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Dell Storage Cross-Platform Replication Solution Guide

Replication between Dell PS Series and SC Series storage

Dell EMC Configuration/Deployment

Revisions

Date	Description
May 2016	Initial release
February 2017	Add snapshot management, ps keep count, sc expiration, add rm support
September 2017	Added references to newer SC platforms

Acknowledgements

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Executive summary

Cross-platform replication allows customers to replicate between Dell™ PS Series and Dell EMC™ SC Series storage for disaster recovery and to enable future migration. The cross-platform replication feature is one way that Dell is simplifying management through a single GUI, while at the same time providing expanded mobility and protection of critical customer assets. This document explains how cross-platform replication works, and also provides typical use cases and requirements for asynchronous replication from PS Series to SC Series storage.

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1 Introduction

Cross-platform replication is asynchronous iSCSI replication between Dell PS Series and SC Series storage platforms. Replication may occur in either direction between the arrays, supporting volume replication, failover, and failback. Cross-platform replication is configured, managed, and monitored through the Dell Storage Manager (DSM) 2016 R1 release or higher.

1.1 Platform management with the Dell Storage Manager

DSM provides centralized management of SC Series, PS Series, and SC Series FluidFS. DSM is comprised of a Dell Storage Client and the Dell Storage Data Collector. The Dell Storage Client and Data Collector may be on separate servers for flexible management. The Data Collector is a database used to store information about the managed Dell Storage arrays, and is required for cross-platform replication. For this reason, the IP or host name of the Data Collector should be used when launching DSM, as opposed to using the IP of the SC Series array.

Figure 1 demonstrates how DSM manages replication, configuration, and operational control between the PS Series and SC Series storage.
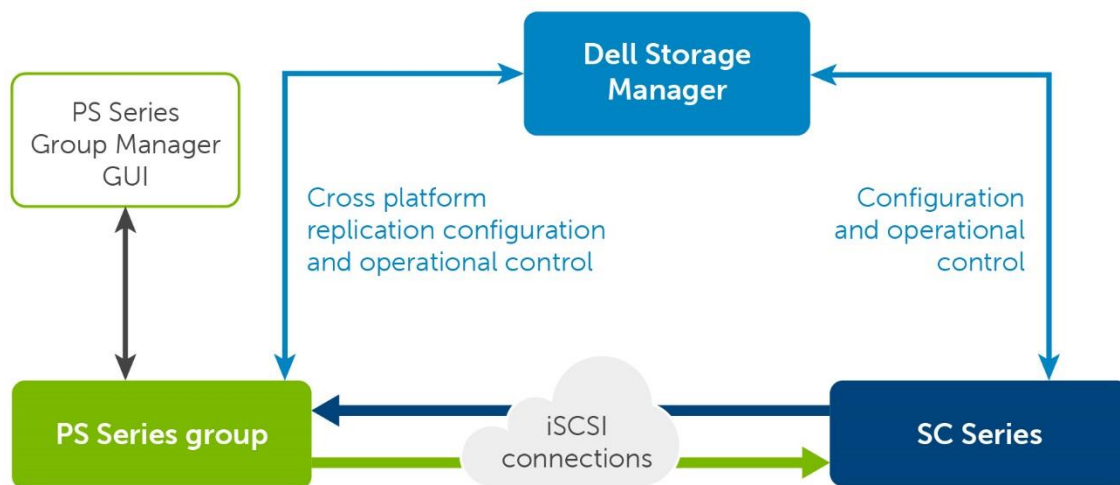
Figure 1   DSM operational relationship with PS Series and SC Series storage

Note: Although the PS Series Group Manager GUI is still available, cross-platform replication operations and management require Dell Storage Manager.

1.2 Cross-platform replication use case

Cross-platform replication is snapshot replication between PS Series and SC Series arrays. Cross-platform replication is asynchronous using iSCSI, is designed to work over distances, and requires less bandwidth than synchronous replication. It is a suitable option for disaster recovery sites with moderate RPOs and RTOs, such as social media platforms, blogs, wikis, or video-sharing sites and cloud storage applications based on snapshot replicas.

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1.3 Cross-platform replication of snapshots

Snapshot replication refers to a replication method between storage arrays. During this process, data is infrequently updated at specified times by copying only the data changes from the primary (protected) storage array to secondary (recovery) storage array. Since only data changes are copied, snapshot replication typically uses less network bandwidth and requires less time. Cross-platform replication uses snapshots to replicate only the changes between replication cycles.

1.4 Dell Storage terminology

See Table 1 for a list of terminology differences between PS Series and SC series replication

Table 1 PS Series and SC Series terminology differences for replication

Function	PS Series	SC Series
Asynchronous replication	Asynchronous replication	Remote Data Instant Replay[1]
Point-In-time copy (PITC)	Snapshot	Data Instant Replay[1]
Application consistent PITC	Smart copy	Data Instant Replay[1]
Server based host integration manager	Auto-Snapshot Manager	Replay Manager or Application Protection Manager
Synchronous replication	SyncRep	Synchronous replication
Volume on the remote array	Replica	Remote Data Instant Replay[1]
Relationship between source and target	Partners	Source SC and remote SC
Storage subsystem	Group	Storage Center or SC

[1] In the DSM Client, snapshot is now the common terminology for PITC for both platforms. The SC Series term, Replay (or Data Instant Replay), will no longer be used. Replication is also the common reference between both platforms.

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1.5 Important information

The following tables list important information regarding cross-platform replication functionality. Additional considerations are covered in the DSM, PS Series, and SC Series release notes located on the appropriate support site (see appendix A).

> Note: The current replication functional, operational implementations are preserved for each storage system. Cross-platform replication will be implemented for unique volumes not participating in any current replication.

Table 2 Both SC Series and PS Series

Function	Supported (Yes/No)
NAA (Network Address Authority) ID preservation for VMware® volumes	No
IPv6 configured iSCSI or management	No
Greater than 15 TB volumes	No
Volume collections	No

Table 3 SC Series functionality

Function	Supported (Yes/No)
Live Volume or replicate active snapshot	No
Compression or encryption of replicated data	No
Simulate a replicated volume	No
Portable Volume	No
Predefine disaster recovery	No
Test Activate Disaster Recovery	Yes
Validate restore points	No
Multi-point replication topology with PS Series	No
Multi-hop replication topology with PS Series as source	No

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Table 4   PS Series functionality

Function	Supported (Yes/No)
Replicate a PS Series volume with a sector size of 4K bytes to an SC Series system	No
Manage PS Series snapshot borrowing for replication in DSM	No
PS Series multiple pool replication	No
Application integration (Host Integration Tools and smart copy) with replicas.	No
Automatic thin provisioning of cross-platform replication volumes that are promoted	Yes
PS Series Manual Transfer Utility (MTU)	No
Replication of VMware Virtual Volumes (VVol)	No
SCSI UNMAP operations on PS Series source volumes configured with cross-platform replication	No
Compression of replicated data	No
Shrinking a volume that is configured for replication if the source is a PS Series and the destination is a SC Series.	No
Replication of thin clones	No
Replicate to primary	No
Active volume replication	No

Note: Please review the space considerations as described in Section 3.3 and 3.4

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2 Requirements for cross-platform replication

This section describes the requirements for managing cross-platform replication with DSM, minimum firmware revisions for the platforms, and the supported replication configurations. It is recommended to review the latest release notes for each platform on the appropriate support site (see appendix A).

2.1 Dell Storage Manager

Dell Storage Manager 2016 R1 or higher is needed for all cross-platform management functions.

2.2 PS Series model and firmware support

Cross-platform replication has the following PS Series requirements:

- PS Series firmware version 9.0 or higher
- PS Series model PS6610, PS4210, PS6210, PS-M4110, PS4110, PS6110, PS4100, PS6100, PS6510, PS6010, PS4000, PS6500, or PS6000

For the latest information, visit the Dell PS Series support site (login required) for administration guides, installation guides, and release notes.

2.3 SC Series model and SCOS support

Cross-platform replication has the following SC Series requirements:

- Storage Center Operating System (SCOS) version 7 or higher
- A supporting SC Series array, includes all except the SCv2000 Series
- SC Series Asynchronous Replication license (there is not a separate license for cross-platform replication)

For the latest information, visit the Dell EMC SC Series support site (login required) for administration guides, installation guides, and release notes.

2.4 Operating system requirements

Cross-platform replication supports block-only replication. Dell FluidFS is not supported with cross-platform replication.

For volumes to fail over properly, the operating systems and their versions should be supported on both platforms.

2.5 Host integration

PS Series Host Integration Tools (HIT) for the appropriate operating system is recommended for hosts attached to PS Series storage. Smart-copy replicas for volumes in a cross-platform replication relationship are not supported.

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SC Series Replay Manager (RM) for Microsoft® or VMware may be used to create snapshots on the local hosts for volumes replicating to a PS Series. However, the remote snapshots on the PS Series destination will not be accessible through RM.

The SC Series DSM Server Adapter is recommended on SC-attached Microsoft Windows® and VMware hosts. All SC-attached hosts should follow the best practices for that operating system.

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3 Design considerations for replication

In general, both SC Series and PS Series systems have similar requirements for asynchronous replication. They both use snapshot-based replication which requires only deltas for subsequent replication. Also, since the data is asynchronously replicated, cross-platform replication may have a higher tolerance for long distances and less-available bandwidth. However, even with these advantages, several physical aspects should be considered carefully in order to ensure a successful cross-platform replication deployment.

- The bandwidth available must be adequate to meet the business objectives for data replication.
- Cross-platform replication requires an IPv4 IP network (iSCSI) and should not be shared with other LAN traffic.
- Latency between sites should be considered with iSCSI replication across long distances. Higher latency reduces the rate of data replication and can therefore may affect other business objectives and dependencies such as minimum acceptable recovery point objective (RPO) and/or recovery time objective (RTO).

3.1 Planning for replication

Answering the following questions will help determine which storage arrays to configure for replication, how often to replicate the volumes, how many snapshots to keep, and how to coordinate the replication frequency:

- How large are the volumes?
- How much and how often does volume data change?
- How many copies of the volume (snapshots) should be kept?
- How much space is available on the PS Series and SC Series arrays to store replicated snapshots?
- What are the business recovery needs for the applications (RPO and RTO)?
- Who manages the replication and data-recovery process?

3.2 Primary and secondary server operating system considerations

When replicating between storage platforms, the operating system versions for both the primary and secondary should be the same for proper failover. In addition, the host operating system should be supported by both SC Series and PS Series storage.

3.3 PS Series space considerations

PS Series storage reserves space for replication, and cross-platform replication makes use of these reserves appropriately depending on the direction of the replication. When PS Series storage is the source, the **local replication reserve** is used to track changes; when PS Series storage is the target, **delegated space** is used. Both reserves are required to accommodate replication and failover situations, and are configured appropriately according to the following information.

Local replication reserve: This is configured by default to 200 percent of the source volume. This is the amount of space reserved in the pool for replication operations. Local replication reserve keeps track of changes that occur to the volume while it is being replicated. It also stores a failback snapshot (enabled by default with cross-platform replication).

Because replication snapshots and failback snapshots are representations of the volume data at precise points in time, the PS Series storage must maintain that state until the replication completes. To allow the volume to remain online and in use during this time, PS storage uses the local replication reserve to temporarily track changes to the volume while the operation is underway. When the replication is complete, the local replication reserve space is kept for a failback snapshot.

Delegated space: This is the amount of space dedicated to storing snapshots during replication when the PS Series storage is the target. Delegated space is required and will need to be allocated to accommodate snapshots from the partner for either replication or failover. All replication reserves are confined to exist within this configured limit.

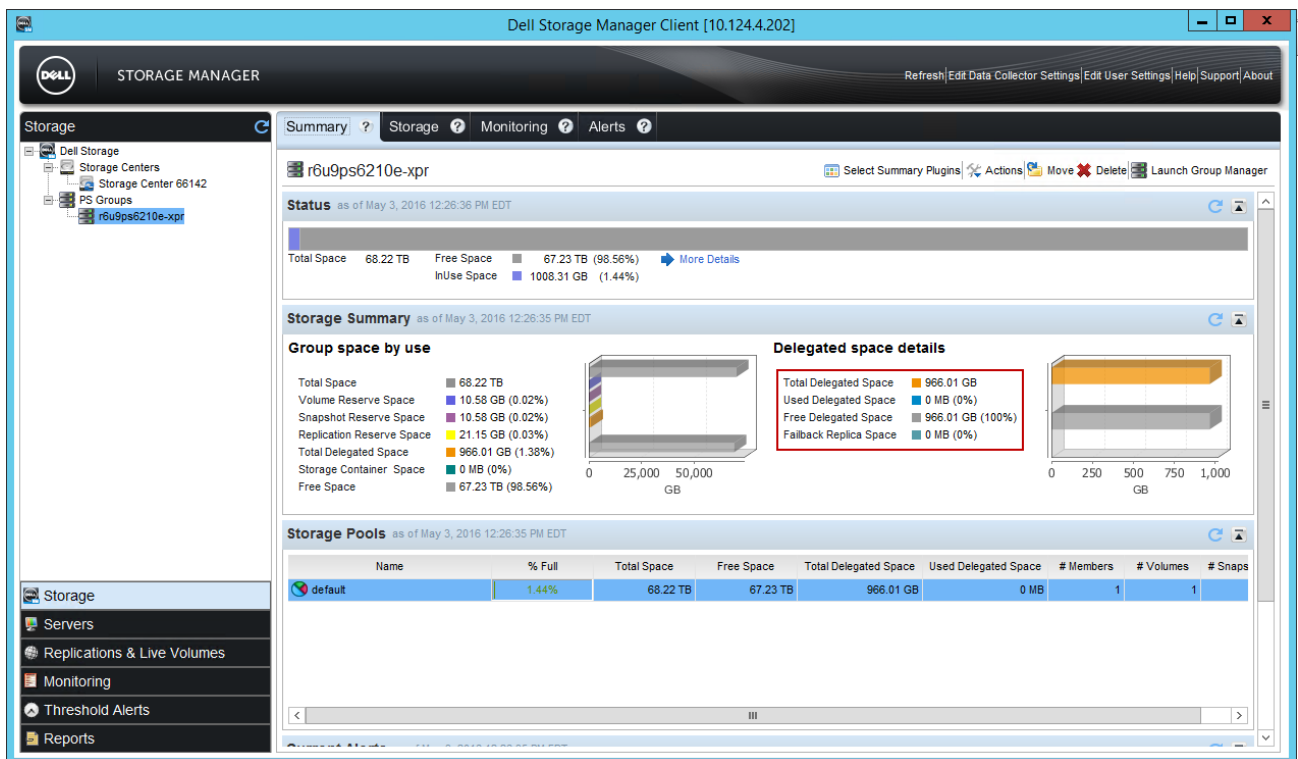Figure 2   Delegated space allocated for the remote PS group during iSCSI connection setup

Figure 3   PS Series space usage example in DSM

Note: When the PS Series is the destination with Cross-platform replication, the maximum replicas to keep is not available to the PS Series array. If the snapshots on the destination are not deleted regularly, the delegated space may fill up and manual intervention may be required. Please review the PS Series release notes for more information.

3.4   SC Series array space considerations

SC Series arrays are thin provisioned and do not reserve space for replication. The space is available from the free space in the disk folder and will allocate space as needed.

Note: When the SC Series array is the destination with Cross-platform replication, the snapshot will be retired based on the expiration time. The default is set to "Do not expire", this should be changed to match the business needs to avoid filling up the space on the SC Series array. Review the DSM release notes for more information.

3.5 SC Series replication and connectivity

SC Series asynchronous replication replicates snapshots between local and remote sites, offering easy-to-implement disaster recovery. With SC Series replication, organizations can establish business continuity with the granularity required to recover to any point in time. SC Series replication supports traditional Fibre Channel replication or cost-effective, IP-based replication.

Although cross-platform replication requires the use of iSCSI connections for replication, the primary or secondary hosts may be connected to SC Series arrays by any SC-supported connectivity option.

3.6 SC Series iSCSI replication considerations

SC Series storage provides replication throughput control to minimize overutilization of available network bandwidth. When replicating from SC Series to PS Series storage, this bandwidth control needs to be configured to enable replication. This is also known as the replication Quality of Service (QoS) for SC Series replication.

3.6.1 SC Series replication QoS

Cross-platform replication requires replication QoS when replicating a volume between SC Series and PS Series storage, or when the volume is failed over to the SC Series array and a **Restore/Restart Disaster Recovery** operation is initiated.

Replication QoS allows for no limits, or can limit the overall bandwidth between storage platforms or the percentage of bandwidth based on the day of week and the time of day.

Figure 4   SC Series replication QoS bandwidth limit schedule showing no limit as the default

4 Other methods for replication

This section covers other methods that address application and operating system business continuance and disaster recovery.

4.1 VMware Site Recovery Manager (SRM)

VMware Site Recovery Manager (SRM) helps applications seamlessly migrate from the primary (protected) site to the secondary (recovery) site during a disaster recovery. Storage Replication Adapters (SRAs) allow SRM to interact directly with the PS or SC storage arrays.

