

IBM Spectrum Virtualize Family Storage
Replication Adapter
4.0.0

User Guide



Note

Before using this document and the product it supports, read the information in [“Notices” on page 29.](#)

First Edition (August 2022)

This publication applies to IBM Spectrum Virtualize Family Storage Replication Adapter 4.0.0 and to all subsequent releases and modifications until otherwise indicated in a newer publication.

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About this guide

This guide describes how to install, configure, and use the IBM Spectrum Virtualize Family Storage Replication Adapter.

Who should use this guide

This guide is intended for system administrators or others who install and use the VMware Site Recovery Manager with the supported storage systems.

It is important to have an understanding of the following systems:

- Storage area networks (SANs)
- Spectrum Virtualize Family Metro/Global-Mirror Copy Services (for more information, see [“Related information and publications”](#) on page vii)
- IBM Stretched Cluster
- IBM HyperSwap function
- The capabilities of your storage system

Conventions used in this guide

The notices that are used in this publication highlight key information.

Note: These notices provide important tips, guidance, or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or difficult situations.



Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before the instruction or situation in which damage can occur.

Related information and publications

You can find additional information and publications related to the IBM Spectrum Virtualize Family Storage Replication Adapter at the following websites:

- [IBM FlashSystem 5200, 5000, 5100, Storwize® V5100 and V5000E in IBM Documentation \(ibm.com®/docs/en/flashsystem-5x00\)](#)
- [IBM FlashSystem 7300, 7200 and Storwize V7000 in IBM Documentation \(ibm.com/docs/en/flashsystem-7x00\)](#)
- [IBM FlashSystem® 9500, 9200 and 9100 in IBM Documentation \(ibm.com/docs/en/flashsystem-9x00\)](#)
- [IBM SAN Volume Controller \(2145 and 2147\) in IBM Documentation \(ibm.com/docs/en/sanvolumecontroller\)](#)
- [SAN Volume Controller and Storwize V7000 Replication Family Services \(redbooks.ibm.com/redbooks/pdfs/sg247574.pdf\)](#)
- [SAN Volume Controller Best Practices and Performance Guidelines \(redbooks.ibm.com/redbooks/pdfs/sg247521.pdf\)](#)
- [VMware Documentation \(vmware.com/support/pubs\)](#)
- [VMware Product Support \(vmware.com/support\)](#)
- [VMware Knowledge Base \(kb.vmware.com\)](#)

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- [IBM](http://www.ibm.com) (www.ibm.com)
- [IBM Publications Center website](http://www.ibm.com/resources/publications) (www.ibm.com/resources/publications)
- [IBM Directory of Worldwide Contacts](http://www.ibm.com/planetwide) (www.ibm.com/planetwide)

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Procedure

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 - Exact publication title and version
 - Publication form number (for example, GA32-1234-00)
 - Page, table, or illustration numbers that you are commenting on
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Introduction

The IBM Spectrum Virtualize Family Storage Replication Adapter (SRA) is a software add-on that integrates with the VMware vCenter Site Recovery Manager (SRM) solution to run failovers together with supported storage systems.

The IBM Spectrum Virtualize Family SRA extends SRM capabilities and uses replication and mirroring as part of the SRM comprehensive Disaster Recovery Planning (DRP) solution.

VMware administrators can automate the failover of storage systems at the protected (primary) SRM site to a recovery (secondary) SRM site. Immediately upon a failover, the VMware ESX/ESXi servers at the recovery SRM site initiate the replicated datastores on the mirrored volumes of the recovery storage system.

When the protected site is back online, you can run failback from the recovery site to the protected site by clicking **Reprotect** in the SRM.

Note: The supported storage systems for the Spectrum Virtualize Family SRA are listed in the release notes, and are referred throughout the documentation as "Spectrum Virtualize Family," "storage systems," or "Spectrum Virtualize software."

Concept diagram

Spectrum Virtualize Family can use the IBM Spectrum Virtualize Family SRA add-on that works with each instance of VMware vCenter SRM (protected or recovery).

[Figure 1 on page 2](#) shows how an IBM SAN Volume Controller is integrated in a typical VMware SRM disaster recovery solution.

