CHAPTER 1

Configuring Volume Snapshots

See the following topics for information on configuring and managing volume snapshots:

About Volume Snapshots

A snapshot is a copy of the data on a volume at the moment you create the snapshot. Creating a snapshot causes the array controller to suspend I/O to the base volume while it creates a physical volume, called the snapshot reserve volume. The snapshot reserve volume stores information about the data that has changed since the snapshot was created. The capacity of the snapshot reserve volume is a configurable percentage of the base volume.

You can work with snapshot volumes as you would any other volume, with the exception that you cannot take a snapshot of a snapshot. Each snapshot can be accessed independently by other applications. A snapshot can be mounted on another server and used in the following ways:

- Backing up snapshots of data to reduce downtime for backup operations

  Backing up snapshots, rather than online data, enables critical transactions to keep running during the backup process. Mount the snapshot to the backup server, and then back up the snapshot's data to tape.

- Performing data analysis and testing applications with actual, current data.

  Instead of working with operating data or interfering with critical transactions, use the most recent snapshot for analysis or testing of data.

- Restarting applications from the snapshot

If an application problem causes bad data to be written to the primary volume, restart the application with the last known good snapshot until it is convenient to perform a full recovery.

Note – A snapshot of data is not suitable for failure recovery. Continue to use offline backup methods to create full-volume backup copies.

Snapshots on the Sun StorEdge 6130 array are copy-on-write or dependent copy. In this type of snapshot, write operations to the primary volume causes the system to copy the snapshot metadata and copy-on-write data to the snapshot reserve volume. Because the only blocks that are physically stored in the snapshot reserve volume are those that have changed since the time the snapshot was created, the snapshot uses less disk space than a full physical copy.

When a write operation occurs on the primary volume to a data block in which the data has not changed since the snapshot was created, the management software does the following:

- Copies the new data to the snapshot reserve volume
- Writes the new data to the primary volume
- Adds a record to the snapshot bitmap indicating the location of the new data

When a host sends a read request to the snapshot, the system checks whether the requested blocks have changed on the primary volume since the snapshot was created. If they have changed, the read request is satisfied from the data stored in the snapshot reserve volume. If the data has not changed, the read request is satisfied from the primary volume. Snapshots can also accept write operations. Write operations to a snapshot are stored in the snapshot reserve volume.

The management software provides a warning message when the snapshot reserve volume nears the configurable threshold. The threshold is a percentage of the full capacity of the snapshot reserve (the default is 30%). When the snapshot reserve volume threshold is met, its capacity can be expanded using the free capacity on the virtual disk.

To see the current snapshots for a volume, go to the Snapshot Summary page, as described in Displaying Volume Snapshot Information.

Related Topics

- Managing Volume Snapshots
- Planning a Volume Snapshot

Managing Volume Snapshots

You can create snapshots, resnap an existing snapshot, copy a snapshot, disable or delete a snapshot, map and unmap snapshots, and you can display information about existing snapshots.

Related Topics

- About Volume Snapshots
- Displaying Volume Snapshot Information
- Planning a Volume Snapshot
- Creating a Volume Snapshot
- Resnapping a Volume
- Unmapping a Volume Snapshot
- Mapping a Volume Snapshot to a Host or Host Group
- Copying a Snapshot
- Disabling a Volume Snapshot
- Deleting a Snapshot

Enabling Volume Snapshots

Before you can use the snapshots feature, you must enable it.

To enable the volume snapshots feature:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Administration > Licensing.

   The Licensable Feature page is displayed.
3. Click Add License.

   The Add License page opens.
4. Select the Snapshot license type from the drop down menu.
5. Enter the version number and the digest, and click OK.

Displaying Volume Snapshot Information

You can display summary and detail information for existing snapshots.

To display information on snapshots:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots

   The Snapshot Summary page is displayed.
3. Click the snapshot name for detailed information on that snapshot.

   The Volume Details page for the selected volume is displayed.

