

Module 8: Data Protection

Exercise 1: Managing Snapshot Copies

In this exercise, you create and schedule a NetApp ONTAP Snapshot copy and then restore data from that copy.

Objectives

This exercise focuses on enabling you to do the following:

- Create and schedule a Snapshot copy
- Restore data from a Snapshot copy

Case Study

The employees acquired from Dwurple are untried, and Mr. Zarrot is unsure of their abilities. To reduce the amount of data that might be lost due to user mistakes, Mr. Zarrot decrees that frequent Snapshot copies of all valuable data must be made.


An employee accidentally corrupted the spreadsheet with the latest rocket-part delivery forecasts. You recover the spreadsheet from the most recent Snapshot copy.

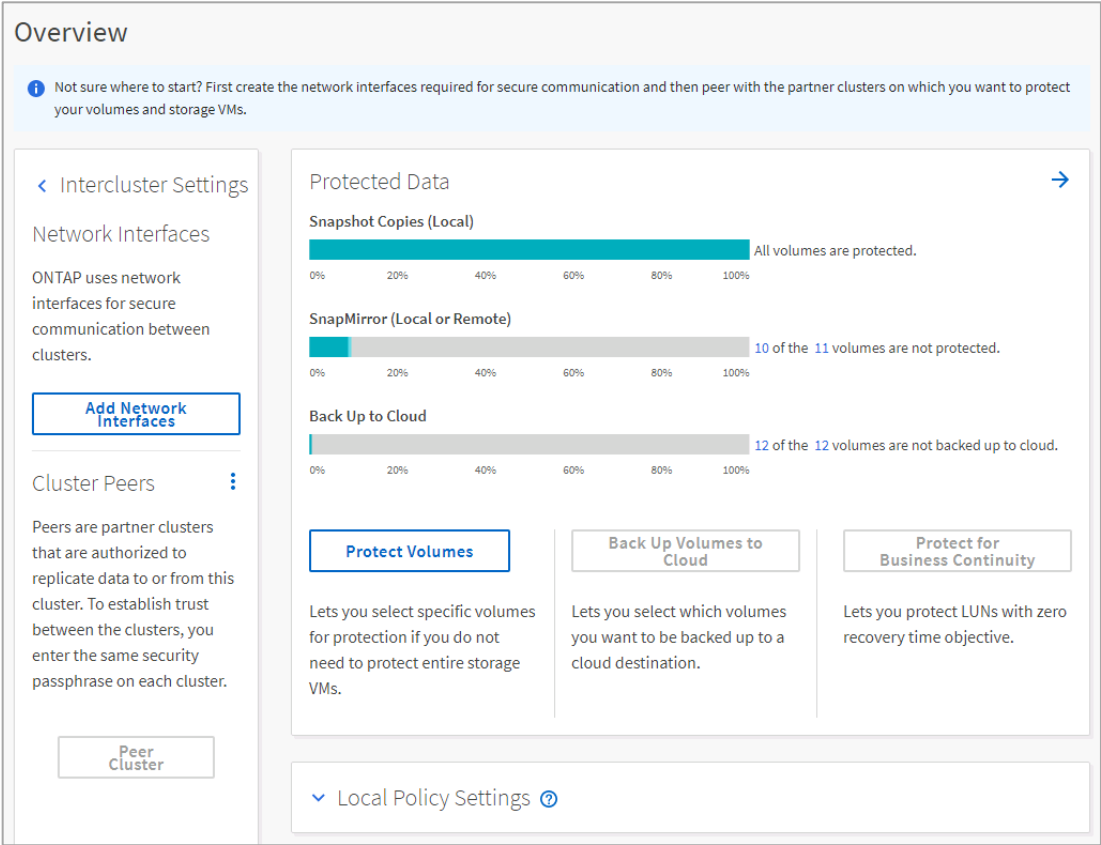
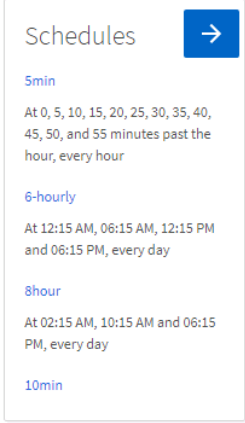
Lab Equipment

Use the following equipment to complete the exercise:

| System | Host Name | IP Addresses | User Name | Password |
|---|-----------|---------------|------------------------|----------|
| Windows Server | jumphost | 192.168.0.5 | DEMOAdministrator | Netapp1! |
| ONTAP cluster-management LIF (cluster1) | cluster1 | 192.168.0.101 | admin (case sensitive) | Netapp1! |

Task 1: Create a Schedule

| Step | Action |
|------|---|
| 1-1 | Log in to NetApp ONTAP System Manager for cluster1 . |
| 1-2 |  Be sure to log in to the correct cluster. |
| 1-3 | From the System Manager menu, select Protection > Overview . |

| Step | Action |
|------|---|
| 1-4 | <p>On the Overview page, expand the Local Policy Settings.</p>  <p>The screenshot shows the 'Overview' page. On the left, there are sections for 'Intercluster Settings' (Network Interfaces and Cluster Peers) and 'Protected Data'. The 'Protected Data' section has three progress bars: 'Snapshot Copies (Local)' at 100% (All volumes are protected), 'SnapMirror (Local or Remote)' at 10% (10 of the 11 volumes are not protected), and 'Back Up to Cloud' at 0% (12 of the 12 volumes are not backed up to cloud). Below these are three buttons: 'Protect Volumes', 'Back Up Volumes to Cloud', and 'Protect for Business Continuity'. At the bottom, the 'Local Policy Settings' section is expanded, showing a dropdown menu with options like '5min', '6-hourly', '8hour', and '10min'.</p> |
| 1-5 | <p>In the Schedules pane, click the arrow.</p>  <p>The screenshot shows the 'Schedules' pane. It has a title 'Schedules' with a blue arrow button to its right. Below the title, there are four schedule options: '5min', '6-hourly', '8hour', and '10min'. Each option has a description of its frequency. The '5min' option is selected, and its description is: 'At 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, and 55 minutes past the hour, every hour'.</p> |

Step

Action

1-6

Examine the default schedules.

