plan. After executing the resiliency plan, you can navigate to the **Activities** page to view the progress of the plan.

To execute a resiliency plan

- 1 Navigate
Resiliency Plans (menu bar) or **Quick Actions > Resiliency Plans**
 - 2 In the **Saved Plans** list, place your cursor on the row which you want to execute. Do one of the following:
 - Right click your mouse and click **Execute**.
 - Click on the vertical ellipsis and select **Execute**.
 - 3 In the **Execute Saved Plan** panel click **Execute**.
- See [“Creating a new resiliency plan”](#) on page 60.

Configuring VMware environment for disaster recovery with EMC SRDF based replication

This appendix includes the following topics:

- [Configuring VMware virtual machines disaster recovery using EMC SRDF replication](#)

Configuring VMware virtual machines disaster recovery using EMC SRDF replication

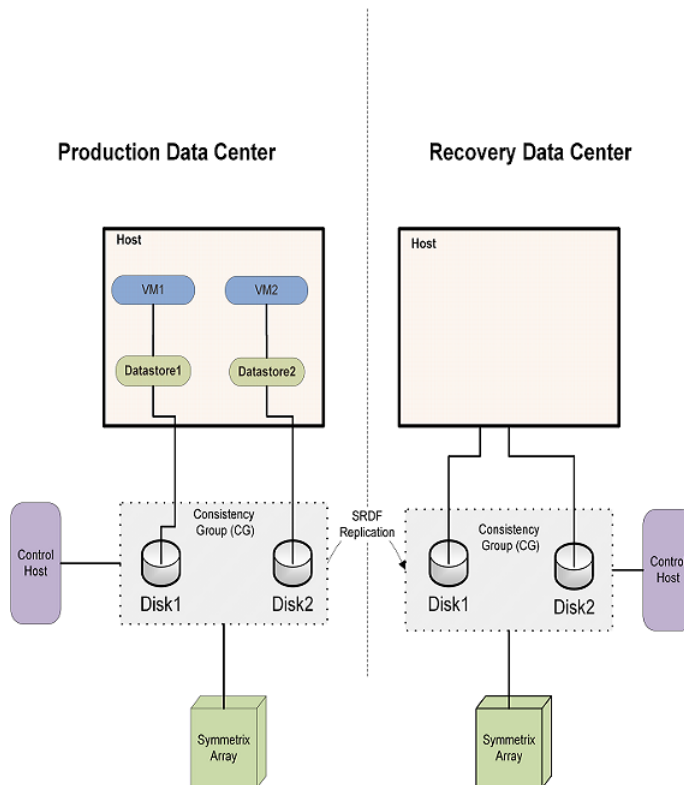
This section lists the prerequisites to enable data replication using EMC SRDF for the Veritas Resiliency Platform environment.

- Ensure that EMC Solutions Enabler is installed on a host and that the SRDF device groups are already set up for the replication between the primary and remote arrays.
- Ensure that the SRDF replicated LUNs are assigned to the respective VMware ESX Servers. Do not attach replicated peer SRDF LUNs (R1 and R2) to the same VMware ESX Server.

Note: If any changes are made to storage or storage-adapters available to the ESX/ESXi host or cluster, you must perform storage rescan, storage adapter rescan or both depending on the changes made.

- Ensure that the virtual machine's virtual disk files that are replicated using EMC SRDF replication are stored on a datastore and a corresponding device group must be created for them.

Note: For EMC SRDF-based replication in Resiliency Platform, all virtual machines that consume storage from a consistency group must belong to the same resiliency group. A consistency group is a collection of Symmetrix LUNs that helps in maintaining write consistency during replication. A resiliency group is a unit of management and control that you create in Resiliency Platform. Related virtual machines are organized into a resiliency group and managed and monitored as a single entity.



Once you have performed the necessary configurations, proceed with Resiliency Platform specific tasks to add the asset infrastructure to the Infrastructure Management Server (IMS).

Resiliency Platform configurations:

Using the Resiliency Platform console, you add the asset infrastructure to the IMS. The following is a summary of the steps. More information is available.

See the *Veritas Resiliency Platform Deployment Guide*.

- Add the Symmetrix enclosure to the IMS using the **Add Enclosure** option. Provide the discovery host name and the SYMCLI location on this discovery host.