Related Topics

- Planning a Volume Snapshot
- Managing Volume Snapshots
- Creating a Volume Snapshot
- Unmapping a Volume Snapshot

Planning a Volume Snapshot

When you create a snapshot, as long as it is enabled, storage array performance is impacted by the copy-on-write activity to the associated snapshot reserve volume. If a snapshot is no longer needed you can stop the copy-on-write activity by either disabling or deleting the snapshot.

When disabled, the snapshot and associated reserve volume still exist. When you need to create a different point-in-time image of the same base volume, you can re-snap the volume to reuse the disabled snapshot and its associated reserve volume. This takes less time than creating a new snapshot.

If you do not intend to recreate a snapshot, you can delete the snapshot instead of disabling it. When you delete a snapshot, the management software also deletes the associated snapshot reserve volume.

When you create a snapshot, be prepared to provide the following information:

- Snapshot volume name

  Provide a unique name that identifies the snapshot and enables you to easily identify the primary volume.
- Reserve volume name

When you create a snapshot, you also create a snapshot reserve volume that stores information about the data that has changed since the snapshot was created. Provide a unique name that enables you to easily identify the snapshot to which it corresponds.

- Capacity of the reserve volume

  You must specify the capacity of the snapshot reserve volume as a percentage of the base volume. You can eliminate the risk of running out of space, by setting the snapshot reserve volume to the 100% level of activity, indicating that every block will change, for the following reasons:

  - Space in the snapshot reserve volume is consumed each time a block is written to the primary volume that was not written since the snapshot was created or when a block is written to the snapshot for the first time. Estimating the rate at which these activities occur can be difficult.
  - After you specify the capacity of the snapshot reserve volume, you can expand its capacity by using the free capacity on the virtual disk.

- The reserve volume capacity that generates a warning message

  You can specify the threshold at which the array generates messages to indicate the level of space left in the snapshot reserve volume. By default, the array generates a warning notification when data in the snapshot reserve volume reaches 30% of the available capacity. You can monitor the percentage of space used from the Volume Details page for the volume snapshot.

- The manner in which the management software handles failures.

  If the reserve volume for a snapshot becomes full, the management software can:

  - Fail the snapshot creation. Therefore, the snapshot becomes invalid but the base volume continues to operate normally
  - Fail the base volume. Therefore, attempts to write new data to the base volume will fail. This leaves the snapshot as a valid copy of the original base volume.

- The way a virtual disk is selected

  A snapshot can be created on a virtual disk as long as the RAID level, the number of disks, and the disk type (either FC or SATA) of the virtual disk matches the parent volumes' pool profile. The virtual disk must also have enough capacity for the snapshot volume. You must determine the way the software assigns the snapshot volume to a virtual disk. The following options are available:

  - Automatic: The management software automatically selects the virtual disk on which to create the volume from a list (provided by the array) of virtual disks that match the necessary criteria.
  - Manual: Enables you to select the virtual disks on which to create the volume from the list of all available virtual disks.
  - Create: Enables you to create a new virtual disk on which to create the snapshot volume.

- Whether or not to map the snapshot volume to a host or host group

  Determine which hosts or host groups, if any, you want to have read/write access to the snapshot volume by including the snapshot volume in a LUN map set.

  To include the snapshot volume in a LUN map set, select Yes and the software prompts you to select the host or host groups to map to the volume. Otherwise, select no.

  By default the All host group allows all hosts on the network to have access to the volumes. You can map the snapshot to this host group, however for enhanced security you can create other hosts and host groups. For instructions, go to Configuring Host Groups and Hosts.

Related Topics

- About Volume Snapshots
- Creating a Volume Snapshot
- Unmapping a Volume Snapshot

Creating a Volume Snapshot

For information on the factors you must consider in planning a snapshot, see Planning a Volume Snapshot.

