Remote volume mirroring

E-Series Systems

NetApp
May 24, 2022

Table of Contents

Remote volume mirroring

Remote Storage Volumes overview

Use the SANtricity® Remote Storage Volumes feature to import data from a remote storage device directly to a local E-Series volume. This feature helps streamline the process for equipment upgrades and provides data migration capabilities to move data from non-E-Series devices to E-Series systems.

Configuration overview

The Remote Storage Volumes feature is available with SANtricity System Manager on selected submodel IDs. To use this feature, you must configure a remote storage system and an E-Series storage system to communicate with each other.

Use the following workflow:

1. Review requirements and restrictions.
2. Configure hardware.
3. Import remote storage.

Find more information

- Online help, available in the System Manager user interface or in the SANtricity software doc site.
- For additional technical information on the Remote Storage Volumes feature, see the Remote Storage Volumes Technical Report.

Requirements and restrictions for remote storage

Before configuring the Remote Storage Volumes feature, review the following requirements and restrictions.

Hardware requirements

Supported protocols

For the initial release of the Remote Storage Volumes feature, support is only available for iSCSI and IPv4 protocols.

Refer to the NetApp Interoperability Matrix Tool for up-to-date support and configuration information between the host and E-Series (destination) array used for the Remote Storage Volumes feature.

Storage system requirements

The E-Series storage system must include:

- Two controllers (duplex mode)
- iSCSI connections for both E-Series controllers to communicate with the remote storage system through

one or more iSCSI connections

- SANtricity OS 11.71 or greater
- Remote Storage feature enabled in the Submodel ID (SMID)

The remote system can be either an E-Series storage system or a system from another vendor. It must include iSCSI-capable interfaces.

Volume requirements

Volumes used for imports must meet the requirements for size, status, and other criteria.

Remote storage volume

The source volume of an import is called a "remote storage volume." This volume must meet the following criteria:

- Cannot be part of another import
- Must have an online status

After the import begins, the controller firmware creates a remote storage volume in the background. Due to that background process, the remote storage volume is not manageable in System Manager and can only be used for the import operation.

After it is created, the remote storage volume is treated like any other standard volume on the E-Series system with the following exceptions:

- Can be used as proxies to the remote storage device.
- Cannot be used as candidates for other volume copies or snapshots.
- Cannot have the Data Assurance setting changed while the import is in progress.
- Cannot be mapped to any hosts, because they are reserved strictly for the import operation.

Each remote storage volume is associated with only one remote storage object; however, one remote storage object can be associated with multiple remote storage volumes. The remote storage volume is uniquely identified using a combination of the following:

- Remote storage object identifier
- Remote storage device LUN number

Target volume candidates

The target volume is the destination volume on the local E-Series system.

The destination volume must meet the following criteria:

- Must be a RAID/DDP volume.
- Must have a capacity that is equal to or larger than the remote storage volume.
- Must have a block size that is the same as the remote storage volume.
- Must have a valid state (optimal).
- Cannot have any of the following relationships: volume copy, snapshot copies, asynchronous or synchronous mirroring.

- Cannot be undergoing any reconfiguration operations: Dynamic Volume Expansion, Dynamic Capacity Expansion, Dynamic Segment Size, Dynamic RAID Migration, Dynamic Capacity Reduction, or Defragmentation.
- Cannot be mapped to a host before the import starts (however, it can be mapped after import completes).
- Cannot have Flash Read Cached (FRC) enabled.

System Manager automatically checks these requirements as part of the Import Remote Storage wizard. Only volumes that meet all the requirements are displayed for destination volume selection.