Default SymCLI location on Linux host /opt/emc/SYMCLI/bin/

Default SymCLI location on Windows host C:\Program Files\EMC\SYMCLI\bin

Note: Any managed host can be designated as the array discovery host, including the virtual machine inside VMware ESX server that has EMC Symmetrix Gatekeeper device visibility and SYMCLI installed. The host on which consistency groups are defined can also be used as an array discovery host.

This operation returns the list of Symmetrix arrays (local and remote) accessible to the discovery host. To configure disaster recovery for the virtual machines, select one or more local arrays only.

Ensure that the enclosure discovery is complete before proceeding with adding the VMware vCenter Servers

- Add the vCenter Servers to their respective IMS in each data center using the **Add Virtualization Server** option. The user needs to have vCenter administrator privileges.

Note: Ensure that the virtualization server and ESX server are discovered successfully.

- Add the host where the SRDF device groups are configured to the IMS using the **Add Hosts** option.
- Perform add host and add enclosure operations for the IMS at the disaster recovery data center as well.

See [“Troubleshooting discovery of assets”](#) on page 70.

Configuring VMware environment for disaster recovery with NetApp SnapMirror based replication

This appendix includes the following topics:

- [Configuring VMware disaster recovery using NetApp SnapMirror](#)

Configuring VMware disaster recovery using NetApp SnapMirror

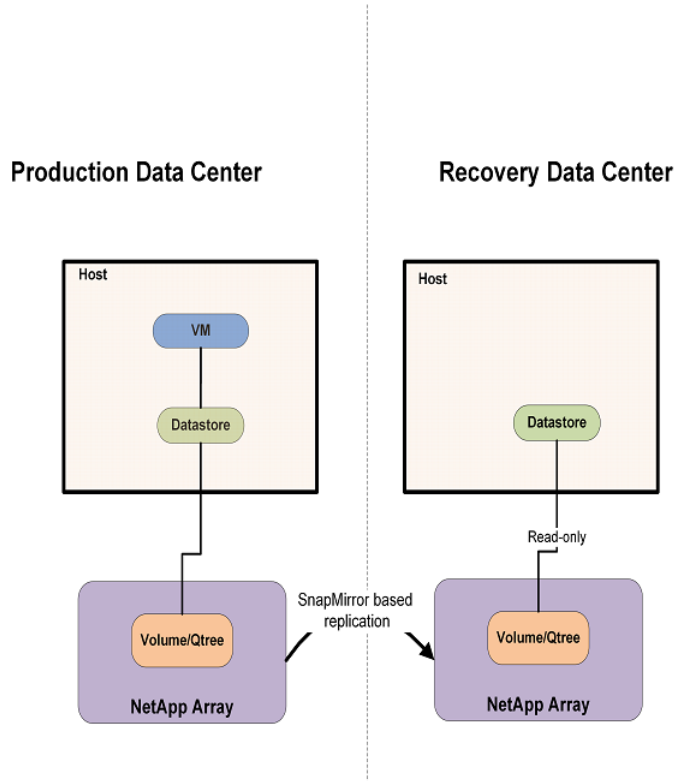
This section lists the prerequisites to enable data replication for the Veritas Resiliency Platform environment using NetApp SnapMirror when the hosts are part of a vSphere HA Cluster.

- Ensure that the NetApp volumes are already set up for replication between the primary and remote NetApp storage systems. The export path and the actual path properties should be the same for NetApp volumes and Qtree in the NetApp export configuration. You must mount array volumes and Qtree in NFS mode only.
- Ensure that the NetApp SnapMirror replicated volumes are mounted on the respective VMware ESX servers in both the sites. Do not mount the replicated peer NetApp volumes to the same VMware ESX server

Note: If any changes are made to storage or storage-adapters available to the ESX/ESXi host or cluster, you must perform storage rescan, storage adapter rescan or both depending on the changes made.

- Ensure that all virtual machines that are part of a resiliency group have their virtual disks located on the same NAS datastores that are configured using NetApp volumes.
- Ensure that the following options are turned on in the NetApp enclosure:
`httpd.admin.enable` and `httpd.enable`.
These are required for NetApp SnapMirror operations.
- Ensure that the following licenses are installed and enabled in the NetApp enclosure: `licensed_feature.multistore.enable` (For discovering IP addresses) and `licensed_feature.flex_clone.enable` (For rehearsal)

Note: For NetApp SnapMirror based replication in Resiliency Platform, all virtual machines that consume storage from a NetApp volume must belong to the same resiliency group. A resiliency group is a unit of management and control that you create in Resiliency Platform. Related virtual machines are organized into a resiliency group and managed and monitored as a single entity.



