Site Recovery Manager Installation and Configuration

vCenter Site Recovery Manager 5.5

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About Site Recovery Manager Installation and Configuration

Site Recovery Manager Installation and Configuration provides information about how to install, upgrade, and configure VMware vCenter Site Recovery Manager.

This information also provides a general overview of Site Recovery Manager.

For information about how to perform day-to-day administration of Site Recovery Manager, see *Site Recovery Manager Administration*.

Intended Audience

This information is intended for anyone who wants to install, upgrade, or configure Site Recovery Manager. The information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

Overview of VMware vCenter Site Recovery Manager

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VMware vCenter Site Recovery Manager (SRM) is a business continuity and disaster recovery solution that helps you to plan, test, and run the recovery of virtual machines between a protected vCenter Server site and a recovery vCenter Server site.

You can configure SRM to work with several third-party disk replication mechanisms by configuring array-based replication. Array-based replication surfaces replicated datastores to recover virtual machine workloads. You can also use host-based replication by configuring SRM to use VMware vSphere Replication to protect virtual machine workloads.

You can use SRM to implement different types of recovery from the protected site to the recovery site.

Planned Migration	The orderly evacuation of virtual machines from the protected site to the recovery site. Planned Migration prevents data loss when migrating workloads in an orderly fashion. For planned migration to succeed, both sites must be running and fully functioning.
Disaster Recovery	Similar to planned migration except that disaster recovery does not require that both sites be up and running, for example if the protected site goes offline unexpectedly. During a disaster recovery operation, failure of operations on the protected site are reported but otherwise ignored.

SRM orchestrates the recovery process with the replication mechanisms, to minimize data loss and system down time.

- At the protected site, SRM shuts down virtual machines cleanly, if the protected site is still running.
- SRM powers on the replicated virtual machines at the recovery site according to a recovery plan.

A recovery plan specifies the order in which virtual machines start up on the recovery site. A recovery plan specifies network parameters, such as IP addresses, and can contain user-specified scripts that SRM can run to perform custom recovery actions.

SRM lets you test recovery plans. You conduct tests by using a temporary copy of the replicated data in a way that does not disrupt ongoing operations at either site.

- About Protected Sites and Recovery Sites on page 10

  In a typical SRM installation, the protected site provides business-critical datacenter services. The recovery site is an alternative facility to which SRM can migrate these services.

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  When you use array-based replication, one or more storage arrays at the protected site replicate data to peer arrays at the recovery site. With storage replication adapters (SRAs), you can integrate SRM with a wide variety of arrays.

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  SRM Server operates as an extension to the vCenter Server at a site. Because the SRM Server depends on vCenter Server for some services, you must install and configure vCenter Server at a site before you install SRM.

About Protected Sites and Recovery Sites

In a typical SRM installation, the protected site provides business-critical datacenter services. The recovery site is an alternative facility to which SRM can migrate these services.

The protected site can be any site where vCenter Server supports a critical business need. The recovery site can be located thousands of miles away from the protected site. Conversely, the recovery site can be in the same room as a way of establishing redundancy. The recovery site is usually located in a facility that is unlikely to be affected by environmental, infrastructure, or other disturbances that affect the protected site.

The vSphere configurations at each site must meet requirements for SRM.

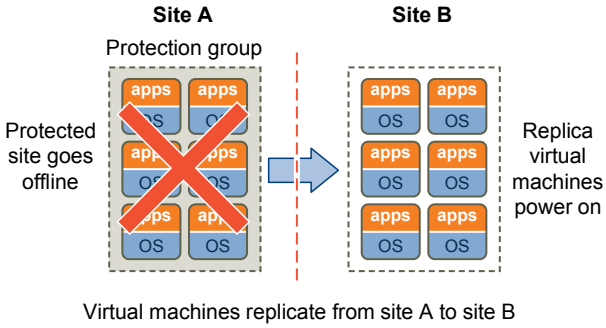
- Each site must have at least one datacenter.
- If you are using array-based replication, identical replication technologies must be available at both sites and the sites must be paired.
- The recovery site must have hardware, network, and storage resources that can support the same virtual machines and workloads as the protected site. You can oversubscribe the recovery site by running additional virtual machines there that are not protected. In this case, during a recovery you must suspend non-critical virtual machines on the recovery site.
- The sites must be connected by a reliable IP network. If you are using array-based replication, ensure that your network connectivity meets the arrays' network requirements.
- The recovery site should have access to comparable public and private networks as the protected site, although not necessarily the same range of network addresses.

Pairing the Protected and Recovery Sites

You must pair the protected and recovery sites before you can use SRM.

SRM includes a wizard that guides you through the site-pairing process. You must establish a connection between the sites and you must provide authentication information for the two sites so that they can exchange information. Site pairing requires vSphere administrative privileges at both sites. To begin the site-pairing process, you must know the user name and password of a vSphere administrator at each site. If you are using vSphere Replication, you must pair the vSphere Replication appliances.

Figure 1-1. SRM Site Pairing and Recovery Process



Bidirectional Protection

You can use a single set of paired SRM sites to protect virtual machines in both directions. Each site can simultaneously be a protected site and a recovery site, but for a different set of virtual machines.

You can implement bidirectional protection by using either array-based replication or vSphere Replication. If you are using array-based replication, each of the array's LUNs replicates in only one direction. Two LUNs in paired arrays can replicate in different directions from each other.

For information about the numbers of virtual machines for which you can establish bidirectional protection between two sites, see http://kb.vmware.com/kb/2034768.

Heterogeneous Configurations on the Protected and Recovery Sites

The configurations of the SRM and vCenter Server installations can be different on each of the protected and recovery sites.

Some components in the SRM and vCenter Server installations must be identical on each site. Because the protected and recovery sites are often in different physical locations, some components on the protected site can be of a different type to their counterparts on the recovery site.

Although components can be different on each site, you must use the types and versions of these components that SRM supports. See the Site Recovery Manager Compatibility Matrixes for information.

Table 1-1. Heterogeneity of SRM Components Between Sites

Component	Heterogeneous or Identical Installations
SRM Server	Must be the same version on both sites. The SRM version must be the same as the vCenter Server version.
vCenter Server	Must be the same version on both sites.
vSphere Replication	Must be the same version on both sites. The vSphere Replication version must be the same as the SRM version and the vCenter Server version.
Authentication method	Must be the same on both sites. If you use autogenerated certificates to authenticate between the SRM Server instances on each site, you must use autogenerated certificates on both sites. If you use custom certificates that are signed by a certificate authentication service, you must use such certificates on both sites. Similarly, the authentication method that you use between SRM Server and vCenter Server must be the same on both sites. If you use different authentication methods on each site, site pairing fails.
vCenter Server Appliance or standard vCenter Server instance	Can be different on each site. You can run a vCenter Server Appliance on one site and a standard vCenter Server instance on the other site.

Table 1-1. Heterogeneity of SRM Components Between Sites (Continued)

Component	Heterogeneous or Identical Installations
Storage arrays for array-based replication	Can be different on each site. You can use different versions of the same type of storage array on each site, or different types of storage array. The SRM Server instance on each site requires the appropriate storage replication adapter (SRA) for each type or version of storage array for that site. Check SRA compatibility with all versions of storage array to ensure compatibility.
SRM database	Can be different on each site. You can use different versions of the same type of database on each site, or different types of database on each site.
Host operating system of the SRM Server installation	Can be different on each site. You can run different versions of the host operating system and the host operating system can run in different locales on each site.
Host operating system of the vCenter Server installation	Can be different on each site. You can run different versions of the host operating system and the host operating system can run in different locales on each site.

Example: Heterogenous Configurations on the Protected and Recovery Sites

The SRM and vCenter Server installations might be in different countries, with different setups.

- Site A in Japan:
  - SRM Server runs on Windows Server 2008 in the Japanese locale
  - SRM extends a vCenter Server Appliance instance
  - SRM Server uses an SQL Server database
- Site B in the United States:
  - SRM Server runs on Windows Server 2012 in the English locale
  - SRM extends a standard vCenter Server instance that runs on Windows Server 2008 in the English locale
  - SRM Server uses an Oracle Server database

Using Array-Based Replication with SRM

When you use array-based replication, one or more storage arrays at the protected site replicate data to peer arrays at the recovery site. With storage replication adapters (SRAs), you can integrate SRM with a wide variety of arrays.

To use array-based replication with SRM, you must configure replication first before you can configure SRM to use it.

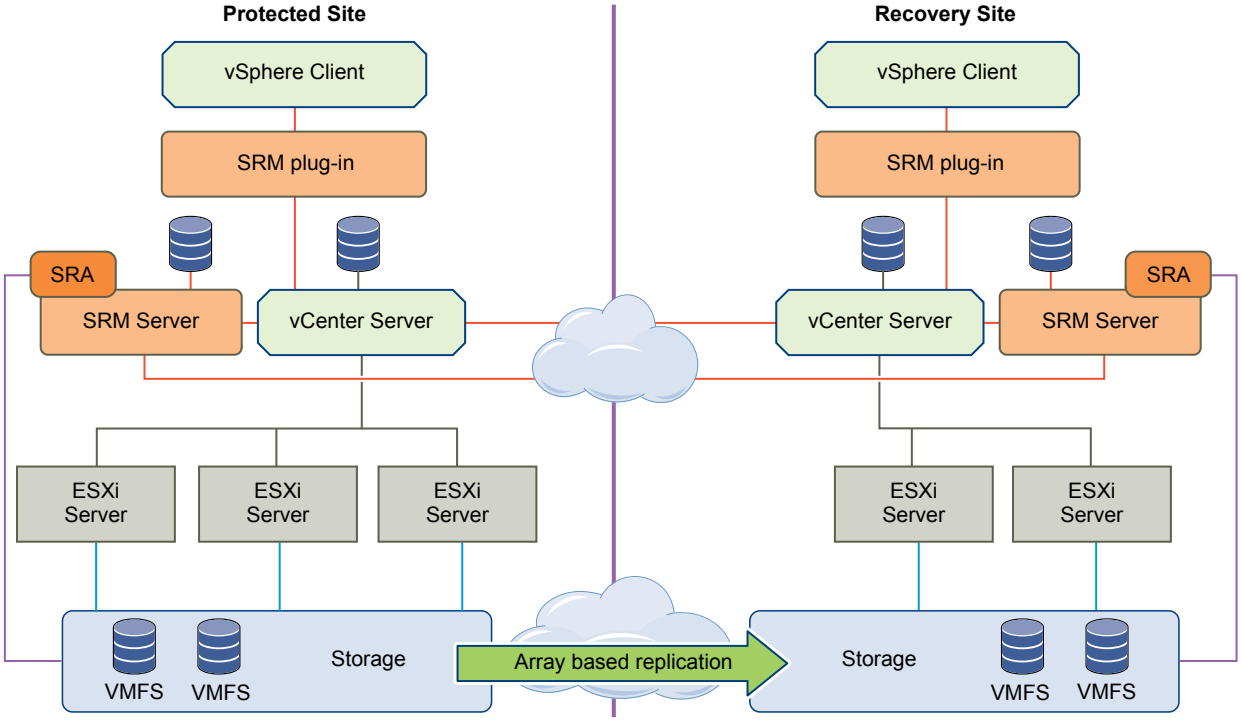
If your storage array supports consistency groups, SRM is compatible with vSphere Storage DRS and vSphere Storage vMotion. You can use Storage DRS and Storage vMotion to move virtual machine files within a consistency group that SRM protects. If your storage array does not support consistency groups, you cannot use Storage DRS and Storage vMotion in combination with SRM.

You can protect virtual machines that contain disks that use VMware Virtual Flash storage. Since the host to which a virtual machine recovers might not be configured for Virtual Flash, SRM disables Virtual Flash on disks when it starts the virtual machines on the recovery site. After the recovery, you can migrate the virtual machine to a host with Virtual Flash storage and manually restore the original Virtual Flash setting on the virtual machine.

Storage Replication Adapters

Storage replication adapters are not part of an SRM release. Your array vendor develops and supports them. You can download storage replication adapters by going to https://my.vmware.com/web/vmware/downloads and selecting **VMware vCenter Site Recovery Manager > View Components > Go to Downloads**. VMware does not support SRAs that you download from other sites. You must install an SRA specific to each array that you use with SRM on the SRM Server host. SRM supports the use of multiple SRAs.

Figure 1-2. SRM Architecture with Array-Based Replication



Using vSphere Replication with SRM

SRM can use vSphere Replication to replicate data to servers at the recovery site.

You deploy vSphere Replication as a virtual appliance. The vSphere Replication appliance contains two components.

- A vSphere Replication management server:
  - Configures the vSphere Replication server on the recovery site.
  - Enables replication from the protected site.
  - Authenticates users and checks their permissions to perform vSphere Replication operations.
  - Manages and monitors the replication infrastructure.
- A vSphere Replication server:
  - Listens for virtual machine updates from the vSphere Replication host agent on the protected site.
  - Applies the updates to the virtual disks on the recovery site.

If necessary, you can deploy multiple vSphere Replication servers on a site to balance the replication load across your virtual infrastructure.

For information about the loads that a vSphere Replication management server and a vSphere Replication server can support, see http://kb.vmware.com/kb/2034768.

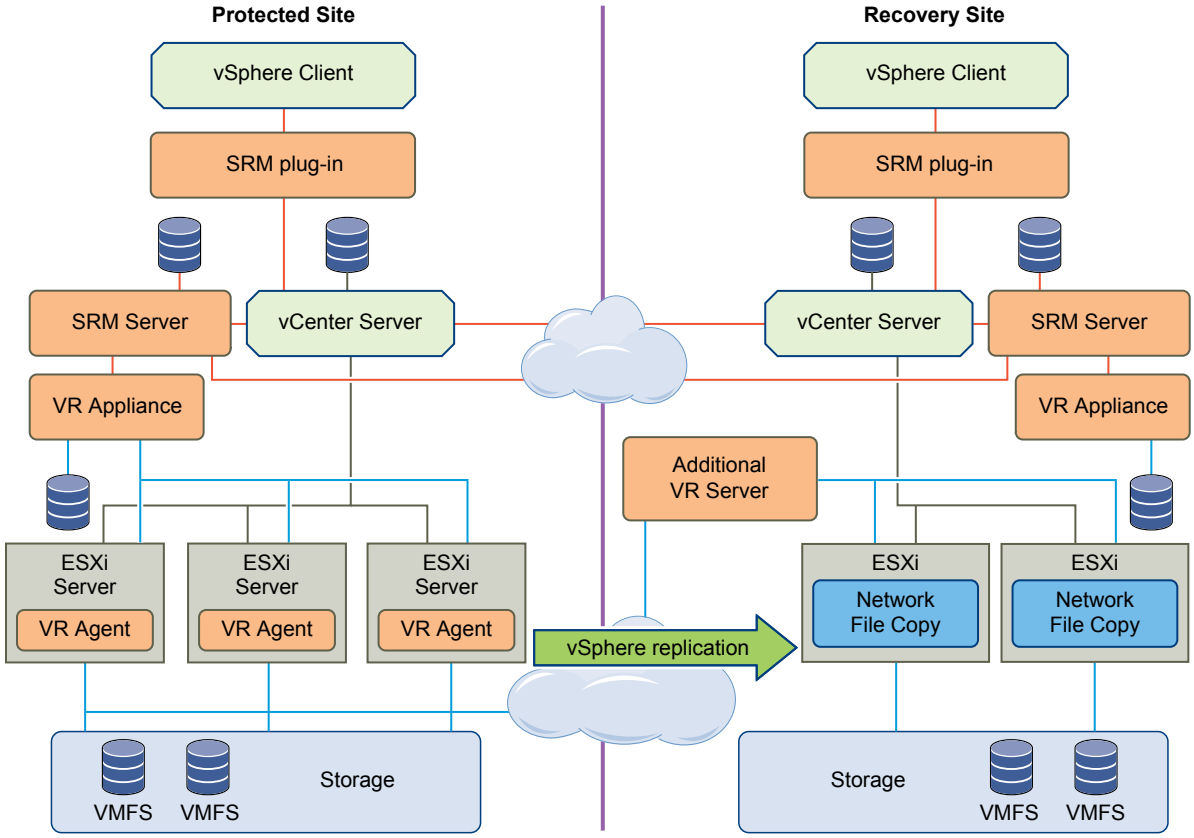
vSphere Replication does not require storage arrays. The vSphere Replication storage replication source and target can be any storage device, including, but not limited to, storage arrays. You can use Virtual SAN (VSAN) storage with vSphere Replication.

NOTE vSphere 5.5 includes Virtual SAN as an experimental feature. You can perform testing with Virtual SAN, but it is not supported for use in a production environment. See the release notes for this release for information about how to enable Virtual SAN.

You can configure vSphere Replication to regularly create and retain snapshots of protected virtual machines on the recovery site. Taking multiple point-in-time (MPIT) snapshots of virtual machines allows you to retain more than one replica of a virtual machine on the recovery site. Each snapshot reflects the state of the virtual machine at a certain point in time. You can select which snapshot to recover when you use vSphere Replication to perform a recovery.

vSphere Replication is compatible with vSphere Storage vMotion and vSphere Storage DRS on the protected site. You can use Storage vMotion and Storage DRS to move the disk files of a virtual machine that vSphere Replication protects, with no impact on replication.

Figure 1-3. SRM Architecture with vSphere Replication



How vSphere Replication Works

With vSphere Replication, you can configure replication of a virtual machine from a source site to a target site, monitor and manage the status of the replication, and recover the virtual machine at the target site.

When you configure a virtual machine for replication, the vSphere Replication agent sends changed blocks in the virtual machine disks from the source site to the target site, where they are applied to the copy of the virtual machine. This process occurs independently of the storage layer. vSphere Replication performs an initial full synchronization of the source virtual machine and its replica copy. You can use replication seeds to reduce the amount of time and bandwidth required for the initial replication.

During replication configuration, you can set a recovery point objective (RPO) and enable retention of instances from multiple points in time (MPIT).

As administrator, you can monitor and manage the status of the replication. You can view information for incoming and outgoing replications, source and target site status, replication issues, and for warnings and errors.

vSphere Replication stores replication configuration data in its embedded database. You can also configure vSphere Replication to use an external database.

Contents of the vSphere Replication Appliance

The vSphere Replication appliance provides all the components that vSphere Replication requires.

- An embedded database that stores replication configuration and management information.
- A vSphere Replication Management Server and a vSphere Replication Server that provide the core of the vSphere Replication infrastructure.

You can use vSphere Replication immediately after you deploy the appliance. The vSphere Replication appliance provides a virtual appliance management interface (VAMI) that you can use to reconfigure the appliance after deployment, if necessary. For example, you can use the VAMI to change the appliance security settings, change the network settings, or configure an external database. You can deploy additional vSphere Replication Servers using a separate .ovf package.

Compatibility of vSphere Replication with Other vSphere Features

vSphere Replication is compatible with certain other vSphere management features.

You can safely use vSphere Replication in combination with certain vSphere features, such as vSphere vMotion. Some other vSphere features, for example vSphere Distributed Power Management, require special configuration for use with vSphere Replication.

Table 1-2. Compatibility of vSphere Replication with Other vSphere Features

vSphere Feature	Compatible with vSphere Replication	Description
vSphere vMotion	Yes	You can migrate replicated virtual machines by using vMotion. Replication continues at the defined recovery point objective (RPO) after the migration is finished.
vSphere Storage vMotion	Yes	You can move the disk files of a replicated virtual machine on the source site using Storage vMotion with no impact on the ongoing replication.
vSphere High Availability	Yes	You can protect a replicated virtual machine by using HA. Replication continues at the defined RPO after HA restarts a virtual machine. vSphere Replication does not perform any special HA handling. You can protect the vSphere Replication appliance itself by using HA.

Table 1-2. Compatibility of vSphere Replication with Other vSphere Features (Continued)

vSphere Feature	Compatible with vSphere Replication	Description
vSphere Fault Tolerance	No	vSphere Replication cannot replicate virtual machines that have fault tolerance enabled. You cannot protect the vSphere Replication appliance itself with FT.
vSphere DRS	Yes	Replication continues at the defined RPO after resource redistribution is finished.
vSphere Storage DRS	Yes	You can move the disk files of a replicated virtual machine on the source site using Storage DRS with no impact on the ongoing replication.
VMware Virtual SAN datastore	Experimental	You can use VMware Virtual SAN datastores as a target datastore when configuring replications. See "Using vSphere Replication with Virtual SAN Storage," on page 16. NOTE vSphere 5.5 includes Virtual SAN as an experimental feature. You can perform testing with Virtual SAN, but it is not supported for use in a production environment. See the release notes for this release for information about how to enable Virtual SAN.
vSphere Distributed Power Management	Yes	vSphere Replication coexists with DPM on the source site. vSphere Replication does not perform any special DPM handling on the source site. Disable DPM on the target site to allow enough hosts as replication targets.
VMware vSphere Flash Read Cache	Yes	You can replicate virtual machines that contain disks that use VMware vSphere Flash Read Cache storage. Since the host to which a virtual machine recovers might not be configured for Flash Read Cache, vSphere Replication disables Flash Read Cache on disks when it starts the virtual machines on the target site. After the recovery, you can migrate the virtual machine to a host with Flash Read Cache storage and restore the original Flash Read Cache setting on the virtual machine.
vCloud APIs	Not applicable	No interaction with vSphere Replication.
vCenter Chargeback	Not applicable	No interaction with vSphere Replication
VMware Data Recovery	Not applicable	No interaction with vSphere Replication.

Using vSphere Replication with Virtual SAN Storage

You can use VMware Virtual SAN datastores as a target datastore when configuring replications.

NOTE vSphere 5.5 includes Virtual SAN as an experimental feature. You can perform testing with Virtual SAN, but it is not supported for use in a production environment. See the release notes for this release for information about how to enable Virtual SAN.

vSphere Replication does not support replicating or recovering virtual machines to the root folders with user-friendly names on Virtual SAN datastores. These names can change, which causes replication errors. When selecting Virtual SAN datastores, always select folders with UUID names, which do not change.

Configuring Replications

When configuring replications for a single virtual machine, vSphere Replication creates the destination folder that you choose, obtains the UUID reference for that folder, and then uses the UUID name rather than the user-friendly name. The UUID name is visible when vSphere Replication displays the target folders when reconfiguring replications.

When configuring replication for multiple virtual machines using the multi-VM wizard, create a root folder in the vSAN datastore, obtain its UUID name and use this folder by the UUID in the replication wizard.

Configuring Replications by Using Replication Seeds

When copying replication seed files to the target datastore, you can use the vSphere Web Client to create a new root folder on a virtual SAN datastore, or place the files in an existing folder. When you configure replications that use replication seeds, you must select the folder by using its UUID name. Selecting the user-friendly folder names is not supported.

Reconfiguring Replications

If you want to change the destination folder for a disk or the virtual machine config files, you must use the following options:

- Select the UUID name of an existing folder.
- Allow vSphere Replication to create a new folder and obtain its UUID name.