Restrictions

The Remote Storage feature has the following restrictions:

- Mirroring must be disabled.
- Destination volume on the E-Series system must not have snapshots.
- Destination volume on the E-Series system must not be mapped to any hosts before the import is started.
- Destination volume on the E-Series system must have resource-provisioning disabled.
- Direct mappings of the remote storage volume to a host or multiple hosts are not supported.
- Web Services Proxy is not supported.
- iSCSI CHAP secrets are not supported.
- SMcli is not supported.
- VMware Datastore is not supported.
- Only one storage system in the relationship/import pair can be upgraded at a time when there is an import pair present.

Preparation for production imports

You should perform a test or "dry run" import before production imports to verify proper storage and fabric configuration.

Many variables can impact the import operation and completion time. To ensure a production import is successful and to get a duration estimate, you can use these test imports to ensure all connections are working as expected and the import operation is completing in an appropriate amount of time. You can then make adjustments to achieve the desired results before the production import is initiated.

Configure hardware for Remote Storage Volumes

The E-Series storage system must be configured to communicate with the remote storage system through the supported iSCSI protocol.

Configure remote storage device and E-Series array

Before proceeding to the SANtricity System Manager to configure the Remote Storage Volumes feature, do the following:

1. Manually establish a cabled connection between the E-Series system and the remote storage system such that the two systems can be configured to communicate via iSCSI.

2. Configure the iSCSI ports such that the E-Series system and the remote storage system can communicate successfully with each other.

3. Obtain the IQN of the E-Series system.

4. Make the E-Series system visible to the remote storage system. If the remote storage system is an E-Series system, then create a host using the IQN of the destination E-Series system as the connection information for the host port.

5. If the remote storage device is in use by a host/application:

   ◦ Stop I/O to the remote storage device.

   ◦ Unmap/unmount the remote storage device.

6. Map the remote storage device to the host defined for the E-Series storage system.

7. Obtain the LUN number of the device used for the mapping.

> ⓘ Recommended: Back up the remote source volume before starting the import process.

Cable the storage arrays

As part of the setup process, the storage arrays and I/O host must be cabled to the iSCSI-compatible interface.

The following diagrams provide examples of how to cable the systems such that they perform Remote Storage Volume operations over an iSCSI connection.

