

IBM Storwize Family Storage Replication Adapter
Version 3.1.0

User Guide



Note

Before using this document and the product it supports, read the information in “Notices” on page 39.

Edition notice

Publication number: SC27-4231-07. This edition applies to version 3.1.0 of the IBM Storwize Family Storage Replication Adapter and to all subsequent releases and modifications until otherwise indicated in a newer publication.

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Contents

Figures	v
About this guide	vii
Who should use this guide	vii
Conventions used in this guide	vii
Related information and publications.	vii
Getting information, help, and service	viii
Ordering publications	viii
Sending or posting your comments	viii
Chapter 1. Introduction	1
Concept diagram	1
Compatibility and requirements	2
Chapter 2. Preparation	3
Preparing the SRA environment	3
Verifying the mirroring configuration	3
Supported iSCSI configurations for mirroring	4
Verifying the VMware vCenter Site Recovery Manager installation	5
Chapter 3. Installation.	7
Downloading the software.	7
Running the installation wizard	7
Verifying the Storwize Family SRA installation	10
Uninstalling the software	11
Chapter 4. Configuration	13
Configuring preconfigured environments	14
Configuring non-preconfigured environments	15
Setting user privileges for SRA configurations	15
Checking the configuration	15
Chapter 5. Usage	19
Creating the Target Volumes and Metro/Global Mirror Relationships	19
Adding an Array Manager to the VMware Site Recovery Manager	19
Filtering volumes and consistency groups by name	24
Filtering different consistency groups and volumes	28
Running a Test procedure	29
Running a Test procedure on a preconfigured environment	29
Running a Test procedure on a non-preconfigured environment	30
Running a failover procedure	30
Running a Reprotect procedure.	30
Chapter 6. Best practices.	33
Managing datastores and consistency groups	33
Chapter 7. Troubleshooting	35
Notices	39
Trademarks	41
Index	43

Figures

1.	Concept diagram	2
2.	VMware vSphere Client – Site Recovery Manager	6
3.	Welcome pane	8
4.	Customer Information pane	9
5.	Confirm New Folder pane	9
6.	Ready to Install the Program pane	10
7.	Array Managers – SRAs tab	11
8.	Configuration utility	13
9.	Storwize Family SRA configuration utility	16
10.	Check Configuration Tool	17
11.	Summary tab	20
12.	vSphere Client with the Add Array Manager link	20
13.	Display Name of the local Storwize Family SRA	21
14.	Add Array Manager pane.	21
15.	Display Name for the remote Storwize Family	23
16.	Information added for the remote Storwize Family	23
17.	Array Pairs tab	24
18.	Devices found without using a filter	25
19.	Edit Array Manager pane with Name Filter field	26
20.	Adding volumes on the local site	27
21.	Recovery Array with Name Filter added	28
22.	Storwize V7000 management GUI – volumes and consistency groups	29
23.	IBM SRA Check Tool	36

About this guide

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

Note: Procedures in this guide include steps and screen captures that apply when using VMware vSphere Client. If you are using VMware vSphere Web Client, similar steps are applicable, except the step of logging in to vSphere Client. Procedures to which this note applies include:

- Verifying the VMware vCenter Site Recovery Manager installation
 - Verifying the Storwize Family SRA installation
 - Adding an Array Manager to the VMware Site Recovery
 - Manager Filtering volumes and consistency groups by name
-

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)
- SAN Volume Controller Metro/Global-Mirror Copy Services (for more information, see “Related information and publications”)
- SAN Volume Controller Stretched Cluster
- The capabilities of your storage system

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

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Related information and publications

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- IBM Storage Host Software Solutions Information Center (<http://publib.boulder.ibm.com/infocenter/strhosts/ic/index.jsp>).
- IBM SAN Volume Controller Information Center (publib.boulder.ibm.com/infocenter/svc/ic/index.jsp).

- SAN Volume Controller Best Practices and Performance Guidelines (<http://www.redbooks.ibm.com/redbooks/pdfs/sg247521.pdf>)
- IBM Flex System[®] Information Center (publib.boulder.ibm.com/infocenter/flexsys/information)
- IBM Storwize V3700 Information Center (ibm.com/support/knowledgecenter/STLM5A/landing/V3700_welcome.html)
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Chapter 1. Introduction

The IBM Storwize 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 Storwize 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 Storwize Family SRA are listed in the release notes, and are referred throughout the documentation as “Storwize Family” or “storage systems.”

Concept diagram

Storwize Family can use the IBM Storwize 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.

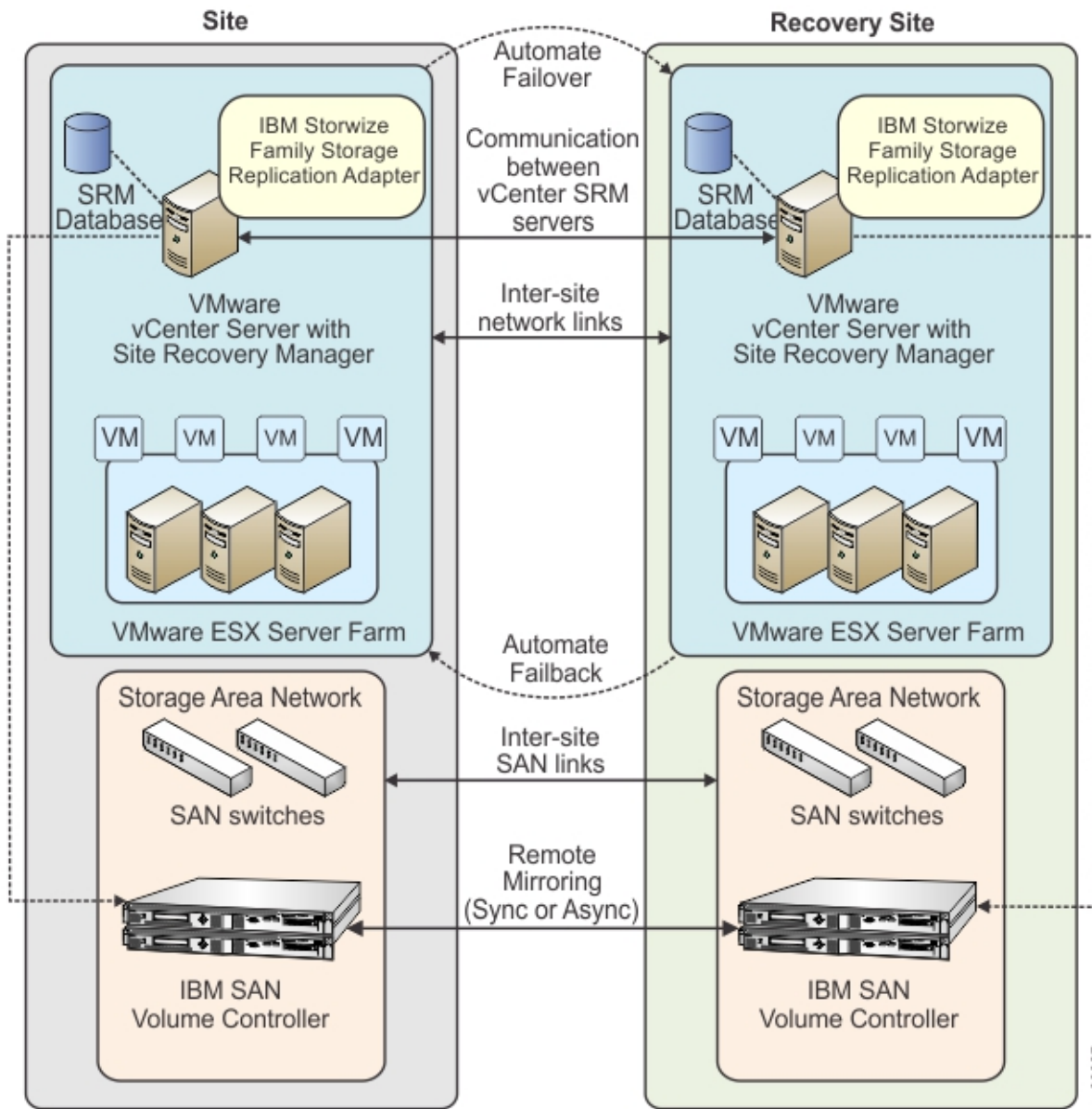


Figure 1. Concept diagram

Compatibility and requirements

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

You can obtain the latest release notes on the IBM Storage Host Software Solutions Information Center.

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

Chapter 2. Preparation

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

- “Preparing the SRA environment”
- “Verifying the mirroring configuration”
- “Verifying the VMware vCenter Site Recovery Manager installation” on page 5

Preparing the SRA environment

Before you install the IBM Storwize Family SRA, you must 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 Storwize Family. If you are using the IBM SAN Volume Controller, 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 SVC Stretched Cluster, create appropriate-sized stretched volumes as needed.

Note: For more information about Metro/Global Mirror Copy Services, download the IBM SAN Volume Controller Advanced Copy Services Implementation PDF(<http://www.redbooks.ibm.com/redbooks/pdfs/sg247574.pdf>). For more information about IBM SVC Stretched Cluster, click [here](#).

3. Create a user on the Storwize Family with the appropriate privileges for the Storwize 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.

Important: Use the same user name and password on both the protected (primary) and the recovery site.

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

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 Storwize Family SRA, verify that the following prerequisites are completed:

- Your local Storwize Family at the protected (primary) site has mirroring connectivity with the target Storwize Family at the recovery (secondary) site. For IBM SVC Stretched Cluster, stretched volumes are created, and both copies of a stretched volume are online.

- The name of each Storwize Family is unique at both the protected and the recovery sites.
- The target name of any target Storwize Family (remote copy system) is identical to the predefined System Name of that same remote Storwize 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.
- 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 Storwize Family-based volumes that you intend to protect as part of your Disaster Recovery Plan (DRP). For IBM SVC Stretched Cluster, stretched volumes are created, and both copies of a stretched volume are online.
- Protected volumes are mapped to the protected VMware ESX hosts. For Stretched Cluster, the stretched volumes are mapped to both protected and recovery VMware ESX hosts.
- For non-preconfigured environments, the recovery Storwize Family-based volumes remain unmapped.
- The recovery VMware ESX/ESXi hosts are defined as Storwize Family hosts at the recovery site. For Stretched Cluster, the recovery VMware ESX/ESXi hosts are defined as storage hosts in SVC.
- 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 Storwize 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 Storwize 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 Storwize 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 Storwize 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 install the IBM Storwize Family SRA, you must ensure that the VMware vCenter SRM is already installed and accessible at the protected (primary) site, in addition to at the recovery (secondary) site.