Schedules

Protection Overview

+ Add

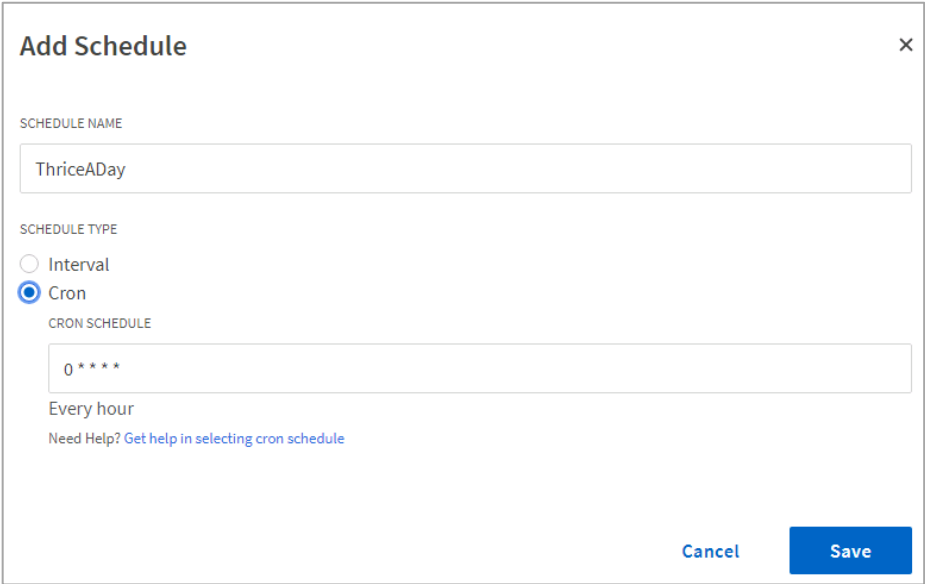
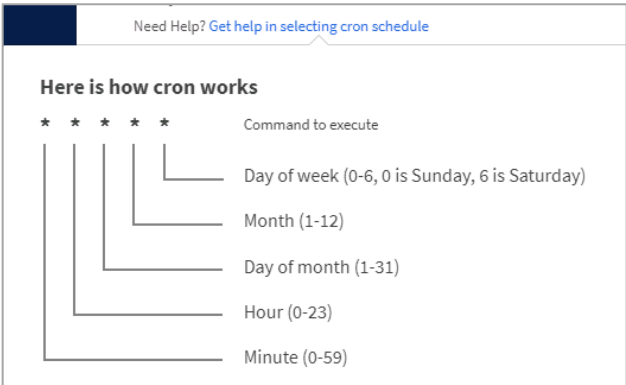
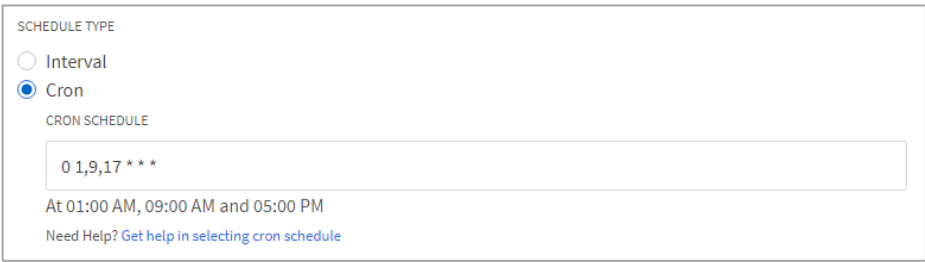
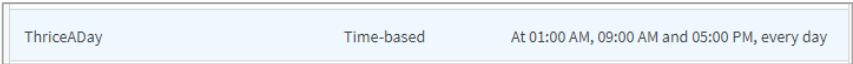
Show / Hide

Filter

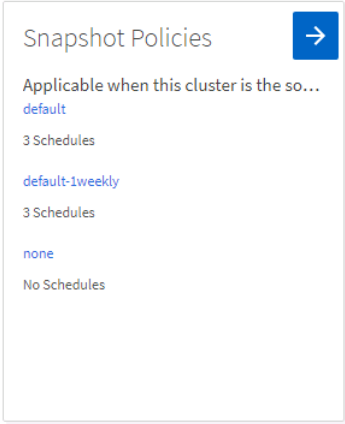
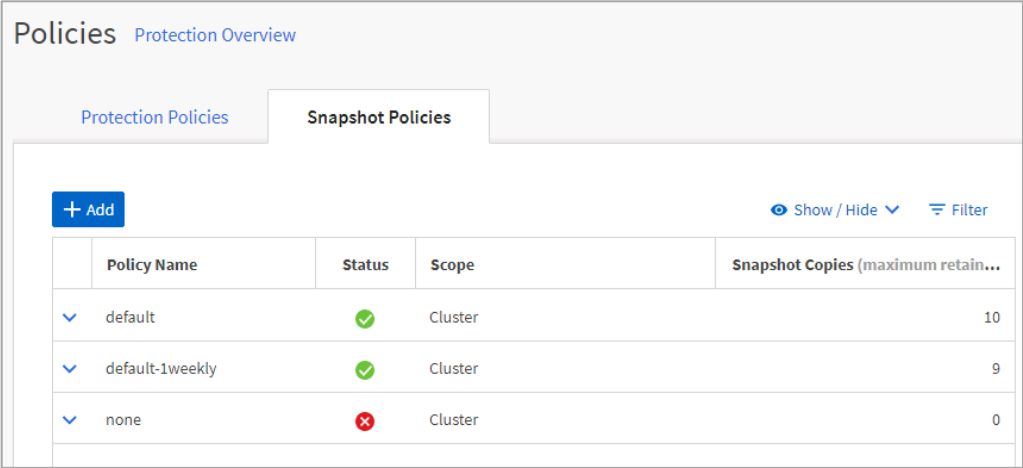
| Name | Type | Schedule |
|---------------------------------------|----------------|---|
| 5min | Time-based | At 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, and 55 ... |
| 6-hourly | Time-based | At 12:15 AM, 06:15 AM, 12:15 PM and 06:15 PM, ... |
| 8hour | Time-based | At 02:15 AM, 10:15 AM and 06:15 PM, every day |
| 10min | Time-based | At 0, 10, 20, 30, 40, and 50 minutes past the hou... |
| 12-hourly | Time-based | At 12:15 AM and 12:15 PM, every day |
| 15min | Time-based | At 0, 15, 30, and 45 minutes past the hour, every... |
| Application Templates ASUP Dump | Interval-based | Every 1 day |
| Auto Balance Aggregate Scheduler | Interval-based | Every 1 hour |
| Balanced Placement Model Cache Update | Interval-based | Every 7 minutes, 30 seconds |
| daily | Time-based | At 12:10 AM, every day |
| hourly | Time-based | At 5 minutes past the hour, every hour |
| monthly | Time-based | At 12:20 AM, on day 1 of the month, every day o... |
| RepositoryBalanceMonitorJobSchedule | Interval-based | Every 10 minutes |
| weekly | Time-based | At 12:15 AM, only on Sunday, every month |