When you run the Create a Snapshot Volume wizard, you are prompted to do the following:

1. Define the snapshot name.
2. Define the snapshot reserve volume name.
3. Assign the capacity to the snapshot reserve volume
4. Define the snapshot reserve volume capacity notification threshold.
5. Select the snapshot failure handling method.
6. Select the virtual disk selection method.
7. Select whether or not to map the snapshot volume to a host or host group.

Note – You cannot create a snapshot of a target volume.

To create a volume snapshot:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Volumes.
3. Click a volume name to view the Volume Details page for that volume.
4. Click Snapshot.

   The Create a Snapshot Volume wizard is displayed.

   Follow the steps in the wizard. Click the Help button in the wizard for more information.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots

Resnapping a Volume

To resnap a volume:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots.

   The Snapshot Summary page appears.
3. Select the snapshot that you want to resnap, which enables the Re-snap button.
4. Click Resnap.

   Upon completion of the new snapshot, this message appears:

   The requested snapshot(s) have been resnapped.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots

Copying a Snapshot

Before copying a snapshot, be sure that a suitable target volume exists on the storage array, or create a new target volume specifically for the snapshot copy.

Caution – A snapshot volume copy will overwrite all data on the target volume and automatically make the target volume read-only to hosts. Ensure that you no longer need the data or have backed up the data on the target volume before starting a volume copy.

To copy a snapshot:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshot.
3. Click Copy.

   The Copy Snapshot page is displayed.
4. Select a copy priority.

   Valid values are Highest, High, Medium, Low, and Lowest. The higher priorities will allocate more resources at the expense of the storage array's performance.
5. Select a target volume from the Target Volumes list.

   Only a valid target volume having a capacity equal to or greater than the source volume will be available in the Target Volumes list.

Note – Selecting a target volume with a capacity similar to the snapshot volume will reduce the risk of having unusable space on the target volume after the volume copy completes.

6. Stop all I/O activity to the snapshot volume and target volume.
7. Unmount any file systems on the source volume and target volume, if applicable.
8. Review the specified information. If you are satisfied, click OK. Otherwise, click Cancel.
9. Remount any file systems on the source volume and target volume, if applicable.
10. Enable I/O activity to the snapshot volume and target volume.

Mapping a Volume Snapshot to a Host or Host Group

To map a volume snapshot to one or more hosts or host groups:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots.

The Snapshot Summary page is displayed.

3. Click the volume to which you want to map one or more hosts or host groups.

   The Map button is enabled

4. Click Map.

   The Map Volume page appears with a list of available Hosts and Host Groups. Use the quick filter to display only Hosts or Host Groups.

5. Select the Host or Host Group that you want to map to this volume and click OK.

   A message specifies that the volume or volumes were mapped successfully

Unmapping a Volume Snapshot

To unmap a volume snapshot:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots.

   The Snapshot Summary page appears.

3. Select the snapshot that you want to unmap, which enables the Unmap button.
4. Click Unmap.

   You are prompted to confirm the unmapping.

5. Click OK.
6. Upon completion, this message appears:

   The volume was successfully unmapped.

Related Topics

- About Volume Snapshots
- Disabling a Volume Snapshot

Disabling a Volume Snapshot

Disabling a volume snapshot does not remove either the volume snapshot or its associated reserve volume.

When you disable a volume snapshot:

- You can re-enable the snapshot volume by selecting the volume snapshot from the Snapshot Summary page and clicking the Re-snap button.
- Only the specified volume snapshot is disabled. All other volume snapshots remain functional.

To disable a volume snapshot:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots.

   The Snapshot Summary page appears.
3. Select the snapshot that you want to disable, which enables the Disable button.
4. Click Disable.

   You are prompted to confirm the disabling of the snapshot volume.
5. Click OK.
6. Upon completion, this message appears:

   The selected snapshots have been disabled.

Deleting a Snapshot

Deleting a volume snapshot also deletes the snapshot reserve volume.

To delete a volume snapshot:

1. Go to the Sun Web Console page and click SE6130 Configuration Service.
2. Click Storage > Logical > Snapshots.

   The Snapshot Summary page appears.
3. Select the snapshot that you want to delete, which enables the Delete button.
4. Click Delete.