Using Array-Based Replication and vSphere Replication with SRM

You can use a combination of array-based replication and vSphere Replication in your SRM deployment.

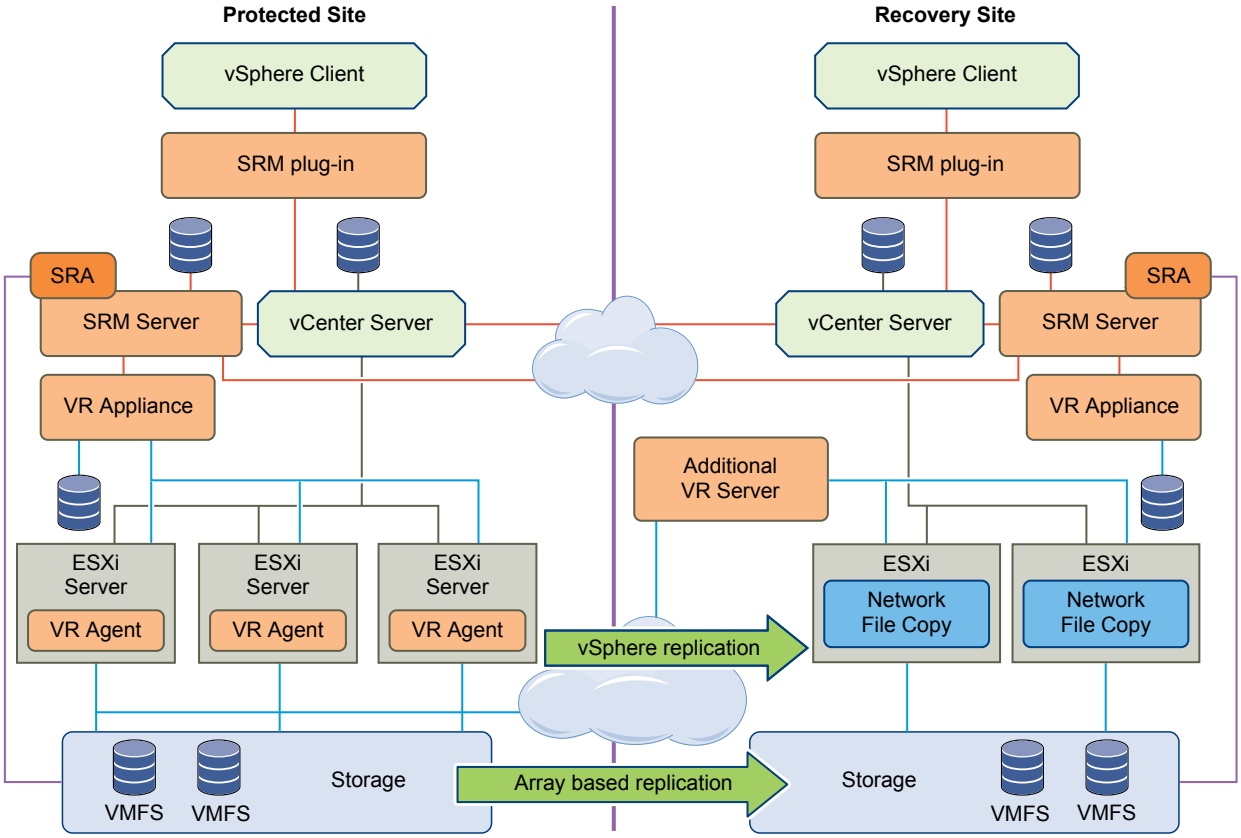
To create a mixed SRM deployment that uses array-based replication and vSphere Replication, you must configure the protected and recovery sites for both types of replication.

- Set up and connect the storage arrays and install the appropriate storage replication adapters (SRA) on both sites.
- Deploy vSphere Replication appliances on both sites and configure the connection between the appliances.
- Configure virtual machines for replication using either array-based replication or vSphere Replication, as appropriate.

  NOTE Do not attempt to configure vSphere Replication on a virtual machine that resides on a datastore that you replicate by using array-based replication.

You create array-based protection groups for virtual machines that you configure with array-based replication, and vSphere Replication protection groups for virtual machines that you configure with vSphere Replication. You cannot mix replication types in a protection group. You can mix array-based protection groups and vSphere Replication protection groups in the same recovery plan.

Figure 1-4. SRM Architecture with Array-Based Replication and vSphere Replication



SRM and vCenter Server

SRM Server operates as an extension to the vCenter Server at a site. Because the SRM Server depends on vCenter Server for some services, you must install and configure vCenter Server at a site before you install SRM.

SRM takes advantage of vCenter Server services, such as storage management, authentication, authorization, and guest customization. SRM also uses the standard set of vSphere administrative tools to manage these services.

You can use SRM and vSphere Replication with the vCenter Server Appliance or with a standard vCenter Server installation. You can have vCenter Server Appliance on one site and a standard vCenter Server installation on the other.

How Changes to vCenter Server Inventory Affect SRM

Because SRM protection groups apply to a subset of the vCenter Server inventory, changes to the protected inventory made by vCenter Server administrators and users can affect the integrity of SRM protection and recovery. SRM depends on the availability of certain objects, such as virtual machines, folders, resource pools, and networks, in the vCenter Server inventory at the protected and recovery sites. Deletion of resources such as folders or networks that are referenced by recovery plans can invalidate the plan. Renaming or relocating objects in the vCenter Server inventory does not affect SRM, unless it causes resources to become inaccessible during test or recovery.

SRM can tolerate certain changes at the protected site without disruption.

- Deleting protected virtual machines.
- Deleting an object for which an inventory mapping exists.

SRM can tolerate certain changes at the recovery site without disruption.

- Moving placeholder virtual machines to a different folder or resource pool.
- Deleting an object for which an inventory map exists.

SRM and the vCenter Server Database

If you update the vCenter Server installation that SRM extends, do not reinitialize the vCenter Server database during the update. SRM stores identification information about all vCenter Server objects in the SRM database. If you reinitialize the vCenter Server database, the identification data that SRM has stored no longer matches identification information in the new vCenter Server instance and objects are not found.

SRM and Other vCenter Server Solutions

You can run other VMware solutions such as vCenter Update Manager, vCenter Server Heartbeat, VMware Fault Tolerance, vSphere Storage vMotion, vSphere Storage DRS, and vCenter CapacityIQ in deployments that you protect using SRM. However, use caution before connecting other VMware solutions to the vCenter Server instance to which the SRM Server is connected. Connecting other VMware solutions to the same vCenter Server instance as SRM might cause problems when you upgrade SRM or vSphere. Check the compatibility and interoperability of these solutions with SRM before by consulting the *VMware Product Interoperability Matrixes* at http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php?.

Site Recovery Manager System Requirements

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The system on which you install vCenter Site Recovery Manager must meet specific hardware requirements.

Table 2-1. SRM System Requirements

Component	Requirement
Processor	2.0GHz or higher Intel or AMD x86 processor
Memory	2GB minimum
Disk Storage	5GB minimum
Networking	1 Gigabit recommended for communication between SRM sites. Use a trusted network for the management of ESXi hosts.

For information about supported platforms and databases, see the *Site Recovery Manager Compatibility Matrixes*, at https://www.vmware.com/support/srm/srm-compat-matrix-5-5.html.

- SRM Licensing on page 21

  After you install SRM, it remains in evaluation mode until you install an SRM license key.

- SRM Network Ports on page 22

  SRM Server instances use several network ports to communicate with each other, with client plug-ins, and with vCenter Server. If any of these ports are in use by other applications or are blocked on your network, you must reconfigure SRM to use different ports.

- Operational Limits of SRM on page 22

  Each SRM server can support a certain number of virtual machines, protection groups, datastore groups, vSphere Replication management server instances per host, and vSphere Replication servers per vSphere Replication appliance.

SRM Licensing

After you install SRM, it remains in evaluation mode until you install an SRM license key.

After the evaluation license expires, existing protection groups remain protected and you can recover them, but you cannot create new protection groups or add virtual machines to an existing protection group until you obtain and assign a valid SRM license key. Obtain and assign SRM license keys as soon as possible after installing SRM.

To obtain SRM license keys, go to the SRM Product Licensing Center at http://www.vmware.com/products/site-recovery-manager/buy.html, or contact your VMware sales representative.

SRM License Keys and vCenter Server Instances in Linked Mode

If your vCenter Server instances are connected with vCenter Server instances in linked mode, you install the same SRM license on both vCenter Server instances.

SRM License Keys and Protected and Recovery Sites

SRM requires a license key that specifies the number of virtual machines that you can protect at a site.

- Install SRM license keys at one site to enable recovery.
- Install the same SRM license keys at both sites to enable bidirectional operation, including reprotect.

SRM checks for a valid license whenever you add a virtual machine to or remove a virtual machine from a protection group. If licenses are not in compliance, vSphere triggers a licensing alarm. Configure alerts for triggered licensing events so that licensing administrators receive a notification by email.

Example: SRM Licenses Required for Recovery and Reprotect

You have a site that contains 25 virtual machines for SRM to protect.

- For failover, you require a license for 25 virtual machines, that you install on the protected site to allow one-way protection from the protected site to the recovery site.
- For reprotect, you require a license for 25 virtual machines, that you install on the protected and the recovery site to allow bidirectional protection between both sites.

SRM Network Ports

SRM Server instances use several network ports to communicate with each other, with client plug-ins, and with vCenter Server. If any of these ports are in use by other applications or are blocked on your network, you must reconfigure SRM to use different ports.

SRM uses default network ports for intrasite communication between hosts at a single site and intersite communication between hosts at the protected and recovery sites. You can change these defaults when you install SRM. Beyond these standard ports, you must also meet network requirements of your particular array-based replication provider.

You can change the network ports from the defaults when you first install SRM. You cannot change the network ports after you have installed SRM.

For a list of all the ports that must be open for SRM and vSphere Replication, see http://kb.vmware.com/kb/1009562.

For the list of default ports that all VMware products use, see http://kb.vmware.com/kb/1012382.

Operational Limits of SRM

Each SRM server can support a certain number of virtual machines, protection groups, datastore groups, vSphere Replication management server instances per host, and vSphere Replication servers per vSphere Replication appliance.

For details about the operational limits of SRM and vSphere Replication, see http://kb.vmware.com/kb/2034768.

Creating the SRM Database 3

The SRM Server requires its own database, which it uses to store data such as recovery plans and inventory information.

The SRM database is a critical part of an SRM installation. You must create the SRM database and establish a database connection before you can install SRM.

SRM cannot use the vCenter Server database because it has different database schema requirements. You can use the vCenter Server database server to create and support the SRM database.

Each SRM site requires its own instance of the SRM database. Use a different database server instance to run the individual SRM databases for each site. If you use the same database server instance to run the databases for both sites, and if the database server experiences a problem, neither SRM site will work and you will not be able to perform a recovery.

SRM does not require the databases on each site to be identical. You can run different versions of a supported database from the same vendor on each site, or you can run databases from different vendors on each site. For example, you can run different versions of Oracle Server on each site, or you can have an Oracle Server database on one site and an SQL Server database on the other.

If you are updating SRM to a new version, you can use the existing database. Before you attempt an SRM environment upgrade, make sure that both SRM Server databases are backed up. Doing so helps ensure that you can revert back to the previous version after the upgrade, if necessary.

For the list of database software that SRM supports, see the *Site Recovery Manager Compatibility Matrixes*.

- Configure Microsoft SQL Server for SRM on page 23

  When you create a Microsoft SQL Server database, you must configure it correctly to support SRM.
- Configure Oracle Server for SRM on page 24

  When you create a Oracle Server database, you must configure it correctly to support SRM.
- Create an ODBC System DSN for SRM on page 24

  You must provide SRM with a system database source name (DSN) for a 64-bit open database connectivity (ODBC) connector. The ODBC connector allows SRM to connect to the SRM database.

Configure Microsoft SQL Server for SRM

When you create a Microsoft SQL Server database, you must configure it correctly to support SRM.

You use SQL Server Management Studio to create and configure an SQL Server database for SRM to use.

This information provides the general steps that you must perform to configure an SQL Server database for SRM to use. For specific instructions, see the SQL Server documentation.

If you install SQL Server on a different machine to SRM Server, both of the SRM Server and SQL Server machines must belong to the same domain. You then create a domain user that has the SQL Server login and that also has access to SRM Server.

For information about database sizing, see the *Sizing calculator for vCenter Site Recovery Manager databases - MSSQL* at http://www.vmware.com/products/site-recovery-manager/resource.html.

Procedure

1 Select an authentication mode when you create the database instance.

Option	Description
Windows authentication	The database user account must be the same user account that you use to run the SRM service.
SQL Authentication	Leave the default local system user.

2 Create the SRM database user account.

3 Grant the SRM database user account the **bulk insert**, **connect**, and **create table** permissions.

4 Create the database schema.

The SRM database schema must have the same name as the database user account.

5 Set the SRM database user as the owner of the SRM database schema.

6 Set the SRM database schema as the default schema for the SRM database user.

7 (Optional) If you are using SQL Server 2012, configure the **`NT AUTHORITY\SYSTEM`** login.

Option	Action
General:: Default database	Type the database name.
Server Roles	Select the **Public** and **Admin** roles.
User Mapping	Select the check box to map the login to the database.

Configure Oracle Server for SRM

When you create a Oracle Server database, you must configure it correctly to support SRM.

You create and configure an Oracle Server database for SRM by using the tools that Oracle Server provides.

This information provides the general steps that you must perform to configure an Oracle Server database for SRM. For instructions about how to perform the relevant steps, see the Oracle documentation.

For information about database sizing, see the *Sizing calculator for vCenter Site Recovery Manager databases - Oracle* at http://www.vmware.com/products/site-recovery-manager/resource.html.

Procedure

1 When creating the database instance, specify UTF-8 encoding.

2 Create the SRM database user account.

3 Grant the SRM database user account the **connect**, **resource**, **create session** privileges and permissions.

Create an ODBC System DSN for SRM

You must provide SRM with a system database source name (DSN) for a 64-bit open database connectivity (ODBC) connector. The ODBC connector allows SRM to connect to the SRM database.

You can create the ODBC system DSN before you run the SRM installer by running `Odbcad32.exe`, the 64-bit Windows ODBC Administrator tool.

Alternatively, you can create an ODBC system DSN by running the Windows ODBC Administrator tool during the SRM installation process.

Prerequisites

You created the database instance to connect to SRM.

Procedure

1 Double-click the `Odbcad32.exe` file at `C:\Windows\System32` to open the 64-bit ODBC Administrator tool.

IMPORTANT Do not confuse the 64-bit Windows ODBC Administrator tool with the 32-bit ODBC Administrator tool located in `C:\Windows\SysWoW64`. Do not use the 32-bit ODBC Administrator tool.

2 Click the **System DSN** tab and click **Add**.

3 Select the appropriate ODBC driver for your database software and click **Finish**.

Option	Action
SQL Server	Select **SQL Server Native Client 10.0**.
Oracle Server	Select **Microsoft ODBC for Oracle**.

4 (Optional) Create a SQL Server data source for the database.

a Provide the details for the data source.

Option	Action
Name	Type a name for this data source, for example **SRM**.
Description	Type a description of the data source, for example **SRM**.
Server	Select the running database instance to which to connect or type the address of the database server.

b Select the authentication method that corresponds to the database that you created and click **Next**.

c Click **Next** to retain the default settings for this database connection and click **Finish**.

5 (Optional) Create an Oracle Server data source for the database and click **Next**.

Option	Action
Data Source Name	Type a name for this data source, for example **SRM**.
Description	Type a description of the data source, for example **SRM**.
TNS Service Name	Type the address of the database server in the format ***database_server_address*:1521/*database_name***.
User ID	Type the database user name.

6 Click **Test Data Source** to test the connection and click **OK** if the test succeeds.

If the test does not succeed, check the configuration information and try again.

7 Click **OK** to exit the Windows ODBC Administrator tool.

The ODBC driver for your database is ready to use.

SRM Authentication 4

All communications between SRM and vCenter Server instances take place over SSL connections and are authenticated by public key certificates or stored credentials.

When you install an SRM Server, you must choose either credential-based authentication or custom certificate-based authentication. By default, SRM uses credential-based authentication, but custom certificate-based authentication can alternatively be selected. The authentication method you choose when installing the SRM Server is used to authenticate connections between the SRM Server instances at the protected and recovery sites, and between SRM and vCenter Server.

IMPORTANT You cannot mix authentication methods between SRM Server instances at different sites and between SRM and vCenter Server.

Credential-Based Authentication

This is the default authentication method that SRM uses. If you are using credential-based authentication, SRM stores a user name and password that you specify during installation, and then uses those credentials when connecting to vCenter Server. SRM also creates a special-purpose certificate for its own use. This certificate includes additional information that you supply during installation.

NOTE Even though SRM creates and uses this special-purpose certificate when you choose credential-based authentication, credential-based authentication is not equivalent to certificate-based authentication in either security or operational simplicity.

Custom Certificate-Based Authentication

If you have or can acquire a PKCS#12 certificate signed by a trusted authority, use custom certificate-based authentication. Public key certificates signed by a trusted authority streamline many SRM operations and provide the highest level of security. Custom certificates that SRM uses have special requirements. See "Requirements When Using Public Key Certificates with SRM," on page 28.

If you use custom certificate-based authentication, you must use certificates signed by trusted authority on the vCenter Server and SRM Server instances on both the protected site and the recovery site.

Certificate Warnings

If you are using credential-based authentication, attempts by the SRM Server to connect to vCenter Server produce a certificate warning because the trust relationship asserted by the special-purpose certificates created by SRM and vCenter Server cannot be verified by SSL. A warning allows you to verify the thumbprint of the certificate used by the other server and confirm its identity. To avoid these warnings, use certificate-based authentication and obtain your certificate from a trusted certificate authority.

Requirements When Using Public Key Certificates with SRM

If you installed SSL certificates issued by a trusted certificate authority (CA) on the vCenter Server that supports SRM, the certificates you create for use by SRM must meet specific criteria.

While SRM uses standard PKCS#12 certificate for authentication, it places a few specific requirements on the contents of certain fields of those certificates. These requirements apply to the certificates used by both members of an SRM Server pair.

NOTE The certificate requirements for vSphere Replication differ from those of SRM. If you use vSphere Replication with public key certificates, see "Requirements When Using a Public Key Certificate with vSphere Replication," on page 59.

- The certificates must have a Subject Name value constructed from the following components.
  - A Common Name (CN) attribute, the value of which must be the same for both members of the pair. A string such as **`SRM`** is appropriate here.
  - An Organization (O) attribute, the value of which must be the same as the value of this attribute in the supporting vCenter Server certificate.
  - An Organizational Unit (OU) attribute, the value of which must be the same as the value of this attribute in the supporting vCenter Server certificate.
- The certificate used by each member of an SRM Server pair must include a Subject Alternative Name attribute the value of which is the fully-qualified domain name of the SRM Server host. This value will be different for each member of the SRM Server pair. Because this name is subject to a case-sensitive comparison, use lowercase letters when specifying the name during SRM installation.
  - If you are using an openssl CA, modify the openssl configuration file to include a line like the following if the SRM Server host's fully-qualified domain name is srm1.example.com:

    ```
    subjectAltName = DNS: srm1.example.com
    ```

  - If you are using a Microsoft CA, refer to http://support.microsoft.com/kb/931351 for information on how to set the Subject Alternative Name.
- If both SRM Server and vCenter Server run on the same host machine, you must provide two certificates, one for SRM and one for vCenter Server. Each certificate must have the Subject Alternative Name attribute set to the fully-qualified domain name of the host machine. Consequently, from a security perspective, it is better to run SRM Server and vCenter Server on different host machines.
- The certificate used by each member of an SRM Server pair must include an `extendedKeyUsage` or `enhancedKeyUsage` attribute the value of which is `serverAuth, clientAuth`. If you are using an openssl CA, modify the openssl configuration file to include a line like the following:

  ```
  extendedKeyUsage = serverAuth, clientAuth
  ```

- The SRM certificate password must not exceed 31 characters.
- The SRM certificate key length must be a minimum of 2048-bits.
- SRM accepts certificates with MD5RSA and SHA1RSA signature algorithms, but these are not recommended. Use SHA256RSA or stronger signature algorithms.

  NOTE vSphere Replication does not support or accept MD5RSA certificates.

Installing SRM 5

You must install an SRM Server at the protected site and also at the recovery site.

SRM requires a vCenter Server instance of the equivelent version at each site before you install SRM Server. The SRM installer must be able to connect with this vCenter Server instance during installation.

After you install the SRM Server instances, you can download the SRM client plug-in from the SRM Server instance by using the **Manage Plug-ins** menu from your vSphere Client. You use the SRM client plug-in to configure and manage SRM at each site.

Procedure

1 Install the SRM Server on page 29

You must install an SRM Server at the protected site and at the recovery site.

2 Install the SRM Client Plug-In on page 32

To install the SRM client plug-in, you use a vSphere Client to connect to the vCenter Server at the protected or recovery site. You download the plug-in from the SRM Server and enable it in the vSphere Client.

3 Connect to SRM on page 33

You use the vSphere Client to connect to SRM.

4 Connect the Protected and Recovery Sites on page 33

Before you can use SRM, you must connect the protected and recovery sites. The sites must authenticate with each other. This is known as site pairing.

5 Install the SRM License Key on page 34

The SRM Server requires a license key to operate. Install an SRM license key as soon as possible after you install SRM.

6 Modify the Installation of an SRM Server on page 35

To change the information that you supplied when you installed the SRM Server, you can run the SRM installer in modify mode.

7 Repair the Installation of an SRM Server on page 36

You can run the SRM installer in repair mode to repair an SRM Server installation.

Install the SRM Server

You must install an SRM Server at the protected site and at the recovery site.

SRM requires the equivalent version of vCenter Server. You must install the same version of SRM Server and vCenter Server on both sites. You cannot mix SRM and vCenter Server versions across sites.

For environments with a small number of virtual machines to protect, you can run SRM Server and vCenter Server on the same system. For environments that approach the maximum limits of SRM and vCenter Server, install SRM Server on a system that is different from the system on which vCenter Server is installed. If SRM Server and vCenter Server are installed on the same system, administrative tasks might become more difficult to perform in large environments.

If you are upgrading an existing SRM installation, see Chapter 6, "Upgrading SRM," on page 39.

