

IBM System Storage IBM DS8000

Storage Replication Adapter for VMware SRM Installation and Users Guide

Version 1.1

About this guide

The IBM System Storage DS8000 Storage Replication Adapter for VMware SRM Installation and Users Guide provides information that helps you install and configure Storage Replication Adapter.

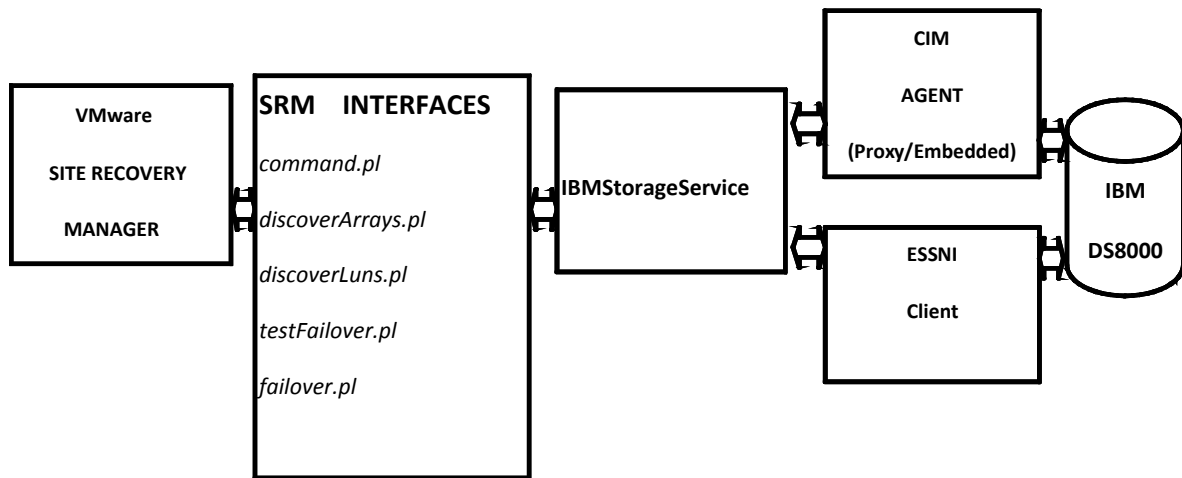
Who should use this guide

The IBM System Storage DS8000 Storage Replication Adapter for VMware SRM Installation and Users guide is intended for system administrators or others who install and use the VMware Site Recovery Manager with IBM System Storage DS8000. Before installing and using the Storage Replication Adapter for DS8000, you should have an understanding of storage area networks (SANs), DS8000 Metro Mirror Copy Services and the capabilities of your storage units. For more information on how to use Metro Mirror Copy Services, refer to IBM System Storage DS8000 Administration guide that can be downloaded from <http://www.ibm.com>.

Contents

Functional Block Diagram.....	4
System requirements for the IBM System Storage DS8000 Storage Replication Adapter software...	5
Installing the IBM System Storage DS8000 Storage Replication Adapter software.....	6
Creating the Target Volumes and Metro/Global Mirror Relationships.....	10
Uninstalling IBM System Storage DS8000 Storage Replication Adapter Software.....	11
Adding Array Managers to VMware Site Recovery Manager.....	11
TestFailover Procedure.....	16
Failover Procedure.....	17
Failback Procedure.....	17
Managing Failback.....	17
Failback Scenario.....	17
To manually execute a failback scenario.....	18
IBM DS8000 SRA and IBM TPC-R Coexistence.....	20

Functional Block Diagram



Installation overview

The steps for implementing the IBM System Storage DS8000 Storage Replication Adapter for VMware SRM software must be completed in the correct sequence. Before you begin, you must have experience with or knowledge of administering an IBM DS8000.

Complete the following tasks:

1. Verify that the system requirements are met.
2. Install DS8000 HMC (Management Console), if not already installed.
3. Install the DS Open API (CIM Agents) one for the protected site and one for the recovery site DS8000, if they are not already installed.

Important: Make sure you create the same Username and Passwords as the ones created on the HMC installed in Step2 for both protected and recovery sites.

4. Install the IBM System Storage DS8000 Replication Adapter software.
5. Verify the installation.
6. Create appropriate sized target set volumes on the recovery site DS8000 and create Metro/Global Mirror relationships between the source volumes at the protected site

and target volumes at the recovery site. For more information on Metro/Global Mirror Copy Services refer to IBM System Storage DS8000: Copy Services in Open Environments (<http://www.redbooks.ibm.com/redbooks/pdfs/sg246788.pdf>).

Note: For more information on how to install DS Open API (CIM Agent) refer to DS Open API Installation and Configuration Guide.

System requirements for the IBM System Storage DS8000 Storage Replication Adapter software

Ensure that your system satisfies the following requirements before you install the IBM System Storage™ DS8000 Storage Replication Adapter for VMware SRM software on a Windows Server 2003 operating system.

The following software is required:

1. DS Open API (CIM Agent) software version 5.3.0 or later installed on the IBM System Storage Productivity Center or other supported environments.

Note: If the DS8000 storage is running firmware v2.4 or later, the SRA can connect to the embedded CIMOM running on the HMC.
2. DS8000 with Microcode version 2.4 or later installed with the Metro/Global Mirror and FlashCopy features enabled.
3. If the user wants SRA to use SE volumes during test failover operations, Space Efficient volume feature must be enabled on the DS8000
4. IBM System Storage DS8000 Storage Replication Adapter software version 1.1.
5. VMware vSphere Virtual Center Server v4.0 or later with Site Recovery Manager 4.0 or later Plug-in must be installed before you install the DS8000 Storage Replication Adapter.