About this task

The following procedure includes steps and screen captures that apply when using VMware vSphere Client. If you are using VMware vSphere Web Client, similar steps are applicable, except the step of logging in to vSphere Client.

Procedure

1. Log in to VMware vSphere Client.



2. Go to the home page and check that the **Site Recovery** icon is displayed under **Solutions and Applications**

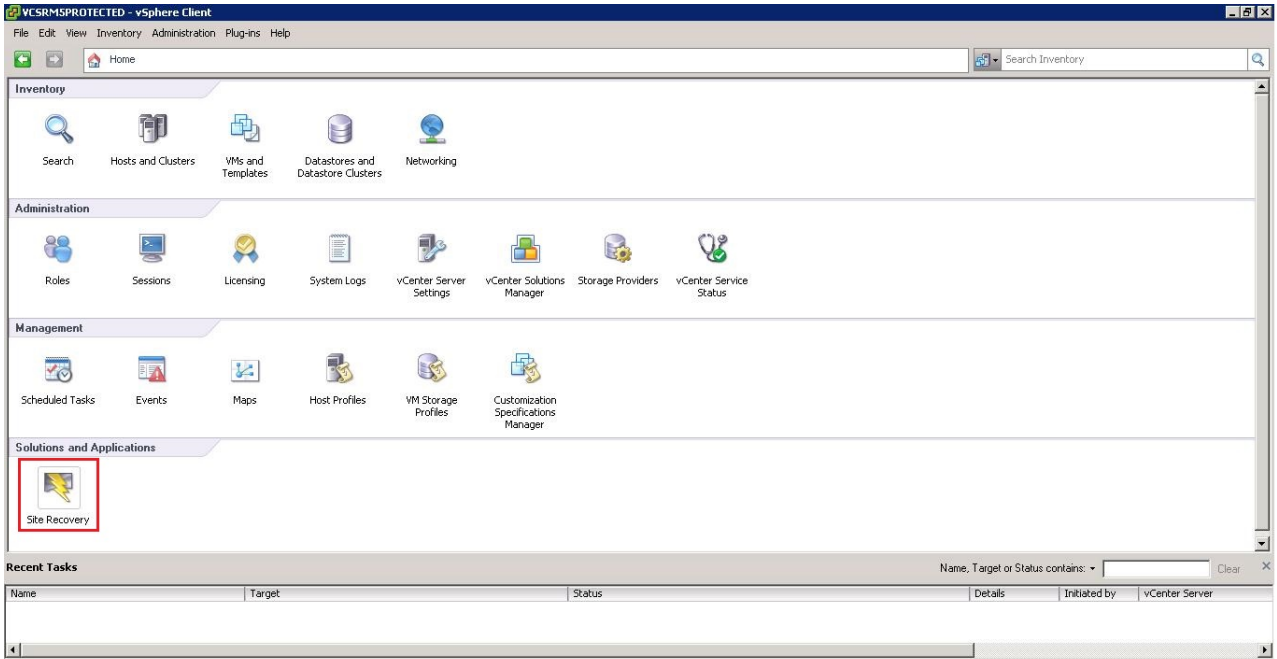


Figure 2. VMware vSphere Client – Site Recovery Manager

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

Chapter 3. Installation

After you finish the required preparation, you can install the IBM Storwize Family SRA.

This chapter describes:

- “Downloading the software”
- “Running the installation wizard”
- “Verifying the Storwize Family SRA installation” on page 10
- “Uninstalling the software” on page 11

Downloading the software

You can download the IBM Storwize Family SRA from the VMware website.

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

Running the installation wizard

The installation wizard can help you to install the IBM Storwize Family SRA software.

Before you begin

If you are upgrading to version 3.1.0, it is suggested that you uninstall your current version before installing version 3.1.0. You must satisfy all of the prerequisites that are listed in Chapter 2, “Preparation,” on page 3 before you start the installation.

Procedure

Complete the following steps to install the IBM Storwize Family SRA software on the Windows server:

1. Log on to the Windows server as an administrator.
2. Double-click the IBMSVCSRA.exe file that you extracted from the downloaded compressed file archive. The Welcome pane is displayed.



Figure 3. Welcome pane

3. Click **Next**. The License agreement pane is displayed. You can click **Cancel** at any time to exit the installation.
4. Read the license agreement information. Select the **I accept the terms of the license agreement** option and click **Next**. If you do not accept the terms of the agreement, you cannot continue with the installation.
5. Enter the appropriate user and organization names and click **Next**.

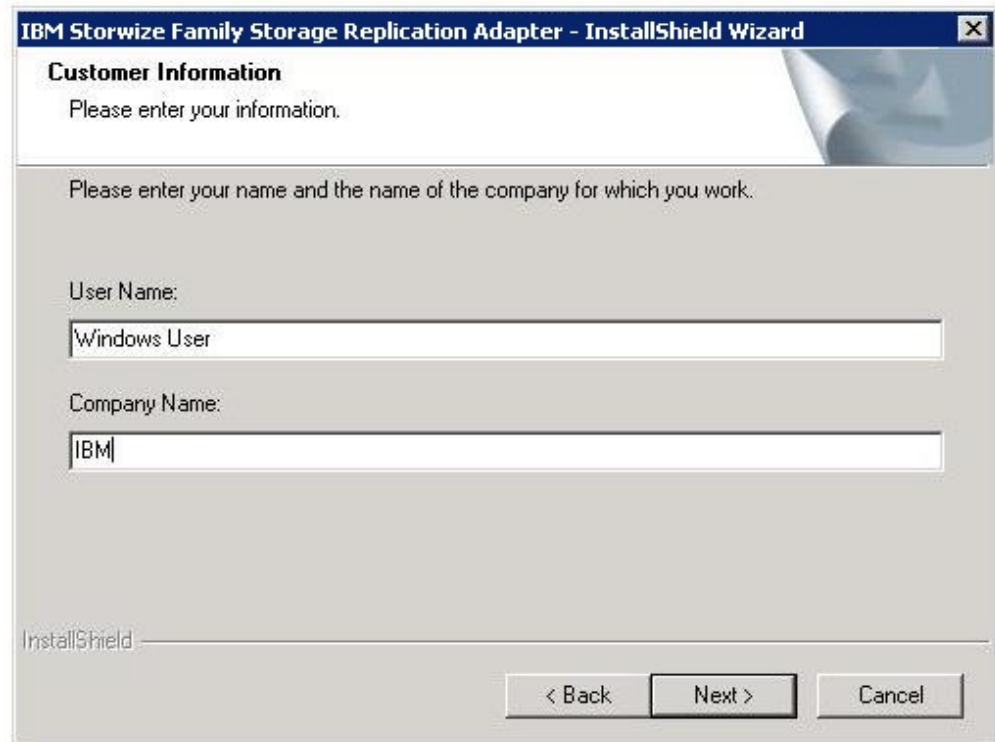


Figure 4. Customer Information pane

6. On the **Confirm New Folder** pane, the installation location is displayed. Click **Yes** to allow the installer to create the destination folder. If you do not agree with the installation location, click **No**.

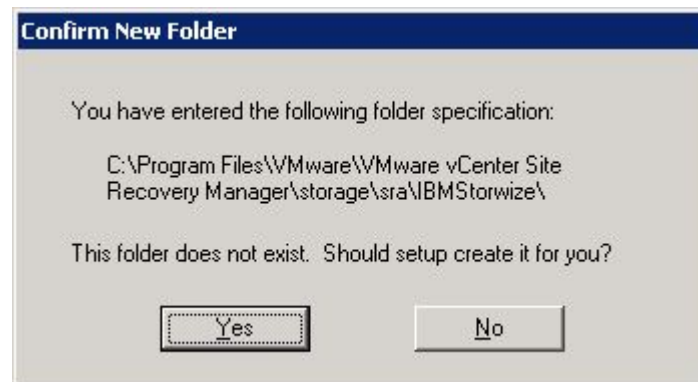


Figure 5. Confirm New Folder pane

7. Click **Install**.

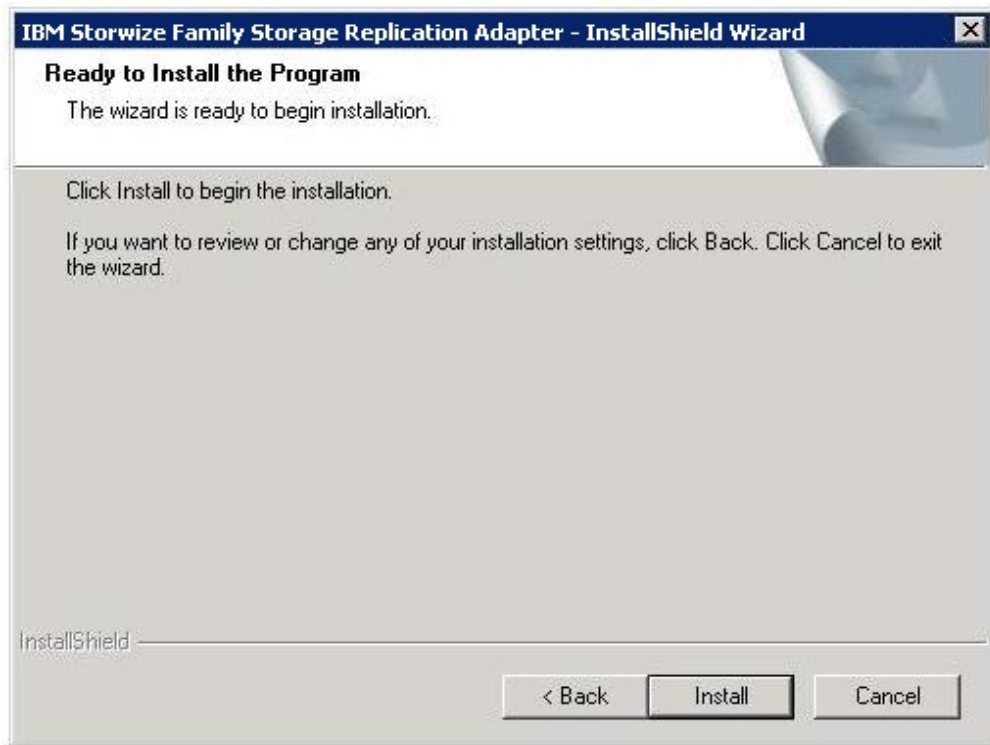


Figure 6. Ready to Install the Program pane

8. Click **Finish** when the installation process completes.

Verifying the Storwize Family SRA installation

After the installation, verify that the IBM Storwize Family SRA is properly installed.

