



# Work with copy services

## SANtricity 11.5

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# Work with copy services

## Copy volume

You can copy data from one volume to another volume in the same storage array, and create a physical, point-in-time duplicate (clone) of a source volume.

### Before you begin

- All I/O activity to the source volume and the target volume must be stopped.
- Any file systems on the source volume and the target volume must be unmounted.
- If you have used the target volume in a Copy Volume operation before, you no longer need that data or that you have backed up the data.

### About this task

The source volume is the volume that accepts host I/O and stores application data. When a Copy Volume is started, data from the source volume is copied in its entirety to the target volume.

The target volume is a standard volume that maintains a copy of the data from the source volume. The target volume is identical to the source volume after the Copy Volume operation completes. The target volume must have the same or greater capacity as the source volume; however, it can have a different RAID level.

### More about online and offline copies

#### Online copy

An online copy creates a point-in-time copy of any volume within a storage array, while it is still possible to write to the volume with the copy in progress. This function is achieved by creating a snapshot of the volume and using the snapshot as the actual source volume for the copy. The volume for which the point-in-time image is created is known as the base volume and it can be a standard volume or a thin volume in the storage array.

#### Offline copy

An offline copy reads data from the source volume and copies it to a target volume, while suspending all updates to the source volume with the copy in progress. All updates to the source volume are suspended to prevent chronological inconsistencies from being created on the target volume. The offline volume copy relationship is between a source volume and a target volume.



A Copy Volume operation overwrites data on the target volume and fails all snapshot volumes associated with the target volume, if any exist.

### Steps

1. Select **Storage > Volumes**.
2. Select the volume that you want to use as the source for the Copy Volume operation, and then select **Copy Services > Copy volume**.

The **Copy Volume-Select Target** dialog box appears.

3. Select the target volume to which you want to copy the data.

The table shown in this dialog box lists all the eligible target volumes.

4. Use the slider bar to set the copy priority for the Copy Volume operation.

The copy priority determines how much of the system resources are used to complete the Copy Volume operation as compared to service I/O requests.

#### More about copy priority rates

There are five copy priority rates:

- Lowest
- Low
- Medium
- High
- Highest If the copy priority is set to the lowest rate, I/O activity is prioritized, and the Copy Volume operation takes longer. If the copy priority is set to the highest rate, the Copy Volume operation is prioritized, but I/O activity for the storage array might be affected.

5. Select whether you want to create an online copy or an offline copy. To create an online copy, select the **Keep source volume online during copy operation** check box.
6. Do one of the following:
  - To perform an *online* copy operation, click **Next** to continue to the **Reserve Capacity** dialog box.
  - To perform an *offline* copy operation, click **Finish** to start the offline copy.
7. If you chose to create an online copy, set the reserved capacity needed to store data and other information for the online copy, and then click **Finish** to start the online copy.

The volume candidate table displays only the candidates that support the reserved capacity specified. Reserved capacity is the physical allocated capacity that is used for any copy service operation and storage object. It is not directly readable by the host.

Allocate the reserved capacity using the following guidelines:

- The default setting for reserved capacity is 40% of the capacity of the base volume, and usually this capacity is sufficient.
- Reserved capacity, however, varies depending on the number of changes to the original data. The longer a storage object is active, the larger the reserved capacity should be.

#### Results

System Manager copies all data from the source volume to the target volume. After the Copy Volume operation is complete, the target volume automatically becomes read-only to the hosts.

#### After you finish

Select **Home** > **View Operations in Progress** to view the progress of the Copy Volume operation. This operation can be lengthy and could affect system performance.

# Take action on a Copy Volume operation

You can view a Copy Volume operation in progress and stop, change priority, re-copy, or clear a Copy Volume operation.


## Steps

1. Select **Home** > **View Operations in Progress**.

The **Operations in Progress** dialog box appears.

2. Find the Copy Volume operation that you want to take action on, and then click the link in the **Actions** column to take one of the following actions.

Read all cautionary text provided in dialogs, particularly when stopping an operation.