Once you have performed the necessary configurations, proceed with Resiliency Platform specific tasks to add the asset infrastructure to the Infrastructure Management Server (IMS). The following is a summary of the steps. More information is available.

See the *Veritas Resiliency Platform Deployment Guide*.

Resiliency Platform configurations:

- Configure the VMware vCenter Server to send traps to the IMS.
- Add the VMware vCenter Servers to their respective IMS in each data center using the **Add Virtualization Server** option.. The user needs to have vCenter administrator privileges.

Note: Ensure that the virtualization server and ESX server are discovered successfully.

- Add the NetApp enclosure to the IMS using the **Add Enclosure** option.

While adding the enclosure, you must provide the IMS name as the discovery host name. Also provide the NetApp storage system name or IP, and credentials. The user should have sufficient privileges to perform SnapMirror replication operations.

- Perform add virtualization server and add enclosure operations for the IMS at the disaster recovery data center as well.

See [“Troubleshooting discovery of assets”](#) on page 70.

Troubleshooting

This appendix includes the following topics:

- [Troubleshooting discovery of assets](#)
- [Viewing events and logs in the console](#)
- [Events in VMware virtual machines disaster discovery](#)
- [Displaying risk information](#)

Troubleshooting discovery of assets

When asset infrastructure is added to the Infrastructure Management Server (IMS), or when changes are made to the infrastructure, the IMS discovers and correlates the asset information and displays the information on the Assets page of the Resiliency Platform console. The discovery can take some time before the information is updated on the console. Until discovery is complete, some information needed to configure resiliency groups may be missing from the Assets page on the console.

If changes have been made to the asset infrastructure, you can use the Refresh operation on assets in the IMS to speed up discovery so that updated asset information is displayed more quickly in the console. To use the Refresh operation, display the asset infrastructure page for the IMS, select the asset type, right-click the asset and select Refresh.

If you are configuring replication using storage arrays in a VMware vCenter Server environment, you can use the following guidelines to speed up discovery or to troubleshoot information that is not being updated:

Table C-1 Configuring asset infrastructure in IMS for storage arrays in VMware environment

Situation	Troubleshooting/best practices
Adding storage arrays as enclosures to IMS	Ensure that the storage arrays that are added to the IMS are the ones that provide storage to the ESX servers managed by the vCenter Server that is added to the IMS.
More than one IMS in data center	Ensure that the vCenter Server that is managing the ESX servers, and the enclosure providing storage to those servers, are added to the same IMS.
Refreshing the IMS after a change in infrastructure	Ensure that you use the Refresh operation on the correct vCenter Servers and enclosures where the change was made.
Refreshing the IMS after a change in infrastructure, where there is more than one IMS	Ensure that you use the Refresh operation in the correct IMS.

In the VMware and EMC SRDF environment, the general guideline is to add/refresh the enclosure before adding/refreshing the VMware vCenter Server.

Table C-2 Configuring or refreshing asset infrastructure in IMS for VMware and EMC SRDF environment

Situation	Recommended sequence
You have not yet added the asset infrastructure.	Add the enclosure information in the IMS and let the discovery complete before adding the vCenter Server to the IMS.
You later provision new storage from an enclosure that is already configured in the IMS and mount datastores from the new storage.	Refresh the enclosure in the IMS, let the refresh task on the enclosure complete, and then refresh the vCenter Server in the IMS.
You provision storage from a new enclosure.	Add the new enclosure in the IMS and then refresh the vCenter Server after the enclosure discovery completes.
You are provisioning storage from an enclosure that is already configured in the IMS to new ESX servers managed by a vCenter Server.	Refresh the enclosure first, then add the vCenter Server to the IMS or refresh it if it is already added to the IMS.

In the VMware and NetApp SnapMirror environment, the general guideline is add/refresh the vCenter Server first, then add/refresh the NetApp enclosure.

