IBM DS8000 Storage Replication Adapter
Version 2.3.0

User Guide

IBM

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About this guide

This guide describes how to install, configure, and use the IBM® DS8000® 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
- Adding an Array Manager to the VMware Site Recovery
- Filtering volumes by name

Who should use this guide

This guide is intended for system administrators or others who install and use the IBM DS8000 Storage Replication Adapter.

It is important to have an understanding of the following systems:
- Storage area networks (SANs)
- DS8000 Metro Mirror/Global Mirror/Metro-Global Mirror Copy Services (for more information, see "Related information and publications")
- The capabilities of your storage system

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- IBM Storage Host Software Solutions Information Center (publib.boulder.ibm.com/infocenter/strhosts/ic/index.jsp).
- VMware vCenter Site Recovery Manager Documentation (http://www.vmware.com/support/pubs/srm_pubs.html)

- VMware Product Support (vmware.com/support)
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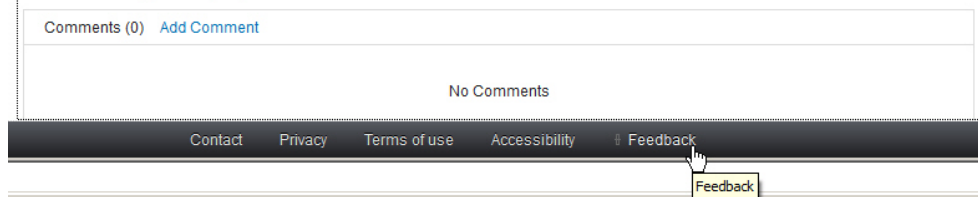
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Chapter 1. Introduction

The IBM DS8000 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 IBM DS8000 storage systems.

The IBM DS8000 SRA extends SRM capabilities to employ DS8000 replication and mirroring as part of the SRM comprehensive Disaster Recovery Planning (DRP) solution.

VMware administrators can automate the failover of a DS8000 system at the protected (primary) SRM site to a DS8000 system at a recovery (secondary) SRM site. Immediately upon failover, the VMware ESX/ESXi servers at the recovery SRM site initiate the replicated datastores on the mirrored volumes of the recovery DS8000 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.

Concept diagram

The IBM DS8000 storage system can use the IBM DS8000 SRA add-on that works with each instance of VMware vCenter SRM (protected or recovery).

Figure 1 shows how the IBM DS8000 Storage Replication Adapter is integrated in a typical VMware SRM disaster recovery solution.
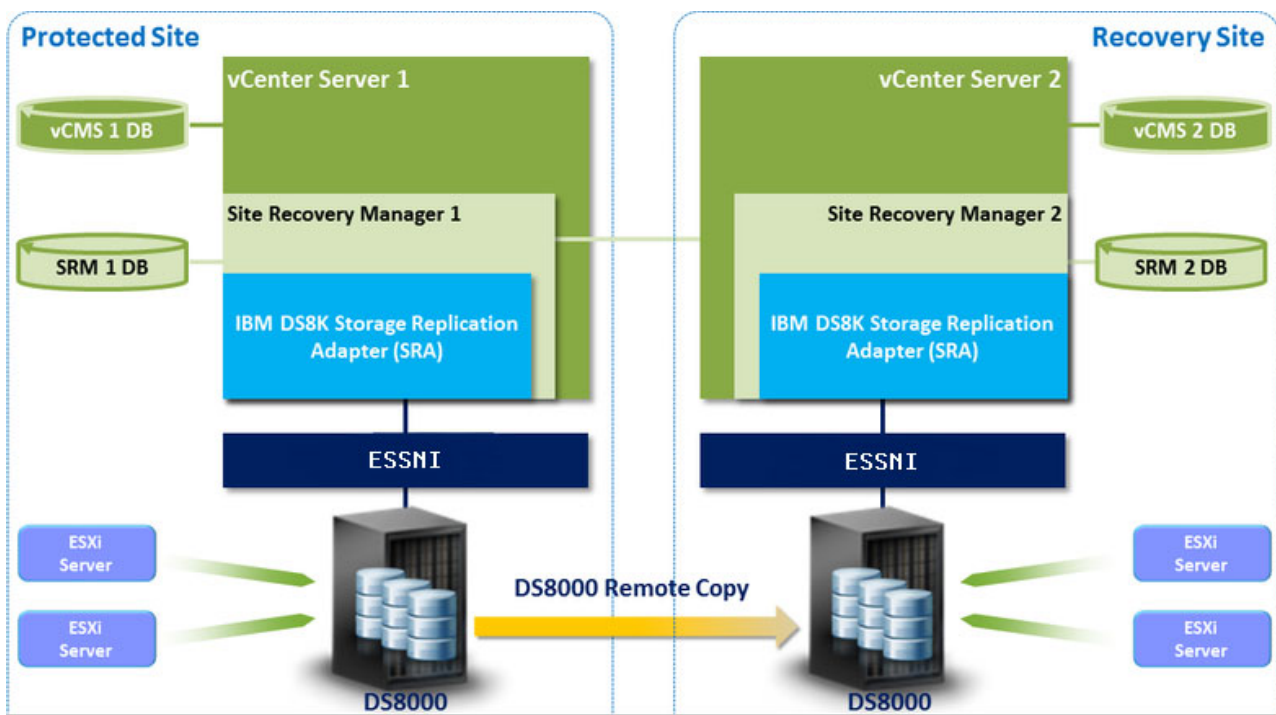
Figure 1. IBM DS8000 Storage Replication Adapter and VMware SRM disaster recovery

System requirements

Your system must have the listed prerequisites before you install the IBM DS8000 SRA.

For complete and up-to-date information about the IBM DS8000 SRA compatibility and requirements, see the latest release notes.

You can obtain the latest release notes on the IBM Storage Host Software Solutions information center (http://publib.boulder.ibm.com/infocenter/strhosts/ic).

Prerequisites:
- Uninstall any previous versions of the DS8000 SRA. See "Uninstalling the SRA software" on page 11.
- Feature licenses for DS8000s with FlashCopy® and Metro Mirror/Global Mirror must be activated at both the protected and recovery sites.
- The DS8000 storage must run on microcode version 6.3.2 (DS8800) or version 7.0 and later (DS8870).
- Determine whether you want DS8000 SRA to use space-efficient (SE) volumes during test failover operations and backup in failover operations. If so, the SE volume feature must be enabled on the DS8000.
- The user name and password for both protected and recovery site DS8000 device's Hardware Management Console (HMC) must be the same.
- VMware vSphere Virtual Center Server v5.0 or later with Site Recovery Manager 5.x or later plug-in must be installed.
- Ensure that the system firewall is not blocking the Enterprise Storage Server® Network Interface (ESSNI) port 1750 and port 1755. Otherwise, SRA fails with an "Invalid Array ID" message.
- A Fibre Channel (FC) connection must be configured between the VMware ESX server and the DS8000 storage system.

Note:

1. For information about installing the VMware vCenter Server and Site Recovery Manager plug-in, refer to the *VMware Site Recovery Manager Installation and Configuration Guide*.
2. See 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.

Important: When you create volumes on the recovery site, make sure that the DS8000 has enough free space for volume creation during test failover operations. If the recovery DS8000 has SE volume support that is enabled, the SRA creates TSE FlashCopy target volumes during test failover operations. Before the SRA can create SE volumes, sufficient SE storage must first be configured on the array. For more information about SE storage configuration and SE concepts in general, see the DS8000 Thin Provisioning PDF (http://www.redbooks.ibm.com/redpapers/pdfs/redp4554.pdf).

Preparing the DS8000 software environment

Before you install the DS8000 SRA, verify the software implementation.

Procedure

Complete the following steps to prepare the DS8000 storage environment:

1. Verify that the supported storage system microcode version is used. See "System requirements" on page 2.
2. Create appropriate-sized target volumes on the recovery (secondary) site DS8000. Create Metro/Global Mirror relationships between the source and target volumes.
3. Create a user on the DS8000 with the appropriate privileges for the DS8000 SRA. For non-preconfigured settings, a user with "Physical Operator" or higher privilege is needed. For preconfigured settings, a user with "Copy Services Operator" or higher privilege is needed.

Note: For information about user privileges, see "Setting user privileges for SRA configurations" on page 41.

Verify the mirroring configuration

All DS8000 storage systems, volumes, and VMware ESX hosts at both the protected (primary) and recovery (secondary) sites must be properly connected to their remote counterparts. The DS8000 systems, volumes, and VMware ESX hosts must then be configured for site mirroring.

Before you install the IBM DS8000 SRA, verify that the following prerequisites are completed:

- The local DS8000 system at the protected (primary) site has mirroring connectivity with the target DS8000 system at the recovery (secondary) site.
- The recovery VMware ESX/ESXi hosts are defined as DS8000 hosts at the recovery site.
- The recovery VMware ESX/ESXi host ports are FC-zoned (Fibre Channel) with the DS8000 storage system at the recovery site and are visible by that DS8000 storage system.

- The name of each DS8000 storage system is unique on both the protected and recovery sites.
- The storage extent pools that contain the replicated volumes at both sites have sufficient free capacity for creating the snapshots of all replicated volumes concurrently.
- Remote mirroring is defined for all DS8000-based volumes that you intend to protect as part of your Disaster Recovery Plan.
- Your protected volumes are mapped to the protected VMware ESX hosts.

Note: Set **HostType** to VMWare when you configure host connect on DS8000. For example:

```
mkhostconnect -wwname 12341234000A000F -hosttype VMWare host_1_port_1
```

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

Verifying the VMware vCenter SRM installation

Before you install the IBM DS8000 SRA, ensure that the VMware SRM is installed. The VMware SRM must be accessible at the protected (primary) and recovery (secondary) sites.

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 confirm that the **Site Recovery** icon is displayed under "Solutions and Applications."
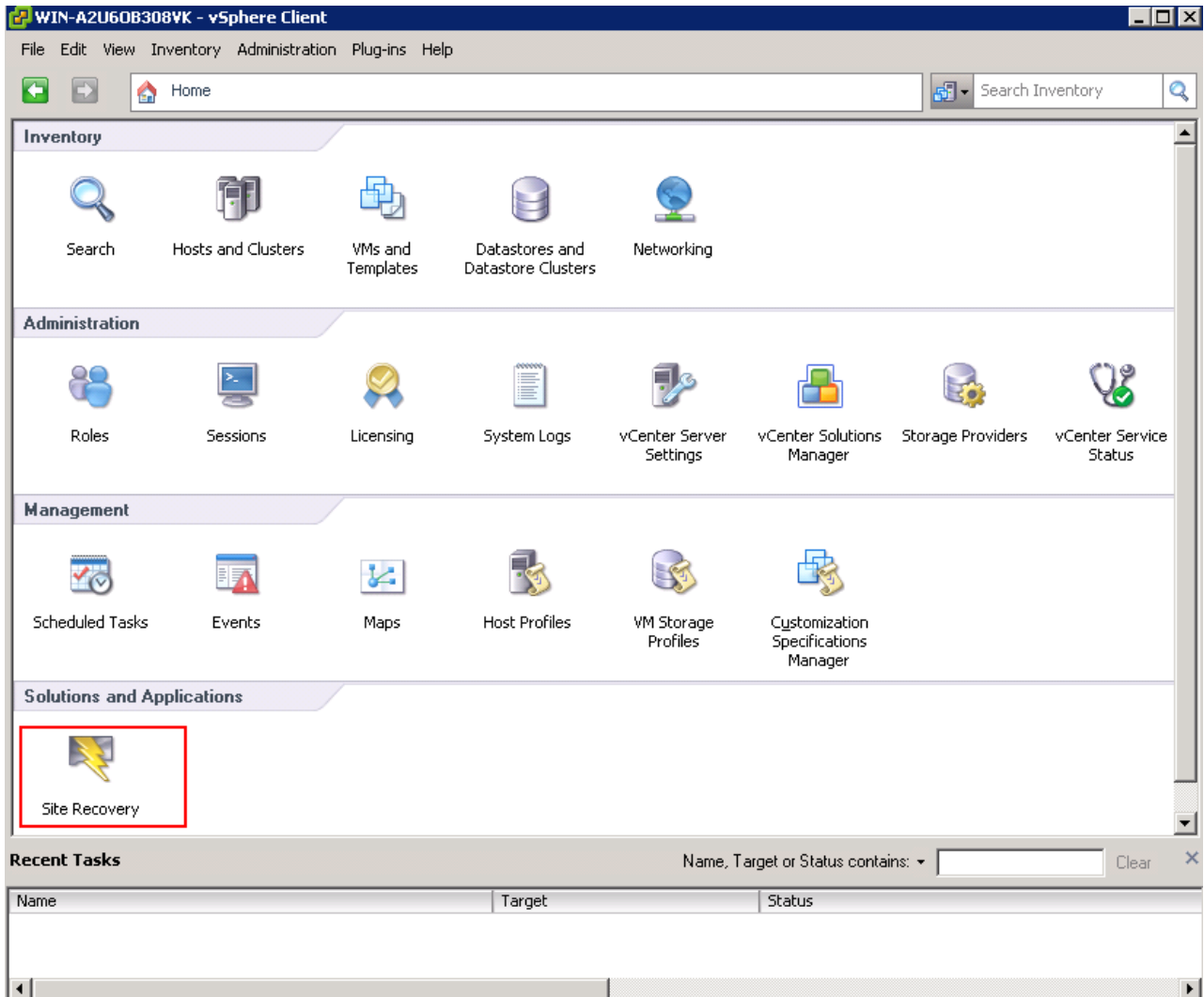
Figure 2. Site Recovery icon on the vSphere client application home page

Note: For Metro-Global Mirror storage configuration, SRA does not support failover to the intermediate site. Install VMware vCenter SRM on the local and remote sites.

Chapter 3. Installation

After you complete the prerequisites, you can install the DS8000 SRA.

Installing the SRA software

Use the installation wizard to install the IBM DS8000 SRA software.

Before you begin

If you are upgrading to the DS8000 SRA version 2.3.0, you must uninstall your current version before installing version 2.3.0. (See Uninstalling the software.) You must also satisfy all of the prerequisites that are listed in "System requirements" on page 2.

Procedure

Complete the following steps to install the IBM DS8000 SRA software on a Windows server:

1. Log on to the Windows server as an administrator.
2. Download and extract the compressed file archive from the VMware website (https://my.vmware.com/cn/group/vmware/details?downloadGroup=SRM_SRA&productId=357&rPId=4228).

   Important: To download the archive file, you must have a VMware account.

3. Double-click the `IBMDS8KSRA.exe` file from the downloaded compressed file archive and choose the installation language. After you select the language, the Welcome window is displayed.

Figure 3. The Welcome panel

4. Click **Next**. The License agreement panel is displayed.
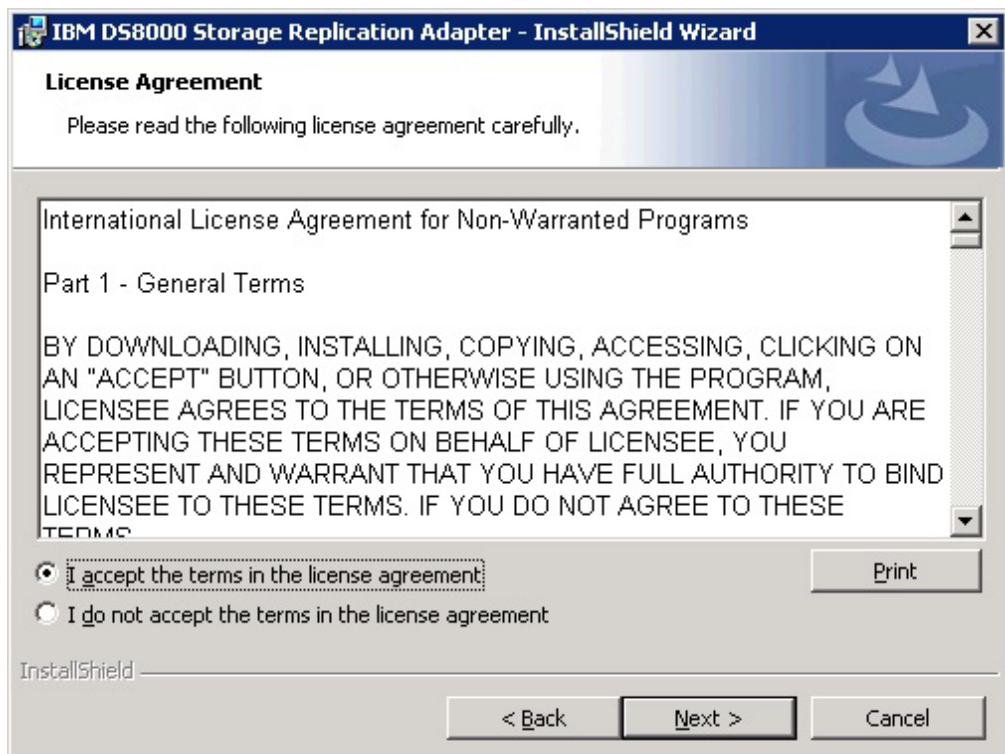
Figure 4. The License Agreement

If you do not want to continue with the installation, click **Cancel**.

