



NetApp SANtricity[®] Storage Replication Adapter 5.6

Installation and User Guide



NetApp, Inc.
495 East Java Drive
Sunnyvale, CA 94089
U.S.

Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1-(888) 463-8277
Web: <http://www.netapp.com>
Feedback: doccomments@netapp.com

Part number: 215-10053_A0
Release date: October 2015

TABLE OF CONTENTS

1	VMWARE SITE RECOVERY MANAGER OVERVIEW.....	1
2	NEW FEATURES AND CHANGES.....	2
3	SYSTEM REQUIREMENTS.....	2
	SERVER OS	2
	STORAGE SYSTEM	3
	SRM COMPATIBILITY	3
4	REFERENCE MATERIAL.....	3
5	STORAGE RECOMMENDATIONS.....	3
	NVSRA M SETTINGS	3
6	LICENSING REQUIREMENTS.....	4
7	CONFIGURATION PROCEDURES.....	4
8	INSTALLATION PROCEDURE.....	4
	CONFIGURE STORAGE ARRAYS.....	6
	CONFIGURE PROTECTION GROUPS.....	7
	CONFIGURE RECOVERY PLANS	9
9	UPGRADE PROCEDURE	9
10	TROUBLESHOOTING INFORMATION	9
11	FLOW DIAGRAM.....	12
	DISCOVERARRAYS.....	12
	DISCOVERLUNS.....	12
	TESTFAILOVER (START)	13
	TESTFAILOVER (STOP)	13
	SYNCONCE	13
	FAILOVER	14

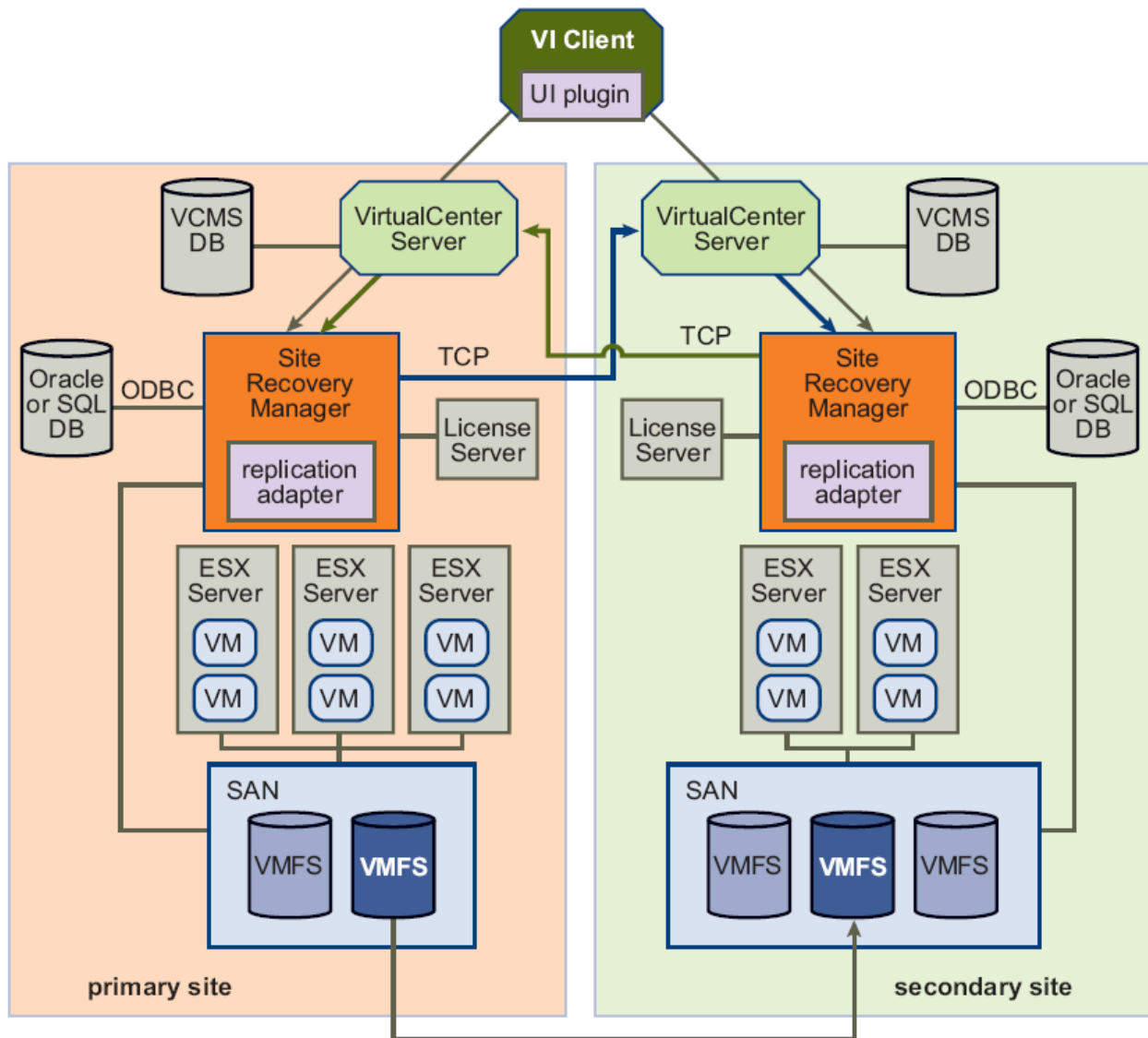
LIST OF FIGURES

Figure 1 - SRM Architecture	1
Figure 2 - SRA Information	5
Figure 3 - SRM Resource Mappings.	5
Figure 4 - Advanced SRM Settings	6
Figure 5 - Site's Related Objects tab	6
Figure 6 - Add Array Managers	7
Figure 7 - Create Protection Group	8
Figure 8 - Protection Group Status	8
Figure 9 - Create Recovery Plan wizard.....	9
Figure 10 - SRM Log Collections.....	10
Figure 11 - Recovery Plan History Export	10
Figure 12 - Storage Array Support Bundle	11
Figure 13 - Storage Array Mapping View	11
Figure 14 - Discover Arrays Function	12
Figure 15 - discoverLuns Function	12
Figure 16 - testFailover (Start) Function.....	13
Figure 17 - testFailover (Stop) Function	13
Figure 18 - syncOnce Function	13
Figure 19 - Failover Function Flow Diagram	14

1 VMWARE SITE RECOVERY MANAGER OVERVIEW

VMware vCenter Site Recovery Manager interacts with the storage arrays via the storage SRA to discover and replicate storage logical unit numbers (LUNs), or virtual disks, between DR sites. In addition, the SRA interacts with the storage array to provide failover and test failover capabilities to SRM allowing for automated failover between DR sites. SRAs are developed and provided by the storage array vendors.

Figure 1 - SRM Architecture¹



There are a number of groups of tasks that are completed to configure SRM. Some of these tasks are completed in all cases, and some tasks are completed only for vSphere Replication (VR) or for array based replication. If your environment will use both types of replication, all tasks should be considered, but if not, you may only need to complete a subset of the total possible set of tasks.

¹ Image obtained from "Getting Started with VMware vCenter Site Recovery Manager" Technical Note, Page 2, VMware® Inc.

The set of tasks are as follows:

- Obtain the latest SRM software and any required patches.
- Configure the SRM databases at each site.
- Install SRM at the protected site.
- Install SRM at the recovery site.
- Pair sites.

In the case of using array based replication, complete the following tasks at both sites:

- Install Storage Replication Adapters (SRAs).
- Configure array managers.

Once you have established the required infrastructure, complete the following steps:

- Configure inventory mappings.
- Configure placeholder datastores.
- If you are using VR, configure datastore mappings.
- Create protection groups.
- Protect virtual machines.
- Create recovery plans.