Table C-3 Configuring or refreshing asset infrastructure in IMS for storage arrays in VMware and NetApp SnapMirror environment

Situation	Recommended sequence
You have not yet added the asset infrastructure.	Add the vCenter Server to the IMS first and let the discovery complete before you add the NetApp enclosure.
You later provision storage from an existing NetApp enclosure and mount NFS datastores on ESX servers.	Refresh the vCenter Server first in the IMS, let the discovery complete and then refresh the NetApp enclosure.
You later provision storage from a new NetApp enclosure and mount NFS datastores on that ESX servers.	Refresh the vCenter Server first in the IMS, wait for the vCenter Server discovery to complete, and then add the new NetApp enclosure.

The recommended sequence for adding or modifying asset infrastructure for application discovery in the NetApp SnapMirror replication environment is as follows: Ensure that discovery of the hosts is complete before you add or refresh the NetApp enclosures.

For more information on adding asset infrastructure and on the refresh operation in the IMS, refer to the *Veritas Resiliency Platform Deployment Guide*.

Viewing events and logs in the console

Veritas Resiliency Platform maintains the following types of logs that can be viewed in the web console:

System logs: System logs are typically the result of a user performing an operation in the console.

Audit logs: Audit logs are primarily used for security audits. They leave a chronological trail of activities performed on the system. They identify user, activity, affected objects, etc. They help track the individuals responsible for activities and detect security violations.

Event and notification logs: Event and notification logs are not necessarily related to user activity; they can include information such as a server going down. Events can be public or private. Rules can be configured to notify users by email of selected public events. Private events are typically unrelated to user-initiated operations.

Private events are displayed in the console for troubleshooting but are not available to include in rules for notification.

By default, logs and SNMP traps are retained for 2 years. This retention period can be modified in the product settings in the console.

To view events and logs

1 Navigate



More Views (menu bar) > **Logs**



You can also view new notifications from the **Notifications** icon.

2 To view logs by type (System, Audit, or Notification) select the appropriate tab. You can filter by the product service and by severity (information, warning, or errors) or type (public, private), depending on the tab.

Events in VMware virtual machines disaster discovery

Different events (information, warning, errors) and logs (service logs, audit logs, event logs) are generated and maintained in Veritas Resiliency Platform to track system or user-initiated changes. Resiliency Platform monitors Replication State to check the current state of your data replication.

For EMC SRDF, the Replication State attribute comes from the EMC Symmetrix consistency group. The replication state of a consistency group is monitored to detect any replication failure and notify the user.

Note: For EMC SRDF, the replication is supported at the consistency group-level, and all the virtual machines residing in a resiliency group must consume storage from the same consistency group.



The state of the replication is monitored and a corresponding event is generated when the replication fails. The event notification can be viewed on the Resiliency Platform web console. In addition, the notification is sent by email to the recipients who are configured for SMTP. An SNMP trap is also generated, which can be used by the listener, for example, any application using the generated SNMP trap.

Displaying risk information

Resiliency Platform identifies and flags several risks that may occur during data center operations. Some of these risks are transient. They are temporary and resolve themselves without your intervention. Other risks, such as the `xprtld` process being down on the Control Host, require intervention and troubleshooting to resolve.

You can display risks in the following ways:

Table C-4 Ways to display risks

To display ...	Do the following:
A complete list of risks across the resiliency domain	<ol style="list-style-type: none"> On the menu bar, select  More Views > Risks On the Risk page, double-click a risk in the table to display detailed information.
Risks that are associated with a specific resiliency group or virtual business service	<ol style="list-style-type: none"> On the navigation pane, select  (Assets) and the tab for either Resiliency Groups or Virtual Business Services. On the tab, double-click a resiliency group or virtual business service to display detailed information. On the details page, note any risks that are listed in the At Risk area, and double-click the risk for details.

[Table C-5](#) describes each Resiliency Platform risk.

Table C-5 Risks and Descriptions

Risk	Description
CTRL_HOST_DOWN	The <code>xprtld</code> process is down on the Control Host, and configured resources are in unknown state. Discovered contents can be stale.