4.1.1 Using array-based replication or vSphere replication with SRM

According to this VMware article, SRM supports two different replication technologies: storage-array-based replication and vSphere replication. One of the key decisions when implementing SRM is which technology to use and for which virtual machines (VMs). The two technologies can be used together in an SRM environment though not to protect the same VM. Refer to the VMware article to understand the differences and tradeoffs between the two different replication technologies: SRM — Array Based Replication vs. vSphere Replication.
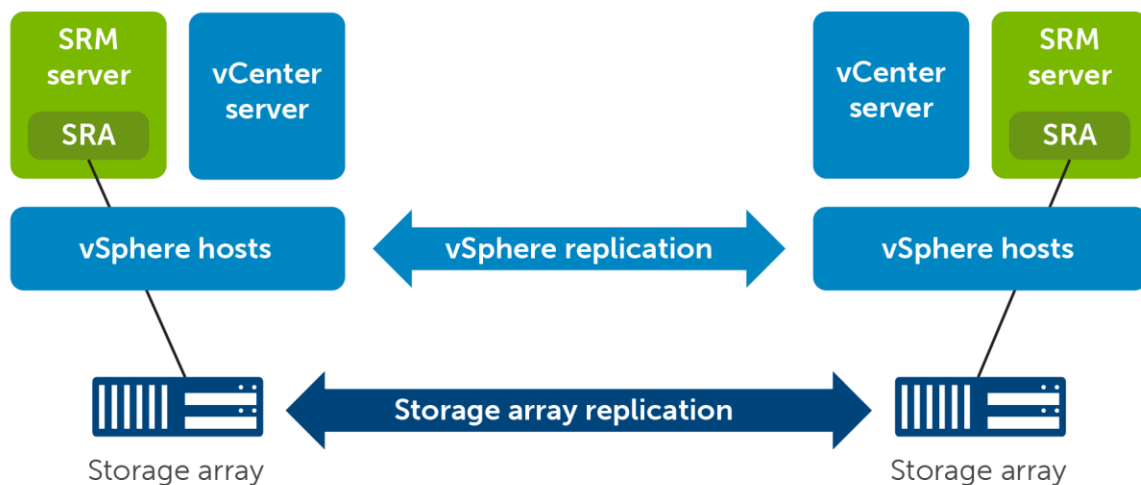

Figure 5   SRM between the same storage array platform

4.1.2 Mixing PS Series and SC Series within the same SRM environment

PS Series and SC Series SRAs currently do not support replication between dissimilar platforms. Therefore, customers using SRM between PS Series and SC Series arrays must use vSphere replication instead of storage-array replication with SRAs.
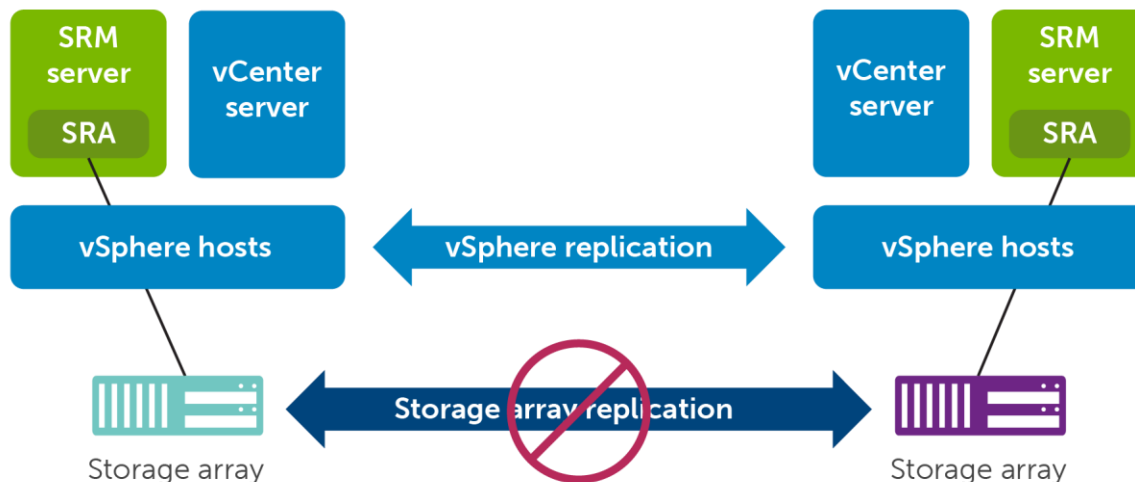

Figure 6   Mixing PS Series and SC Series would need to use vSphere replication with VMWare SRM

4.2 Microsoft SQL Server Always-On Availability Groups

Microsoft SQL Server® provides this availability feature that allows for databases to replicate to each other. Each database may exist on separate storage platforms. For more information, see the Microsoft article, Overview of Always On Availability Groups (SQL Server).

4.3 Microsoft Exchange Database Availability groups (DAGs)

Microsoft Exchange Server provides this availability feature that allows for databases to replicate to each other. Each database may exist on a separate storage platforms. For more information, see the Microsoft article, Database availability groups (DAGs).

4.4 Oracle Data Guard and Real Application Clusters (RAC)

Oracle® also has many high availability features that allows for Oracle databases to replicate to each other. For more information see the Oracle article, Database High Availability.

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5   One-time migration

PS Series storage may be migrated to SC Series storage using the Thin Import feature for block storage migration. This is intended for one-time migration and is not integrated with cross-platform replication.

5.1   PS Series to SC Series: Thin Import

Thin Import is a synchronous method for one-time migration of data from a PS Series volume to an SC Series volume using a high-speed iSCSI connection. For more information, see the document, PS Series to SC Series Storage Data Migration using Thin Import, and the related video on this topic.

5.2   PS Series FluidFS to SC Series FluidFS

Dell global services can provide methods to migrate from a Dell FS7610 or FS7600 system to the Dell FS8600 platform. Contact your Dell account executive or channel partner for more information.

6 Cross-platform replication functions

Cross-platform replication addresses the needs for asynchronous replication and features several main functions to accommodate disaster recovery. These functions are summarized in this section.

6.1 Set up iSCSI connectivity between arrays

This is a one-time operation that will establish the iSCSI communication for replication between front-end ports of both the SC Series and PS Series arrays. This will only need to be established once and will be used for either direction of cross-platform replication. This process is performed through DSM with the **Configure iSCSI Connections** operation (see section 8.1).

6.2 Replicate volumes between arrays

Cross-platform replication requires volumes to be configured between the two arrays and then replication may be initiated manually or automatically with schedules. This process is configured through DSM with the **Replicate Volume** operation (section 8.2). Manual replication of the snapshot is initiated with **Replication Now** (section 9.1) if the PS Series array is the source, or **Create Snapshot** (section 9.2) if the SC Series array is the source. **Schedules** (section 12) may automate the replication cycles.

6.3 Fail over volumes to a destination array

During a disaster or planned maintenance, volumes may need to be failed over to a destination array. This process is through the **Activate Disaster Recovery** operation (see section 10) in DSM.

6.4 Fail back volumes to the original replication direction

Once the environment is back to normal, the data from the destination volume may be replicated back to the original source array and then replication is reestablished as it was before the disaster or maintenance. This process is also administratively initiated in DSM with the **Restore/Restart Disaster Recovery** operation (see section 11).

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7 Install software and manage storage

Install and configure PS Series and SC Series arrays with appropriate connectivity, licenses, and host integration tools per best practices. Make sure PS Series and SC Series storage have the appropriate firmware or OS release as described in the requirements (section 2).

Install the DSM Client and Data Collector on Windows hosts (optionally both on the same host). To provide easy discovery and management of volumes, install the DSM Server Agent on all SC-attached Windows hosts.

7.1 Add a PS Series array to DSM

For the purposes of cross-platform replication, the PS Series replication components must be managed within DSM.

1. In the **Storage** navigation tree, right-click **Dell Storage** and select **Add PS Group**.
2. Provide the hostname or IP address, and the user name and password.
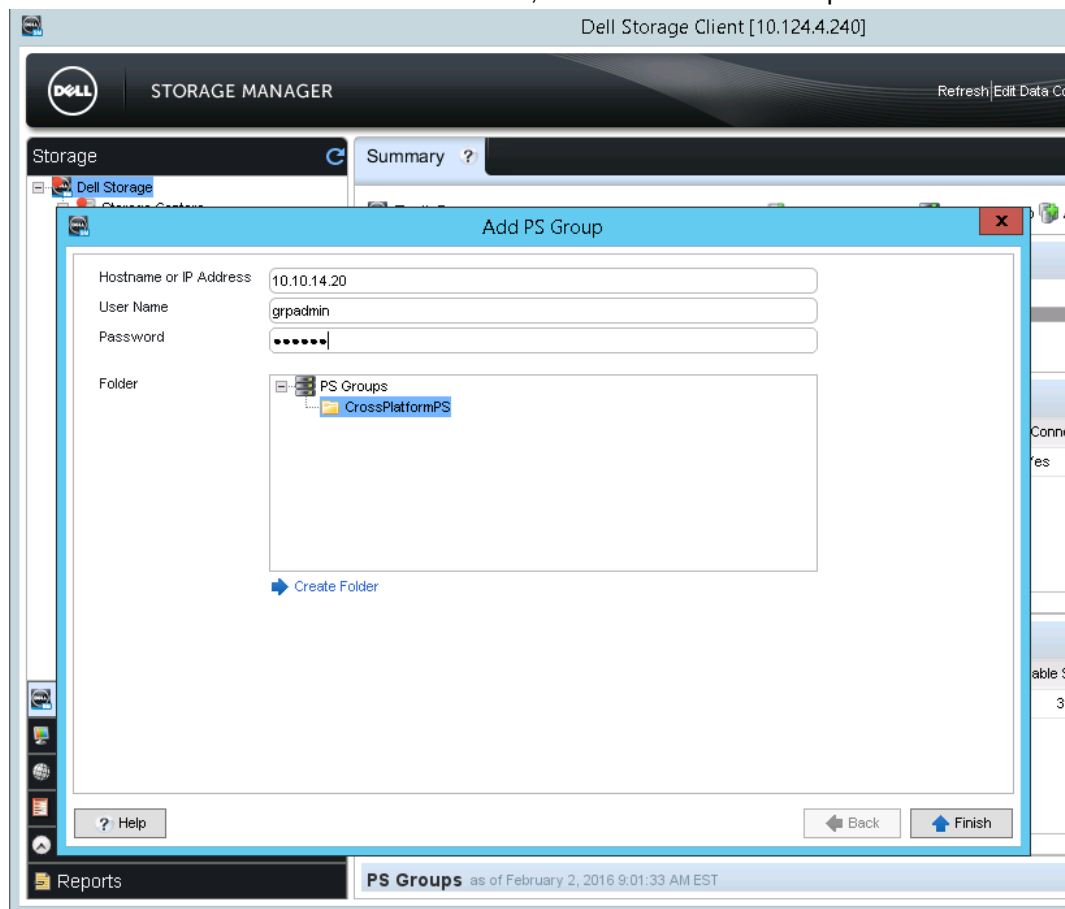
Figure 7   Add a PS Series array to DSM

Both the SC Series and PS Series arrays are now managed by DSM.

3. Click the **Storage** or **Summary** tab to see the properties for the PS group (such as volumes, ACLs, used and available storage, and snapshot space)
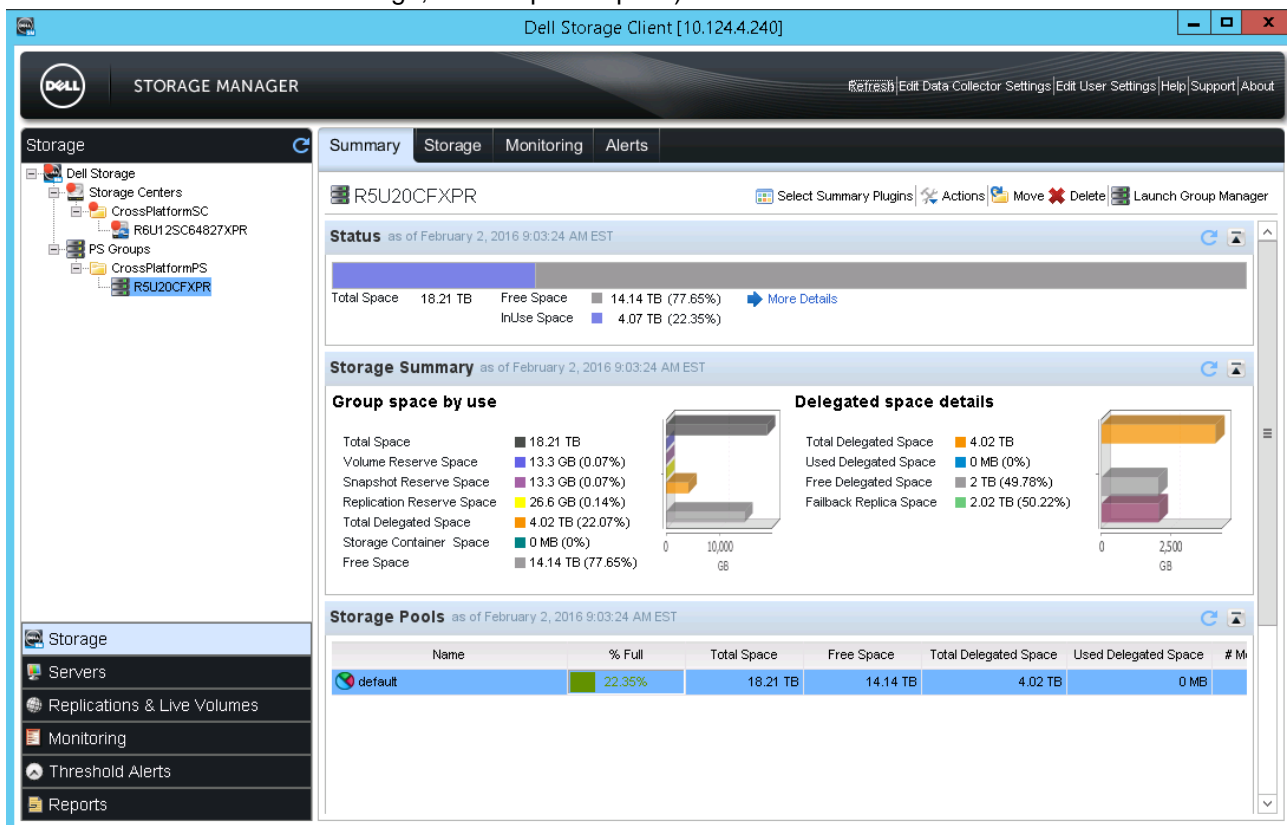

Figure 8   SC Series and the PS Series arrays managed by DSM

7.2 Add a SC Series array to DSM

SC Series storage is completely managed by DSM.

Note: The Storage Center Manager web-based GUI that was included with SC Series controllers (except for the SCv2000) is no longer available with SCOS 7.0.1 and newer. For information about the new web UI, see the *Dell Storage Manager 2016 R1 Web UI Administrator's Guide* available on Dell.com/support.

4. Launch the Dell Storage Client.
5. Enter the IP or host name for the **Dell Storage Manager Data Collector.**
6. Enter the credentials for the **Dell Storage Manager Data Collector**.