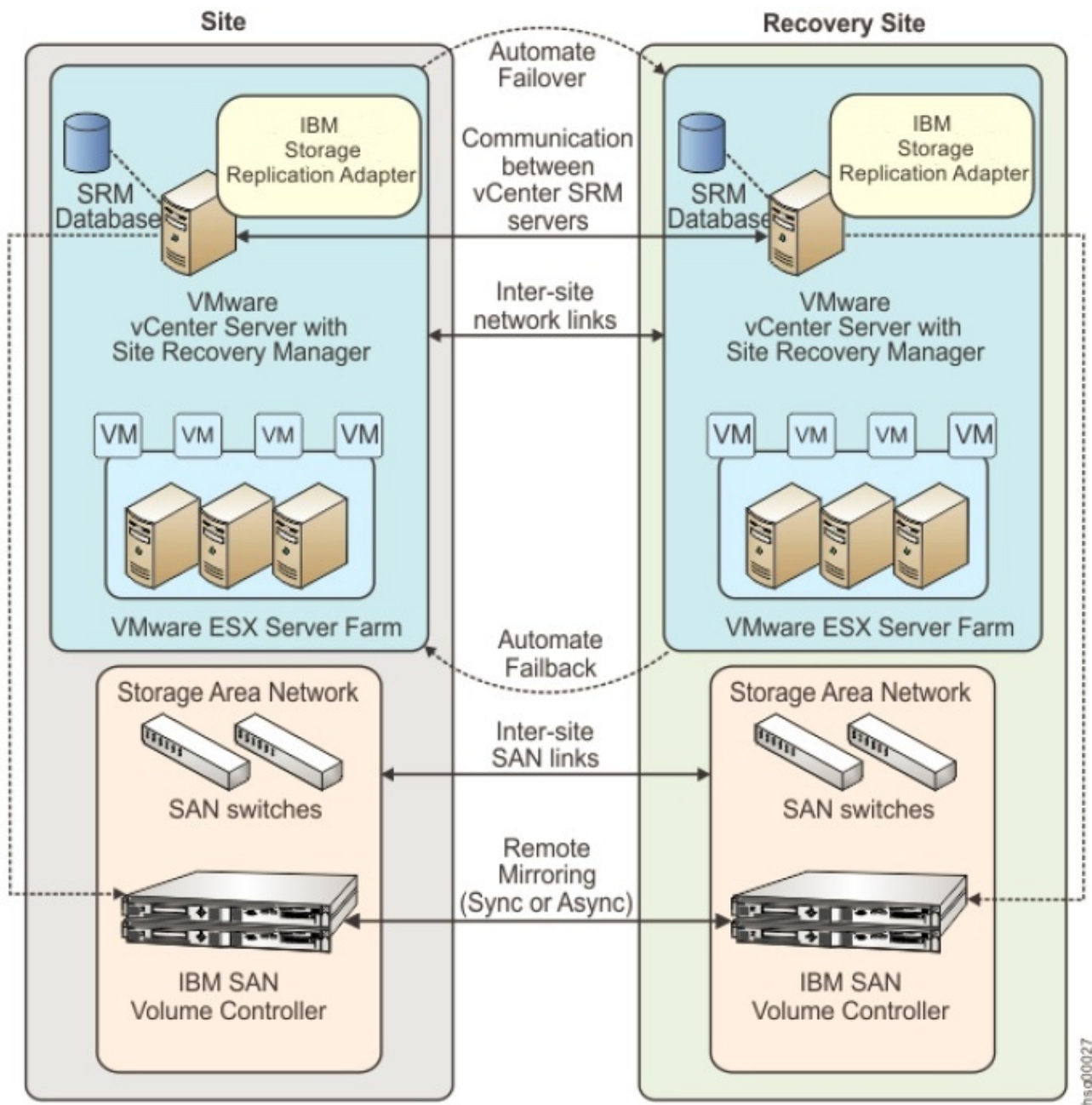


Figure 1. Concept diagram

Compatibility and requirements

For up-to-date information about the compatibility and requirements of the IBM Spectrum Virtualize Family SRA, see the latest release notes.

You can obtain the latest release notes on the [IBM Documentation](http://ibm.com/docs) (ibm.com/docs).

Note: Refer to the relevant VMware documentation for information about how to install the compatible versions of vCenter Server, Site Recovery Manager, and vSphere Web Client. Also, refer to the latest installation and configuration instructions for VMware ESX and ESXi servers.

Preparation

Depending on your specific site configuration, preparation is required as described in the following topics.

- [“Preparing the SRA environment” on page 3](#)
- [“Verifying the mirroring configuration” on page 3](#)
- [“Verifying the VMware vCenter Site Recovery Manager installation” on page 5](#)

Preparing the SRA environment

Before you install the IBM Spectrum Virtualize Family SRA, prepare the storage environment.

Procedure

1. Verify that the supported storage system microcode version is used (for information, refer to the release notes).
2. Create appropriate-sized target volumes on the recovery (secondary) site Spectrum Virtualize Family. If you are using the IBM Spectrum Virtualize Family, create Metro/Global-Mirror relationships between the source and target volumes and add the relationships to consistency groups, as needed. If you are using IBM Stretched Cluster, create appropriate-sized stretched volumes as needed. If you are running IBM HyperSwap, create appropriate-sized HyperSwap volumes as needed.

Note:

- For information about Metro/Global Mirror Copy Services, see the [IBM System Storage SAN Volume Controller and Storwize V7000 Replication Family Services IBM Redbooks publication](#) (redbooks.ibm.com/abstracts/sg247574.html).
 - For information about IBM Stretched Cluster, see the [Relevant Redbooks publications](#) (redbooks.ibm.com/redbooks.nsf/searchsite?SearchView&query=stretched+AND+cluster+Spectrum+Virtualize+SAN+Volume).
 - For more information about IBM HyperSwap, see the [IBM Storwize V7000, Spectrum Virtualize, HyperSwap, and VMware Implementation IBM Redbooks publication](#) (redbooks.ibm.com/abstracts/sg248317.html).
3. Create a user on the Spectrum Virtualize Family with the appropriate privileges for the Spectrum Virtualize Family SRA.

For SRA non-preconfigured settings, a user with "Administrator" or higher privilege is needed. For SRA preconfigured settings, a user with "CopyOperator" or higher privilege is needed.

Note: SRA only supports non-preconfigured settings for IBM Stretched Cluster and IBM HyperSwap.

Verifying the mirroring configuration

All storage systems, volumes, and VMware ESX hosts at both sites must be properly connected to their remote counterparts and configured for site mirroring.

Before you install the IBM Spectrum Virtualize Family SRA, verify that the following prerequisites are completed:

- Your local Spectrum Virtualize Family at the protected (primary) site has mirroring connectivity with the target Spectrum Virtualize Family at the recovery (secondary) site. For IBM Stretched Cluster, stretched volumes are created, and both copies of a stretched volume are online. For IBM HyperSwap, HyperSwap volumes are created, and both the primary volume and secondary volume of a HyperSwap volume are online.
- The name of each Spectrum Virtualize Family is unique at both the protected and the recovery sites.

- The target name of any target Spectrum Virtualize Family (remote copy system) is identical to the predefined System Name of that same remote Spectrum Virtualize Family.
- The storage pools that contain the replicated volumes at both the protected and recovery sites are sufficient for creating the snapshots of all replicated volumes concurrently.

Note: In this guide, the storage pool ID is referred to as the **lsmdiskgrp** command. When using the Spectrum Virtualize GUI, this is the pool ID number.