About this task

The following procedure includes steps and screen captures that apply when using VMware vSphere Client. If you are using VMware vSphere Web Client, similar steps are applicable.

Procedure

1. In the VMware vSphere client, click **Site Recovery > Array Managers**.
2. Click the top hierarchy of a listed array, and then click the **SRAs** tab.

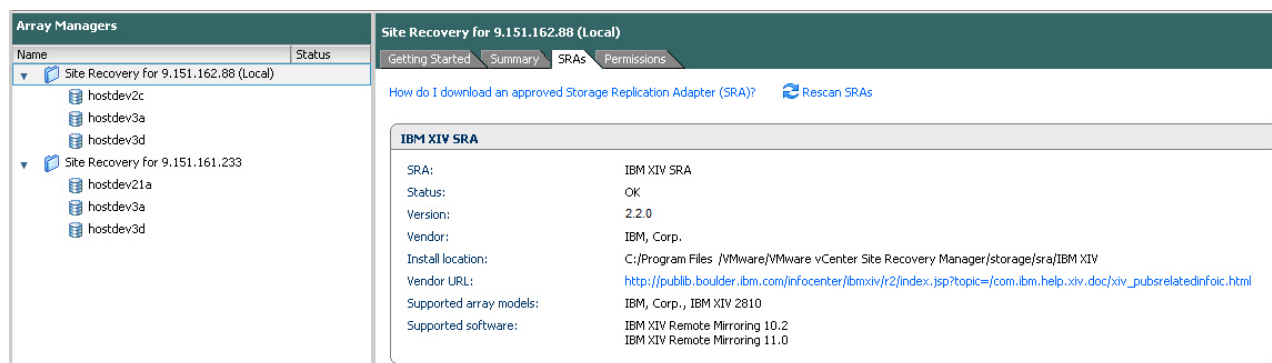


Figure 7. Array Managers – SRAs tab

3. Click **Rescan SRAs** and then verify that the correct IBM Storwize Family SRA version details are displayed.

Uninstalling the software

You can uninstall the software by kicking off the installation file (IBMSVCSRA.exe).

About this task

If you are upgrading to the most recent version of the Storwize Family SRA, it is suggested that you uninstall your current version.

Procedure

Complete the following steps to uninstall the software:

1. Log on to the Windows server as the local administrator.
2. Select one of the following actions:
 - Double-click the IBMSVCSRA.exe file and select **Remove**.
 - Go to **Add/Remove Program** in the Windows Control pane to remove the software.
3. Click **Finish**. If necessary, you are prompted to restart the system.

Chapter 4. Configuration

The Storwize Family SRA installation creates a shortcut named IBM Storwize Family SRA Configuration Utility.exe on the desktop.

Important: The configuration utility must be run on both the protected (primary) site and the recovery (secondary) site SRM host. The **Pre-Configured Env.** setting must be consistent for both sites.

Double-click the IBM Storwize Family SRA Configuration Utility.exe shortcut to open the configuration utility.

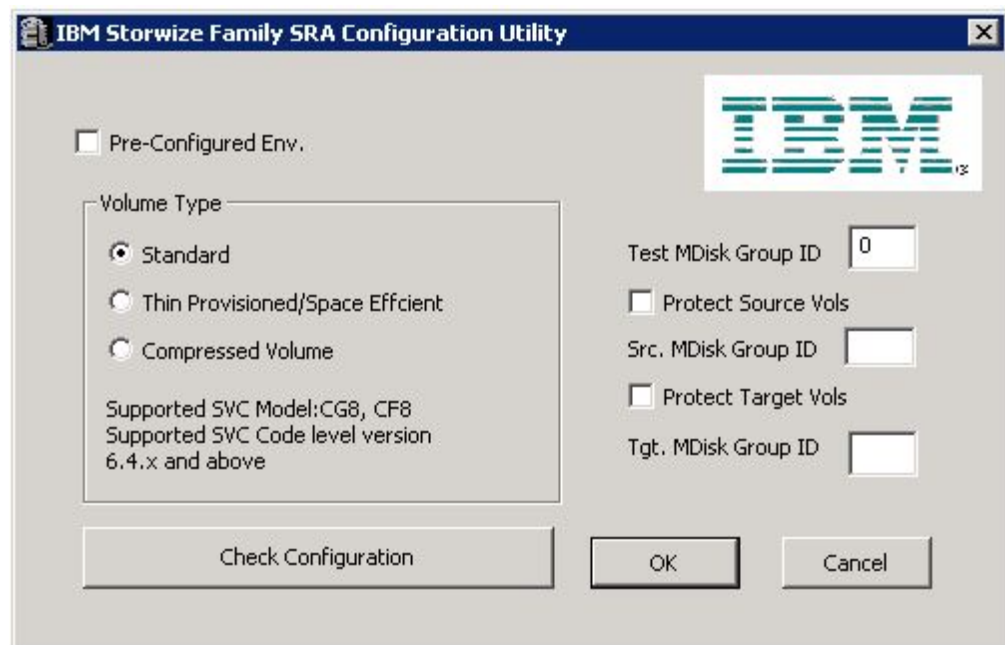


Figure 8. Configuration utility

VMware SRM version 5.0 and later provides two kinds of recoveries:

- Planned failover
- Disaster recovery

In both recovery scenarios, back up the source and target volumes. Instruct the Storwize Family SRA to create FlashCopy® backups of the remote copy source and target volumes by checking **Protect Source Vols** and **Protect Target Vols**.

Note: For IBM SVC Stretched Cluster, a stretched volume does not have source or target, so SRA will not create FlashCopy backups even by checking Protect Source Vols or Protect Target Vols.

Add the appropriate MDisk group IDs in the boxes before you promote target volumes to the VMware ESX server and recover VMs on them.

Note: If the Storwize 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.

- For preconfigured environment configuration settings, see “Configuring preconfigured environments.”
- For non-preconfigured environment configuration settings, see “Configuring non-preconfigured environments” on page 15.
- To set user privileges, see “Setting user privileges for SRA configurations” on page 15.

Configuring preconfigured environments

If the **Pre-Configured Env** option is selected, some pre-configuration steps are necessary before Storwize 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: SRA does not support preconfigured mode for IBM SVC Stretched Cluster.

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:

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

Configuring non-preconfigured environments

With non-preconfigured mode, Storwize Family SRA creates volumes and FlashCopy and also attaches and detaches volumes to and from the host.

Procedure

1. Set the appropriate configuration settings:

Test MDisk group ID

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

Volume Type

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

Note: If you back up remote copy source or target volumes during recovery, the **Src. MDisk Group ID** must be an MDisk group ID on the protected (primary) Storwize Family cluster. Likewise, on the recovery (secondary) site Storwize Family, the **Tgt. MDisk Group ID** must also be an MDisk group ID.

2. Click **OK** to confirm the selections or click **Cancel** to leave the selections unchanged. To confirm or change the options, restart the configuration utility by double-clicking the shortcut. The current selections are shown under Current Settings.

Setting user privileges for SRA configurations

Setting the user privileges for Storwize Family SRA differs, depending on whether you have a pre-configured environment or a non-preconfigured environment.

Preconfigured environment

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 the **Pre-Configured Env.** box is empty in the configuration utility, an **Administrator** privilege is necessary for Storwize Family SRA to complete the following tasks:

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

Important: 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

You can determine whether your configuration is correct from within the configuration utility.

About this task

The SRA Check Configuration tool reviews all remote copies that failover from the protected (primary) site to the recovery (secondary) site. The utility reviews each selected remote copy and determines its status.

Note: The SRA Check Tool does not support review of IBM SVC Stretched Cluster.

Procedure

1. Click the IBM Storwize Family SRA Configuration Utility.exe shortcut on the desktop.

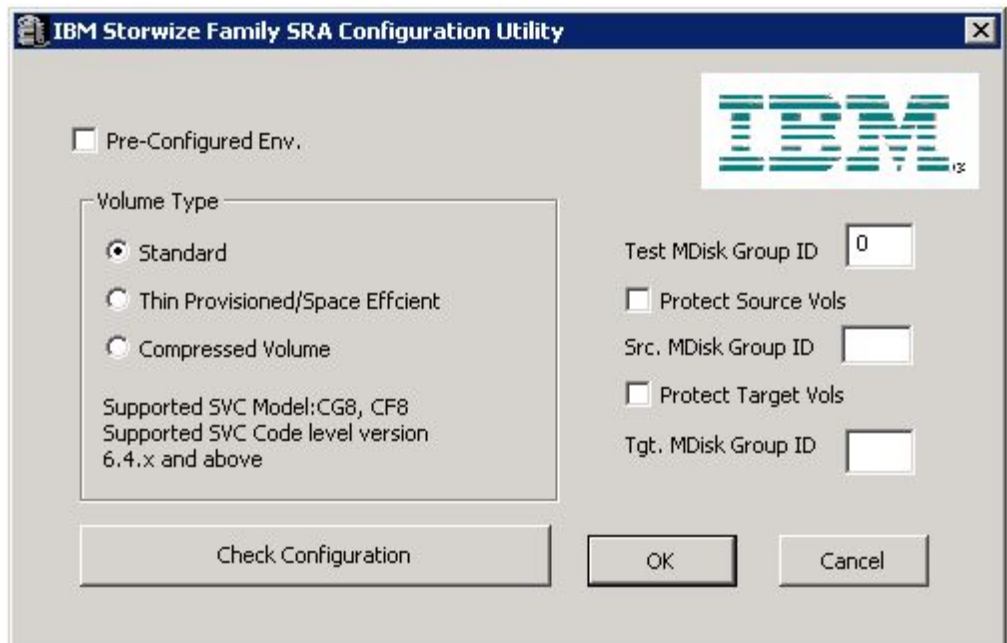


Figure 9. Storwize Family SRA configuration utility

2. Click **Check Configuration**. The **IBM SRA Check Tool** window is displayed.
3. Enter a user name and password for the local array and the peer array.