7. Add a Storage Center (SC Series array):
   a. Right-click the Storage Centers under the **Storage** panel.
   b. Enter the hostname or IP Address.
   c. Enter a user name and password.
   d. Select a folder (optional).
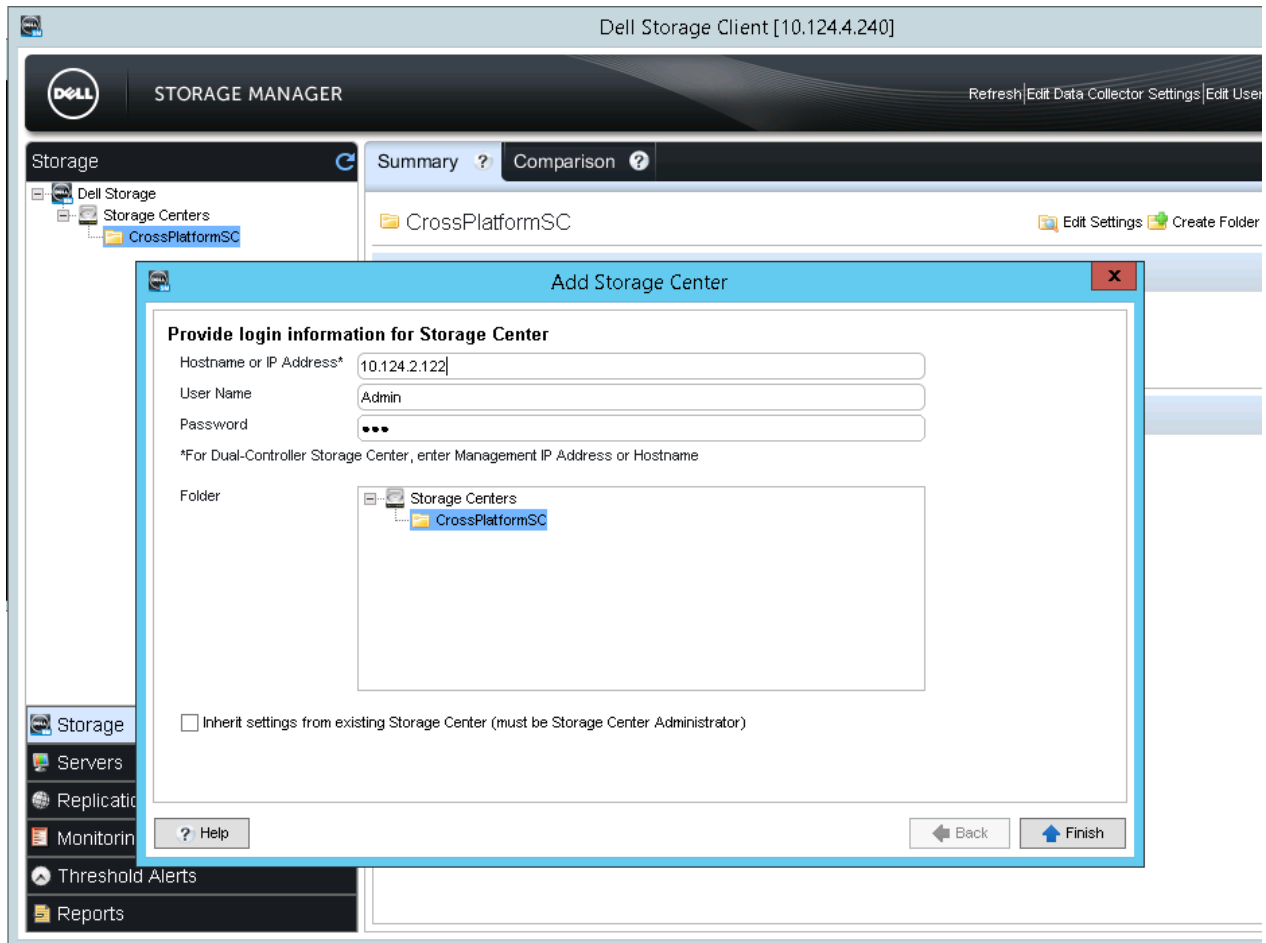   e. Provide the IP address of the SC Series array and the login credentials.

Figure 9   Add an SC Series array to the Dell Storage Client

8 Get started with iSCSI replication

Before enabling cross-platform replication, iSCSI connections must be configured between SC Series and PS Series storage platforms. Once the iSCSI connectivity is established, replication may occur in either direction. Cross-platform replication is enabled at the volume level and must be configured on a volume-by-volume basis.

8.1 Establish iSCSI connectivity between storage platforms

Use the following steps to configure the iSCSI connection between the PS Series and the SC Series arrays:

8. Click the PS Series array under **Storage** in DSM.
9. Right-click **Actions** > **Replication** > **Configure iSCSI Connection**.

Note: The action, Configure iSCSI Connection, only needs to be performed once, regardless of the replication direction.

10. Select the target SC Series array.
11. Click one of the remote iSCSI controller ports to allow connectivity. Be sure this is a port that the PS Series array may access.

Figure 10   Configure the PS-to-SC iSCSI connectivity for replication

Note: Only one fault domain is supported for cross-platform replication.

12. Configure **Storage Pool** and **Delegated Space (For Remote PS Group)** (see section 3.3),
13. Click **Finish**.

> **Note**: At this point, the iSCSI connectivity between arrays has been established, however volume replication is not yet enabled. This step is covered in the following sections.

8.2 Enable PS-to-SC replication on the volume

Once iSCSI connectivity is established, replication must be enabled on a volume-by-volume basis.

1. Select the PS group.
2. Click the **Storage** tab and select the volume on that PS group.
3. Right-click the volume and select **Replicate volume**.
4. Select the destination SC Series array (the target for the volume replication).
5. Change the **Name** of the destination volume (optional).
6. Select the **Destination Storage Type**.
7. Enter the **Replica Time to Live** to determine how long before a replication snapshot will remain before it expires (default is do not expire).

Create Replication [r6u9ps6210e-xpr] [Storage Center 66142]

Replication Attributes
Transport Type   iSCSI Only
Type   Asynchronous

Destination Volume Attributes
Name   ReplOfPStoSC-r6u9ps6210e

PS Group Replication Reserve
Destination Storage Type   Assigned - Redundant - 2 MB
Replica Time to Live   0   Minutes
                            ☐ Do Not Expire

Figure 11   Enable replication of PS Series to SC Series volume

> **Note**: If the default is not changed, the remote snapshots will use up space on the SC Series array. Best practice is to change this value to meet the business objectives for retaining replicas.

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Figure 12   Example of changing the replica time to live to meet the business objective.

8.   Click **Finish**.

Note: For PS-to-SC replication, the SC Series array allows a volume name to be modified.
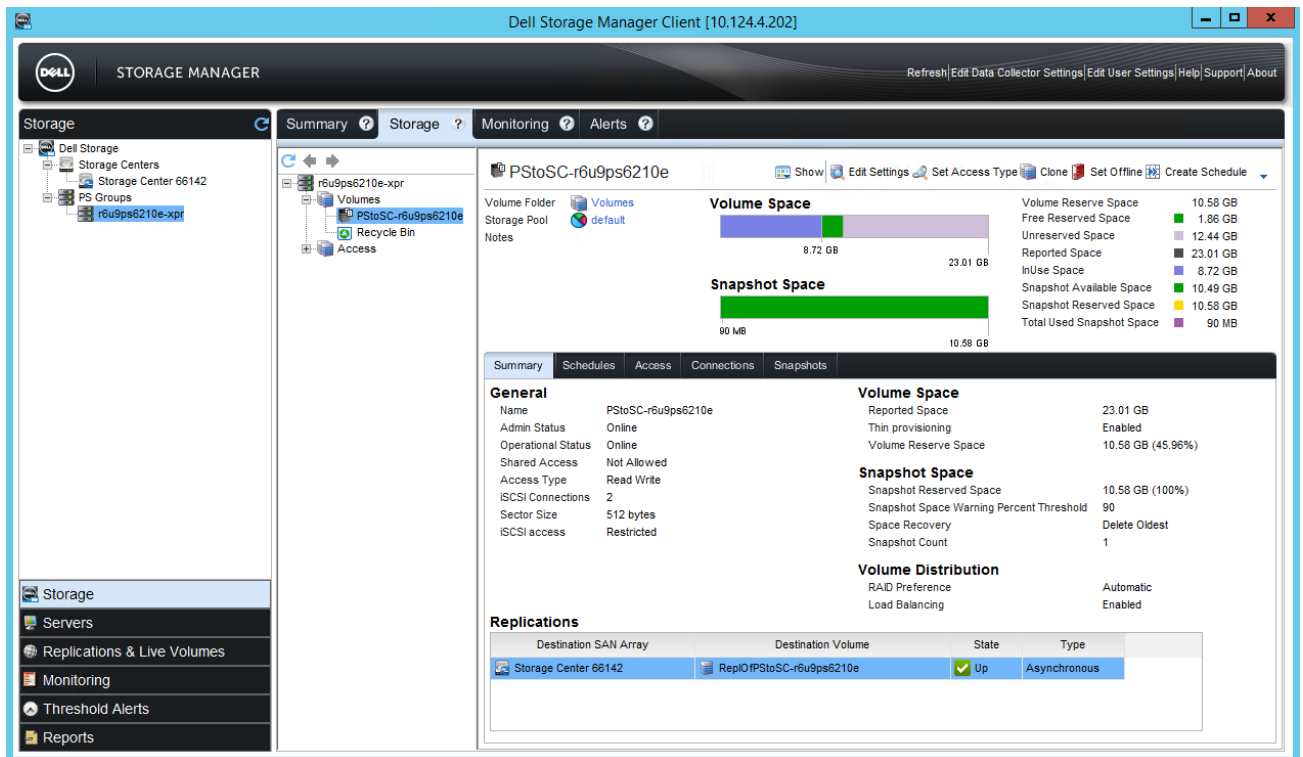

Figure 13   DSM Client with a PS Series volume enabled for replication

The destination volume on the destination SC Series array will be visible from the **Storage** tab of the SC Series array.
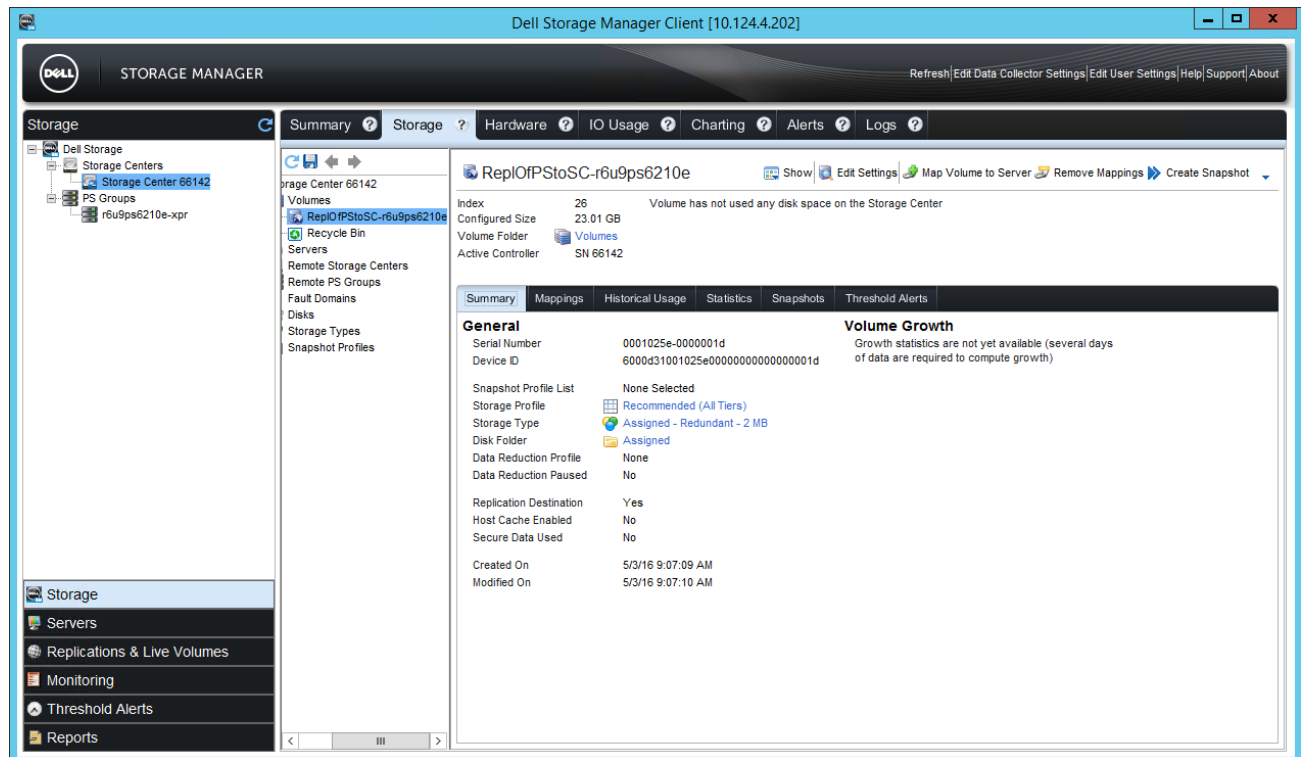

Figure 14   Destination volume on the SC Series array

Note: At this point, the replication relationship is established, but replication will not start until the Replicate Now option is clicked. This step is covered in the following section.

8.3   Enable SC-to-PS replication on the volume

Once iSCSI connectivity is established, replication must be enabled for the volume. This process is functionally the same as when replication is enabled from the PS Series to the SC Series array. However, QoS must be configured.

1. Select the SC Series array.
2. Click the **Storage** tab and select the volume on the source SC Series array.
3. Right-click the volume and select **Replicate Volume**.

Note: If no replication QoS nodes have been configured, you will be given the chance to create one.

4. Select the destination PS Series array to replicate the volume.
5. Select an available **Replication QoS Node**.
6. Set the PS group replication reserve percentage to accommodate the changes between replication cycles (200 percent is recommended for fast failback).

Figure 15   Enable replication from a PS Series to an SC Series volume

7. Click **Finish**.

Note: In SC-to-PS replication, there is no volume created at the destination. For this reason, the destination volume name may not be modified. This is because the destination volume exists only as a replica at the destination. This replica becomes visible as a volume after it is promoted as part of the Activate Disaster Recovery operation.

Figure 16   The Dell Storage Client shows the SC Series volume enabled for replications

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For SC-to-PS replication, the destination volume is indicated under the PS Series **Monitoring** tab > **Replication** > **Inbound Replication.**
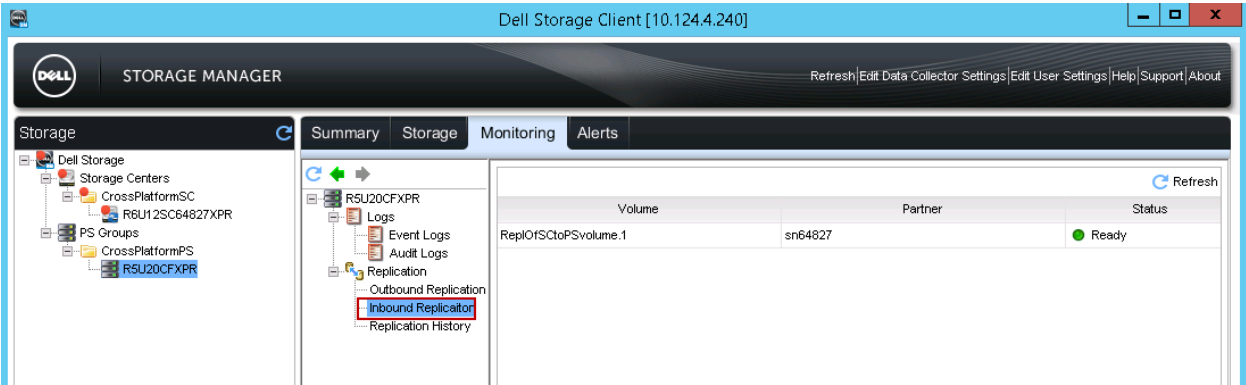
Figure 17   The Dell Storage Client shows the destination volume on the PS Series

Note: At this point, the replication relationship is established. Data will be replicated once it is started manually or through schedules.

9 Manual replication

Replication may be started with a schedule or manually from DSM. To initially synchronize data between platforms, manual replication is an easy method to test cross-platform replication functionality. At any point, replication may be configured as a schedule to replicate updates when necessary.

9.1 PS Series to SC Series: Manual replication

Initiating snapshot replication from PS Series to SC Series storage is performed on the volume after the iSCSI connections have been enabled and the volumes have been enabled for replication.

1. In the Dell Storage Client, click Replications & Live Volumes.
2. Make sure the arrays under the PS Series **Source SAN Arrays** are selected.
3. Right-click the PS Series source volume.
4. Click **Replicate Now**.

The status in **Replications & Live Volumes** shows the percent complete.

> **Note**: On the Replication & Live Volumes dashboard, click the Replications tab to view replication status for a volume.
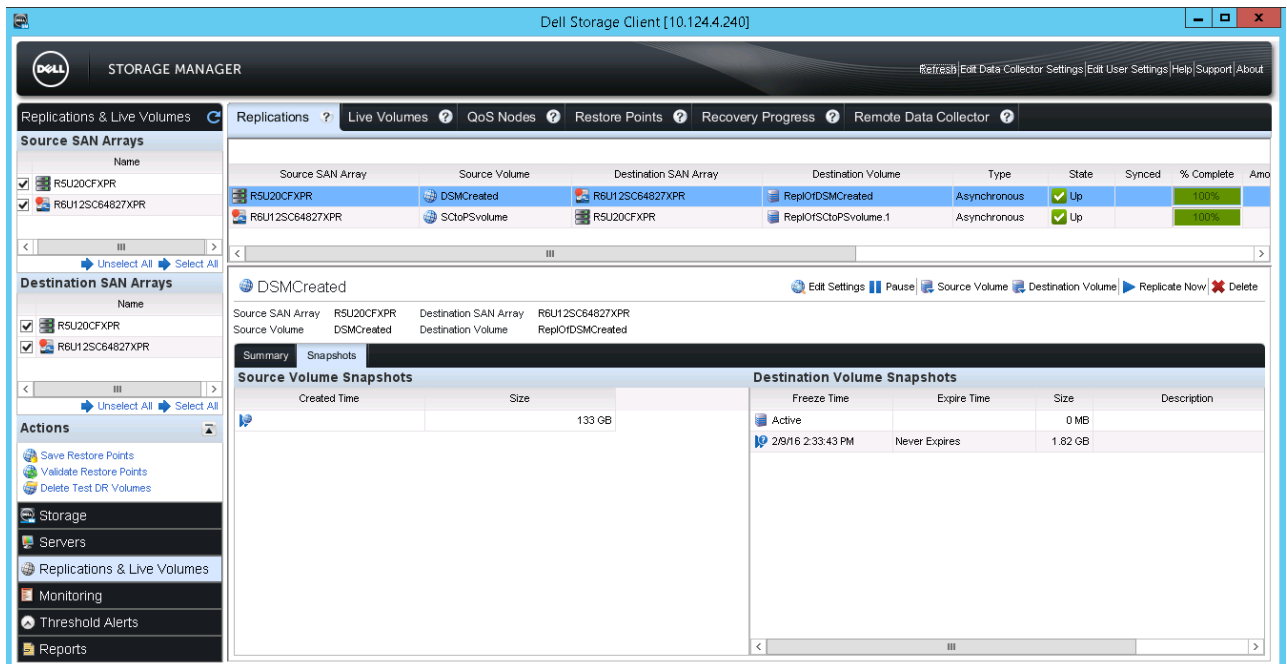
Figure 18   Replication progress and status

9.2 SC Series to PS Series: Manual replication

Initiating replication from SC Series to PS Series storage is performed on the volume after the volumes have been enabled for replication and iSCSI connections have been configured.