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

Installing the IBM System Storage DS8000 Storage Replication Adapter software

This section includes the steps to install the IBM System Storage DS8000 Storage Replication Adapter for VMware SRM software.

You must satisfy all of the prerequisites that are listed in the system requirements section before starting the installation. Perform the following steps to install the IBM System Storage DS8000 Storage Replication Adapter for VMware SRM software on the Windows server.

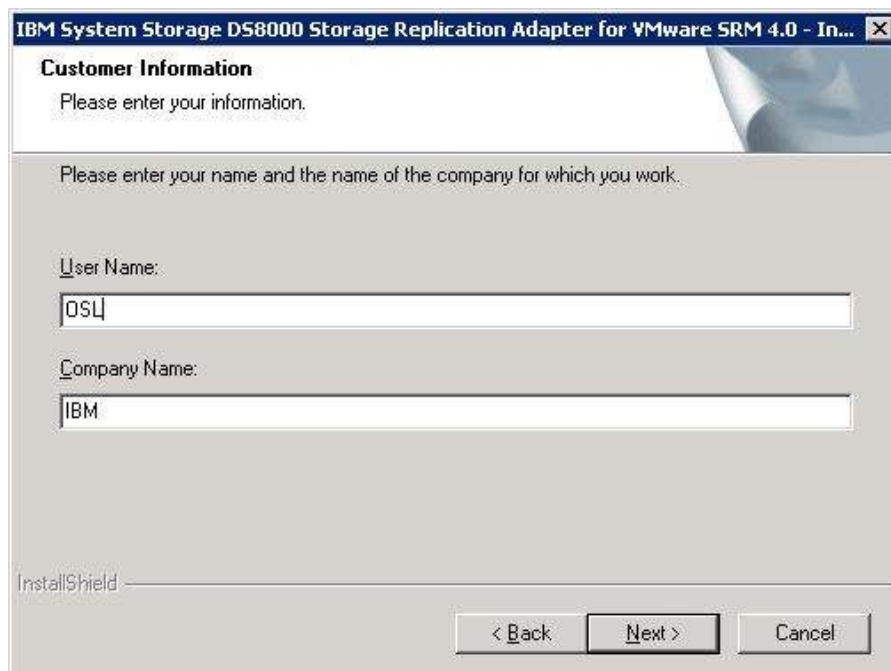
1. Log on to Windows Server where VMware Virtual Center Server and Storage Replication Manager are installed, as an administrator.
2. Double click on IBMD8KSRA.exe that you downloaded to start the installation process.



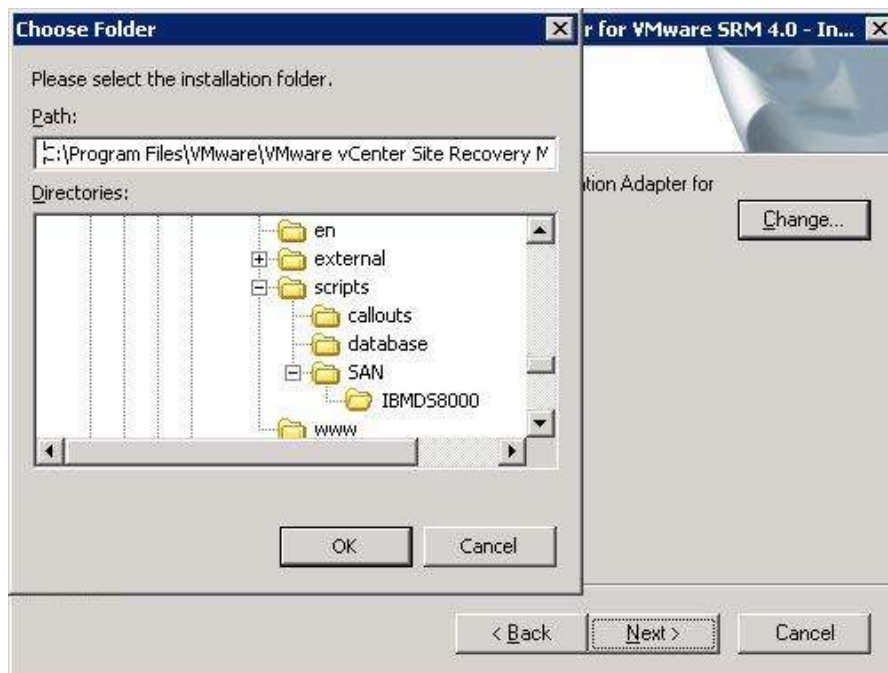
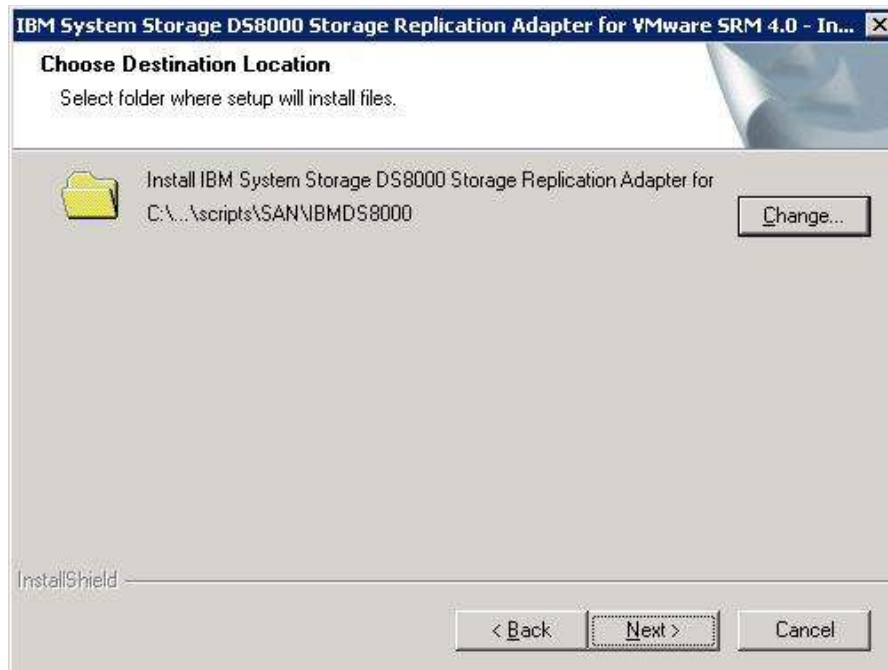
3. Click **Next** to continue. The License Agreement panel is displayed. You can click **Cancel** at any time to exit the installation. To move back to previous screens while using the wizard, click **Back**.