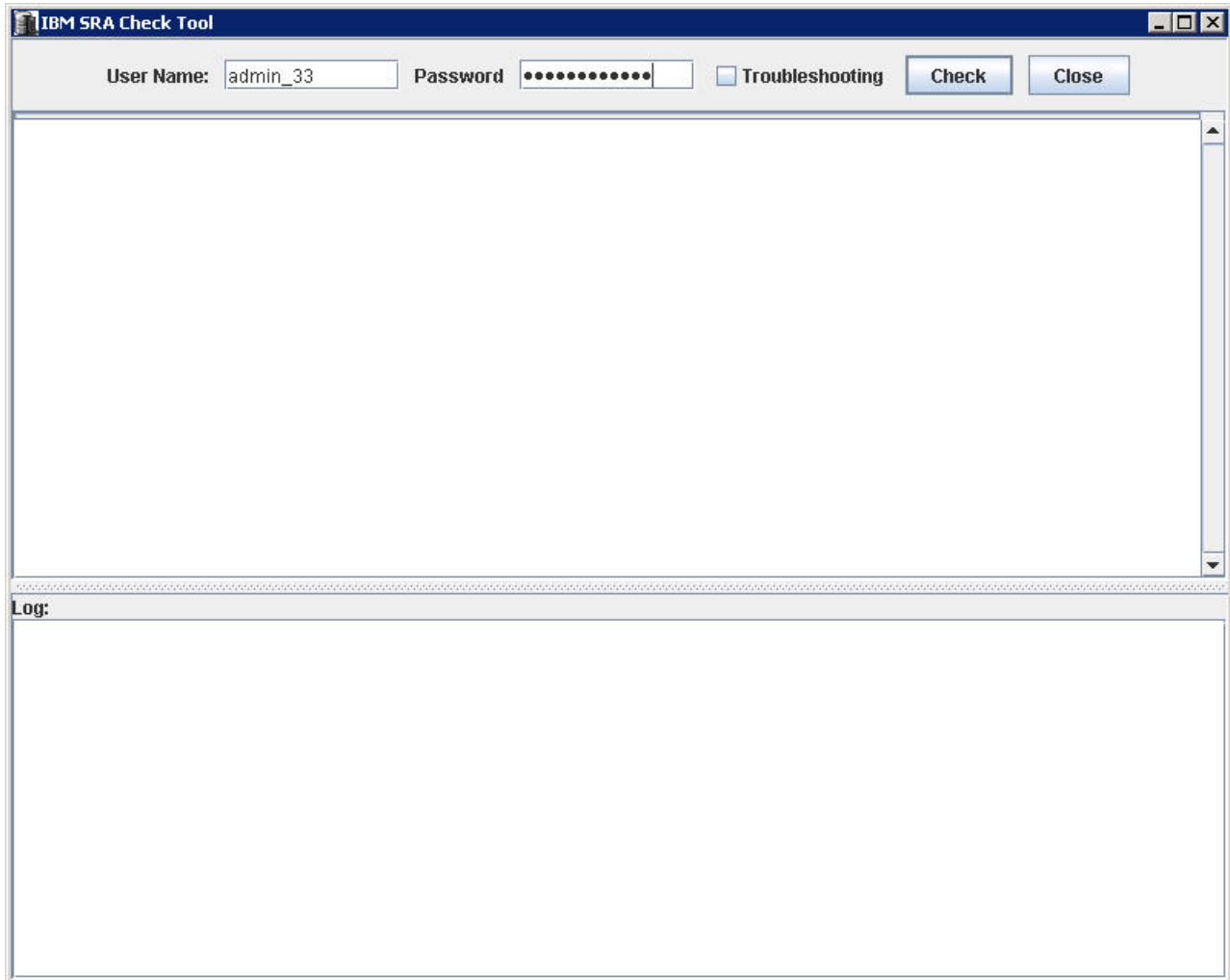


Figure 10. Check Configuration Tool

4. Click **Check** to start the status check.
5. When the utility finishes, click **Close**.
6. Enter a file name and click **Save** to save the log file.

Results

The log file is saved to the hard drive where it can be retrieved for analysis.

Chapter 5. Usage

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

This includes:

- “Creating the Target Volumes and Metro/Global Mirror Relationships”
- “Adding an Array Manager to the VMware Site Recovery Manager”
- “Running a Test procedure” on page 29
- “Running a failover procedure” on page 30

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 site Storwize Family.

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 Storwize Family SRA, make sure that the Metro/Global Mirror relationships and consistency groups are in a consistent synchronized state.
 - For Stretched Cluster, make sure that the two copies of a stretched volume reside in different sites and that both copies are online.
-

Adding an Array Manager to the VMware Site Recovery Manager

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

About this task

The following procedure includes steps and screen captures that apply when using VMware vSphere Client. If you are using VMware vSphere Web Client, similar steps are applicable.

Procedure

1. In the VMware vSphere client, click **Site Recovery** on the Home page.
2. Enter the Remote Virtual Center user name and password, when prompted, and click **OK**.
3. Ensure that the local and remote sites are connected. Confirm the connection by clicking the **Summary** tab in the inventory pane.
4. Click the **Array Managers** option on the inventory pane and select **Summary**.