- For non pre-configured environments, an extra space for Test Failover and Failover is necessary. Ensure that enough space is available in the pool for it.
- Remote copying is defined for all Spectrum Virtualize Family-based volumes that you intend to protect as part of your Disaster Recovery Plan (DRP). For IBM Stretched Cluster, stretched volumes are created, and both copies of a stretched volume are online. For IBM HyperSwap, HyperSwap volumes are created, and both the primary volume and secondary volume of a HyperSwap volume are online. For more information about IBM HyperSwap, see the [IBM Storwize V7000, Spectrum Virtualize, HyperSwap, and VMware Implementation IBM Redbooks publication \(redbooks.ibm.com/abstracts/sg248317.html\)](http://redbooks.ibm.com/abstracts/sg248317.html).
- Protected volumes are mapped to the protected VMware ESX hosts. For Stretched Cluster, the stretched volumes are mapped to both the protected and recovery VMware ESX hosts. For IBM HyperSwap, the primary volume of a HyperSwap is mapped to both the protected and recovery VMware ESX hosts.
- For non-preconfigured environments, the recovery Spectrum Virtualize Family-based volumes remain unmapped.
- The recovery VMware ESX/ESXi hosts are defined as Spectrum Virtualize Family hosts at the recovery site. For IBM Stretched Cluster and IBM HyperSwap, the recovery VMware ESX/ESXi hosts are defined as storage hosts in Spectrum Virtualize.
- Recovery VMware ESX/ESXi host ports are FC-zoned with the storage system at the recovery site, and are visible by that storage system.



Attention: Confirm with your storage administrator that all the requirements are met.

Supported iSCSI configurations for mirroring

Single session or multi-session iSCSI configurations are supported for mirroring.

Single-session configuration

The following single-session configurations are supported:

- A VMware ESX server with one NIC port and a single IPv4 address space configured on it. At the same time, the Spectrum Virtualize Family has a single target IPv4 address space configured on an Ethernet port. This configuration results in a single path from the VMware ESX server to each iSCSI LUN.
- A VMware ESX server with one NIC port and a single IPv4 address space configured on it. At the same time, the Spectrum Virtualize Family has two target IPv4 address spaces configured on Ethernet ports, one on each node. This configuration results in two paths visible from the VMware ESX server to each iSCSI LUN.

Multi-session configuration

A maximum of four sessions are supported between a VMware ESXi Server and a Spectrum Virtualize Family node (canister). Therefore, a maximum of eight paths are available to the disk/LUN. For example, four paths or sessions are available to each Spectrum Virtualize Family node (canister) from the iSCSI Qualified Name (IQN) of each iSCSI initiator.

Note: For more information about iSCSI host attachment of VMware hosts, see [Guidelines for the Attachment of VMware iSCSI Hosts to SAN Volume Controller and Storwize V7000 – Errata](#).

Verifying the VMware vCenter Site Recovery Manager installation

Before you start to run the IBM Spectrum Virtualize Family SRA container, you must ensure that the VMware SRM is already installed and accessible at the protected (primary) site as well as the recovery (secondary) site.

Procedure

1. Log in to the VMware vSphere Web Client.
2. Go to the Web Client home page and verify that **Site Recovery** is displayed in the navigation panel.

Note: For more information on how to install VMware Virtual Center Server and the Site Recovery Manager virtual application, refer to the *VMware Virtual Center installation and administration guide*.

Installation

After you finish the required preparation, you can run the IBM Spectrum Virtualize Family SRA container. Refer to the following sections for more information.

- [“Downloading the SRA” on page 7](#)
- [“Running the SRA container” on page 7](#)
- [“Deleting the SRA” on page 7](#)

Downloading the SRA

You can download the IBM Spectrum Virtualize Family SRA from the VMware website.

<http://www.vmware.com/go/download-srm>

Running the SRA container

Once you have downloaded the IBM Spectrum Virtualize Family SRA from the VMware website, use the VMware SRM Appliance Management interface to run it on the SRM server.

Before you begin

It is suggested that you stop your currently installed version of the SRA container before running a different version. You must satisfy all of the prerequisites that are listed in [“Preparation” on page 3](#) before you run the SRA container.

Procedure

Complete the following steps to run the IBM Spectrum Virtualize Family SRA container on the SRM server.

1. Log in to the VMware SRM Appliance Management interface as admin.
2. Navigate to **Storage Replication Adapters** and click **NEW ADAPTER**.
3. Click **UPLOAD**, navigate to the directory where you saved the SRA file, and double-click it.
The SRA upload process begins.
4. When the upload process finishes, click **Close**.
The SRA card is displayed on the Storage Replication Adapters view.
5. Log in to the vSphere Web Client.
6. Click **Site Recovery** > **OPEN Site Recovery**, select a site pair, and click **VIEW DETAILS**.
7. On the **Site Pair** tab, navigate to **Configure** > **Array Based Replication** > **Storage Replication Adapters**.
8. Click **RESCAN ADAPTERS**. Once the rescan is complete, the **Status** field value is updated to OK.

Deleting the SRA

To delete the IBM Spectrum Virtualize Family Storage Replication Adapter from the SRM Server, use the VMware SRM Appliance Management interface.

Procedure

Complete the following steps to delete the SRA from the SRM Server.

Note: If you delete the SRA, any currently running operations involving storage arrays controlled by this adapter are interrupted, including, but not limited to, Recover, Test, Cleanup, and Reprotect.

1. Log in to the VMware SRM Appliance Management interface as admin.

2. Click **Storage Replication Adapters**.
3. Find the appropriate SRA card, open its drop-down menu, and select **Delete**.
4. Confirm that you are aware of the results of deleting the adapter and click **Delete**.
The SRA is deleted.

Upgrading the SRA

Upgrade to the latest version of the Spectrum Virtualize Family Spectrum Replication Adapter to ensure full support.

Procedure

Use the following procedure to upgrade to the latest version of the Spectrum Virtualize Family SRA.

1. Back up the existing `sra.settings` configuration file.

For example:

```
docker cp <container_id>:/srm/sra/conf/IBMSpectrumVirtualizeFamilySRA/sra.settings  
<local_path>
```

2. Back up the existing SRA-STATUS file.

Note: This step is not required if no operation is pending or if the adapter is in a failed state.