Action	Description
Stop	<p>You can stop a Copy Volume operation while the operation has a status of In Progress, Pending, or Failed.</p> <p>When the Copy Volume is stopped, all of the mapped hosts have write access to the source volume. If data is written to the source volume, the data on the target volume no longer matches the data on the source volume.</p>
Change priority	<p>You can change the priority of a Copy Volume operation while the operation has a status of In Progress to select the rate at which a Copy Volume operation completes.</p>
Re-copy	<p>You can re-copy a volume when you have stopped a Copy Volume operation and want to start it again or when a Copy Volume operation has failed or halted. The Copy Volume operation starts over from the beginning.</p> <p>The re-copy action overwrites existing data on the target volume and fails all snapshot volumes associated with the target volume, if any exist.</p>
Clear	<p>You can remove the Copy Volume operation while the operation has a status of In Progress, Pending, or Failed.</p> <div data-bbox="873 1759 927 1814"></div> <p>Be sure that you want to do this operation before selecting <b>Clear</b>. There is no confirmation dialog.</p>

# Create asynchronous mirrored volume

You mirror a volume asynchronously to maintain data at the remote storage array to be a point-in-time consistent copy of data at the local storage array. You do this by creating a mirror consistency group to establish the mirroring relationship between the two storage arrays, and then selecting the primary volume and secondary volume that you want to use in the mirror.

## Before you begin

- The following conditions must be set up:
  - The Web Services Proxy service is running.
  - SANtricity Unified Manager is running on your local host through an HTTPS connection.
  - Each controller in both the primary array and secondary array must have an Ethernet management port configured and must be connected to your network.
  - SANtricity Unified Manager is showing valid SSL certificates for the storage array. You can accept a self-signed certificate or install your own security certificate using Unified Manager and navigating to **Certificate > Certificate Management**.
  - SANtricity System Manager is launched from a Unified Manager.
  - You must have discovered the two storage arrays you want to mirror data between. Then, from Unified Manager, you select the primary volume's storage array and click **Launch** to open the browser-based SANtricity System Manager.
- You must know the password for the local and remote storage arrays.
- Your local and remote storage arrays must be connected through a Fibre Channel fabric or iSCSI interface.

## About this task

The process to mirror a volume asynchronously is a multi-step procedure:

- [Step 1: Create a mirror consistency group or select an existing one](#)
- [Step 2: Select the primary volume](#)
- [Step 3: Select the secondary volume](#)

A volume can participate in only one mirror relationship.

## Step 1: Create a mirror consistency group or select an existing one

You create a mirror consistency group or select an existing one to establish the mirroring relationship between the local storage array and the remote storage array.

## About this task

The number of mirror consistency group relationships and mirrored pair relationships that you can create depends on the hardware in your storage array.

## Steps

1. Do one of the following actions to access the asynchronous mirroring sequence:
  - Select **Storage > Asynchronous Mirroring > Create Mirrored pair**.

- Select **Storage › Volumes › Copy Services › Mirror a volume asynchronously**.

2. Either select an existing mirror consistency group or create a new one.

To create new mirror consistency group, do the following:

- Enter a unique name that best describes the data on the volumes that will be mirrored between the two storage arrays (for example, R&D Data).
- Select the remote storage array on which you want to establish a mirror relationship with the local storage array.



If your remote storage array is password protected, the system prompts for a password.

- Choose whether you want to resynchronize the mirrored pairs on the remote storage array either manually or automatically.
  - **Manual** — You must explicitly update the secondary point-in-time image using the Manual Resynchronization menu option. Select this option to manually start resynchronization for all asynchronous mirrored pairs within the asynchronous mirror group.
  - **Automatic** — Using the drop-down, specify the time from the beginning of the previous update to the beginning of the next update. To change the automatic synchronization interval from the default of every 10 minutes, edit the interval value, which is defined in minutes.
- Click **Create**.

System Manager creates the mirror consistency group on the local storage array first and then creates the mirror consistency group on the remote storage array.



If System Manager successfully creates the mirror consistency group on the local storage array, but fails to create it on the remote storage array, it automatically deletes the mirror consistency group from the local storage array. If an error occurs while System Manager is attempting to delete the mirror consistency group, you must manually delete it.