1. In the **Dell Storage Client**, under the **Storage** navigation button, make sure the source SC Series storage array is selected.
2. Right-click the source volume under the SC Series **Storage** tab.
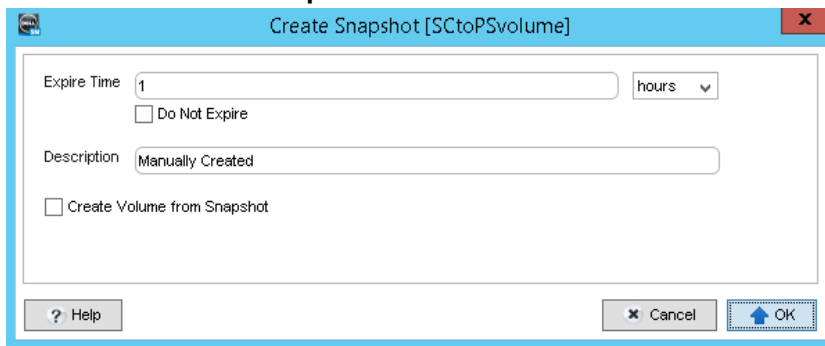3. Click **Create Snapshot**.

Figure 19   Create Snapshot on SC Series volume to initiate replication to a PS Series volume

The **Replications** tab under **Replications & Live Volumes** shows the percent complete.

4. Once complete, click **Replications & Live Volumes** > **Replications** > **Snapshots** to view the status of destination volume snapshots. The replication that recently completed should be listed.

Note: Progress can be monitored from the Replications & Live Volumes tab. Click the refresh button to view the current status.
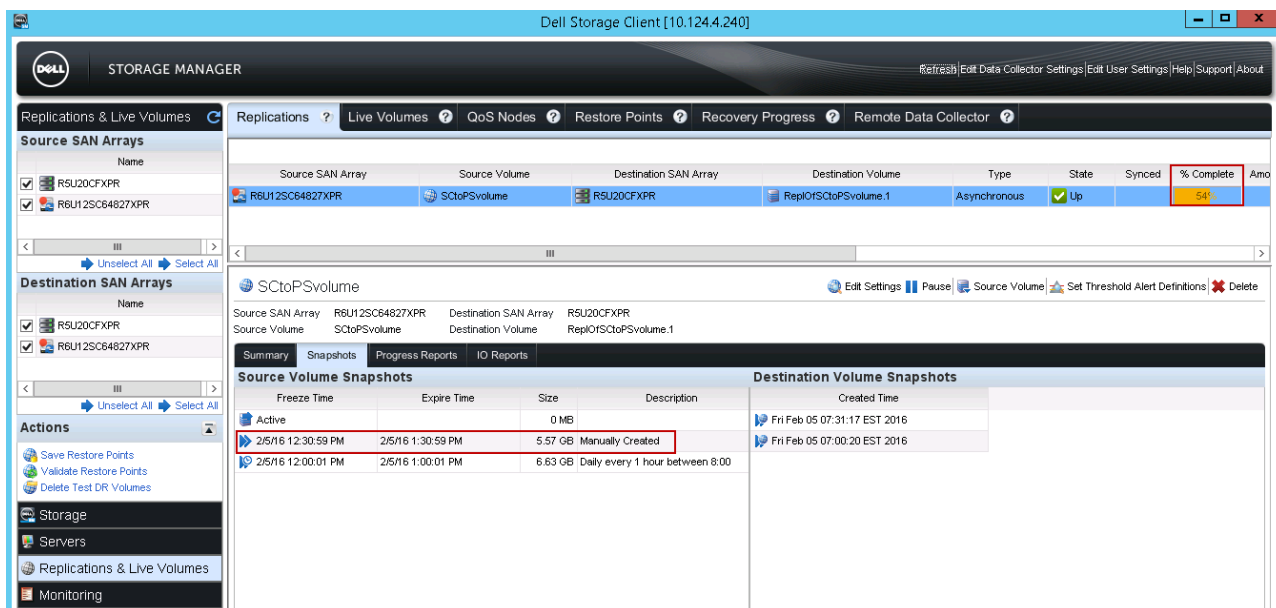
Figure 20   Replication progress and status

10 Activate Disaster Recovery (failover)

Disaster-recovery scenarios may be tested and manually controlled with cross-platform replication in DSM. In the event of an actual production disaster, many other steps related to the facilities, network, and host applications may be necessary. The steps in this section only provide a general guide based on the Dell Storage perspective of disaster recovery.

The process to activate the disaster recovery array through DSM includes these general steps:

1. Select restore points.
2. Activate disaster recovery.
3. Select destination server.
4. Establish connection from the destination server to the destination volume.
   – For PS Series to SC Series: Map volume to server
   – For SC Series to PS Series: Add ACL to server

5. Bring the disk online.

10.1 PS Series to SC Series: Activate Disaster Recovery

This procedure demonstrates failover of a PS Series to an SC Series volume. The replicated volume will become accessible on the target SC Series array and destination host.

1. Launch DSM.
2. Click **Replications & Live Volumes**.
3. Select the source and destination SAN arrays.
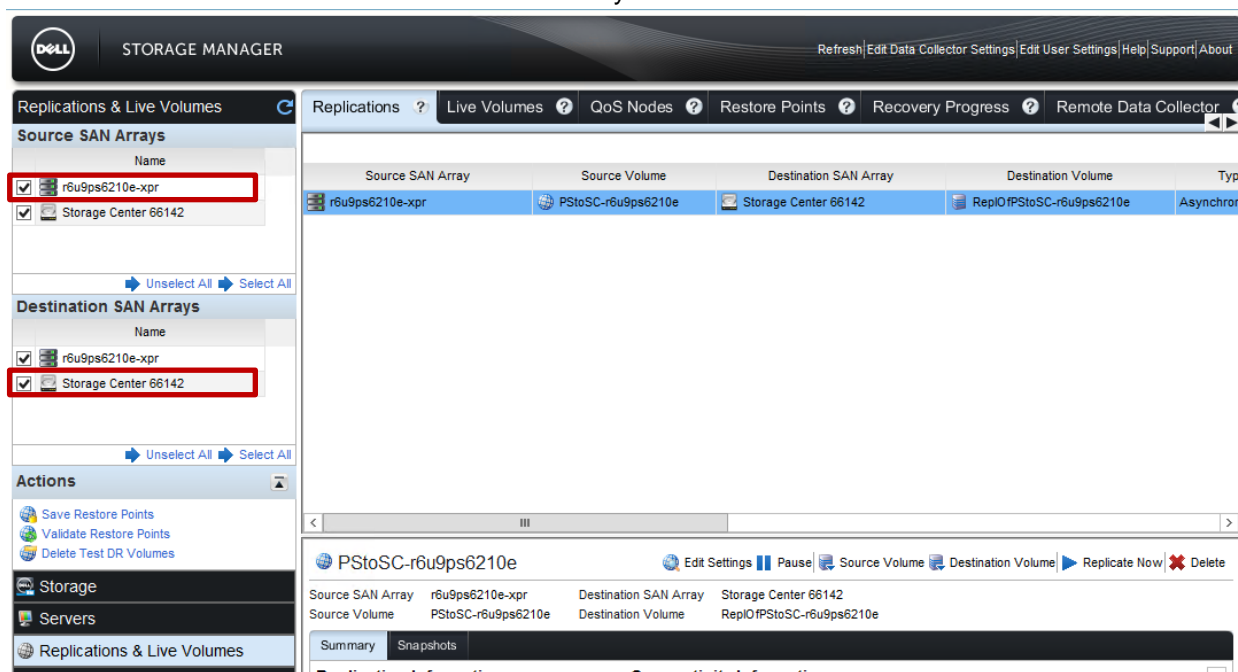
Figure 21   Select source and destination arrays and click Restore Points

4. Click **Restore Points**.
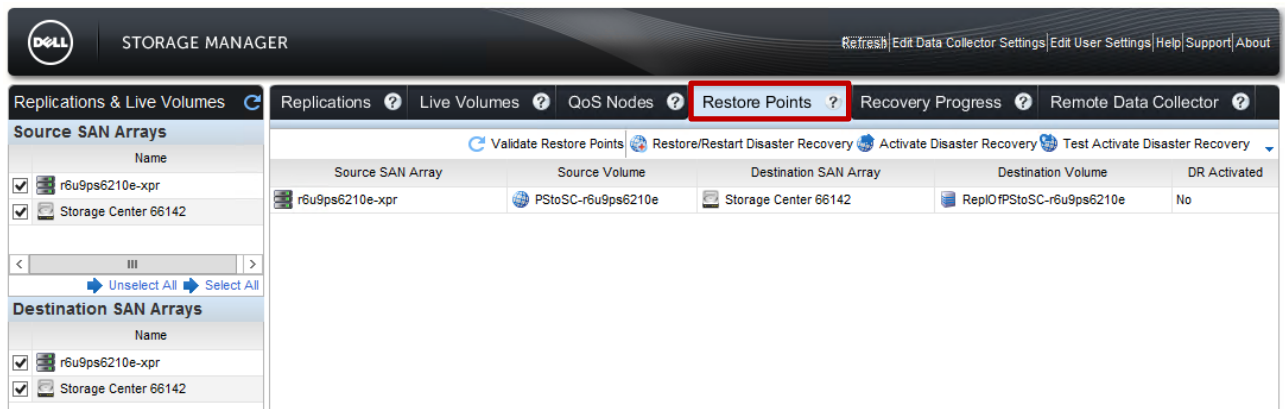
Figure 22　Click Restore Points

5. Select the desired disaster recovery source/destination volume pair:
   a. Click **Activate Disaster Recovery**.
   b. Select the source and destination SAN array in the wizard.
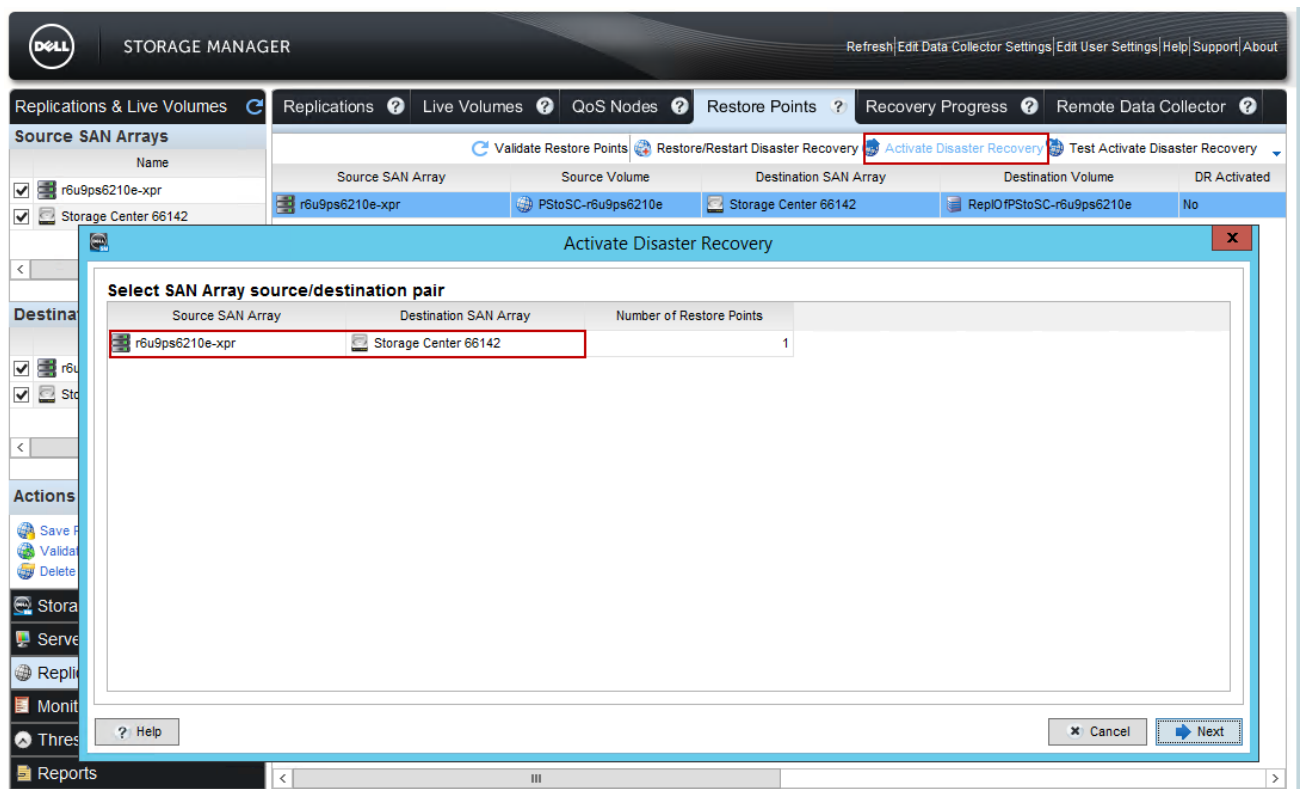   c. Click **Next**.

Figure 23　Activate Disaster Recovery

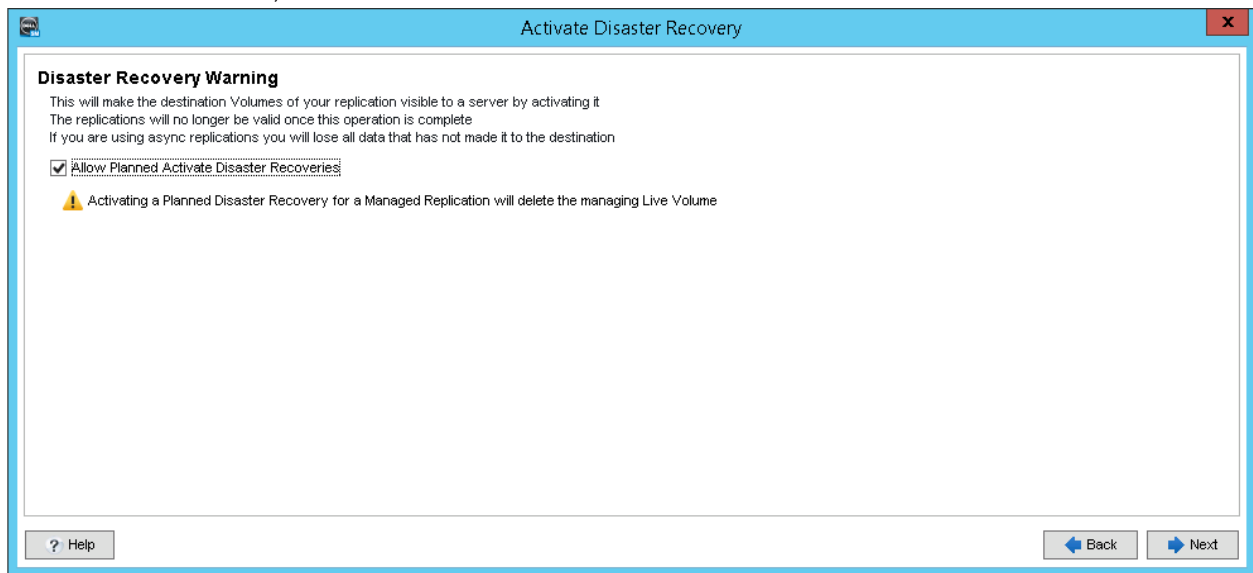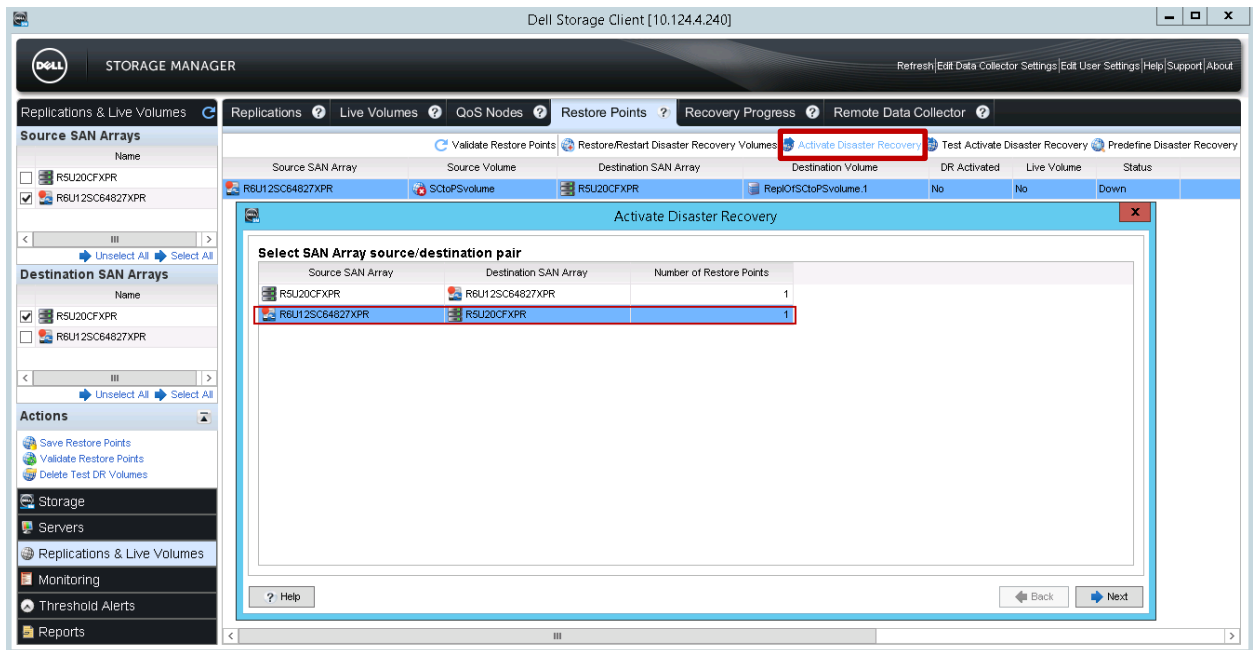6. Check the box, **Allow Planned Activate Disaster Recoveries** and click **Next**.