2 NEW FEATURES AND CHANGES

The NetApp SANtricity Storage Replication Adapter has been updated to work with VMware's vCenter Site Recovery Manager 6.0 and the new features of the 08.20 firmware. This means that this version of the SRA will only work with vCenter Server 5.1, 5.5, and 6.0, with VMware Site Recovery Manager 5.1, 5.5, 5.8, and 6.0. This SRA will not work with prior versions of vCenter Server or Site Recovery Manager. Note that this version of the NetApp SRA will only work with the NetApp E-Series and EF-Series storage arrays, not with NetApp FAS series arrays.

This version of the SRA supports the following features:

- TestFailover
- Failover
- Reprotect
- "Failback" (ability to failover VMs from the recovery site to the original protected site)
- Full management from a single SRM server (no need to switch between protected and recovery)
- Synchronous and Asynchronous Mirror Groups

3 SYSTEM REQUIREMENTS

Detailed below are the various requirements to successfully implement the NetApp SANtricity Storage Replication Adapter.

Server OS

The NetApp SANtricity Storage Replication Adapter supports the following server operating systems:

- MS Windows Server 2012 R2 x64
- MS Windows Server 2012 x64
- MS Windows Server 2008 R2 SP1 x64
- MS Windows Server 2008 R2 x64
- MS Windows Server 2008 SP2 x64

Storage System

The following NetApp E-Series storage arrays are supported with this SRA.

- E5600 (FC and iSCSI²)
- E5500 (FC and iSCSI²)
- E5400 (FC and iSCSI²)
- E2700 (FC and iSCSI²)
- E2600 (FC and iSCSI²)
- EF560 (FC and iSCSI²)
- EF550 (FC and iSCSI²)
- EF540 (FC and iSCSI²)

SRM Compatibility

The NetApp SANtricity Storage Replication Adapter version 05.60 supports SRM version 5.1, 5.5, 5.8, and 6.0.

4 REFERENCE MATERIAL

VMware vCenter Site Recovery Manager Documentation:

https://www.vmware.com/support/pubs/srm_pubs.html

The following reference material is available from <https://communities.netapp.com/groups/appaware-e-series-storage-replication-adapter>

- NetApp SANtricity Storage Replication Adapter Best Practices guide
- NetApp SANtricity Storage Replication Adapter Installation and User Guide (this document)
- NetApp SANtricity Storage Replication Adapter Demo video

5 STORAGE RECOMMENDATIONS

Refer to the NetApp SANtricity Storage Replication Adapter Best Practices guide for recommended storage array configurations and customized settings.

NVSRAM Settings

The following NVSRAM setting must be changed to allow for the mapping of LUNs to multiple hosts or host groups in order to support test failover within SRM. During test failover, snapshots are created on the recovery site storage array. These snapshots may be required to be mapped to multiple hosts or host groups within the vSphere environment. To facilitate this, the following procedure should be used to configure multiple LUN mappings.

1. From the SANtricity Enterprise Management window, select **Tools** → **Execute Script** option from the menu pull-downs.
2. Enter the following commands in the script editor window:

```
show controller[A] NVSRAMByte[0x3b];  
set controller[A] NVSRAMByte[0x3b]=2;  
show controller[A] NVSRAMByte[0x3b];  
  
reset controller[A];
```

² iSCSI support with firmware 07.84 or later and asynchronous remote volume mirroring only.

3. Select **Tools** → **Verify and Execute** option from the menu pull-downs.
4. Repeat steps 2 and 3, substituting [B] for [A] to apply the changes to the B controller.
5. Exit the script editor after completing the changes for the B controller.

Note: It will take several minutes for the controllers to reset and the execution message to complete.

6 LICENSING REQUIREMENTS

The NetApp SANtricity Storage Replication Adapter utilizes either or both Synchronous Mirroring premium feature or Asynchronous Mirroring premium feature along with the Snapshot premium feature to facilitate failover and testFailover. Additionally depending on your environment, storage partitioning should be enabled and sufficient for the number of hosts connected to the storage array. VMware vCenter Site Recovery Manager and the NetApp SANtricity Storage Replication Adapter will not operate without these features enabled on the storage array.

7 CONFIGURATION PROCEDURES

The only configuration procedure required after the initial installation would be to modify the `SraConfigurationData.xml` file, located in the `config` subdirectory of the SRA installation, if your environment employs storage array passwords. If the storage arrays do not utilize passwords, then no modifications are required.

To enable password prompting for NetApp E-Series storage arrays, edit the `SraConfigurationData.xml` file, in the `/config` directory of the SRA installation, and locate the `<PasswordRequiredForArrayAccess>` tag and change the value from “false” to “true”. This will then prompt for a password when adding new array managers from within SRM manager.

SraConfigurationData.xml excerpt text.

```
<!--
    configure how array access is performed.
    when true, a password will be prompted for once and
    then used for all array access
-->
<PasswordRequiredForArrayAccess>true</PasswordRequiredForArrayAccess>
```

Note: See NetApp SANtricity SRA BP-05.60 document for important best practices on configuring volume replication, adjusting SRM settings, and host configurations.

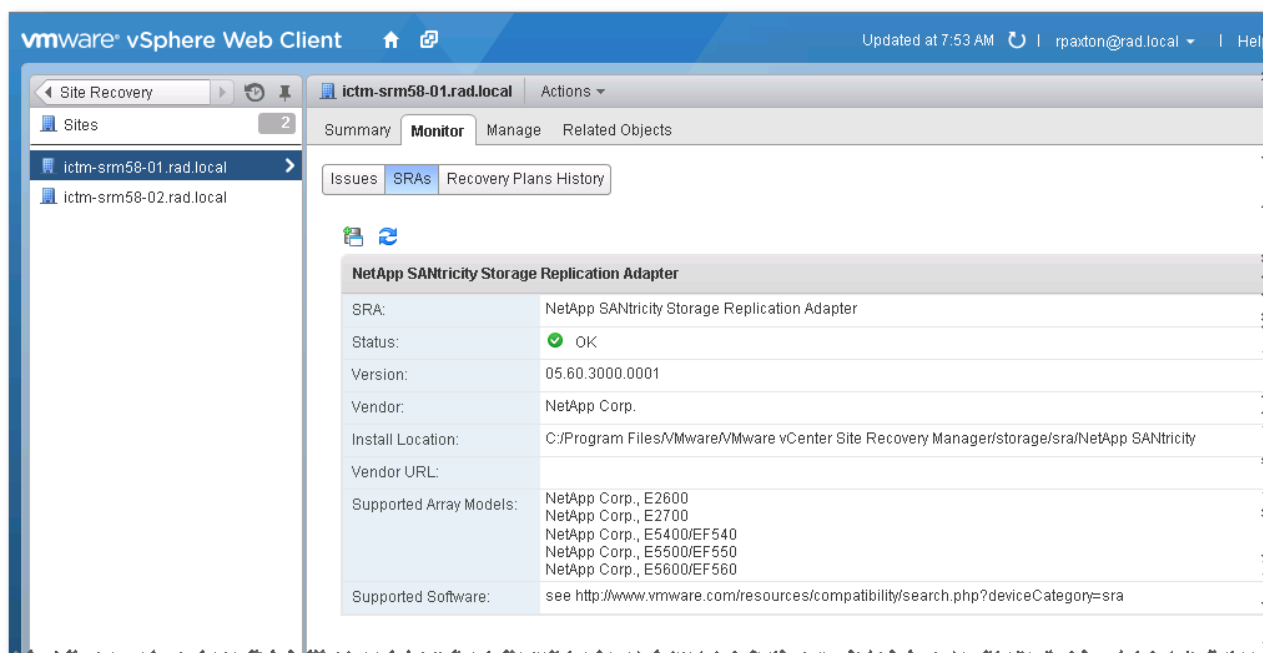
8 INSTALLATION PROCEDURE

To install the NetApp SANtricity Storage Replication Adapter, download the latest version from VMware downloads Site Recovery Manager and verify the md5sum of the installation package. Perform the following procedures to install the SRA:

1. **Ensure** that SRM Server has been installed at both sites that will be participating in disaster recovery.
2. At each site on the SRM server, **run** the `SRAInstaller-05.60.3000.xxxx.exe` package.
3. **Follow** the prompts through the installation wizard to accept the End User License Agreement and installation paths.
4. **Choose** yes or no to view the latest README notes for the SRA and close the installer wizard.
5. **Verify** that the `NetAppSANtricity_SRAsvc` service has been installed and is running from the `services.msc` console.
6. **Verify** that the SRA has been installed to `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\NetApp SANtricity`, for SRM 5.1, SRM 5.5, SRM 5.8, and SRM 6.0 installations directory. This is the SRA scripts directory.
7. **Repeat** the same process for the peer site for this SRM server.