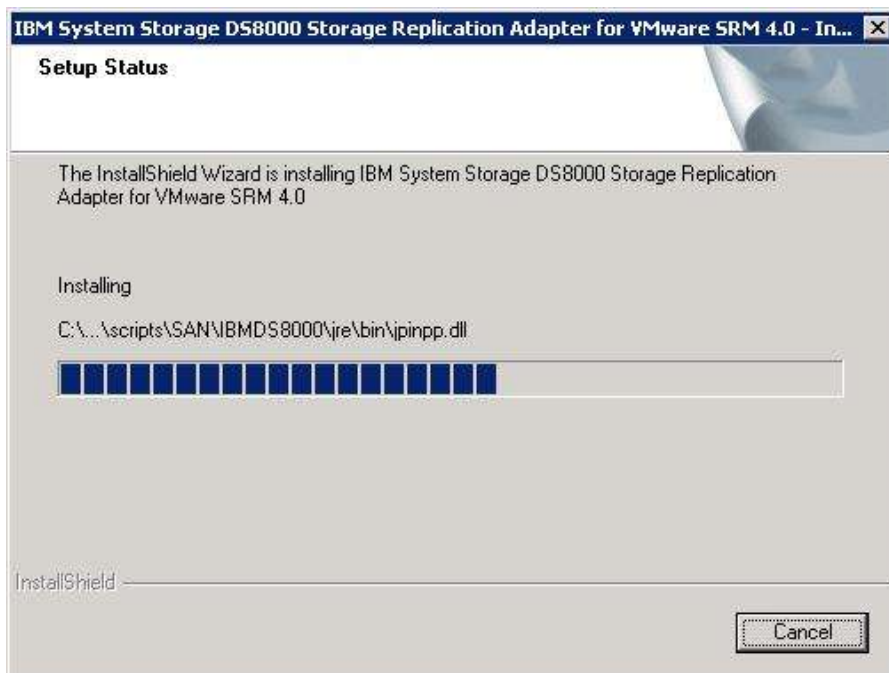
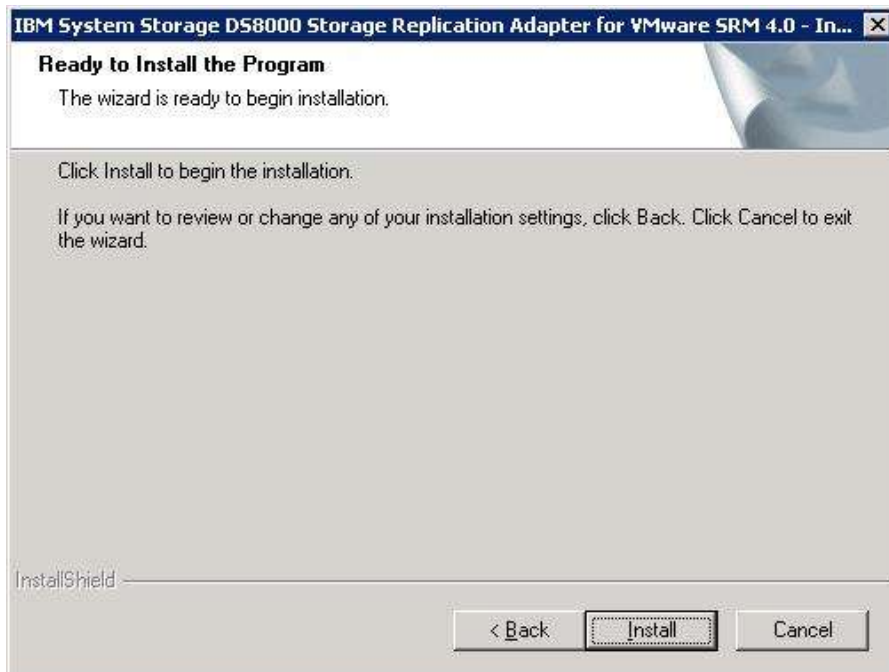
4. Read the license agreement information. Select whether you accept the terms of the license agreement, and click **Next**. If you do not accept, you cannot continue with the installation.
5. The Customer information page is displayed. Enter the appropriate user and organization names.