Figure 24   Warning before activating disaster recovery

7. Check the box next to the desired source volume under **Available Restore Points** and click **Next.**
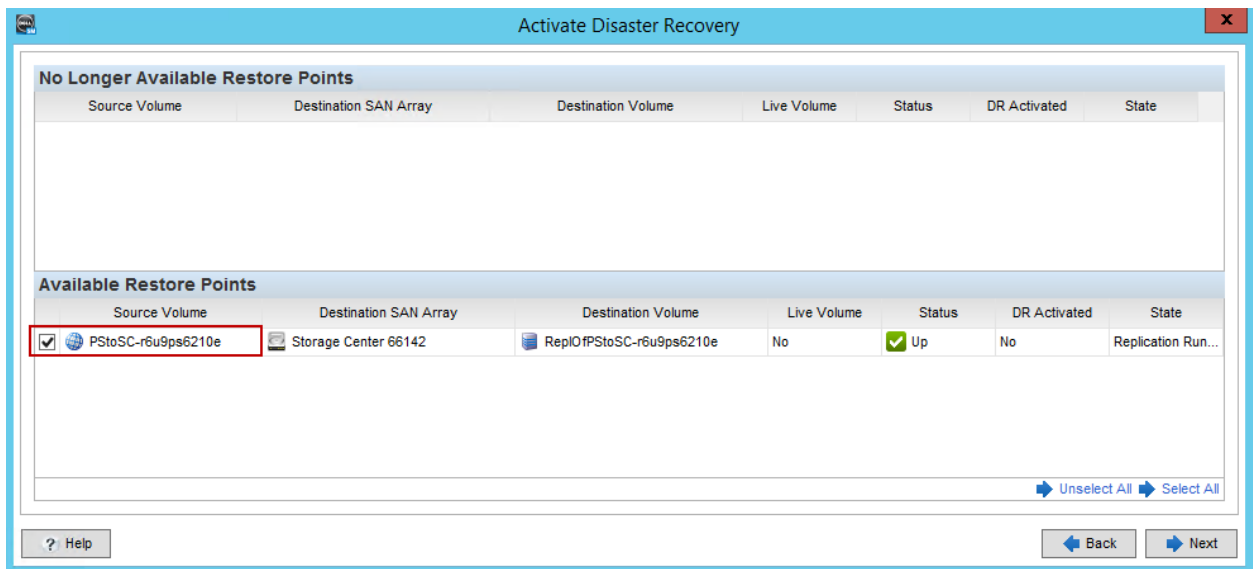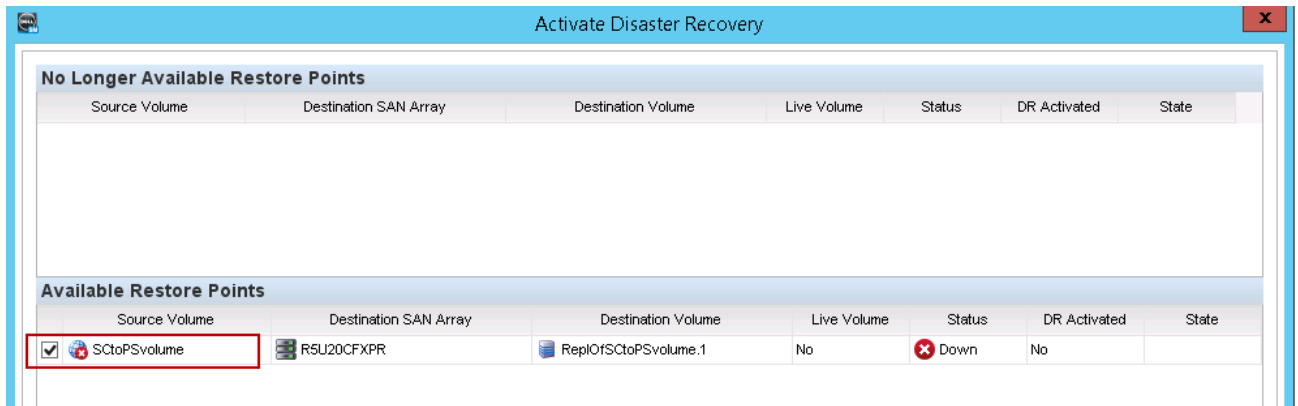

Figure 25   Available restore points

8. Confirm the source and destination and click **Finish**.
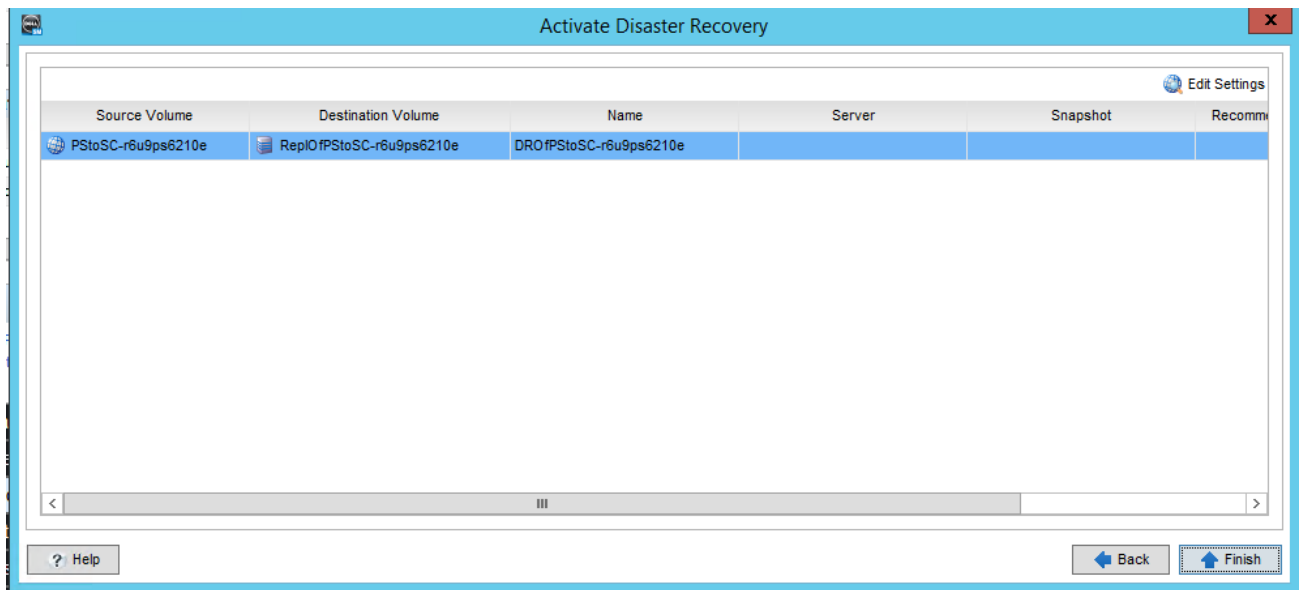
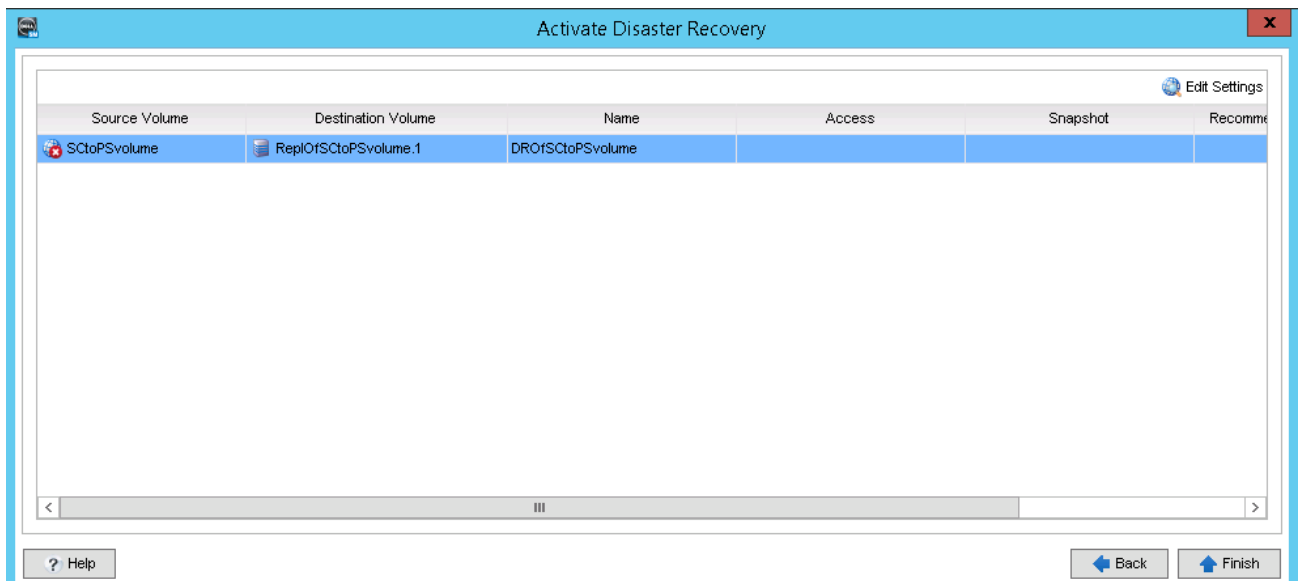Figure 26   Confirm the source and destination volume
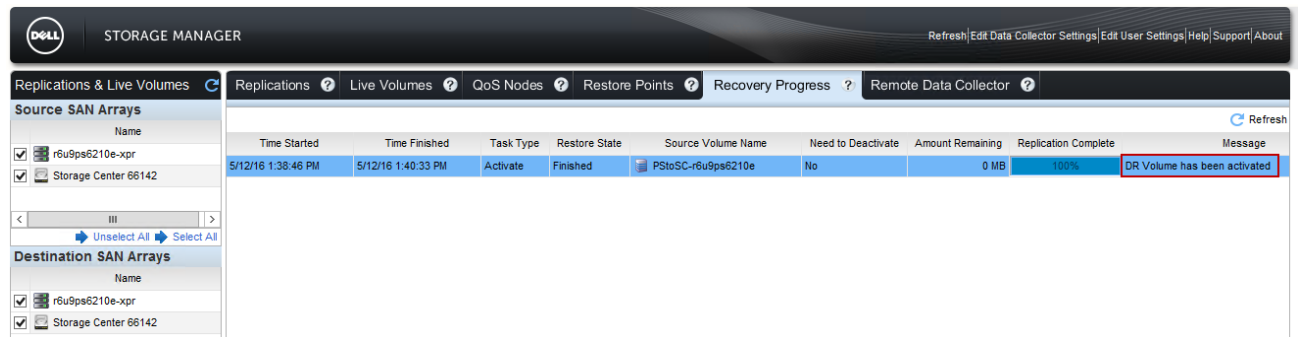
Figure 27   Monitor the status of the failover

10.2   SC Series to PS Series: Activate Disaster Recovery

This section shows how to perform a failover from an SC Series to a PS Series volume. The replicated volume will then be accessible on the target PS Series array and destination host.

1. In the Dell Storage Client, click **Replications & Live Volumes**.
2. Select the source and destination SAN arrays.
3. Click the **Restore Points** tab.
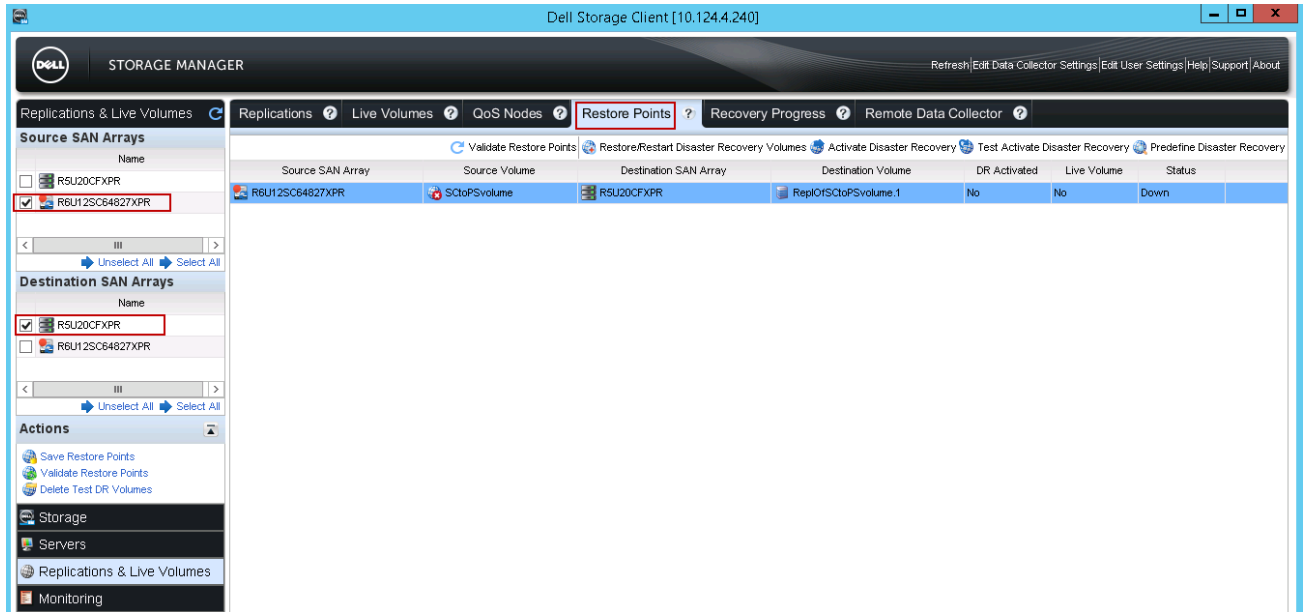
Figure 28   Restore point activation on the SC Series array

4. Select the disaster recovery source and destination volume pair to activate disaster recovery.
5. Click **Activate Disaster Recovery**. A wizard will launch.
6. Select the source and destination SAN Array.
7. Click **Next**.