5. Read the license agreement information. Select the **I accept the terms of the license agreement** option and click **Next**. The **Ready to Install the Program** panel is displayed.
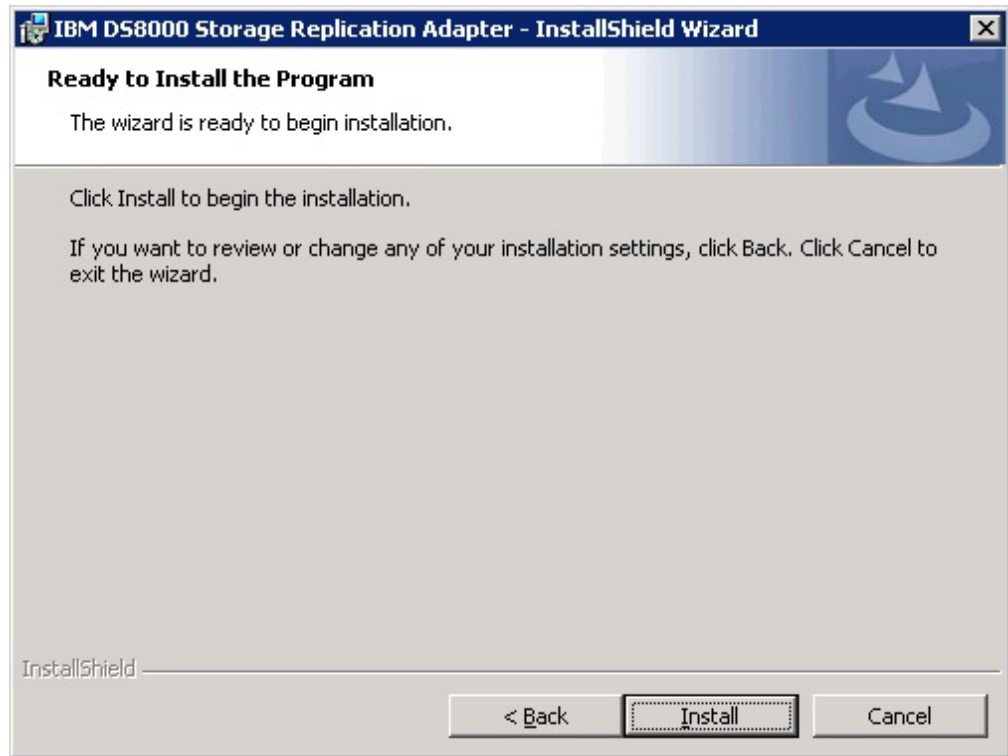
Figure 5. The Ready to Install panel

6. Click **Install**. Afterwords, the installation wizard shows the status of the files that are being copied.
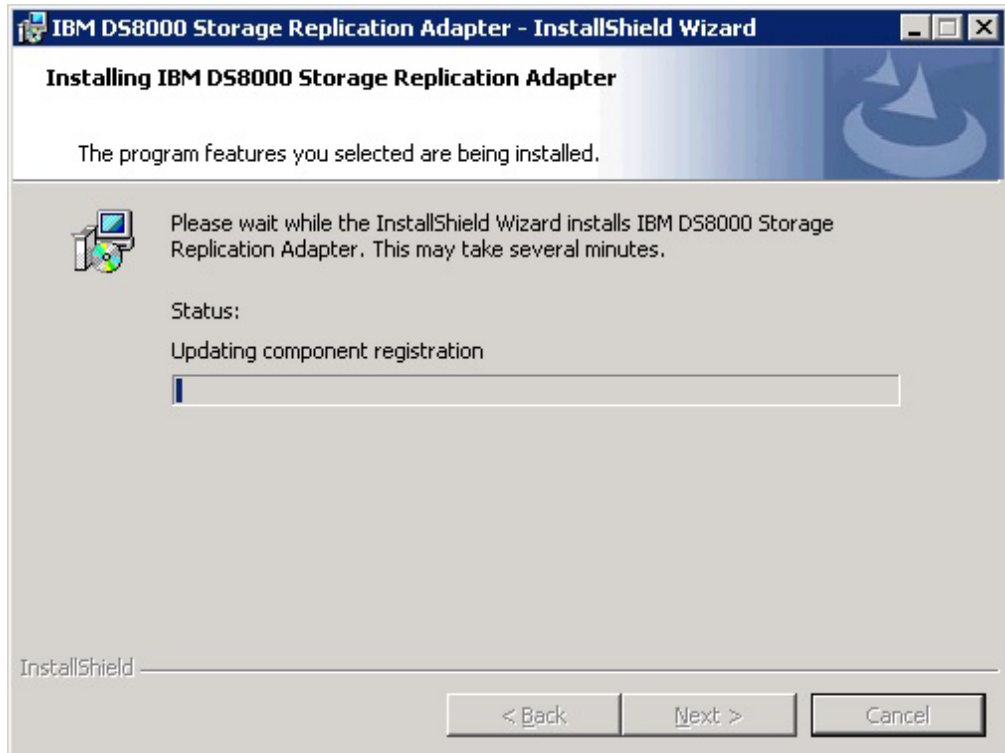
Figure 6. Updating component registration status panel

7. Click **Finish** when the installation process completes.
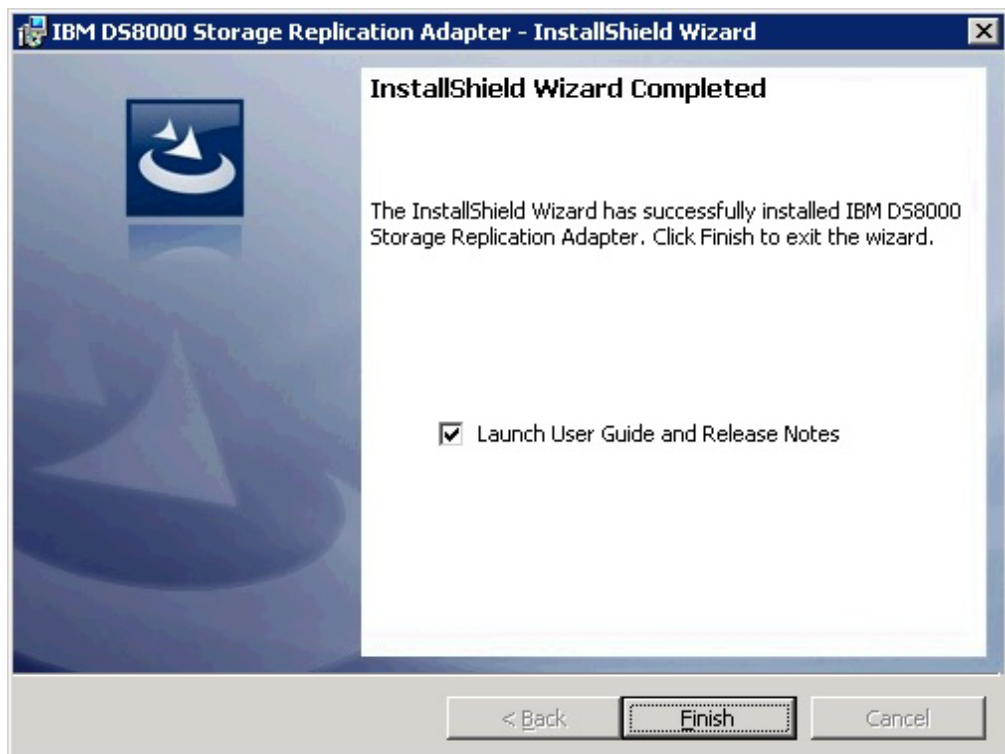
Figure 7. InstallShield Wizard Completed panel

Note: DS8000 SRA is installed under the SRM folder.

- For SRM 5.0, the installation directory is `C:\Program Files (x86)\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000`.
- For SRM 5.1 and later, the installation directory is `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000`.

Uninstalling the SRA software

You can uninstall the IBM DS8000 SRA software by kicking off the installation file (`IBMDS8KSRA.exe`).

Before you begin

If you are upgrading to version 2.3.0 of the DS8000 SRA, you must uninstall your current version.

Procedure

Complete the following steps to uninstall the software:

1. Log on to the Windows server as an administrator.
2. Locate the `IBMDS8KSRA.exe` file and double-click it. The "Preparing to Install" panel is displayed.

Figure 8. Preparing to Install panel

3. Click **Next** on the Welcome page.

Figure 9. Welcome panel

4. Select **Remove** on the **Program Maintenance** panel and click **Next**. See Figure 10.

Figure 10. Program Maintenance panel

5. Click **Remove** to confirm the uninstallation.
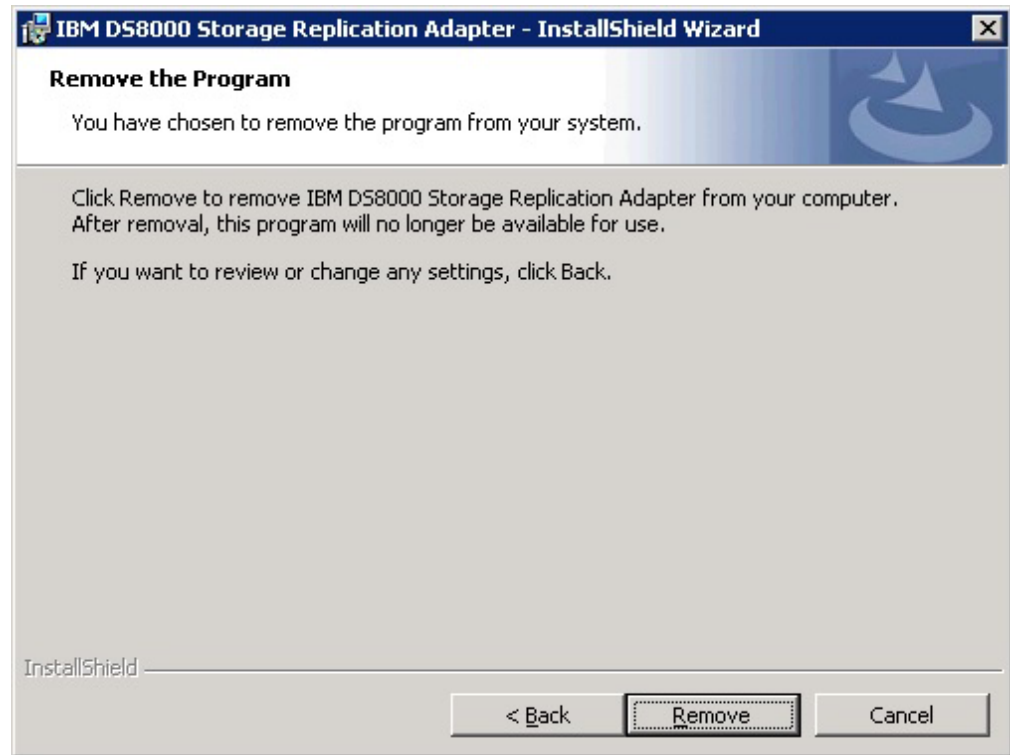
Figure 11. Remove the Program panel

The Removing progress screen is displayed.
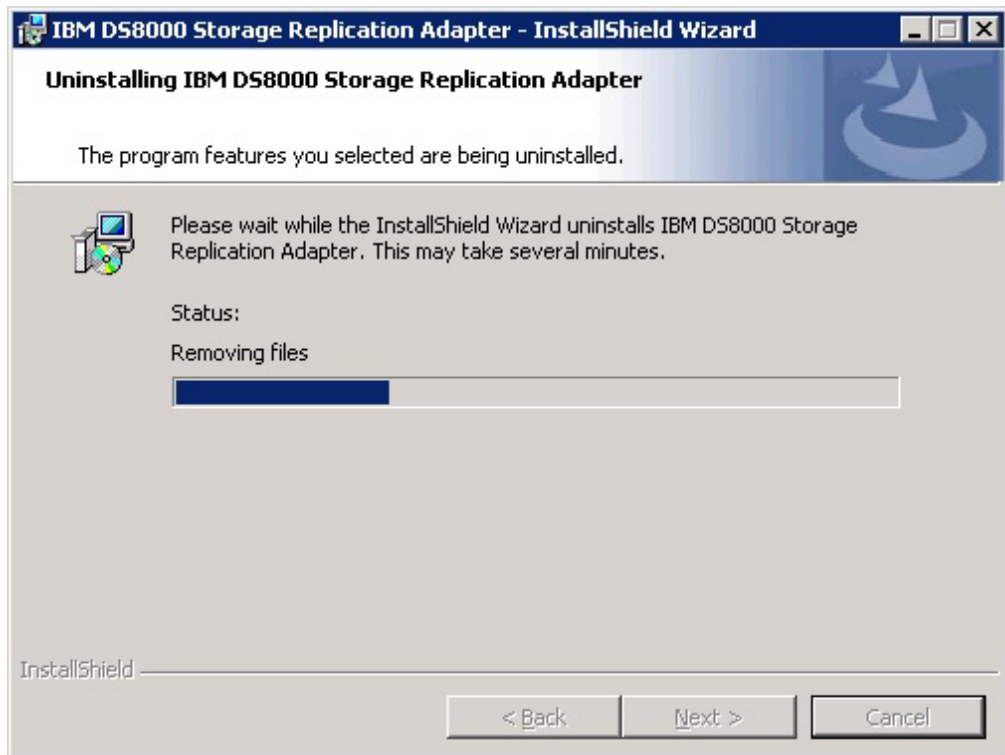
Figure 12. Removing progress panel

6. Click **Finish** from the **InstallShield Wizard Completed** panel. If necessary, you are prompted to restart the system.
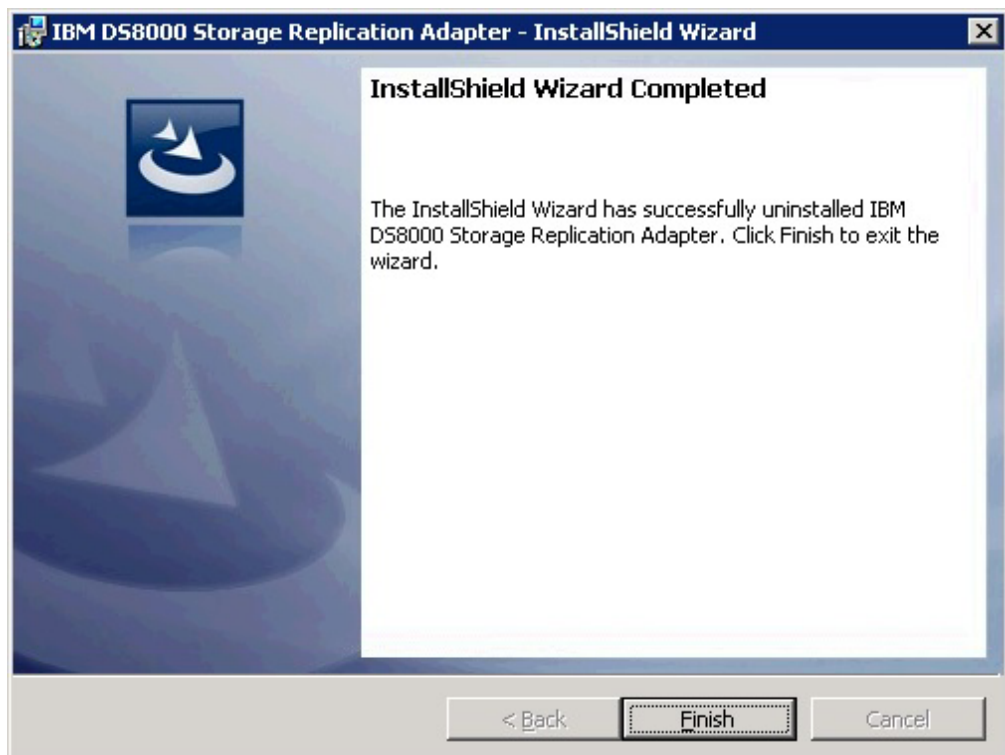
Figure 13. InstallShield Wizard Complete panel

Chapter 4. Configuration

IBM DS8000 SRA works with Metro Mirror, Global Mirror (with or without master and subordinate), Metro-Global Mirror, and IBM Tivoli® Storage Productivity Center for Replication Coexistence.

A shortcut that is named `IBMDS8KSRAUtil.exe` is created on the desktop during the DS8000 SRA installation.

Important: The configuration utility is used to configure the SRA. The configuration takes effect on the site where the utility runs.

Double-clicking the shortcut brings up the Utility panel.
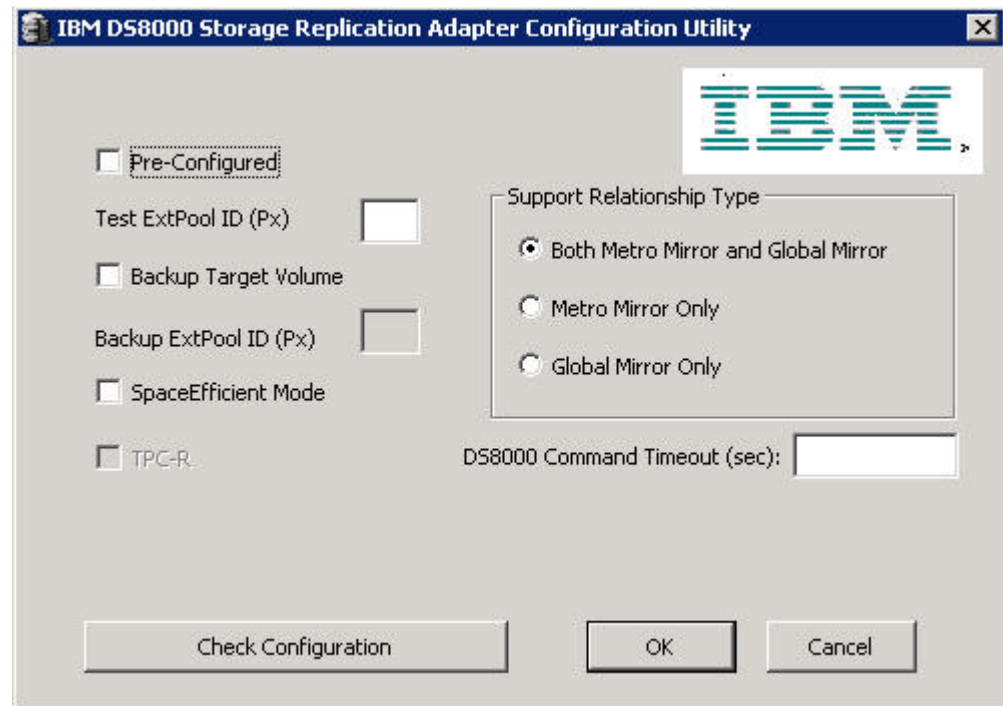
Figure 14. Configuration Utility panel

The Configuration Utility must be set up before you configure SRM with the array.

Preconfigured and Non-preconfigured environments

The environment can be a preconfigured environment or a non-preconfigured environment. A preconfigured environment is one where you create the backup target volumes and map the volumes to the VMware ESX servers at the recovery site, in advance. A non-preconfigured environment is one where the SRA creates and maps snapshot volumes during test failover and backup target volume operations.

Note: If preconfigured/non-preconfigured are switched by the configuration utility, rescan SRA in SRM on both the protected (primary) and the recovery (secondary) site.

DS8000 Command Timeout (sec)

The DS8000 Command Timeout specifies the maximum time, in seconds, to wait for a required state of volume, command results, FlashCopy, or remote copy. The wait is after certain DS8000 commands run, or to wait for command results. For example:

- SRA waits for the volume initialization to be completed before it establishes a FlashCopy relationship.
- After a Metro Mirror copy relationship is resumed, SRA waits for the secondary full duplex state.
- During a reprotect process of Global Mirror, SRA waits for the first pass completion of the remote copy that is established by SRA.
- When ESSNI functional code does not accept the command due to being busy, SRA waits and resubmits the command.

If the time that SRA waited exceeds the configured maximum timeout setting, SRA fails due to a timeout exception. If the value is empty or 0, SRA waits until the required state is met or the command result is returned. The user can keep the box empty as the default value.

For more configuration fields, see "Configuration of DS8000 Remote Copy for SRA."

Configuration of DS8000 Remote Copy for SRA

Along with the regular remote copy configuration on DS8000, some special configuration is required for the SRA defined mode.

Setting up preconfigured environments for DS8000 Remote Copy for SRA

In the Pre-Configured mode, SRA does not create a volume or FlashCopy. SRA also does not attach or detach the volume to or from the host.