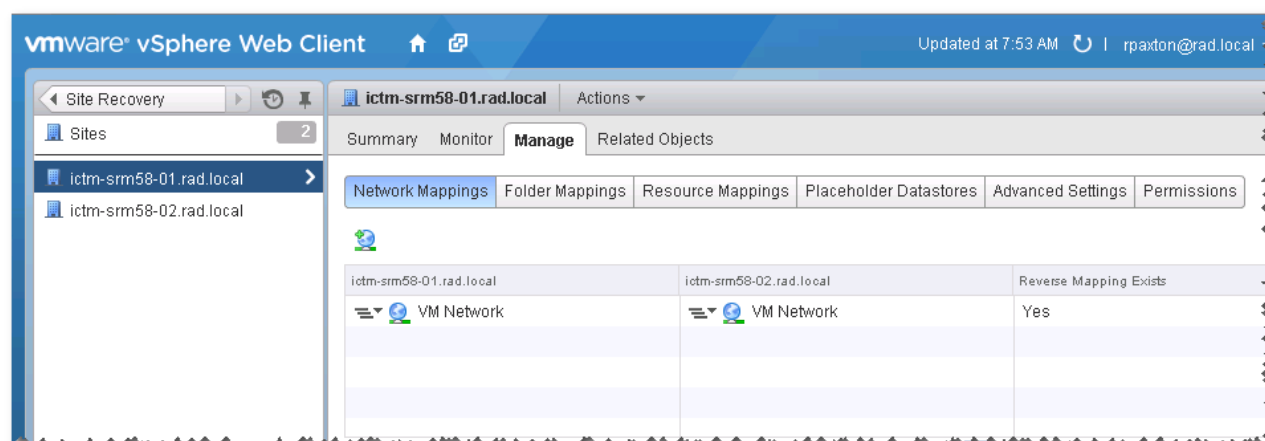
8. After the SRA has been installed at both locations, open a vSphere Client (SRM 5.1 and SRM 5.5) or vSphere Web Client (SRM 5.8 and SRM 6.0) connection to one of the vCenter Servers.
9. **Click** on the *Site Recovery* icon from the Home screen to access the Site Recovery Manager interface.
10. **Pair** the two sites within SRM Sites' manager by selecting Pair Site  icon or from drop down Action Menu link.
11. **Click** on the protected site and then select the **Monitor** tab and then click the **SRAs** button; verify the SRA status and version information, rescan if necessary:

Figure 2 - SRA Information



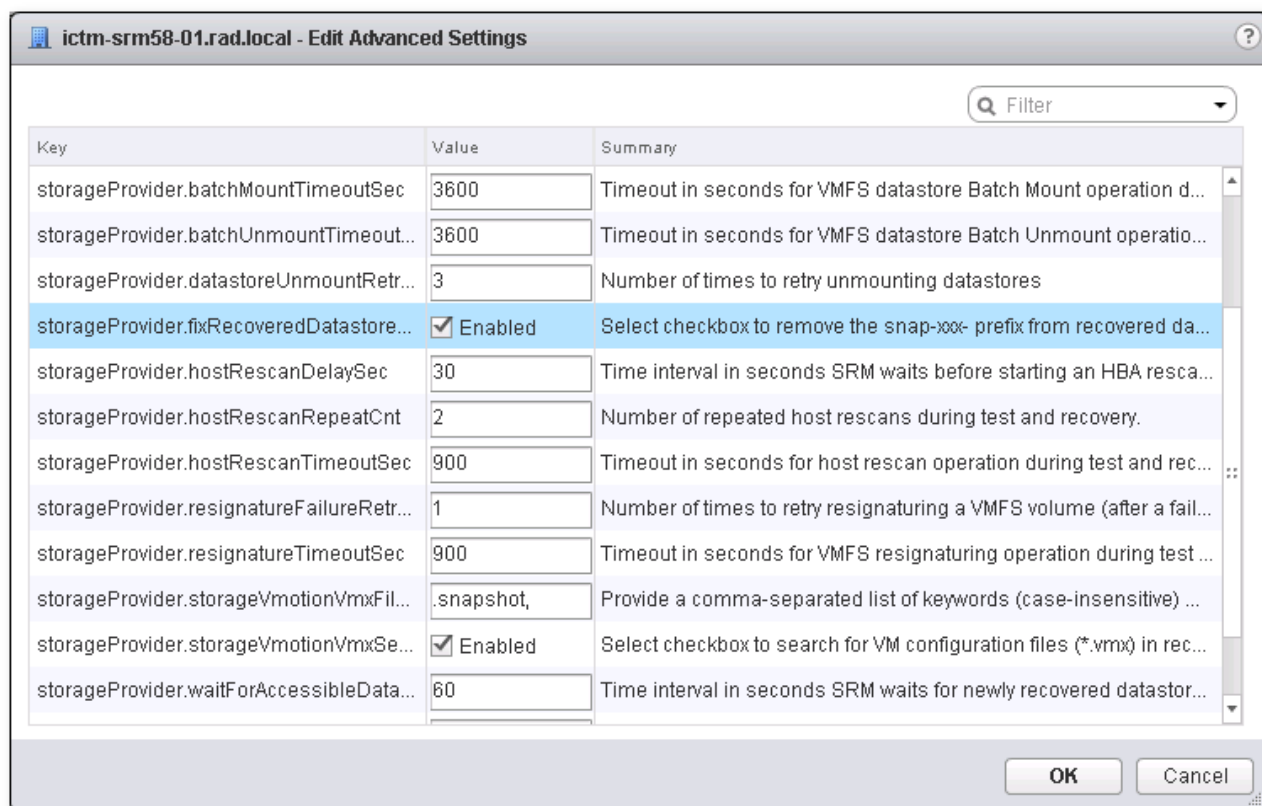
12. **Click** on the **Manage** tab and **configure** resource mappings for both sites, including network mappings, folder mappings, and placeholder datastores.

Figure 3 - SRM Resource Mappings.