Fabric Connection - Use Case 1

Fabric Connection - Use Case 2

iSCSI Switch

New E-Series

A

B

Old E-Series

A

B

I/O Host
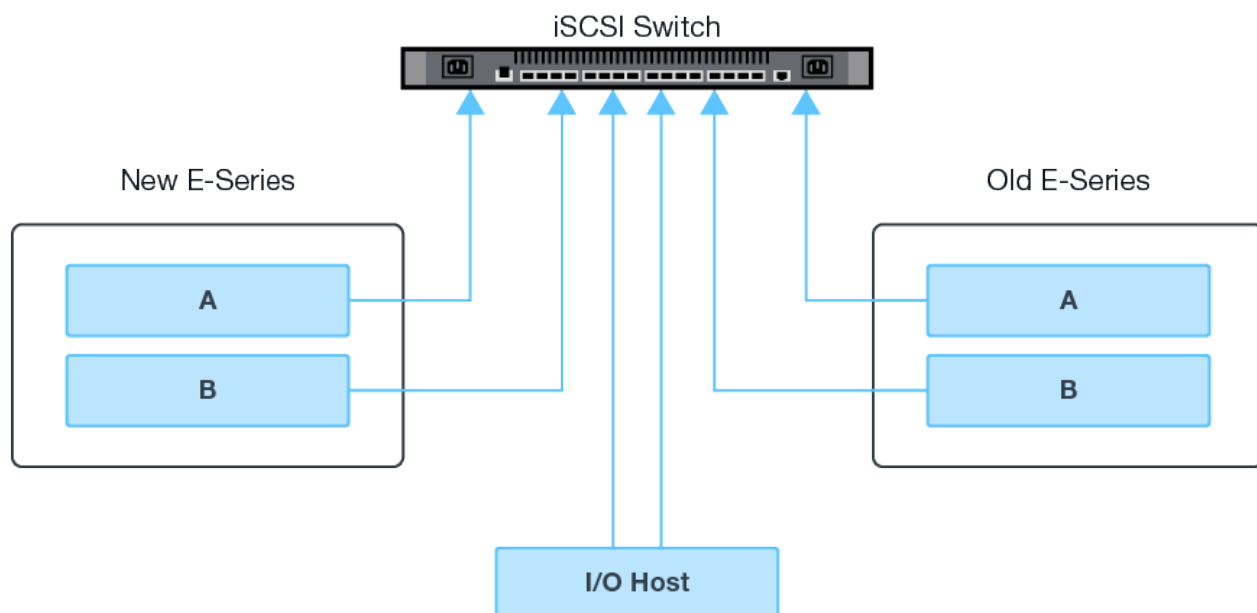
Configure the iSCSI ports

You must configure the iSCSI ports to ensure communication between the target (local E-Series storage array) and source (remote storage array).

The iSCSI ports can be configured multiple ways based on your subnet. The following are a few examples on how to configure the iSCSI ports for use with the Remote Storage Volumes feature.

Source A	Source B	Target A	Target B
10.10.1.100/22	10.10.2.100/22	10.10.1.101/22	10.10.2.101/22

Source A	Source B	Target A	Target B
10.10.0.100/16	10.10.0.100/16	10.10.0.101/16	10.10.0.101/16

Import remote storage

To initiate a storage import from a remote system to a local E-Series storage system, use the Import Remote Storage wizard in the SANtricity System Manager user interface.

What you'll need

- The E-Series storage system must be configured to communicate with the remote storage system. See Configure hardware.
- For the remote storage system, gather the following information:

- iSCSI IQN

- iSCSI IP addresses

- LUN number of the remote storage device (source volume)

- For the local E-Series storage system, create or select a volume to be used for the data import. The target volume must meet the following requirements:

  - Matches the block size of the remote storage device (the source volume).

  - Has a capacity that is equal to or larger than the remote storage device.

  - Has a state of Optimal and is available. For a full list of requirements, see Requirements and restrictions.

- Recommended: Back up volumes on the remote storage system before starting the import process.

About this task

In this task, you create a mapping between the remote storage device and a volume on the local E-Series storage system. When you finish the configuration, the import begins.

> ⓘ Because many variables can impact the import operation and its completion time, you should first perform smaller "test" imports. Use these tests to ensure that all connections work as expected and that the import operation completes in an appropriate amount of time.

Steps

1. From the SANtricity System Manager, click **Storage > Remote Storage**.

2. Click **Import Remote Storage**.

   A wizard for importing remote storage is displayed.

3. In Step 1a of the Configure Source panel, enter connection information.

   a. Under the **Name** field, enter the name for the remote storage device.

   b. Under the **iSCSI connection properties**, enter the following for the remote storage device: IQN, IP address, and the port number (default is 3260).

      If you want to add another iSCSI connection, click **+Add another IP address** to include an additional IP address for the remote storage. When you are done, click **Next**.

      After you click Next, Step 1b of the Configure Source panel is displayed.

4. Under the **LUN** field, select the desired source LUN for the remote storage device, and then click **Next**.

   The Configure Target panel opens and displays volume candidates to serve as the target for the import. Some volumes do not display in the list of candidates due to block size, capacity, or volume availability.

5. From the table, select a target volume on the E-Series storage system. If needed, use the slider to change the import priority. Click **Next**. Confirm the operation in the next dialog box by typing `continue`, and then clicking **Continue**.

   If the target volume has a capacity that is larger than the source volume, that additional capacity is not reported to the host connected to the E-Series system. To use the new capacity, you must perform a file system expansion operation on the host after the import operation completes and is disconnected.

   After you confirm the configuration in the dialog, the Review panel is displayed.

6. From the Review screen, verify the specified remote storage device, target, and import settings are accurate. Click **Finish** to complete the creation of the remote storage.