Before you begin

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

Procedure
1. Create an equal number of FlashCopy (target) volumes on both the protected (primary) and the recovery (secondary) site DS8000.
2. Complete this step according to the scenario:
   - For a Metro Mirror scenario, create the following items:
     a. A background copy and the incremental FlashCopy maps (with the volumes that were created in step 1 as the FlashCopy target volume).
     b. The Metro Mirror copy source and target volumes, as the FlashCopy source volumes.

Note: See the flow chart in Figure 15 on page 19 that shows how a preconfigured Metro Mirror scenario is configured.
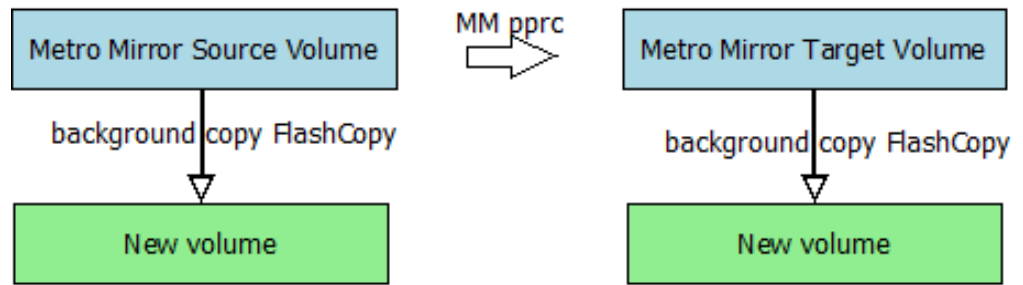
Figure 15. Preconfigured Metro Mirror scenario

- For the Global Mirror scenario, create the following items:
  a. A background copy FlashCopy map (with the volumes that were created in step 1 on page 18 as the FlashCopy target volume).
  b. The Global Mirror source and target volumes as the FlashCopy source volumes.
  c. The Global Mirror FlashCopy between the Remote Mirror source volume and the newly-created FlashCopy target volume.

Note: See the flow chart in Figure 16 showing how a preconfigured Global Mirror scenario is configured.
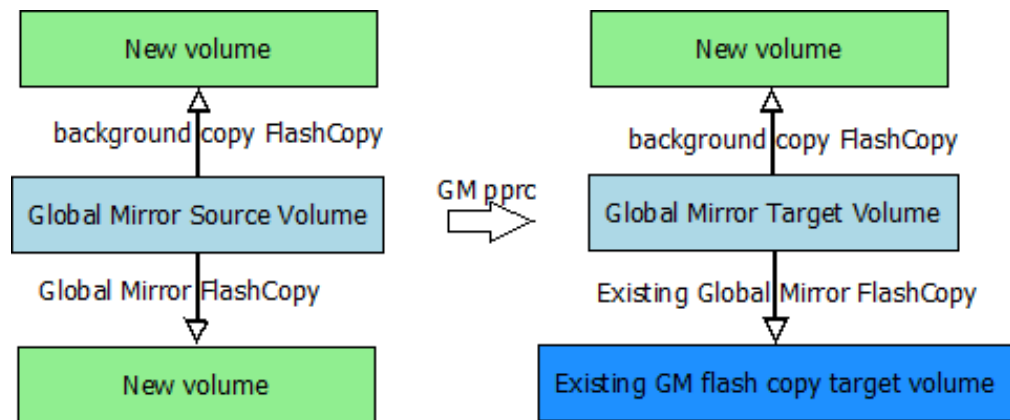
Figure 16. Preconfigured Global Mirror scenario

3. Map the Remote Copy target and the FlashCopy target volumes to the VMware ESX servers. The newly-created FlashCopy target volumes are used as test volumes during the test procedure. The RemoteCopy target volumes are used as the production volumes during the failover procedure.

Note: The preconfigured FlashCopy relationship is synchronized by reestablishing the original FlashCopy relationship. Four FlashCopy options can be restored during the reestablishment process:

- persistent
- record
- nocopy
- tgtse

Important:

1. For Global Mirror in a preconfigured environment, ensure that no session or Global Mirror exists on the logical subsystem (LSS) of the Global Mirror target volume for the initial state.

2. Reserve the session ID, used by the LSS of the remote copy source volume, on the target DS8000.

Setting up non-preconfigured environments for DS8000 Remote Copy for SRA

In the non-preconfigured mode, SRA creates volumes and FlashCopy and can attach or detach volumes to or from the host.

Before you set up a non-preconfigured environment, make sure that the remote copy target volume is unmapped from VMware ESX servers for the initial state.

SRA creates volumes and FlashCopy, and can attach volumes to or from the host when test failover is run. SRA detaches the volumes that are created during test failover from the host, and deletes the FlashCopy and the volumes during test failover clean-up.

Important:

- If Global Mirror/Metro-Global Mirror is picked in a non-preconfigured environment, make sure that no session or Global Mirror exists on the LSS of the Global Mirror target volume for the initial state.

- If Metro-Global Mirror is picked for the non-preconfigured environment, make sure that no session or Global Mirror exists on the LSS of the Metro Mirror source volume for the initial state.

- Reserve the session ID, used by the LSS of the remote copy source volume, on the target DS8000.

SRA Configuration for Metro Mirror and Global Mirror

VMware SRM provides planned failover and disaster recovery.

Important: The configuration utility must be run on both the protected (primary) site and the recovery (secondary) site. The **Pre-Configured** setting (checked or not checked) needs to be consistent on both sites.

VMware SRM provides two kinds of recoveries:

- Planned failover
- Disaster recovery

Double-click the `IBMDS8KSRAUtil.exe` shortcut on the desktop to access the **SRM Configuration Utility** (see Figure 17 on page 21). In both recovery scenarios, the user can opt to back up the remote copy target volumes. If **Pre-Configured** is not checked, check **Backup Target Volume** and set the appropriate Backup ExtPool ID. The ID instructs the SRA to create FlashCopy backups of the remote copy target volumes.
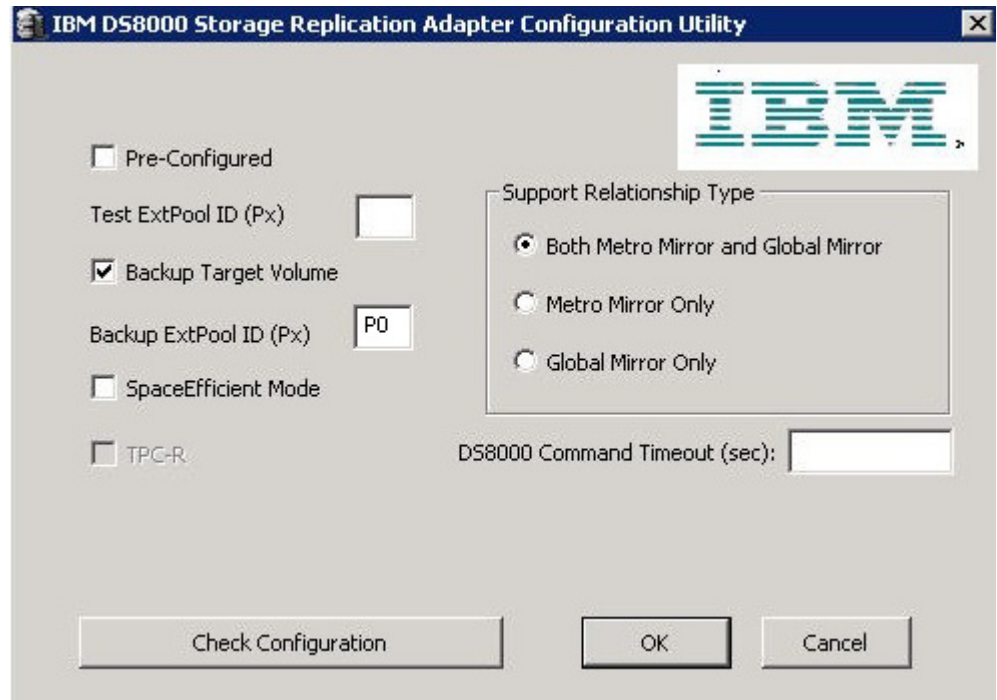
Figure 17. Configuration Utility Window

Support Relationship Type

The Support Relationship Type specifies the types of relationships that the SRA operates on. The default value is "Both Metro Mirror and Global Mirror," which means SRA discovers all the Metro Mirror and Global Mirror relationships between the protected site and the recovery site.

Note:
- SRA creates volumes by using the extent pool of the remote copy target volume when any of the following situations are true:
  – Test extent pool parity is inconsistent with the LSS of remote copy target volume
  – Backup extent pool parity is inconsistent with the LSS of remote copy target volume
  – Test or backup extent pool parity is empty
- If the SRA does not back up the target volumes, check the backups on the storage or check the messages in the SRM log file.

Related concepts:
"Setting user privileges for SRA configurations" on page 41
Setting the user privileges for SRA differs, depending on whether you have a preconfigured environment or a non-preconfigured environment.

Setting up preconfigured environments for Metro Mirror and Global Mirror

If the **Pre-Configured** option is checked, some configuration is needed before SRA can function properly.

Procedure

Double-click the `IBMDS8KSRAUtil.exe` shortcut on the desktop to access the **SRM Configuration Utility** (see Figure 18).

1. Check the **Pre-Configured** option.

Figure 18. Pre-Configured option

Note:

- The Test ExtPool ID (Px), Backup Target Volume, Backup ExtPool ID (Px), and SpaceEfficient Mode options are unavailable if the **Pre-Configured** option is checked.
- The **DS8000 Command Timeout (sec)** option determines how long you want the process to run.

---

2. Select the **Support Relationship Type** according to the user requirement.
3. Check **TPC-R** if you use SRA integrated with Tivoli Storage Productivity Center for Replication.
4. Click **OK** to confirm the new 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.

Note: FlashCopy (target) volumes are resynchronized during failover when the TPC-R option is not checked.

Setting up non-preconfigured environments for Metro Mirror and Global Mirror

If the **Pre-Configured** option is not checked, some SRA configuration is needed before SRA can function properly.

Procedure

Complete the following steps to set up a non-preconfigured environment:

1. Double-click the IBMDS8KSRAUtil.exe shortcut on the desktop to access the **SRM Configuration Utility** (see Figure 19).
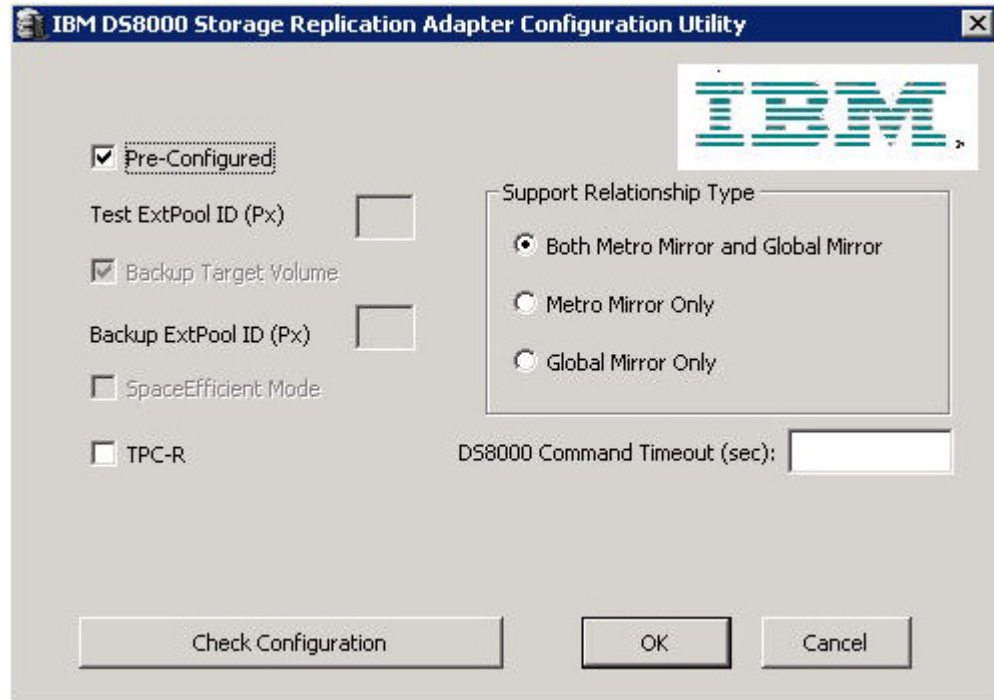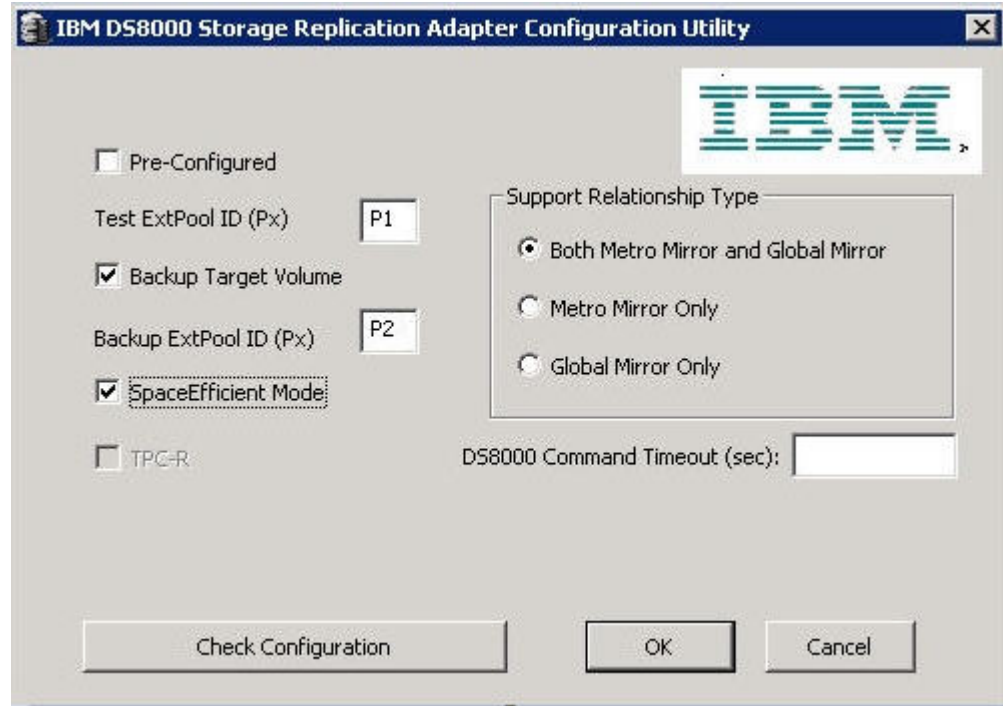

Figure 19. Non-preconfigured option

2. Define the appropriate configuration settings:

   Test ExtPool ID (Px)
   > Specifies which Extent Pool ID on the DS8000 site is used to create FlashCopy (target) volumes during the test recovery operation. The format of input value is Px, for example, P1.

   Backup Target Volume
   > Instructs SRA to back up the target volume during recovery. **Backup ExtPool ID (Px)** must be set if this option is checked.

   Backup ExtPool ID (Px)
   > If **Backup Target Volume** is checked, this field must be set for SRA to create the FlashCopy (target) volume to back up the remote copy target volume. The format of input value is Px, for example, P1.

   Space Efficient Mode
   > Instructs SRA to create an SE volume during test failover or backup target volume process. SRA creates a track space-efficient (TSE) volume with this option. If the option is not checked, a standard volume is created.

3. Click **OK** to confirm the new 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 saved selections are shown when you restart the configuration utility.

Note:

- If **Backup Target Volume** is checked, you must remove the FlashCopy after the copy progress finishes. Otherwise it causes the second test failover, or failover on the same site failure because of an extra preconfigured FlashCopy in a non-preconfigured environment.
- The **DS8000 Command Timeout (sec)** option determines how long you want the process to run.

SRA configuration for M–N Metro Mirror

M–N Metro Mirror enables peer-to-peer remote copy (PPRC) connections from a protected (primary) DS8000 SRA to more than one recovery (secondary) DS8000.

Each PPRC connection is stand-alone. Therefore, a volume on a protected DS8000 having a PPRC with a recovery DS8000 can also have a PPRC from a different volume to a different recovery DS8000.

M–N Metro Mirror also enables connections from a recovery DS8000 SRA to more than one protected DS8000 SRA.

Note: The term "M–N" refers to the number of DS8000s on the protected site (M) and recovery site (N). No calculations are derived from this term. M–N is only used to denote the replication process.

The SRA processes the PPRC connections separately, and each PPRC connection can be reversed.

Protected Site   Recovery Site

10.11.3.242   10.11.3.96

10.11.3.157   10.11.3.301

10.11.3.243

ds8k0002
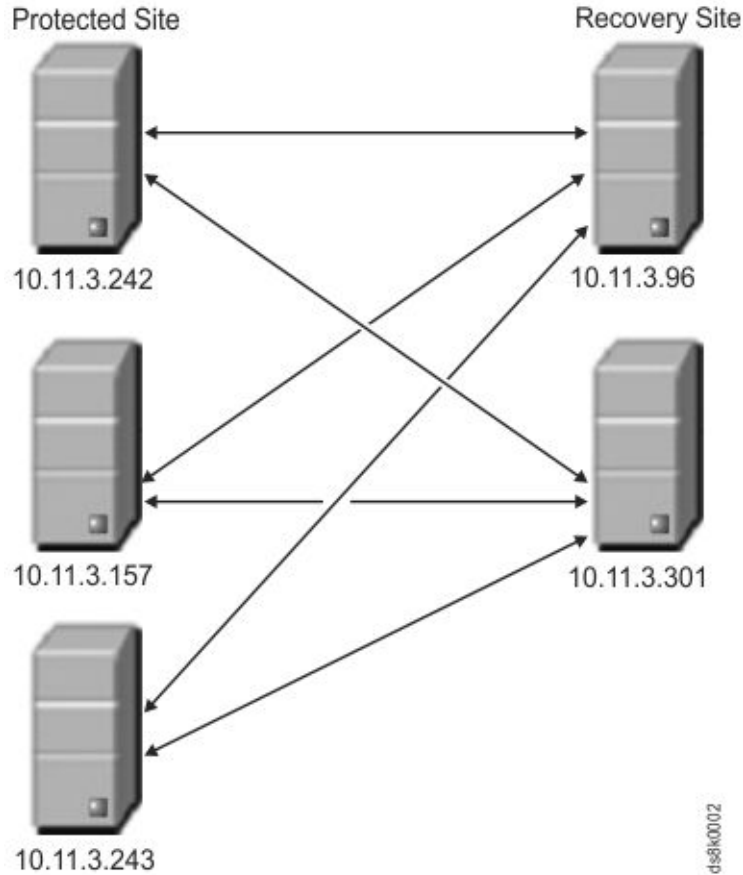
Note:

- Peer storage access information is required on both the protected and recovery SRA.
- The user name and password for every peer SRA must be identical.

Before you use M–N Metro Mirror replication, use the SRA command prompt to register each peer DS8000 SRA.