13. **Select** the **Advanced Settings** button then select **Storage Provider** options and click **Edit**. Modify the following storage provider settings:
 - storageProvider.fixRecoveredDatastoreNames: **Enabled**
 - storageProvider.hostRescanDelaySec: **30**
 - storageProvider.hostRescanRepeatCnt: **2**
 - storageProvider.hostRescanTimeoutSec: **900**

Figure 4 - Advanced SRM Settings

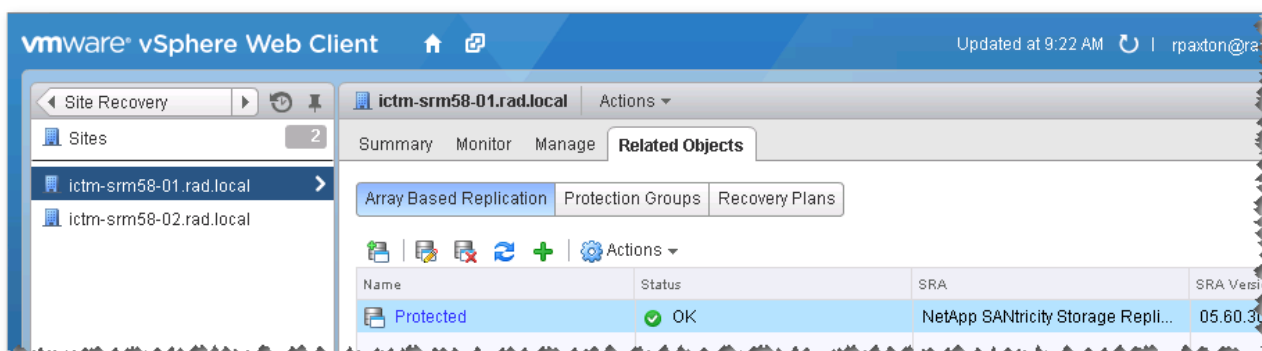


14. **Select** the recovery site and repeat step 13.
15. **Click** on the **Permissions** button and verify list of authorized users for SRM for protected and recovery sites.

Configure Storage Arrays

1. **Click** on **Related Objects** tab and then click on **Array Based Replication** button.

Figure 5 - Site's Related Objects tab



2. **Click** on the  **Add Array Manager** icon.
- The Add Array Manager wizard is displayed (Figure 6).
3. **Select** the **Add a pair of array managers'** radio button (default).
 4. **Verify** the location information and **click Next**.
 5. **Select** the NetApp SANtricity Storage Replication Adapter SRA and **click Next**.

6. **Enter** the display name for the selected site storage array.

Figure 6 - Add Array Managers

Add Array Manager

1 Options
2 Location
3 Select SRA type
4 Configure array manager
5 Configure paired array manager
6 Enable array pairs
7 Ready to complete

Configure array manager
Enter the name and connection parameters for the array manager.

Specify parameters for site 'lctm-srm58-01.rad.local'

Display Name: Protected

Array Connection Params
Parameters needed for connecting to the Storage Array

Array IP Addr 1: 10.113.79.237
Enter the IP Address for the Storage Array's Controller 1 (A)

Array IP Addr 2: 10.113.79.238
Enter the IP Address for the Storage Array's Controller 2 (B)

Peer Array Connection Params
Parameters needed for connecting to the Storage Array's Peer Array

Array IP Addr 1: 10.113.79.239
Enter the IP Address for the Storage Array's Controller 1 (A)

Array IP Addr 2: 10.113.79.240
Enter the IP Address for the Storage Array's Controller 2 (B)

Back Next Finish Cancel

7. In the Array Connections Params box, enter the IP addresses for the local site's storage array. Under the Peer Array Connection Params, enter the IP addresses for the remote site's storage array.
8. **Click Next**, verify array was added successfully and **click Next**.
9. **Repeat** step 7 for the peer site's storage array.
10. **Verify** the array pair checkbox is selected and **click Next**.
11. **Verify** the summary information and **click Finish**.

This completes the SRA portion of the SRM setup but not all of the SRM setup procedures. Additionally, Protection Groups and Recovery Plans must be created for your environment to complete the process. Please consult the VMware Site Recovery Manager Administrator guide for the additional configuration steps. Here is the link documentation: https://www.vmware.com/support/pubs/srm_pubs.html

Configure Protection Groups

1. From the Sites list, **select** one of the site names to configure, **select** the **Related Objects** tab then **click Protection Groups** button and then **click** the **Create Protection Group** icon.

The Create Protection Group wizard is displayed (Figure 7).

2. **Enter** a name for the protection group to be created.
3. **Verify** the protection group type settings and **click Next**.

4. **Select** the Datastore Groups to add to the protection group and **verify** the Virtual Machines for the protection group.

Figure 7 - Create Protection Group

Create Protection Group

1 Name and location
2 Protection group type
3 Datastore groups
4 Description
5 Ready to complete

Datastore groups
Select datastore groups to use for this protection group. Datastore groups contain datastores which must be recovered together.

Datastore Groups:

Datastore Group	Status
☒ VMFS06	Add to this protection group
☐ VMFS03	Add to this protection group
☐ VMFS01	Add to this protection group
☐ VMFS02	Add to this protection group

Virtual Machines:

Virtual Machine	Datastore	Status
VM-03R	VMFS03	Add to this protection g...
VM-06R	VMFS06	Add to this protection g...
VM-01R	VMFS01	Add to this protection g...
VM-02R	VMFS02	Add to this protection g...

Back Next Finish Cancel

5. **Enter** a description for this protection group if desired.
6. **Review** summary information and **click** Finish.
7. **Repeat** steps 1-6 for any other protection groups that may be needed.
8. **Verify** protection group status is OK or **resolve** any mapping issues.

Figure 8 - Protection Group Status

vmware vSphere Web Client

Updated at 9:22 AM | rpaxton@rad.local

Site Recovery

ictm-srm58-01.rad.local

Summary Monitor Manage **Related Objects**

Array Based Replication **Protection Groups** Recovery Plans

Name	Protection Status	Recovery Status	Replication Type	Protected Site
PG1	OK	Ready	ABR	ictm-srm58-01.rad.local
PG2	OK	Ready	ABR	ictm-srm58-02.rad.local