For example:

```
docker cp <container_id>:/srm/sra/log/SRA-STATUS <local_path>
```

Note: When upgrading from Spectrum Virtualize Family SRA 3.6.0 or lower, use the `/srm/sra/SRA-STATUS` path. When upgrading from Spectrum Virtualize Family SRA 3.7.0 or later, use the `/srm/sra/log/SRA-STATUS` path.

3. Optional: Verify that the backup has completed with `FAILOVER` or `TESTFAILOVER` messages.

```
docker exec -it <container_id> cat /srm/sra/log/SRA-STATUS
```

Note: When upgrading from Spectrum Virtualize Family SRA 3.6.0 or lower, use the `/srm/sra/SRA-STATUS` path. When upgrading from Spectrum Virtualize Family SRA 3.7.0 or later, use the `/srm/sra/log/SRA-STATUS` path.

4. Delete the SRA adapter.

For more information, see [“Deleting the SRA” on page 7](#).

5. Install the new SRA adapter.

For more information, see [“Running the SRA container” on page 7](#).

6. Update the `sra.settings` configuration file.

For more information, see [“Updating the SRA configuration file” on page 11](#).

Important: Be sure to edit and update the configuration file. Do not replace it with any existing files. Replacing the file with older content may result in the loss of the new configuration parameters.

7. Update the SRA-STATUS file.

Note: Skip this step if no backup is made in step [“2” on page 8](#), or if the existing (old) file is empty.

- a. Copy the SRA-STATUS file to the container. For example:

```
docker cp <local_path>/SRA-STATUS <container_id>:/srm/sra/log/
```

- b. Update SRA-STATUS file mode (664) and ownership (660:660).

- To update file ownership run the following command:

```
docker exec -it <container_id> chown 660:660 /srm/sra/log/SRA-STATUS
```


- To update the file mode, run the following command:

```
docker exec -it <container_id> chmod 664 /sim/sra/log/SRA-STATUS
```

- c. Verify the content of SRA-STATUS file. For example:

```
docker exec -it <container_id> cat /sim/sra/log/SRA-STATUS
```

Configuration

After the Spectrum Virtualize Family SRA files have been uploaded to the SRM Server via the SRM Appliance Management interface, and the SRA container is running on the SRM VA, various configuration tasks can be performed, as described in the following sections.

- [“Updating the SRA configuration file” on page 11](#)
- [“Configuring source and target volume backup settings” on page 12](#)
- [“Configuring preconfigured environments” on page 13](#)
- [“Configuring non-preconfigured environments” on page 13](#)
- [“Setting SRA user privileges” on page 14](#)

Updating the SRA configuration file

There are two methods you can use to update the SRA configuration file settings on an SRM Server, as described in the following subsections.

Important: The SRA configuration file must be updated on both the protected (primary) site and the recovery (secondary) site SRM VA. The **preConfiguredEnv** setting must be consistent for both sites.

- [“Updating the SRA configuration file from the SRA container volume \(preferred method\)” on page 11](#)
- [“Updating the SRA configuration file from the SRM Appliance Management Interface” on page 11](#)

Updating the SRA configuration file from the SRA container volume (preferred method)

Updating the SRA configuration file on an SRM Server from the SRA container volume is the preferred method. To use this method, complete the following steps.

Procedure

1. Switch to the SRA configuration volume directory located on the SRM VA server:
`/var/lib/docker/volumes/<Docker_Image_ID>-v/_data`
2. For detail, please check the mount information by using the following command:
`docker inspect <Container_ID>`
3. Modify the SRA configuration file `sra.settings` under the directory `IBMSpectrumVirtualizeFamilySRA`.
4. Run the `docker` command to verify the result:
`docker exec <Container_ID> cat /srm/sra/conf/IBMSpectrumVirtualizeFamilySRA/sra.settings`

Updating the SRA configuration file from the SRM Appliance Management Interface

Complete the following steps to updating the SRA configuration file on an SRM Server from the SRM Appliance Management Interface.

Procedure

1. Log in to the **VMware SRM Appliance Management Interface**.
2. Click **Storage Replication Adapters**.
3. On the relevant SRA card, click the drop-down menu and select **Download configuration archive**.

4. Extract the archive and modify the SRA configuration file `sra.settings` under the directory `IBMSpectrumVirtualizeFamilySRA`.
For example, uncompress the archive with the `tar -pzxvf` command.

```
$ tar -pzxvf ibm-spectrum-virtualize-family-sra_4_0_0.tar.gz
x ./
x ./sra-configuration-version.txt
x ./IBMSpectrumVirtualizeFamilySRA/
x ./IBMSpectrumVirtualizeFamilySRA/sra.settings
```

Important: Do not modify the file `sra-configuration-version.txt`. SRM would use this file to match the digest of the current configuration. If the two hashes don't match, the change would be rejected.

5. Compress the SRA configuration files as a `tar.gz`.
For example, compress the archive with the `tar -pzcvf` command.

```
$ tar -pzcvf ibm-spectrum-virtualize-family-sra_4_0_0.tar.gz
  IBMSpectrumVirtualizeFamilySRA sra-configuration-version.txt
a ./IBMSpectrumVirtualizeFamilySRA/
a ./IBMSpectrumVirtualizeFamilySRA/sra.settings
a ./sra-configuration-version.txt
```

6. Back on the **Storage Replication Adapters** pane in the SRM Appliance Management interface, click the drop-down menu within the SRA card and select **Upload configuration archive**.
7. Run the `docker exec` command to verify the result:
`docker exec <Container_ID> cat /srm/sra/conf/IBMSpectrumVirtualizeFamilySRA/sra.settings`

Configuring force recovery setting

Update the force recovery setting from within the SRA configuration file `sra.settings`.

The default setting is disabled. To forcefully perform a recovery operation, change the **force** flag value from *False* to *True*.