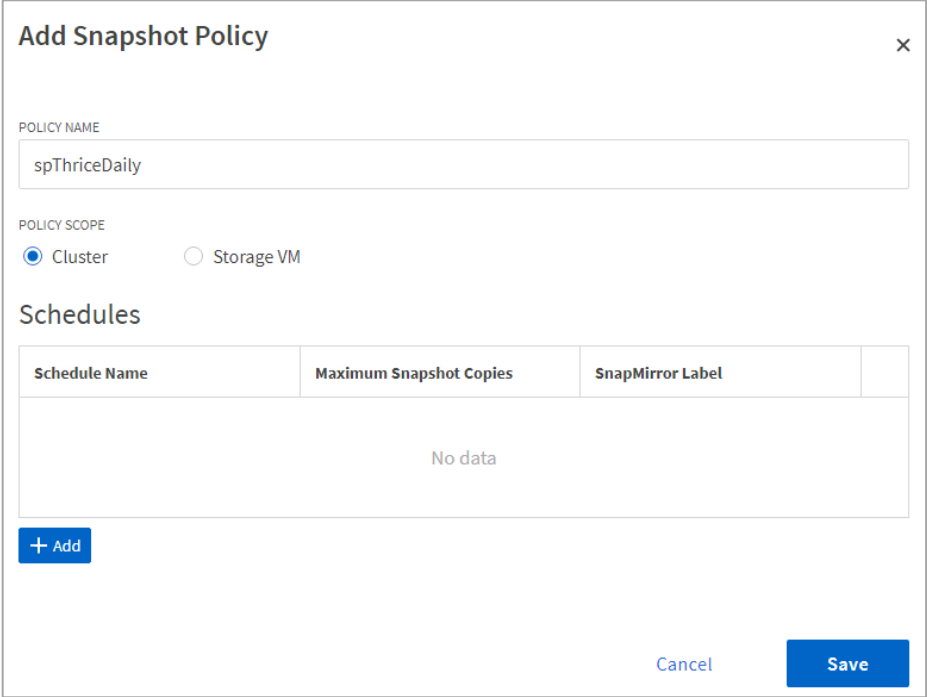
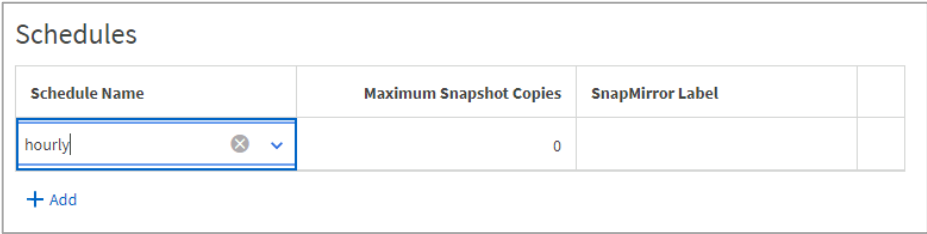

1-7

Click **Add**.

| Step | Action |
|------|---|
| 1-8 | <p>In the Add Schedule dialog box, specify the following settings:</p> <ul style="list-style-type: none"> Schedule Name: ThriceADay Scheduled Type: Cron  |
| 1-9 | <p>Click Get help in selecting cron schedule to view a description of the cron format schedule.</p>  |
| 1-10 | <p>Define a cron schedule that runs at 1 a.m., 9 a.m., and 5 p.m. every day.</p>  |
| 1-11 | Click Save . |
| 1-12 | <p>Verify that the schedule was created successfully.</p>  |