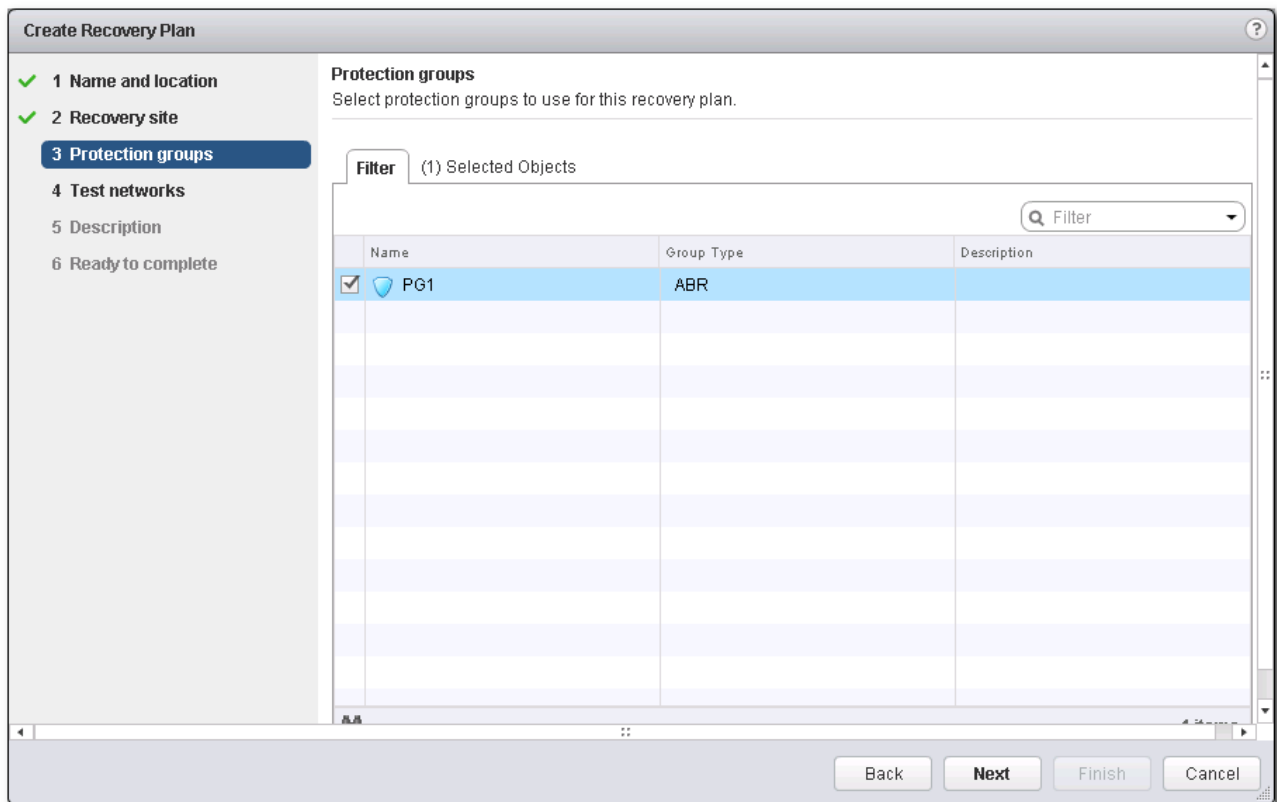
Configure Recovery Plans

1. From the Sites list, **select** one of the site names to configure, **select** the **Related Objects** tab then **click** **Recovery Plans** button and then **click** the **Create Recovery Plan**  icon.

The Create Recovery Plan wizard is displayed (Figure 9).

2. **Enter** a name for the new recovery plan and **click** Next.
3. **Select** the recovery site location radio button for this recovery plan and **click** Next.
4. **Select** the checkbox next to the protection groups to be used with this recovery plan and **click** Next.

Figure 9 - Create Recovery Plan wizard.



The screenshot shows the 'Create Recovery Plan' wizard window. On the left, a sidebar lists six steps: 1 Name and location, 2 Recovery site, 3 Protection groups (highlighted), 4 Test networks, 5 Description, and 6 Ready to complete. The main area is titled 'Protection groups' and contains the instruction 'Select protection groups to use for this recovery plan.' Below this is a table with columns 'Name', 'Group Type', and 'Description'. A search bar labeled 'Filter' is above the table. The table contains one row with a checked checkbox, 'PG1' in the Name column, 'ABR' in the Group Type column, and an empty Description column. At the bottom right, there are four buttons: 'Back', 'Next' (highlighted), 'Finish', and 'Cancel'.

Name	Group Type	Description
☒ PG1	ABR	

5. **Select** the network to use for the test failover workflow and **click** Next.
6. **Enter** a description for the recovery plan if desired and **click** Next.
7. **Review** summary information and **click** Finish.

9 UPGRADE PROCEDURE

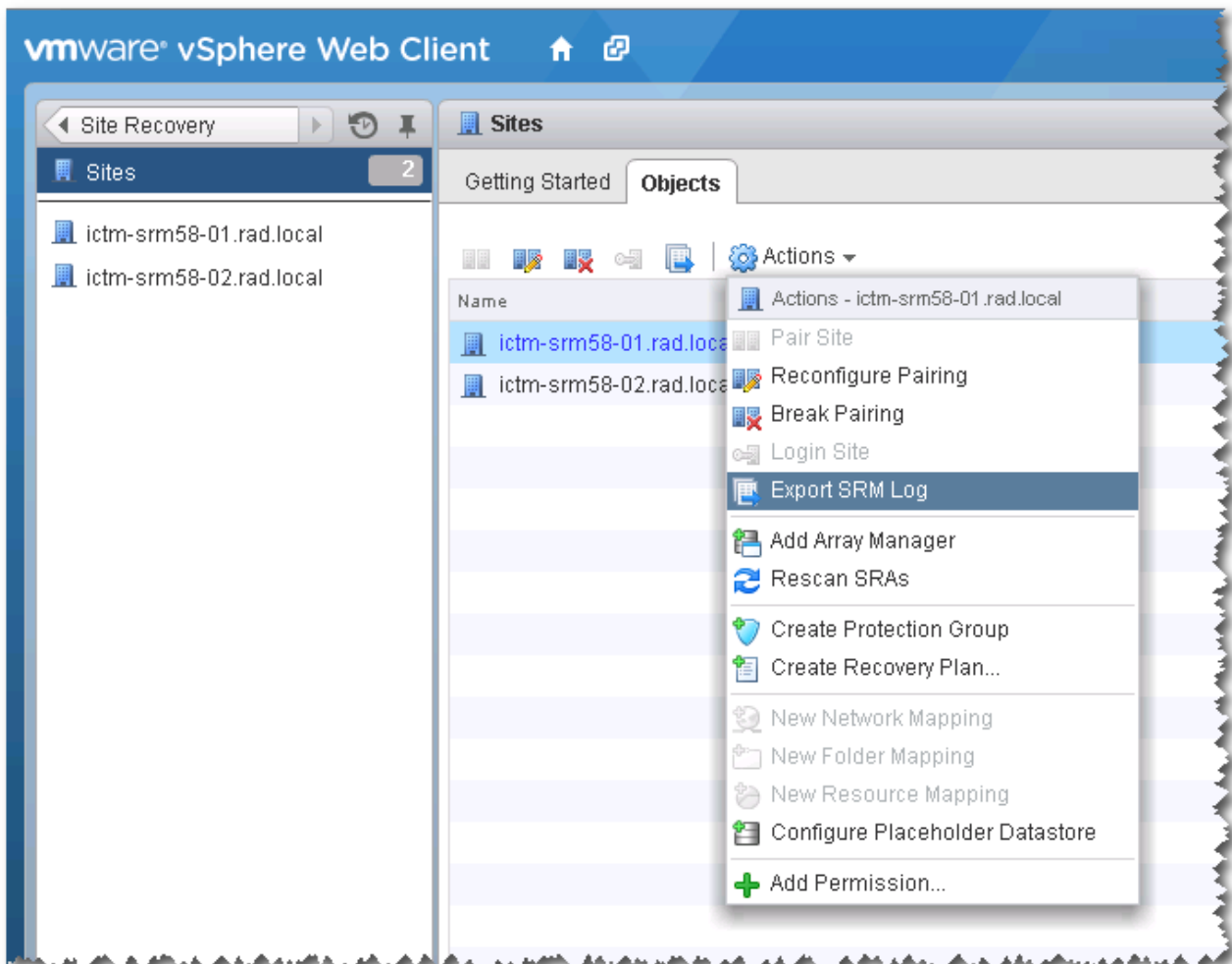
The NetApp SANtricity Storage Replication Adapter version 05.xx.xxxx.xxxx is not compatible with the previous LSI SRA version 01.01.xx.xx. If upgrading a SRM 4.1 environment to SRM 5.0, 5.1, 5.5, or 5.8, you must uninstall the LSI SRA adapter and install the NetApp SANtricity Storage Replication Adapter version 05.60.3000.xxxx. Note that SRM 5.8 and 6.0 use vSphere Web Client to manage Site Recovery Manager.