Table 1. Arguments for **RegPeerArray**

Argument	Use after **RegPeerArray** to:
RegPeerArray <list>	List the currently registered peer arrays.
	For example:
	```C:\>java -cp DS8K_Java_Client.jar RegPeerArray list```
RegPeerArray <add>	Register a peer array.
	For example:
	```C:\>java -cp DS8K_Java_Client.jar``` ```RegPeerArray add IBM.2107-5837254/193.168.12.14```
	where IBM.2107-5837254 is the serial number of the DS 8000 SRA and 193.168.12.14 is the IP address.

Table 1. Arguments for `RegPeerArray` *(continued)*

Argument	Use after `RegPeerArray` to:
`RegPeerArray <delete>`	Remove a peer array. For example: ``` C:\>java -cp DS8K_Java_Client.jar RegPeerArray delete IBM.2107-498264895736/192.168.1.1 ```

You can access help by using the RegPeerArray keyword without any argument.
For example:

```
C:\>java -cp DS8K_Java_Client.jar RegPeerArray
```

Adding Array Managers for M–N Metro Mirror

If you use M–N Metro Mirror when adding array managers, enter the IP addresses for the DS8000s in a specific order.

Because you can have more than one recovery (secondary) DS8000 with the same protected (primary) DS8000, you must enter the array manager information carefully.

First Management IP Address/Hostname
>   Enter the IP address of the protected site DS8000 device's Hardware Management Console (HMC). For example,

>    ```
    192.168.1.1
    ```

>    The address can either be an IP address or a fully qualified domain name.

**Second Management IP Address/Hostname**
>    Enter the IP address of the recovery site array's HMC. For example,

>    ```
    192.168.1.3
    ```

>   The address can either be an IP address or a fully-qualified domain name.
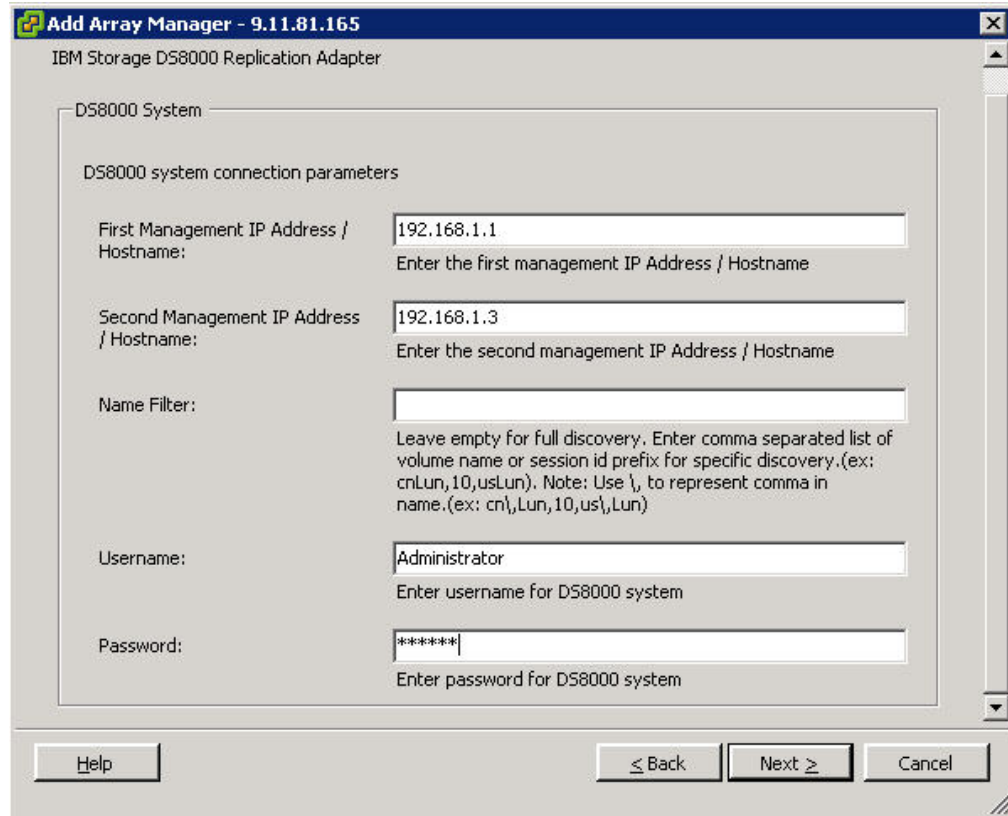
Figure 20. Adding the protected site in the First position, and the recovery site in the Second position

If you have another protected DS8000 to connect with the recovery DS8000 in the **Second Management IP Address/Hostname** space, add another array manager and use the same DS8000 IP address in the **Second Management IP Address/Hostname**. For example:
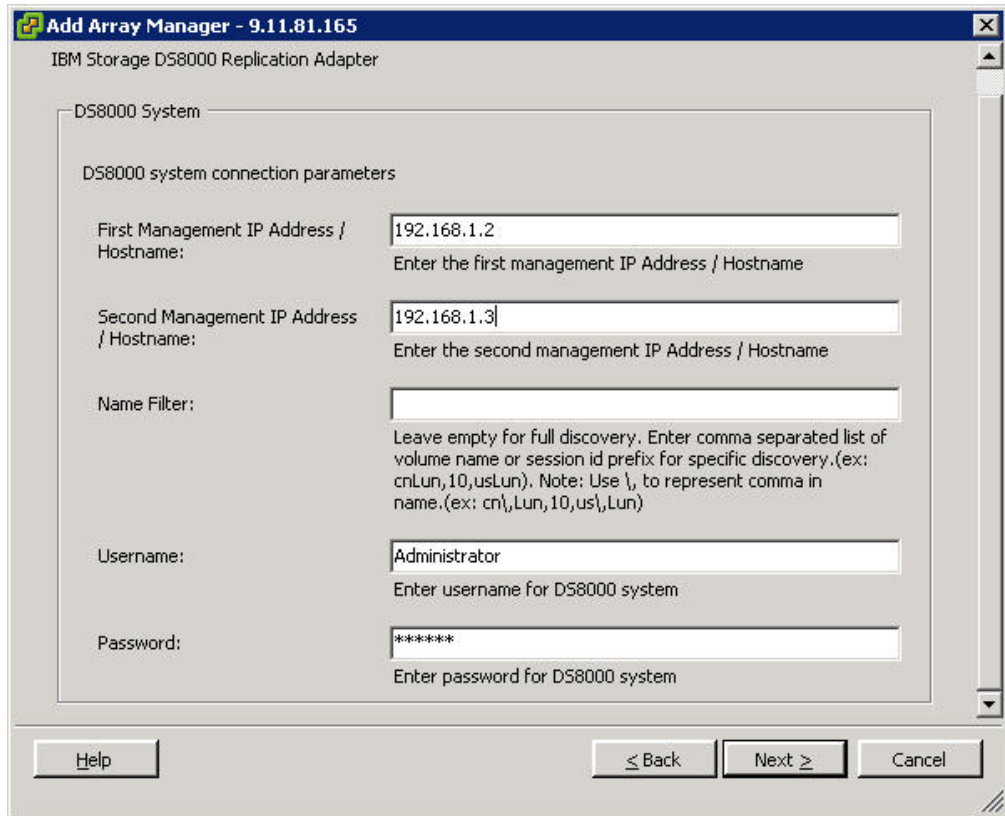
Figure 21. Adding an additional protected site to the First position with the same recovery site in the Second position

SRA Configuration for Metro-Global Mirror

SRA supports only the non-preconfigured setting for Metro-Global Mirror.

If the remote copy relationship is configured as Metro-Global Mirror, you must provide information about the intermediate DS8000 site.

Notes about Metro-Global Mirror:

- SRA does not support failover to the intermediate site.
- The initial direction is **Site A (protected site)** > **Site B (intermediate site)** > **Site C (recovery site)**. After the first reprotect procedure to the initial direction, the direction changes to Global Mirror: **Site C (protected site)** > **Site A (recovery site)**. After the second reprotect procedure, the direction returns to Metro-Global Mirror: **Site A** > **Site B** > **Site C**.

Commands to register or unregister intermediate DS8000

Use the `RegInterSite` command to register, unregister, and show help information.

Note: For SRM 5.1 and later, the SRA installation directory can be \Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000\

Register intermediate DS8000

1. In the open command-line prompt, change the current directory to an SRA installation directory. For example: C:\>cd "\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000\"

2. Issue the following example command to register the intermediate site DS8000:

   ```
   jre\bin\java.exe -cp lib\DS8K_Java_Client.jar
   RegInterSite 9.11.108.28 dsuser dspassword IBM.2107-75H0301 add
   ```

   Where *dsuser* is the username and *dspassword* is the password. The output that is returned appears similar to the following example output:

   ```
   Add 9.11.108.28 successfully. Pre-Configured is set to false.
   ```

Note: SRA supports only a non-preconfigured setting for Metro-Global Mirror. So, the command shows that "Pre-Configured" is being set to false. If you are using the preconfigured setting on the storage system, clear the setting.

Unregister intermediate DS8000

To remove intermediate site information, issue the following example command from the SRA installation directory:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegInterSite 9.11.108.28 delete
```

The output that is returned appears similar to the following example output:

```
Delete 9.11.108.28 successfully.
```

Show help information

To show the help menu, issue the following command from the SRA installation directory:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegInterSite
```

The output that is returned appears similar to the following example output:

```
Usage:
RegInterSite [HMC IP Address] [HMC username] [HMC password] [Machine Serial] add
RegInterSite delete
```

Setting up non-preconfigured environments for Metro-Global Mirror

Configure non-preconfigured environments for Metro-Global Mirroring.

Procedure

Complete the following steps to set up non-preconfigured environments for Metro-Global Mirror:

1. Click **IBMDS8KUtility** to set up SRA configurations for Metro-Global Mirror (see Figure 22 on page 30).
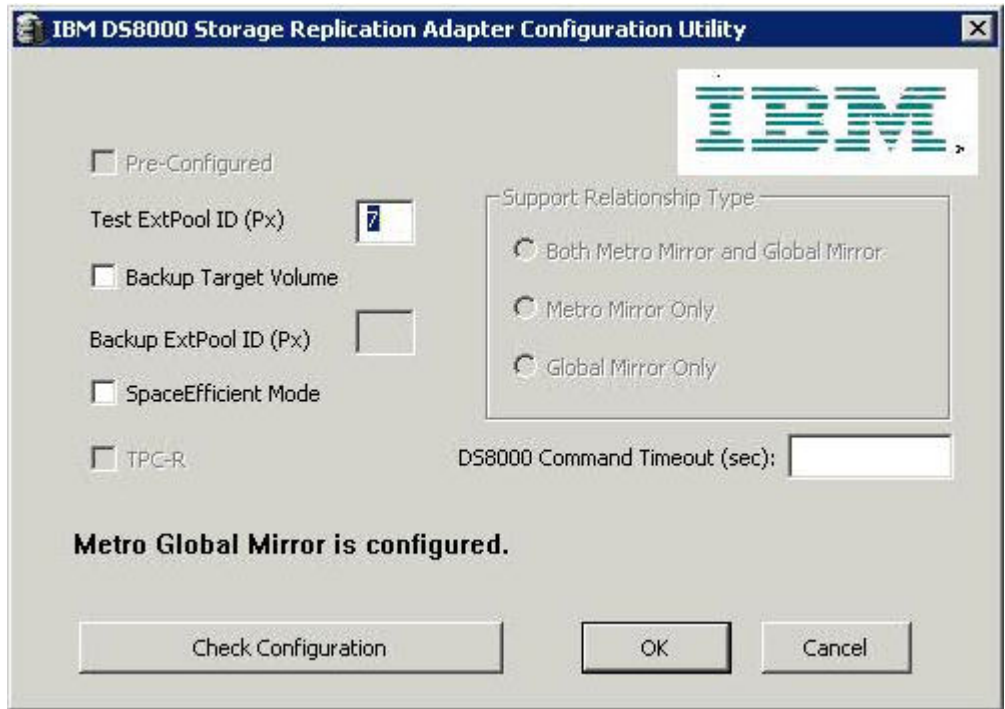
Figure 22. SRA configurations for Metro-Global Mirror

Test ExtPool ID (Px)
> Specifies which Extent Pool ID on the DS8000 site is used to create FlashCopy (target) volumes during test recovery operations. The format of input value is Px, for example, P1.

Backup Target Volume
> Instructs SRA to back up the target volume during recovery. **Backup ExtPool ID (Px)** must be set if this option is selected.

Backup ExtPool ID (Px)
> If **Backup Target Volume** is checked, this field must be set for SRA to create the FlashCopy (target) volume to back up the remote copy target volume. The format of input value is Px, for example, P1.

Space Efficient Mode
> Instructs SRA to create an SE volume when test failover or a backup target volume is specified. SRA always creates a TSE volume with this option. If the option is not checked, a standard volume is created.

2. Click **OK** to confirm the new 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 saved selections are shown.

Note:

- Metro-Global Mirror is a special configuration to Metro Mirror and Global Mirror, so you cannot select **Support Relationship Type** for this case.
- The utility detects the intermediate site setting and shows that Metro Global Mirror is configured on the GUI.
- SRA does not support **TPC-R** for Metro-Global Mirror, so it is disabled.
- If **Backup Target Volume** is checked, you must remove the FlashCopy after the copy progress completes. Otherwise, the FlashCopy causes the second test failover or failover on the same site failure because of an extra preconfigured FlashCopy in a non-preconfigured environment.
- The **DS8000 Command Timeout (sec)** option determines how long you want the process to run.

Checking the configuration

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

About this task

The SRA Check Tool reviews every remote copy that is backed up from the remote site to the recovery site. The utility reviews each selected remote copy and determines its status, which is based on the SRA-STATUS items in the SRA installation directory.

Procedure

1. Open the configuration utility by clicking the IBMSVCSRAUtil.exe shortcut on the desktop.
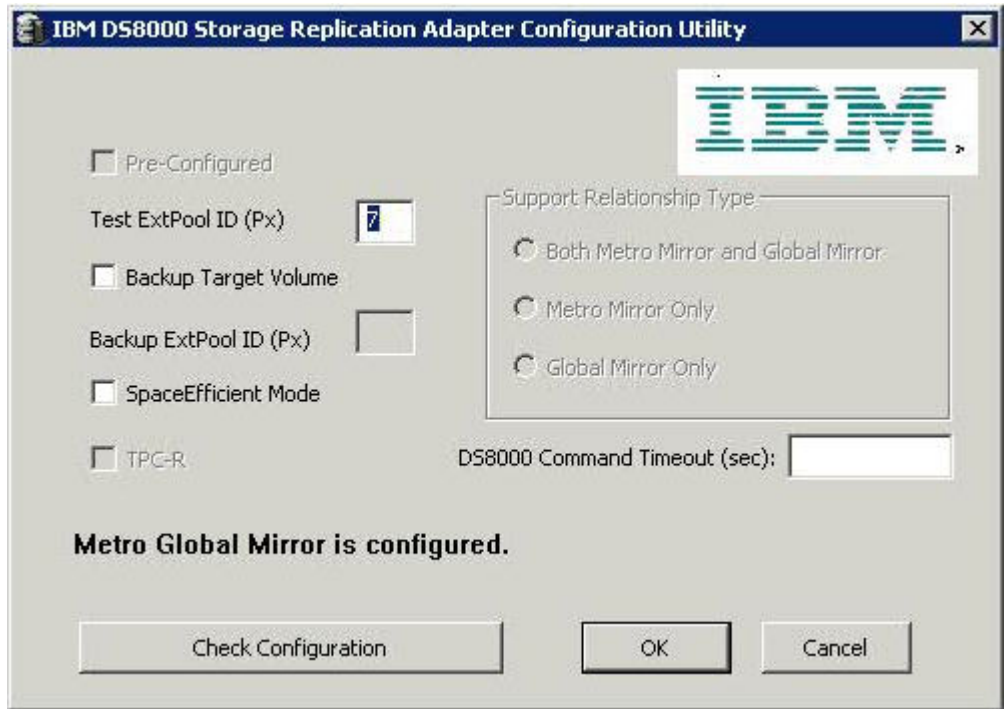
Figure 23. The DS8000 configuration utility

2. Click **Check Configuration**.
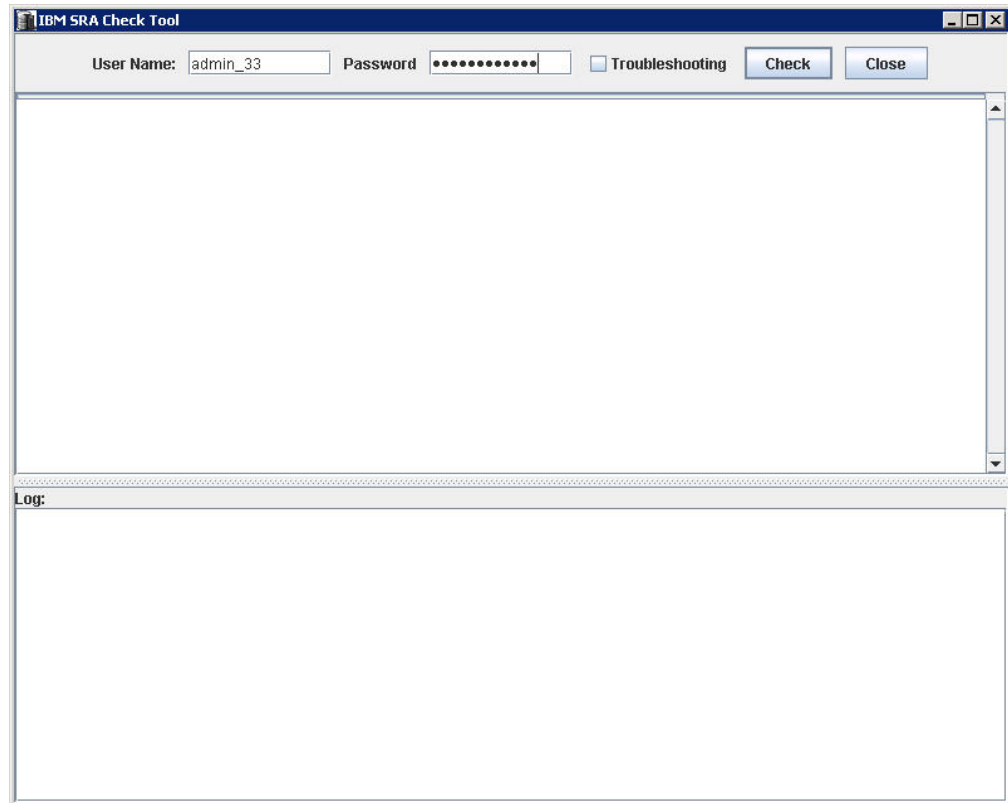3. Enter a user name and password for the local array and the peer array.