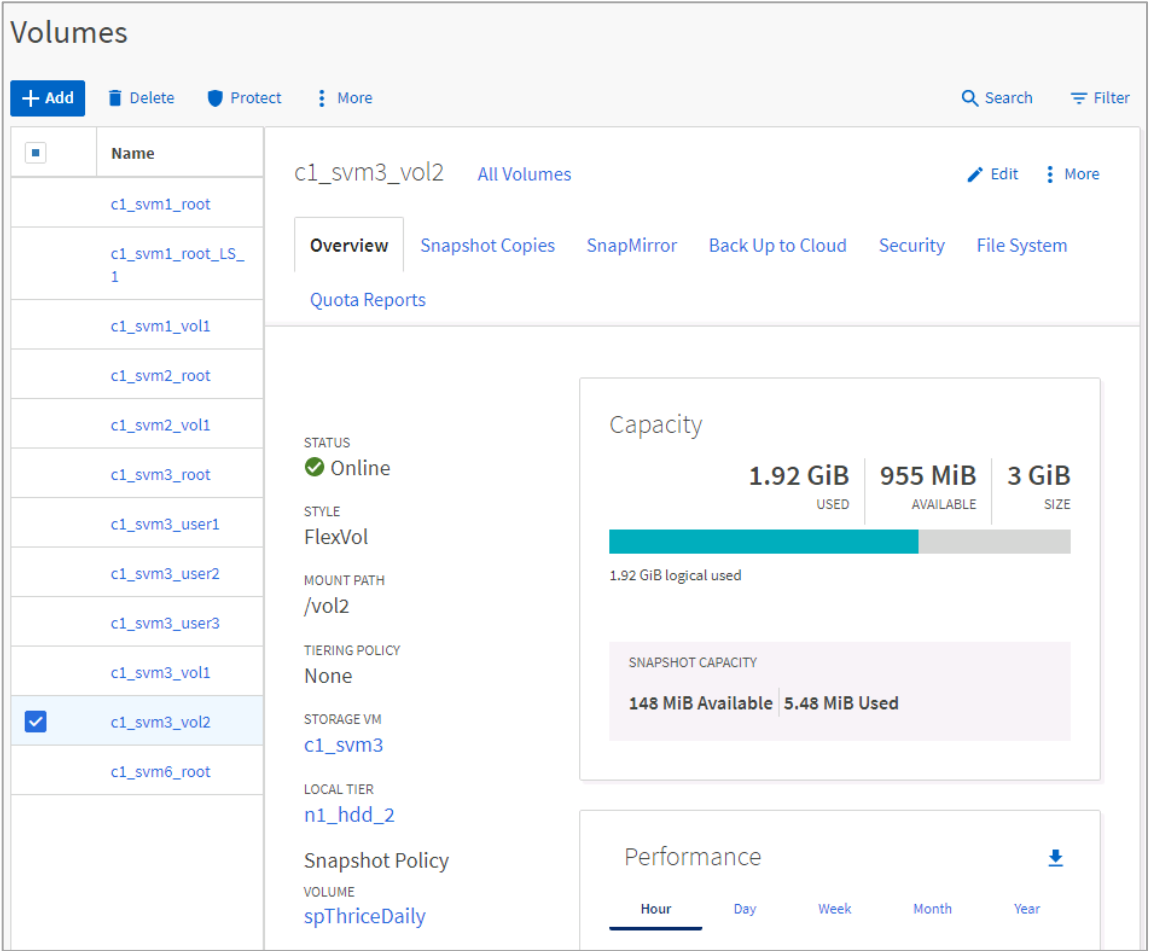
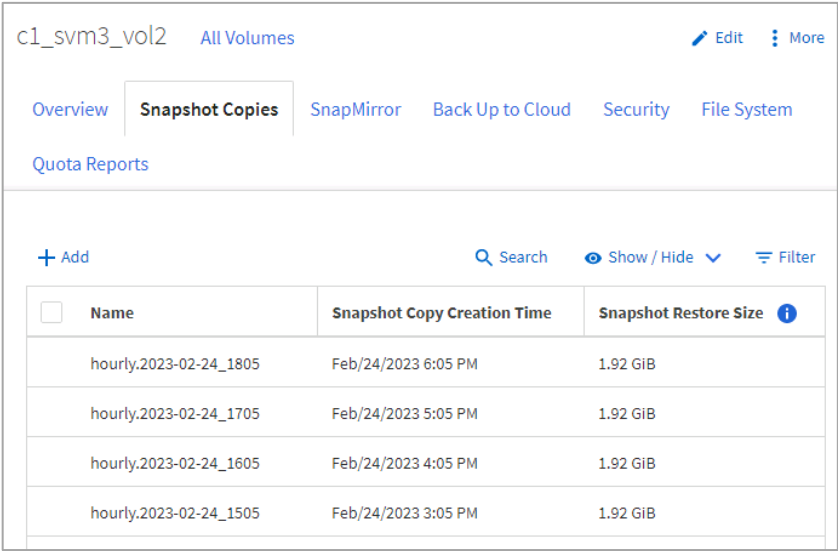
Task 2: Create a Snapshot Policy

| Step | Action |
|------|--|
| 2-1 | Return to the Protection Overview page, and then expand the Local Policy Settings. |
| 2-2 | <p>In the Snapshot Policies pane, click the arrow.</p>  |
| 2-3 | <p>Examine the default Snapshot policies.</p>  |
| 2-4 | Click Add . |

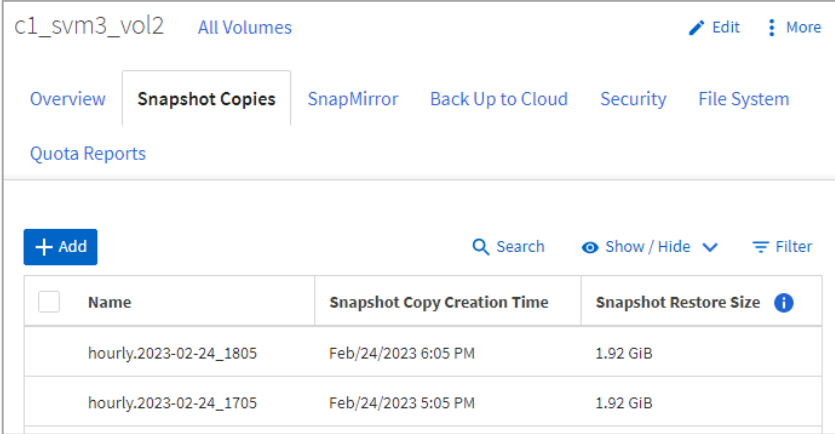
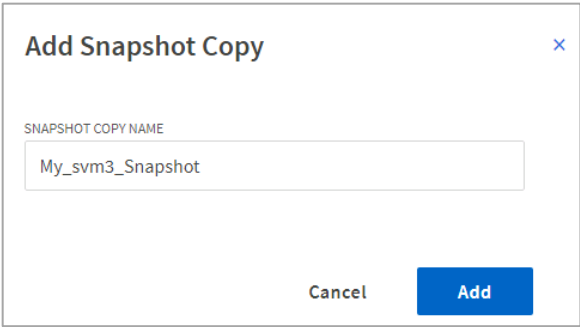
| Step | Action |
|------|---|
| 2-5 | <p>Name the new snapshot policy spThriceDaily.</p>  |
| 2-6 | Click Add . |
| 2-7 | <p>From the Schedule Name list, select ThriceADay.</p>  |
| 2-8 | <p>In the Maximum Snapshot Copies to be retained field, type 5.</p>  |
| 2-9 | Click Save . |
| 2-10 | Verify that the policy was created successfully and is enabled. |