10 TROUBLESHOOTING INFORMATION

All logging for the NetApp SANtricity Storage Replication Adapter is outputted to the SRM log files located at C:\ProgramData\VMware\VMware vCenter Site Recovery Manager\Logs along with SRA logs located at C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\NetApp SANtricity\logs. Any errors encountered during any procedure will be logged to these files. If corrective action cannot be performed to resolve an issue, you will need to contact NetApp technical support and provide the following information:

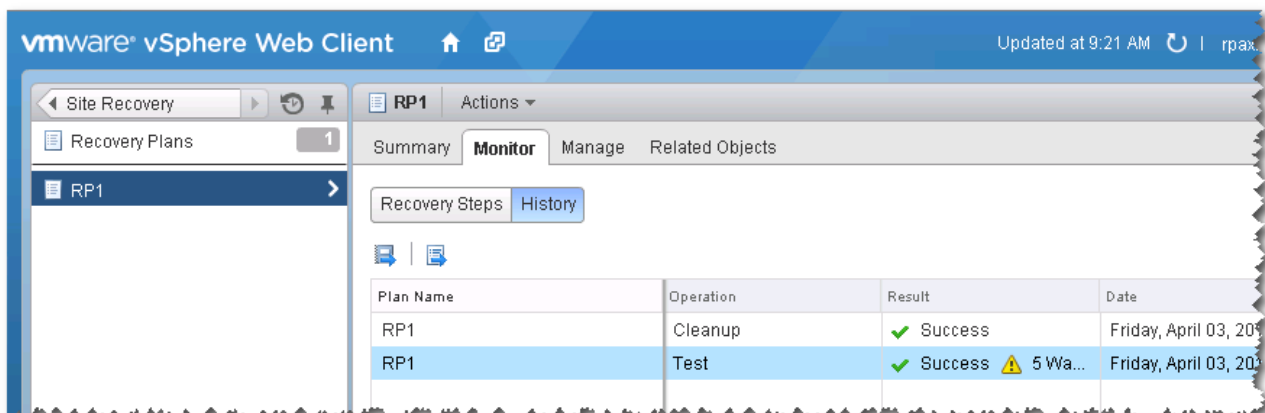
- A detailed description of the issue encountered.
- All software version numbers (vCenter Server, ESXi hosts, SRM Servers, SRAs)
- Export of the SRM System Logs from both sites (see Figure 10).

Figure 10 - SRM Log Collections



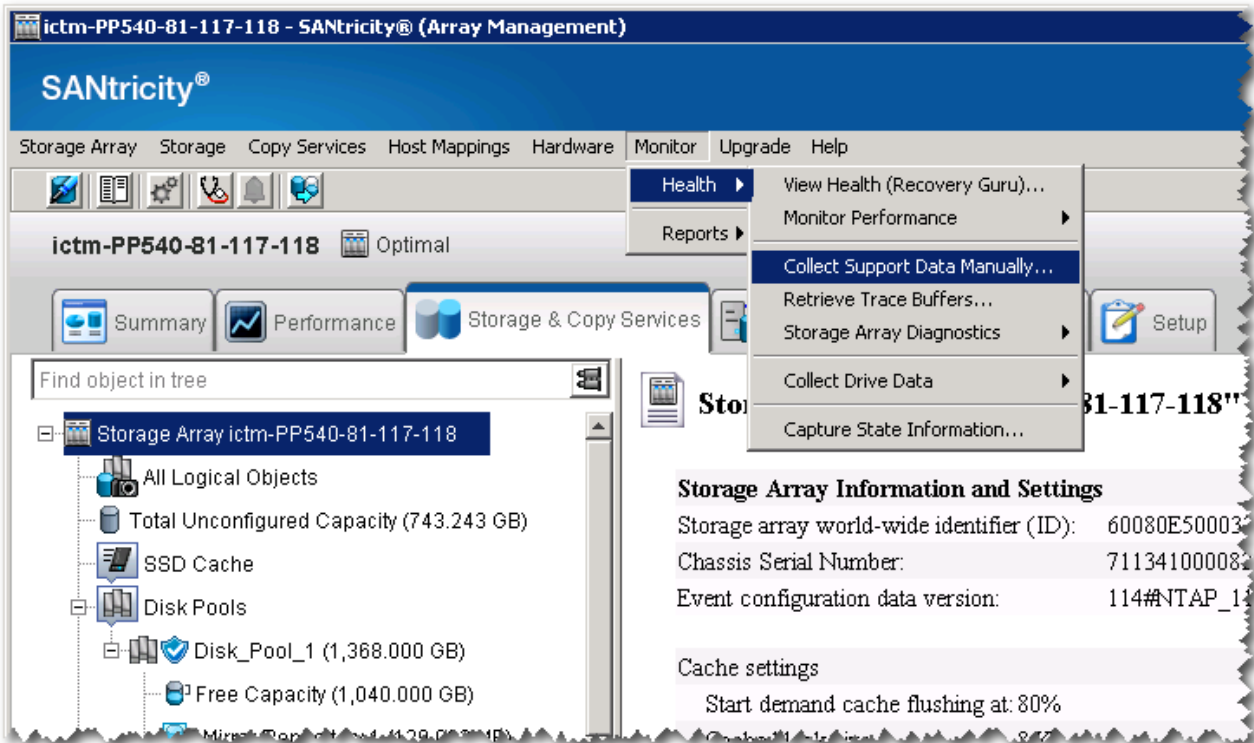
- An export of the failed recovery plan and one (if any) successful runs before it (see Figure 11)

Figure 11 - Recovery Plan History Export



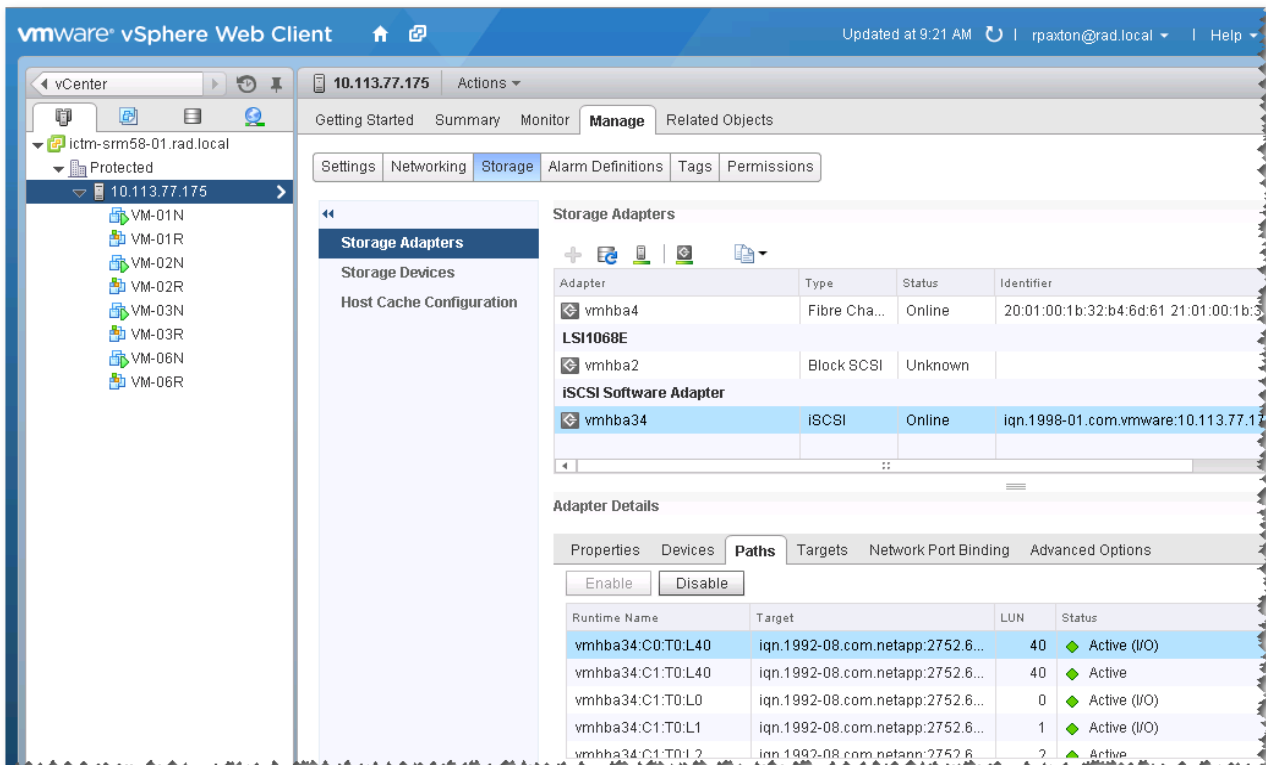
- Storage array support bundle from each storage array (see Figure 12)

Figure 12 - Storage Array Support Bundle



- (Optional, but very helpful) A screen capture of a mapped volume showing path configuration (see Figure 13).