Figure 24. The Check Configuration tool configuration pane

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

Results

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

SRA Configuration for Master Subordinate DS8000s

SRA supports the Global Mirror session, which crosses DS8000s. The subordinate DS8000s must be registered into SRA. The DS8000s' information, which is entered in SRM, is "master DS8000" on the protected (primary) site and the recovery (secondary) site. The authentication information for all master and subordinate DS8000s must be the same for SRA.

Commands to register or unregister subordinate DS8000

Issue the `RegSubStorage` command from the SRA installation directory to register or unregister subordinate DS8000s.

Note: For SRM 5.1 and later, the SRA installation directory can be \Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000\

Registering local or peer subordinate DS8000s

From the SRA installation directory, issue the following command to register local subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar
RegSubStorage add local IBM.2107-75H0301/9.11.108.28
```

Issue the following command to register peer subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar
RegSubStorage add peer IBM.2107-75LH331/9.11.109.142
```

Unregistering local or peer subordinate DS8000s

From the SRA installation directory, issue the following command to unregister local subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar
RegSubStorage delete local IBM.2107-75H0301/9.11.108.28
```

Issue the following command to unregister peer subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar
RegSubStorage delete peer IBM.2107-75LH331/9.11.109.142
```

Listing all registered subordinate DS8000s

From the SRA installation directory, issue the following command to list all registered subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegSubStorage list
```

Listing local or peer registered subordinate DS8000s

From the SRA installation directory, issue the following command to list all local registered subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegSubStorage list local
```

Issue the following command to list peer registered subordinate DS8000s:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegSubStorage list peer
```

Showing help information

From the SRA installation directory, issue the following command to show help information:

```
jre\bin\java.exe -cp lib\DS8K_Java_Client.jar RegSubStorage
```

The information is delivered in the following format:

```
Usage:
RegSubStorage [list] <local | peer>
RegSubStorage [add | delete] [local | peer] [Machine Serial/HMC IP Address]
eg. Add peer subordinate storage:
RegSubStorage add peer IBM.2107-1234567/192.168.1.1
eg. delete peer subordinate storage:
RegSubStorage delete peer IBM.2107-1234567/192.168.1.1
```

Setting up preconfigured environments for Master Subordinate DS8000

If you select the **Pre-Configured** option, some configuration is needed before SRA can function properly.

Procedure

Click **IBMDS8KUtility** to set up the Master Subordinate DS8000 (see Figure 25). The subordinate storage message is displayed in the panel.
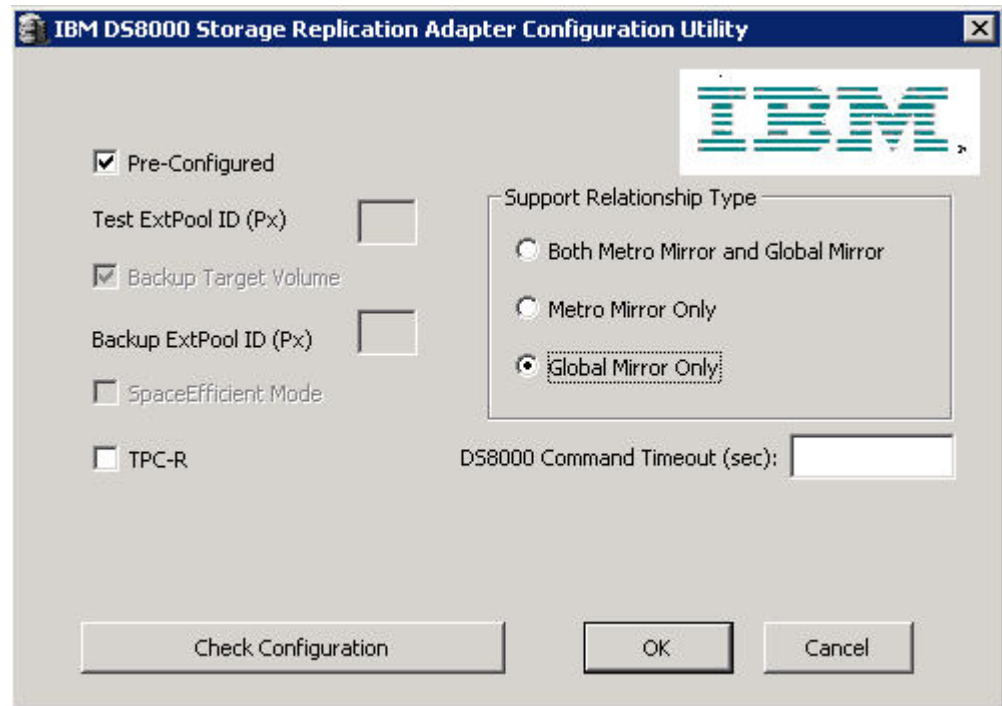

Figure 25. Subordinate storage configuration

1. Select the **Pre-Configured** option. Select **TPC-R** if you use SRA integrated with Tivoli Storage Productivity Center for Replication (TPC-R).
2. Click **OK** to confirm the new 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 saved selections are shown.

Note:
- When you select the Pre-Configured option, the **Test ExtPool ID (Px)**, **Backup Target Volume**, **Backup ExtPool ID (Px)**, and **SpaceEfficient** mode options are unavailable.
- FlashCopy (target) volumes are resynchronized during failover when the **TPC-R** option is not checked.
- Because Master Subordinate DS8000 is for Global Mirror only, you cannot select **Support Relationship Type**.
- The **DS8000 Command Timeout (sec)** option determines how long you want the process to run.

Setting up non-preconfigured environments for Master Subordinate DS8000

If the **Pre-Configured** option is not selected, some SRA settings need to be defined so that SRA can function properly.

Procedure

Click **IBMDS8KUtility** to open the IBM DS8000 SRA (see Figure 26).

1. Select the configuration settings that are appropriate for non-preconfigured environments for Master Subordinate DS8000s.
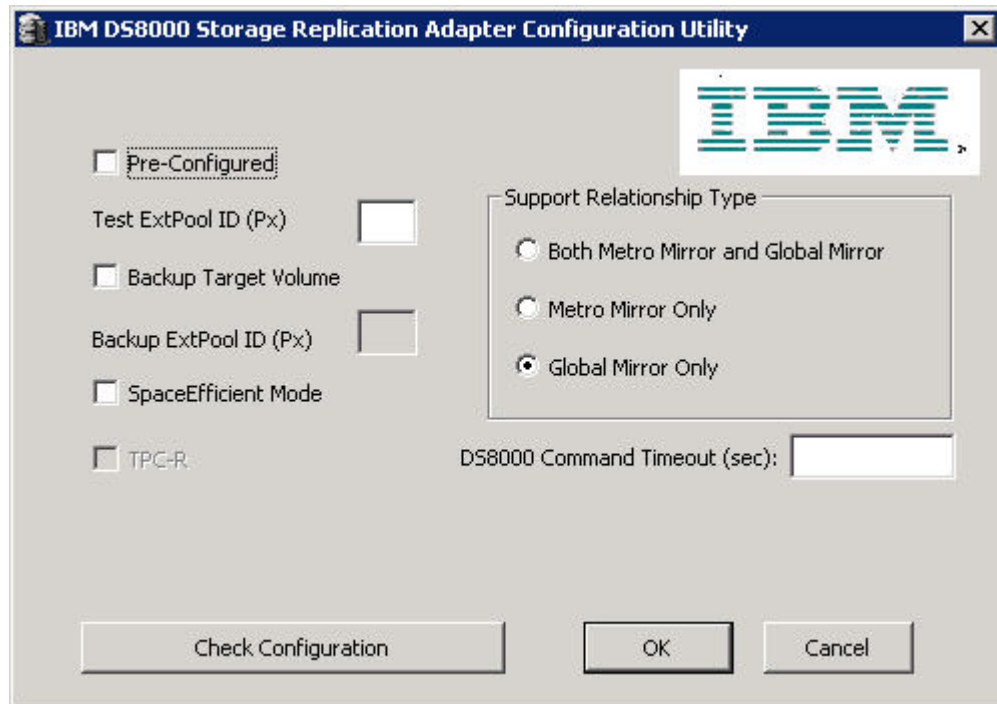

Figure 26. Subordinate storage configuration in a non-pre-configured environment

Test ExtPool ID (Px)
> Specifies which Extent Pool ID on the DS8000 site is used to create FlashCopy (target) volumes during test recovery operations. The input format is Px. For example, P1. This setting applies for all the subordinate storage. Ensure that there is enough space in the extent pool.

Backup Target Volume
> Instructs SRA to back up the target volumes during recovery. **Backup ExtPool ID (Px)** must be set if this option is selected. If this option is not selected, the **Backup ExtPool ID (Px)** option is unavailable.

Backup ExtPool ID (Px)
> If **Backup Target Volume** is selected, this field must be set for SRA to create the FlashCopy (target) volumes to back up the remote copy target volume. The input format is Px. For example, P1. This setting applies for all the subordinate storage. Ensure that there is enough space in the extent pool.

Space Efficient Mode
Instructs SRA to create an SE volume when test failover or backup target volumes is specified. SRA always creates a TSE volume with this option. If the option is not checked, a standard volume is created.

DS8000 Command Timeout (sec)
Determines how long you want the process to run.

2. Click **OK** to confirm the new 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 saved selections are shown.

Note:

- If **Backup Target Volume** is checked, you must remove the FlashCopy after the copy progress completes. Otherwise the second test failover occurs, or failover occurs on the same site failure because of an extra preconfigured FlashCopy in a non-preconfigured environment.
- If you configured both intermediate storage and subordinate storage with commands, SRA treats it as Metro-Global Mirror only.

VMware SRM/IBM DS8000 SRA and Tivoli Storage Productivity Center for Replication Coexistence

If the environment mandates that you use VMware SRM with TPC-R, configure the SRA for the pre-configured environment (by using `IBMDS8000SRAUtil.exe`).

When initiated from SRM, the test failover operation (or practice test) works independently of TPC-R. Therefore, SRA does not try to detect an existing TPC-R installation in the environment. The test failover task on SRM and practice tests on TPC-R must be scheduled and run at different times if both software works on the same Global Mirror session. If the environment is set up such that TPC-R and SRM work on different Global Mirror sessions, then the restriction does not apply.

For a real failover (recovery), if TPC-R and SRM must co-exist and work on the same Global Mirror session, then TPC-R recovery must be initiated first. After the user confirms the successful recovery of volumes by TPC-R, the SRM failover can be initiated.

The **TPC-R** option is enabled when SRA is set to **Pre-Configured**. Click the **TPC-R** check box to enable TPC-R support. A warning message box is displayed. See

Figure 27. TPC-R warning message

Note:

1. You must set TPC-R to run recovery or reprotect operations (only for Metro Mirror with TPC-R) before corresponding SRM operations; otherwise the SRA actions fail.

2. IBM TPC-R mode does not support reprotect operation for Global Mirror.

SRA can integrate with TPC-R with either two of these session types:

- Metro Mirror Failover/Failback with Practice. SRA supports recovery and reprotects. See Figure 28 on page 39 and Figure 29 on page 39.
- Global Mirror Failover/Failback with Practice. SRA supports recovery only. See Figure 30 on page 40 and Figure 31 on page 41.
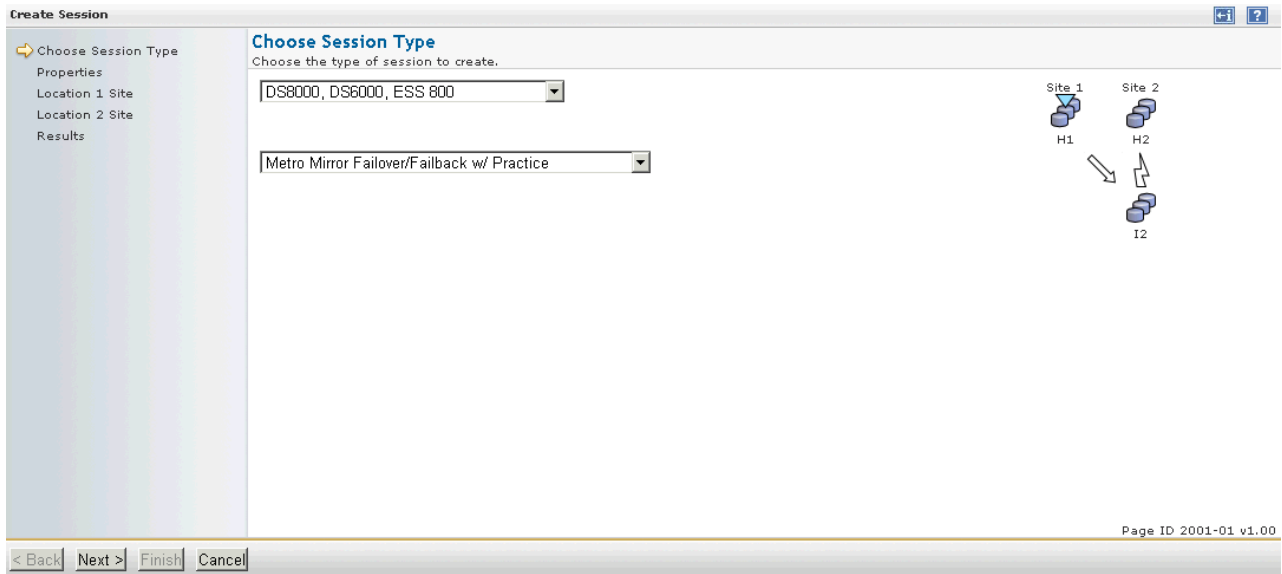
Figure 28. Metro Mirror Failover/Failback with Practice

> **Note:** For Metro Mirror Failover/Failback with Practice - persistent option, select **Persistent** for "Data Studio FlashCopy Options for Role Pair H2-I2" when you set up session properties.
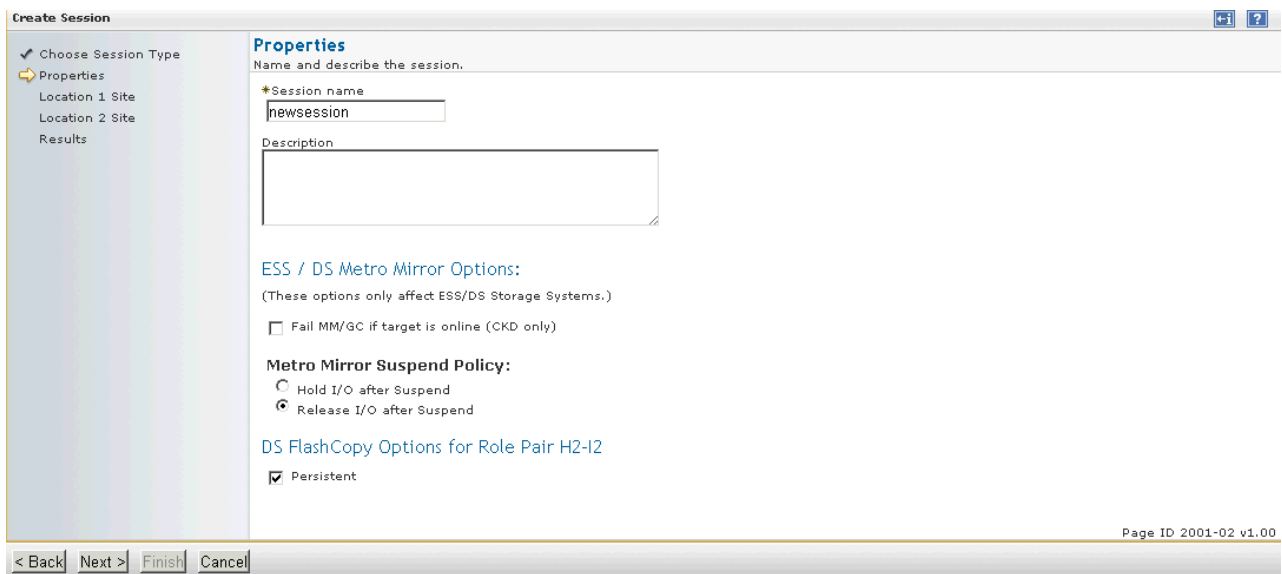

Figure 29. Metro Mirror Failover/Failback with Practice - persistent option selected
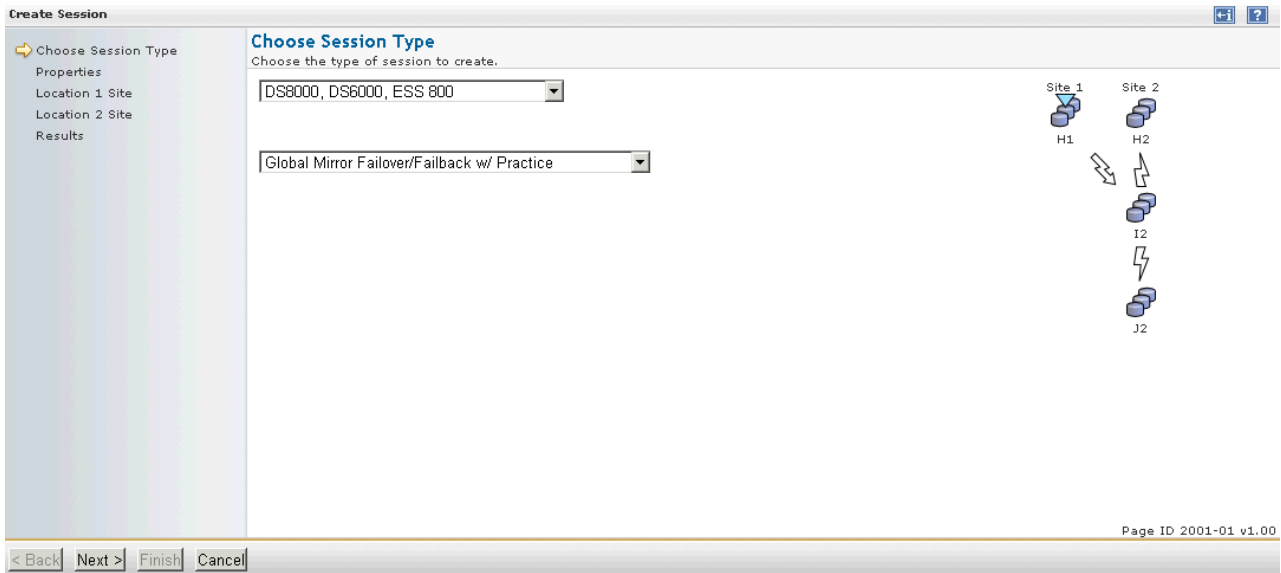
Figure 30. Global Mirror Failover/Failback with Practice

> **Note:** For Global Mirror Failover/Failback with Practice - persistent option, select **Persistent** for "Data Studio FlashCopy Options for Role Pair H2-I2" when you set up session properties.
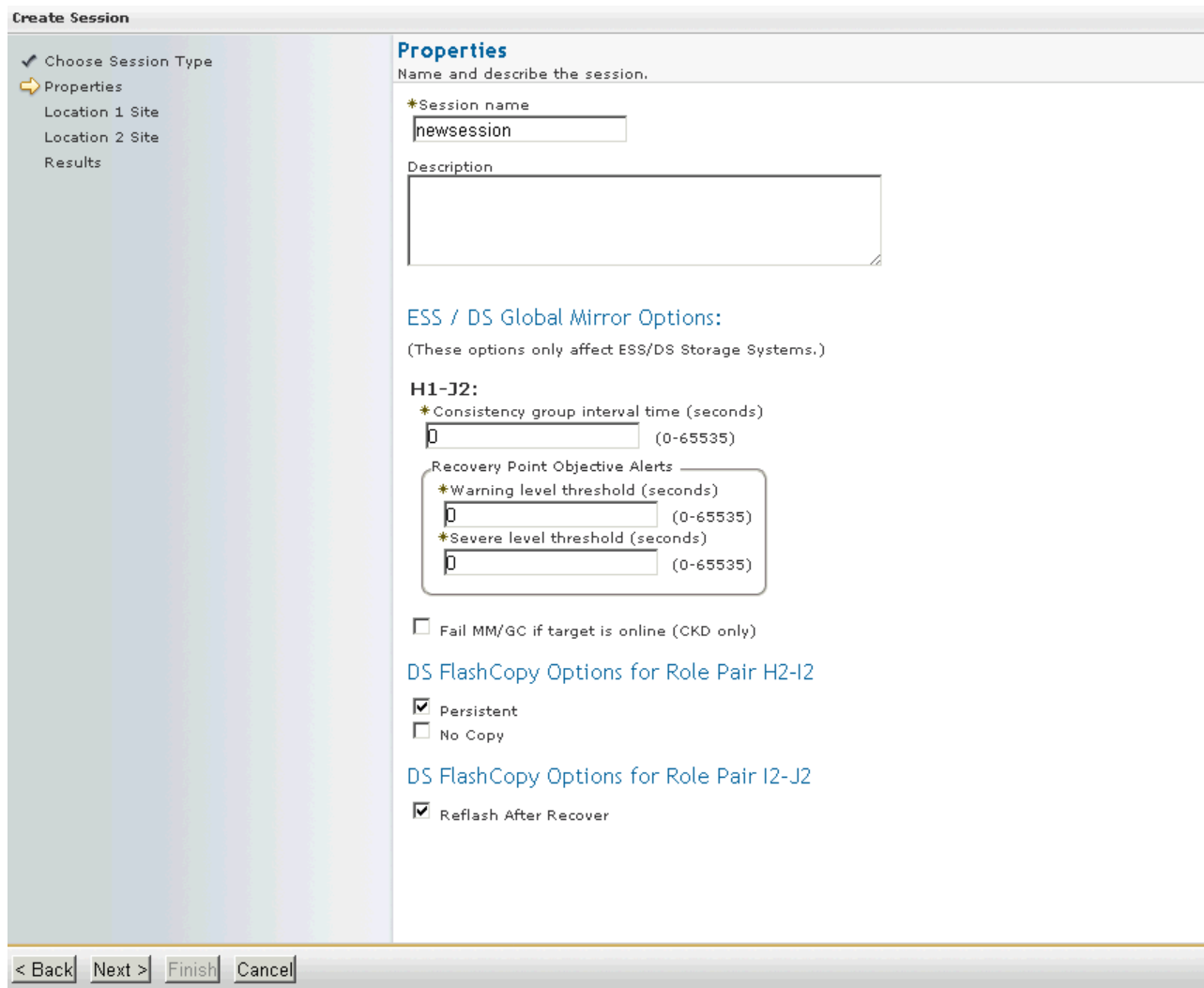
Figure 31. Global Mirror Failover/Failback with Practice - persistent option selected

Setting user privileges for SRA configurations

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

Preconfigured environment

To create the needed volumes and map them to the recovery (secondary) site's VMware ESX servers in advance requires at least **Copy Services Operator** privilege.

Non-preconfigured environment

If the **Pre-Configured** box is left cleared in the configuration utility, a Physical Operator or higher privilege is necessary for SRA to complete the following tasks:

- Create the snapshot volumes and map or unmap the volumes to the VMware ESX servers at the recovery (secondary) site.
- Run test recovery operations.

Chapter 5. Usage

Use the IBM DS8000 SRA to run dependable Disaster Recovery Planning and protect VMware sites with their DS8000-based datastores.

Creating the target volumes and Metro/Global Mirror relationships

You must create an equal number of target volumes (for Metro Mirror targets) to source volumes. You must also create an extra set of volumes for FlashCopy targets for Global Mirror setup on the recovery site DS8000, to source volumes.

Procedure

Create Metro/Global Mirror relationships between the source and target volumes. Do not map the Metro/Global Mirror target volumes to the VMware ESX servers on the recovery (secondary) site in a non-preconfigured environment. The reason is because the mapping process is automated by the SRA for failover and test failover operations. For more information about Metro Mirror/Global Mirror Copy Services, see IBM DS8000: Copy Services in Open Environments (PDF).

Important:
1. When you create Global Mirror relationships with SE volumes, use ESE as your Global Mirror target volumes, not TSE volumes.
2. Before you use the DS8000 SRA, ensure that the following configuration settings are in place:
   - The Metro Mirror relationships on the recovery site are in "Target Full Duplex" status
   - For Global Mirror relationships "First Pass" status on a protected (primary) site is "True"
   - Consistency Groups are forming at the set intervals

If SE volume is not enabled for SRA configuration, the SRA creates fully-allocated volumes during test failover operations. Fully-allocated volumes must be initialized before they can be used as FlashCopy targets. This action might take several minutes, depending on the size of the newly created volume. To accommodate the timing, the user must modify the DS8000 Command Timeout (sec) of `IBMDS8KSRAUtil.exe` or leave the parameter empty to make SRA wait until the newly created volume is ready.
You might also want to change the "storage.commandTimeout" value of VMware SRM.

Adding Array Manager to VMware Site Recovery Manager

To add arrays to the 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, except the step of logging in to vSphere Client.

Procedure

1. Log on to the VMware Virtual Center Server and go to the Home page. See Figure 32.
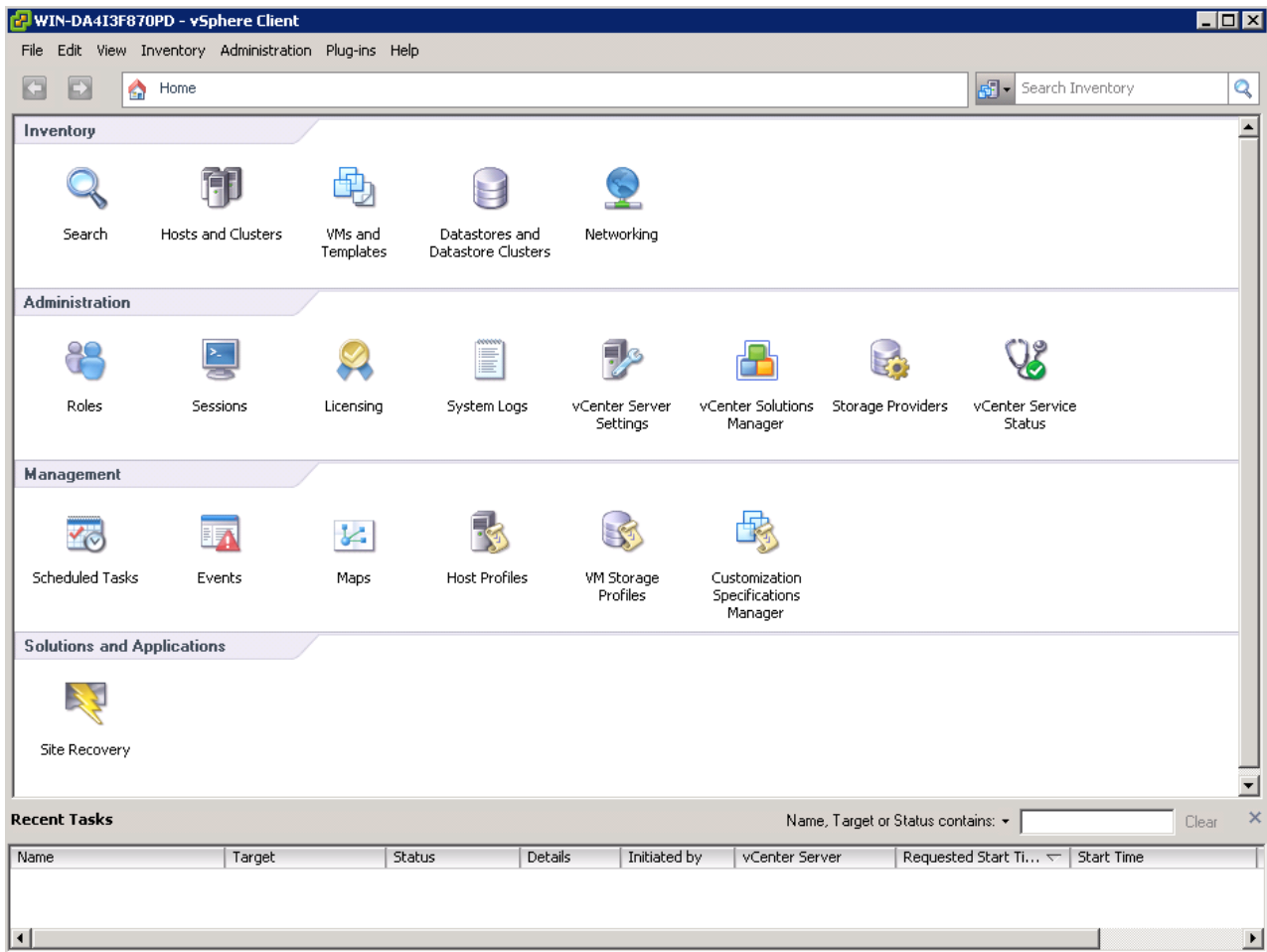

Figure 32. VMware Virtual Center Server Home page

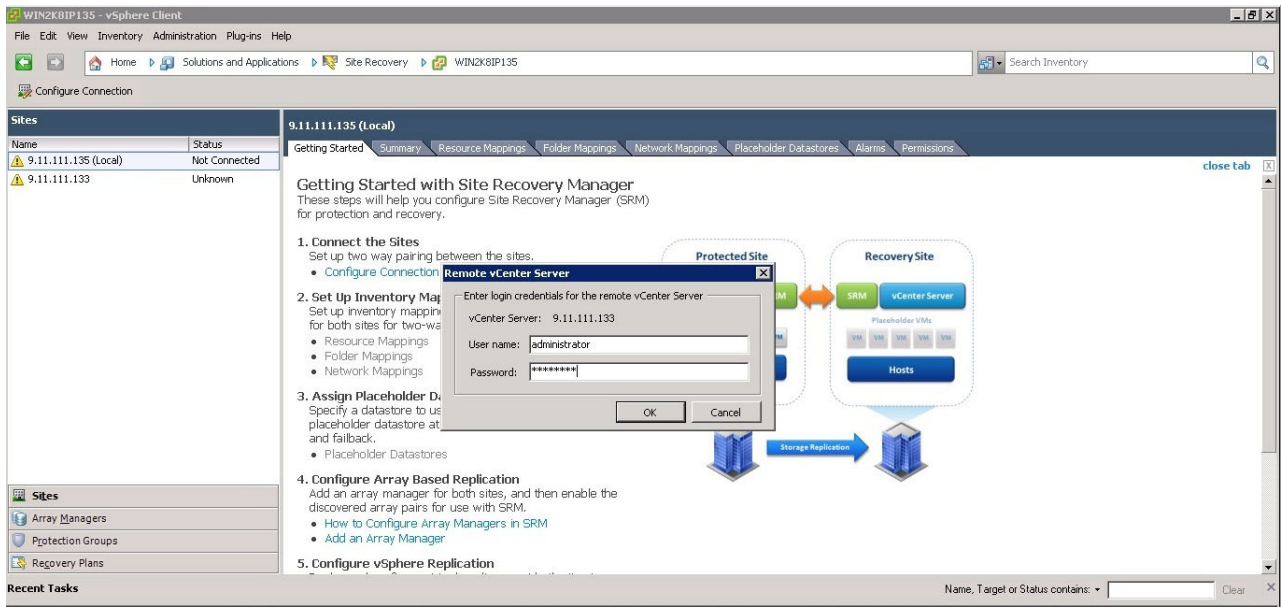2. Click **Site Recovery** on the Home window. See Figure 33 on page 45.

Figure 33. Site Recovery option on the Home window

3. Enter the Remote Virtual Center user name and password when prompted, and click **OK**. See Figure 34.
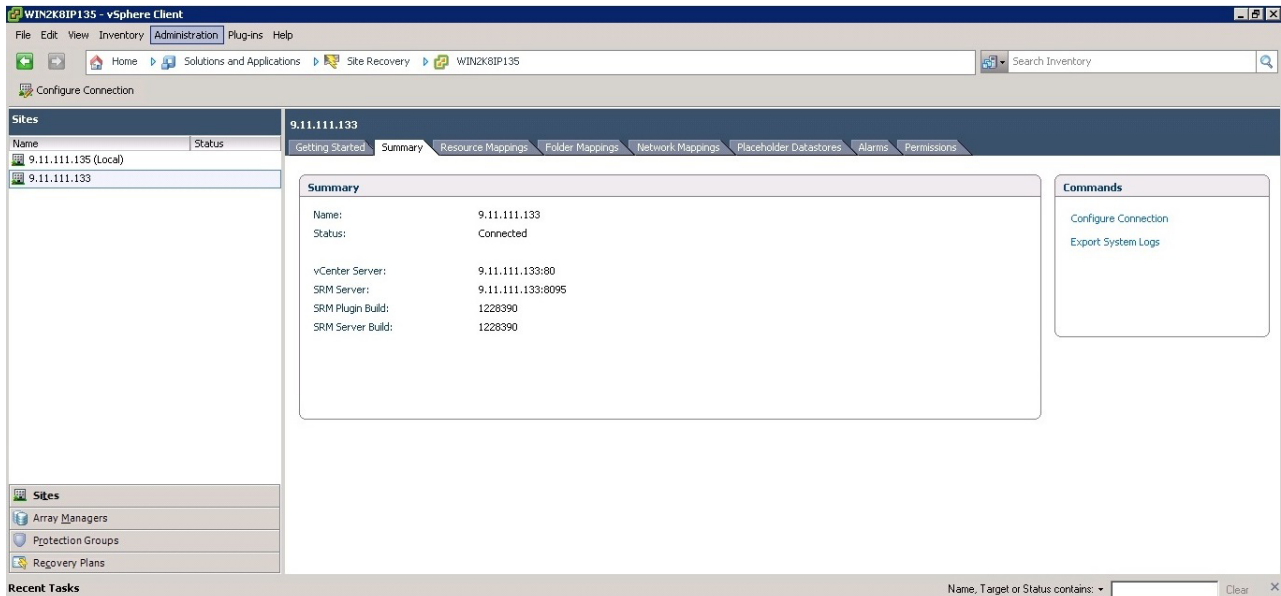