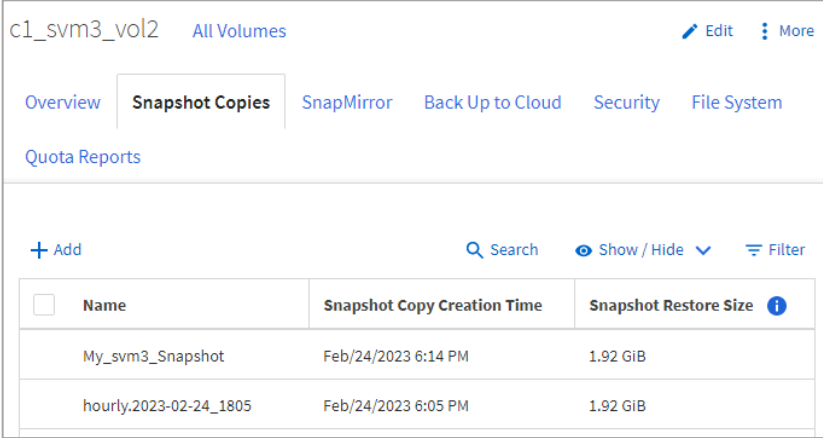
Task 3: Assign a Snapshot Policy to a Volume

| Step | Action | | | | | | | | |
|---------------|--|---|-------------------------|----------|------------------|------------|---|---|---|
| 3-1 | From the System Manager menu, select Storage > Volumes . | | | | | | | | |
| 3-2 | From the Volumes list, select c1_svm3_vol2 , and then from the More menu, select Edit > Volume . | | | | | | | | |
| 3-3 | <div>Scroll to the Snapshot Copies(Local) settings section, and then specify the following settings:</div> <ul style="list-style-type: none">• Snapshot Reserve %: 5 (default)• Schedule Snapshot copies: <selected> (default)• Snapshot Policy: spThriceDaily <div><div>Snapshot Copies (Local) Settings</div><div><div>SNAPSHOT RESERVE %</div><div><div>5</div></div></div><div><div><input checked="" type="checkbox"/> Schedule Snapshot copies</div><div><div>SNAPSHOT POLICY</div><div><div>spThriceDaily</div><div>▼</div></div></div></div><table><tr><th>Schedule Name</th><th>Maximum Snapshot Copies</th><th>Schedule</th><th>SnapMirror Label</th></tr><tr><td>ThriceADay</td><td>5</td><td>At 01:00 AM, 09:00 AM and 05:00 PM, every day</td><td>-</td></tr></table><div><div><input type="checkbox"/> Automatically delete older Snapshot copies</div></div></div> | Schedule Name | Maximum Snapshot Copies | Schedule | SnapMirror Label | ThriceADay | 5 | At 01:00 AM, 09:00 AM and 05:00 PM, every day | - |
| Schedule Name | Maximum Snapshot Copies | Schedule | SnapMirror Label | | | | | | |
| ThriceADay | 5 | At 01:00 AM, 09:00 AM and 05:00 PM, every day | - | | | | | | |
| 3-4 | Click Save . | | | | | | | | |

| Step | Action |
|------|---|
| 3-5 | <p>From the Volumes list, click c1_svm3_vol2 to view the volume details.</p>  |
| 3-6 | <p>Click Snapshots Copies.</p>  |
| 3-7 | <p>Examine the list of Snapshot copies.</p> |

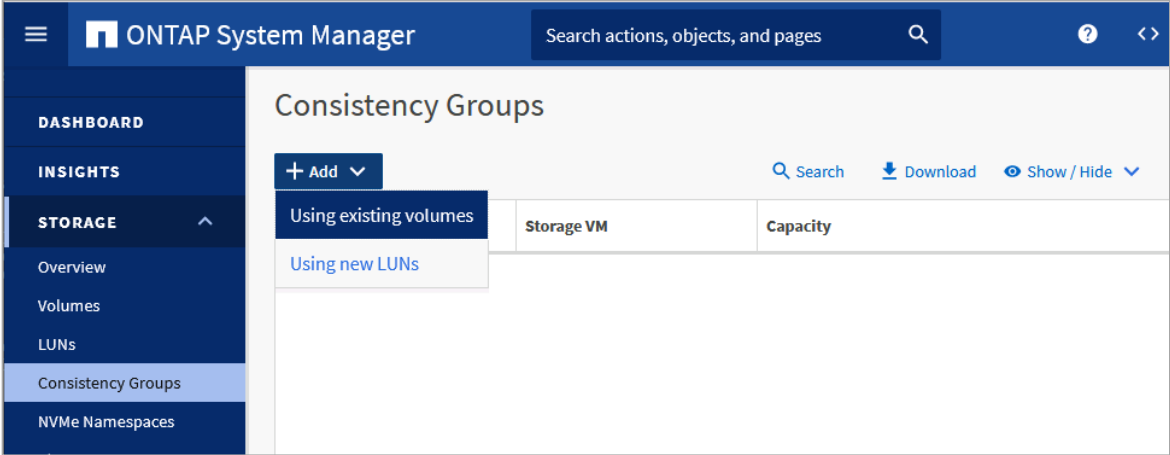
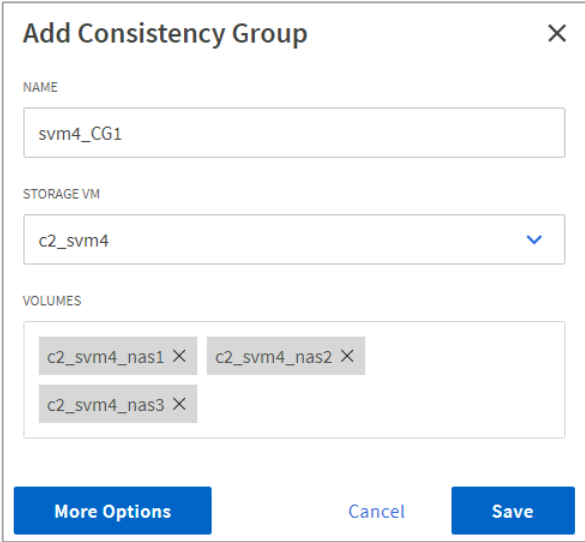
Task 4: Restore a File from a Snapshot Copy

| Step | Action |
|------|---|
| 4-1 | From PuTTY, log in to your Linux computer. |
| 4-2 | Change to the /mnt/svm3/vol2 directory: <code>cd /mnt/svm3/vol2</code> |
| 4-3 | Create two files: <code>touch file1 file2</code> |
| 4-4 | Return to System Manager for cluster1 . |
| 4-5 | On the c1_svm3_vol2 details page, on the Snapshot Copies tab, click Add .  |
| 4-6 | Name the Snapshot copy My_svm3_Snapshot .  |
| 4-7 | Click Add . |