Prerequisites

- Install the same version of vCenter Server as the version of SRM to install.
- Configure and start the SRM database service before you install the SRM Server. See Chapter 3, "Creating the SRM Database," on page 23.
- Download the SRM installation file to a folder on the machine on which to install SRM.
- SRM requires a database source name (DSN) for 64-bit open database connectivity (ODBC). You can create the ODBC system DSN before you run the SRM installer, or you can create the DSN during the installation process. For details about creating the ODBC system DSN, see "Create an ODBC System DSN for SRM," on page 24.
- Verify that you have the following information:
  - A user account with sufficient privileges to install SRM. This account is often an Active Directory domain administrator, but can also be a local administrator.
  - The fully qualified domain name (FQDN) or IP address of the site's vCenter Server instance. The server must be running and accessible during SRM installation. You must use the address format that you use to connect SRM to vCenter Server when you later pair the SRM sites. Using FQDNs is preferred, but if that is not universally possible, use IP addresses for all cases.
  - The user name and password of the vCenter Server administrator account.
  - A user name and password for the SRM database.
  - If you are using certificate-based authentication, the pathname to an appropriate certificate file. See Chapter 4, "SRM Authentication," on page 27 and "Requirements When Using Public Key Certificates with SRM," on page 28.

Procedure

1 Double-click the SRM installer icon, select an installation language, and click **OK**.

2 Follow the prompts and accept the license agreement.

3 Click **Change** to change the folder in which to install SRM, select a target volume, and click **Next**.

The default installation folder for SRM is `C:\Program Files\VMware\VMware vCenter Site Recovery Manager`. If you use a different folder, the pathname cannot be longer than 170 characters including the end slash, and cannot include non-ASCII characters.

4 Select whether to install vSphere Replication and click **Next**.

If you connect SRM to a vCenter Server instance that is already running vSphere Replication as a registered extension, you must still select the **Install vSphere Replication** option. Selecting this option installs components that SRM requires to work with vSphere Replication. You can also install vSphere Replication after you install SRM by running the installer again in Repair mode.

5 Type information about the vCenter Server instance at the site where you are installing SRM and click **Next**.

Option	Action
vCenter Server Address	Type the host name or IP address of vCenter Server. Enter the host name in lowercase letters. After installation is complete and you are configuring the connection between the protected and recovery sites, supply this host name or IP address exactly as you enter it here, because it is subject to case-sensitive comparisons. IMPORTANT Note the address format that you use to connect SRM to vCenter Server. You must use the same address format when you later pair the SRM sites. If you use an IP address to connect SRM to vCenter Server, you must use this IP address when pairing the SRM sites. If you use certificate-based authentication, the address of SRM Server must be the same as the Subject Alternative Name (SAN) value of the SRM certificate. This is usually the fully qualified domain name of the SRM Server host.
vCenter Server Port	Accept the default or enter a different port.
vCenter Server Username	Type the user name of an administrator of the specified vCenter Server instance.
vCenter Server Password	Type the password for the specified user name. The password text box cannot be empty.

6 (Optional) If you are using credential-based authentication, verify the vCenter Server certificate and click **Yes** to accept it.

If you are using certificate-based authentication, there is no prompt to accept the certificate.

7 Select an authentication method and click **Next**.

Option	Description
Use credential-based authentication	a Select **Automatically generate certificate** and click **Next**. b Type text values for your organization and organization unit, typically your company name and the name of your group in the company.
Use certificate-based authentication	a Select **Use a PKCS #12 certificate file** and click **Next**. b Type the path to the certificate file. The certificate file must contain exactly one certificate with exactly one private key matching the certificate. c Type the certificate password. d The local host value must be the same as the Subject Alternative Name (SAN) value of the SRM Server certificate. This is usually the fully qualified domain name of the SRM Server host.

8 Type the administrator and host configuration information and click **Next**.

Option	Description
Local Site Name	A name for this installation of SRM. A suggested name is generated, but you can type any name. It cannot be the same name that you use for another SRM installation with which this one will be paired.
Administrator E-mail	Email address of the SRM administrator, for potential use by vCenter Server.
Additional E-mail	An optional email address of another SRM administrator, for potential use by vCenter Server.

Option	Description
Local Host	Name or IP address of the local host. This value is obtained by the SRM installer and needs to be changed only if it is incorrect. For example, the local host might have more than one network interface and the one detected by the SRM installer is not the interface you want to use. If you use certificate-based authentication, the **Local Host** value must be the same as the SAN value of the supplied certificate. This is usually the fully qualified domain name of the SRM Server host.
Listener Ports	SOAP and HTTP port numbers to use.
API Listener Port	SOAP port number for API clients to use.

The SRM installer supplies default values for the listener ports. Do not change them unless the defaults would cause port conflicts.

9 Provide the SRM database configuration information and click **Next**.

Option	Action
Database Client	Select a database client type from the drop-down menu.
Data Source Name	Select an existing 64-bit DSN from the drop-down menu. You can also click **ODBC DSN Setup** to start the Windows 64-bit ODBC Administrator tool, to view the existing DSNs, or to create a new 64-bit system DSN.
Username	Type a user ID valid for the specified database.
Password	Type the password for the specified user ID.
Connection Count	Type the initial connection pool size. If all connections are in use and a new one is needed, a connection is created as long as it does not exceed the maximum number of connections allowed. It is faster for SRM to use a connection from the pool than to create one. In most cases, it is not necessary to change this setting. Before changing this setting, consult with your database administrator.
Max Connections	Type the maximum number of database connections that can be open simultaneously. If the database administrator has restricted the number of connections that the database can have open, this value cannot exceed that number. In most cases, it is not necessary to change this setting. Before changing this setting, consult with your database administrator.

10 Click **Install**.

11 When the installation is finished, click **Finish**.

What to do next

Repeat the installation process on the recovery site.

Install the SRM Client Plug-In

To install the SRM client plug-in, you use a vSphere Client to connect to the vCenter Server at the protected or recovery site. You download the plug-in from the SRM Server and enable it in the vSphere Client.

When you install the SRM Server, the SRM client plug-in becomes available as a download from the vCenter Server instance that the SRM Server installation extends. You can download, install, and enable the SRM client plug-in on any host where a vSphere Client is installed.

Prerequisites

Verify that you installed SRM Server instances at the protected and recovery sites.

Procedure

1 Start the vSphere Client and connect to vCenter Server at either the protected or recovery site.

2 Select **Plugins > Manage Plug-ins**.

3 Under **Available Plug-ins**, locate **VMware vCenter Site Recovery Manager Extension** and click **Download and Install**.

4 Review and accept the certificate.

This step only occurs if you use certificate-based authentication.

5 After the download finishes, click **Run** to start the installation wizard, select the installation language, and click **OK**.

6 Click **Next** to start the installation, then click **Next** again at the VMware Patents page.

7 Select **I accept the terms in the license agreement**, and click **Next**.

8 Click **Install**.

9 When the installation finishes, click **Finish**.

If the installation replaced any open files, you are prompted to shut down and restart Windows.

Connect to SRM

You use the vSphere Client to connect to SRM.

SRM does not require that you connect to a specific SRM site in an SRM deployment. You can change the protected and recovery sites by connecting to vCenter Server at either site.

Prerequisites

- Verify that you installed SRM Server instances at the protected and recovery sites.
- Verify that you installed the SRM client plug-in in the vSphere Client.
- Verify that you have a user account that is paired with a role that has the necessary permissions to connect to SRM.

Procedure

1 Open a vSphere Client and connect to vCenter Server on either the protected site or the recovery site.

2 On the vSphere Client Home page, click the **Site Recovery** icon.

Connect the Protected and Recovery Sites

Before you can use SRM, you must connect the protected and recovery sites. The sites must authenticate with each other. This is known as site pairing.

When you enter the address of the vCenter Server instance on the recovery site, take a note of the address format that you use. You must use the same address format that you use to connect the SRM sites for later configuration operations. You must enter exactly the same vCenter Server address format here that you entered when installing the SRM Server at the recovery site. If you used an IP address when installing the SRM Server at the recovery site, use an IP address to pair the SRM sites. If you entered a hostname when installing the SRM Server, use the same hostname to pair the SRM sites.

Important SRM does not support network address translation (NAT). If the network that you use to connect the SRM sites uses NAT, attempting to connect the sites results in an error. Use credential-based authentication and network routing without NAT when connecting the sites.

If you are using an untrusted certificate, several of the steps in this procedure produce certificate warnings. You can ignore the warnings.

Prerequisites

- Verify that you installed SRM Server instances at the protected and recovery sites.
- Verify that you installed the SRM client plug-in in the vSphere Client.

Procedure

1 In the vSphere Client, connect to the SRM Server on the protected site.

2 Click **Sites** in the left pane and click **Configure Connection** on either the **Summary** tab or the **Getting Started** tab.

3 On the Remote Site Information page, type the IP address or hostname of the vCenter Server instance at the recovery site and the port to which to connect and click **Next**.

Port 80 is used for the initial connection to the remote site. After the initial HTTP connection is made, the two sites establish an SSL connection for subsequent connections.

4 On the vCenter Server Authentication page, provide the vCenter administrator user name and password for the recovery site and click **Next**.

You must enter exactly the same information here that you entered when installing the SRM Server at the recovery site.

5 On the Complete Connections page, click **Finish** after all of the site paring steps have completed successfully.

6 In the Remote vCenter Server window, enter credentials for the vCenter Server instance at the recovery site.

7 Connect another vSphere Client instance to the vCenter Server instance on the recovery site and go to the SRM interface.

8 In the Remote vCenter Server window, enter credentials for the vCenter Server instance at the protected site.

Install the SRM License Key

The SRM Server requires a license key to operate. Install an SRM license key as soon as possible after you install SRM.

SRM uses the vSphere licensing infrastructure for license management. Additionally, vSphere itself needs to be licensed sufficiently for SRM to protect and recover virtual machines.

Procedure

1 Open a vSphere Client and connect to a vCenter Server instance on which SRM is installed.

2 On the vSphere Client Home page, click **Licensing**.

3 For the **View by** mode, select **Product**.

4 Click **Manage vSphere Licenses**.

5 On the Add License Keys page, enter the SRM license key in the **vSphere license keys** text box, type an optional label for the key, and click **Add License Keys**.

6 Review the details of the SRM license and click **Next**.

7 Click the **Solutions** tab in the Assign Licenses page.

8 Select **VMware vCenter Site Recovery Manager** in the **Asset** panel.

9 Select the SRM license key from the list of available licenses, and click **Next**.

10 Click **Next** to skip the Remove License Keys page.

11 Click **Finish** to confirm the license changes.

What to do next

Repeat the process to assign SRM license keys to all appropriate vCenter Server instances.

Modify the Installation of an SRM Server

To change the information that you supplied when you installed the SRM Server, you can run the SRM installer in modify mode.

Installing the SRM Server binds the installation to a number of values that you supply, including the vCenter Server instance to extend, the SRM database DSN and credentials, the type of authentication, and so on. The SRM installer supports a modify mode that allows you to change certain values that you configured when you installed SRM Server.

- The user name and password of the vCenter Server administrator
- The user name, password, and connection numbers for the SRM database
- The type of authentication (certificate-based or credential-based), the authentication details, or both

The installer's modify mode presents modified versions of some of the pages that are part of the SRM Server installation.

CAUTION Updating the certificate affects the thumbprint, which can affect the connection between the protected site and the recovery site. Check the connection between the protected site and the recovery site after you run the installer in modify mode. For information about how to configure the connection between the protected site and the recovery site, see "Connect the Protected and Recovery Sites," on page 33.

Prerequisites

Verify that you have administrator privileges on the SRM Server or that you are a member of the Administrators group. If you are a member of the Administrators group but you are not an administrator, disable Windows User Account Control (UAC) before you attempt the change operation.

Procedure

1 Log in to the SRM Server host.

2 Open **Programs and Features** from the Windows Control Panel.

3 Select the entry for **VMware vCenter Site Recovery Manager** and click **Change**.

4 Click **Next**.

5 Select **Modify** and click **Next**.

6 Type the username and password for the vCenter Server instance.

You cannot use the installer's repair or modify mode to change the vCenter Server address or port. When you click **Next**, the installer contacts the specified vCenter Server instance and validates the information you supplied.

7 Select an authentication method and click **Next**.

Option	Description
Leave the current authentication method unchanged	Select **Use existing certificate**. If the installed certificate is not valid, this option is unavailable.
Use credential-based authentication	Select **Automatically generate certificate** to generate a new certificate.
Use certificate-based authentication	Select **Use a PKCS #12 certificate file** to upload a new certificate.

If you do not select **Use existing certificate**, you are prompted to supply additional authentication details such as certificate location or strings to use for Organization and Organizational Unit.

8 Provide or change the database configuration information and click **Next**.

Option	Description
Username	A user ID valid for the specified database.
Password	The password for the specified user ID.
Connection Count	The initial connection pool size.
Max Connections	The maximum number of database connection open simultaneously.

9 Select **Use existing database** or **Recreate the database** and click **Next**.

Option	Description
Use existing database	Preserves the contents of the existing database.
Recreate the database	Overwrites the existing database and deletes its contents.

10 Click **Install** to modify the installation.

The installer makes the requested modifications and restarts the SRM Server.

11 When the modification operation is finished and the SRM Server restarts, log in to the SRM interface in the vSphere Client to check the status of the connection between the protected site and the recovery site.

12 (Optional) If the connection between the protected site and the recovery site is broken, reconfigure the connection, starting from the SRM Server that you updated.

Repair the Installation of an SRM Server

You can run the SRM installer in repair mode to repair an SRM Server installation.

Running the installer in repair mode fixes missing or corrupted files, shortcuts, and registry entries in the SRM Server installation. Running the installer in repair mode also allows you to install vSphere Replication if you did not do so when you installed SRM.

Caution Do not run the SRM installer in repair mode on the protected site and on the recovery site simultaneously.

Prerequisites

Verify that you have administrator privileges on the SRM Server or that you are a member of the Administrators group. If you are a member of the Administrators group but you are not an administrator, disable Windows User Account Control (UAC) before you attempt the change operation.

Procedure

1 Log in to the SRM Server host.

2 Open **Programs and Features** from the Windows Control Panel.

3 Select the entry for **VMware vCenter Site Recovery Manager** and click **Change**.

4 Click **Next**.

5 Select **Repair** and click **Next**.

6 (Optional) If you did not install vSphere Replication when you installed SRM, select whether to install it now.

   If you already installed vSphere Replication, this option does not appear.

7 Click **Install** to repair the installation and optionally install vSphere Replication.

   The installer makes the requested repairs, optionally installs vSphere Replication, and restarts the SRM Server.

Upgrading SRM 6

You can upgrade existing SRM installations. The SRM upgrade process preserves existing information about SRM configurations.

You must upgrade versions of SRM earlier than 5.0 to SRM 5.0 or 5.0.1 before you can upgrade to SRM 5.5.

IMPORTANT Upgrading vCenter Server directly from 4.1.x to 5.5 is a supported upgrade path. However, upgrading SRM directly from 4.1.x to 5.5 is not a supported upgrade path. When upgrading a vCenter Server 4.1.x instance that includes an SRM installation, you must upgrade vCenter Server to version 5.0.x before you upgrade SRM to 5.0 or 5.0.1. If you upgrade vCenter Server from 4.1.x to 5.5 directly, when you attempt to upgrade SRM from 4.1.x to 5.0 or 5.0.1, the SRM upgrade fails. SRM 5.0.x cannot connect to a vCenter Server 5.5 instance.

For the supported upgrade paths for other SRM releases, see the release notes for those releases. Alternatively, see the Solution Upgrade Path section of the *VMware Product Interoperability Matrixes* at http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php?.

To revert to SRM 5.0.x or 5.1.x after upgrading to SRM 5.5, see "Revert to a Previous Release of SRM," on page 47.

Information That SRM Upgrade Preserves

The SRM upgrade procedure preserves information from existing installations.

SRM preserves settings and configurations that you created for the previous release.

- Datastore groups

- Protection groups
- Inventory mappings
- Recovery plans
- IP customizations for individual virtual machines
- Custom roles and their memberships
- SRM object permissions in vSphere
- Custom alarms and alarm actions
- Test plan histories
- Security certificates
- Mass IP customization files (CSVs)

IMPORTANT During an upgrade, SRM preserves only protection groups and recovery plans that are in a valid state. SRM discards protection groups or recovery plans that are in an invalid state.

Types of Upgrade that SRM Supports

Upgrading SRM requires that you upgrade vCenter Server. SRM supports different upgrade configurations.

Table 6-1. Types of vCenter Server and SRM Upgrades

Upgrade Type	Description	Supported
In-place upgrade of SRM	The simplest upgrade path. This path involves upgrading the vCenter Server instances associated with SRM before upgrading SRM Server.	Yes
Upgrade SRM with migration	To migrate an SRM to a different host or virtual machine as part of the SRM upgrade, stop the existing SRM Server. Do not uninstall the previous release of SRM Server and make sure that you retain the database contents. Run the new version of the SRM installer on the new host or virtual machine, connecting to the existing database.	Yes
New SRM Server installation with migration	Create new installations of vCenter Server and migrate SRM Server to these new vCenter Server instances.	No. You cannot migrate SRM Server to a new installation of vCenter Server. SRM requires unique object identifiers on the vCenter Server that are not available if you use a new vCenter Server installation. To use a new vCenter Server installation you must create a new SRM Server installation.

Order of Upgrading vSphere and SRM Components

You must upgrade the components in your vSphere and SRM environment in the correct order.

You must upgrade certain components of your vSphere environment before you upgrade SRM. You must upgrade SRM Server before you upgrade other SRM components and vSphere Replication.

Upgrade the components on the protected site before you upgrade the components on the recovery site. Upgrading the protected site first allows you to perform a disaster recovery on the recovery site if you encounter problems during the upgrade that render the protected site unusable. The exception is the ESXi hosts, which you can upgrade after you finish upgrading the other components on the protected and recovery sites.

IMPORTANT If you configured bidirectional protection, in which each site acts as the recovery site for the virtual machines on the other site, upgrade the most critical of the sites first.

1 Upgrade vCenter Server on the protected site.

2 Upgrade SRM Server on the protected site.

3 Upgrade the storage replication adapters (SRA) on the protected site.

4 Upgrade the vSphere Replication appliance on the protected site.

5 Upgrade any additional vSphere Replication server instances on the protected site.

6 Upgrade vCenter Server on the recovery site.

7 Upgrade SRM Server on the recovery site.

8 Upgrade the storage replication adapters (SRA) on the recovery site.

9 Upgrade the vSphere Replication appliance on the recovery site.

10 Upgrade any additional vSphere Replication server instances on the recovery site.

11 Configure the connection between the SRM sites and vSphere Replication appliances.

12 Verify that your protection groups and recovery plans are still valid.

13 Upgrade ESXi Server on the recovery site.

14 Upgrade ESXi Server on the protected site.

15 Upgrade the virtual hardware and VMware Tools on the virtual machines on the ESXi hosts.

Upgrade SRM

You perform several tasks to upgrade SRM.

You must perform the upgrade tasks in order. Complete all of the upgrade tasks on the protected site first, then complete the tasks on the recovery site.

Prerequisites

You must upgrade versions of SRM earlier than 5.0 to SRM 5.0 or 5.0.1 before you can upgrade to SRM 5.5.

IMPORTANT Upgrading vCenter Server directly from 4.1.x to 5.5 is a supported upgrade path. However, upgrading SRM directly from 4.1.x to 5.5 is not a supported upgrade path. When upgrading a vCenter Server 4.1.x instance that includes an SRM installation, you must upgrade vCenter Server to version 5.0.x before you upgrade SRM to 5.0 or 5.0.1. If you upgrade vCenter Server from 4.1.x to 5.5 directly, when you attempt to upgrade SRM from 4.1.x to 5.0 or 5.0.1, the SRM upgrade fails. SRM 5.0.x cannot connect to a vCenter Server 5.5 instance.

Procedure

1 Prepare for SRM Upgrade on page 42

Before you can upgrade SRM, you must perform preparatory tasks.

2 Upgrade the SRM Server Without Migration on page 42

You can upgrade the SRM Server on the same host as an existing SRM Server installation.

3 Upgrade the SRM Server with Migration on page 44

You can upgrade SRM and migrate the SRM Server to a different host than the previous SRM Server installation.

4 Upgrade the SRM Client Plug-In on page 46

You must upgrade the SRM client plug-in for all vSphere Client instances that you use to manage SRM.

5 Configure the Upgraded SRM Installation on page 47

You must configure the upgraded components to establish a working SRM installation.

Prepare for SRM Upgrade

Before you can upgrade SRM, you must perform preparatory tasks.

SRM 5.0.x uses a 32-bit open database connectivity (ODBC) database source name (DSN), but SRM 5.5 requires a 64-bit DSN to connect to the SRM database. If you are upgrading from SRM 5.0.x, you must create a 64-bit DSN. See "Create an ODBC System DSN for SRM," on page 24.

Prerequisites

You must upgrade versions of SRM earlier than 5.0 to SRM 5.0 or 5.0.1 before you can upgrade to SRM 5.5.

IMPORTANT Upgrading vCenter Server directly from 4.1.x to 5.5 is a supported upgrade path. However, upgrading SRM directly from 4.1.x to 5.5 is not a supported upgrade path. When upgrading a vCenter Server 4.1.x instance that includes an SRM installation, you must upgrade vCenter Server to version 5.0.x before you upgrade SRM to 5.0 or 5.0.1. If you upgrade vCenter Server from 4.1.x to 5.5 directly, when you attempt to upgrade SRM from 4.1.x to 5.0 or 5.0.1, the SRM upgrade fails. SRM 5.0.x cannot connect to a vCenter Server 5.5 instance.

Procedure

1 Log in to the machine on the protected site on which you have installed SRM.

2 Back up the SRM database by using the tools that the database software provides.

3 (Optional) If you are upgrading from SRM 5.0.x, create a 64-bit DSN.

4 Upgrade the vCenter Server instance to which SRM connects to vCenter Server 5.5.

If you are upgrading from vCenter Server and SRM 4.1.x, you must upgrade the vCenter Server and SRM Server instances in the correct sequence before you can upgrade to SRM 5.5.

a Upgrade vCenter Server from 4.1.x to 5.0.x.

b Upgrade SRM from 4.1.x to 5.0.x.

c Upgrade vCenter Server from 5.0.x to 5.5.

Upgrade the SRM Server Without Migration

You can upgrade the SRM Server on the same host as an existing SRM Server installation.

To upgrade SRM and migrate the SRM Server to a different host, see "Upgrade the SRM Server with Migration," on page 44.

When you upgrade an existing version of the SRM Server, the SRM installer reuses information about vCenter Server connections, certificates, and database configuration from the existing installation. The installer populates the text boxes in the installation wizard with the values from the previous installation.

An upgrade without migration provides a quick way to upgrade the SRM Server to a new release without changing any of the information that you provided for the current installation. To change any installation information, for example, database connections, the authentication method, certificate location, or administrator credentials, you must run the installer in modify mode after you upgrade an existing SRM Server.

If you connect SRM to a vCenter Server instance that is already running vSphere Replication as a registered extension, you must still select the **Install vSphere Replication** option. Selecting this option installs components that SRM requires to work with vSphere Replication. You can also install vSphere Replication after you install SRM by running the installer again in Repair mode.