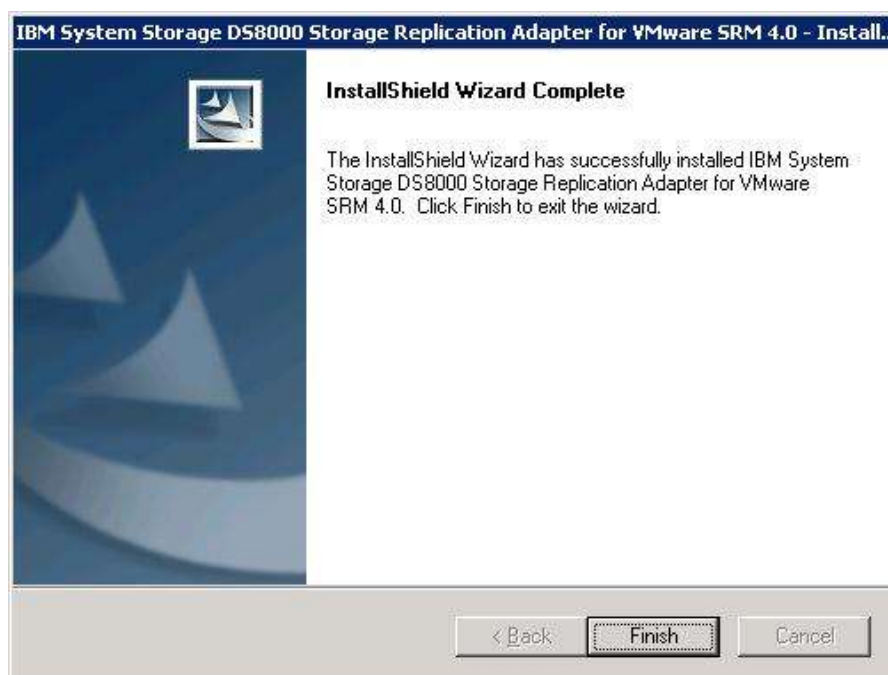
- On the next page, select the install location for the SRA. Click **Change** to change the default install location. Once done click **Next**.



- On the next page click **Install** to initiate the installation process.



8. After the install completes, click **Finish**. If necessary, the InstallShield Wizard prompts you to restart the system.



Creating the Target Volumes and Metro/Global Mirror Relationships

You must create equal number of target volumes (for Metro Mirror targets), and an additional set of volumes for FlashCopy targets for Global Mirror set-up, on the recovery site DS8000, to source volumes.

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

1. Create Metro/Global Mirror relationships between the source and target volumes. The Metro/Global Mirror target volumes should NOT be mapped to the ESX server (s) on the recovery site, as the mapping process is completely automated by the SRA for failover and test failover operations. For more information on Metro/Global

Mirror Copy Services refer to IBM System Storage DS8000: Copy Services in Open Environments (<http://www.redbooks.ibm.com/redbooks/pdfs/sg246788.pdf>).

Important: Before you start using the DS8000 Storage Replication Adapter, make sure the Metro Mirror relationships are in “Full Duplex” mode and for Global Mirror relationships’ “First Pass” status is “True” and Consistency Groups forming at the set intervals.

Important: If the DS8000 arrays are not SE volume support enabled, the SRA creates fully allocated volumes during test failover operations. Fully allocated volumes need to be completely initialized before they can be used as FlashCopy targets. This might take several minutes depending on the size of the newly created volume. To accommodate this initialization time, the user needs to modify the command time out values of VMware SRM appropriately. This can be done by changing the value of command time out entry in vmware-dr.xml file found under VMware SRM installation directory.

When using Global Mirror, the test failover and failover operations might take longer depending on the number of volumes participating in SRM. For this reason we recommend a command time out value set to 900 or more for this SRA in general.

For example: `<CommandTimeout>900</CommandTimeout>`

Uninstalling IBM System Storage DS8000 Storage Replication Adapter Software

You must use the Storage Replication Adapter installation executable to uninstall the IBM System Storage DS8000 Storage Replication Adapter software from the Windows server. Perform the following steps to uninstall the software:

1. Log on to the Windows server as the local administrator.
2. Double-click on the IBMD8KSRA.exe and select Remove.
3. Click Finish on the final screen to complete the uninstall. If necessary, InstallShield will prompt the user to re-start the system.

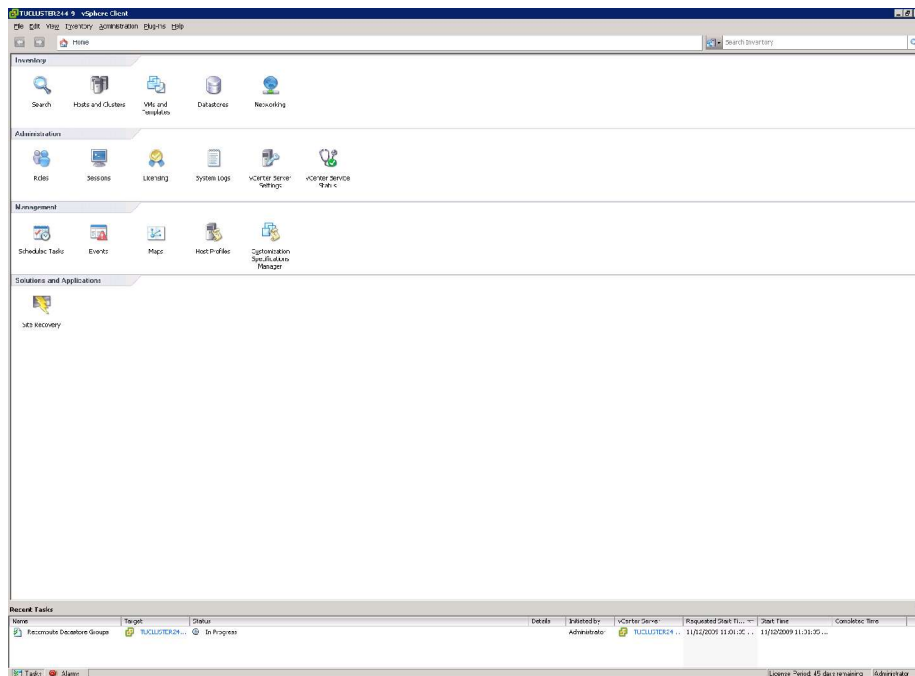
Adding Array Managers to VMware Site Recovery Manager

To add arrays to VMware Site Recovery Manager execute the following.