   You are prompted to confirm the deleting of the snapshot volume.
5. Click OK.
6. Upon completion, this message appears:

   The selected snapshots have been deleted.

Related Topics

- About Volume Snapshots
- Planning a Volume Snapshot
- Creating a Volume Snapshot
- Unmapping a Volume Snapshot

Snapshot Summary Page

This page displays information about all snapshots. Click a snapshot name to view the details and additional information for that snapshot.

Field	Indicates
Name	The snapshot name.
Base Volume	The base volume associated with this snapshot.
Reserve Volume	The reserve volume associated with this snapshot.
Creation Date	The date this snapshot was created.
Percent Full	The percentage of the snapshot reserve volume that is being used.
WWN	The world-wide name of the snapshot.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots

Snapshot Details Page

This page displays details for the selected snapshot, including available additional information.

TABLE 1-1 Storage Snapshot Details

Field	Indicates
Name	The snapshot name.
Base Volume	The base volume associated with this snapshot.
Reserve Volume	The reserve volume associated with this snapshot.
Creation Date	The date this snapshot was created.
Percent Full	The percentage of the snapshot reserve volume that is being used.
WWN	The world-wide name of the snapshot.

The additional information table provides related information. Click an item to see its details.

TABLE 1-2 Storage Pool Additional Information

Type	Number of Items
Volumes	The number of volumes in this pool.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots

Volume Additional Information - Snapshot Summary Page

This page provides information about the snapshots associated with this volume.

TABLE 1-3 Volume Additional Information - Snapshot Summary

Field	Indicates
Name	The name of the snapshot.
State	The current state of the volume: • Mapped - The volume is mapped currently to one or more snapshots. • Free - The volume is free currently and unmapped by a snapshot.
Condition	The condition of the snapshot: • Intact - The snapshot is operational currently. • Broken - The snapshot is not operational currently. • Degraded - The snapshot is degraded, and one or more input or output data paths is not operating properly; however, the redundant failover paths are still intact. • Snapshot Reset - Removes an older snapshot and resnaps the volume.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots
- Planning a Volume Snapshot

Volume Additional Information - Mapping Summary Page

This page shows the initiators mapped to this volume.

TABLE 1-4 Volume Additional Information - Mapping Summary

Field	Indicates
Name	The name of the mapped initiator.
Status	The current mapping status: Online or Offline.
LUN	The mapped LUN number.
Permissions	The current permissions: Read-only or Write, Read.

Related Topics

- About Volumes
- Managing Volumes

Volume Additional Information - Snapshot Details Page

This page shows details for the selected volume snapshot.

TABLE 1-5 Volume Additional Information - Snapshot Details

Field	Indicates
Name	The name of the volume snapshot.
Description	A description of the volume snapshot.
State	The state of the snapshot: • Free - The snapshot is unmapped. • Mapped - The snapshot is mapped to one or more volumes.

TABLE 1-5 Volume Additional Information - Snapshot Details

Field	Indicates
Condition	The current condition of the volume snapshot: Broken, Intact, or N/A for a volume with a Missing state.
Storage Domain	The storage domain with which this volume snapshot is associated.
WWN	The WWN of the volume snapshot.

The Additional Information table provides related information. Click an item to see its details.

TABLE 1-6 Snapshot additional information

Type	Number of Items
Mapped Initiators	The number of initiators associated with this snapshot.

Related Topics

- About Volume Snapshots
- Managing Volume Snapshots
- Planning a Volume Snapshot

Snapshot Additional Information - Mapping Summary Page

This page shows the initiators associated with this volume snapshot.

TABLE 1-7 Snapshot Additional Information - Mapping Summary

Field	Indicates
Name	The name of the mapped initiator.
Status	The current mapping status: Online or Offline.
LUN	The mapped LUN number.
Permissions	The current permissions: Read-only or Write, Read.

Related Topics

- About Volumes
- Managing Volumes