If existing configuration information is invalid for the upgrade, the upgrade fails. For example, the upgrade fails if the database is not accessible at the same DSN, or if vCenter Server is not accessible at the same port.

IMPORTANT If you created custom permissions that you assigned to the SRM 5.0 service instance, you must upgrade the SRM Server with migration. If you upgrade the SRM Server without migration, custom permissions are lost. See "Upgrade the SRM Server with Migration," on page 44.

Prerequisites

- You completed the tasks in "Prepare for SRM Upgrade," on page 42.
- Log into the SRM host to upgrade. Log in using an account with sufficient privileges. This is often an Active Directory domain administrator, but can also be a local administrator.
- Download the SRM installation file to a folder on the SRM Server host.

Procedure

1. Double-click the SRM installer icon, select an installation language, and click **OK**.
2. If you are upgrading from SRM 5.0.x, click **OK** to confirm that you created a 64-bit ODBC DSN to connect SRM to the existing database.

   This prompt does not appear when you upgrade from SRM 5.1.
3. Follow the prompts and accept the license agreement.
4. Click **Change** to change the folder in which to install SRM, select a target volume, and click **Next**.

   The default installation folder for SRM is `C:\Program Files\VMware\VMware vCenter Site Recovery Manager`. If you use a different folder, the pathname cannot be longer than 170 characters including the end slash, and cannot include non-ASCII characters.
5. Select whether to install vSphere Replication and click **Next**.
6. Provide the username and password for vCenter Server and click **Next**.

   You cannot change the vCenter Server instance to which SRM connects. To connect to a different vCenter Server instance, you must install a new SRM Server.
7. (Optional) If you are using credential-based authentication, verify the vCenter Server certificate and click **Yes** to accept it.

   If you are using certificate-based authentication, there is no prompt to accept the certificate.
8. Click **Yes** to confirm that you want to overwrite the existing SRM extension on this vCenter Server instance.

9 Select an authentication method and click **Next**.

Option	Description
Use credential-based authentication	a Select **Automatically generate certificate** and click **Next**. b Type text values for your organization and organization unit, typically your company name and the name of your group in the company.
Use certificate-based authentication	a Select **Use a PKCS #12 certificate file** and click **Next**. b Type the path to the certificate file. The certificate file must contain exactly one certificate with exactly one private key matching the certificate. c Type the certificate password. d The local host value must be the same as the Subject Alternative Name (SAN) value of the SRM Server certificate. This is usually the fully qualified domain name of the SRM Server host.

10 Verify the Administrator E-mail and Local Host values and click **Next**.

11 Select the 64-bit ODBC DSN from the **Data Source Name** drop-down menu, provide the username and password for the database, and click **Next**.

12 Select **Use existing database** and click **Next**.

CAUTION If you select **Recreate the database** the installer overwrites the existing database and you lose all configuration information from the previous installation.

13 Click **Install**.

Upgrade the SRM Server with Migration

You can upgrade SRM and migrate the SRM Server to a different host than the previous SRM Server installation.

To upgrade SRM and keep the SRM Server on the same host as the previous installation, see "Upgrade the SRM Server Without Migration," on page 42.

To upgrade SRM and migrate the SRM Server to a different host, you create a new SRM Server installation on the new host, and connect it to the SRM database from the previous installation.

If you connect SRM to a vCenter Server instance that is already running vSphere Replication as a registered extension, you must still select the **Install vSphere Replication** option. Selecting this option installs components that SRM requires to work with vSphere Replication. You can also install vSphere Replication after you install SRM by running the installer again in Repair mode.

Prerequisites

- You completed the tasks in "Prepare for SRM Upgrade," on page 42.
- Log into the SRM host to upgrade. Log in using an account with sufficient privileges. This is often an Active Directory domain administrator, but can also be a local administrator.
- Log in to the host on which to install the new version of SRM Server.
- Download the SRM installation file to a folder on the new SRM Server host.

Procedure

1 Stop the SRM Server service on the old SRM Server host.

IMPORTANT Do not uninstall the previousSRM Server installation.

2 On the host on which to install the new version of SRM Server, double-click the SRM installer icon, select an installation language, and click **OK**.

3 Follow the prompts and accept the license agreement.

4 Click **Change** to change the folder in which to install SRM, select a target volume, and click **Next**.

The default installation folder for SRM is `C:\Program Files\VMware\VMware vCenter Site Recovery Manager`. If you use a different folder, the pathname cannot be longer than 170 characters including the end slash, and cannot include non-ASCII characters.

5 Select whether to install vSphere Replication and click **Next**.

6 Enter information about the upgraded vCenter Server instance that you used with the previous SRM Server installation and click **Next**.

Option	Action
vCenter Server Address	Type the host name or IP address of vCenter Server. Enter the host name in lowercase letters. After installation is complete and you are configuring the connection between the protected and recovery sites, supply this host name or IP address exactly as you enter it here, because it is subject to case-sensitive comparisons. IMPORTANT Note the address format that you use to connect SRM to vCenter Server. You must use the same address format when you later pair the SRM sites. If you use an IP address to connect SRM to vCenter Server, you must use this IP address when pairing the SRM sites. If you use certificate-based authentication, the address of SRM Server must be the same as the Subject Alternative Name (SAN) value of the SRM certificate. This is usually the fully qualified domain name of the SRM Server host.
vCenter Server Port	Accept the default or enter a different port.
vCenter Server Username	Type the user name of an administrator of the specified vCenter Server instance.
vCenter Server Password	Type the password for the specified user name. The password text box cannot be empty.

7 (Optional) If you are using credential-based authentication, verify the vCenter Server certificate and click **Yes** to accept it.

If you are using certificate-based authentication, there is no prompt to accept the certificate.

8 Select an authentication method and click **Next**.

Option	Description
Use credential-based authentication	a Select **Automatically generate certificate** and click **Next**. b Type text values for your organization and organization unit, typically your company name and the name of your group in the company.
Use certificate-based authentication	a Select **Use a PKCS #12 certificate file** and click **Next**. b Type the path to the certificate file. The certificate file must contain exactly one certificate with exactly one private key matching the certificate. c Type the certificate password. d The local host value must be the same as the Subject Alternative Name (SAN) value of the SRM Server certificate. This is usually the fully qualified domain name of the SRM Server host.

9 Type the administrator and host configuration information and click **Next**.

Option	Description
Local Site Name	A name for this installation of SRM. A suggested name is generated, but you can type any name. It cannot be the same name that you use for another SRM installation with which this one will be paired.
Administrator E-mail	Email address of the SRM administrator, for potential use by vCenter Server.

Option	Description
Additional E-mail	An optional email address of another SRM administrator, for potential use by vCenter Server.
Local Host	Name or IP address of the local host. This value is obtained by the SRM installer and needs to be changed only if it is incorrect. For example, the local host might have more than one network interface and the one detected by the SRM installer is not the interface you want to use. If you use certificate-based authentication, the **Local Host** value must be the same as the SAN value of the supplied certificate. This is usually the fully qualified domain name of the SRM Server host.
Listener Ports	SOAP and HTTP port numbers to use.
API Listener Port	SOAP port number for API clients to use.

The SRM installer supplies default values for the listener ports. Do not change them unless the defaults would cause port conflicts.

10 Provide the connection information for the SRM database that you used with the previous installation, and click **Next**.

Option	Action
Database Client	Select a database client type from the drop-down menu.
Data Source Name	Select an existing 64-bit DSN that connects to the SRM database that you used with the previous installation.
Username	Type a valid user ID for the specified database.
Password	Type the password for the specified user ID.
Connection Count	Type the initial connection pool size. In most cases, it is not necessary to change this setting. Before changing this setting, consult with your database administrator.
Max Connections	Type the maximum number of database connections that can be open simultaneously. In most cases, it is not necessary to change this setting. Before changing this setting consult with your database administrator.

11 Select **Use existing database** and click **Next**.

CAUTION If you select **Recreate the database** the installer overwrites the existing database and you lose all configuration information from the previous installation.

12 Click **Install**.

13 When the installation is finished, click **Finish**.

Upgrade the SRM Client Plug-In

You must upgrade the SRM client plug-in for all vSphere Client instances that you use to manage SRM.

Prerequisites

- Verify that you upgraded vCenter Server, the SRM Server, and the vSphere Client.
- Log in to the machine on which the vSphere Client is installed.
- Uninstall the old SRM client plug-in, if it is installed.

Procedure

1 Start the vSphere Client and connect to vCenter Server at either the protected or recovery site.

2 Select **Plugins > Manage Plug-ins**.

3 Under **Available Plug-ins**, locate **VMware vCenter Site Recovery Manager Extension** and click **Download and Install**.

4 Review and accept the certificate.

This step only occurs if you use certificate-based authentication.

5 After the download finishes, click **Run** to start the installation wizard, select the installation language, and click **OK**.

If you did not uninstall the previous version of the SRM client plug-in, the installer prompts you to do so and stops the installation.

6 Click **Next** to start the installation, then click **Next** again at the VMware Patents page.

7 Select **I accept the terms in the license agreement**, and click **Next**.

8 Click **Install**.

9 When the installation finishes, click **Finish**.

If the installation replaced any open files, you are prompted to shut down and restart Windows.

What to do next

Repeat this process for other vSphere Client instances that you use to connect to this SRM site.

Configure the Upgraded SRM Installation

You must configure the upgraded components to establish a working SRM installation.

SRM 5.5 is a 64-bit application. If you are upgrading from SRM 5.0.x and you use array-based replication, even if you performed an in-place upgrade of SRM, you must install 64-bit storage array adapters (SRA) that are compatible with SRM 5.5.

Prerequisites

You upgraded vCenter Server, the vSphere Client, SRM, and the SRM client to version 5.5.

Procedure

1 In the SRM client, select **Sites > Summary** and click **Configure Connection** to pair the SRM Server instances.

2 (Optional) If you use array-based replication, reinstall and reconfigure the SRA on the SRM Server hosts that you upgraded.

You must perform these tasks on both sites.

a Reinstall all SRAs.

b Click **Rescan SRAs** in the **Array Managers > SRAs** tab.

c Reconfigure all array managers with the correct credentials.

Revert to a Previous Release of SRM

To revert to a previous release of SRM, you must uninstall SRM from the protected and recovery sites and uninstall any instances of the SRM client plug-in. You can then reinstall the previous release.

Prerequisites

- Verify that your installation of vCenter Server supports the SRM release that you are reverting to. For information about the vCenter Server releases that support different versions of SRM, see the *Site Recovery Manager Compatibility Matrixes*, at http://www.vmware.com/support/pubs/srm_pubs.html. For information about reverting a vCenter Server installation, see the vSphere documentation.

- Verify that you made a backup of the SRM database before you upgraded SRM from a previous release to this release.

Procedure

1. Use the Windows Control Panel options to uninstall SRM at the protected and recovery sites.

   If you connected the SRM Server instances at the protected and recovery sites, you must uninstall SRM at both sites. If you uninstall SRM from one side of a site pairing but not the other, the database on the remaining site becomes inconsistent.

2. Use the Windows Control Panel options to uninstall the SRM plug-in from any vSphere Client instances on which you installed it.

3. Restore the SRM database from the backup that you made when you upgraded SRM from the previous release.

   You must restore the database on both sites so they are synchronized. For instructions about how to restore a database from a backup, see the documentation from your database vendor.

4. Install the previous release of SRM Server on the protected and recovery sites.

5. Install the previous release of the SRM client plug-in on any vSphere Client instances that you use to connect to SRM.

6. Reestablish the connection between the SRM Server instances on the protected and recovery sites.

If you restored a backup of the SRM database from the previous version, any configurations or protection plans that you created before you upgraded SRM are retained.

Configuring Array-Based Protection 7

After you pair the protected and recovery sites, you must configure protection for virtual machines. If you are using array-based replication, you must configure storage replication adapters (SRAs) at each site.

If you are using only vSphere Replication, you do not require an SRA. See Chapter 8, "Installing vSphere Replication," on page 53.

Procedure

1 Install Storage Replication Adapters on page 49

If you are using array-based replication, you must install a Storage Replication Adapter (SRA) specific to each storage array that you use with SRM. An SRA is a program that an array vendor provides that enables SRM to work with a specific kind of array.

2 Configure Array Managers on page 50

After you pair the protected site and recovery site, configure their respective array managers so that SRM can discover replicated devices, compute datastore groups, and initiate storage operations.

3 Rescan Arrays to Detect Configuration Changes on page 51

SRM checks arrays for changes to device configurations every 24 hours. However, you can force an array rescan at any time.

4 Edit Array Managers on page 51

Use the Edit Array Manager wizard to modify an array manager's name or other settings, such as the IP address or user name and password.

Install Storage Replication Adapters

If you are using array-based replication, you must install a Storage Replication Adapter (SRA) specific to each storage array that you use with SRM. An SRA is a program that an array vendor provides that enables SRM to work with a specific kind of array.

You must install an appropriate SRA on the SRM Server hosts at the protected and recovery sites. If you use more than one type of storage array, you must install the SRA for each type of array on both of the SRM Server hosts.

NOTE You can configure SRM to use more than one type of storage array, but you cannot store the virtual machine disks for a single virtual machine on multiple arrays from different vendors. You must store all of the disks for a virtual machine on the same array.

Storage replication adapters come with their own installation instructions. You must install the version of an SRA that corresponds to a specific SRM version. Install the same version of the SRA at both sites. Do not mix SRA versions.

If you are using vSphere Replication, you do not require an SRA.

Prerequisites

- Download the SRA by going to https://my.vmware.com/web/vmware/downloads and selecting **VMware vCenter Site Recovery Manager > Download Product > Go to Downloads > Go to Downloads**. VMware does not support storage replication adapters downloaded from other sites.
- Read the documentation provided with your SRA. SRAs do not support all features that storage arrays support. The documentation that your SRA provides details what the SRA supports and requires. For example, HP and EMC have detailed physical requirements which must be met for the SRA to perform as expected.
- Install SRM Server before you install the SRAs.
- Your SRA might require the installation of other vendor-provided components. You might need to install some of these components on the SRM Server host. Other components might require only network access by the SRM Server. For the latest information on such requirements, review the release notes and readme files for the SRAs you are installing.
- Enable the storage array's capability to create snapshot copies of the replicated devices. See your SRA documentation.

Procedure

1 Install the SRA on each SRM Server host.

  The installer installs the SRA in `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra`.

2 Using the vSphere Client, connect to SRM, select **Array Managers** in the left pane, click the **SRAs** tab, and click **Rescan SRAs**.

  This action refreshes SRA information, allowing SRM to discover the SRA.

Configure Array Managers

After you pair the protected site and recovery site, configure their respective array managers so that SRM can discover replicated devices, compute datastore groups, and initiate storage operations.

You typically configure array managers only once, after you connect the sites. You do not need to reconfigure them unless array manager connection information or credentials change, or you want to use a different set of arrays.

Prerequisites

- Connect the sites as described in "Connect the Protected and Recovery Sites," on page 33.
- Install SRAs at both sites as described in "Install Storage Replication Adapters," on page 49.

Procedure

1 Select **Array Managers** in the SRM interface, and select the site on which you want to configure array managers.

2 Click the **Summary** tab and click **Add Array Manager**.

3 Type a name for the array in the **Display Name** text box.

  Use a descriptive name that makes it easy for you to identify the storage associated with this array manager.

4 Select the array manager type that you want SRM to use from the **SRA Type** drop-down menu.

If no manager type appears, rescan for SRAs or check that you have installed an SRA on the SRM Server host.

5 Provide the required information for the type of SRA you selected.

The SRA creates these text boxes. For more information about how to fill in these text boxes, see the documentation that your SRA vendor provides. Text boxes vary between SRAs, but common text boxes include IP address, protocol information, mapping between array names and IP addresses, and user name and password.

6 Click **Finish**.

7 Repeat steps Step 1 through Step 6 to configure an array manager for the recovery site.

8 Select an array in the **Array Managers** panel and click the **Array Pairs** tab.

9 (Optional) Click **Refresh** to scan for new array pairs.

10 Select an array pair in the Discovered Array Pairs panel, and click **Enable**.

If you have added array managers, but no array pairs are visible, click **Refresh** to collect the latest information about array pairs.

Rescan Arrays to Detect Configuration Changes

SRM checks arrays for changes to device configurations every 24 hours. However, you can force an array rescan at any time.

You can reconfgure the frequency with which SRM preforms regular array scans by changing the `storage.minDsGroupComputationInterval` option in Advanced Settings. See Change Storage Settings in *Site Recovery Manager Administration*.

Configuring array managers causes SRM to compute datastore groups based on the set of replicated storage devices that it discovers. If you change the configuration of the array at either site to add or remove devices, SRM must rescan the arrays and recompute the datastore groups.

Procedure

1 Click **Array Managers** and select an array.

2 Click the **Devices** tab.

The **Devices** tab provides information about all the storage devices in the array, including the local device name, the device it is paired with, the direction of replication, the protection group to which the device belongs, whether the datastore is local or remote, and the consistency group ID for each SRA device.

3 Click **Refresh** to rescan the arrays and recompute the datastore groups.

Edit Array Managers

Use the Edit Array Manager wizard to modify an array manager's name or other settings, such as the IP address or user name and password.

For more information about how to fill in the adapter fields, see the documentation that your SRA vendor provides. While fields vary among SRAs, common fields include IP address, protocol information, mapping between array names and IP addresses, and user names and passwords.

Procedure

1 Click **Array Managers** in the left pane, and select an array manager.

2 Right-click an array and select **Edit Array Manager**.

3 Modify the name for the array in the **Display Name** field.

   Use a descriptive name that makes it easy for you to identify the storage associated with this array manager. You cannot modify the array manager type.

4 Modify the adapter information.

   These fields are created by the SRA.

5 Click **Finish** to complete the modification of the array manager.

Installing vSphere Replication

8

vSphere Replication uses the replication technologies included in ESXi with the assistance of virtual appliances to replicate virtual machines between source and target sites.

The vSphere Replication appliance registers with the corresponding vCenter Server instance. For example, on the source site, the vSphere Replication appliance registers with the vCenter Server instance on the source site.

The vSphere Replication appliance contains a vSphere Replication server that manages the replication process. To meet the load balancing needs of your environment, you might need to deploy additional vSphere Replication servers at each site. Additional vSphere Replication servers that you deploy are themselves virtual appliances. You must register any additional vSphere Replication servers with the vSphere Replication appliance on the corresponding site.

The vSphere Replication appliance provides a virtual appliance management interface (VAMI). You can use this interface to reconfigure the vSphere Replication database, network settings, public-key certificates, and passwords for the appliances.

Before you can use vSphere Replication with SRM, you must configure the SRM infrastructure.

- When installing SRM, make sure that you select the vSphere Replication option. If you did not select the vSphere Replication option when you installed SRM, you can add that option by running the installer again in repair mode.
- Pair the SRM Server instances as described in "Connect the Protected and Recovery Sites," on page 33.

The **Getting Started page** in the vSphere Replication view of the SRM interface provides guidance to ensure that you complete the installation and configuration process correctly.

Procedure

1 Deploy the vSphere Replication Virtual Appliance on page 54

vSphere Replication is distributed as an OVF virtual appliance. You must deploy the appliance at both of the primary and secondary sites.

2 Configure vSphere Replication Connections on page 55

To use vSphere Replication between two sites managed by different vCenter Server instances, you need to configure a connection between the two vSphere Replication appliances.

3 Reconfigure the vSphere Replication Appliance on page 56

If necessary, you can reconfigure the vSphere Replication appliance settings by using the virtual appliance management interface (VAMI).

4 Deploy an Additional vSphere Replication Server on page 67

The vSphere Replication appliance includes a vSphere Replication server. However, you might need to deploy multiple vSphere Replication servers to meet your load balancing needs.

5 Register an Additional vSphere Replication Server on page 68

If you deploy additional vSphere Replication servers, you must register these servers with the vSphere Replication appliance to enable them as traffic handlers at the recovery site.

6 Reconfigure vSphere Replication Server Settings on page 68

The vSphere Replication appliance contains a vSphere Replication server. If you deploy additional vSphere Replication servers, the server settings are established during deployment. You can modify the settings after you deploy the server.

7 Unregister and Remove a vSphere Replication Server on page 69

If you deployed additional vSphere Replication server instances that you no longer require, you must unregister them from the vSphere Replication appliance before you delete them.

8 Uninstall vSphere Replication on page 70

You uninstall vSphere Replication by unregistering the appliance from vCenter Server and removing it from your environment.

9 Unregister vSphere Replication from vCenter Server if the Appliance Was Deleted on page 70

If the vSphere Replication appliance virtual machine does not exist because it was deleted, you cannot use the virtual appliance management interface (VAMI) to unregister vSphere Replication from vCenter Server. Instead, you can use the Managed Object Browser (MOB) to delete the vSphere Replication extension.

Deploy the vSphere Replication Virtual Appliance

vSphere Replication is distributed as an OVF virtual appliance. You must deploy the appliance at both of the primary and secondary sites.

SRM deploys the OVF file from the vCenter Server instance that SRM extends. The vSphere Replication OVF file is also available at `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\www\vSphere_Replication_SRM_OVF10.ovf` on the SRM Server machine. If deploying the vSphere Replication OVF from the default location fails or is slow, you can also deploy it from SRM Server.

Prerequisites

- You opted to install vSphere Replication when you installed SRM.
- In the vSphere Client, go to **Administration > vCenter Server Settings > Advanced Settings** on the vCenter Server instance on which you are deploying vSphere Replication. Verify that the `VirtualCenter.FQDN` value is set to a fully-qualified domain name or a literal address.

Procedure

1 Select **vSphere Replication** in the SRM interface.

2 Click **Deploy VR Appliance** in the **Summary** tab.

3 Click **OK** to start the Deploy OVF Template wizard.

4 Click **Next** to deploy the OVF file from the default location.

5 Review the virtual appliance details and click **Next**.

6 Accept the default name and destination folder or provide a new name and folder for the virtual appliance, and click **Next**.

7 Follow the prompts to select a destination host, datastore, and disk format for the virtual appliance.

8 Set the appliance properties, and click **Next**.

Option	Description
Password	Type and confirm a root password for the appliance.
Initial Configuration	Use the embedded vSphere Replication database. If you use the embedded database, you can use vSphere Replication immediately after deployment. Deselect the checkbox to use vSphere Replication with an external database. If you use an external database, you must set up the database before you can use vSphere Replication.
Networking Properties	If you do not set network settings, the appliance uses DHCP. Set a static IP address for the appliance. You can also reconfigure network settings after deployment by using the virtual appliance management interface (VAMI).

9 Review the binding to the vCenter Extension vService and click **Next**.

10 (Optional) Select the **Power on virtual machine** check box and click **Finish**.

If you deploy the vSphere Replication OVF file from the default location, the check box is selected automatically.