Important: Do not enable this configuration in a regular working environment. Only enable this setting after consulting IBM Support, in a disaster scenario. Be sure to disable the configuration after the task is complete. Leaving the configuration enabled may lead to data loss or corruption.

Configuring source and target volume backup settings

Source and target volume backup settings must be configured for the following recovery scenarios provided by VMware SRM 8.2 or later:

- Planned failover
- Disaster recovery

To do this, configure Spectrum Virtualize Family SRA to create FlashCopy backups of the remote copy source and target volumes by setting **protectSource** and **protectTarget** to *True* in `sra.settings`. (For more information, see [“Updating the SRA configuration file”](#) on page 11.)

Note: Stretched and HyperSwap volumes within IBM Stretched Cluster and IBM HyperSwap features do not have a source or target. As a result, the SRA does not create FlashCopy backups even if **protectSource** and **protectTarget** are set to *True*.

Before completing the update process, set the following MDisk group IDs within `sra.settings`:

- **sourceMDiskGroupID**
- **recoveryMDiskGroupID**
- **testMDiskGroupID**

Note:

- **testMDiskGroupID** must be set before promoting target volumes to the VMWare ESX server and recovering VMs on them.
- If the Spectrum Virtualize Family SRA fails to back up the source or target volumes, no warning message is displayed. Check the backups on the storage system or check the messages in the SRM log files.

Configuring preconfigured environments

If the **preconfiguredEnv** option is set to `True` in the SRA configuration file `sra.settings`, some additional steps must be completed before Spectrum Virtualize Family SRA can function properly.

About this task

To complete these tasks you must use the storage system GUI or tools that are part of the storage system that you use.

Note: IBM Spectrum Virtualize Family SRA does not support preconfigured mode for IBM Stretched Cluster or IBM HyperSwap.

Procedure

1. Create an equal number of FlashCopy (target) volumes as the Remote Copy target volumes on the recovery (secondary) site storage system.
2. Create a background copy and incremental FlashCopy mapping between Remote Copy target volumes and the previously created FlashCopy target volumes on the recovery site storage system.
3. If the remote copies are in a consistency group, create a corresponding FlashCopy consistency group and configure the corresponding FlashCopy to the FlashCopy consistency group.
4. Map the Remote Copy target and FlashCopy target volumes to the recovery site vSphere servers.
5. Create an equal number of FlashCopy (target) volumes as the Remote Copy source volumes on the protected (primary) site storage system.
6. Create a background copy and incremental FlashCopy mapping between Remote Copy source volumes and the previously created FlashCopy target volumes on the protected site storage system.
7. If the remote copies are in a consistency group, create a corresponding FlashCopy consistency group and configure the corresponding FlashCopy to the FlashCopy consistency group.
8. Map the Remote Copy source and FlashCopy target volumes to the protected site vSphere servers.

Note:

- FlashCopy configuration on the protected site is for the test recovery and recovery operations, after the **reprotect** operation on the recovery site.
- FlashCopy (target) volumes are resynchronized during recovery.

Configuring non-preconfigured environments

If the **preconfiguredEnv** option is set to `False` in the SRA configuration file `sra.settings`, IBM Spectrum Virtualize Family SRA runs in non-preconfigured mode, creates volumes and FlashCopy, and attaches and detaches volumes to and from the host. But in order for the SRA to function correctly in this mode, some additional configuration is required.

About this task

To configure needed settings for the SRA running in non-preconfigured mode, you must update the SRA configuration file, `sra.settings`. To learn how, see [“Updating the SRA configuration file” on page 11](#).

Procedure

1. Set appropriate values for the following parameters in `sra.settings`:

SaveExportInformation

The default setting is disabled. To enable this feature, change the flag value from *False* to *True*.

Note:

- When the flag is enabled, SRA uses the original host mapping that was configured before the failover, to export storage LUNs during the failback process.
- When the flag is disabled, SRA continues to use the host list shared by SRM to export storage LUNs.

Important: When using a high availability (HA) storage configuration (stretched or HyperSwap topology) a known issue from VMware Site Recovery Manager (SRM) may fail operations during a disaster recovery operation. For more information and full recovery information, see the known issue [Reprotect fails when using stretched storage on some storage arrays within the VMware Site Recovery Manager 8.5 Release Notes on VMware Docs \(https://docs.vmware.com/\)](https://docs.vmware.com/en/VMware-Site-Recovery-Manager/8.5/Release-Notes/Reprotect-fails-when-using-stretched-storage-on-some-storage-arrays-within-the-VMware-Site-Recovery-Manager-8.5-Release-Notes-on-VMware-Docs.html).

testMDiskGroupID

Instructs Spectrum Virtualize Family SRA on which MDisk group on the recovery site storage system creates the FlashCopy (target) volumes during test recovery operations.

volumeType

Set the volume type as Standard, Thin Provisioned (Space Efficient), or Compressed Volume depending on your requirement. Spectrum Virtualize Family SRA creates the same type of volume during test recovery or recovery.

Note:

- When backing up the remote copy source or target volumes during the recovery process, the **sourceMDiskGroupID** must be an MDisk group ID on the protected (primary) storage system cluster. The recovery (secondary) storage system site **recoveryMDiskGroupID** must also be an MDisk group ID.
- MDisk group IDs (**testMDiskGroupID**, **sourceMDiskGroupID**, **recoveryMDiskGroupID**) must be a valid single numeric value.

2. Save the `sra.settings` file and run the `docker` command to verify the result:

```
docker exec <Container_ID> cat /srm/sra/conf/IBMSpectrumVirtualizeFamilySRA/sra.settings
```

Setting SRA user privileges

Setting Spectrum Virtualize Family SRA user privileges differs depending on whether you have a preconfigured environment or a non-preconfigured environment.

Refer to the following guidelines for each case.

Preconfigured environment

If **preconfiguredEnv** is set to `True` in the SRA configuration file `sra.settings`, a **CopyOperator** privilege is enough if you first create the needed volumes and map them to the recovery site VMware ESX servers.