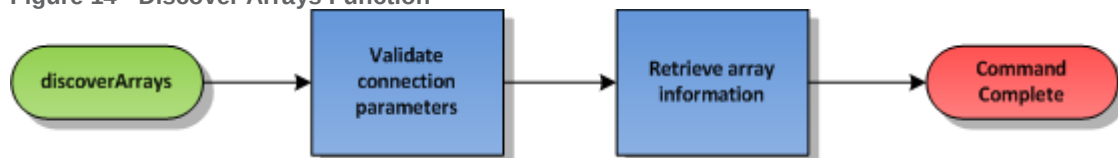
Figure 13 - Storage Array Mapping View



11 FLOW DIAGRAM

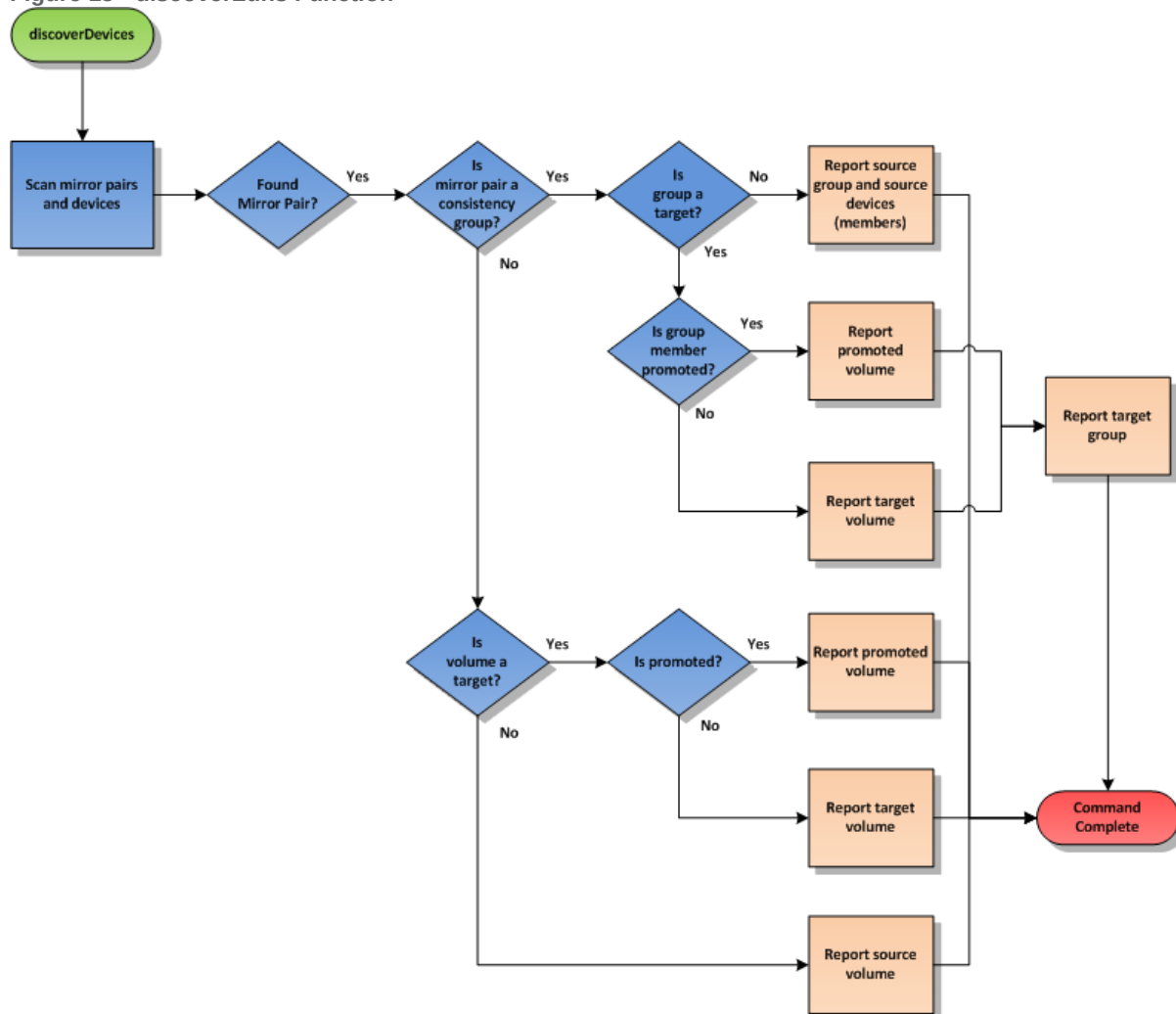
discoverArrays

Figure 14 - Discover Arrays Function



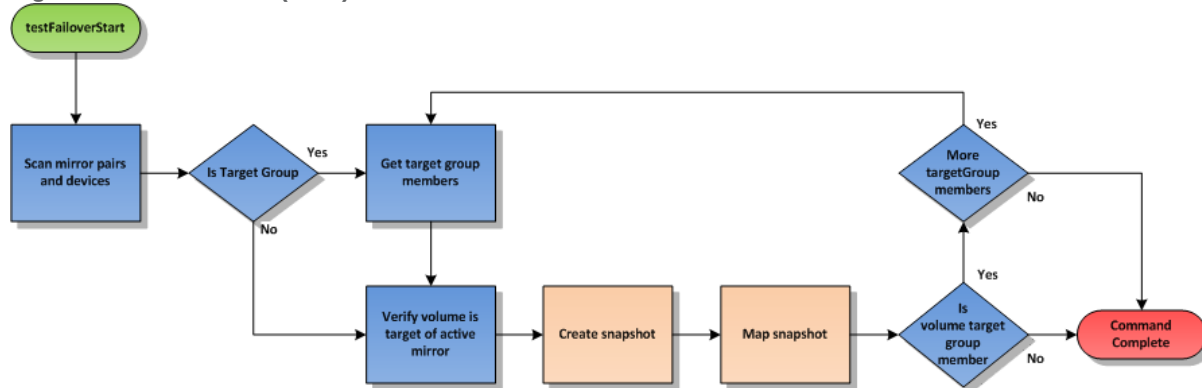
discoverLUNs

Figure 15 - discoverLuns Function



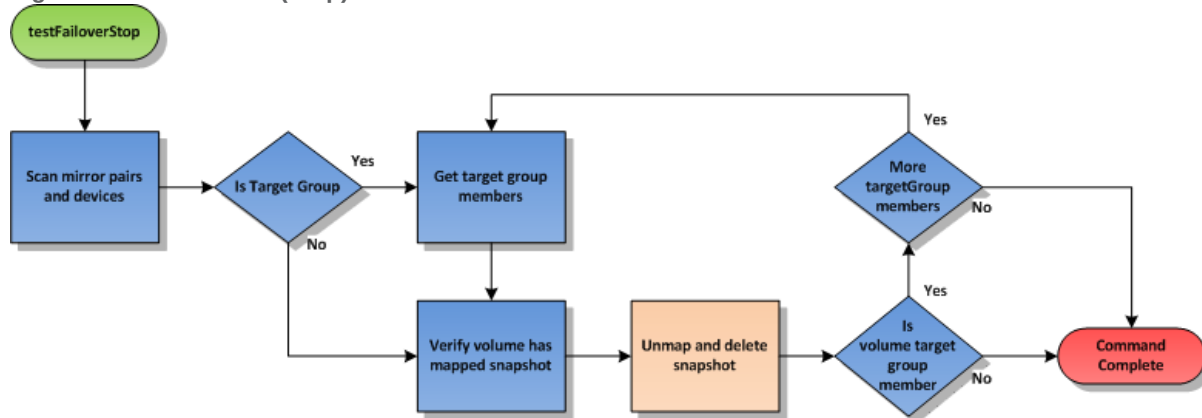
testFailover (Start)