11 Repeat the procedure to install vSphere Replication on the secondary site.

When the OVF deployment finishes and the appliance has booted, vSphere Replication registers as an extension with vCenter Server. The vSphere Replication appliance appears under the site name in the vSphere Replication tab of the SRM interface. vSphere Replication is ready for use immediately after you deploy the appliance. No manual configuration or registration is required.

What to do next

Connect the vSphere Replication sites. You can also perform optional reconfiguration of the vSphere Replication appliance.

Configure vSphere Replication Connections

To use vSphere Replication between two sites managed by different vCenter Server instances, you need to configure a connection between the two vSphere Replication appliances.

You can complete this process on either site on which you have installed a vSphere Replication appliance. If you are using an untrusted certificate, certificate warnings might appear during the process. You can also configure connection between the two sites when you configure a replication.

Prerequisites

Verify that you have deployed SRM at two sites and configured the connection between the SRM sites. Verifiy that you have deployed the vSphere Replication appliances at the two sites.

Procedure

1 Click **vSphere Replication** in the left pane of the SRM interface, and select a site.

A site is indicated by a folder icon.

2 Click the **Summary** tab.

3 Click **Configure VR Connection**.

4 Click **Yes** to confirm that you want to connect the sites.

5 Click **OK**.

Reconfigure the vSphere Replication Appliance

If necessary, you can reconfigure the vSphere Replication appliance settings by using the virtual appliance management interface (VAMI).

You provide the settings for the vSphere Replication appliance in the Deploy OVF wizard when you deploy the appliance. If you selected automatic configuration of the appliance using an embedded database, you can use the vSphere Replication appliance immediately after deployment. If necessary you can modify the configuration settings of the vSphere Replication appliance after you deploy it.

- Reconfigure General vSphere Replication Settings on page 56

  You can use vSphere Replication immediately after you deploy the vSphere Replication appliance. If necessary, you can reconfigure the general settings after deployment in the virtual appliance management interface (VAMI).

- Change the SSL Certificate of the vSphere Replication Appliance on page 57

  vSphere Replication appliance uses certificate-based authentication for all connections that it establishes with vCenter Server and remote site vSphere Replication appliances.

- Change the Password of the vSphere Replication Appliance on page 60

  You set the password of the vSphere Replication appliance when you deploy the appliance. You can change the password after installation by using the virtual appliance management interface (VAMI).

- Change Keystore and Truststore Passwords of the vSphere Replication Appliance on page 60

  To increase security, you can change the default passwords of the vSphere Replication appliance keystore and truststore. If you copy the keystores from the appliance to another machine, VMware recommends that you change the passwords before the copy operation.

- Configure vSphere Replication Network Settings on page 61

  You can review current network settings and change address and proxy settings for vSphere Replication. You might make these changes to match network reconfigurations.

- Configure vSphere Replication System Settings on page 62

  You can view the vSphere Replication system settings to gather information about the vSphere Replication appliance. You can also set the system time zone, and reboot or shut down the appliance.

- Reconfigure vSphere Replication to Use an External Database on page 63

  The vSphere Replication appliance contains an embedded vPostgreSQL database that you can use immediately after you deploy the appliance, without any additional database configuration. If necessary, you can reconfigure vSphere Replication to use an external database.

- Use the Embedded vSphere Replication Database on page 66

  If you configured vSphere Replication to use an external database, you can reconfigure vSphere Replication to use the embedded database.

Reconfigure General vSphere Replication Settings

You can use vSphere Replication immediately after you deploy the vSphere Replication appliance. If necessary, you can reconfigure the general settings after deployment in the virtual appliance management interface (VAMI).

The general settings of the vSphere Replication appliance include the name and IP address of the vSphere Replication appliance, the address and port of the vCenter Server instance to which it connects, and an administrator email address. You can change the general settings from the default values in the virtual appliance management interface (VAMI).

For example, you can reconfigure the address of the vSphere Replication appliance if you did not specify a fixed IP address when you deployed the appliance, and DHCP changes the address after deployment. Similarly, you can update the address of the vCenter Server instance if the address changes after deployment.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Review and confirm the browser security exception, if applicable, to proceed to the login page.

3 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

4 Select the **VR** tab and click **Configuration**.

5 Type the address of the vSphere Replication appliance or click **Browse** to select an IP address from a list.

6 Type the address of the vCenter Server instance to use with this installation.

You must use the same address format that you used when you installed vCenter Server.

For example, if you used a fully qualified domain name during installation, you must use that FQDN. If you used an IP address, you must use that IP address.

7 Type an administrator email address.

8 Click **Save and Restart Service** to apply the changes.

You reconfigured the general settings of the vSphere Replication appliance.

Change the SSL Certificate of the vSphere Replication Appliance

vSphere Replication appliance uses certificate-based authentication for all connections that it establishes with vCenter Server and remote site vSphere Replication appliances.

vSphere Replication does not use username and password based authentication. vSphere Replication generates a standard SSL certificate when the appliance first boots and registers with vCenter Server. The default certificate policy uses trust by thumbprint.

You can change the SSL certificate, for example if your company's security policy requires that you use trust by validity and thumbprint or a certificate signed by a certification authority. You change the certificate by using the virtual appliance management interface (VAMI) of the vSphere Replication appliance. For information about the SSL certificates that vSphere Replication uses, see "vSphere Replication Certificate Verification," on page 58 and "Requirements When Using a Public Key Certificate with vSphere Replication," on page 59.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

3 (Optional) Click the **VR** tab and click **Security** to review the current SSL certificate.

4 Click **Configuration**.

5 (Optional) To enforce verification of certificate validity, select the **Accept only SSL certificates signed by a trusted Certificate Authority** check box.

See "vSphere Replication Certificate Verification," on page 58 for details of how vSphere Replication handles certificates.

6 Generate or install a new SSL certificate.

Option	Action
Generate a self-signed certificate	Click **Generate and Install**. Using a self-signed certificate provides trust by thumbprint only and might not be suitable for environments that require high levels of security. You cannot use a self-signed certificate if you selected **Accept only SSL certificates signed by a trusted Certificate Authority**.
Upload a certificate	Click **Browse** to select a PKCS#12 certificate and click **Upload and Install**. Public key certificates must meet certain requirements. See "Requirements When Using a Public Key Certificate with vSphere Replication," on page 59.

7 Click **Save and Restart Service** to apply the changes.

You changed the SSL certificate and optionally changed the security policy to use trust by validity and certificates signed by a certificate authority.

NOTE If you change the SSL certificate, the vSphere Replication status changes to disconnected. Validate the certificate to reconnect the source and target sites before replicating a virtual machine.

vSphere Replication Certificate Verification

vSphere Replication verifies the certificates of vCenter Server and remote vSphere Replication servers.

All communication between vCenter Server, the local vSphere Replication appliance, and the remote vSphere Replication appliance goes through a vCenter Server proxy at port 80. All SSL traffic is tunnelled.

vSphere Replication can trust remote server certificates either by verifying the validity of the certificate and its thumbprint or by verifying the thumbprint only. The default is to verify by thumbprint only. You can activate the verification of the certificate validity in the virtual appliance management interface (VAMI) of the vSphere Replication appliance by selecting the option **Accept only SSL certificates signed by a trusted Certificate Authority** when you upload a certificate.

Thumbprint Verification	vSphere Replication checks for a thumbprint match. vSphere Replication trusts remote server certificates if it can verify the the thumbprints through secure vSphere platform channels or, in some rare cases, after the user confirms them. vSphere Replication only takes certificate thumbprints into account when verifying the certificates and does not check certificate validity.
Verification of Thumbprint and Certificate Validity	vSphere Replication checks the thumbprint and checks that all server certificates are valid. If you select the **Accept only SSL certificates signed by a trusted Certificate Authority** option, vSphere Replication refuses to communicate with a server with an invalid certificate. When verifying certificate validity, vSphere Replication checks expiration dates, subject names and the certificate issuing authorities.

In both modes, vSphere Replication retrieves thumbprints from vCenter Server. vSphere Replication refuses to communicate with a server if the automatically determined thumbprint differs from the actual thumbprint that it detects while communicating with the respective server.

You can mix trust modes between vSphere Replication appliances at different sites. A pair of vSphere Replication appliances can work successfully even if you configure them to use different trust modes.

Requirements When Using a Public Key Certificate with vSphere Replication

If you enforce verification of certificate validity by selecting **Accept only SSL certificates signed by a trusted Certificate Authority** in the virtual appliance management interface (VAMI) of the vSphere Replication appliance, some fields of the certificate request must meet certain requirements.

vSphere Replication can only import and use certificates and private keys from a file in the PKCS#12 format. Sometimes these files have a `.pfx` extension.

- The certificate must be issued for the same server name as the value in the **VRM Host** setting in the VAMI. Setting the certificate subject name accordingly is sufficient, if you put a host name in the **VRM Host** setting. If any of the certificate Subject Alternative Name fields of the certificate matches the **VRM Host** setting, this will work as well.
- vSphere Replication checks the issue and expiration dates of the certificate against the current date, to ensure that the certificate has not expired.
- If you use your own certificate authority, for example one that you create and manage with the OpenSSL tools, you must add the fully qualified domain name or IP address to the OpenSSL configuration file.
  - If the fully qualified domain name of the appliance is `VR1.example.com`, add `subjectAltName = DNS: VR1.example.com` to the OpenSSL configuration file.
  - If you use the IP address of the appliance, add `subjectAltName = IP:` *`vr-appliance-ip-address`* to the OpenSSL configuration file.
- vSphere Replication requires a trust chain to a well-known root certificate authority. vSphere Replication trusts all the certificate authorities that the Java Virtual Machine trusts. Also, you can manually import additional trusted CA certificates in `/opt/vmware/hms/security/hms-truststore.jks` on the vSphere Replication appliance.

- vSphere Replication accepts MD5 and SHA1 signatures, but VMware recommends that you use SHA256 signatures.
- vSphere Replication does not accept RSA or DSA certificates with 512-bit keys. vSphere Replication requires at least 1024-bit keys. VMware recommends using 2048-bit public keys. vSphere Replication shows a warning if you use a 1024-bit key.

Change the Password of the vSphere Replication Appliance

You set the password of the vSphere Replication appliance when you deploy the appliance. You can change the password after installation by using the virtual appliance management interface (VAMI).

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

3 Click the **VR** tab and click **Security**.

4 Type the current password in the **Current Password** text box.

5 Type the new password in the **New Password** and the **Confirm New Password** text boxes.

The password must be a minimum of eight characters. vSphere Replication does not support blank passwords.

6 Click **Apply** to change the password.

Change Keystore and Truststore Passwords of the vSphere Replication Appliance

To increase security, you can change the default passwords of the vSphere Replication appliance keystore and truststore. If you copy the keystores from the appliance to another machine, VMware recommends that you change the passwords before the copy operation.

The keystore and truststore passwords might be stored in an access restricted `config` file.
vSphere Replication has the following keystores:

- `/opt/vmware/hms/security/hms-keystore.jks`, which contains the vSphere Replication appliance private key and certificate.
- `/opt/vmware/hms/security/hms-truststore.jks`, which contains additional CA certificates besides the ones that Java already trusts.

Procedure

1 To change the `hms-keystore.jks` password, log in as root.

2 Obtain the current hms-keystore password.

```
# /opt/vmware/hms/hms-configtool -cmd list | grep keystore
```

Example of the output `hms-keystore-password = old_password`

3 Change the hms-keystore password.

```
 # /usr/java/default/bin/keytool -storepasswd -storepass old_password -new new_password -
keystore /opt/vmware/hms/security/hms-keystore.jks
```

4 Change the vSphere Replication appliance private key password.

```
# /usr/java/default/bin/keytool -keypasswd -alias jetty -keypass
old_password -new new_password -storepass new_password -keystore
/opt/vmware/hms/security/hms-keystore.jks
```

5 Update the configuration with the new password.

```
/opt/vmware/hms/hms-configtool -cmd reconfig -property
'hms-keystore-password=new_password'
```

6 Reboot the appliance for the changes to take effect.

```
# reboot
```

7 To change the hms-truststore.jks password, log in as root.

8 Obtain the current hms-truststore password.

```
# /opt/vmware/hms/hms-configtool -cmd list | grep truststore
```

Example of the output: `hms-truststore-password = old_password`

9 Change the hms-truststore password.

```
# /usr/java/default/bin/keytool -storepasswd -storepass
old_password -new new_password -keystore
/opt/vmware/hms/security/hms-truststore.jks
```

10 Update the configuration with the new password.

```
/opt/vmware/hms/hms-configtool -cmd reconfig -property
'hms-truststore-password=new_password'
```

11 Restart the vSphere Replication service.

```
# service hms restart
```

Configure vSphere Replication Network Settings

You can review current network settings and change address and proxy settings for vSphere Replication. You might make these changes to match network reconfigurations.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

3 Click the **Network** tab.

4 Click **Status** to review current network settings.

5 Click **Address** to review or modify IPv4 and IPv6 address settings.

IP Address Type	Option	Description
IPv4	DHCP	DHCP is not recommended if the IP address of the appliance might change if it reboots.
IPv4	Static	With a static IPv4 address, you can modify the IP settings, DNS settings, netmask, and host name information.
IPv4	None	Deactivates IPv4 addresses.
IPv6	Auto	Automatic assignment of IPv6 addresses is not recommended if the IP address of the appliance might change if it reboots.
IPv6	Static	With a static IPv6 address, you can modify the IP address and the address prefix.

6 Click **Save Settings**.

If you do not click **Save Settings**, changes are discarded.

7 Click **Proxy** to review or modify proxy settings.

a Select **Use a proxy server** to use a proxy server.

b Type a proxy server name in the **HTTP Proxy Server** text box.

c Type a proxy port in the **Proxy Port** text box.

d (Optional) Type a proxy server user name and password.

8 Click **Save Settings**.

If you do not click **Save Settings**, changes are discarded.

What to do next

A network address change might require you to reconnect the source and target sites and might also require a change of certificate if you have activated verification of certificate validity.

Configure vSphere Replication System Settings

You can view the vSphere Replication system settings to gather information about the vSphere Replication appliance. You can also set the system time zone, and reboot or shut down the appliance.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the server.

3 Click the **System** tab.

4 Click **Information**.

You can review information about vSphere Replication, and reboot or shutdown the appliance.

Option	Description
Vendor	Vendor name
Appliance Name	vSphere Replication appliance name
Appliance Version	vSphere Replication version
Hostname	Hostname of the appliance
OS Name	Operating system name and version
OVF Environment: View	Displays information about the OVF environment
Reboot	Reboots the virtual appliance
Shutdown	Shuts down the virtual appliance

Shutting down the vSphere Replication appliance stops configured replications and prevents you from configuring replication of new virtual machines as well as modifying existing replication settings.

5 Click **Time Zone**.

Option	Description
System Time Zone	Time zones are available from the drop-down list
Save Settings	Saves settings
Cancel Changes	Discards changes

Reconfigure vSphere Replication to Use an External Database

The vSphere Replication appliance contains an embedded vPostgreSQL database that you can use immediately after you deploy the appliance, without any additional database configuration. If necessary, you can reconfigure vSphere Replication to use an external database.

Each vSphere Replication appliance requires its own database. If the database at either site is corrupted, vSphere Replication does not function. vSphere Replication cannot use the vCenter Server database because it has different database schema requirements. However, if you do not use the embedded vSphere Replication database you can use the vCenter database server to create and support an external vSphere Replication database.

You might need to use an external database to improve performance or load balancing, for easier backup, or to meet your company's database standards.

NOTE vSphere Replication server inside the vSphere Replication appliance uses its own embedded database and config files. Configuring VRMS to use external database does not provide protection of losing the vSphere Replication appliance or any Additional vSphere Replication Server appliance.

If you reinitialize the database after you deploy vSphere Replication, you must go to the vSphere Replication virtual appliance management interface (VAMI) to reconfigure vSphere Replication to use the new database connection.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.

- You must create and configure the external database before you connect it to vSphere Replication. See "Databases that vSphere Replication Supports," on page 64 for the configuration requirements for each supported type of database.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

3 Select the **VR** tab and click **Configuration**.

4 Select **Manual configuration** to specify a configuration or select **Configure from an existing VRM database** to use a previously established configuration.

5 In the DB text boxes, provide information about the database for vSphere Replication to use.

Option	Setting
DB Type	Select **SQL Server** or **Oracle**.
DB Host	IP address or fully qualified domain name of the host on which the database server is running.
DB Port	Port on which to connect to the database.
DB Username	Username for the vSphere Replication database user account that you create on the database server.
DB Password	Password for the vSphere Replication database user account that you create on the database server.
DB Name	Name of the vSphere Replication database instance.
DB URL	Auto-generated and hidden by default. Advanced users can fine-tune other database properties by modifying the URL, for example if you use a named instance of SQL Server.

6 Click **Save and Restart Service** to apply the changes.

You configured vSphere Replication to use an external database instead of the database that is embedded in the vSphere Replication appliance.

Databases that vSphere Replication Supports

The vSphere Replication virtual appliance includes the VMware standard embedded vPostgreSQL database. You can also configure vSphere Replication to use an external database.

Automated migration between the embedded database and any external databases is not supported in any direction. If you must configure an external database, you must manually migrate the data or manually recreate all replications.

You can configure vSphere Replication to use one of the supported external databases.

- Microsoft SQL
- Oracle

External vPostgreSQL databases are not supported. vSphere Replication supports the same database versions as vCenter Server. For supported database versions, see the *VMware Product Interoperability Matrixes* at http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php?.

Configure Microsoft SQL Server for vSphere Replication

When you create a Microsoft SQL Server database, you must configure it correctly to support vSphere Replication.

You use SQL Server Management Studio to create and configure an SQL Server database for vSphere Replication.

This information provides the general steps that you must perform to configure an SQL Server database for vSphere Replication. For instructions about how to perform the relevant steps, see the SQL Server documentation.

Prerequisites

Verify that the SQL Server Browser service is running.

Procedure

1 Select **Mixed Mode Authentication** when you create the database instance.

The vSphere Replication appliance and the database server run on different hosts, so you must use mixed mode authentication and not Windows Authentication.

2 Use either a named instance or the default instance of SQL Server.

If you intend to use dynamic TCP ports, you must use a named instance of SQL Server.

3 Enable TCP on the database instance.

4 Set a TCP port.

Option	Action
Static TCP port	Set the TCP port to the default of 1433.
Dynamic TCP port	a Use a named instance of SQL Server. You can only use dynamic ports with a named instance of SQL Server. b Select the **Show DB URL** check box in the virtual appliance management interface (VAMI) of the vSphere Replication appliance. c Modify the **DB URL** value. Replace port=*port_number* with instanceName=*instance_name* in the URL. d Use the `PortQuery` command from a remote machine to check that the port on which the SQL Server Browser service runs is not blocked by a firewall. The SQL Server Browser runs on port 1434. Type the `PortQuery` command in a terminal window. `PortQry.exe –n Machine_Name –p UDP –e 1434`

5 Verify that the firewall on the database server permits inbound connections on the TCP port.

6 Create the vSphere Replication security login.

7 Create the vSphere Replication database and set the vSphere Replication security login as the database owner.

8 Keep the dbo user and dbo schema settings.

Because the vSphere Replication security login is the database owner, it maps to the database user dbo and uses the dbo schema.

Configure Oracle Server for vSphere Replication

You must configure an Oracle Server database correctly to support vSphere Replication.

You create and configure an Oracle Server database for vSphere Replication by using the tools that Oracle Server provides.

This information provides the general steps that you must perform to configure an Oracle Server database for vSphere Replication. For instructions about how to perform the relevant steps, see the Oracle documentation.

Procedure

1 When creating the database instance, specify UTF-8 encoding.

2 Create the vSphere Replication database user account.

3 If they are not selected already, select the **CONNECT** and **RESOURCE** roles.

These roles provide the privileges that vSphere Replication requires.

Use the Embedded vSphere Replication Database

If you configured vSphere Replication to use an external database, you can reconfigure vSphere Replication to use the embedded database.

The vSphere Replication appliance includes an embedded vPostgreSQL database. The embedded database is preconfigured for use with vSphere Replication and is enabled if you accept the default **Performs initial configuration of the appliance using an embedded database** option when you deploy the vSphere Replication appliance. If you reconfigured vSphere Replication to use an external database after deployment, you can switch to the embedded database. After switching databases, you must manually configure replications again as the replication management data is not migrated to the database. You can use the reset feature in the embedded database to drop replications, site connections and external vSphere Replication registrations.

Prerequisites

- Verify that the vSphere Replication appliance is powered on.
- You must have administrator privileges to configure the vSphere Replication appliance.
- You must have reconfigured vSphere Replication to use an external database.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the root user name and password for the appliance.

You configured the root password during the OVF deployment of the vSphere Replication appliance.

3 Select the **VR** tab and click **Configuration**.

4 Select **Configure using the embedded database**.

5 (Optional) Click **Reset Embedded Database** to reset the database.

6 Click **Save and Restart Service** to apply the changes.

You configured vSphere Replication to use the embedded vSphere Replication database.

Deploy an Additional vSphere Replication Server

The vSphere Replication appliance includes a vSphere Replication server. However, you might need to deploy multiple vSphere Replication servers to meet your load balancing needs.

vSphere Replication server is distributed as an OVF virtual appliance. SRM deploys the OVF file from the vCenter Server instance that SRM extends. The vSphere Replication server OVF file is also available at `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\www\vSphere_Replication_Server_SRM_OVF10.ovf` on the SRM Server machine. If deploying the vSphere Replication server OVF from the default location fails or is slow, you can also deploy it from SRM Server.

You can deploy multiple vSphere Replication servers to route traffic from source hosts to target datastores without traveling between different sites managed by the same vCenter Server.

For information about the loads that a vSphere Replication management server and a vSphere Replication server can support, see http://kb.vmware.com/kb/2034768.

Prerequisites

- Deploy vSphere Replication appliances on the protected and recovery sites.
- Connect the vSphere Replication appliances.
- Deploy vSphere Replication servers on a network that allows them to communicate with the vSphere Replication appliances on the protected and recovery sites.
- Verify that the vSphere Replication servers can communicate with the ESXi Server instances on the primary site that hosts the replicated virtual machines.
- Connect to SRM as described in "Connect to SRM," on page 33.

Procedure

1 Click **vSphere Replication** in the SRM interface, and click the **Summary** tab.

2 Click **Deploy VR Server**.

3 Click **OK** to start the Deploy OVF Template wizard.

4 Click **Next** to deploy the OVF file from the default location.

5 Review the virtual appliance details and click **Next**.

6 Accept the default name and destination folder or provide a new name and folder for the virtual appliance, and click **Next**.

7 Follow the prompts to select a destination host, datastore, and disk format for the virtual appliance.

8 Set the appliance properties, and click **Next**.

Option	Description
Password	Type and confirm a root password for the appliance.
Networking Properties	If you do not set network settings, the appliance uses DHCP. Set a static IP address for the appliance. You can also reconfigure network settings after deployment by using the virtual appliance management interface (VAMI).

9 Review your settings and select **Power on after deployment** to start the appliance immediately after deployment completes.