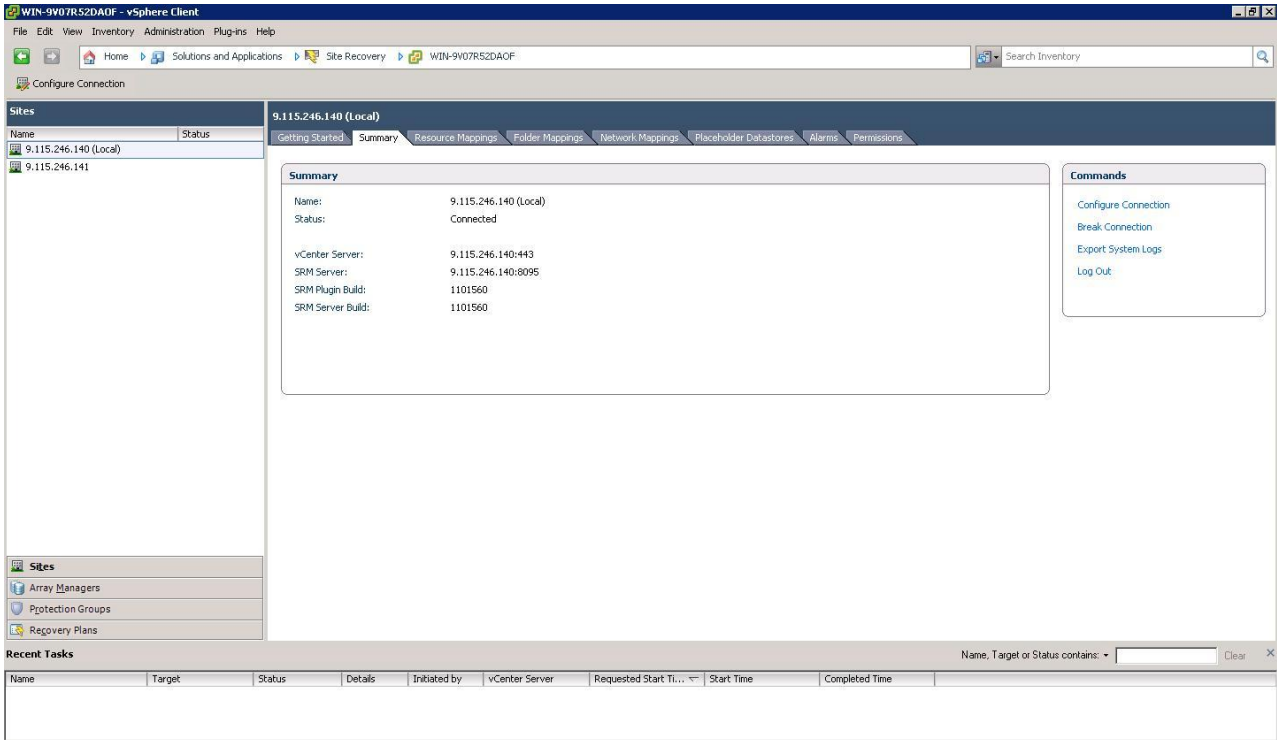


Figure 11. Summary tab

5. Select the local site on the inventory pane and click **Add Array Manager**.

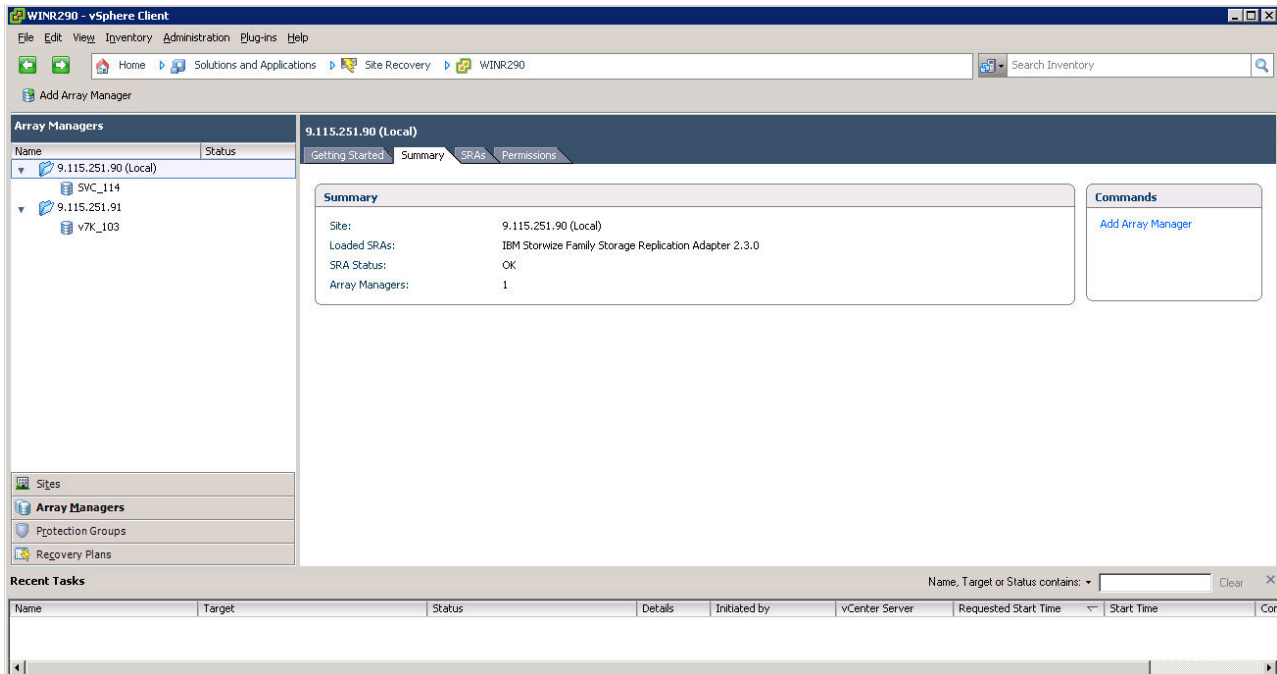


Figure 12. vSphere Client with the Add Array Manager link

6. Enter the display name for the protected (primary) Storwize Family and click **Next**.

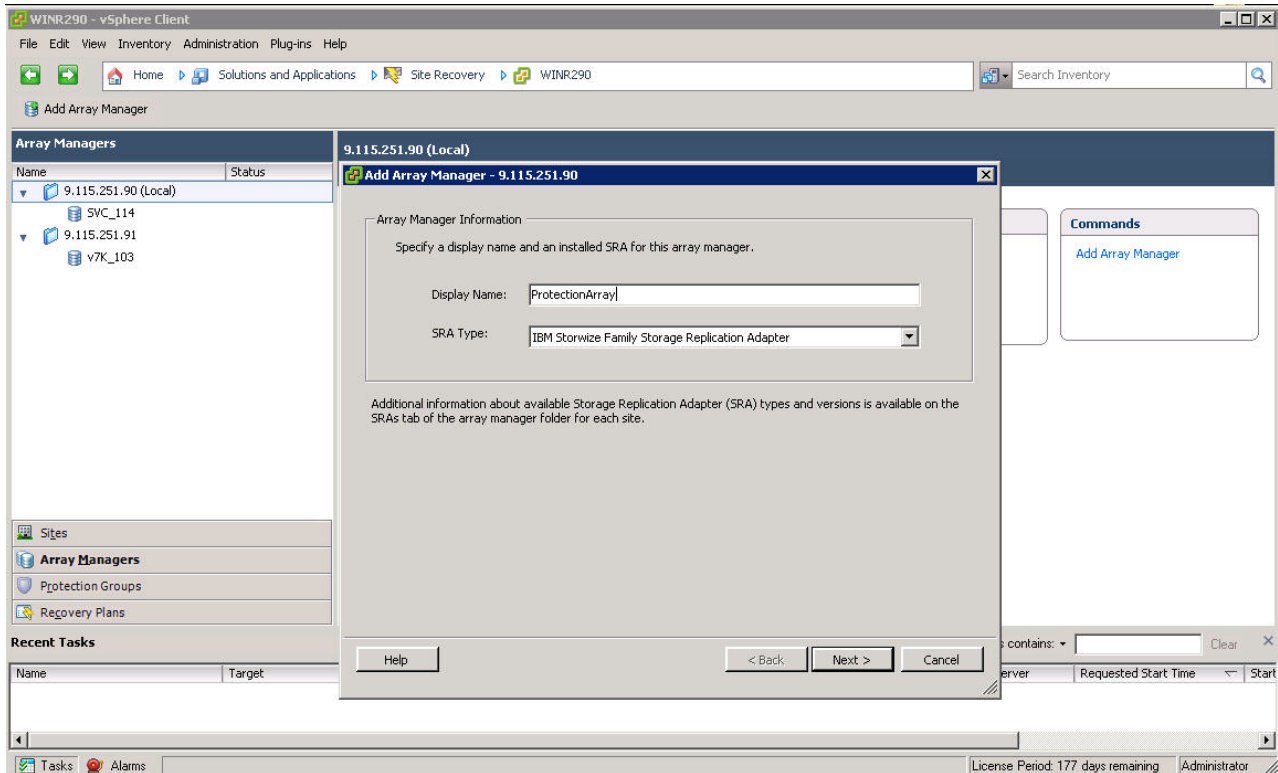


Figure 13. Display Name of the local Storwize Family SRA

7. Enter the array manager information in the Add Array Manager pane.

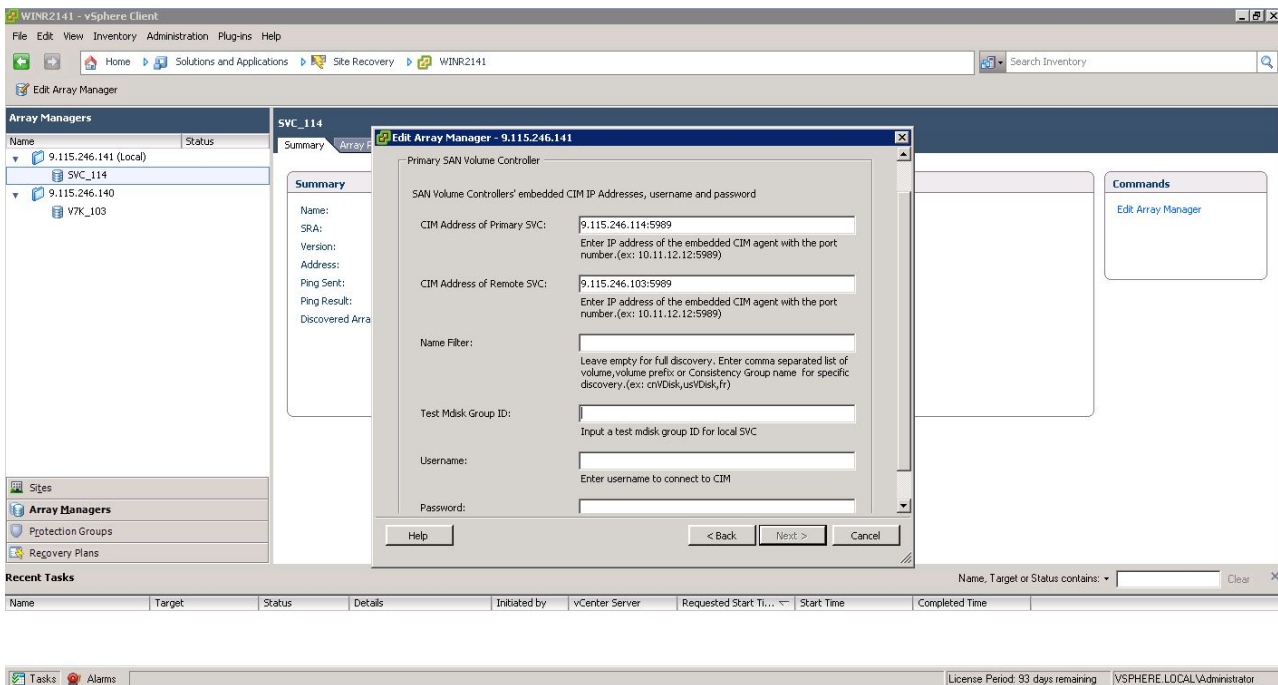


Figure 14. Add Array Manager pane

CIM Address of Primary SAN Volume Controller

Enter the CIMOM address and CIM port of the local SAN Volume Controller cluster.

Note: SAN Volume Controller SRA supports secure ports to connect to CIMOM.

CIM Address of Remote SAN Volume Controller

Enter the CIMOM address and CIM port of the remote SAN Volume Controller cluster. The addresses can either be IP addresses or fully qualified domain names.

Note: Enter the same CIMOM address and CIM port as the primary SVC, if you are using IBM SVC Stretched Cluster.

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 24.

Test Mdisk Group ID

Input an Mdisk group ID for the local SVC, which will be used to create flash copies in when running the test operation.

Note: If an Mdisk group ID is set here, SRA will ignore the value of Test Mdisk Group ID set in the SRA Utility.

User name

Enter the user name that is configured on the CIMOM.

Password

Enter the password that is configured on the CIMOM.

Important: The user name and password for local and remote SAN Volume Controller CIMOMs must be the same.

8. Enter the connection information for the array.
9. Click **Next**. SRM discovers the Storwize Family device at the specified IP address.
10. Click **Finish**.
11. Select the remote site on the inventory pane and click **Add Array Manager**.
12. Enter the **Display Name** for the remote Storwize Family and click **Next**.