Figure 16 - testFailover (Start) Function



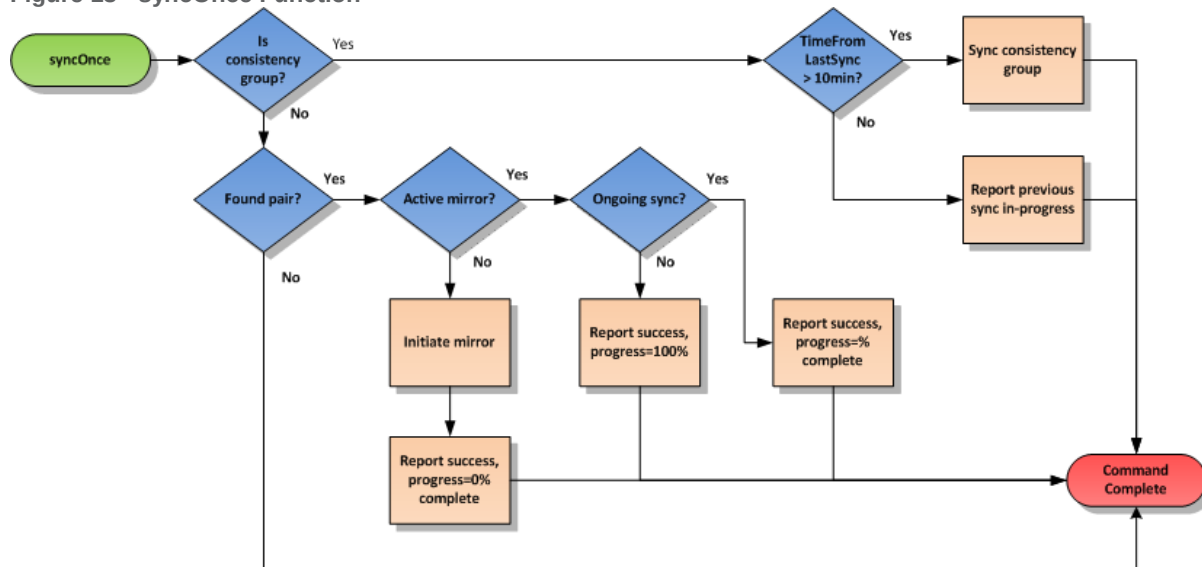
testFailover (Stop)

Figure 17 - testFailover (Stop) Function



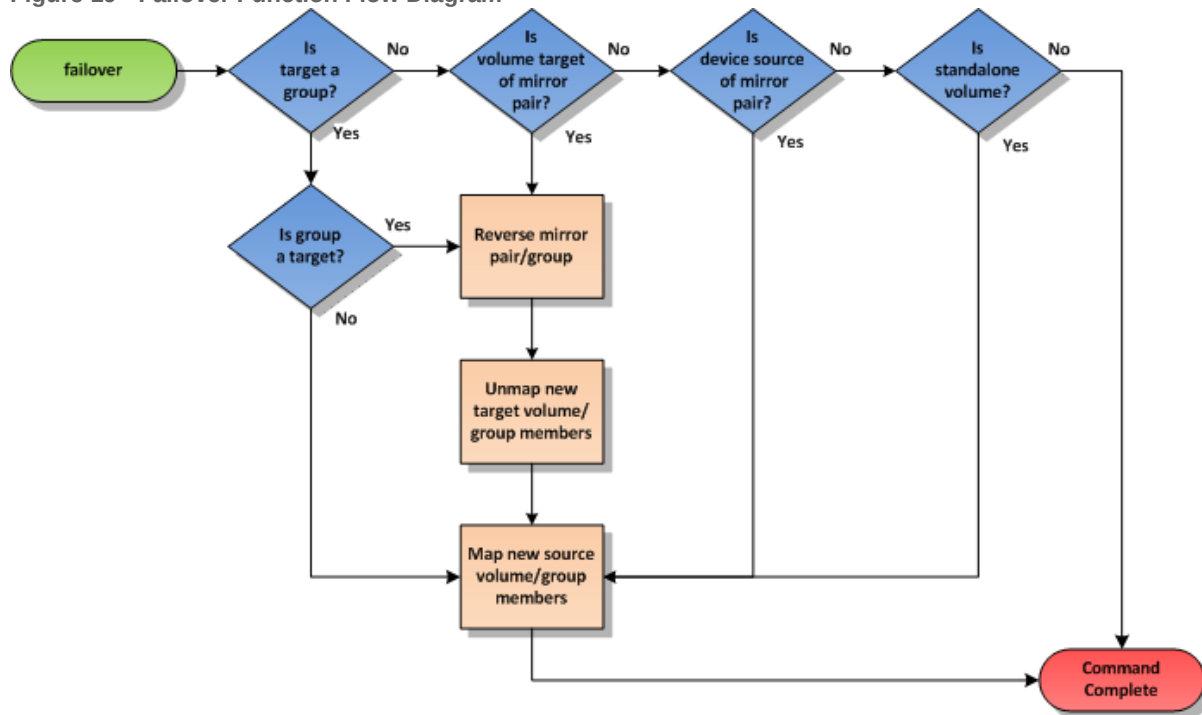
SyncOnce

Figure 18 - syncOnce Function



Failover

Figure 19 - Failover Function Flow Diagram



Trademark information

NetApp, the NetApp logo, Go Further, Faster, ASUP, AutoSupport, Campaign Express, Cloud ONTAP, clustered Data ONTAP, Customer Fitness, Data ONTAP, DataMotion, Fitness, Flash Accel, Flash Cache, Flash Pool, FlashRay, FlexArray, FlexCache, FlexClone, FlexPod, FlexScale, FlexShare, FlexVol, FPolicy, GetSuccessful, LockVault, Manage ONTAP, Mars, MetroCluster, MultiStore, NetApp Insight, OnCommand, ONTAP, ONTAPI, RAID-DP, SANtricity, SecureShare, Simplicity, Simulate ONTAP, Snap Creator, SnapCopy, SnapDrive, SnapIntegrator, SnapLock, SnapManager, SnapMirror, SnapMover, SnapProtect, SnapRestore, Snapshot, SnapValidator, SnapVault, StorageGRID, Tech OnTap, Unbound Cloud, and WAFL are trademarks or registered trademarks of NetApp, Inc. in the United States, and/or other countries. A current list of NetApp trademarks is available on the web at <http://www.netapp.com/us/legal/netapptmlist.aspx>.

Cisco and the Cisco logo are trademarks of Cisco in the U.S. and other countries. All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such.

Copyright information

Copyright © 1994-2015 NetApp, Inc. All rights reserved. Printed in the U.S.

No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

How to send your comments

You can help us to improve the quality of our documentation by sending us your feedback.

Your feedback is important in helping us to provide the most accurate and high-quality information. If you have suggestions for improving this document, send us your comments by email to doccomments@netapp.com. To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

You can also contact us in the following ways:

NetApp, Inc., 495 East Java Drive, Sunnyvale, CA 94089 U.S.

Telephone: +1 (408) 822-6000

Fax: +1 (408) 822-4501

Support telephone: +1 (888) 463-8277



NetApp®