3. Select **Next** and go to [Step 2: Select the primary volume](#).

## Step 2: Select the primary volume

You must select the primary volume that you want to use in the mirror relationship and allocate its reserved capacity. Any volumes added to the mirror consistency group on the local storage array will hold the primary role in the mirror relationship.

### Steps

- Select an existing volume that you want to use as the primary volume in the mirror, and then click **Next** to allocate the reserved capacity.
- Allocate the reserved capacity for the primary volume you selected. Do one of the following actions:
  - **Accept the default settings** — Use this recommended option to allocate the reserved capacity for the primary volume with the default settings.
  - **Allocate your own reserved capacity settings to meet your data storage needs related to asynchronous mirroring** — Allocate the reserved capacity using the following guidelines.
    - The default setting for reserved capacity is 20% of the capacity of the base volume, and usually this

capacity is sufficient.

- The capacity needed varies, depending on the frequency and size of I/O writes to the primary volume and how long you need to keep the capacity.
- In general, choose a larger capacity for reserved capacity if one or both of these conditions exist:
  - You intend to keep the mirrored pair for a long period of time.
  - A large percentage of data blocks will change on the primary volume due to heavy I/O activity. Use historical performance data or other operating system utilities to help you determine typical I/O activity to the primary volume.

3. Select **Next** and go to [Step 3: Select the secondary volume](#).

### Step 3: Select the secondary volume

You must select the secondary volume that you want to use in the mirror relationship and allocate its reserved capacity. Any volumes added to the mirror consistency group on the remote storage array will hold the secondary role in the mirror relationship.

#### About this task

When you select a secondary volume on the remote storage array, the system displays a list of all the eligible volumes for that mirrored pair. Any volumes that are not eligible to be used do not display in that list.

#### Steps

1. Select an existing volume that you want to use as the secondary volume in the mirrored pair, and then click **Next** to allocate the reserved capacity.
2. Allocate the reserved capacity for the secondary volume you selected. Do one of the following actions:
  - **Accept the default settings** — Use this recommended option to allocate the reserved capacity for the secondary volume with the default settings.
  - **Allocate your own reserved capacity settings to meet your data storage needs related to asynchronous mirroring** — Allocate the reserved capacity using the following guidelines.
    - The default setting for reserved capacity is 20% of the capacity of the base volume, and usually this capacity is sufficient.
    - The capacity needed varies, depending on the frequency and size of I/O writes to the primary volume and how long you need to keep the capacity.
    - In general, choose a larger capacity for reserved capacity if one or both of these conditions exist:
      - You intend to keep the mirrored pair for a long period of time.
      - A large percentage of data blocks will change on the primary volume due to heavy I/O activity. Use historical performance data or other operating system utilities to help you determine typical I/O activity to the primary volume.
3. Select **Finish** to complete the asynchronous mirroring sequence.

#### Results

System Manager performs the following actions:

- Begins initial synchronization between the local storage array and the remote storage array.
- If the volume being mirrored is a thin volume, only the provisioned blocks (allocated capacity rather than reported capacity) are transferred to the secondary volume during the initial synchronization. This reduces the amount of data that must be transferred to complete the initial synchronization.



- Creates the reserved capacity for the mirrored pair on the local storage array and on the remote storage array.

## Create synchronous mirrored volume

You mirror a volume synchronously to replicate data in real-time between storage arrays, so your information is protected from both system and site failures. You do this by selecting the primary volume and the secondary volume that you want to use in the synchronous mirroring relationship between a local storage array and a remote storage array.

### Before you begin

- Because the Synchronous Mirroring feature requires the management of multiple storage arrays, you must have the browser-based SANtricity Unified Manager installed, and have discovered the two storage arrays you want to mirror data between. Then, from Unified Manager, you select the primary volume's storage array and click **Launch** to open the browser-based SANtricity System Manager.
- You must have two storage arrays.
- Each storage array must have two controllers.
- The primary and secondary volumes' storage arrays can run different OS versions. The minimum version supported is 7.84.
- You must know the password for the local and remote storage arrays.
- Your local and remote storage arrays must be connected through a Fibre Channel fabric.
- You must have created both the primary and secondary volumes that you want to use in the synchronous mirror relationship.