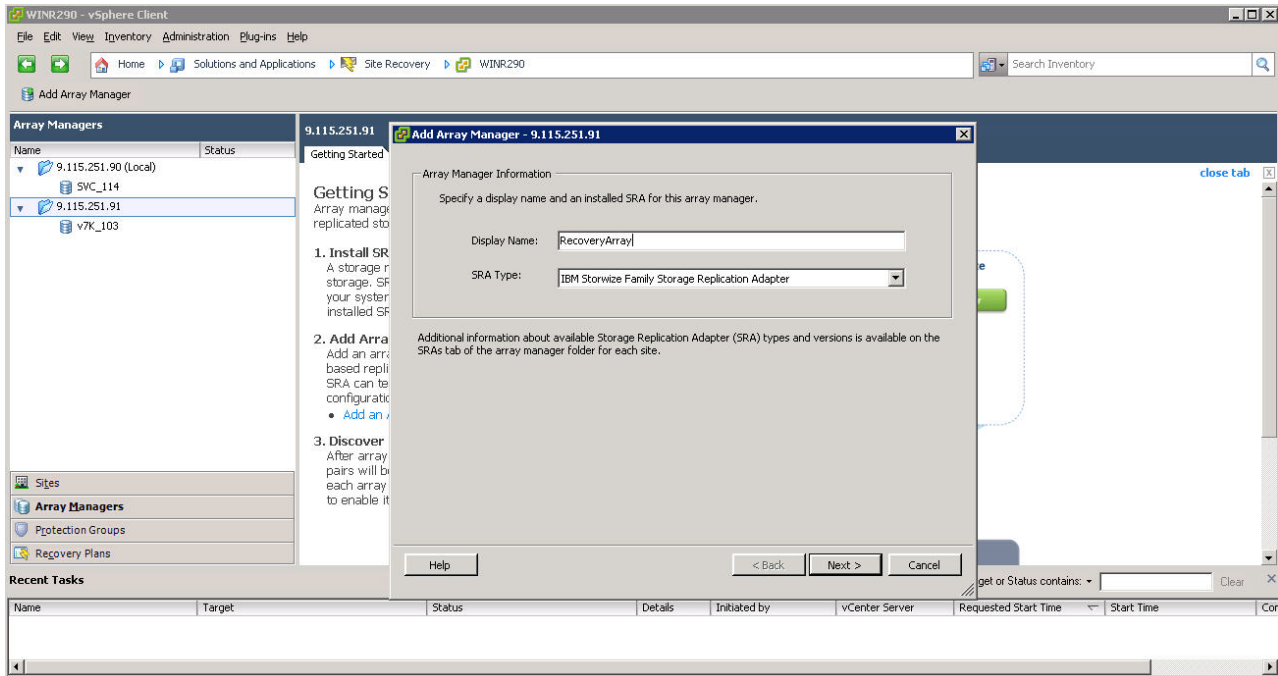


Figure 15. Display Name for the remote Storwize Family

13. Enter the Array Manager information for the remote Storwize Family cluster on the **Add Array Manager** pane.

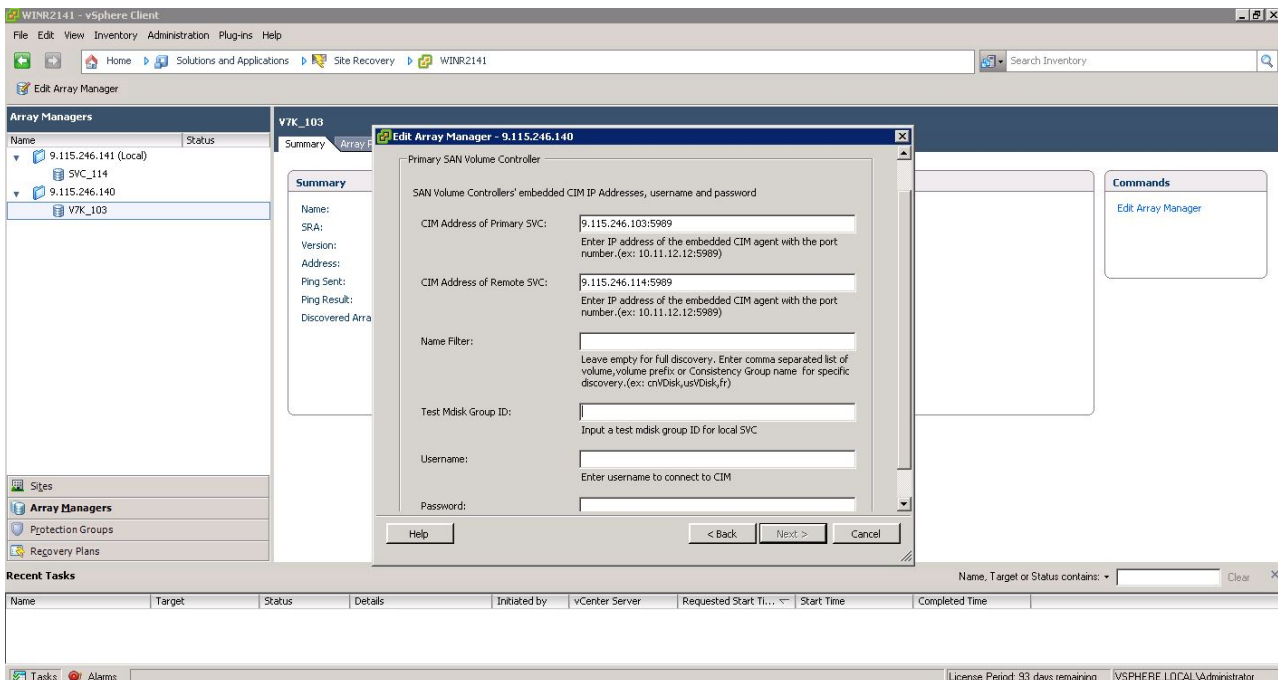


Figure 16. Information added for the remote Storwize Family

14. Click **Next** to confirm the successful addition of the Array Manager.
15. Click **Finish**.
16. Select the local array on the inventory screen and select the **Array Pairs** tab.

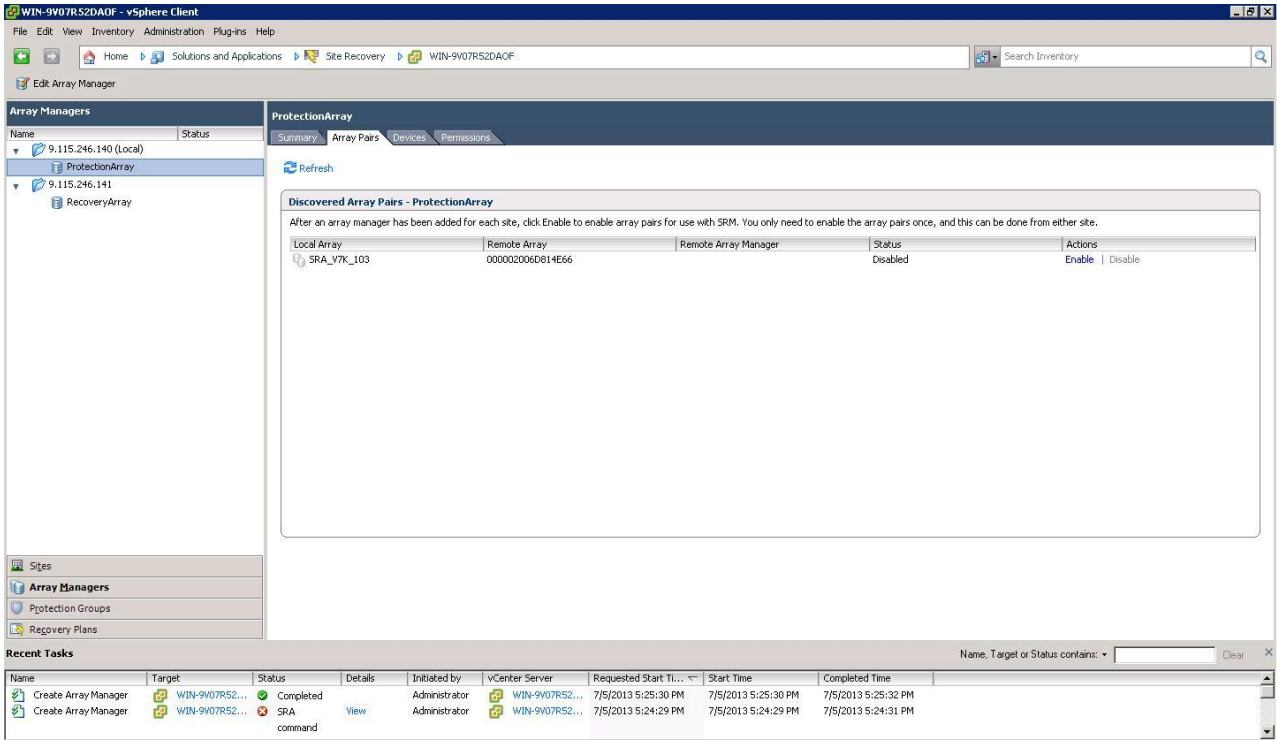


Figure 17. Array Pairs tab

- Click **Enable** in the Actions column to pair the local and remote sites together. The device discovery and data store computation process is initiated. If the pairing is successful, the Status column shows **Enabled**. The discovered device information is available under the Devices tab. If new replicated devices must be discovered, click **Refresh**.

Attention: All Storwize 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

If you want to see selected volumes in the **Devices** tab, use the **Name Filter** option.

About this task

The following procedure includes steps and screen captures that apply when using VMware vSphere Client. If you are using VMware vSphere Web Client, similar steps are applicable.

Note: Use of the **Name Filter** field is optional. It can be left empty to enable full discovery, as shown in Figure 18 on page 25.

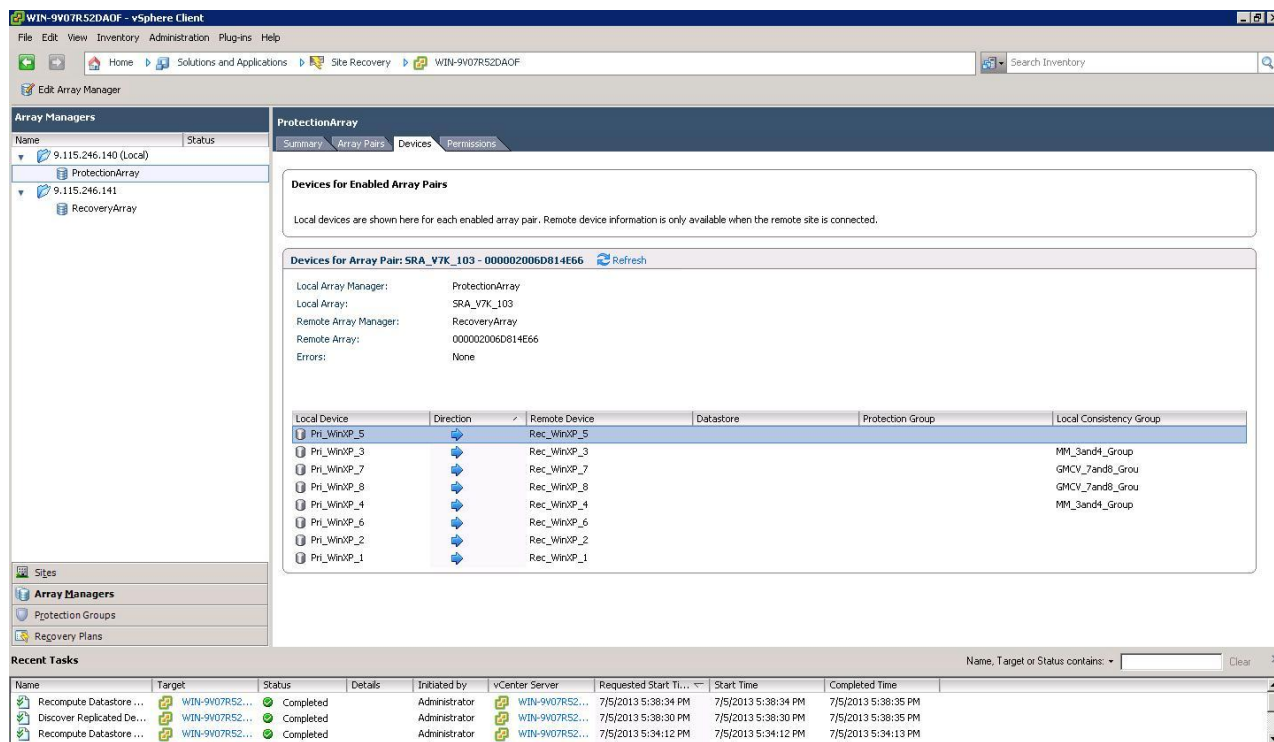


Figure 18. Devices found without using a filter

Procedure

1. In the VMware vSphere client, click **Edit Array Manager** in the Array Managers tab.
2. Enter the consistency group name or prefix and volume name or volume name prefix to show the selected volumes in the **Devices** tab.