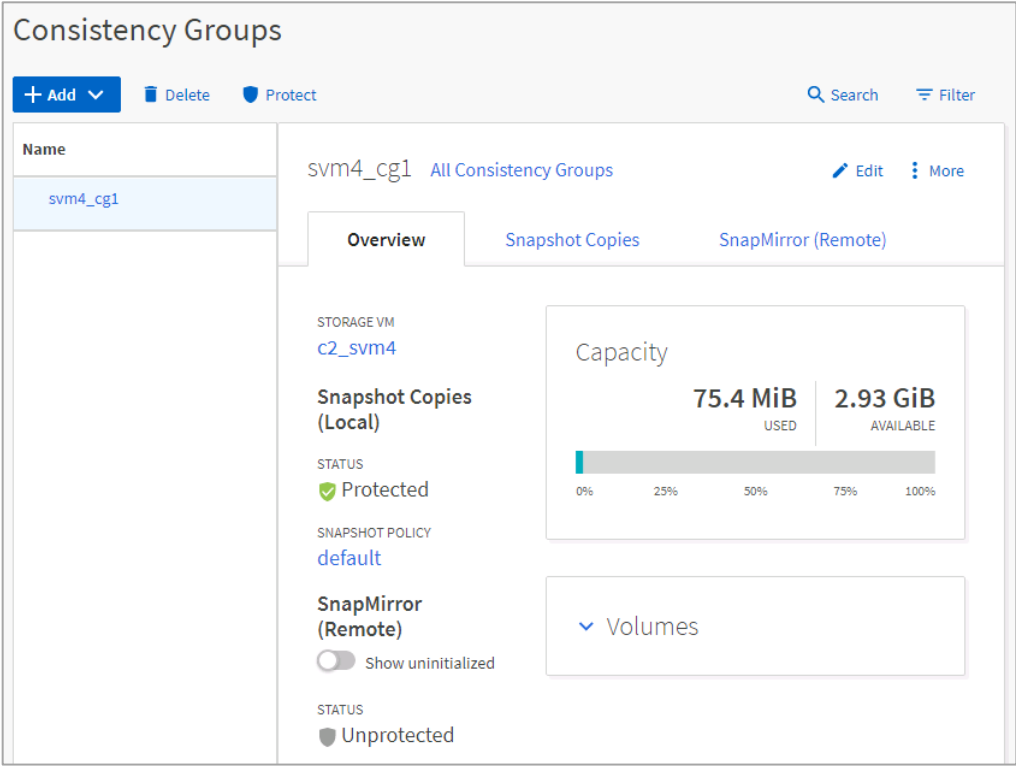
| Step | Action |
|------|--|
| 4-8 | <p>Confirm the creation of the new Snapshot copy.</p>  |
| 4-9 | Return to your PuTTY Linux session. |
| 4-10 | <p>List the files in the /mnt/svm3/vol2 directory:</p> <pre>ls -l</pre> |
| 4-11 | <p>Delete file1 from the /mnt/svm3/vol2 directory:</p> <pre>rm file1</pre> |
| 4-12 | Enter y to confirm your decision. |
| 4-13 | <p>List all the files in the directory, including hidden files and directories:</p> <pre>ls -la</pre> |
| 4-14 | <p>Explore the hidden .snapshot directory:</p> <pre>ls .snapshot</pre> |
| 4-15 | <p>Review the contents of My_svm3_Snapshot:</p> <pre>ls .snapshot/My_svm3_Snapshot</pre> |
| 4-16 | <p>Restore file1 to the root of c1_svm3_vol2:</p> <pre>cp .snapshot/My_svm3_Snapshot/file1 /mnt/svm3/vol2</pre> |
| 4-17 | <p>Verify that the file is successfully restored:</p> <pre>ls /mnt/svm3/vol2</pre> |

Task 5: Creating Snapshot Consistency Groups

| Step | Action |
|------|---|
| 5-1 | Log in to NetApp ONTAP System Manager for cluster2 . |
| 5-2 | From the System Manager menu, select Storage > Consistency Groups . |

| Step | Action |
|------|--|
| 5-3 | <p>Click Add and then click Using existing volumes.</p>  |
| 5-4 | <p>In the Add Consistency Group dialog box, specify the following settings:</p> <ul style="list-style-type: none"> • Name: svm4_cg1 • Storage VM: c2_svm4 (default) • Volumes: c2_svm4_nas1, c2_svm4_nas2, c2_svm4_nas3  |
| 5-5 | Click More Options . |