### About this task

The process to mirror a volume synchronously is a multi-step procedure:

- [Step 1: Select the primary volume](#)
- [Step 2: Select the secondary volume](#)
- [Step 3: Select synchronization settings](#)

A volume can participate in only one mirror relationship.

## Step 1: Select the primary volume

You must select the primary volume that you want to use in the synchronous mirror relationship. This volume holds the primary role in the mirror relationship.

### Before you begin

- You must have created the primary volume that you want to use in the synchronous mirror relationship.
- The primary volume must be a standard volume. It cannot be a thin volume or a snapshot volume.

### Steps

1. Do one of the following actions to access the synchronous mirroring sequence:
  - Select **Storage > Synchronous Mirroring > Mirror volume**.

- Select **Storage > Volumes > Copy Services > Mirror a volume synchronously**. The **Create Synchronous Mirrored Pair** dialog appears.

2. Select an existing volume that you want to use as the primary volume in the mirror.



If a volume was selected in the Volumes tile and it is eligible to be mirrored, it will be selected by default.

3. Select **Next** and go to [Step 2: Select the secondary volume](#).

## Step 2: Select the secondary volume

You must select the secondary volume that you want to use in the mirror relationship. This volume will hold the secondary role in the mirror relationship.

### Before you begin

- You must have created the secondary volume that you want to use in the synchronous mirror relationship.
- The secondary volume must be a standard volume. It cannot be a thin volume or a snapshot volume.
- The secondary volume must be at least as large as the primary volume.

### About this task

When you select a secondary volume on the remote storage array, the system displays a list of all the eligible volumes for that mirrored pair. Any volumes that are not eligible to be used do not display in that list.

The volumes that appear in this dialog are sorted by capacity, starting with the volume nearest to the capacity of the primary volume capacity. Volumes with identical capacity are sorted alphabetically.

### Steps

1. Select the remote storage array on which you want to establish a mirror relationship with the local storage array.



If your remote storage array is password protected, the system prompts for a password.

- Storage arrays are listed by their storage array name. If you have not named a storage array, it will be listed as "unnamed."
- If the storage array you want to use is not in the list, add it using the Enterprise Management Window (EMW) of SANtricity Storage Manager. Select **Edit > Add Storage Array**.

2. Select an existing volume that you want to use as the secondary volume in the mirror.



If a secondary volume is chosen with a capacity that is larger than the primary volume, the usable capacity is restricted to the size of the primary volume.

3. Click **Next** and go to [Step 3: Select synchronization settings](#).

## Step 3: Select synchronization settings

You must set the priority at which the controller owner of the primary volume resynchronizes data with the secondary volume after a communication interruption. You must also select the resynchronization policy, either manual or automatic.

## Steps

1. Use the slider bar to set the synchronization priority.

The synchronization priority determines how much of the system resources are used to complete initial synchronization and the resynchronization operation after a communication interruption as compared to service I/O requests.

The priority set on this dialog applies to both the primary volume and the secondary volume. You can modify the rate on the primary volume at a later time by selecting **Storage > Synchronous Mirroring > More > Edit Settings**.

### More about synchronization rates

There are five synchronization priority rates:

- Lowest
- Low
- Medium
- High
- Highest If the synchronization priority is set to the lowest rate, I/O activity is prioritized, and the resynchronization operation takes longer. If the synchronization priority is set to the highest rate, the resynchronization operation is prioritized, but I/O activity for the storage array might be affected.

2. Choose whether you want to resynchronize the mirrored pairs on the remote storage array either manually or automatically.
  - **Manual** (the recommended option) — Select this option to require synchronization to be manually resumed after communication is restored to a mirrored pair. This option provides the best opportunity for recovering data.
  - **Automatic** — Select this option to start resynchronization automatically after communication is restored to a mirrored pair. To manually resume synchronization go to **Storage > Synchronous Mirroring**, highlight the mirrored pair in the table, and select **Resume** under **More**.
3. Click **Finish** to complete the synchronous mirroring sequence.

## Results

System Manager performs the following actions:

- Activates the Synchronous Mirroring feature.
- Begins initial synchronization between the local storage array and the remote storage array.
- Sets the synchronization priority and resynchronization policy.

### After you finish

Select **Home > View Operations in Progress** to view the progress of the synchronous mirroring operation. This operation can be lengthy and could affect system performance.