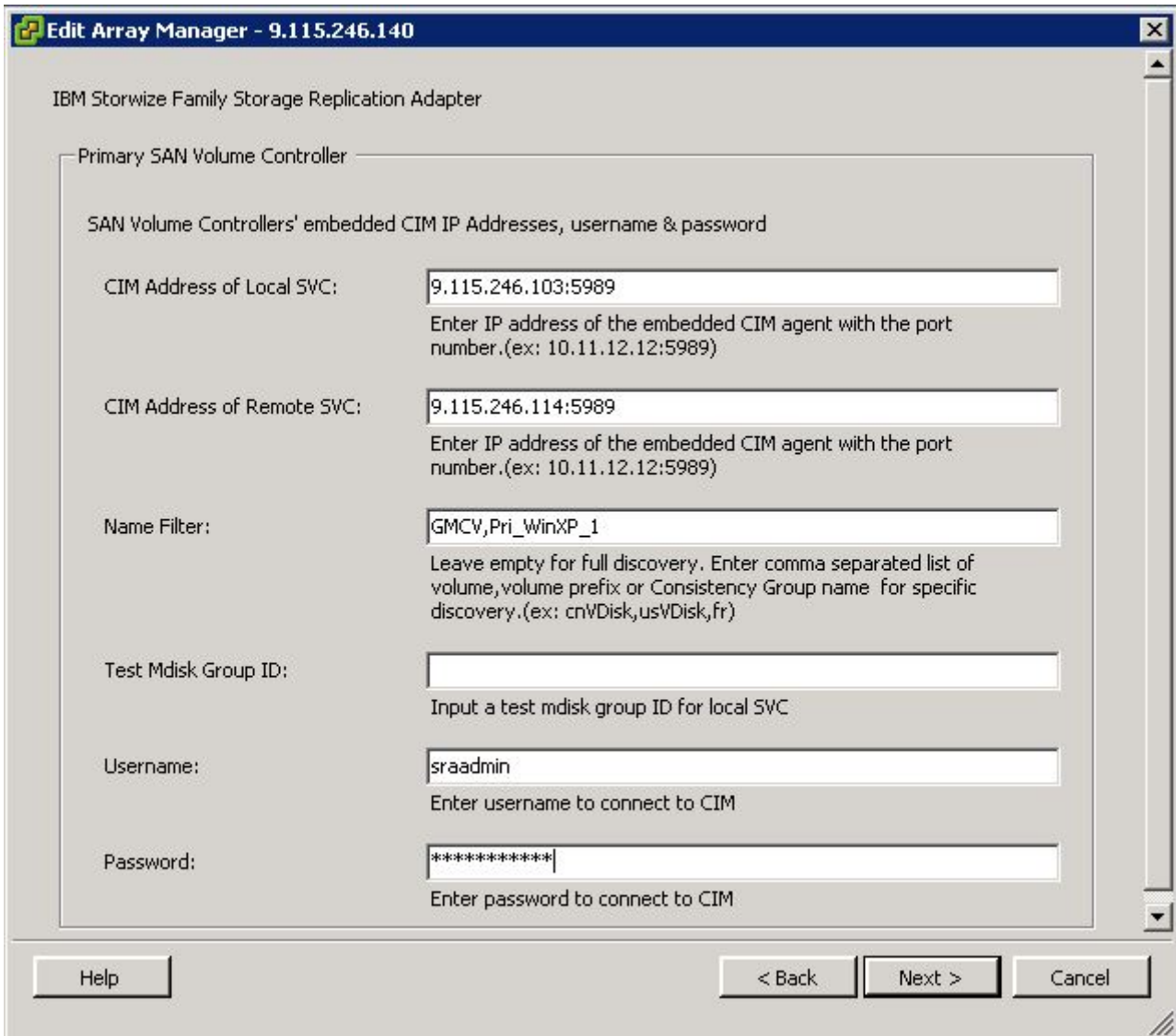


Figure 19. Edit Array Manager pane with Name Filter field

Note: You can enter multiple volume names or volume prefixes, multiple consistency group names, or prefixes, or both, as shown in Figure 19.

3. Enter the same volume names on the remote site.

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.

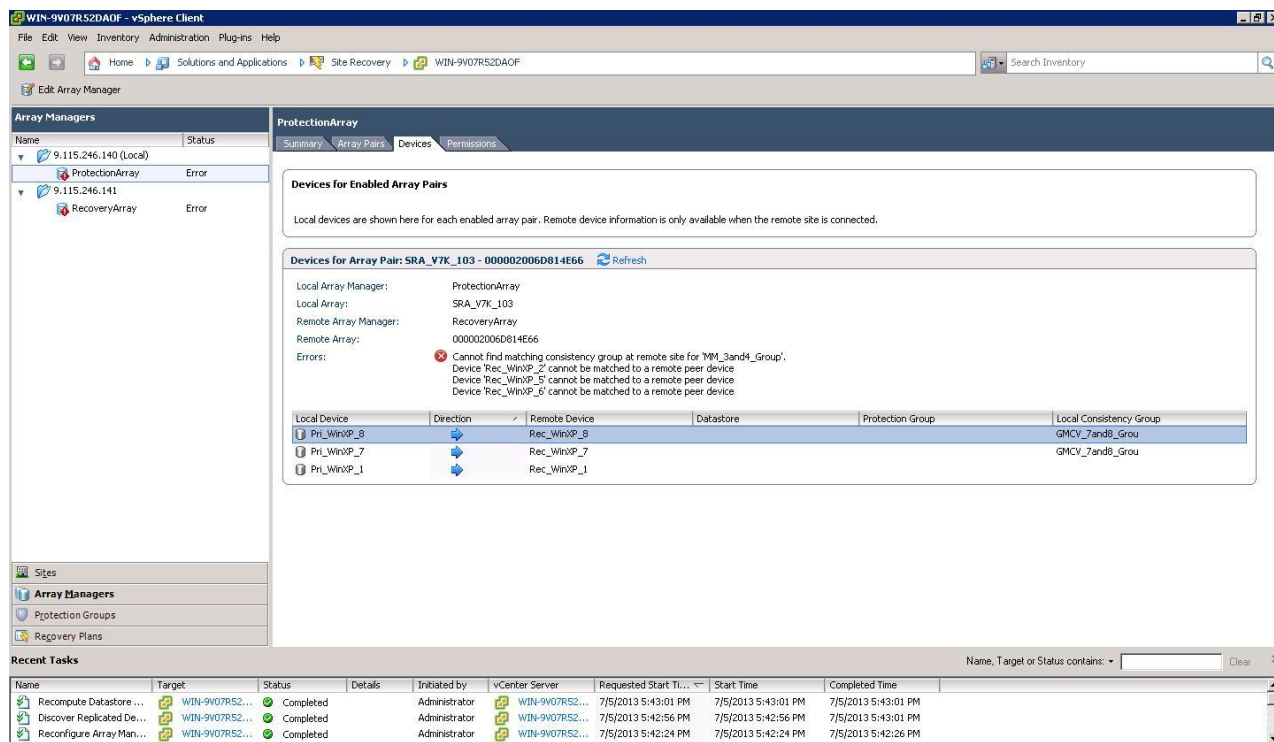


Figure 20. Adding volumes on the local site

- Use the **Add/Edit Array Manager** to add the volume/consistency group names in the **Name Filter** on the remote site.

Prefixes for the volume name can be different for each site, but prefixes must be paired with the remote site array manager. For example, the local site volume name is Pri_WinXP_3, and on the remote site it is mapped to Rec_WinXP_3. Then, in **Name Filter** of the local site, you can enter prefix Pri, and on the remote site, enter prefix Rec.

To use the **Name Filter** for the consistency group, enter the same name/prefixes at the local and remote sites.

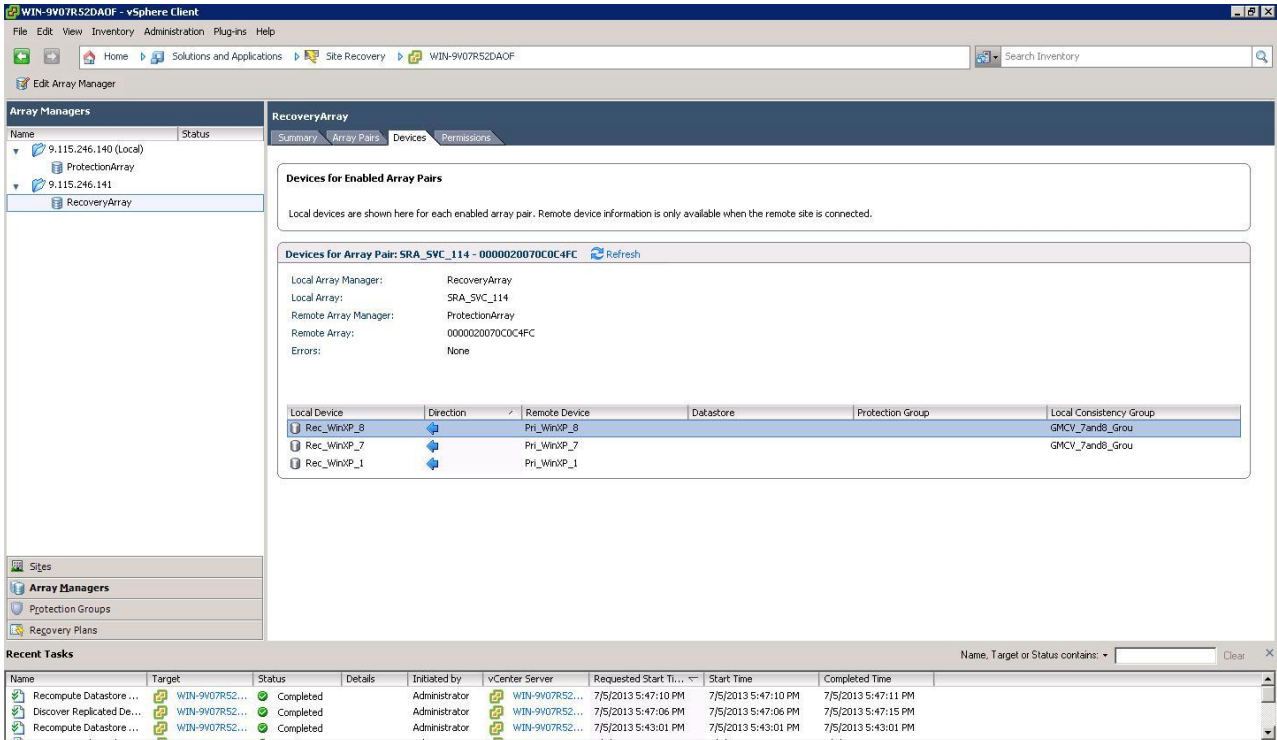


Figure 21. Recovery Array with Name Filter added

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.

As shown in the Storwize V7000 management GUI in Figure 22 on page 29, 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 29.