Figure 29   Activate Disaster Recovery

8. Check the box, **Allow Planned Activate Disaster Recoveries** and click **Next**.
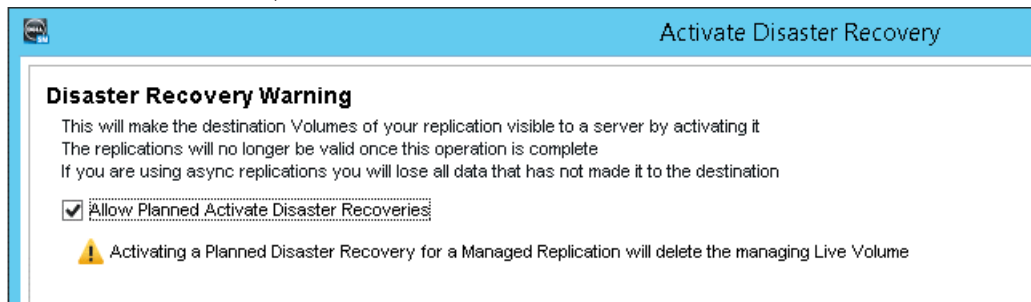
Figure 30   Allow Planned Activate Disaster Recoveries

9. Check the box next to the source volume in the **Available Restore Points** section and click **Next**.

Figure 31   Select the available restore point

10. Confirm the source and destination and click **Finish.**

Figure 32   Confirm the source and destination volume
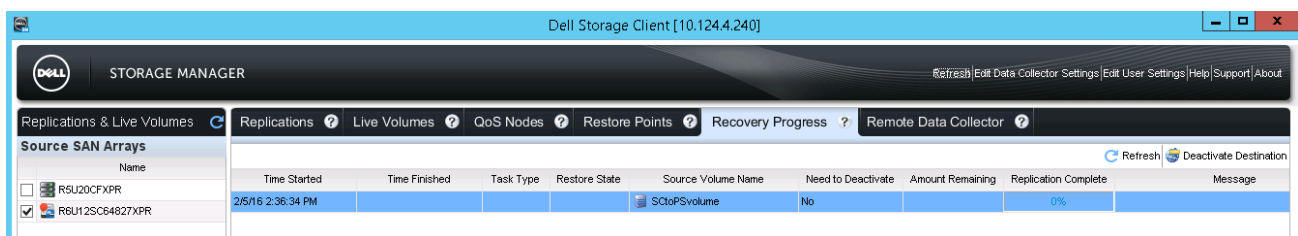
Figure 33   Monitor the status of the failover

10.3 PS Series to SC Series: Establish server connection

In most disaster scenarios, the volume will need to be accessed by a destination server attached to the SC Series array to allow for review or changes to the volume and possible restore. The SC-attached server needs to be added to DSM before access is possible to the volume.

1. In the **Dell Storage Client**, click **Storage Centers** and select the destination SC Series array.
2. Click the destination volume and click the **Mappings** tab.
3. If no mappings exist, click the **Map Volume to Server** option.
4. Select the destination server.
5. Establish mappings to the activated destination volume.
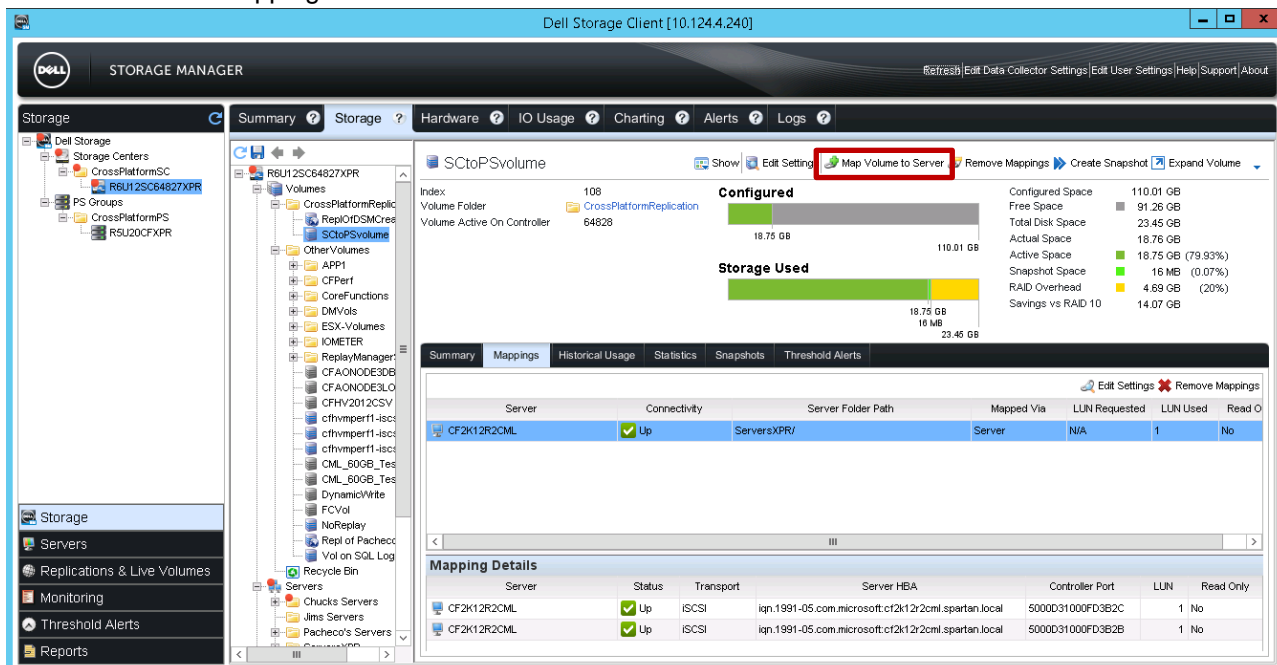
Figure 34   SC Series volume mapped to the DR server

On the destination server, the volume should be online (may require a rescan).

The volume contents on the disaster recovery server should show the data as it was after the last replication cycle.
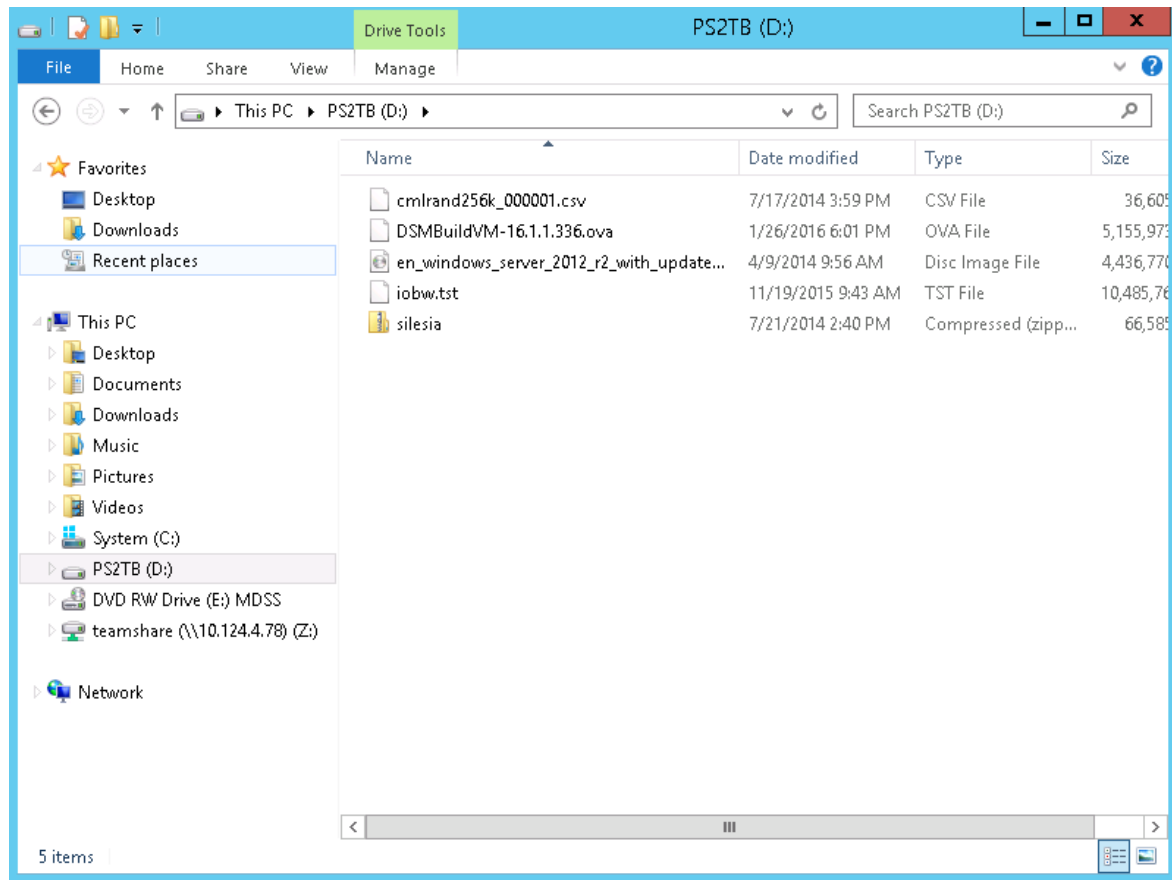

Figure 35   Volume contents on the target for this example

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10.4 SC Series to PS Series: Reestablish server connection

Once the Activate Disaster Recovery operation is completed, the volume may need to be accessed by a destination server to allow for review or changes to the volume and possible restore.
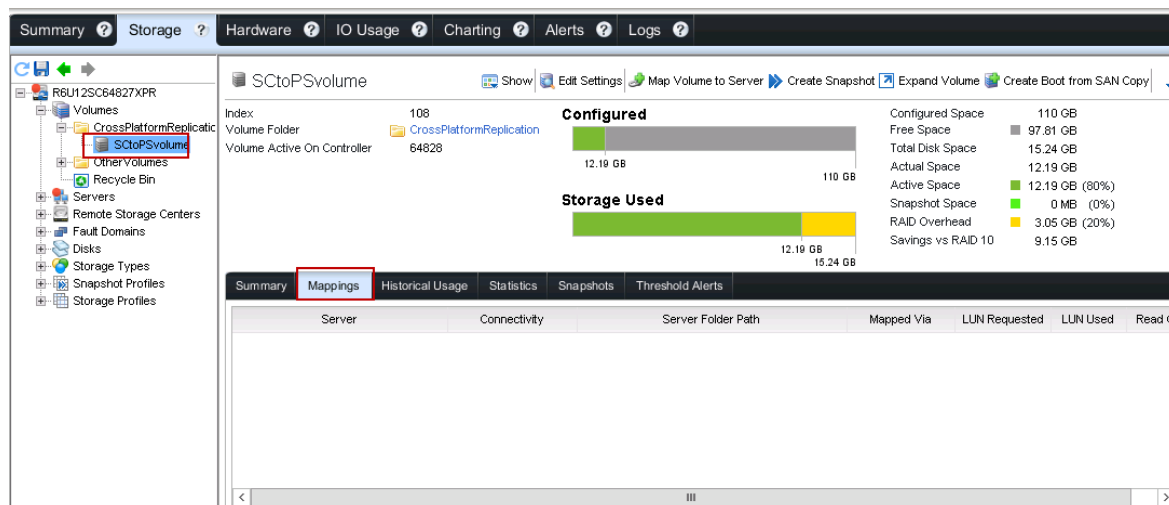

Figure 36   After disaster recovery, the primary volume is no longer mapped

To establish access to the destination volume on the PS Series array:

1. In **DSM** > **Storage** tab for the PS Series, click the volume and click **Access**.
2. Select existing Access Policy Groups, Access Policies or Basic Access Points, or create a new ACL.
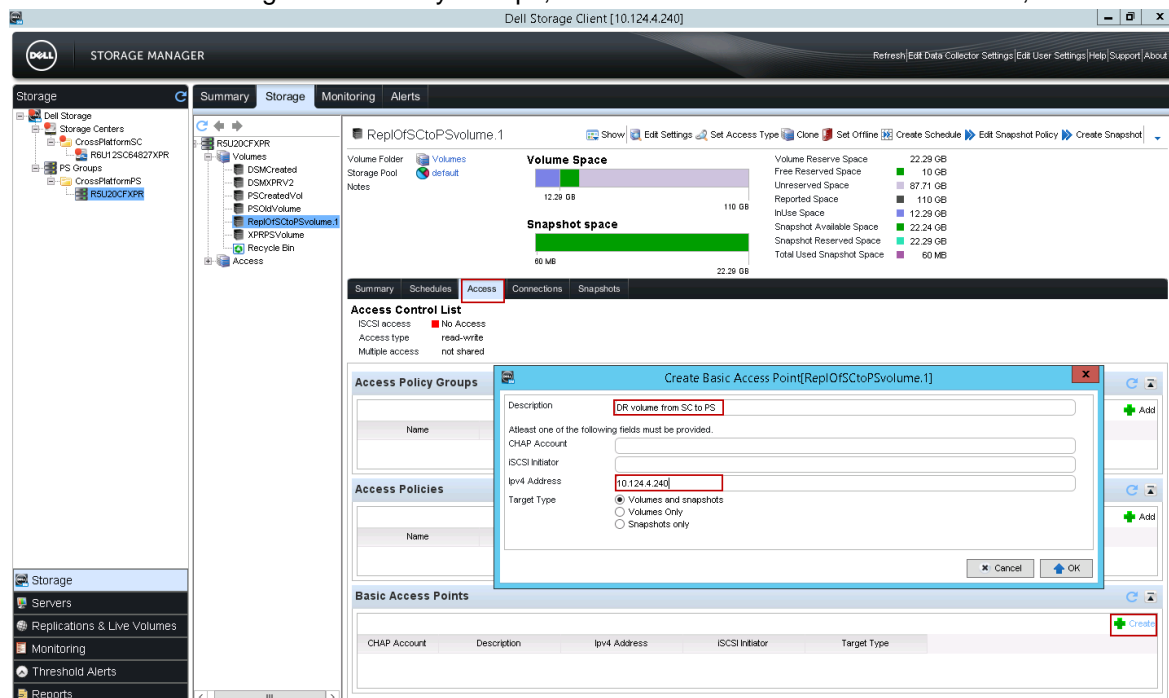
Figure 37   Establish PS Series access to the destination server

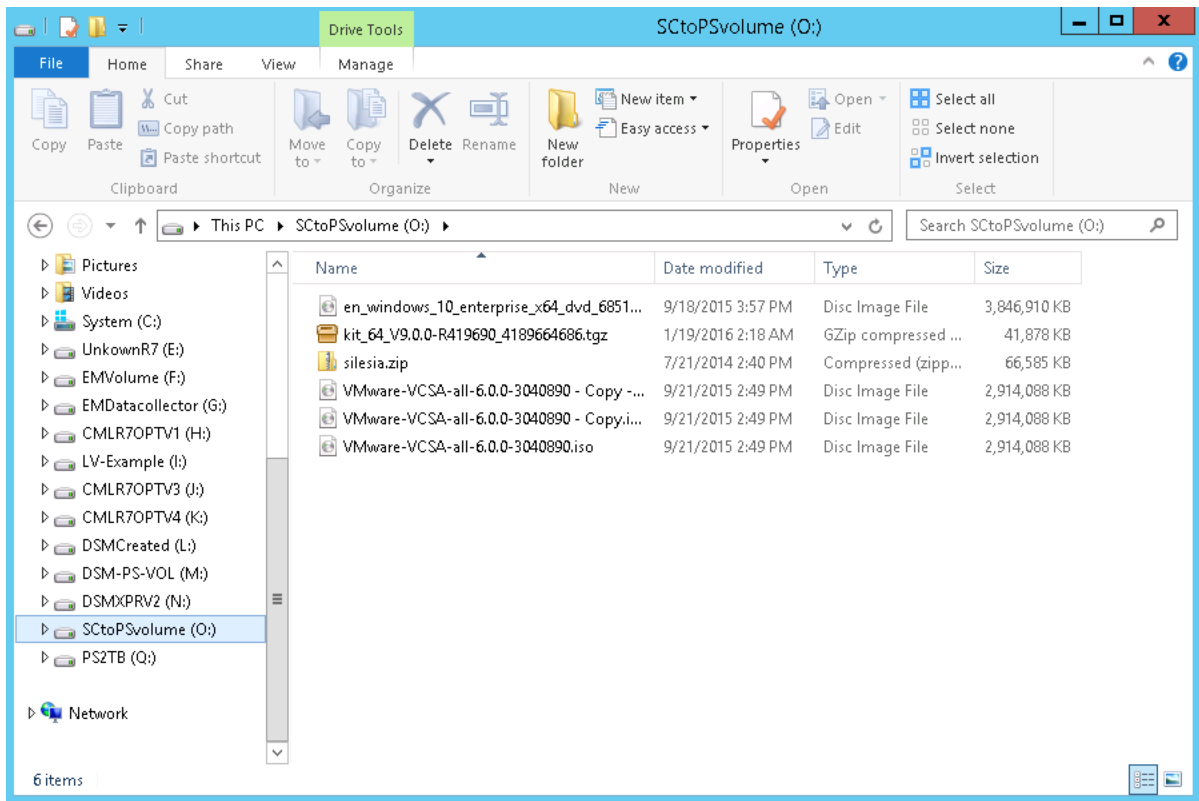The target volume shows the data as it was from the last replication cycle.

Figure 38   Activated volume on the PS Series array

11 Perform a restore (failback)

The restore operation simply restores the original target volume with the contents of the failed-over volume and restarts the replication. This failback procedure is the next step after the completing the steps to Activate Disaster Recovery.