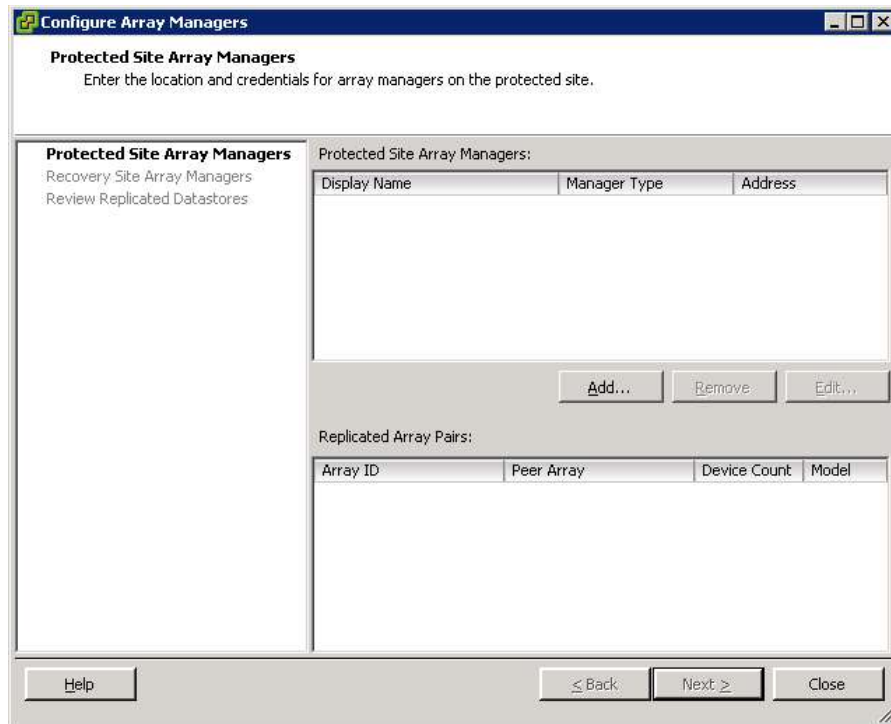
1. Log on to the VMware Virtual Center Server machine



2. Click Site Recovery on the VI client home page



3. Click **Configure** option next to Array Manager in the Setup panel.

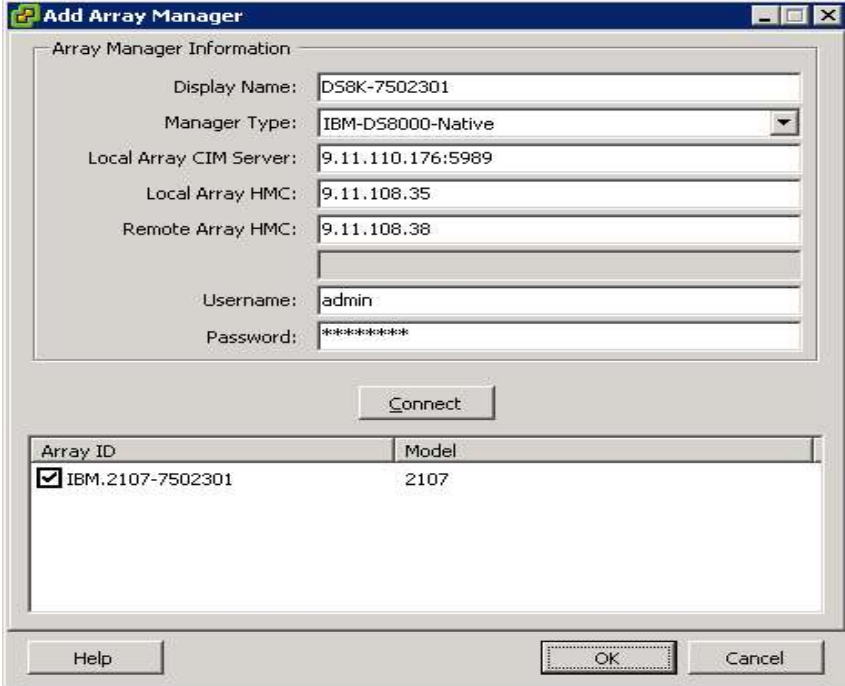


4. Click **Add** in the Configure Array Manager panel.
5. Enter array manager information on the Add Array Manager screen. Reinststate the connection information for the array. Click Connect.
 - **Display Name** - Enter the name of your array.
 - **Manager Type** - From the pull down menu, select the type of array you are using
 - **Local Array CIM Server** – Enter the IP address and the port number of the local array's CIM agent. For example, 192.168.15.2:5989, where 5989 is the CIM agent's port number if using a proxy CIM agent. If connecting to an embedded CIMOM use 6989.

Note: IBM System Storage DS8000 Storage Replication Adapter only supports secure ports for CIM agents and only one DS8000 device managed by each CIM agent.

 - **Local Array HMC** – Enter the IP address of the protected site DS8000 device's HMC. For example, 192.168.15.3.
 - **Remote Array HMC** – Enter the IP address of the recovery site array's HMC. For example 192.168.17.2

- **User Name** - Enter the user name configured for the CIM agent.
- **Password** - Enter the password configured for the CIM agent.