Figure 34. Entering the Remote Virtual Center user name and password

4. Ensure that the local and remote sites are connected. Select the local site and confirm the connection by clicking the **Summary** tab in the Inventory window. See Figure 35 on page 46.
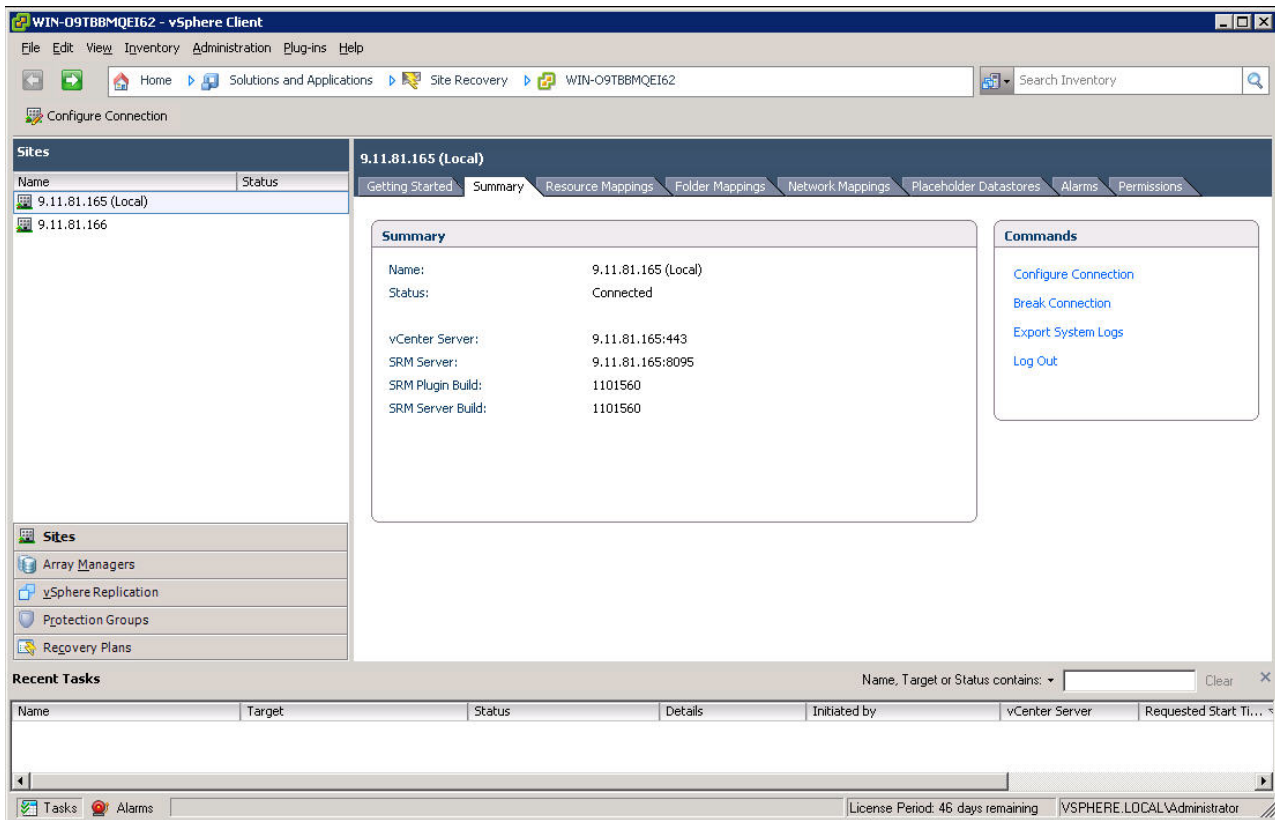
Figure 35. Summary tab in the Inventory window

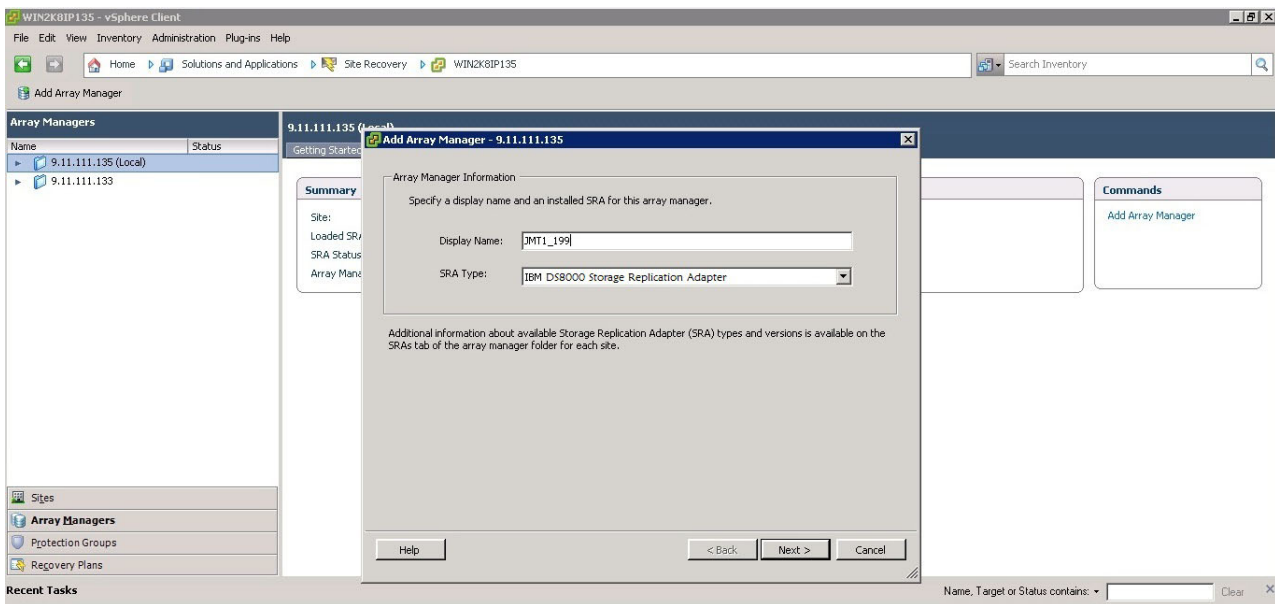5. Click the **Array Managers** option on the Inventory window and select **Summary**.

Figure 36. Array Managers option in the Inventory window

6. Select the local site on the Inventory window and click **Add Array Manager**.

7. Enter the name of the local DS8000 and select **IBM System DS8000 Adapter as SRA type**, then click **Next**.

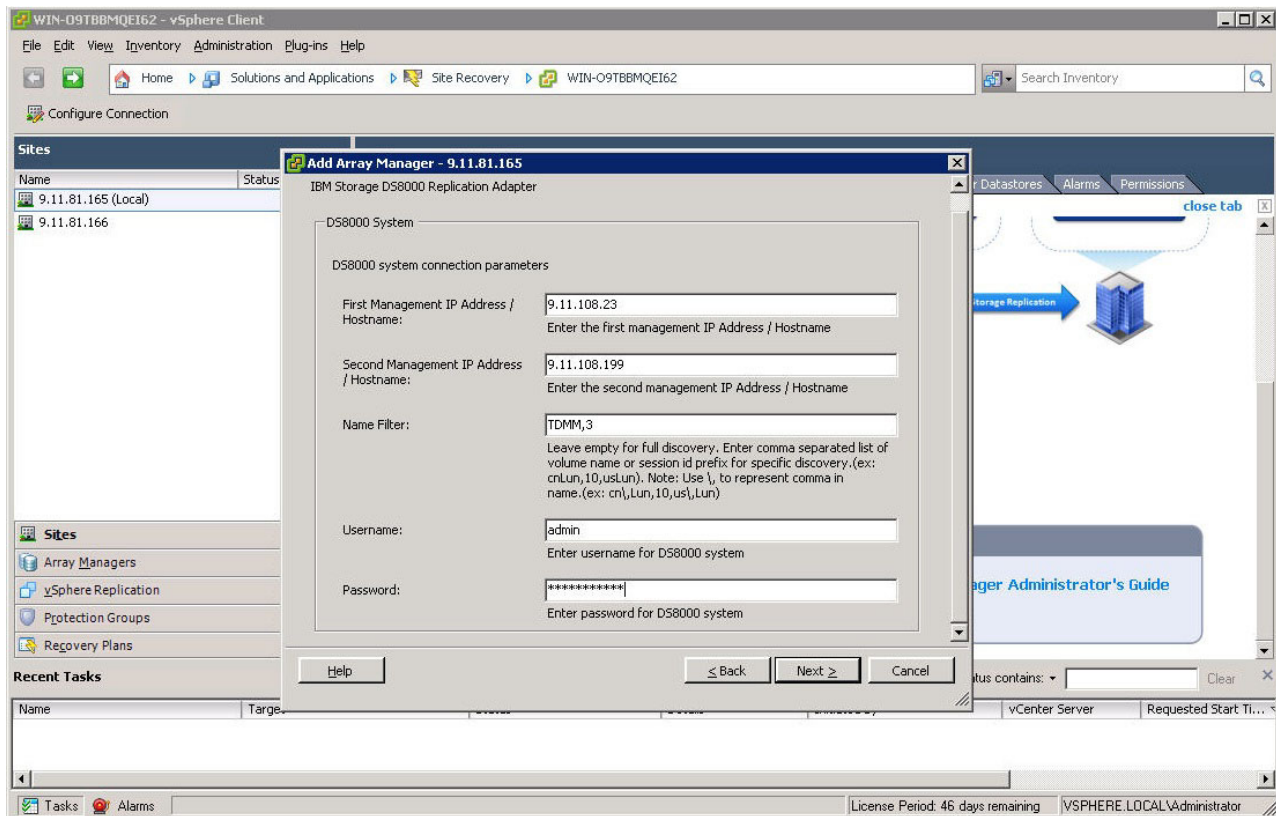8. Enter the array manager information in the Add Array Manager panel.

Figure 37. IBM System DS8000 Adapter as SRA type

First Management IP Address/Hostname

Enter the IP address of the protected (primary) site DS8000 device's Hardware Management Console (HMC). For example,

192.168.15.3

The address can either be an IP address or a fully-qualified domain name.

Second Management IP Address/Hostname

Enter the IP address of the recovery (secondary) site array's HMC. For example,

192.168.17.2

The address can either be an IP address or a fully-qualified domain name.

Note: IBM DS8000 SRA works with only one of the HMCs (in dual HMC environments).

Name Filter

Enter a comma-separated list of volume names or session ID prefixes for a specific discovery (for example, cnLun,10,usLun). Leave the parameter empty for full discovery.

Note:

- Use \ to represent the comma in the volume name or session id. For example, `cnLun\10\usLun`.
- For more information, see "Filtering volumes by name" on page 50.

> **User name**
> > Enter the user name that is configured for DS8000 device's HMC.
>
> **Password**
> > Enter the password for the DS8000 device's HMC.

Note: The user name and password for protected and recovery site DS8000 device's HMC must be the same.

9. Enter the connection information for the array.
10. Click **Next**. SRM discovers the DS8000 device at the specified IP address.
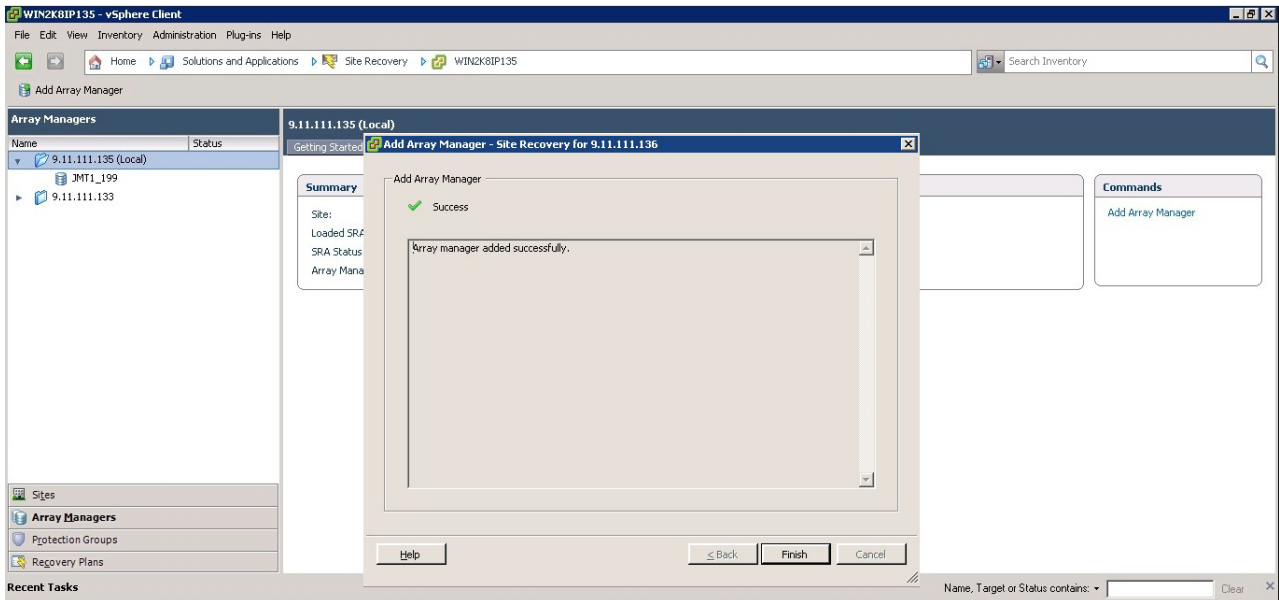11. Click **Finish**.

Figure 38. Array Manager information

12. Select the remote site on the Inventory window and click **Add Array Manager**.
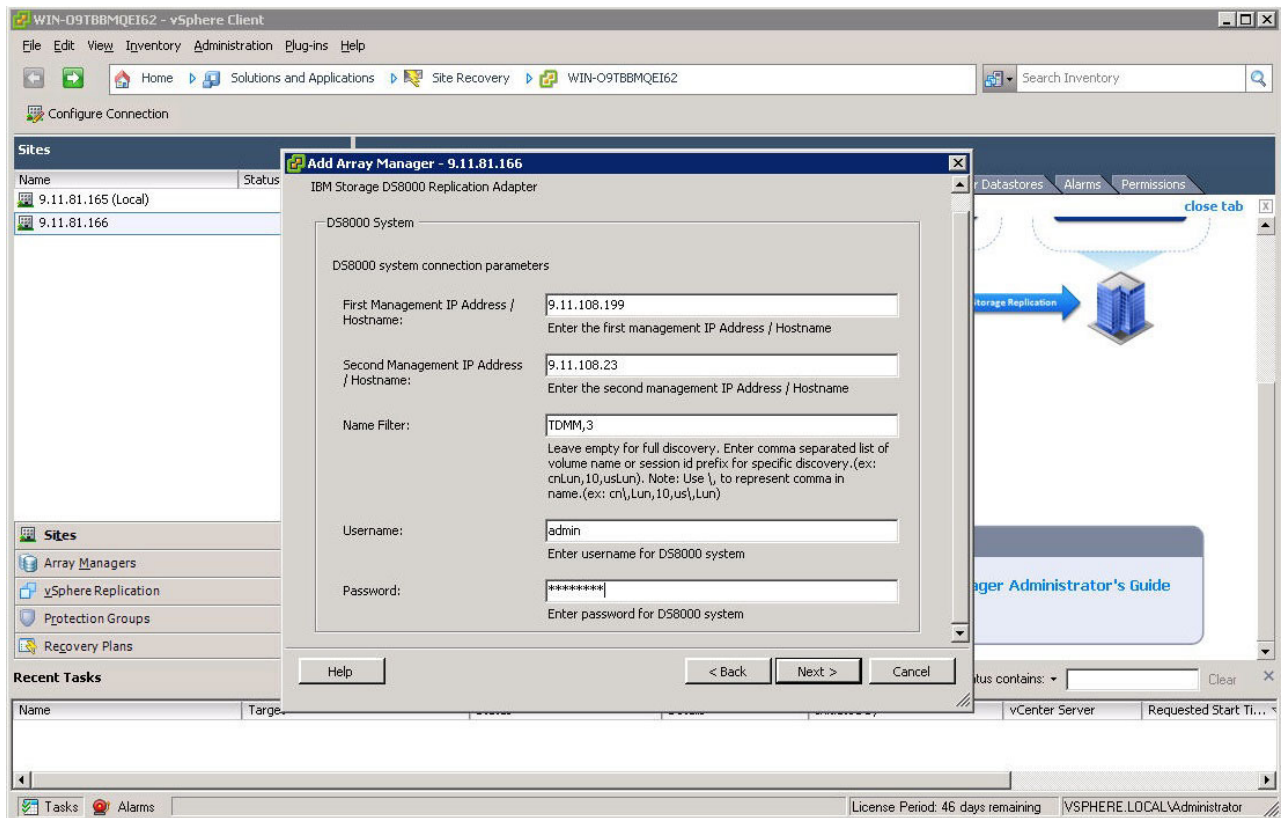
Figure 39. Add Array Manager Successfully

13. Enter the name for the remote DS8000 and click **Next**.
14. Enter the Array Manager information for the remote DS8000 on the Add Array Manager window.
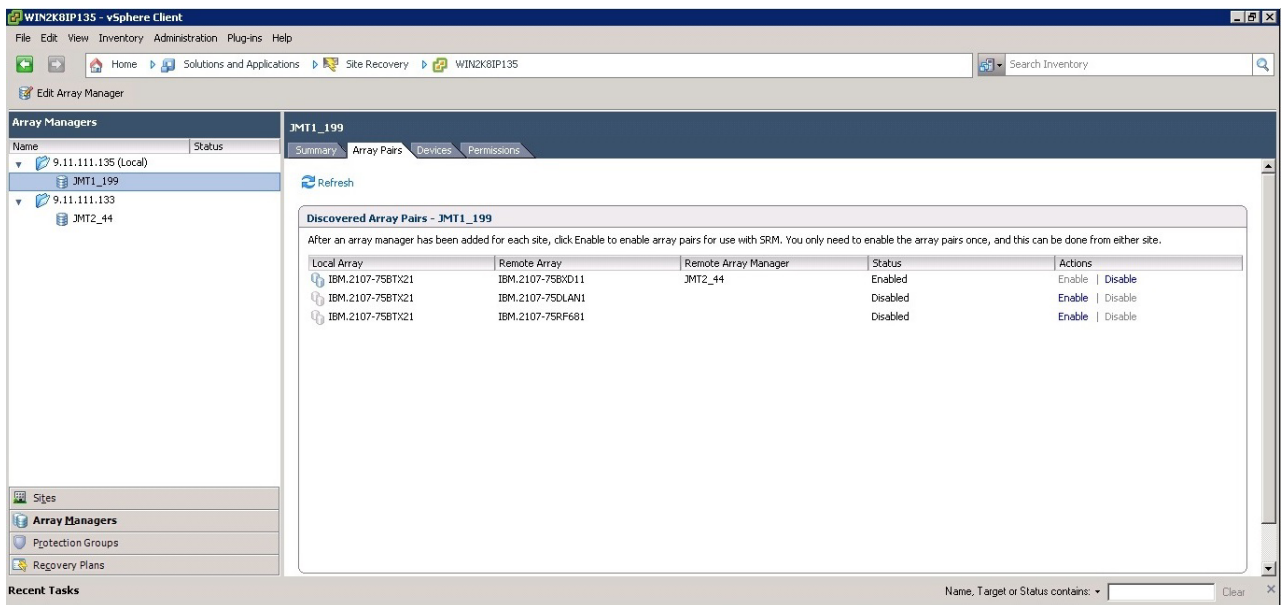

Figure 40. Array Manager information for the remote DS8000

Note: The IP address is reversed to the peer site.

15. Click **Next** to confirm the successful addition of the Array Manager.
16. Click **Finish**.
17. Select the local array on the Inventory window and select the **Array Pairs** tab.
18. Click **Enable** in the Actions column to pair the local and remote sites together. The device discovery and datastore computation process is initiated. If the pairing is successful, the Status column shows `Enabled`. The discovered devices information is available under the Devices tab. If new replicated devices must be discovered, click **Refresh**.

Important: All DS8000-replicated volumes that participate in SRM and belong to the same remote copy consistency group are shown under a single local consistency group in SRM. 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 by name

You can use the **Name Filter** parameter to provide replicated device filtering. By default, the `discoverDevices` command returns the list of all replicated devices for a pair of replicated storage arrays. This list can be long, so you might want to limit the device discovery to the subset of devices that are managed by SRM.

Note: 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.

DS8000 SRA defines one **Name Filter** parameter to specify a filter for device discovery. The parameter can be used to limit the discovery to replicated volumes or session IDs whose names begin with the specified string. The parameter filters Metro Mirror remote copies by source or target volume names and filters Global Mirror or Metro-Global Mirror remote copies by session IDs.

For full discovery, leave the parameter empty. The parameter can be a comma-separated list of the prefix of the volume name or session ID for specific discovery (Example: cnLun,10,usLun).

Note:

- Use \ to represent the comma in the volume name or session id.

  For example, cnLun\10\usLun.

- When SRA is set to **Pre-Configured** and the **TPC-R** option is enabled, check the remote copy session IDs and volume names on the DS8000 storage before you set up the **Name Filter**. It is suggested that you leave the **Name Filter** empty in the TPC-R scenario.

- Prefixes for session IDs are the same on both the protected (primary) and the recovery (secondary) site. Session ID x can be set up as 0x if x is only one character.

  For Example: Session ID 9 can be set up as 09; Session ID E can be set up as 0E.

- Prefixes for the volume name can be different for each site, but the prefixes must be paired on both sites.

  For Example: The protected site volume name is pro_volumeA and on the recovery site it is mapped to rec_volumeB. Then, in the **Name Filter** of the protected site, enter prefix pro. On the recovery site, enter rec.

Configure the **Name Filter** parameter when you are adding an array manager to the VMware Site Recovery Manager. See Figure 41 on page 52.
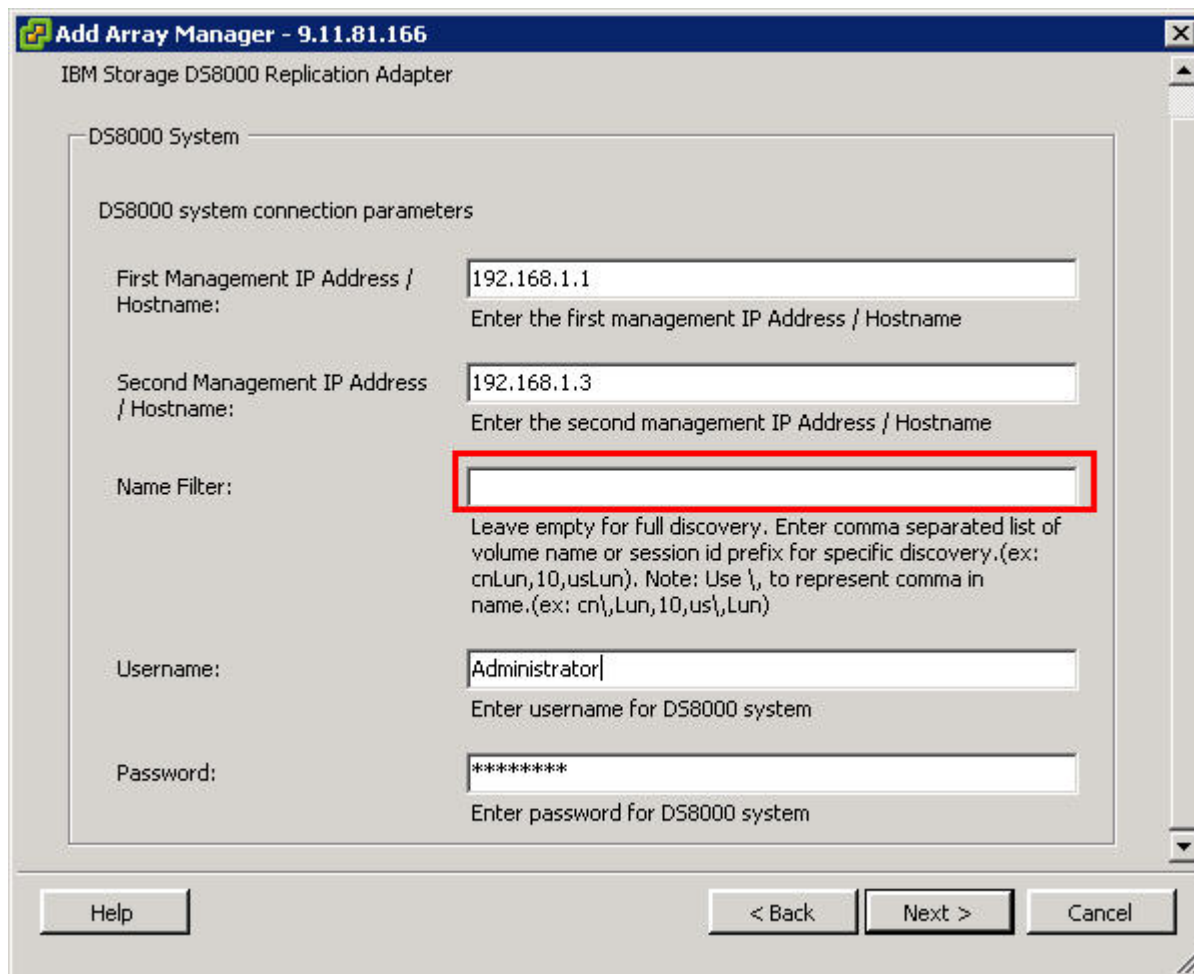
Figure 41. Configure Name Filter parameter

> **Related tasks**:
>
> "Adding Array Manager to VMware Site Recovery Manager" on page 43
> To add arrays to the VMware Site Recovery Manager, complete the following steps.

Running a Test procedure

Depending on the SRA configuration, it might be necessary to perform extra tasks for the Test procedure to work.

Attention: If you encounter a failure during the Test procedure, check to see if the remote copy status is the same as the original state. If NOT, manually restore the remote copy status back to its original state after cleanup procedures.

For troubleshooting information, see "Test failures" on page 56.

Running the Test procedure on a preconfigured environment

The IBM DS8000 SRA completely automates the Test procedure.

The preconfigured FlashCopy target volumes are resynchronized during the test procedure.

Ensure that all of the steps that are outlined in "Setting up preconfigured environments for DS8000 Remote Copy for SRA" on page 18 are completed.

Running the Test procedure on a non-preconfigured environment

The IBM DS8000 SRA completely automates the Test procedure.

During this procedure, the SRA creates SE FlashCopy target volumes if the SE volume support feature is enabled and SE storage is defined on the storage array is specified. If the recovery site DS8000 does not have SE support that is enabled, the SRA creates fully-allocated volumes for test failover operations. The only prerequisite that this procedure needs, from the SRA's perspective, is enough free capacity available in one of the extent pools to accommodate the FlashCopy target volumes.

During the cleanup procedure, the FlashCopy relationships and FlashCopy target volumes that are created during the test procedure are deleted.

Prerequisites for the SRA Test procedure
- Have enough free space available on the Extent Pool.
- Complete all the steps that are outlined in "Setting up non-preconfigured environments for DS8000 Remote Copy for SRA" on page 20.

Running a Reprotect procedure

The IBM DS8000 SRA completely automates the Reprotect procedure.

Before you run the **Reprotect** action, refresh the Devices window of the SRM Array Managers to ensure that no error messages occur.

During the **Reprotect** procedure, the Metro/Global Mirror/Metro-Global Mirror direction changes from the original recovery (secondary) site to the original protected (primary) site, and the mirroring action is resumed.

Note:
- Original protected volumes are detached from the host during the Reprotect procedure for non-preconfigured scenarios.
- For Metro-Global Mirror, the initial direction is **Site A (protected site)** > **Site B (intermediate site)** > **Site C (recovery site)**. After the first reprotect procedure to initial direction, the direction is changed to Global Mirror: **Site C (protected site)** > **Site A (recovery site)**. After the second Reprotect procedure, the direction will be changed back to Metro-Global Mirror: **Site A** > **Site B** > **Site C**.

Prerequisites for the SRA reprotect procedure
- For non-preconfigured Global Mirror/Metro-Global Mirror, ensure that there is enough free space available on the Extent Pool of the original remote copy source volume.
- For preconfigured environments, complete all the steps that are outlined in "Setting up preconfigured environments for DS8000 Remote Copy for SRA" on page 18.

- For non-preconfigured environments, complete all the steps that are outlined in "Setting up non-preconfigured environments for DS8000 Remote Copy for SRA" on page 20.

Running a failover procedure

The IBM DS8000 SRA completely automates the failover procedure.

DS8000 SRA does a failover of the Metro/Global Mirror/Metro-Global Mirror target volumes to the recovery (secondary) site during a failover operation. The Metro/Global Mirror/Metro-Global Mirror target volumes are promoted to the VMware ESX Server as production volumes.

During an SRA preconfigured failover procedure, the preconfigured FlashCopy is resynchronized.

Prerequisites for the SRA Failover procedure