Non-preconfigured environment

If **preconfiguredEnv** is set to `False` in the SRA configuration file `sra.settings`, an **Administrator** privilege is necessary for Spectrum Virtualize Family SRA to complete the following tasks:

- Create snapshot volumes and map them to the VMware ESX servers at the recovery site.
- Run test recovery operations.

Note: If the replicated targets are pre-mapped to the recovery site VMware ESX servers, a **CopyOperator** privilege is enough for recovery operations.

Checking the configuration

To check the SRA configuration, complete the following steps.

Procedure

1. Run the following command:

```
docker exec -it <container_ID> java -jar srachecktool.jar
```

Note: The container ID should be the latest one.

2. Enter the user name and password.

Usage

Use the IBM Spectrum Virtualize Family SRA to run dependable Disaster Recovery Planning (DRP). The Spectrum Virtualize Family SRA also protects VMware sites with their storage system-based datastores.

This includes:

- [“Creating the target volumes and Metro/Global Mirror relationships” on page 17](#)
- [“Adding an array pair to the VMware Site Recovery Manager” on page 17](#)
- [“Running a Test procedure” on page 21](#)
- [“Running a failover procedure” on page 21](#)

Creating the target volumes and Metro/Global Mirror relationships

You must create an equal number of target VDisks (for Metro/Global Mirror targets) and source VDisks on the recovery storage system site.

Important:

- Create Metro/Global Mirror relationships between the source and target VDisks and add them to consistency groups, as explained in [“Preparing the SRA environment” on page 3](#).
- Before you use the Spectrum Virtualize Family SRA, make sure that the Metro/Global Mirror relationships and consistency groups are in a consistent synchronized state.
- For stretched clusters, make sure that the two copies of a stretched volume reside in different sites and that both copies are online.
- For IBM HyperSwap, make sure that the primary volume and secondary volume of a HyperSwap volume are online.

Adding an array pair to the VMware Site Recovery Manager

To add an array pair to VMware Site Recovery Manager, complete the following steps.

Procedure

1. In the VMware vSphere Web Client, click **Site Recovery > Open Site Recovery > NEW SITE PAIR**.
2. Enter the Remote Virtual Center host name, user name, and password when prompted and click **NEXT**.
3. Click one of the sites you want to pair and click **NEXT**.
4. Confirm the connection by clicking **CONNECT**.
5. Review your selected settings and click **FINISH**.
6. Click **VIEW DETAILS** to verify the information on the Summary pane.
7. From the **Site Pair** tab, navigate to **Configure > Array Based Replication > Array Pairs** to open the Array Pairs pane.
8. Click **ADD** to add Array Pairs window.
The Add Array Pair window is displayed.
9. On the **Storage replication adapter** tab, select **IBM Spectrum Virtualize Family Storage Replication Adapter** and click **NEXT**.
10. On the **Local array manager** tab, enter the array manager information and then click **NEXT**.
[Figure 2 on page 19](#) shows an example of the Local array manager tab.
 - a) Enter a name for the array manager.

Note: Be sure to use a unique name. An existing array manager name cannot be used.

- b) Fill in the Primary Virtualize Storage URL form. Use the following information for filling out the form fields.

URL of Local Storage

Provide a single input or local storage URL. For example: `https://10.11.11.10:7443/rest` or `https://10.11.11.10:7443/rest/v1`

Name Filter

This field is optional. To run a full discovery, keep this field empty. To filter volume names or consistency groups, enter the volume name/prefix or consistency group name/prefix to run the filter operation.

Note: For more information, see [“Filtering volumes and consistency groups by name”](#) on page 19.

Test Mdisk Group ID

Input an Mdisk group ID for the local Spectrum Virtualize Cluster, which is used to create flash copies when running the test operation.

Note:

- MDisk group IDs (**testMDiskGroupID**, **sourceMDiskGroupID**, **recoveryMDiskGroupID**) must be a valid single numeric value.
- If an MDisk group ID is set, the SRA ignores the value of the **testMDiskGroupID** set in the SRA utility.

User name

Enter the user name that is configured on the Spectrum Virtualize storage system.

Password

Enter the password that is configured on the Spectrum Virtualize storage system.

Local array manager



Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "altran-vcsa-1.ssd.hursley.ibm.com":

Primary Spectrum Virtualize Storage URL

Spectrum Virtualize Family Storage URL Addresses, username & password

URL of Local Storage
Enter URL of the embedded storage(ex: https://10.11.12.12:7443/rest or https://10.11.12.12:7443/rest/v1)

Name Filter
Leave empty for full discovery. Enter comma separated list of volume,volume prefix or Consistency Group name for specific discovery.(ex: cnVDisk,usVDisk,fr)

Test Mdisk Group ID
Input a test mdisk group ID for local Spectrum Virtualize Storage

Username
Enter username to connect to storage

Password
Enter password to connect to storage

CANCEL

BACK

NEXT

Figure 2. Local array manager tab

11. On the **Remote array manager** tab, enter the remote array manager information as detailed above and then click **NEXT**.
12. On the **Array pairs** tab, enable the array pairs and then click **NEXT**.
13. On the **Ready to complete** tab, click **FINISH**.

The Array Pairs page is displayed, and if there are new replicated devices that need to be discovered, click **DISCOVER DEVICES** to refresh.



Attention: All Spectrum Virtualize family-replicated VDisks that participate in SRM and belong to the same remote copy consistency group are shown under a single local consistency group. To avoid data inconsistencies, when adding replicated VDisks to the same VM or datastore, all VDisks used by a single VM or application must be added to the same consistency group.

Filtering volumes and consistency groups by name

Use the **Name Filter** option if you only want to see SRM managed replicated volumes.

Before you begin

Note: Use of the **Name Filter** field is optional. It can be left empty to enable full discovery.