| Step | Action | | | | | | | | | | | | | | | | | | |
|--------------|---|--|--|--------------|-------------------------|----------|------------------|--|---|--|---|------------------------|-------|------------------------|-------|--|--------|--|--------|
| 5-6 | <p>Scroll down the Add Consistency Group dialog box to the Protection section and click Schedule Snapshot Copies (Local).</p> <div><div>Protection</div><div><div><input checked="" type="checkbox"/> Schedule Snapshot Copies (Local)</div><div><div>SNAPSHOT POLICY</div><div><div>Search for objects.</div><div>▼</div></div></div><div><input type="checkbox"/> Enable SnapMirror (Remote)</div></div></div> <tr><td>5-7</td><td><p>Select the default Snapshot policy and click Save.</p><div><div>Protection</div><div><div><input checked="" type="checkbox"/> Schedule Snapshot Copies (Local)</div><div><div>SNAPSHOT POLICY</div><div><div>default</div><div>▼</div></div></div><div><table><tr><th>Schedule ...</th><th>Maximum Snapshot Copies</th><th>Schedule</th><th>SnapMirror Label</th></tr><tr><td>hourly</td><td>6</td><td>At 5 minutes past the hour, every hour</td><td>-</td></tr><tr><td>daily</td><td>2</td><td>At 12:10 AM, every day</td><td>daily</td></tr><tr><td>weekly</td><td>2</td><td>At 12:15 AM, only on Sunday, every month</td><td>weekly</td></tr></table></div><div><input type="checkbox"/> Enable SnapMirror (Remote)</div><div><div>Save</div><div>Cancel</div></div></div></div></td></tr> | 5-7 | <p>Select the default Snapshot policy and click Save.</p> <div><div>Protection</div><div><div><input checked="" type="checkbox"/> Schedule Snapshot Copies (Local)</div><div><div>SNAPSHOT POLICY</div><div><div>default</div><div>▼</div></div></div><div><table><tr><th>Schedule ...</th><th>Maximum Snapshot Copies</th><th>Schedule</th><th>SnapMirror Label</th></tr><tr><td>hourly</td><td>6</td><td>At 5 minutes past the hour, every hour</td><td>-</td></tr><tr><td>daily</td><td>2</td><td>At 12:10 AM, every day</td><td>daily</td></tr><tr><td>weekly</td><td>2</td><td>At 12:15 AM, only on Sunday, every month</td><td>weekly</td></tr></table></div><div><input type="checkbox"/> Enable SnapMirror (Remote)</div><div><div>Save</div><div>Cancel</div></div></div></div> | Schedule ... | Maximum Snapshot Copies | Schedule | SnapMirror Label | hourly | 6 | At 5 minutes past the hour, every hour | - | daily | 2 | At 12:10 AM, every day | daily | weekly | 2 | At 12:15 AM, only on Sunday, every month | weekly |
| 5-7 | <p>Select the default Snapshot policy and click Save.</p> <div><div>Protection</div><div><div><input checked="" type="checkbox"/> Schedule Snapshot Copies (Local)</div><div><div>SNAPSHOT POLICY</div><div><div>default</div><div>▼</div></div></div><div><table><tr><th>Schedule ...</th><th>Maximum Snapshot Copies</th><th>Schedule</th><th>SnapMirror Label</th></tr><tr><td>hourly</td><td>6</td><td>At 5 minutes past the hour, every hour</td><td>-</td></tr><tr><td>daily</td><td>2</td><td>At 12:10 AM, every day</td><td>daily</td></tr><tr><td>weekly</td><td>2</td><td>At 12:15 AM, only on Sunday, every month</td><td>weekly</td></tr></table></div><div><input type="checkbox"/> Enable SnapMirror (Remote)</div><div><div>Save</div><div>Cancel</div></div></div></div> | Schedule ... | Maximum Snapshot Copies | Schedule | SnapMirror Label | hourly | 6 | At 5 minutes past the hour, every hour | - | daily | 2 | At 12:10 AM, every day | daily | weekly | 2 | At 12:15 AM, only on Sunday, every month | weekly | | |
| Schedule ... | Maximum Snapshot Copies | Schedule | SnapMirror Label | | | | | | | | | | | | | | | | |
| hourly | 6 | At 5 minutes past the hour, every hour | - | | | | | | | | | | | | | | | | |
| daily | 2 | At 12:10 AM, every day | daily | | | | | | | | | | | | | | | | |
| weekly | 2 | At 12:15 AM, only on Sunday, every month | weekly | | | | | | | | | | | | | | | | |

| Step | Action |
|------|---|
| 5-8 | <p>In the Consistency Groups page, click svm4_cg1 and observe the protection status.</p>  <p>The screenshot displays the 'Consistency Groups' management interface. On the left, a list of consistency groups is shown, with 'svm4_cg1' selected. The main panel provides an overview of the selected group, including its storage VM ('c2_svm4'), snapshot copies (75.4 MiB used, 2.93 GiB available), and its status (Protected). A 'Capacity' section shows a progress bar indicating the usage of the storage space.</p> |

Step

Action

5-9

Expand the Volumes section and observe the volumes that are members of the consistency group.

svm4_cg1All Consistency GroupsEditMore

OverviewSnapshot CopiesSnapMirror (Remote)

STORAGE VM
c2_svm4

Snapshot Copies (Local)
STATUS
Protected
SNAPSHOT POLICY
default

Snapshot Copies (Remote)
Show uninitialized
STATUS
Unprotected
APPLICATION TYPE
Other

Capacity
1.23 MiB3 GiB
USEDAVAILABLE
0%10%20%30%40%50%60%70%80%90%100%

Volumes
DeleteRemove from consistency groupFilter

| <input type="checkbox"/> | Name | Capacity (available total) |
|--------------------------|--------------|-------------------------------------|
| <input type="checkbox"/> | c2_svm4_nas3 | 408 KiB used1 GiB available1.05 GiB |
| <input type="checkbox"/> | c2_svm4_nas1 | 424 KiB used1 GiB available1.05 GiB |
| <input type="checkbox"/> | c2_svm4_nas2 | 452 KiB used1 GiB available1.05 GiB |

5-10

Click on the **Snapshot Copies** tab and then click **Add**.