- For preconfigured environments, complete all the steps that are outlined in "Setting up preconfigured environments for DS8000 Remote Copy for SRA" on page 18.
- For non-preconfigured environments, complete all the steps that are outlined in "Setting up non-preconfigured environments for DS8000 Remote Copy for SRA" on page 20.

Chapter 6. Troubleshooting

When an error occurs, check the status of the DS8000s, ESX servers, vCenter servers, and SANs.

DiscoverArrays failures

Verify the following items when you encounter failure during Array Manager operations.

- Check that the IP address is correct and in the correct format. For example, the format can resemble: 192.168.15.3
- Check that the user name and password are correct
- Check to see whether the DS8000s are paired

Example:

Symptom: Unable to update array manager. See Figure 42.

Figure 42. Unable to update array manager.

Possible root cause and solution: The IP address, user name, or password is incorrect. Check and correct the IP address, user name, or password.

DiscoverDevices failures

Verify the following items when you encounter failure during Devices for Enabled Array Pairs operation.

- Ensure that the Metro Mirror relationships' status on the recovery (secondary) site are "Target Full Duplex."
- Ensure that Global Mirror relationships' "First Pass" status is "True" on the protected (primary) site and consistency groups are forming at the set intervals.
- Ensure that no volume status items are in the SRA-STAUS file on both the protected and the recovery site for initial state or after you restore a remote mirror environment because of test failover, failover, or reprotect failure.

- Ensure that the **Name Filter** configuration is paired on both the protected and the recovery site.

Note:

- The `SRA-STAUS` file is in the SRA installation directory. For example, `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000\lib`

- The content format of volume status' item in the `SRA-STAUS` file: `[SourceVolumeId:]Target VolumeId@CopyType[@SessionId]:VOLUMESTATUS=VolumeStatus[@SessionId]`

Example:

Symptom: Device 'xxx' cannot be matched to a remote peer device.

Figure 43. Device cannot be matched to a remote peer device warning

Possible root cause and solution:
- IP addresses are not correct. Check the IP addresses of DS8000 on both sites and correct if wrong.
- The information that is recorded in the `SRA-STAUS` file is inconsistent with the DS8000 remote copy status.
- **Name Filter** configuration is not paired on the protected and the recovery site. Check the **Name Filter** configuration on both sites. Correct the configuration in the Array Manager and refresh the devices.

Remove incorrect device information in the `SRA-STAUS` file and restore the remote copy relationship on DS8000.

Test failures

Verify the following items when you encounter a failure during test operations:
- The user name and password for both the protected (primary) and the recovery (secondary) site DS8000 device's HMC are the same.
- Preconfigured/non-preconfigured is switched without rescanning SRA in SRM on both the protected and the recovery site.
- Make sure that you do not use TSE as the Global Mirror target volumes.

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

- DS8000 user privilege problem, "administrator" required.
- Not enough space in the extent pool.
- No preconfigured flash copies to remote-copy target volumes on the recovery site.

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

- Preconfigured FlashCopy were not created to remote-copy target volumes on the recovery site.
- More than one preconfigured FlashCopy was created.
- The FlashCopy target volume is not mapped to the host.
- The FlashCopy target volumes that are mapped to the host are shown as Mounted in Hosts and Clusters/Configuration/Storage/Devices.

Recovery failures

Verify the following items when you encounter problems during recovery operations.

- The user name and password for both the protected (primary) and the recovery (secondary) site DS8000 device's HMC are the same.
- Preconfigured/non-preconfigured is switched without rescanning SRA in SRM on both the protected and the recovery site.

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

- DS8000 user privilege problem, "administrator" required.
- No preconfigured flash copies to remote-copy target volumes are on the recovery site.
- Make sure that you do not use TSE as the Global Mirror target volumes.
- After disaster recovery, you must 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 in place before reprotecting the plan.

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

- Preconfigured FlashCopy is not created to remote-copy target volumes on the recovery site.
- More than one preconfigured FlashCopy was created.
- Make sure that you do not use TSE as Global Mirror target volumes.
- Remote-copy target volume is not mapped to the recovery site.

"VMFS volume cannot be found" failures

Verify the following items when you encounter "VMFS volume cannot be found" failure during test or recovery operations.

- For environments that are preconfigured, ensure that the pre-created backup target volumes are pre-mapped to the VMware ESX servers at the recovery site.

- For environments that are not preconfigured, ensure that backup target volumes are mapped to the VMware ESX servers successfully at the recovery (secondary) site.

Example:

Symptom: VMFS volume that is on recovered devices "xxx" and expected to be auto-mounted during HBA rescan cannot be found. Figure 44 shows an example error message of a VMFS volume that is on the recovered devices and expected to be auto-mounted during HBA rescan, but cannot be found.
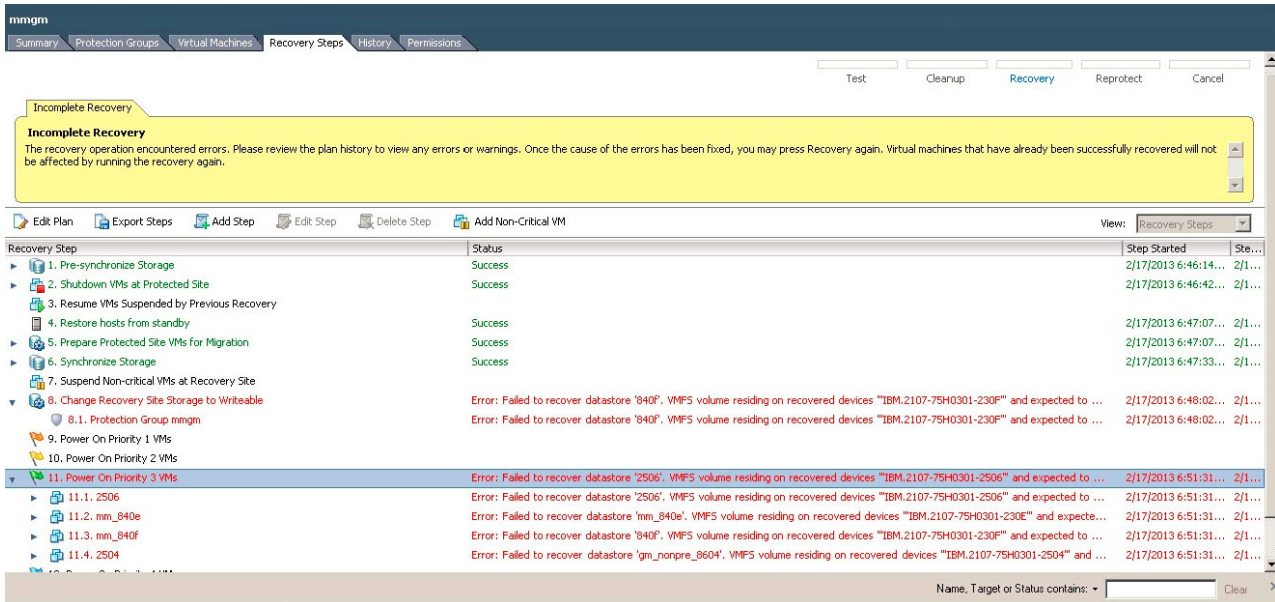

Figure 44. Incomplete Recovery

Possible causes and solutions:
- The backup target volumes are not mapped to the VMware ESX servers.
  - For environments that are preconfigured, check whether pre-created backup target volumes are pre-mapped to the VMware ESX servers at the recovery site.
  - For environments that are not preconfigured, check and correct host connections of the recovery site DS8000.
- Some extra time is required to be auto-mounted. Increase the value of parameter `WaitExtraSeconds` in Windows Registry `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\IBM Corporation\IBM DS8000 Storage Replication Adapter`. This parameter makes DS8000 SRA wait extra time before it responds to SRM.

Note: You might also need to increase the `storage.commandTimeout` value of VMware SRM appropriately.

Reprotect failures

Verify the following items when you encounter failure during Reprotect operations:
- The user name and password for both the protected (primary) and the recovery (secondary) site DS8000 device's HMC are the same.

- Preconfigured/non-preconfigured is switched without rescanning SRA in SRM on both the protected and the recovery site.

For environments that are not preconfigured, ensure that the following are checked or corrected:
- For Global Mirror/Metro-Global Mirror, not enough space is in the extent pool of the original remote-copy source volume to create Global Mirror FlashCopy.
- For Global Mirror/Metro-Global Mirror, make sure that no session or Global Mirror exists on the LSS of the original remote mirror target volume for the initial state.
- For Metro-Global Mirror, make sure that no session or Global Mirror exists on the LSS of the original Metro Mirror source volume for the initial state.

For environments that are preconfigured, ensure that the following are checked or corrected:
- For Global Mirror/Metro-Global Mirror, make sure that no session or Global Mirror exists on the LSS of the remote mirror target volume for the initial state.
- For Metro-Global Mirror, make sure that no session or Global Mirror exists on the LSS of the original Metro Mirror source volume for the initial state.

Managing SRM procedures

Verify the following items when you encounter failure during SRM procedures.

1. Refresh the devices in the SRM array managers. If there are no errors, go to step 3.
2. Check all the previously related SRA-STATUS volume status' items in the SRA installation directory. For example, `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\IBM DS8000\lib`

   Note: The following example output shows the content format of the volume status item in the SRA-STAUS file:

   ```
   [SourceVolumeId:]Target VolumeId@CopyType
   [@SessionId]:VOLUMESTATUS=VolumeStatus[@SessionId]
   ```

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

Troubleshooting remote copies with the SRA Check Tool

You can troubleshoot problems with remote copies from within the configuration utility tool.

About this task

The SRA Check Tool reviews every remote copy that is included in the most recent SRM operation.

Procedure

1. Open the configuration utility tool by clicking the IBMSVCSRAUtil.exe shortcut on the desktop.
2. Click **Check**.

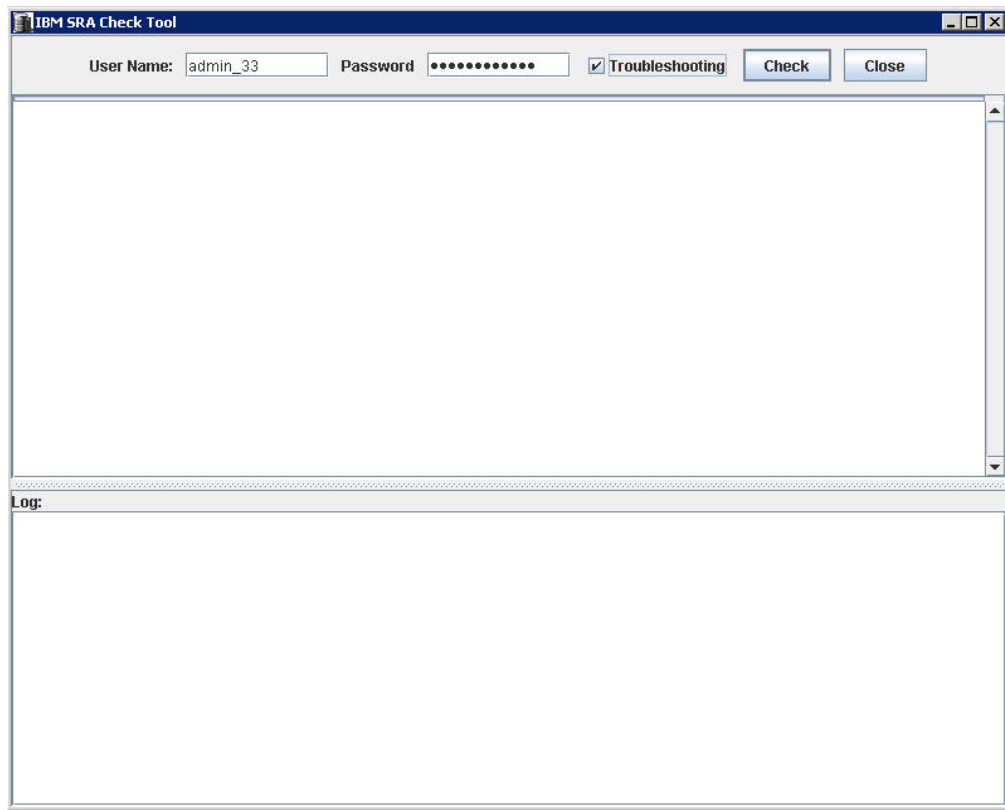3. Enter a user name and password for the local and the peer array.

Figure 45. The SRA Check Tool Troubleshooting setting

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**.

Results

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

Managing datastores and consistency groups

Follow these guidelines while you are working with 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 SRM.
* Set appropriate timeout and rescan values in the SRM for recovery of many VMs.

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.

See "Getting information, help, and service" on page viii.

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