If you deploy the vSphere Replication server OVF file from the default location, the **Power on after deployment** check box is selected automatically.

10 Click **Finish**.

What to do next

When the OVF file has deployed, register the vSphere Replication server with the vSphere Replication appliance.

Register an Additional vSphere Replication Server

If you deploy additional vSphere Replication servers, you must register these servers with the vSphere Replication appliance to enable them as traffic handlers at the recovery site.

Prerequisites

Verify that the vSphere Replication appliance is deployed and configured.

Verify that the additional vSphere Replication server is deployed.

Procedure

1 Click **vSphere Replication** in the left pane, select a site, and click **Register VR Server** in the **Summary** tab.

2 Select a virtual machine in the inventory that is a working vSphere Replication server, and click **OK**.

The newly registered vSphere Replication server appears in the list.

3 Click **Yes** to confirm registration of the vSphere Replication server.

Reconfigure vSphere Replication Server Settings

The vSphere Replication appliance contains a vSphere Replication server. If you deploy additional vSphere Replication servers, the server settings are established during deployment. You can modify the settings after you deploy the server.

A vSphere Replication server does not require additional configuration through the virtual appliance management interface (VAMI) after deployment. To increase security, you can change the root password of the vSphere Replication server and install a new certificate. Using a self-signed certificate provides the benefit of public-key based encryption and authentication, although using such a certificate does not provide the level of assurance offered when you use a certificate signed by a certificate authority.

You can also reconfigure the network settings for the vSphere Replication server virtual appliance.

Prerequisites

You deployed an optional vSphere Replication server in addition to the vSphere Replication appliance, and the server is powered on.

Procedure

1 In the SRM interface, select **vSphere Replication**.

2 Select a vSphere Replication server and click the **Configure VR Server** link.

Alternatively, you can connect to the Web interface of the vSphere Replication server by entering the server's IP address and port 5480 in a browser. A sample address might be https://192.168.1.2:5480.

3 Log in to the vSphere Replication server configuration interface as **root**.

Use the root password you set when you deployed the vSphere Replication server.

4 Click the **VRS** tab.

5 (Optional) Click **Configuration** to generate or upload a new certificate.

Option	Action
Generate and install a self-signed certificate	Click **Generate and Install**.
Upload an existing SSL certificate	Click **Browse** next to the **Upload PKCS#12 (*.pfx) file** text box to browse for an existing certificate, and click **Upload and Install**.

6 (Optional) Click **Security** to change the Super User password for the vSphere Replication server.

`root` is the Super User.

7 (Optional) Click the **Network** tab to change the network settings.

Option	Action
View current network settings	Click **Status**.
Set static or DHCP IPv4 or IPv6 addresses	■ Click **Address**, and select **DHCP**, **Static**, or **None** for IPv4 addresses. ■ Select **Auto** or **Static** for IPv6 addresses. If you select **Static**, type the default gateway and DNS server addresses to use.
Configure proxy server	Click **Proxy**, select the **Use a proxy server** check box, and type the proxy server address and port number.
Save Settings	If you do not click **Save Settings**, changes are discarded.

8 (Optional) Select **VRS > Configuration > Restart** to restart the vSphere Replication service.

9 (Optional) Select **System > Reboot** to reboot the vSphere Replication server appliance.

What to do next

If you change the SSL certificate of the vSphere Replication server and the server is already registered, the vSphere Replication status is disconnected. Click **Register VR Server** in the vSphere Replication view of the SRM interface to validate the certificate and reconnect the vSphere Replication appliance with the additional server.

Unregister and Remove a vSphere Replication Server

If you deployed additional vSphere Replication server instances that you no longer require, you must unregister them from the vSphere Replication appliance before you delete them.

Prerequisites

You deployed and registered a vSphere Replication server that you no longer require. Make sure it does not serve any replications, otherwise the operations will fail.

Procedure

1 Select the vSphere Replication view in the SRM interface.

2 Select the vSphere Replication server to remove and click the **Virtual Machines** tab.

3 Select the virtual machines that the vSphere Replication server manages.

- Click **Remove Replication** to stop replication of a virtual machine.
- Click **Configure Replication** to use a different virtual vSphere Replication server to handle the replication of a virtual machine.

4 Right-click the vSphere Replication server to remove and select **Remove VR Server**.

Removing the vSphere Replication server unregisters it from the vSphere Replication management server in the vSphere Replication appliance.

5 In the Hosts and Clusters view, power off and delete the vSphere Replication server virtual machine.

Uninstall vSphere Replication

You uninstall vSphere Replication by unregistering the appliance from vCenter Server and removing it from your environment.

Prerequisites

- Verify that the vSphere Replication virtual appliance is powered on.
- Stop all existing outgoing or incoming replications to the site.
- Disconnect any connections to other vSphere Replication sites.

Procedure

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Select the **Configuration** tab.

3 Click **Unregister from vCenter Server**.

4 In the vSphere Client, power off and delete the vSphere Replication appliance.

You removed vSphere Replication from your environment.

Unregister vSphere Replication from vCenter Server if the Appliance Was Deleted

If the vSphere Replication appliance virtual machine does not exist because it was deleted, you cannot use the virtual appliance management interface (VAMI) to unregister vSphere Replication from vCenter Server. Instead, you can use the Managed Object Browser (MOB) to delete the vSphere Replication extension.

Prerequisites

Log in to https://*<vCenter_Server_address>*/mob/?moid=ExtensionManager with vCenter Server credentials.

Procedure

1 In the extensionList property, click the corresponding link for the com.vmware.vcHms extension key to check the key details.

2 Verify that the displayed data is for a vSphere Replication appliance that is already lost.

3 In ExtensionManager, click **unregisterExtension**.

4 Type **`com.vmware.vcHms`** for the extension key value, and click **Invoke Method**.

5 Verify that the result displays `void` and not an error message.

An error message might appear if the specified extension is not registered, or if an unexpected runtime error occurs.

6 Close the window.

7 Refresh the ExtensionManager page and verify that the extensionList entry does not include com.vmware.vcHms.

What to do next

Deploy a new vSphere Replication appliance and perform any optional configuration.

Upgrading vSphere Replication 9

If you installed vSphere Replication as part of a previous SRM installation, you must upgrade vSphere Replication after you upgrade SRM.

If you upgrade SRM, vSphere Replication is not upgraded automatically. You must upgrade vSphere Replication as a separate process from upgrading SRM.

The quickest way to upgrade vSphere Replication is to use vSphere Update Manager. If you cannot use Update Manager, you can upgrade vSphere Replication by using the virtual appliance management interface (VAMI) of the vSphere Replication appliances. Upgrading vSphere Replication by using the VAMI requires more steps than upgrading by using Update Manager.

You might have installed an earlier version of vSphere Replication as part of an SRM installation, or you might have installed the standalone version of vSphere Replication.

- vSphere Replication 1.0.x was delivered with SRM 5.0.x.
- vSphere Replication 5.1.x was delivered with SRM 5.1.x and is also available as a standalone product, independently of SRM.

You can upgrade vSphere Replication 1.0.x and 5.1.x to vSphere Replication 5.5. The upgrade preserves the configuration from the previous installation, including the database configuration, certificates, vSphere Replication site pairings, registered vSphere Replication servers, and configured replications.

In SRM 5.0 the vSphere Replication management server and the vSphere Replication server are separate appliances. In SRM 5.1 and later and vSphere Replication 5.1 and later, vSphere Replication is a single appliance named the vSphere Replication appliance, that contains both the vSphere Replication management server and a vSphere Replication server.

When upgrading vSphere Replication 1.0.x to vSphere Replication 5.5, the upgrade process upgrades the vSphere Replication management server to the combined vSphere Replication 5.5 appliance. As a consequence, an upgraded installation of vSphere Replication uses the vSphere Replication server that is embedded in the combined appliance. If your infrastructure uses more than one vSphere Replication server, you must upgrade them to vSphere Replication 5.5 and reregister them with the vSphere Replication appliance.

NOTE After you upgrade vSphere Replication 1.0.x, the port on which the vSphere Replication appliance publishes the VAMI changes from 8080 to 5480.

Using Standalone vSphere Replication with SRM

vSphere Replication 5.1 and later is available as a standalone extension of vCenter Server, that is independent of SRM. If you installed a standalone version of vSphere Replication and then install SRM, all existing pairings and replications are immediately accessible through the SRM user interface, except for pairings and replications in a single vCenter Server. Pairings and replications in a single vCenter Server are visible only in the vSphere Replication user interface.

Migration of the vSphere Replication database is not supported. If you upgrade vSphere Replication 5.1 to SRM 5.5, vSphere Replication uses the embedded database. The standalone version of vSphere Replication and SRM can coexist and work together in the same infrastructure. For example, you can replicate 100 virtual machines with vSphere Replication but choose to protect only 50 of them by using SRM. You can manage all of the replications by using either the vSphere Replication interface in the vSphere Web Client or by using the SRM interface. Some limitations apply to the management of the replications, depending on which interface you use.

- You cannot manage replications in a single vCenter Server instance in the SRM interface.
- You cannot use the vSphere Replication interface in the vSphere Web Client to manually recover virtual machines that SRM protects.
- You must use the vSphere Web Client to configure vSphere Replication to retain point-in-time snapshots of virtual machines.

Update Releases

You can obtain update releases of vSphere Replication 5.5 by using Update Manager or by using the VAMI of the vSphere Replication appliance.

Upgrade vSphere Replication

You can upgrade vSphere Replication by using either vSphere Update Manager or by using the virtual appliance management interfaces (VAMI) of the vSphere Replication management server and vSphere Replication servers.

In SRM 5.0 the vSphere Replication management server and the vSphere Replication server are separate appliances. In SRM 5.1 and later and vSphere Replication 5.1 and later, vSphere Replication is a single appliance named the vSphere Replication appliance, that contains both the vSphere Replication management server and a vSphere Replication server.

Upgrade vSphere Replication By Using vSphere Update Manager

You can upgrade vSphere Replication by using vSphere Update Manager.

Update Manager 5.5 contains the upgrade information for vSphere Replication 5.5. Using Update Manager is the easiest way to upgrade vSphere Replication, especially for large SRM environments that contain multiple vSphere Replication servers. You can upgrade multiple vSphere Replication servers at the same time.

In SRM 5.0 the vSphere Replication management server and the vSphere Replication server are separate appliances. In SRM 5.1 and later and vSphere Replication 5.1 and later, vSphere Replication is a single appliance named the vSphere Replication appliance, that contains both the vSphere Replication management server and a vSphere Replication server.

If you are upgrading from vSphere Replication 1.0.x, you must perform an intermediate upgrade before you upgrade to vSphere Replication 5.5. If you are upgrading from vSphere Replication server 5.1, you do not perform an intermediate upgrade.

Prerequisites

- You upgraded vCenter Server, the vSphere Client, SRM, and the SRM client to version 5.5.
- For the list of vSphere Replication appliances, vSphere Replication management servers, and vSphere Replication servers to upgrade, consult the vSphere Replication upgrade report that the SRM installer generated at the end of the SRM upgrade.
- Verify that you installed Update Manager 5.5 and installed the Update Manager client plug-in on the vCenter Server instance that you use to connect to SRM.

Procedure

1 In the Update Manager interface, click the **Configuration** tab, click **Download Settings**, and select the **VMware VAs** download source.

You can deselect all other download sources.

2 Click **Apply** and click **Download Now** to download the latest updates.

3 Click the **Baselines and Groups** tab, select **VMs/VAs**, and click **Create** to create an upgrade baseline for virtual appliances.

4 Type a name and a description for this upgrade baseline, and select **VA Upgrade** as the baseline type.

5 Click **Add Multiple Rules** and set the upgrade rules to create the upgrade baseline.

Option	Description
Vendor	Select **VMware Inc.**
Appliances	Select **vSphere Replication Appliance** and **vSphere Replication Server**
Upgrade To	Select **Latest**

6 Click **OK**, click **Next**, and click **Finish**.

The upgrade baseline is created.

7 In the VMs and Templates view, select the vSphere Replication 5.1.x appliance or the vSphere Replication 5.0.x management server in the Inventory, and click the **Update Manager** tab.

8 Click **Attach**, select the baseline that you created, and click **Attach** to attach the baseline to the vSphere Replication appliance.

9 Click **Scan** to discover the upgrade version available.

10 Click **Remediate** and follow the prompts to start the upgrade of the vSphere Replication appliance.

You can monitor the progress of the upgrades in the Recent Tasks panel and verify that the appliance is upgraded after the task finishes.

The vSphere Replication 1.0.x management server or the vSphere Replication 5.1 appliance is upgraded to the vSphere Replication 5.5 appliance.

11 Select a vSphere Replication server in the Inventory and click the **Update Manager** tab.

12 Click **Attach**, select the baseline that you created, and click **Attach** to attach the baseline to the vSphere Replication server.

13 Click **Remediate** and follow the prompts to start the upgrade of the vSphere Replication server.

- If you are upgrading from vSphere Replication 5.1.x, this completes the upgrade of the vSphere Replication server to version 5.5.
- If you are upgrading from vSphere Replication 5.0.x, the upgrade of the vSphere Replication server is not complete. The version of the vSphere Replication server after the initial upgrade is 1.0.999. Click **Remediate** again to complete the upgrade of the vSphere Replication server to version 5.5.

14 Repeat Step 11 to Step 13 for all vSphere Replication servers.

What to do next

If you configured vSphere Replication to accept only certificates that are signed by a trusted certificate authority, after an upgrade you must reconnect the vSphere Replication appliances.

Upgrade vSphere Replication by Using the VAMI

You can upgrade vSphere Replication by using the virtual appliance management interface (VAMI) of the vSphere Replication management server.

In SRM 5.0 the vSphere Replication management server and the vSphere Replication server are separate appliances. In SRM 5.1 and later and vSphere Replication 5.1 and later, vSphere Replication is a single appliance named the vSphere Replication appliance, that contains both the vSphere Replication management server and a vSphere Replication server.

Prerequisites

You upgraded vCenter Server, the vSphere Client, SRM, and the SRM client to version 5.5.

Procedure

1 Connect to the VAMI of the vSphere Replication 1.0.x management server or vSphere Replication 5.1.x appliance in a Web browser.

- The URL for the VAMI of the vSphere Replication management server in SRM 5.0 is https://*vrms-address*:8080.
- The URL for the VAMI of the vSphere Replication appliance in SRM 5.1.x is https://*vrms-address*:5480.

2 Type the root user name and password for the vSphere Replication management server appliance.

You configured the root password during the OVF deployment of the vSphere Replication management server.

3 Click the **Update** tab.

4 Click **Check Updates**.

By default, the VAMI shows the most recently available version. If you want to upgrade to an update release of an older version when the next major release is already available, you must manually change the upgrade URL:

a Click **Settings**.

b Select **Use Specified Repository** and paste the update URL into the **Repository URL** text box.

See the release notes of the update release for the exact URL.

c Click **Save Settings**.

d Click **Status**.

e Click **Check Updates**.

The update checker shows that a new version is available.

5 Click **Install Updates** and click OK.

6 When the update finishes, select the **System** tab, and click **Reboot**.

7 Repeat the process on the target site.

What to do next

If you configured vSphere Replication to accept only certificates that are signed by a trusted certificate authority, after an upgrade you must reconnect the vSphere Replication appliances.

If your SRM 5.1.x infrastructure uses more than one vSphere Replication server, or if you are upgrading from SRM 5.0.x, upgrade the vSphere Replication server appliances.

Upgrade vSphere Replication Servers by Using the VAMI

If your infrastructure uses more than one vSphere Replication server, you must upgrade all of the vSphere Replication servers that you use with SRM.

If you are upgrading from vSphere Replication 1.0.x, the process to upgrade the vSphere Replication server is a two-step process. To upgrade version 1.0.x of the vSphere Replication server, you first perform an intermediate upgrade. From the intermediate upgrade version of the vSphere Replication server, you upgrade to version 5.5 of the vSphere Replication server. Upgrading the vSphere Replication server from version 5.1 is a one-step process.

Prerequisites

Verify that you upgraded the vSphere Replication management server from SRM 5.0.x or the vSphere Replication appliance from SRM 5.1 to the vSphere Replication 5.5 appliance.

Procedure

1 In a Web browser, connect to the VAMI of the vSphere Replication server to upgrade.

   The URL for the VAMI of the vSphere Replication server is https://*vr-server-address*:5480.

2 Type the root user name and password for the vSphere Replication server appliance.

3 Click the **Update** tab.

4 Click **Check Updates**.

   By default, the VAMI shows the most recently available version. If you want to upgrade to an update release of an older version when the next major release is already available, you must manually change the upgrade URL:

   a Click **Settings**.

   b Select **Use Specified Repository** and paste the update URL into the **Repository URL** text box.

      See the release notes of the update release for the exact URL.

   c Click **Save Settings**.

   d Click **Status**.

   e Click **Check Updates**.

      The update checker shows that a new version is available.

5 Click **Install Updates** and click **OK**.

   - If you are upgrading from vSphere Replication 5.1.x, this completes the upgrade of the vSphere Replication server to version 5.5.
   - If you are upgrading from vSphere Replication 1.0.x, the upgrade of the vSphere Replication server is not complete. The version of the vSphere Replication server after the initial upgrade is 1.0.999. Click **Check Updates** and **Install Updates** again to complete the upgrade of the vSphere Replication server to version 5.5.

6 After the upgrade finishes, click the **System** tab and click **Reboot**.

7 Repeat the procedure to upgrade other vSphere Replication server instances that you deployed with the previous version.

Upgrade vSphere Replication Without Internet Access

In environments where you do not have access to the Internet, you can upgrade the vSphere Replication appliance and the vSphere Replication server by using a downloaded ISO image.

Prerequisites

- Upgrade the vCenter Server instance that vSphere Replication extends.
- Upgrade SRM by running the new version of the SRM installer.
- Download the `VMware-vSphere_Replication-5.5.x.x-build_number.iso` ISO image from the vSphere downloads page. Copy the ISO image file to a datastore that is accessible from the vCenter Server instance that you use with vSphere Replication.

Procedure

1 In the vSphere Client, power off the vSphere Replication management server virtual machine.

2 Right-click the vSphere Replication virtual machine and select **Edit Settings**.

3 In **Virtual Hardware**, select **CD/DVD Drive > Datastore ISO File**.

4 Navigate to the ISO image in the datastore.

5 For **File Type**, select **ISO Image** and click **OK**.

6 For **New device**, select **CD/DVD Drive** and click **Add**.

7 Check the box to connect at power on and follow the prompts to add the CD/DVD Drive to the vSphere Replication virtual machine.

8 Restart the vSphere Replication virtual machine.

9 In a Web browser, log in to the virtual appliance managment interface (VAMI).

If you are updating vSphere Replication 5.1, go to https://*vr_appliance_address*:5480.

If you are upgrading vSphere Replication 1.0.x, go to https://*vr_appliance_address*:8080.

10 Click the **Update** tab.

11 Click **Settings** and select **Use CDROM Updates**, then click **Save**.

12 Click **Status** and click **Check Updates**.

The appliance version appears in the list of available updates.

13 Click **Install Updates** and click **OK**.

14 After the updates install, click the **System** tab and click **Reboot** to complete the upgrade.

What to do next

If you have been using vSphere Replication with SRM 5.0.x or 5.1.x and your infrastructure uses more than one vSphere Replication server, you must upgrade the vSphere Replication servers to 5.5. Complete these steps to upgrade each vSphere Replication server.

Creating SRM Placeholders and Mappings

10

When you use SRM to configure the protection for virtual machines, you reserve resources on the recovery site by creating placeholders. You map the resources of the protected virtual machines to resources on the recovery site.

- About Placeholder Virtual Machines on page 79

  When you add a virtual machine or template to a protection group, SRM creates a placeholder virtual machine at the recovery site.

- About Inventory Mappings on page 80

  You must create inventory mappings so that SRM can create placeholder virtual machines.

- About Placeholder Datastores on page 81

  For every virtual machine in a protection group, SRM creates a placeholder virtual machine at the recovery site. You must identify a datastore on the recovery site in which SRM can store the placeholder virtual machines.

- Configure Datastore Mappings for vSphere Replication on page 82

  You configure datastore mappings to determine which datastores vSphere Replication uses to store replicated virtual machine disks and configuration files at the recovery site.

About Placeholder Virtual Machines

When you add a virtual machine or template to a protection group, SRM creates a placeholder virtual machine at the recovery site.

SRM reserves a place for protected virtual machines in the inventory of the recovery site by creating a subset of virtual machine files. SRM uses that subset of files as a placeholder to register a virtual machine with vCenter Server on the recovery site. The presence of placeholder in the recovery site inventory provides a visual indication to SRM administrators that the virtual machines are protected. The placeholders also indicate to vCenter Server administrators that the virtual machines can power on and start consuming local resources when SRM tests or runs a recovery plan.

When you recover a protected virtual machine by testing or running a recovery plan, SRM replaces its placeholder with the recovered virtual machine and powers it on according to the settings of the recovery plan. After a recovery plan test finishes, SRM restores the placeholders and powers off the virtual machines as part of the cleanup process.

About Placeholder Virtual Machine Templates

When you protect a template on the protected site, SRM creates the placeholder template by creating a virtual machine in the default resource pool of a compute resource and then by marking that virtual machine as a template. SRM selects the compute resource from the set of available compute resources in the datacenter on the recovery site to which the folder of the virtual machine on the protected site is mapped. All the hosts in the selected compute resource must have access to at least one placeholder datastore. At least one host in the compute resource must support the hardware version of the protected virtual machine template.

About Inventory Mappings

You must create inventory mappings so that SRM can create placeholder virtual machines.

Inventory mappings provide a convenient way to specify how SRM maps virtual machine resources at the protected site to resources at the recovery site. SRM applies these mappings to all members of a protection group when you create the group. You can reapply mappings whenever necessary, for example when you add new members to a group.

SRM does not enforce an inventory mapping requirement. If you create a protection group without defining inventory mappings, you must configure each protected virtual machine individually or use the Configure All option. SRM cannot protect a virtual machine unless it has valid inventory mappings for key virtual machine resources.

- Networks
- Folders
- Compute resources
- Placeholder datastores

After you configure mappings at the protected site when you configure protection, configure inventory mappings at the recovery site to enable reprotect.

When SRM creates a placeholder virtual machine, SRM derives its folder and compute resource assignments from inventory mappings that you establish at the protected site. A vCenter Server administrator at the recovery site can modify folder and compute resource assignments as necessary.

Configuring Inventory Mappings for Individual Virtual Machines

You can configure mappings for individual virtual machines in a protection group. If you create inventory mappings for a site, you can override them by configuring the protection of individual virtual machines. If you must override inventory mappings for some members of a protection group, use the vSphere Client to connect to the recovery site, and edit the settings of the placeholder virtual machines or move them to a different folder or resource pool.