   Another dialog box opens asking if you want to initiate another import.

7. If needed, click **Yes** to create another remote storage import. Clicking Yes returns to Step 1a of the Configure Source panel, where you can select the existing configuration or add a new one. If you do not want to create another import, click **No** to exit the dialog.

   Once the import process begins, the entire target volume is overwritten with the copied data. If the host writes any new data to the target volume during this process, that new data is propagated back to the remote device (source volume).

8. View the progress of the operation in the View Operations dialog under the Remote Storage panel.

   The time required to complete the import operation depends on the size of the remote storage system, the priority setting for the import, and the amount of I/O load on both storage systems and their associated volumes. Once the import is complete, the local volume is a duplicate of the remote storage device.

9. When you are ready to break the relationship between the two volumes, select **Disconnect** on the import object from the Operations in Progress view. Once the relationship is disconnected, performance of the local volume returns to normal and is no longer impacted by the remote connection.

Manage import progress

After the import process begins, you can view and take action on its progress.

For each import operation, the Operations in Progress page displays a percentage of completion and estimated time remaining. Actions include changing the import priority, stopping and resuming operations, and disconnecting from the operation.

> ⓘ You can also view Operations in Progress from the Home page (**Home > Show operations in progress**).

Steps

1. In SANtricity System Manager, go to the Remote Storage page and select **View Operations**.

   The Operations in Progress dialog is displayed.

2. If desired, use the links in the Actions column to stop and resume, change priority, or disconnect from an operation.

   ◦ **Change Priority** – Select **Change Priority** to change the processing priority of an operation that is in progress or pending. Apply a priority to the operation and then click **OK**.

   ◦ **Stop** – Select **Stop** to pause the copying of data from the remote storage device. The relationship between the import pair is still intact, and you can select **Resume** when you are ready to continue the import operation.

   ◦ **Resume** – Select **Resume** to begin a stopped or failed process from where it left off. Next, apply a priority to the Resume operation, and then click **OK**.

     The Resume operation does **not** restart the import from the beginning. If you want to restart the process from the beginning, you must select **Disconnect**, and then re-create the import through the Import Remote Storage wizard.

- **Disconnect** – Select **Disconnect** to break the relationship between the source and destination volumes for an import operation that has stopped, completed, or failed.

Modify remote storage connection settings

You can edit, add, or delete connection settings for any remote storage configuration through the View/Edit Settings option.

Making changes to connection properties will affect in-progress imports. To avoid disruptions, only make changes to connection properties when imports are not running.

Steps

1. From the Remote Storage screen of the SANtricity System Manager, select the desired Remote Storage object under the result list section.

2. Click **View/Edit Settings**.

   The Remote Storage Settings screen is displayed.

3. Click the **Connection Properties** tab.

   The configured IP address and port settings for the remote storage import are displayed.

4. Perform one of the following actions:
   - **Edit** – Click **Edit** next to the corresponding line item for the remote storage object. Enter the revised IP address and/or port information in the fields.

   - **Add** – Click **Add**, and then enter the new IP address and port information in the fields provided. Click **Add** to confirm, and then the new connection appears in the list of remote storage objects.

   - **Delete** – Select the desired connection from the list and then click **Delete**. Confirm the operation by typing `delete` in the provided field and then click **Delete**. The connection is removed from the list of remote storage objects.

5. Click **Save**.

   The modified connection settings are applied to the remote storage object.

Remove remote storage object

After an import completes, you can remove a remote storage object if you no longer want data copied between the local and remote devices.

Steps

1. Make sure that no imports are associated with the remote storage object you plan to remove.

2. From the Remote Storage screen of the SANtricity System Manager, select the desired Remote Storage object under the result list section.

3. Click **Remove**.

   The Confirm Remove Remote Storage Connection dialog is displayed.

4. Confirm the operation by typing `remove` and then clicking **Remove**.

The selected Remote Storage object is removed.