# Create snapshot image

You can manually create a snapshot image from a base volume or snapshot consistency group. This is also called an *instant snapshot* or *instant image*.

## Before you begin

- The base volume must be optimal.
- The drive must be optimal.
- The snapshot group cannot be designated as “reserved.”
- The reserved capacity volume must have the same Data Assurance (DA) settings as the associated base volume for the snapshot group.

## Steps

1. Do one of the following actions to create a snapshot image:
  - Select **Storage > Volumes**. Select the object (base volume or snapshot consistency group), and then select **Copy Services > Create instant snapshot**.
  - Select **Storage > Snapshots**. Select the **Snapshot Images** tab, and then select **Create > Instant snapshot image**. The **Create Snapshot Image** dialog box appears. Select the object (base volume or snapshot consistency group), and then click **Next**. If a previous snapshot image was created for the volume or snapshot consistency group, then the system creates the instant snapshot immediately. Otherwise, if this is the first time a snapshot image is created for the volume or snapshot consistency group, the **Confirm Create Snapshot Image** dialog box appears.
2. Click **Create** to accept the notification that reserved capacity is needed and to proceed to the **Reserve Capacity** step.

The **Reserve Capacity** dialog box appears.

3. Use the spinner box to adjust the capacity percentage, and then click **Next** to accept the candidate volume highlighted in the table.

The **Edit Settings** dialog box appears.

4. Select the settings for the snapshot image as appropriate, and confirm that you want to perform the operation.

## Field Details

Setting	Description
<b>Snapshot image settings</b>	
Snapshot image limit	Keep the check box selected if you want snapshot images automatically deleted after the specified limit; use the spinner box to change the limit. If you clear this check box, snapshot image creation stops after 32 images.
<b>Reserved capacity settings</b>	
Alert me when...	<p>Use the spinner box to adjust the percentage point at which the system sends an alert notification when the reserved capacity for a snapshot group is nearing full.</p> <p>When the reserved capacity for the snapshot group exceeds the specified threshold, use the advance notice to increase reserved capacity or to delete unnecessary objects before the remaining space runs out.</p>
Policy for full reserved capacity	<p>Choose one of the following policies:</p> <ul style="list-style-type: none"><li>• <b>Purge oldest snapshot image:</b> The system automatically purges the oldest snapshot image in the snapshot group, which releases the snapshot image reserved capacity for reuse within the group.</li><li>• <b>Reject writes to base volume:</b> When the reserved capacity reaches its maximum defined percentage, the system rejects any I/O write request to the base volume that triggered the reserved capacity access.</li></ul>

## Results

- System Manager displays the new snapshot image in the Snapshot Images table. The table lists the new image by timestamp and associated base volume or snapshot consistency group.
- Snapshot creation might remain in a Pending state because of the following conditions:
  - The base volume that contains this snapshot image is a member of an asynchronous mirror group.
  - The base volume is currently in a synchronization operation. The snapshot image creation completes as soon as the synchronization operation is complete.

# Schedule snapshot images

You create a snapshot schedule to enable recovery in case of a problem with the base volume and to perform scheduled backups. Snapshots of base volumes or snapshot consistency groups can be created on a daily, weekly, or monthly schedule, at any time of day.

## Before you begin

The base volume must be Optimal.

## About this task

This task describes how to create a snapshot schedule for an existing snapshot consistency group or base volume.



You also can create a snapshot schedule at the same time you create a snapshot image of a base volume or snapshot consistency group.

## Steps

1. Do one of the following actions to create a snapshot schedule:

- Select **Storage > Volumes**.

Select the object (volume or snapshot consistency group) for this snapshot schedule, and then select **Copy Services > Create snapshot schedule**.

- Select **Storage > Snapshots**.

Select the **Schedules** tab, and then click **Create**.

2. Select the object (volume or snapshot consistency group) for this snapshot schedule, and then click **Next**.

The **Create Snapshot Schedule** dialog box appears.

3. Do one of the following actions:

- **Use a previously defined schedule from another snapshot object.**

Make sure advanced options are displayed. Click **Show more options**. Click **Import Schedule**, select the object with the schedule you want to import, and then click **Import**.