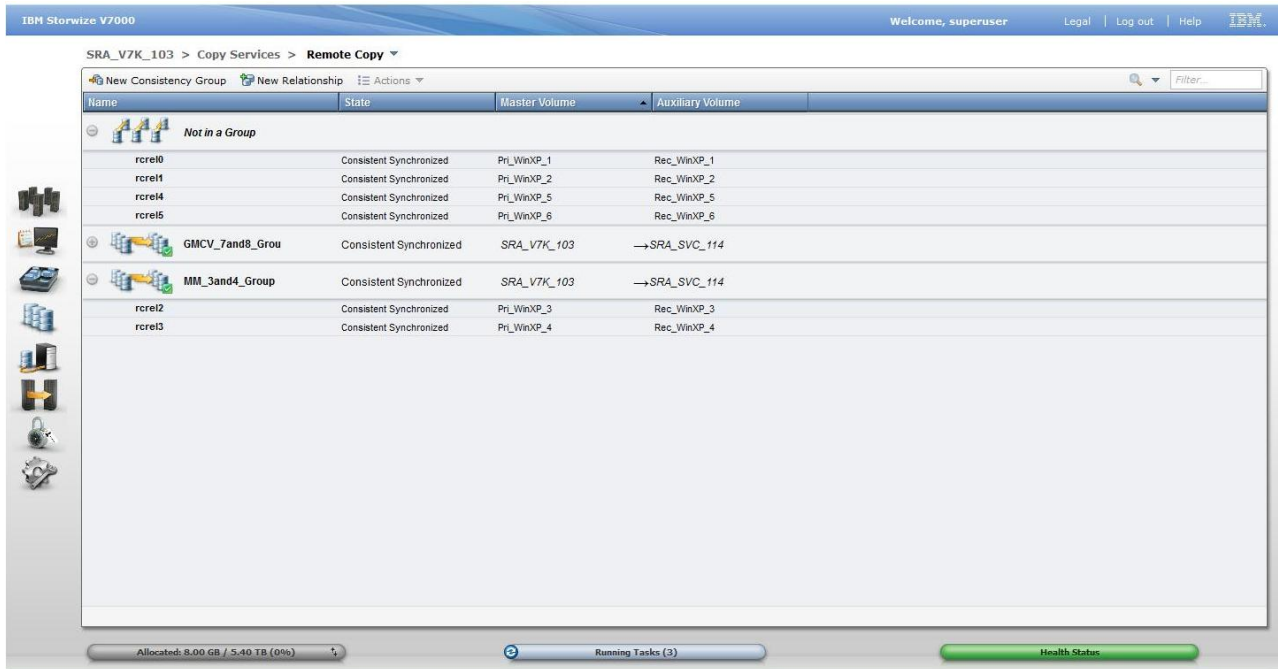


Figure 22. Storwize V7000 management GUI – volumes and consistency groups

Table 1. Name Filter Output

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 37.

Running a Test procedure on a preconfigured environment

The Storwize 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 14 are finished.

Running a Test procedure on a non-preconfigured environment

The Storwize 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 15 are finished.

Running a failover procedure

The Storwize Family SRA completely automates the failover procedure.

Note: For IBM SVC Stretched Cluster, the synchronization between the two copies of a stretched volume is managed by SVC stretched cluster, so the active-active replication within a stretched volume is always running unless one of the copies 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 14 are finished.
- Ensure that all the steps that are outlined in “Configuring non-preconfigured environments” on page 15 are finished.

Running a Reprotect procedure

The Storwize 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 14 are finished.
- Ensure all the steps that are outlined in “Configuring non-preconfigured environments” on page 15 are finished.

Chapter 6. Best practices

The following guidelines are important to follow while you configure the Storwize 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.

Chapter 7. Troubleshooting

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

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, the format can resemble: 192.168.10.1:5989.
2. Check that the user name and password are correct.
3. Check to see whether the SAN Volume Controllers are paired.

Managing DiscoverDevices failure

Important: Relationship and consistency group status typically is consist_synchronized or consistent_copying for Global Mirror with Cycling Mode.

Troubleshooting remote copies with the SRA Check Tool

Note: The SRA Check Tool does not support review of IBM SVC Stretched Cluster.

You can troubleshoot remote copy problems from within the configuration utility tool. The troubleshooting service from within the **SRA Check Tool** reviews every remote copy that is included in the most recent SRM operation.

Complete the following steps to run the **SRA Check Tool**:

1. Open the configuration utility tool by clicking the IBM Storwize Family SRA Configuration Utility.exe shortcut on the desktop.
2. Click **Check**.
3. Enter a user name and password for the local and the peer array.

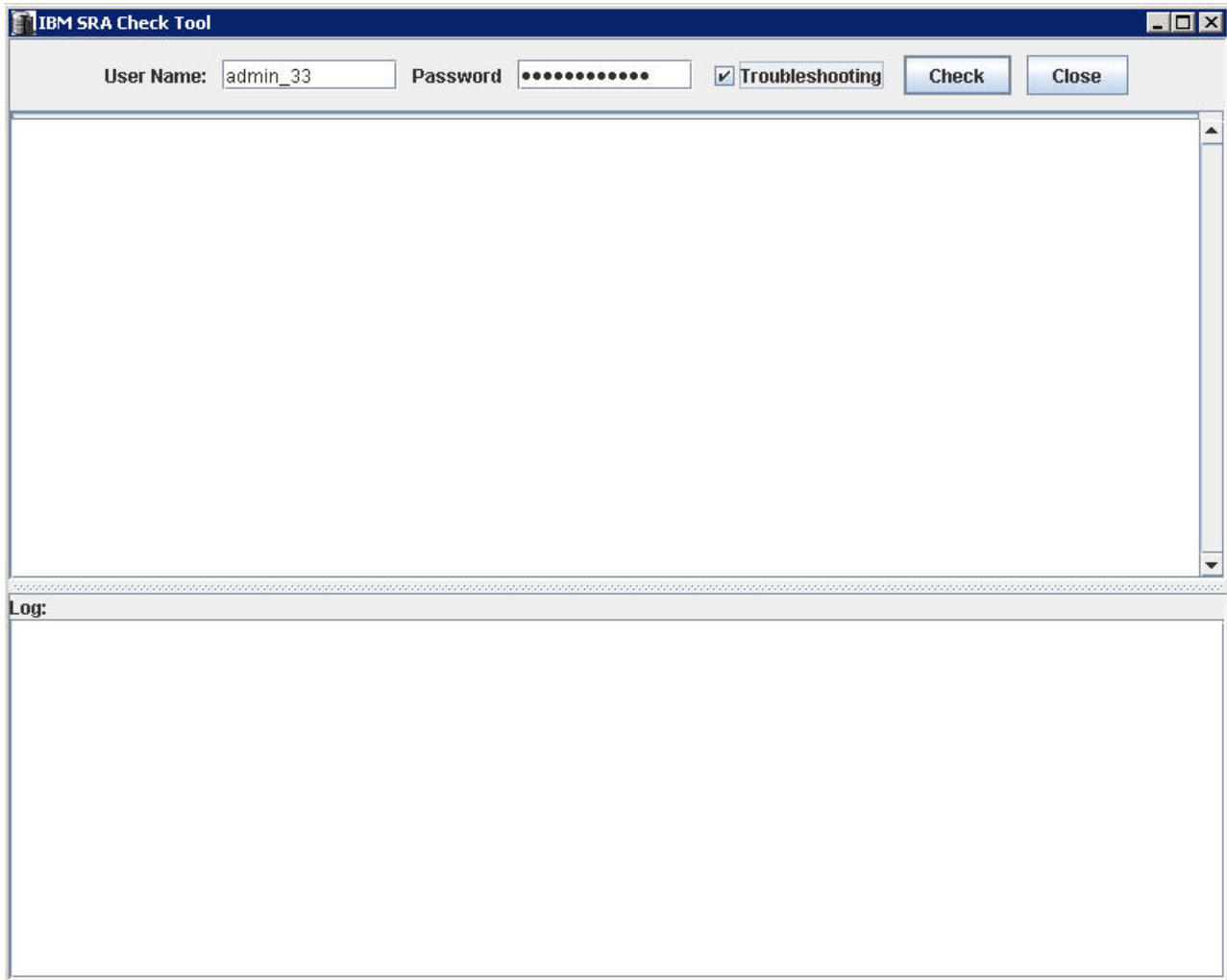


Figure 23. IBM SRA Check Tool

4. Select **Troubleshooting** from the **SRA Check Tool** menu and click **Check**.
5. When the utility finishes, click **Close**.
6. Enter a file name and click **Save** to save the log file.

The log file is saved to the hard drive where it can be retrieved for troubleshooting help.

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-config without rescan SRA.
2. CIM user privilege problem, "administrator" 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 reprotected.

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.

Managing Test failure

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

1. CIM user privilege problem, “administrator” 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 Storwize Family SRA.

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.

Managing SRM procedures

1. Refresh the devices in the SRM array managers. If there are no errors, go to step 3. Otherwise, continue to step 2.
2. Check all the previously related remote copies in the SRA-STATUS file in the SRA installation directory. For example, C:\Program Files \VMware\VMware vCenter Site Recovery Manager\storage\sra\IBMStorwize. 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=CREATEVOLUME04;
60:05:07:68:01:BA:05:39:98:00:00:00:00:00:2C
TESTFAILOVER04;
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. Storwize 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. 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 the SRM log files and contact IBM support.

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Index

A

add array manager 19

B

best practices
 datastores and consistency groups 33

C

compatibility 2
configuration
 check tool 16
 non-preconfigured environments 15
 preconfigured environments 14
 storage replication adapter 13, 19
 user privileges 15
creating target volumes and
 Metro/Global Mirror relationships 19

F

failover procedure 30

H

help
 related publications vii

I

installation 3
introduction 1
iSCSI configurations 4

M

mirroring configuration 3, 4

N

name filter 24
non-preconfigured environments
 configuration 15
 test procedure 30

P

preconfigured environment
 configuration 14
 test procedure 29
preparation 3

R

related publications vii

reprotect
 running the procedure 30
requirements 2

S

software installation 7
storage replication adapter
 configuration 13, 15, 19
 creating target volumes and
 Metro/Global Mirror
 relationships 19
 implementation 3
 software installation 7
 uninstalling 11
 user privileges 15

T

test procedure
 non-preconfigured environment 30
 preconfigured environment 29
troubleshooting
 Check Tool 35
 DiscoverArrays 35
 DiscoverDevices 35
 recovery failure 36
 Test Failover failure 37

U

usage
 name filter 24

V

verifying
 iSCSI configurations 4
 mirroring configuration 3
 SRA installation 10
 VMware SRM installation 5
VMware site recovery manager
 add array manager 19
VMware SRM installation
 verifying 5



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