Changing Inventory Mappings

If you change existing inventory mappings for a site, the changes do not affect virtual machines that SRM already protects. SRM only applies the new mappings to newly added virtual machines or if you repair a lost placeholder for a particular virtual machine.

Because placeholder virtual machines do not support NICs, you cannot change the network configurations of placeholder virtual machines. You can only change the network for a placeholder virtual machine in the inventory mappings. If no mapping for a network exists, you can specify a network when you configure protection for an individual virtual machine. Changes that you make to the placeholder virtual machine override the settings that you establish when you configure the protection of the virtual machine. SRM preserves these changes at the recovery site during the test and recovery.

How SRM Applies Mappings During Reprotect

During reprotect, SRM converts the virtual machines from the original protected site into placeholders, to protect the recovered virtual machines that were formerly the placeholder virtual machines on the recovery site. In most cases, the previously protected virtual machines and their devices are used during reprotect. If you add devices to a virtual machine after the virtual machine is recovered, or if original protected virtual machines are deleted, SRM uses mappings during reprotect.

Select Inventory Mappings

Inventory mappings provide default locations and networks for virtual machines to use when SRM creates placeholder virtual machines on the recovery site.

Unless you intend to configure mappings individually for each member of a protection group, you should configure inventory mappings for a site before you create protection groups.

Procedure

1 Click **Sites** in the left pane of the SRM interface and select the site for which to configure inventory mappings.

2 Select a tab for a type of inventory object to configure.

3 Select an inventory object and click **Configure Mapping**.

4 Expand the inventory items and navigate to the resources on the recovery site to which to map the protected site resource.

Option	Action
Resource Mappings	Select a resource pool, a host, or a cluster on the recovery site. You can also click **New Resource Pool** to create a resource pool on the host on the recovery site in which to place the recovered virtual machines. You cannot create a new resource pool on a cluster.
Folder Mappings	Select a datacenter or virtual machine folder on the recovery site. You can also click **New Folder** to create a virtual machine folder on the host on the recovery site in which to place the recovered virtual machines. You cannot create a new folder on a cluster.
Network Mappings	Select a network on the recovery site to use to connect the recovered virtual machines.

The selected resource appears in the Recovery Site Resource column. The path to the resource relative to the root of the vCenter Server on the recovery site appears in the Recovery Site Path column.

5 Repeat Step 2 through Step 4 for all resource types for which to establish mappings.

About Placeholder Datastores

For every virtual machine in a protection group, SRM creates a placeholder virtual machine at the recovery site. You must identify a datastore on the recovery site in which SRM can store the placeholder virtual machines.

After you select the datastore to contain the placeholder virtual machines, SRM reserves a place for protected virtual machines in the inventory on the recovery site. SRM creates a set of virtual machine files on the specified datastore at the recovery site and uses that subset to register the placeholder virtual machine with vCenter Server on the recovery site.

To enable planned migration and reprotect, you must select placeholder datastores at both sites.

Placeholder datastores must meet certain criteria.

- For clusters, the placeholder datastores must be visible to all of the hosts in the cluster.

- You cannot select replicated datastores as placeholder datastores.

Configure a Placeholder Datastore

You can specify a placeholder datastore for SRM to use for the storage of placeholder virtual machines.

Prerequisites

Verify that you connected and paired the protected and recovery sites.

Procedure

1. Select **Sites** in the left pane of the SRM interface, and select a site.
2. Click the **Placeholder Datastores** tab.
3. Click **Configure Placeholder Datastore**.
4. Expand the folders to find a datastore to designate as the location for placeholder virtual machines, click the datastore, and click **OK**.

   NOTE If an array manager is replicating datastores, but the array manager is not configured with SRM, the option to select the replicated datastore might be available. Do not select replicated datastores. Previously configured and replicated datastores appear but you cannot select them.

   The selected placeholder datastore appears in the Datastore column. If the datastore is on a standalone host, the host name appears. If the datastore is on a host that is in a cluster, the cluster name appears.

Configure Datastore Mappings for vSphere Replication

You configure datastore mappings to determine which datastores vSphere Replication uses to store replicated virtual machine disks and configuration files at the recovery site.

You can use datastore mappings when you configure vSphere Replication for virtual machines as a way to select the default destination datastores.

You configure datastore mappings from the source datastores of the virtual machines being configured for replication to destination datastores for the replicated files. A source datastore can be a single datastore that contains a single virtual machine, or it can be many datastores with many virtual machines with files spread across the datastores.

When you configure replication for a single virtual machine, you can override the datastore mappings for a site, but when you configure replication for multiple virtual machines, you can use only the site-wide datastore mappings, and you cannot override them.

Procedure

1. Click **vSphere Replication** in the left pane, and select a site.
2. Click the **Datastore Mappings** tab, and select a source datastore.
3. Click **Configure Mapping**.
4. Browse through the hierarchy of datastores at the recovery site and select a datastore to which to map.

Installing SRM to Use with a Shared Recovery Site

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With SRM, you can connect multiple protected sites to a single recovery site. The virtual machines on the protected sites all recover to the same recovery site. This configuration is known as a shared recovery site, a many-to-one, or an N:1 configuration.

In the standard one-to-one SRM configuration, you use SRM to protect a specific instance of vCenter Server by pairing it with another vCenter Server instance. The first vCenter Server instance, the protected site, recovers virtual machines to the second vCenter Server instance, the recovery site.

Another example is to have multiple protected sites that you configure to recover to a single, shared recovery site. For example, an organization can provide a single recovery site with which multiple protected sites for remote field offices can connect. Another example for a shared recovery site is for a service provider that offers business continuity services to multiple customers.

In a shared recovery site configuration, you install one SRM Server instance on each protected site. On the recovery site, you install multiple SRM Server instances to pair with each SRM Server instance on the protected sites. All of the SRM Server instances on the shared recovery site connect to the same vCenter Server instance. You can consider the owner of an SRM Server pair to be a customer of the shared recovery site.

You can use either array-based replication or vSphere Replication or a combination of both when you configure SRM Server to use a shared recovery site.

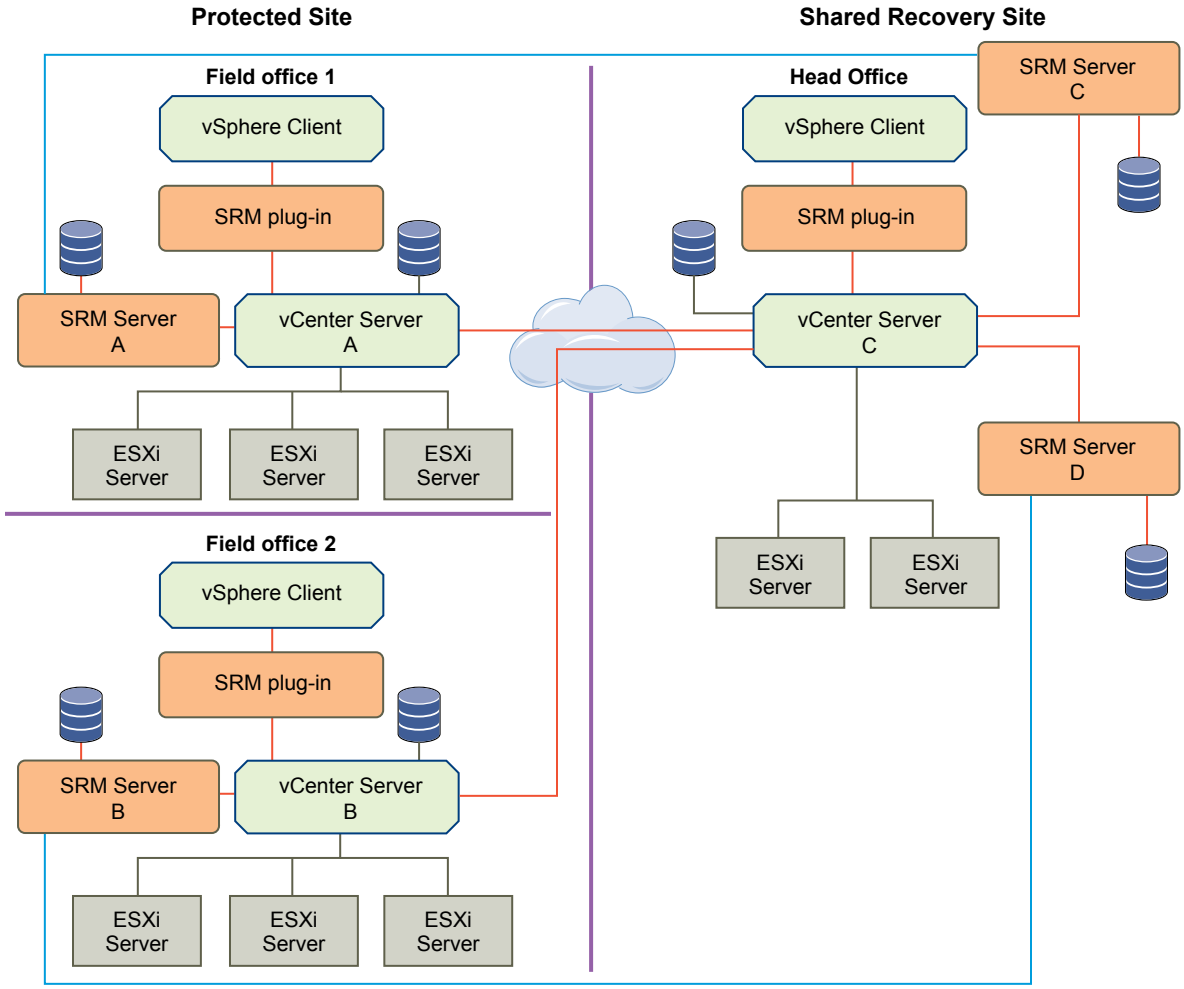
Example: Using SRM with Multiple Protected Sites and a Shared Recovery Site

An organization has two field offices and a head office. Each of the field offices is a protected site. The head office acts as the recovery site for both of the field offices. Each field office has an SRM Server instance and a vCenter Server instance. The head office has two SRM Server instances, each of which is paired with an SRM Server in one of the field offices. Both of the SRM Server instances at the head office extend a single vCenter Server instance.

- Field office 1
  - SRM Server A
  - vCenter Server A
- Field office 2
  - SRM Server B
  - vCenter Server B
- Head office
  - SRM Server C, that is paired with SRM Server A

- SRM Server D, that is paired with SRM Server B
- vCenter Server C, that is extended by SRM Server C and SRM Server D

Figure 11-1. Example of Using SRM in a Shared Recovery Site Configuration



- Limitations of Using SRM in Shared Recovery Site Configuration on page 85

  When you configure SRM to use a shared recovery site, SRM supports the same operations as it does in a standard one-to-one configuration. Configuring for a shared recovery site support is subject to some limitations.

- SRM Licenses in a Shared Recovery Site Configuration on page 85

  If you configure SRM to use with a shared recovery site, you can assign licenses individually on the shared recovery site. You can also share a license between all SRM Server instances on the shared recovery site.

- Install SRM In a Shared Recovery Site Configuration on page 86

  To install SRM in a shared recovery site configuration, you deploy SRM Server on one or more protected sites, and deploy a corresponding number of SRM Server instances on the shared recovery site.

- Use Array-Based Replication in a Shared Recovery Site Configuration on page 91

  You can use array-based replication with SRM in a shared recovery site configuration in the same way as you do in a standard one-to-one configuration.

- Use vSphere Replication in a Shared Recovery Site Configuration on page 92

  You can use vSphere Replication with SRM in a shared recovery site configuration in the same way that you do in a standard one-to-one configuration.

Limitations of Using SRM in Shared Recovery Site Configuration

When you configure SRM to use a shared recovery site, SRM supports the same operations as it does in a standard one-to-one configuration. Configuring for a shared recovery site support is subject to some limitations.

- You cannot reconfigure an existing one-to-one SRM installation to use a shared recovery site. You can only configure new SRM installations to use with a shared recovery site.
- For each shared recovery site customer, you must install SRM Server once at the customer site and again at the recovery site.
- You must specify the same SRM extension ID when you install the SRM Server instances on the protected site and on the shared recovery site.
- You must install each SRM Server instance at the shared recovery site on its own host machine. You cannot install multiple instances of SRM Server on the same host machine.
- Each SRM Server instance on the protected site and on the shared recovery site requires its own database.
- You can create a shared protected site by registering multiple SRM Server instances with a single vCenter Server instance on the protected site. This configuration creates a single point of failure on the protected site, so this configuration is not advisable in production environments. Setting up shared protection sites might be useful for testing in a lab environment.
- Both sites must use the same authentication method. If you use certificate-based authentication, the certificates on both sites must be configured in the same way. If you use credential-based authentication, both sites must specify the same values for the Organization and Organization Unit. The value that you specify for the Organization in the VMware vCenter Site Recovery Manager Plugin Identifier page of the SRM installer has no relation to the value that you specify for the Organization when you configure credential-based authentication. See Chapter 4, "SRM Authentication," on page 27.
- A single shared recovery site can support a maximum of ten protected sites. You can run concurrent recoveries from multiple sites. See KB 2008061 for the number of concurrent recoveries that you can run with array-based replication and with vSphere Replication.
- When connecting to SRM on the shared recovery site, every customer can see all of the SRM extensions that are registered with the shared recovery site, including company names and descriptions. All customers of a shared recovery site can have access to other customers' folders and potentially to other information at the shared recovery site.

SRM Licenses in a Shared Recovery Site Configuration

If you configure SRM to use with a shared recovery site, you can assign licenses individually on the shared recovery site. You can also share a license between all SRM Server instances on the shared recovery site.

In a shared recovery site configuration, you install SRM license keys on each of the protected sites to enable recovery. You can install the same license key on the shared recovery site and assign it to the partner SRM Server instance to enable bidirectional operation, including reprotect. You can use the same license key for both SRM Server instances in the SRM pair, in the same way as for a one-to-one configuration.

Alternatively, you can install one SRM license key on the shared recovery site. All SRM Server instances on the shared recovery site share this license. In this configuration, you must ensure that you have sufficient licenses for the total number of virtual machines that you protect on the shared recovery site, for all protected sites.

Example: Sharing SRM Licenses on a Shared Recovery Site

You connect two protected sites to a shared recovery site. You install a single SRM license on the shared recovery site.

- If you protect 20 virtual machines on protected site A, you require a license for 20 virtual machines on protected site A to recover these virtual machines to the shared recovery site.
- If you protect 10 virtual machines on protected site B, you require a license for 10 virtual machines on protected site B to recover these virtual machines to the shared recovery site.
- You share a SRM license for 25 virtual machines between two SRM Server instances, C and D, on the shared recovery site. The SRM Server instances on sites A and B connect to SRM Server instances C and D respectively.

Because you have a license for 25 virtual machines on the shared recovery site, the total number of virtual machines for which you can perform reprotect after a recovery is 25. If you recover all of the virtual machines from sites A and B to the shared recovery site and attempt to perform reprotect, you have sufficient licenses to reprotect only 25 of the 30 virtual machines that you recovered. You can reprotect all 20 of the virtual machines from site A to reverse protection from SRM Server C to site A. You can reprotect only 5 of the virtual machines to reverse protection from SRM Server D to site B.

In this situation, you can purchase licenses for more virtual machines for the shared recovery site. Alternatively, you can add the license keys from sites A and B to vCenter Server on the shared recovery site, and assign the license from site A to SRM Server C and the license from site B to SRM Server D.

Install SRM In a Shared Recovery Site Configuration

To install SRM in a shared recovery site configuration, you deploy SRM Server on one or more protected sites, and deploy a corresponding number of SRM Server instances on the shared recovery site.

You can only pair protected and recovery sites that have the same SRM extension ID.

Procedure

1 Install SRM Server on Multiple Protected Sites to Use with a Shared Recovery Site on page 87

   You install SRM Server to use with a shared recovery site by running the SRM installer from the command line with a custom setup option.

2 Install Multiple SRM Server Instances on a Shared Recovery Site on page 88

   In a shared recovery site configuration, you can install multiple SRM Server instances that all extend the same vCenter Server instance.

3 Install the SRM Client Plug-In In a Shared Recovery Site Configuration on page 88

   After you install SRM Server instances on the shared recovery site, you must install the SRM client plug-in.

4 Connect to SRM in a Shared Recovery Site Configuration on page 89

   When you log in to SRM on a site on which more than one SRM Server is running, SRM prompts you to select one of the SRM Server instances to which to connect.

5 Connect the SRM Sites in a Shared Recovery Site Configuration on page 90

   In a shared recovery site configuration, you connect the SRM sites in the same way as for a standard one-to-one configuration.

6 Configure Placeholders and Mappings in a Shared Recovery Site Configuration on page 90

   When you configure placeholders and mappings in a shared recovery site configuration, the customers of the shared recovery site can share the resources on the recovery site. Alternatively, you can assign isolated resources to each customer.

Install SRM Server on Multiple Protected Sites to Use with a Shared Recovery Site

You install SRM Server to use with a shared recovery site by running the SRM installer from the command line with a custom setup option.

When you run the installer from the command line with the custom setup option, the SRM installer presents additional screens on which you specify a unique SRM extension ID.

For each protected site, you must install one instance of SRM Server at the protected site and one instance of SRM Server at the recovery site. You can only pair SRM Server instances that have the same SRM extension ID. Each protected site must include its own vCenter Server instance.

Prerequisites

- Download the SRM installation file to a folder on the SRM Server host.
- This information presumes knowledge of the standard procedure for installing SRM. See "Install the SRM Server," on page 29 for information about a standard SRM installation.

Procedure

1 Start the SRM installer by typing the custom setup command in a command line terminal.

```
VMware-srm-version-build_number.exe /v"CUSTOM_SETUP=1"
```

2 Follow the prompts to begin the SRM installation.

3 At the VMware vCenter Site Recovery Manager Plugin Identifier page of the installer, select **Custom SRM Plugin Identifier** and click **Next**.

4 Provide information to identify this custom SRM extension and click **Next**.

Option	Description
SRM ID	Type a unique identifier for this pair of SRM Server instances. The SRM ID can be a string of up to 29 ASCII characters from the set of ASCII upper-lower-case characters, digits, the underscore, the period, and the hyphen. You cannot use the underscore, period, and hyphen as the first or last characters of the SRM ID, and they cannot appear adjacent to one another.
Organization	Type a string of up to 50 ASCII characters to specify the organization that created the extension.
Description	Type a string of up to 50 ASCII characters to provide a description of the extension.

5 Follow the prompts to complete the remainder of the installation.

6 Repeat the procedure on each of the sites to protect.

Connect each SRM Server to its own vCenter Server instance. Assign a unique SRM ID to each SRM Server.

What to do next

For each SRM Server that you installed on a protected site, install a corresponding SRM Server instance on the shared recovery site.

Install Multiple SRM Server Instances on a Shared Recovery Site

In a shared recovery site configuration, you can install multiple SRM Server instances that all extend the same vCenter Server instance.

The SRM Server instances that you install on a shared recovery site each correspond to an SRM Server on a protected site.

Prerequisites

- You created one or more protected sites, each with an SRM Server instance for which you configured a unique SRM ID.
- Download the SRM installation file to a folder on the SRM Server host.
- This information presumes knowledge of the standard procedure for installing SRM. See "Install the SRM Server," on page 29 for information about a standard SRM installation.

Procedure

1 Start the SRM installer by typing the custom setup command in a command line terminal.

```
VMware-srm-version-build_number.exe /v"CUSTOM_SETUP=1"
```

2 At the VMware vCenter Site Recovery Manager Plugin Identifier page of the installer, select **Custom SRM Plugin Identifier** and click **Next**.

3 Provide information to identify this SRM extension as the partner of an SRM Server server on a protected site, and click **Next**.

Option	Description
SRM ID	Type the same SRM ID as you provided for the corresponding SRM Server instance on the protected site. For example, if you set the SRM ID of the SRM Server instance on the protected site to **`SRM-01`**, set the SRM ID to **`SRM-01`**.
Organization	Type a string of up to 50 ASCII characters to specify the organization that created the extension.
Description	Type a string of up to 50 ASCII characters to provide a description of the extension.

4 Follow the prompts to complete the remainder of the installation.

5 Repeat Step 1 to Step 4 to install an SRM Server with an SRM ID that matches an SRM Server on another protected site.

Each additional SRM Server instance that you install connects to the vCenter Server instance on the shared recovery site.

What to do next

Install the SRM client plug-in.

Install the SRM Client Plug-In In a Shared Recovery Site Configuration

After you install SRM Server instances on the shared recovery site, you must install the SRM client plug-in.

After you install the SRM client plug-in, client plug-ins from other SRM Server instances running on the same shared site show as Available in the Manage Plug-ins interface. Install the client plug-in only once. Subsequent installations overwrite each other.

Prerequisites

- You installed one or more SRM Server instances on a shared recovery site.
- You assigned the same SRM extension ID to an SRM Server instance on a protected site and to an SRM Server instance on the shared recovery site.

Procedure

1 Connect the vSphere Client to vCenter Server on the shared recovery site.

2 Select **Plugins > Manage Plug-ins**.

3 Under **Available Plug-ins**, locate **VMware vCenter Site Recovery Manager Extension** and click **Download and Install**.

A client plug-in is available from each of the SRM Server instances that are running on the shared recovery site. You can install the SRM client plug-in from any SRM Server instance. Install the client plug-in only once. Subsequent installations overwrite each other.

4 Follow the prompts of the installer to complete the installation of the SRM client plug-in.

5 Repeat Step 1 through Step 4 to install the SRM client plug-in on all instances of the vSphere Client that you use to connect to SRM on the protected and recovery sites.

What to do next

Connect the protected sites to the shared recovery site.

Connect to SRM in a Shared Recovery Site Configuration

When you log in to SRM on a site on which more than one SRM Server is running, SRM prompts you to select one of the SRM Server instances to which to connect.

For each SRM Server instance that is running at the shared recovery site, the prompt lists the SRM ID, organization, and description that you supplied when you installed SRM Server.

Prerequisites

- You installed one or more SRM Server instances on a shared recovery site.
- You assigned the same SRM extension ID to an SRM Server instance on a protected site and to an SRM Server instance on the shared recovery site.
- You connected the vSphere Client to vCenter Server on the shared recovery site.
- You installed the SRM client plug-in.

Procedure

1 Click **Home** in the vSphere Client.

2 Click **Site Recovery** under Solutions and Applications.

3 Select the SRM ID of the SRM Server instance to connect to and click **Open**.

What to do next

Configure the connections between the protected sites and the shared recovery site.

Connect the SRM Sites in a Shared Recovery Site Configuration

In a shared recovery site configuration, you connect the SRM sites in the same way as for a standard one-to-one configuration.

If you start the site connection from one of the protected sites, SRM uses the SRM ID that you set during installation to connect to the correct SRM Server instance on the recovery site.

If you start the site connection from one of the SRM Server instances on the shared recovery site, and you try to connect to a protected site that has an SRM Server extension with a different SRM ID, the connection fails with an error.