- **Modify the basic or advanced options.**

In the upper right of the dialog box, click **Show more options** to display all options, and then refer to the following table.

## Field Details

Field	Description
<b>Basic settings</b>	
Select days	Select individual days of the week for snapshot images.
Start time	From the drop-down list, select a new start time for the daily snapshots (selections are provided in half-hour increments). The start time defaults to one half-hour ahead of the current time.
Time zone	From the drop-down list, select your array's time zone.
<b>Advanced settings</b>	
Day / month	<p>Choose one of the following options:</p> <ul style="list-style-type: none"> <li>• <b>Daily / Weekly</b> — Select individual days for synchronization snapshots. You also can select the <b>Select all days</b> check box in the upper right if you want a daily schedule.</li> <li>• <b>Monthly / Yearly</b> — Select individual months for synchronization snapshots. In the <b>On day(s)</b> field, enter the days of the month for synchronizations to occur. Valid entries are <b>1</b> through <b>31</b> and <b>Last</b>. You can separate multiple days with a comma or semi-colon. Use a hyphen for inclusive dates. For example: 1,3,4,10-15,Last. You also can select the <b>Select all months</b> check box in the upper right if you want a monthly schedule.</li> </ul>
Start time	From the drop-down list, select a new start time for the daily snapshots (selections are provided in half-hour increments). The start time defaults to one half-hour ahead of the current time.
Time zone	From the drop-down list, select your array's time zone.
Snapshots per day / Time between snapshots	Select the number of snapshot images to create per day. If you select more than one, also select the time between snapshot images. For multiple snapshot images, be sure that you have adequate reserved capacity.

Field	Description
Create snapshot image right now?	Select this check box to create an instant image in addition to the automatic images you are scheduling.
Start/End date or No end date	Enter the start date for synchronizations to begin. Also enter an end date or select <b>No end date</b> .

4. Do one of the following actions:

- If the object is a snapshot consistency group, click **Create** to accept the settings and create the schedule.
- If the object is a volume, click **Next** to allocate reserved capacity for the snapshot images.

The volume candidate table displays only the candidates that support the reserved capacity specified. Reserved capacity is the physical allocated capacity that is used for any copy service operation and storage object. It is not directly readable by the host.

5. Use the spinner box to allocate the reserved capacity for the snapshot images. Do one of the following actions:

- **Accept the default settings.**

Use this recommended option to allocate the reserved capacity for the snapshot images with the default settings.

- **Allocate your own reserved capacity settings to meet your data storage needs.**

If you change the default reserved capacity setting, click **Refresh Candidates** to refresh the candidate list for the reserved capacity you specified.

Allocate the reserved capacity using the following guidelines:

- The default setting for reserved capacity is 40% of the capacity of the base volume. Usually this capacity is sufficient.
- The capacity needed varies, depending on the frequency and size of I/O writes to the volumes and the quantity and duration of snapshot image collection.

6. Click **Next**.

The Edit Settings dialog box appears.

7. Edit the settings for the snapshot schedule as needed, and then click **Finish**.



## Field Details

Setting	Description
<b>Snapshot image limit</b>	
Enable automatic deletion of snapshot images when...	Keep the check box selected if you want snapshot images automatically deleted after the specified limit; use the spinner box to change the limit. If you clear this check box, snapshot image creation stops after 32 images.
<b>Reserved capacity settings</b>	
Alert me when...	<p>Use the spinner box to adjust the percentage point at which the system sends an alert notification when the reserved capacity for a schedule is nearing full.</p> <p>When the reserved capacity for the schedule exceeds the specified threshold, use the advance notice to increase reserved capacity or to delete unnecessary objects before the remaining space runs out.</p>
Policy for full reserved capacity	<p>Choose one of the following policies:</p> <ul style="list-style-type: none"><li>• <b>Purge oldest snapshot image</b> — The system automatically purges the oldest snapshot image, which releases the snapshot image reserved capacity for reuse within the snapshot group.</li><li>• <b>Reject writes to base volume</b> — When the reserved capacity reaches its maximum defined percentage, the system rejects any I/O write request to the base volume that triggered the reserved capacity access.</li></ul>

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