Add Array Manager

Array Manager Information

Display Name: D58K-7502301

Manager Type: IBM-DS8000-Native

Local Array CIM Server: 9.11.110.176:5989

Local Array HMC: 9.11.108.35

Remote Array HMC: 9.11.108.38

Username: admin

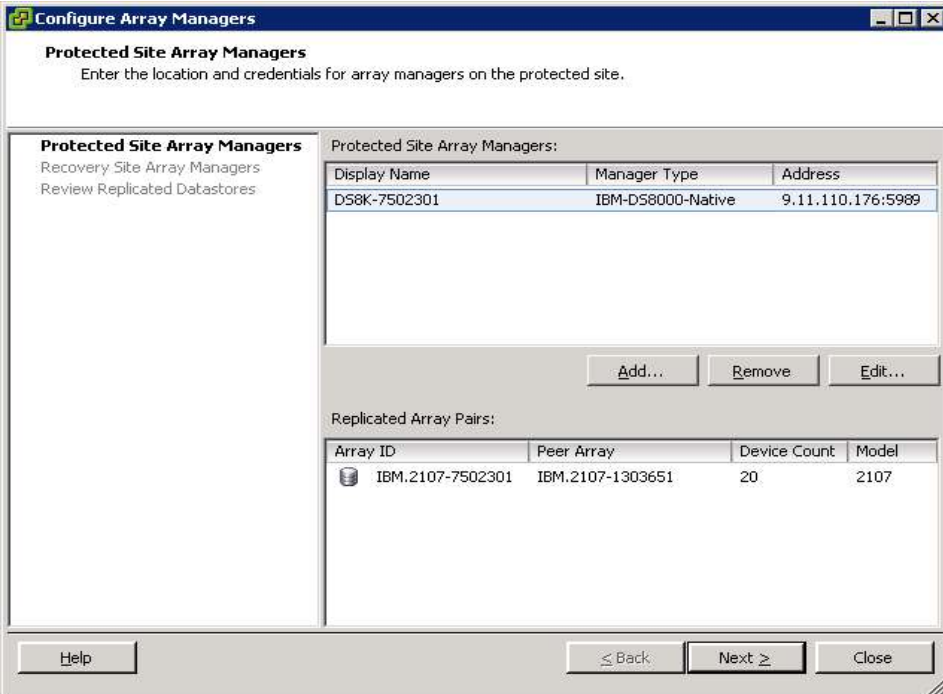
Password: *****

Connect

Array ID	Model
<input checked="" type="checkbox"/> IBM.2107-7502301	2107

Help OK Cancel

6. Click **OK** to initiate LUN discovery on the protected site.



Configure Array Managers

Protected Site Array Managers
Enter the location and credentials for array managers on the protected site.

Protected Site Array Managers
Recovery Site Array Managers
Review Replicated Datastores

Display Name	Manager Type	Address
D58K-7502301	IBM-DS8000-Native	9.11.110.176:5989

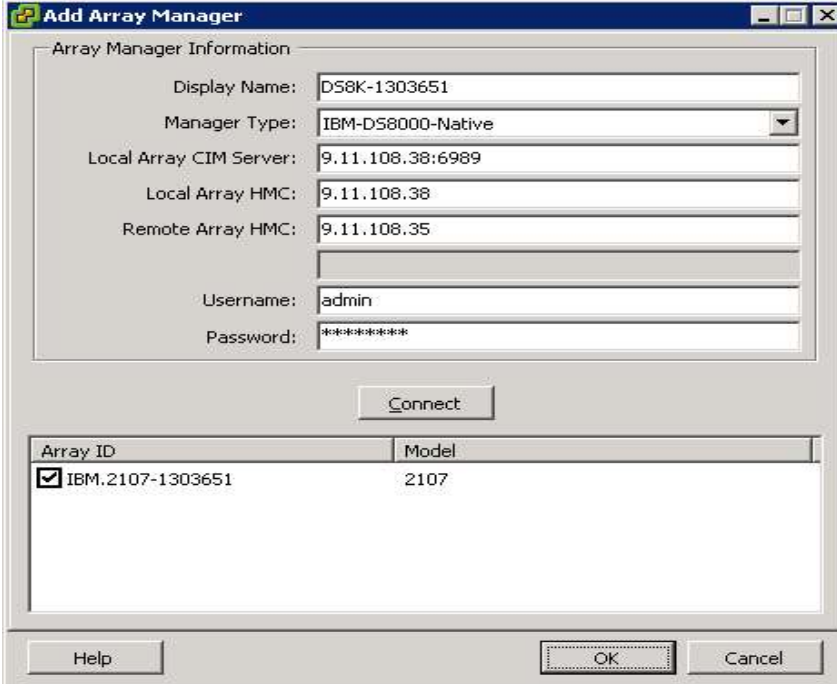
Add... Remove Edit...

Replicated Array Pairs:

Array ID	Peer Array	Device Count	Model
IBM.2107-7502301	IBM.2107-1303651	20	2107

Help ≤ Back Next ≥ Close

7. Confirm the DS8000 image IDs of protected and recovery site arrays and click **Next**. On the next page click **Add** to add the recovery site array information and click **Connect**