Prerequisites

- You installed SRM Server on one or more protected sites.
- You installed one or more SRM Server instances on a shared recovery site.
- You assigned the same SRM extension ID to an SRM Server instance on a protected site and to an SRM Server instance on the shared recovery site.
- You installed the SRM client plug-in.

Procedure

1. Log in to SRM on a protected site or log in to one of the SRM instances on the shared recovery site.
2. Select **Sites**, click the **Summary** tab, and click **Configure Connection**.
3. Type the address of the vCenter Server on the remote site and click **Next**.
   - If you logged in to SRM on a protected site, type the address of vCenter Server on the shared recovery site.
   - If you logged in to SRM on the shared recovery site, type the address of vCenter Server on the corresponding protected site. The SRM extension of this vCenter Server instance must have an SRM ID that matches theSRM ID of the SRM instance from which you are connecting.
4. Follow the prompts to accept certificates and provide the login credentials for vCenter Server on the remote site and click **Finish**.

Configure Placeholders and Mappings in a Shared Recovery Site Configuration

When you configure placeholders and mappings in a shared recovery site configuration, the customers of the shared recovery site can share the resources on the recovery site. Alternatively, you can assign isolated resources to each customer.

On a shared recovery site, multiple customers share a single vCenter Server instance. In some cases, multiple customers can share a single ESXi host on the recovery site. You can map the resources on the protected sites to shared resources on the shared recovery site. You might share resources on the recovery site if you do not need to keep all of the customers' virtual machines separate, for example if all of the customers belong to the same organization.

You can also create isolated resources on the shared recovery site and map the resources on the protected sites to their own dedicated resources on the shared recovery site. You might use this configuration if you must keep all of the customers' virtual machines separate from each other, for example if all of the customers belong to different organizations.

For information about how to assign permissions to allow users to access the resources on a shared recovery site, see *Site Recovery Manager Administration*.

Prerequisites

- You installed SRM in a shared recovery site configuration.
- You connected the protected sites with the shared recovery site.
- Familiarize yourself with the procedure for configuring placeholders and mappings. For information about configuring placeholders and mappings in a standard configuration, see Chapter 10, "Creating SRM Placeholders and Mappings," on page 79.

Procedure

1 Click **Sites** in the SRM interface on the protected sites and use the **Resource Mappings**, **Folder Mappings**, **Network Mappings**, and **Placeholder Datastores** tabs to configure the mappings.

Option	Action
Share customer resources	Map the resources, networks, and datastores on the protected sites to a common datacenter, network, and placeholder datastore on the shared recovery site. You can create individual folders for each customer on the recovery site and map the folders on the protected sites to the individual folders.
Isolate customer resources	Map the resources, networks, folders, and datastores on the protected sites to separate datacenters, networks, folders, and placeholder datastores on the shared recovery site.

2 (Optional) If you use vSphere Replication, select **vSphere Replication > Datastore Mappings** on the protected sites to map the datastores to a datastore or datastores on the shared recovery site.

The datastore mappings determine in which datastores on the recovery site vSphere Replication places replicated virtual machines.

Option	Action
Share customer resources	Map the datastores on the protected sites to a common datastore on the shared recovery site. You can create individual folders for each customer on the recovery site and map the folders on the protected sites to the individual folders.
Isolate customer resources	Map the datastores on the protected sites to separate datastores on the shared recovery site.

Use Array-Based Replication in a Shared Recovery Site Configuration

You can use array-based replication with SRM in a shared recovery site configuration in the same way as you do in a standard one-to-one configuration.

To use array-based replication with SRM in a shared recovery site configuration, you must install storage arrays and storage replication adapters (SRA) on each of the protected sites. Each protected site can use a different type of storage array.

Each protected site can either share the same storage on the shared recovery site, or you can allocate storage individually for each protected site. The type of storage that you use on the shared recovery site can be different than the storage that you use on the protected sites. You can use storage from multiple vendors on the shared recovery site. You must install the appropriate SRA for each type of storage that you use on the shared recovery site.

For information about protection and recovery limits when you use array-based replication with SRM in a shared recovery site configuration, see KB 2008061.

Prerequisites

- You installed SRM in a shared recovery site configuration.

- You connected the protected sites with the shared recovery site.
- Familiarize yourself with the procedure for configuring array-based replication. For information about how to configure array-based replication in a standard configuration, see Chapter 7, "Configuring Array-Based Protection," on page 49.

Procedure

1 Set up storage arrays on the protected sites following the instructions that your storage array provides.

2 Install the appropriate SRAs on SRM Server systems on the protected sites.

3 Install the appropriate SRAs on SRM Server systems on the shared recovery site.

4 Configure the array managers on the protected sites and on the shared recovery sites.

5 Configure the mappings from the resources on the protected sites to resources on the shared recovery site and configure the placeholder datastores.

The shared recovery site is ready to receive replicated virtual machines that you recover from the protected sites by using array-based replication.

Use vSphere Replication in a Shared Recovery Site Configuration

You can use vSphere Replication with SRM in a shared recovery site configuration in the same way that you do in a standard one-to-one configuration.

You deploy one vSphere Replication appliance on each protected site. You deploy only one vSphere Replication appliance on the shared recovery site. All of the vSphere Replication appliances on the protected sites connect to this single vSphere Replication appliance on the recovery site. You deploy the vSphere Replication appliances in the same way as for a standard one-to-one configuration.

IMPORTANT Deploy only one vSphere Replication appliance on the shared recovery site. If you deploy multiple vSphere Replication appliances on the shared recovery site, each new vSphere Replication appliance overwrites the registration of the previous vSphere Replication appliance with vCenter Server. This overwrites all existing replications and configurations.

You can deploy the vSphere Replication appliance on the shared recovery site from any of the SRM instances on the shared recovery site. After deployment, the vSphere Replication appliance registers with vCenter Server on the shared recovery site and is available to all of the SRM instances on the shared recovery site.

You can deploy multiple additional vSphere Replication servers on the shared recovery site to distribute the replication load. For example, you can deploy on the shared recovery site a vSphere Replication server for each of the protected sites that connects to the shared recovery site. For information about protection and recovery limits when using vSphere Replication with SRM in a shared recovery site configuration, see KB 2008061.

Prerequisites

- You installed SRM in a shared recovery site configuration.
- You connected the protected sites with the shared recovery site.
- Familiarize yourself with the procedure for deploying vSphere Replication. For information about a standard vSphere Replication installation, see Chapter 8, "Installing vSphere Replication," on page 53.

Procedure

1 Deploy a vSphere Replication appliance on each of the protected sites.

2 Deploy one vSphere Replication appliance on the shared recovery site.

3 Log in to SRM on each of the protected sites and configure the vSphere Replication connection to the recovery site.

   All of the vSphere Replication appliances on the protected sites connect to the same vSphere Replication appliance on the recovery site.

4 (Optional) Deploy additional vSphere Replication servers on the shared recovery site.

5 (Optional) Register the additional vSphere Replication servers with the vSphere Replication appliance on the shared recovery site.

   The vSphere Replication servers become available to all SRM instances on the shared recovery site.

6 Configure the mappings from the resources on the protected sites to resources on the shared recovery site and configure the placeholder datastores.

7 Configure the vSphere Replication datastore mappings from the protected sites to datastores on the shared recovery site.

The shared recovery site is ready to receive replicated virtual machines that you recover from the protected sites by using vSphere Replication.

Troubleshooting SRM Installation and Configuration

12

Known troubleshooting information can help you diagnose and correct problems during the installation and configuration of SRM.

Solution

Cannot Restore SQL Database to a 32-Bit Target Virtual Machine During SRM Upgrade

You might encounter problems restoring a SQL database on a 32-bit target virtual machine when you upgrade or migrate SRM.

Problem

If you use an SQL Express database and upgrade or migrate SRM to a new database server, restoring the database on a 32-bit operating system might fail.

Use Attach rather than Restore when you migrate the SQL Express database on the 64-bit target virtual machine rather than on a 32-bit target virtual machine.

If you use SQL Express bundled with vCenter Server, note the following conditions:

- If you uninstall vCenter Server, SQL Express is also removed and you lose all your SRM data.
- Create and manage a separate database instance in the SQL Express server. SRM does not install on a database, that is pointed to by a DSN that contains vCenter Server data, regardless of database vendor, version, or edition.

Solution

1. To install SQL Express and migrate the database during SRM upgrade, stop the SRM service and back up your database.
2. Install SQL Express on the new host or virtual machine.
3. Copy the backup file to the new host or virtual machine and restore the database from it.
4. Create a system DSN that points to the restored database.
5. Install SRM and select **Use existing database** for both migration and upgrade.

SRM Server Does Not Start

SRM depends on other services. If one of those services is not running, the SRM Server does not start.

Problem

After you install, repair, or modify SRM by running the SRM installer, or after you reboot the SRM Server, the SRM Server does not start.

Cause

The SRM Server might not start if vCenter Server is not running, if it cannot connect to the SRM database, or if other services that SRM requires are not running.

Solution

1 Verify that the vCenter Server instance that SRM extends is running.

   If the vCenter Server service is running on a different host to the SRM Server and the vCenter Server service stops, the SRM Server will start succesfully and then stop after a short period.

2 Verify that the SRM database service is running.

3 Log in to the machine on which you installed the SRM Server.

4 Verify that SRM can connect to vCenter Server.

   a Open **Programs and Features** from the Windows Control Panel.

   b Select the entry for **VMware vCenter Site Recovery Manager** and click **Change**.

   c Click **Next**.

   d Select **Modify**.

   e Check that the address for vCenter Server is correct.

      If the vCenter Server address has changed since you installed SRM, for example if the vCenter Server machine uses DHCP instead of a static address, remove, reinstall, and reconfigure SRM.

   f Type the vCenter Server password and click **Next**.

      If the vCenter Server password has changed since you installed SRM, type the new password.

   g Select **Use existing certificate** and click **Next**.

   h Type the credentials for the SRM database and click **Next**.

      If the connection to the database fails, close the SRM installer and go to Step 5.

   i Select **Use existing database** and click **Next**.

   j Click **Install** to update the SRM configuration, or click **Cancel** if you made no changes.

5 Verify that SRM can connect to the SRM database.

   a Open the Windows ODBC Data Source Administrator utility, `C:\Windows\System32\Odbcad32.exe`.

   b Select the system DSN that you created for SRM and click **Configure**.

   c Check that SRM is attempting to connect to the correct database server and click **Next**.

   d Enter the login credentials for the SRM database and click **Next**.

   e Review the database settings on the next pages, and click **Finish**.

f Click **Test Data Source**.

If the connection is configured correctly, the ODBC Data Source Test window shows a positive result.

g If the connection test fails, reconfigure the SRM database by using the administration software from your database provider.

6 Verify that the SRM database permits sufficient connections.

If the SRM logs contain the message `GetConnection: Still waiting for available connections`, increase the maximum number of database connections.

NOTE Consult with your database administrator before changing these settings.

a Open the `vmware-dr.xml` file in a text editor.

You find the `vmware-dr.xml` file in the `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\config` folder on the SRM Server host.

b Change the `<connectionCount>` value to increase the size of the pool of database connections from the default of 5.

```
<connectionCount>10</connectionCount>
```

c Change the `<maxConnections>` value to increase the maximum number of database connections from the default of 20.

```
<maxConnections>30</maxConnections>
```

d Restart the SRM service.

7 Open the Windows Server Manager utility and select **Configuration > Services**.

8 Verify that the services that SRM requires are running.

- Windows Server
- Windows Workstation
- Protected Storage

9 Select the **VMware vCenter Site Recovery Manager Server** service in the Windows Server Manager utility and click **Start** or **Restart**.

vSphere Client Cannot Connect to SRM

Connecting to the SRM interface in the vSphere Client fails.

Problem

When you click the **Site Recovery** icon in the Home page of the vSphere Client, the connection to SRM fails with the message:

`Connection to local Site Recovery Manager https:`*`SRM_address`*`:8095/dr failed`

The SRM logs show a certificate error.

```
Failed to establish connection to VMware vCenter.
: std::exception 'class Vmacore::Ssl::SSLVerifyException'
"SSL Exception:
The remote host certificate has these problems:
* The host name used for the connection does not match the subject name on the host certificate
* The host certificate chain is not complete.
```

Cause

This problem can occur if the certificate for vCenter Server does not match the certificate that SRM requires, for example if the certificate for vCenter Server changed since you installed SRM.

Solution

Restore the vCenter Server certificate to the certificate that you used when you installed SRM or install a new vCenter Server certificate.

Site Pairing Fails Because of Different Certificate Trust Methods

If you use custom certificates that a certificate authority signs, connecting the SRM sites fails if the root certificate from the certificate authority is not present on SRM Server.

Problem

When you try to connect SRM sites, the connection fails with the error `Local and Remote servers are using different certificate trust methods`.

Cause

You did not install the root certificate for the certificate authority that signs the SRM certificate on SRM Server.

Solution

1. Use the Windows Certificate Manager utility to install the root certificate for the certificate authority that you use to sign the SRM certificate.

   The Certificate Manager utility is at `C:\Windows\System32\certmgr.msc` on the SRM Server host.
2. From the Windows Control Panel, run the SRM installer in Modify mode.
3. At the Certificate Type Selection page of the installer, select **Use a PKCS#12 certificate file** and browse to the custom SRM certificate.
4. Follow the prompts and click **Finish** to run the SRM installer in Modify mode.

Error at vService Bindings When Deploying the vSphere Replication Appliance

When you deploy the vSphere Replication appliance, you get an error at vService bindings in the Deploy OVF Template wizard.

Problem

When you deploy the vSphere Replication, an error appears at vService bindings in the Deploy OVF Template wizard.

```
Unsupported section '{http://www.vmware.com/schema/ovf}vServiceDependencySection'(A vService dependency)
```

Cause

This error is typically the result of the vCenter Management Web service being paused or stopped.

Solution

Attempt to start the vCenter Management Web service. If vCenter Server is running as a Linux virtual appliance, reboot the appliance.

OVF Package is Invalid and Cannot be Deployed

When you attempt to deploy OVF for the vSphere Replication appliance, an OVF package error might occur.

Problem

The error `OVF package is invalid and cannot be deployed` might appear while you attempt to deploy the vSphere Replication appliance.

Cause

This problem is due to the vCenter Server port being changed from the default of 80.

Solution

If possible, change the vCenter Server port back to 80.

vSphere Replication Appliance or vSphere Replication Server Does Not Deploy from the SRM Interface

If problems occur when you use the SRM interface to deploy a vSphere Replication appliance or a vSphere Replication server, you can deploy the OVF manually.

Problem

Deployment of the vSphere Replication appliance or vSphere Replication server from the SRM interface fails.

Solution

1 Select **File > Deploy OVF Template** in the vSphere Client.

2 Navigate to the vSphere Replication appliance or vSphere Replication server OVF file in the `www` directory in the SRM installation.

Option	OVF File
vSphere Replication appliance	`C:\Program Files\VMware\VMware vCenter Site Recovery Manager\www\vSphere_Replication_SRM_OVF10.ovf`
vSphere Replication server	`C:\Program Files\VMware\VMware vCenter Site Recovery Manager\www\vSphere_Replication_Server_SRM_OVF10.ovf`

3 Follow the prompts to deploy the vSphere Replication appliance or the vSphere Replication server.

Connection Errors Between vSphere Replication and SQL Server Cannot be Resolved

You cannot resolve a connection error between the vSphere Replication appliance and SQL Server.

Problem

vSphere Replication might not be able to connect to SQL Server, and you have insufficient information to solve this problem.

Cause

Several issues can cause this problem, and initially available information about the problem is insufficient to affect a resolution.

Solution

1 Use a file management tool to connect to the vSphere Replication appliance.

For example, you might use SCP or WinSCP. Connect using the root account, which is the same account used to connect to the VAMI.

2 Delete any files you find in `/opt/vmware/hms/logs`.

3 Connect to the VAMI and attempt to save the vSphere Replication configuration.

This action recreates the SQL error.

4 Connect to the vSphere Replication appliance again and find the `hms-configtool.log` file which is in `/opt/vmware/hms/logs`.

This log file contains information about the error that just occurred. Use this information to troubleshoot the connection issue, or provide the information to VMware for further assistance. See "Reconfigure vSphere Replication to Use an External Database," on page 63.

404 Error Message when Attempting to Pair vSphere Replication Appliances

Pairing vSphere Replication appliances might result in a 404 error message.

Problem

vSphere Replication might fail with a 404 error when you are pairing vSphere Replication appliances.

This problem happens if you paired the SRM Server instances by using a vCenter Server address that differs from the address in the **vCenter Server Address** entry in the vSphere Replication virtual appliance management interface (VAMI).

Cause

By default, vSphere Replication uses the IP address of the vCenter Server instance to connect to vCenter Server.

If you paired the SRM sites using host names, the vSphere Replication pairing fails with an error.

```
Unexpected status code: 404
```

The vCenter Server address value in the VAMI must match the address that you provide when you connect the sites.

- If you used an IP address to pair the SRM sites, you must use the same IP address to connect vSphere Replication to vCenter Server.
- If you used a host name to pair the SRM sites, you must use the same host name to connect vSphere Replication to vCenter Server.

Solution

1 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

2 Type the same IP address or host name for vCenter Server as you used when you configured the pairing of the SRM sites.

3 Click **Save and Restart Service** to apply the changes.

vSphere Replication Service Fails with Unresolved Host Error

If the address of vCenter Server is not set to a fully qualified domain name (FQDN) or to a literal address, the vSphere Replication service can stop unexpectedly or fail to start after a reboot.

Problem

The vSphere Replication service stops running or does not start after a reboot. The error `unable to resolve host: non-fully-qualified-name` appears in the vSphere Replication logs.

Solution

1 In the vSphere Client, select **Administration > vCenter Server Settings > Advanced Settings** and check that the `VirtualCenter.FQDN` key is set to either a fully qualified domain name or to a literal address.

2 Connect to the VAMI of the vSphere Replication appliance in a Web browser.

The URL for the VAMI is https://*vr-appliance-address*:5480.

You can also access the VAMI by clicking **Configure VR Appliance** in the **Summary** tab in the vSphere Replication view of the SRM interface.

3 Enter the same FQDN or literal address for vCenter Server as you set for the `VirtualCenter.FQDN` key.

4 Click **Save and Restart Service** to apply the changes.

Increase the Memory of the vSphere Replication Server for Large Deployments

If you deploy an additional vSphere Replication server, you might need to increase the memory of the vSphere Replication server if that server manages large numbers of virtual machines.

Problem

vSphere Replication supports a maximum of 100 virtual machines per vSphere Replication server. Replication of more than 100 virtual machines on a single vSphere Replication server can cause memory swapping on the vSphere Replication server, which affects performance.

Solution

For deployments that exceed 100 virtual machines per vSphere Replication server, increase the RAM of the vSphere Replication server virtual machine from the default of 512MB to 1GB.

Alternatively, deploy additional vSphere Replication servers and balance the replication load accordingly.

vSphere Replication Appliance Extension Cannot Be Deleted

If you delete the vSphere Replication appliance virtual machine, the virtual appliance management interface (VAMI) is not available to delete the appliance extension that still exists in vCenter Server.

Problem

Deleting the vSphere Replication appliance does not remove the vSphere Replication extension from vCenter Server.

Solution

1 Use the Managed Object Browser (MOB) to delete the vSphere Replication extension manually.

2 Redeploy the appliance and reconfigure the replications.

See "Unregister vSphere Replication from vCenter Server if the Appliance Was Deleted," on page 70

Uploading a Valid Certificate to vSphere Replication Results in a Warning

When you upload a custom certificate to the vSphere Replication appliance, you see a warning even if the certificate is valid.

Problem

When you use the virtual appliance management interface (VAMI) in Internet Explorer to upload certificates to the vSphere Replication appliance, you see a certificate error:

`The certificate installed with warnings. Remote VRM systems with the 'Accept only SSL certificate signed by a trusted CA' option enabled may be unable to connect to this site for the following reason: The certificate was not issued for use with the given hostname: vr_appliance_hostname.`

Solution

Ignore this error, or connect to the VAMI by using a supported browser other than Internet Explorer.

vSphere Replication Status Shows as Disconnected

The status of the vSphere Replication appliance shows as Disconnected if you are running the SRM client plug-in on Windows XP SP2 x64.

Problem

The status of the vSphere Replication appliance shows as Disconnected in the Summary tab for a vSphere Replication site. Attempting to reconfigure the connection results in the error `Lost connection to local VRMS server at server_address:8043. (The client could not send a complete request to the server 'server_address'. (The underlying connection was closed: An unexpected error occurred on a send.))`.

Cause

This problem occurs because the SRM client plug-in and vSphere Client cannot negotiate cryptography when the SRM client plug-in runs on older versions of Windows. If you run the desktop version of vSphere Client and SRM client plug-in on Windows XP SP2 x64, you might encounter incompatibilities between server and client cryptography support. SRM does not support older Windows XP x64 service packs.

Windows XP SP3 x86 is not affected by this issue. SRM does not support older Windows XP x86 service packs.

Solution

Download and install the Microsoft Hotfix from Microsoft KB 948963 http://support.microsoft.com/kb/948963. This hotfix is not applied in any regular Windows updates so you must manually download and apply the fix.

vSphere Replication Server Registration Takes Several Minutes

vSphere Replication server registration might take a long time depending on the number of hosts in the vCenter Server inventory.

Problem

If the vCenter Server inventory contains a few hundred or more hosts, the Register VR Server task takes more than a few minutes to complete.

Cause

vSphere Replication updates each host's SSL thumbprint registry. The vCenter Server Events pane displays `Host is configured for vSphere Replication` for each host as the vSphere Replication server registration task progresses.

Solution

1 Wait for the registration task to complete.

After it finishes, you can use vSphere Replication for incoming replication traffic.

2 Alternatively, edit `/opt/vmware/hms/conf/hms-configuration.xml` and change `hms-config-host-at-hbr-threadpool-size` parameter to a higher value to enable parallel processing of more hosts at a time and restart the vSphere Replication management server `/etc/init.d/hms restart`

vSphere Replication is Inaccessible After Changing vCenter Server Certificate

If you change the SSL certificate of vCenter Server, you cannot access vSphere Replication.

Problem

vSphere Replication uses certificate-based authentication to connect to vCenter Server. If you change the vCenter Server certificate, vSphere Replication is inaccessible.

Cause

The vSphere Replication database contains the old vCenter Server certificate.

Solution

1 Power off and power on the vSphere Replication appliance.

vSphere Replication obtains the new certificate from vCenter Server when it powers on.

2 (Optional) If you configured vSphere Replication to use an external database, log into the virtual appliance management interface (VAMI) of the vSphere Replication appliance and click **Configuration > Save and Restart Service**.

Do not change any configuration information before clicking **Save and Restart Service**.

vSphere Replication restarts with the new vCenter Server certificate.

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