Table C-5 Risks and Descriptions (*continued*)

Risk	Description
HOST_SFMMH_REINSTALLED	The host is disconnected. The probable cause is that the host has been reinstalled. Changes you make after this condition are not reflected on the Resiliency Manager. To correct this issue, remove and re-add this host to the Infrastructure Management Server (IMS).
HOST_DISCONNECTED_MAC_CHANGED	The host is disconnected. The probable cause is that the media access code (MAC) address of host has changed. Changes you make after this condition are not reflected on the Resiliency Manager. To correct this issue, remove and re-add this host to the Infrastructure Management Server (IMS).
VMWARE_DISCOVERY_FAILED	VMware discovery failed.
FS_FILESYSTEM_FULL	The file system is at 100% usage.

Glossary

activity	A task or an operation performed on a resiliency group.
add-on	An additional software package that can be installed on hosts by the Infrastructure Management Server (IMS) for specialized uses.
asset infrastructure	The data center assets that can be added to the Infrastructure Management Server (IMS) for IMS discovery and monitoring. For example, virtual machines or virtualization servers.
assets	In Veritas Resiliency Platform, the virtual machines or applications that have been discovered by the Infrastructure Management Server (IMS) and that can be grouped into resiliency groups.
CLISH	Command Line Interface SHell. Provides the command line menu on the Veritas Resiliency Platform virtual appliance for use after the initial bootstrap configuration..
data center	<p>A location that contains asset infrastructure to be managed by Veritas Resiliency Platform.</p> <p>For the disaster recovery use case, the resiliency domain must contain at least two data centers in different locations, a production data center and recovery data center. Each data center has a Resiliency Manager and one or more IMSs.</p>
host	<p>Physical servers, virtual machines, or Hyper-V servers that are added to the Infrastructure Management Server (IMS) as hosts.</p> <p>Adding the assets as hosts installs the host package that is used by the IMS for discovery and monitoring.</p>
Infrastructure Management Server (IMS)	The Veritas Resiliency Platform component that discovers, monitors, and manages the asset infrastructure within a data center. The IMS transmits information about the asset infrastructure to the Resiliency Manager.
migrate	A planned activity involving graceful shutdown of virtual machines at the production data center and starting them at the recovery data center. In this process, replication ensures that consistent virtual machine data is made available at the recovery data center.
persona	A user role that has access to a predefined set of jobs (operations). Used to assign permissions to users and groups for Veritas Resiliency Platform web console operations.
product role	The function configured for a Veritas Resiliency Platform virtual appliance.

	For example, a virtual appliance can be configured as a Resiliency Manager, Infrastructure Management Server (IMS) or both.
production data center	The data center that is normally used for business. See also recovery data center.
recovery data center	The data center that is used if a disaster scenario occurs. See also production data center.
rehearsal	<p>A zero-downtime test that mimics the configuration, application data, storage, and the failover behavior of the resiliency group.</p> <p>Rehearsal verifies the ability of the resiliency group to fail over to the recovery data center during a disaster.</p>
resiliency domain	The logical scope of a Resiliency Platform deployment. It can extend across multiple data centers.
resiliency group	The unit of management and control in Veritas Resiliency Platform. Related assets are organized into a resiliency group and managed and monitored as a single entity.
Resiliency Manager	The Veritas Resiliency Platform component that provides resiliency capabilities within a resiliency domain. It is composed of loosely coupled services, a distributed data repository, and a management console.
resiliency plan	A collection of tasks or operations, along with the relevant assets, which are performed in a predefined sequence.
resiliency plan template	A template defining the execution sequence of a collection of tasks or operations.
takeover	An activity initiated by a user when the production data center is down due to a disaster and the virtual machines need to be restored at the recovery data center to provide business continuity.
tier	Within a virtual business service (VBS), resiliency groups are arranged as tiers. Tiers represent the logical dependencies between the resiliency groups and determine the relative order in which the resiliency groups start and stop.
virtual appliance	<p>An appliance that includes the operating system environment and the software application which are deployed together as a virtual machine.</p> <p>The Veritas Resiliency Platform virtual appliance is deployed as a virtual machine and then configured with basic settings and a role (for example, Resiliency Manager).</p>
virtual business service (VBS)	A multi-tier IT service where each VBS tier hosts one or more resiliency groups. A VBS groups multiple services as a single unit for visualization, automation, and controlled start and stop in the desired order. You can also migrate/takeover the entire VBS.
web console	The web-based management console on the Resiliency Manager that is used to configure the settings for the resiliency domain and perform operations.

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