Procedure

1. On the Array Pairs pane in the VMware vSphere Web Client, select an array pair and then select **Edit Local Array Manager** from the **ARRAY MANAGER PAIR** drop-down menu to open the **Edit Array Manager** window.
2. Enter the consistency group name or prefix and volume name or volume name prefix in the **Name Filter** field.

Note: You can enter multiple volume names or volume prefixes, multiple consistency group names, or prefixes, or both.

3. Fill in the **Username** and **Password** fields.
4. Click **SAVE**.

The name filter is added to the local array and is displayed on the Array Pairs pane.

Note: An error is issued if you enter the volume names on the local site and a matching remote site volume name is not found.

5. Select **Edit Remote Array Manager** from the **ARRAY MANAGER PAIR** drop-down menu to open the **Edit Array Manager** window.
6. Enter the consistency group name or prefix and volume name or volume name prefix in the **Name Filter** field.

Note: You can enter multiple volume names or volume prefixes, multiple consistency group names, or prefixes, or both.

Note: Prefixes for the volume name can be different for each site, but prefixes must be paired with the remote site array manager. For example, if the local site volume name is Pri_WinXP, and on the remote site it is mapped to Rec_WinXP, then you could enter the prefix Pri in the **Name Filter** field for the local site and the prefix Rec on the remote site. To use the name filter for the consistency group, enter the same names and prefixes at both the local and remote sites.

7. Fill in the **Username** and **Password** fields.
8. Click **SAVE**.

The name filter is added to the remote array and is displayed on the Array Pairs page.

Filtering different consistency groups and volumes

When the **Name Filter** shows the volumes that belong to any consistency group, it shows volumes only if the prefix matches to all volumes in that consistency group.

For example, from the Spectrum Virtualize management user interface (UI), if you enter the name or prefix and it does not match all of the names in the consistency group it ignores other volumes of that consistency group. For more information, see [Table 1 on page 20](#).

Local site: Name Filter value	Remote site: Name Filter value	Devices that are displayed on SRM
GMCV	GMCV	Pri_WinXP_7, Pri_WinXP_8
Pri	Rec	Full Discovery
Pri_WinXP_1, Pri_WinXP_7	Rec_WinXP_1, Rec_WinXP_7	Only Pri_WinXP_1 display.
Pri_WinXP_7, Pri_WinXP_8, Pri_WinXP_3, Pri_WinXP_6	Rec_WinXP_7, Rec_WinXP_8, Rec_WinXP_3, Rec_WinXP_6	All display except Pri_WinXP_3

Running a Test procedure

Depending on the SRA configuration, you might have to perform extra tasks for the test procedure to work.

For troubleshooting information, see [“Managing test failure” on page 26](#).

Running a Test procedure on a preconfigured environment

The Spectrum Virtualize Family SRA completely automates the test procedure.

During the test procedure, the preconfigured FlashCopy target volumes are resynchronized. During the cleanup procedure, the preconfigured FlashCopy target volumes are stopped.

Ensure that all the steps that are outlined in [“Configuring preconfigured environments” on page 13](#) are finished.

Running a Test procedure on a non-preconfigured environment

The Spectrum Virtualize Family SRA completely automates the test procedure.

During the test procedure, FlashCopy target volumes are created in the MDisk Group that is specified during the configuration. During the cleanup procedure, the FlashCopy target volumes that are created during the test procedure are deleted.

SRA Test procedure prerequisites:

- Ensure that there is enough free space available on the MDisk Group.
- Ensure that all the steps that are outlined in [“Configuring non-preconfigured environments” on page 13](#) are finished.
- Ensure that all VDisks within a consistency group are protected within the SRM Recovery Plan.
- Ensure that the VDisk protect enabler feature is disabled on the MDisk group on which any FlashCopy mappings will be created.

Running a failover procedure

The Spectrum Virtualize Family SRA completely automates the failover procedure.

Note:

- For IBM Stretched Cluster, the synchronization between the two copies of a stretched volume is managed by IBM Stretched Cluster, so the active-active replication within a stretched volume is always running, unless one of the copies is offline.
- For IBM HyperSwap, the synchronization between the primary volume and the secondary volume of a HyperSwap volume is managed by the HyperSwap function, so the active-active replication within a HyperSwap volume is always running, unless one of the sites is offline.

For a planned failover, the Metro Mirror/Global Mirror direction is switched. Global Mirror with Cycling Mode is stopped with the target volume writable.

For an unplanned failover, the Metro Mirror/Global Mirror/Global Mirror with Cycling Mode is stopped with the target volume writable.

The Metro Mirror/Global Mirror/Global Mirror with Cycling Mode target volume is prompted to the vSphere Server as a production volume. During an SRA preconfigured failover procedure, the preconfigured FlashCopy is resynchronized.

SRA Failover procedure prerequisites:

- Ensure that all the steps that are outlined in [“Configuring preconfigured environments” on page 13](#) are finished.
- Ensure that all the steps that are outlined in [“Configuring non-preconfigured environments” on page 13](#) are finished.

- Ensure that all VDisks within a consistency group are protected within the SRM Recovery Plan.

Running a Reprotect procedure

The Spectrum Virtualize Family SRA completely automates the reprotect procedure.

Before you run the **Reprotect** action, ensure that the status of the Metro Mirror/Global Mirror/Global Mirror with Cycling Mode is not disconnected. Refresh the **SRM Array Managers Devices** pane to ensure that no error messages occur.

The Metro Mirror/Global Mirror/Global Mirror with Cycling mode direction changes from the original recovery site to the original protection site, and the mirroring action resumes.

For SRA with a non-preconfigured setting, the volume of the original protection site is masked from the vSphere Server to avoid any damage to the volume. The original protection site consists of the target volume of the Metro Mirror/Global Mirror/Global Mirror with Cycling Mode.

The following tasks are required for the SRA reprotect procedure:

- Ensure all the steps that are outlined in [“Configuring preconfigured environments” on page 13](#) are finished.
- Ensure all the steps that are outlined in [“Configuring non-preconfigured environments” on page 13](#) are finished.
- Ensure the firewall is enabled to connect to both of the following:
 - Protected SRM to Protected Storage
 - Recovery SRM to Recovery Storage

Best practices

The following guidelines are important to follow while you configure the Spectrum Virtualize Family SRA.