11.1 PS Series to SC Series: Restore

1. From the Dell Storage Client, click **Replications & Live Volumes**.
2. Click the **Restore Points** tab.
3. Click **Restore/Restart Disaster Recovery**. This will launch a wizard.
4. Select the source and destination SAN arrays and click **Next**.
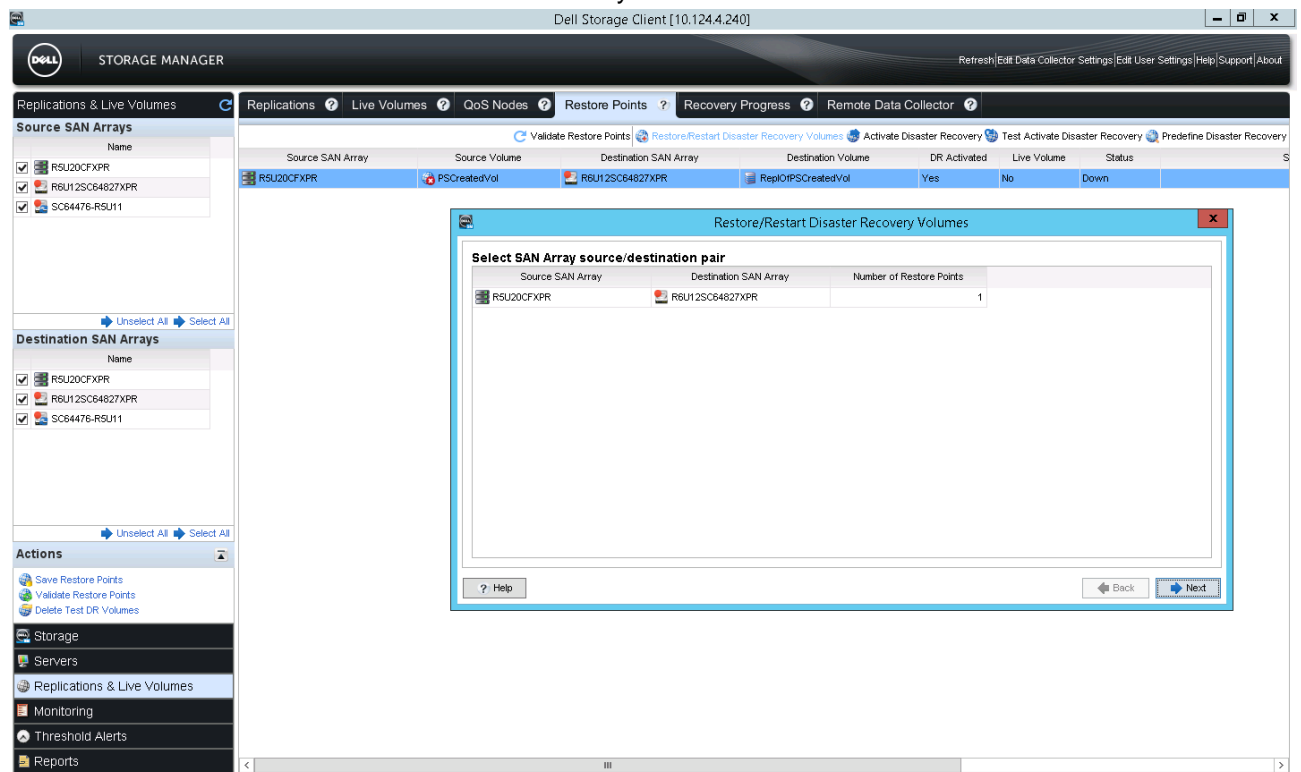
Figure 39   Select the PS Series source and the SC Series destination SAN array

5. Click **Next** when presented with the restart and recovery warnings.
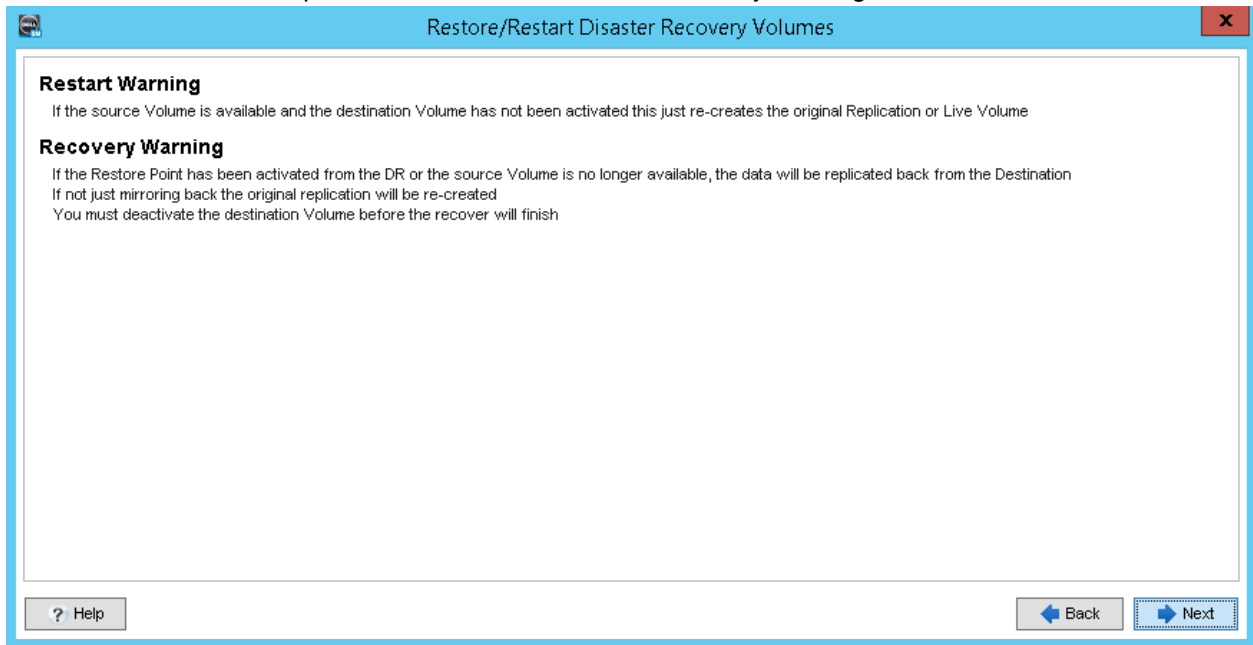

Figure 40   Restart and recovery warning
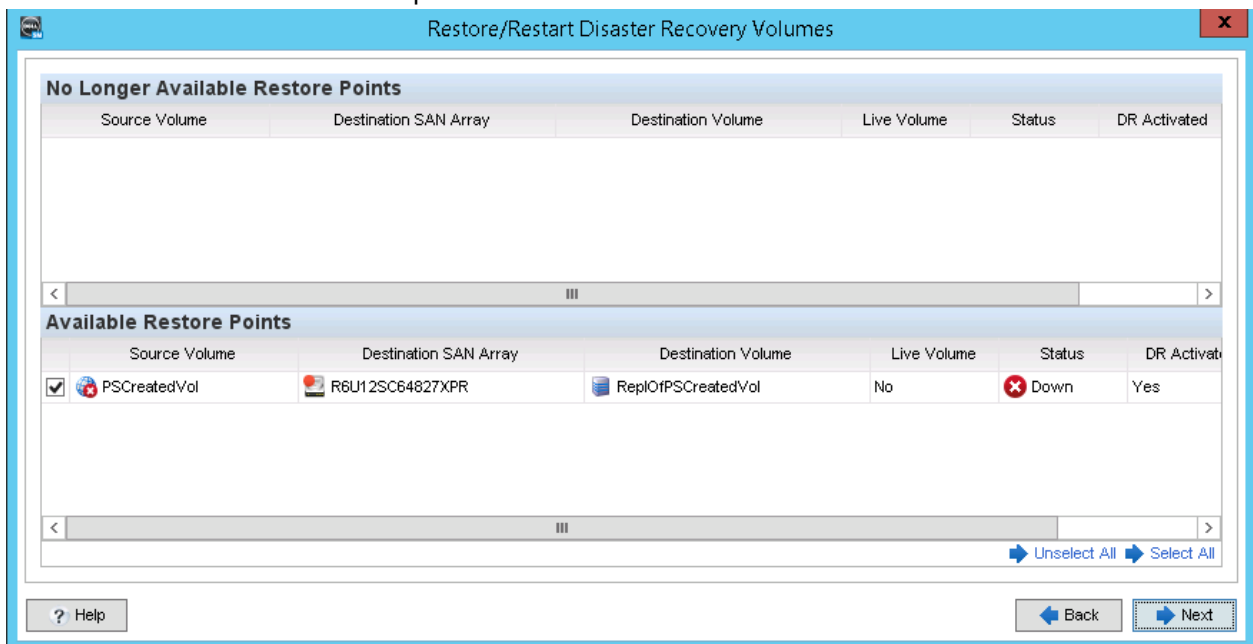
6. Select the desired restore point and click **Next**.

Figure 41   Select the available restore point

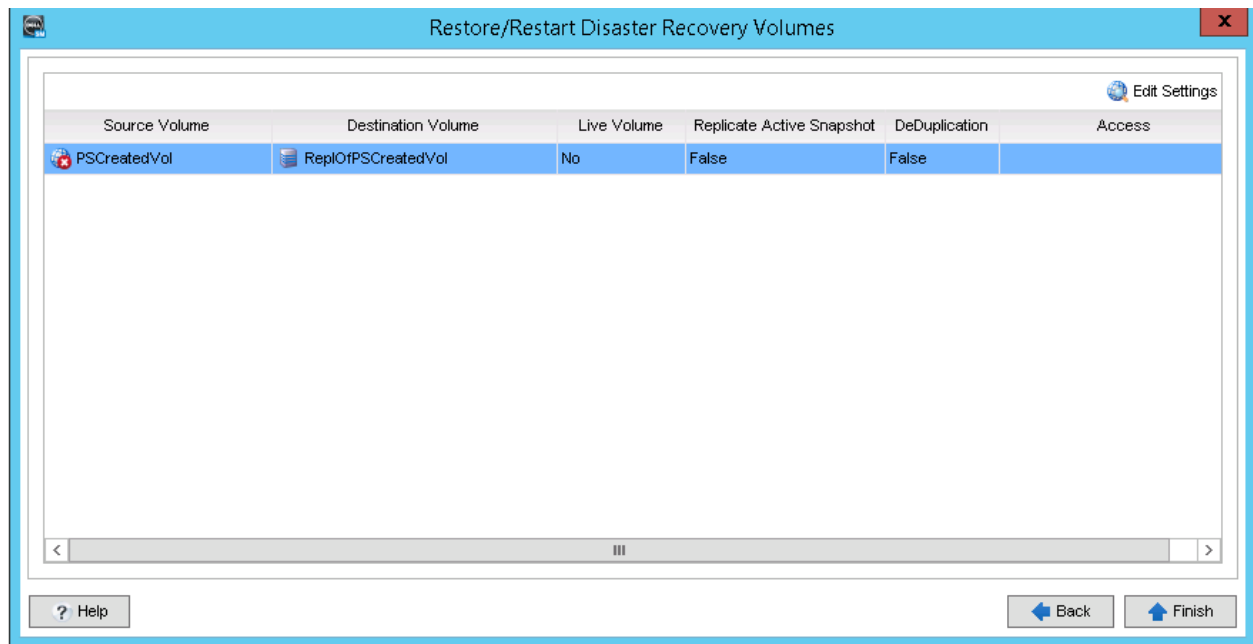7. Confirm the source and destination volume and click **Finish.**

Figure 42   Confirm the restore

Note: If the volume is not online, verify that the correct ACL is enabled and the iSCSI target is connected.

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11.2   SC Series to PS Series: Restore

1. In the Dell Storage Client, click **Replications & Live Volumes**.
2. Click the **Restore Points** tab.
3. Click **Restore/Restart Disaster Recovery**. This will launch a wizard.
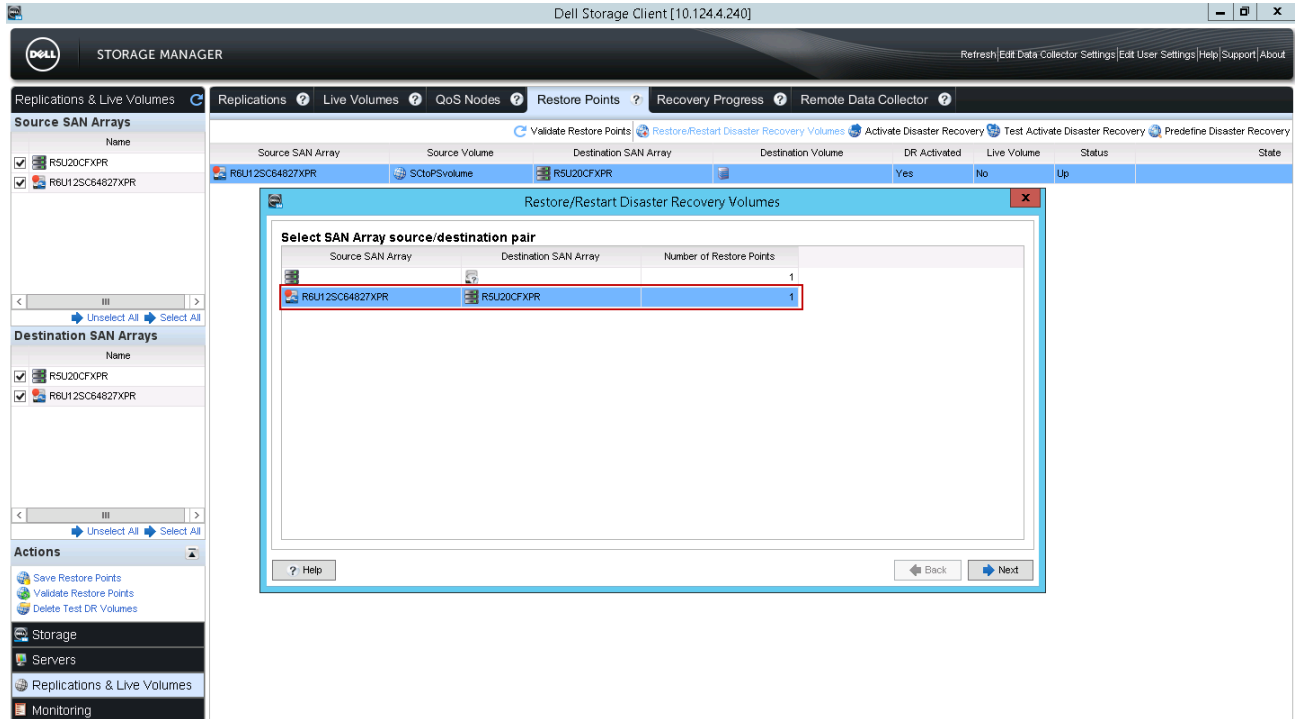4. Select the source and destination SAN arrays and click **Next**.

Figure 43   Restore/Restart Disaster Recovery Volumes window (SC Series to PS Series)

5. Click **Next** when presented with the restart and recovery warning.

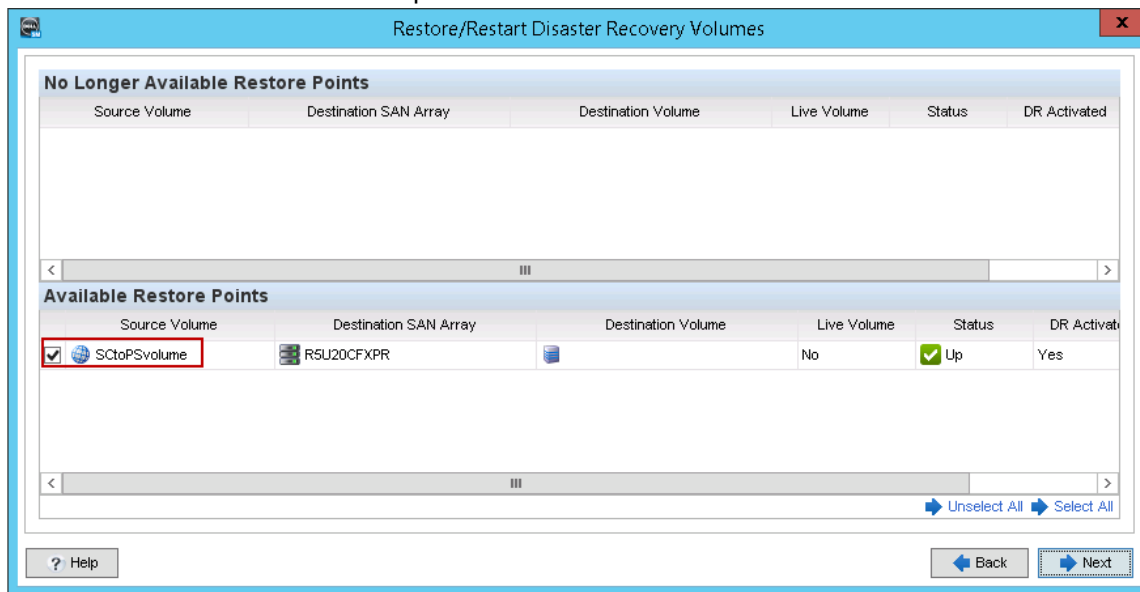6. Select the desired restore point and click **Next**.