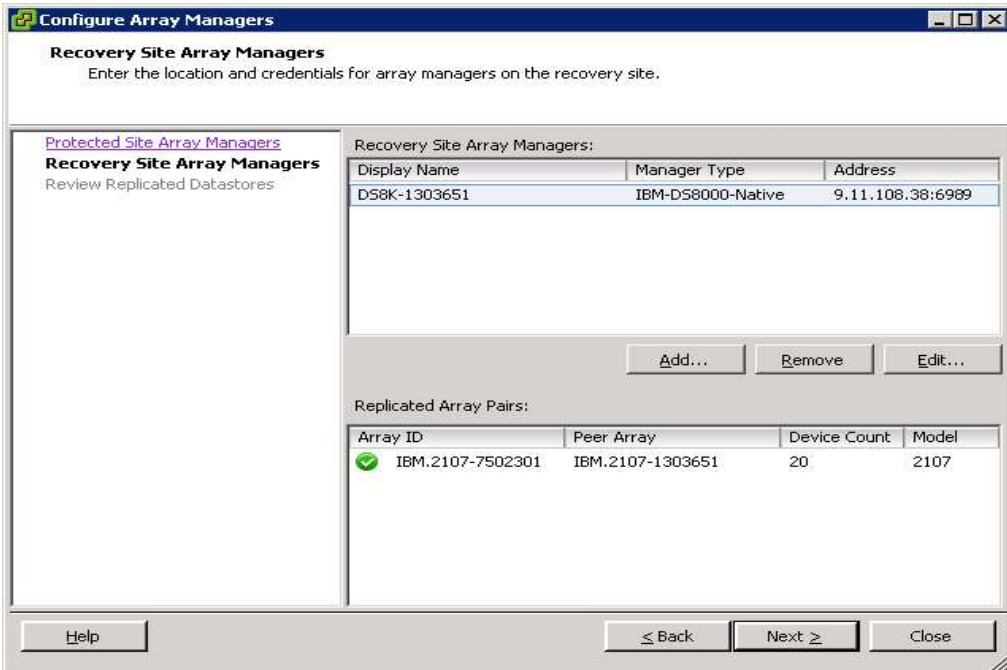


The 'Add Array Manager' dialog box contains the following fields and controls:

- Array Manager Information:**
 - Display Name: DS8K-1303651
 - Manager Type: IBM-DS8000-Native (dropdown)
 - Local Array CIM Server: 9.11.108.38:6989
 - Local Array HMC: 9.11.108.38
 - Remote Array HMC: 9.11.108.35
 - Username: admin
 - Password: *****
- Connect** button
- Array List Table:**

Array ID	Model
<input checked="" type="checkbox"/> IBM.2107-1303651	2107
- Buttons:** Help, OK, Cancel

8. Confirm the image ID of the recovery site DS8000 and click **OK**



The 'Configure Array Managers' dialog box displays the following information:

- Recovery Site Array Managers:**

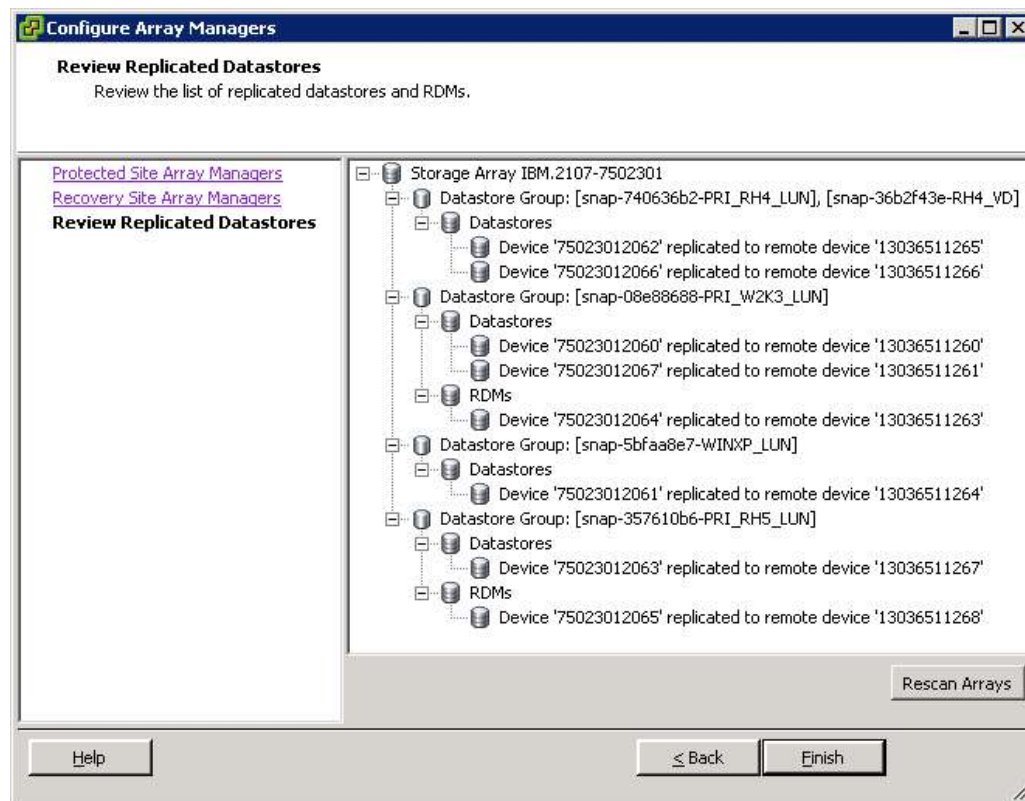
Enter the location and credentials for array managers on the recovery site.

Display Name	Manager Type	Address
DS8K-1303651	IBM-DS8000-Native	9.11.108.38:6989

Buttons: Add..., Remove, Edit...
- Replicated Array Pairs:**

Array ID	Peer Array	Device Count	Model
<input checked="" type="checkbox"/> IBM.2107-7502301	IBM.2107-1303651	20	2107
- Buttons:** Help, ≤ Back, Next ≥, Close

9. Confirm that a Green icon appears on the screen as seen in the above image. Click **Next** to see the list of replicated VMware datastores.