Managing datastores and consistency groups

Follow these best practice guidelines while you manage datastores and consistency groups.

- The datastores of one VM should be in the same consistency group.
- The datastore of the VM and the raw disk in the VM should be in the same consistency group.
- You must have administrator privileges to install the Recovery Manager.
- Set the appropriate timeout and rescan values in SRM for the recovery of many VMs.

Troubleshooting

When an error occurs, check the status of Spectrum Virtualize Family, VMware ESX servers, vCenter servers, and SANs.

Managing Reprotect failure

Ensure the firewall is enabled to connect to both of the following:

- Protected SRM to Protected Storage
- Recovery SRM to Recovery Storage

When using a high availability (HA) storage configuration (stretched or HyperSwap topology), after a disaster recovery operation, the protected host site disconnects from the volume. The volume must be mapped manually to the ESXi host after the Reprotect operation is complete.

Managing Generic failure

Ensure MDisk group IDs are configured in an array pair or that the `sra.settings` is a valid single numeric value.

Note: String and list IDs are not supported.

Managing DiscoverArrays failure

Verify the following items when you encounter a failure during Array Manager operation:

1. Check that the IP address is correct and in the correct format. For example: `https://192.168.10.1:7443/rest/`
2. Check that the user name and password are correct.
3. Check to see whether the Spectrum Virtualize Clusters are paired.

Managing DiscoverDevices failure

Note: Relationship and consistency group (CG) status typically is `consist_synchronized` or `consistent_copying` for Global Mirror with Cycling Mode.

If an Unknown status occurs for **DiscoverDevices**, from the SRA-STATUS file verify that there are no LUN list entries with pending operations. If there are any pending operations, complete all operations.

Managing recovery failure

For environments that are not pre-configured, ensure that the following items are checked or corrected:

1. Recovery, after you switch from pre-configuration without a rescan of the SRA.
2. User privilege problem, "administrator" access required.
3. After disaster recovery, it is necessary to wait a few minutes and then refresh the devices in the SRM Array Managers on both sites. This step is necessary to ensure that there is no error before the plan is re-protected.
4. All volumes part of a consistency group are not included in the SRM Recovery Plan.

For environments that are pre-configured, ensure that the following items are checked or corrected:

1. FlashCopy was not created.
2. Corresponding **fcmap** consistency group was not created.

3. The **Remotecopy** target volume is not mapped to the recovery site.
4. All volumes part of a consistency group are not included in the SRM Recovery Plan.

Managing test failure

For environments that are not preconfigured, ensure that the following are checked or corrected:

1. User privilege problem, "administrator" access required.
2. Not enough space in the **mdisk** group.
3. Switching from pre-configured without rescan SRA.
4. The **Mdiskgroup** and volume type is not set for Spectrum Virtualize Family SRA.
5. All volumes part of a consistency group are not included in the SRM Recovery Plan.

For environments that are preconfigured, ensure that the following items are checked or corrected:

1. FlashCopy not created.
2. FlashCopy target volume is not mapped to host.
3. Corresponding FlashCopy consistency group not created.
4. FlashCopy target volume that is mapped to the host are shown as Mounted in Hosts and Clusters/Configuration/Storage/Devices.
5. All volumes part of a consistency group are not included in the SRM Recovery Plan.

Managing SRM procedures

1. Refresh the devices in the SRM array managers. If there are no errors, go to step [“8” on page 27](#). Otherwise, continue to step [“2” on page 26](#).
2. Check all the previously related remote copies in the SRA-STATUS file in the SRA installation directory. For example:

```
sudo docker exec -it <container_id> cat /srm/sra/log/SRA-STATUS
```

Retrieve *<container_id>* from **sudo docker ps** command. The format of the SRA-STATUS file is shown in the following example:

```
[ArrayID] | [LunID]=* [ArrayID] + "|CG;" +  
[RemoteCopyConsistencyGroupName]=*
```

A sample of the content of the SRA-STATUS file can be seen in the following example:

```
000002006E814E66|2=CREATEVOLUME@4;  
60:05:07:68:01:BA:05:39:98:00:00:00:00:00:2C  
TESTFAILOVER@4;  
60:05:07:68:01:BA:05:39:98:00:00:00:00:00:2C
```

This example shows that the standalone remote copy (target volume id:[2]) in the array [000002006E814E66] was in *testfailover* status. Spectrum Virtualize Family SRA created a FlashCopy for the remote copy target [2] and the FlashCopy target volume id is [4]. The UUID is 60:05:07:68:01:BA:05:39:98:00:00:00:00:00:2C.

3. Copy the SRA-STATUS file from container using **docker cp**. For example:

```
docker cp <container_id>:/srm/sra/log/SRA-STATUS <local_path>
```

4. Modify the SRA-STATUS file and upload it to the container. For example:

```
docker cp <local_path>/SRA-STATUS <container_id>:/srm/sra/log/
```

5. Update SRA-STATUS file mode (664) and ownership (660:660).
 - To update file ownership run the following command:

```
docker exec -it <container_id> chown 660:660 /srm/sra/log/SRA-STATUS
```

- To update the file mode, run the following command:

```
docker exec -it <container_id> chmod 664 /srm/sra/log/SRA-STATUS
```

6. Verify the content of SRA-STATUS file. For example:

```
docker exec -it <container_id> cat /srm/sra/log/SRA-STATUS
```

7. Delete the SRA-STATUS file if none of the entries are required. For example:

```
docker exec -it <container_id> rm /srm/sra/log/SRA-STATUS
```

8. Refresh the devices in the SRM array managers again to ensure that there are no errors.

Collect log files

If the problem cannot be resolved by following any of the troubleshooting tips, collect SRM log files for both sites from their respective paths `/var/log/vmware/srm` and contact IBM Support.

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