Figure 44   Restore to the available restore point (destination on the PS Series array)

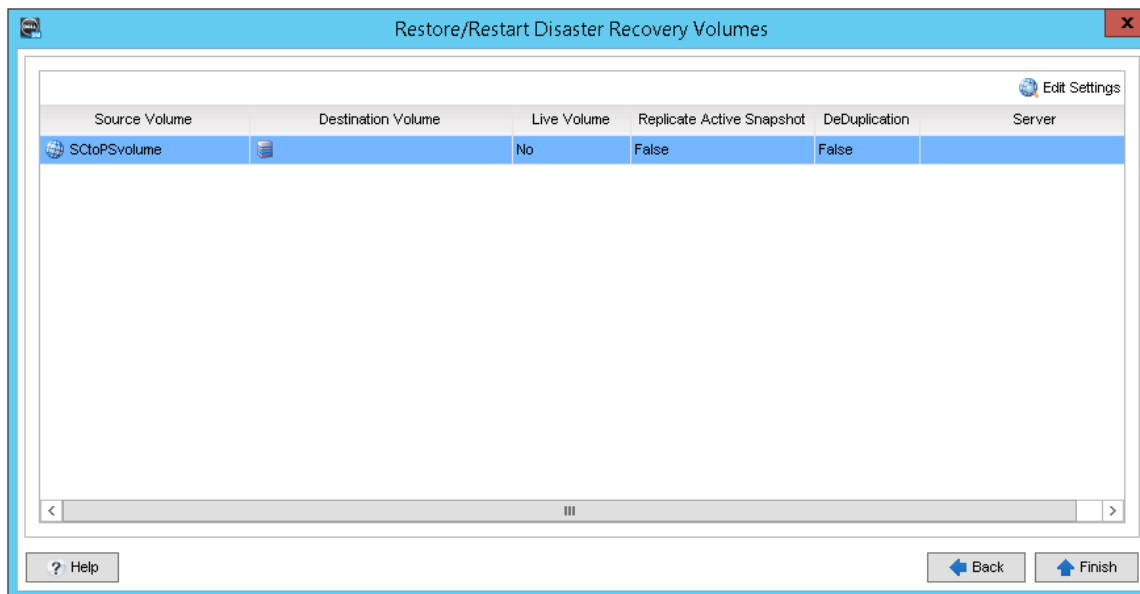7. Confirm the source and destination volumes and click **Finish**.

Figure 45   Verify the source and destination

8. Click the **Storage** tab for the SC Series array and click **Mappings** and to verify the configuration.
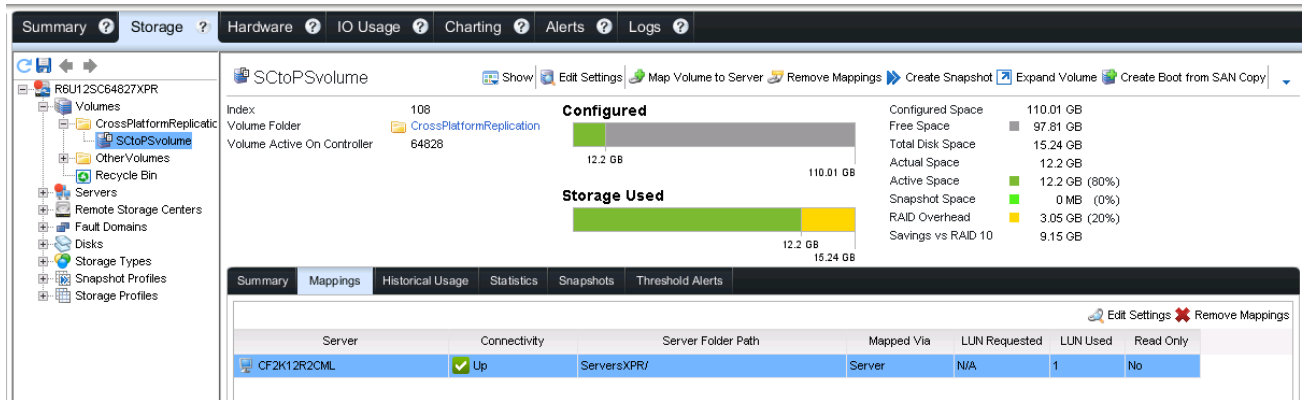

Figure 46   View server mappings

9. If mappings are not present, remap the volume to the original server. Then, verify the volume is online and replication will continue as before.
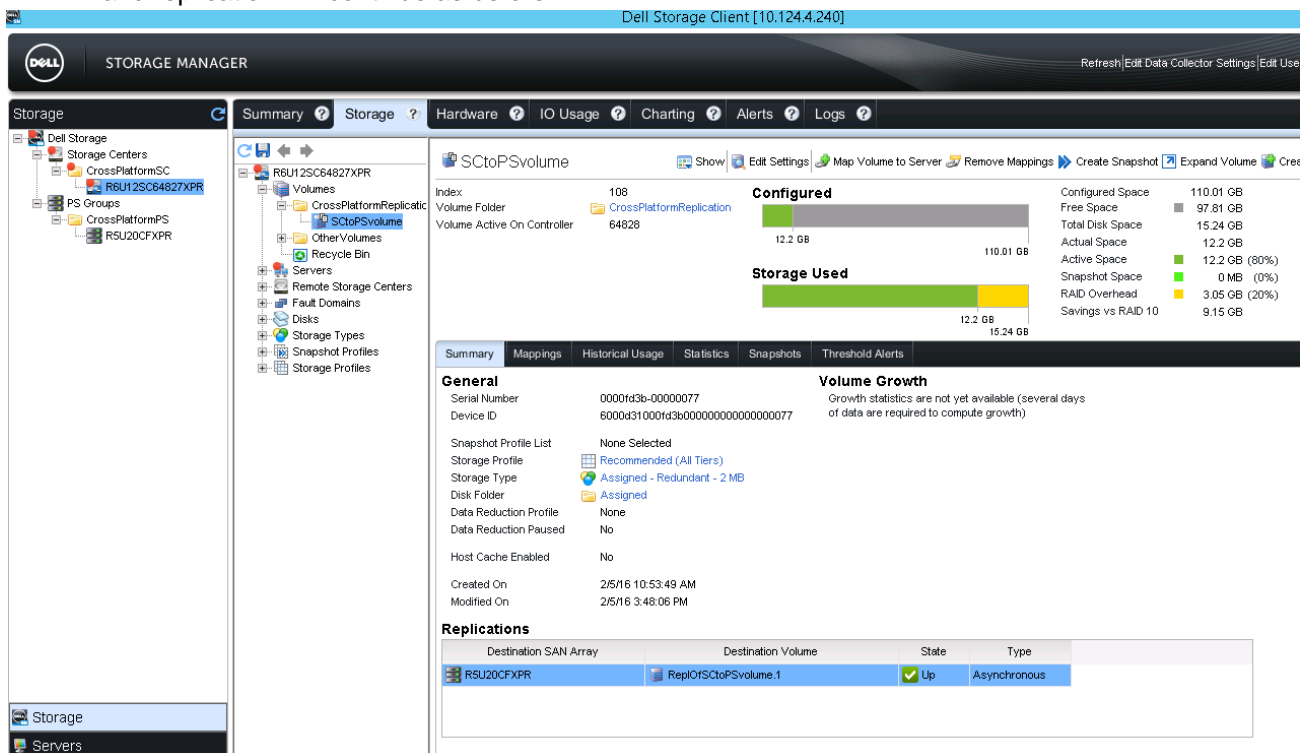

Figure 47   After the restore, the SC Series volume shows the replication status

12 Set up schedules for automated replication

Replications can be automatically started through replication schedules, or they can be manually started with the **Replicate Now** option for PS-to-SC replication or the **Create Snapshot** option for SC-to-PS replication.

12.1 PS Series to SC Series: Replication schedule

PS Series storage has schedules based on snapshots or replicas and may have multiple types for a single volume.

To set the schedule on a PS-to-SC replicated volume in DSM:

1. Right-click the PS Series volume and select **Create Schedule**.
2. Enter the **Name**, **Frequency**, **Schedule Type** (**Replication Schedule**), and the maximum number of replicas to keep. Click **OK**.

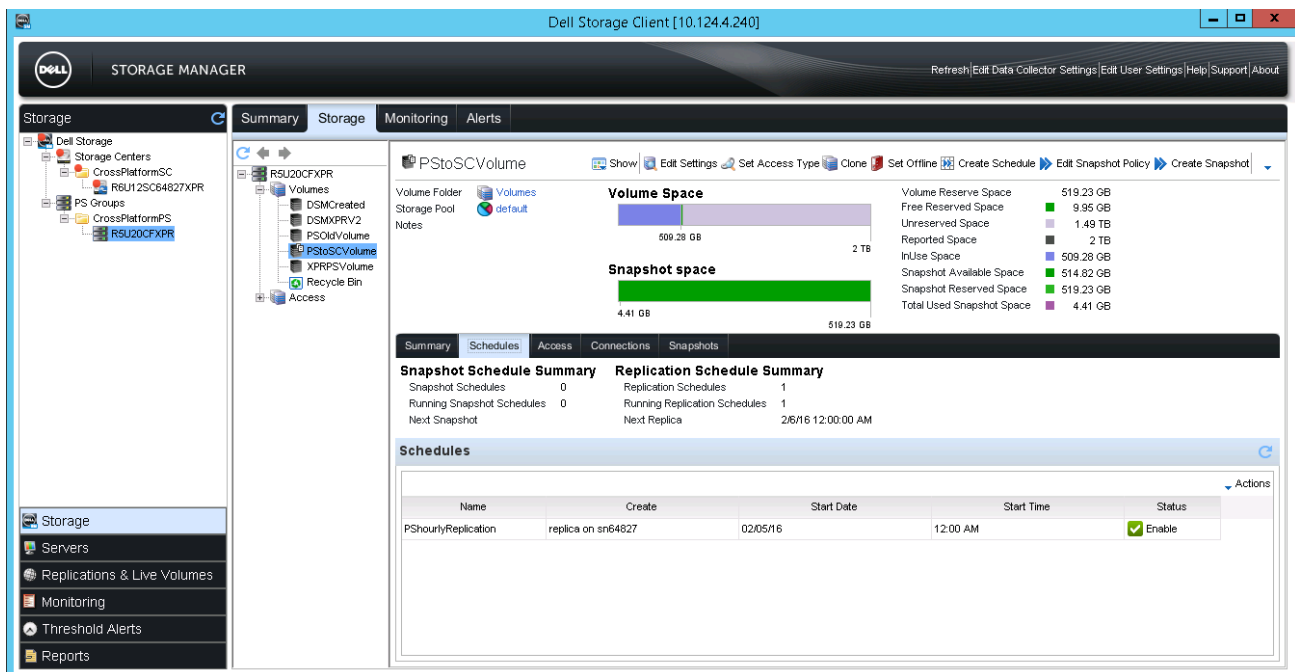Figure 48   PS Series volume snapshot and replication schedule

Figure 49   Replica schedule created on a PS Series volume

12.2   SC Series to PS Series: Replication schedule

SC Series storage uses schedules based on snapshots which trigger replication if the volume is replicated to another array. These are known as **Snapshot Profiles**, and several pre-defined profiles exist. In the event that an existing Snapshot Profile does not fit the business requirements, a custom Snapshot Profile may be created.
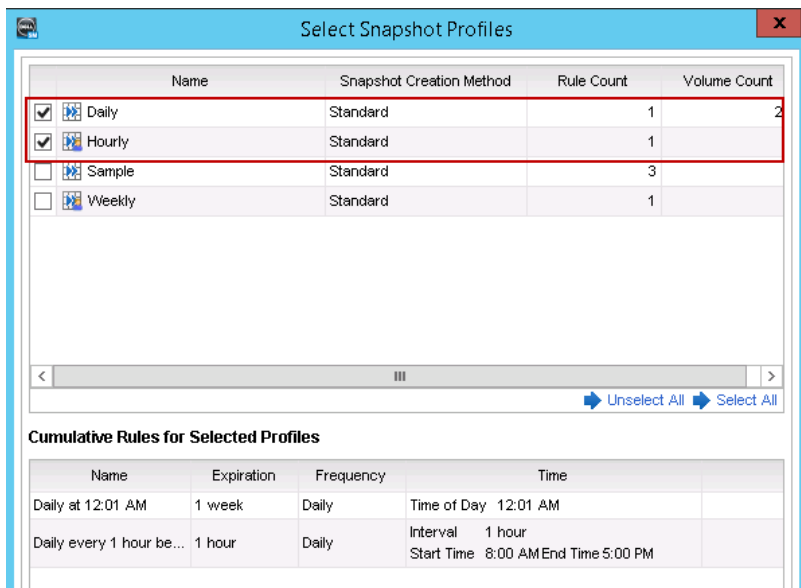

Figure 50   Snapshot Profile created on the SC Series volume

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Replication occurs according to the selected SC Series volume Snapshot Profiles.
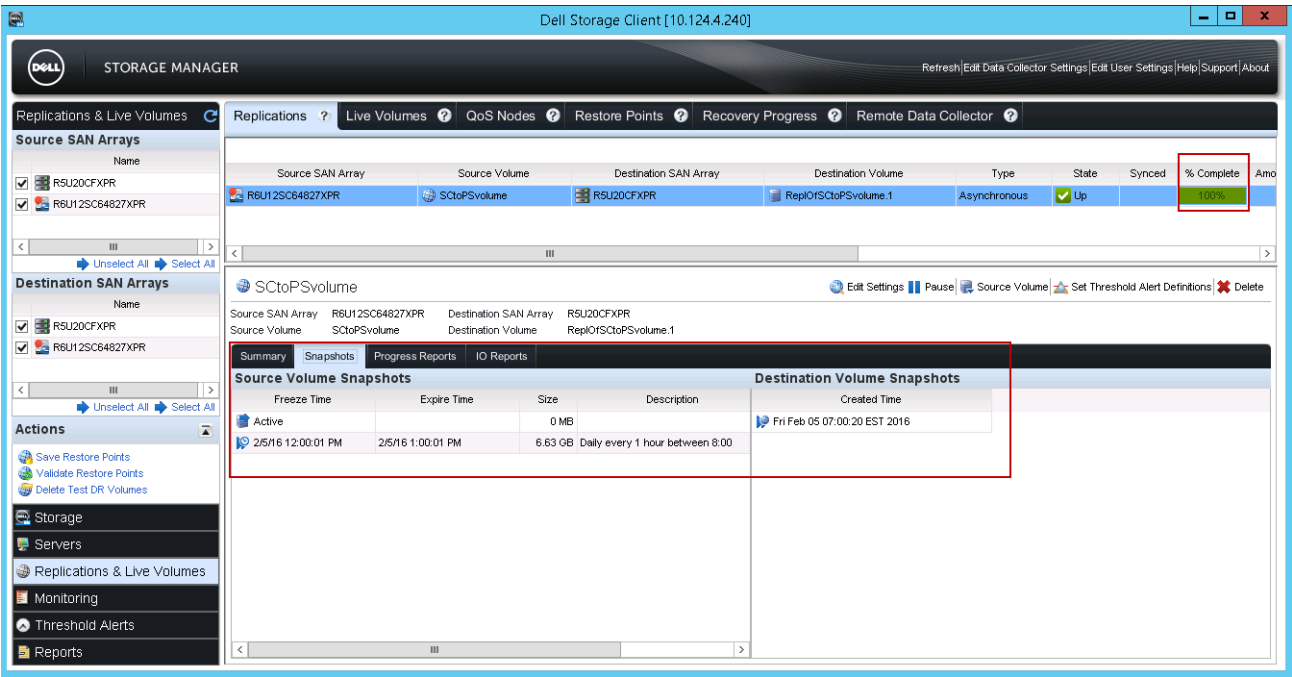

Figure 51   SC Series source volume snapshots created by a schedule (Snapshot Profile)

13 Summary

The introduction of cross-platform replication is part of the ongoing commitment by Dell to consolidate and simplify storage management. Cross-platform replication enables customers to maximize their storage investment in mixed environments with both PS Series and SC Series storage. The cross-platform replication feature through DSM is also an important step towards achieving a single-pane-of-glass management experience for both the SC Series and PS Series storage platforms.

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A Technical support and resources

Dell.com/support is focused on meeting customer needs with proven services and support.

Dell TechCenter is an online technical community where IT professionals have access to numerous resources for Dell EMC software, hardware and services.

Storage Solutions Technical Documents on Dell TechCenter provide expertise that helps to ensure customer success on Dell EMC Storage platforms.

A.1 Referenced or recommended resources

See the following referenced or recommended Dell publications:

- Dell Storage Cross-Platform Replication video series
- Dell PS Series Configuration Guide
- *Dell Storage Center Deployment Guide* at Dell.com/support
- *Dell Storage Center Dell Storage Client 2016 R1 Administrator's Guide* at Dell.com/support

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