Review and confirm the Datastore list and click **Finish**

TestFailover Procedure

The IBM System Storage DS8000 SRA completely automates the TestFailover procedure. During this procedure, the SRA creates Space Efficient FlashCopy target volumes, if SE volume support feature is enabled and SE storage defined on the storage array. If the recovery site DS8000 does not have SE support enabled, the SRA creates fully allocated volumes for test failover operations. The only pre-requisite this procedure needs, from the Storage Replication Adapter's perspective, is to have enough free space available in one of the extent pools to accommodate the FlashCopy target volumes

Please refer to important notes under "Creating Target Volumes and Metro/Global Mirror Relationships" section.

Important: If for some reason the SRM and/or SRA crash during a test failover or failover operations, stale lock files might be left over from the run. If the lock files are not cleaned up the following test failover or failover operations will time out. To clean up the lock files change directory to VMware Site Recovery Manager installation directory, and under that directory change directory to “bin”. Delete all files with a “.d” extension.

This procedure doesn’t require anything specific to the Storage Replication Adapter, be done by the user as long as all the steps and pre-requisites mentioned in this document are carried out properly.

Failover Procedure

DS8000 SRA does a failover of the Metro/Global Mirror target volumes to the recovery site during a failover operation.

Important: If for some reason the SRM and/or SRA crash during a test failover or failover operations, stale lock files might be left over from the run. If the lock files are not cleaned up the following test failover or failover operations will time out. To clean up the lock files change directory to VMware Site Recovery Manager installation directory, and under that directory change directory to “bin”. Delete all files with a “.d” extension.

This procedure doesn’t require anything specific to the Storage Replication Adapter, be done by the user as long as all the steps and pre-requisites mentioned in this document are carried out properly.

Failback Procedure

Managing Failback

Managing failback using SRM is a manual process given that the protection site could have completely different hardware and network configuration after a disaster occurs. Failback can be managed like any planned server migration.

Failback Scenario

The following failback scenario uses SRM as a failback tool to Site A after executing a recovery plan R1 at Site B in recovery mode for recovered virtual machines.

To manually execute a failback scenario

1. Delete recovery plan R1 at Site B.
2. If Site A still has DR protection configured for the protection groups P1 in recovery plan R1, delete protection groups P1 at Site A.
3. If it is not already in place, use the VI Client at Site B to establish Site A as the secondary site for Site B. (If Site A does not have SRM installed, install SRM at Site A.)
4. Establish appropriate array replication from Site B to Site A for the datastores containing recovered virtual machines.
 - Mask the volumes on the protected site DS8000 from the ESX server at Site A.
- On the recovery DS8000 at Site B, issue failback operations on B volumes with A volume as targets.

Note1: Before issuing the failback command ensure that paths are defined from remote site LSS to its corresponding LSS at the local site.

Note2: If volumes at Site A were online when a crash happened use “-resetreserve” switch with the failback command, so that any stale reservations on Site A volumes are cleared.

Note3: The failback can be done in two ways

- A. Synchronous data transfer from volumes at Site B to volumes at Site A for both Metro and Global Mirror relationships, if the applications are active on Site B volumes.

```
dscli> failbackpprc -dev IBM.2107-1303651 -remotedev  
IBM.2107-7502301 -type mmir 1260:2060
```

- B. Asynchronous data transfer from volumes at Site B to volumes at Site A for Global Mirror relationships. This method requires the applications at Site B quiesced to ensure consistent data transfer from B to A volumes.

```
dscli> failbackpprc -dev IBM.2107-1303651 -remotedev  
IBM.2107-7502301 -type gcp 1260:2060
```

For more information on failback refer to IBM System Storage DS8000: Copy Services in Open Environments (<http://www.redbooks.ibm.com/redbooks/pdfs/sg246788.pdf>).

5. Create protection group or groups P2 at Site B to protect recovered virtual machines to Site A.
6. At Site A, create a recovery plan R2 for the protection group or groups P2.
7. After the user has determined that the virtual machines have been fully replicated to Site A, execute recovery plan R2 at Site A in test mode.
8. If the test is successful, execute recovery plan R2 in recovery mode.
9. At this point, the user may want to re-protect recovered virtual machines to Site B:
10. Delete recovery plan R2 at Site A.
11. Delete protection group(s) P2 at Site B.
12. Establish appropriate array replication from Site A to Site B for datastores containing recovered virtual machines.

- Mask the volumes on the protected site DS8000 from the ESX server at Site B.
 - On the protected DS8000 at Site A, issue failback of Metro/Global Mirror relationships on A volumes with B volume as targets.

Note1: For Metro Mirror relationships execute failbackpprc command with “-type mmir” switch.

```
dscli> failbackpprc -dev IBM.2107-7502301 -remotedev IBM.
2107-1303651 -type mmir 2060:1260
```

Note2: For Global Mirror relationships execute failbackpprc command with “-type gcp” switch.

```
dscli> failbackpprc -dev IBM.2107-7502301 -remotedev IBM.
2107-1303651 -type gcp 2060:1260
```

- Once the failback is complete, re-start the Global Mirror session. Nothing needs to be done for the Metro Mirror relationships

For more information on failback refer to IBM System Storage DS8000: Copy Services in Open Environments (<http://www.redbooks.ibm.com/redbooks/pdfs/sg246788.pdf>).

13. Create protection group(s) P3 at Site A to protect recovered virtual machines from Site A to Site B.

Create a recovery plan R3 at Site B for the groups.

IBM DS8000 SRA and IBM TPC-R Coexistence

Due to the current DS8000 design limitation of only one Global Mirror session per array, it becomes important to make sure both DR solutions work properly in a given environment. If the Global Mirror session consists of VMware and other open system volumes, then the failover operation initiated from one solution will impact all volumes that are part of that Global Mirror session and thus impacting the other DR solution.