Consistency Groups

+ AddDeleteProtect

SearchFilter

Name

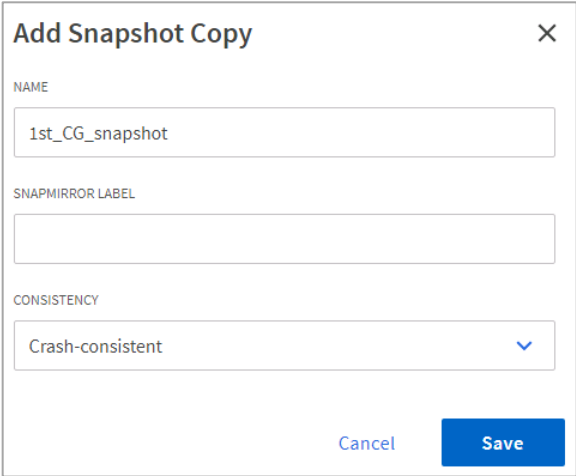
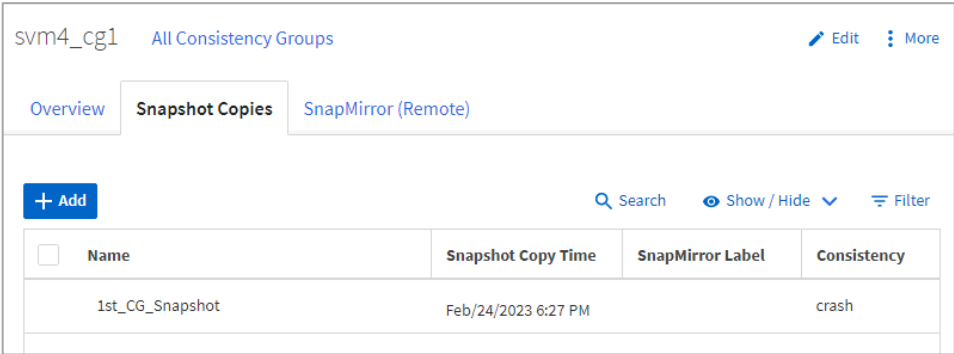
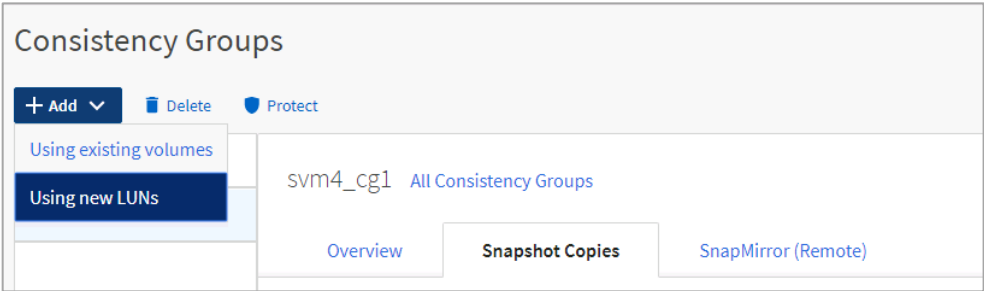
svm4_cg1All Consistency GroupsEditMore

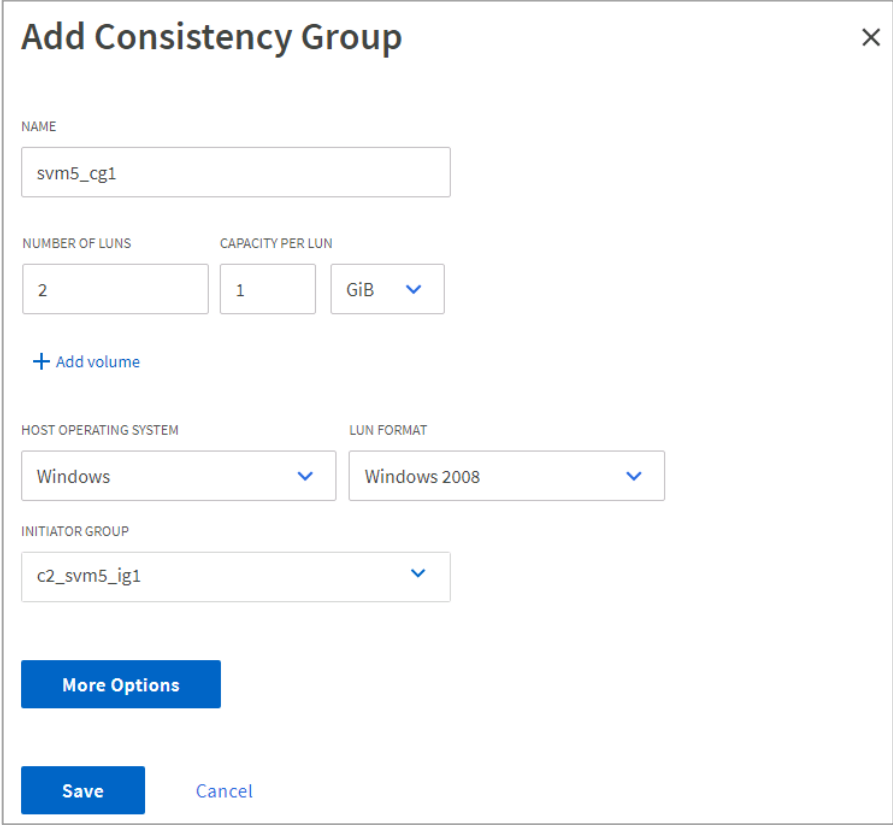
OverviewSnapshot CopiesSnapMirror (Remote)

+ Add

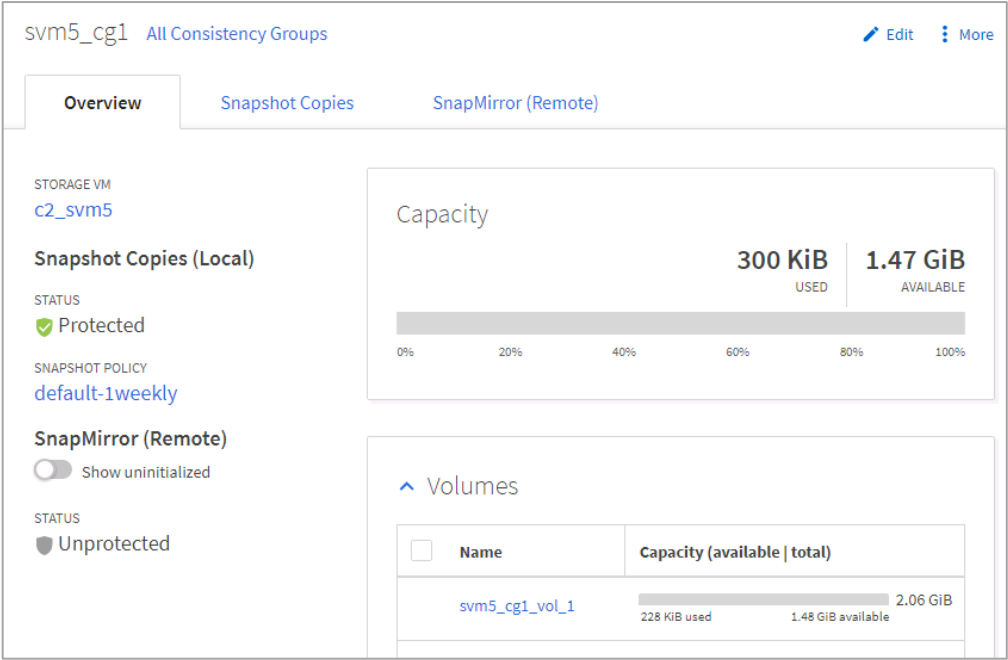
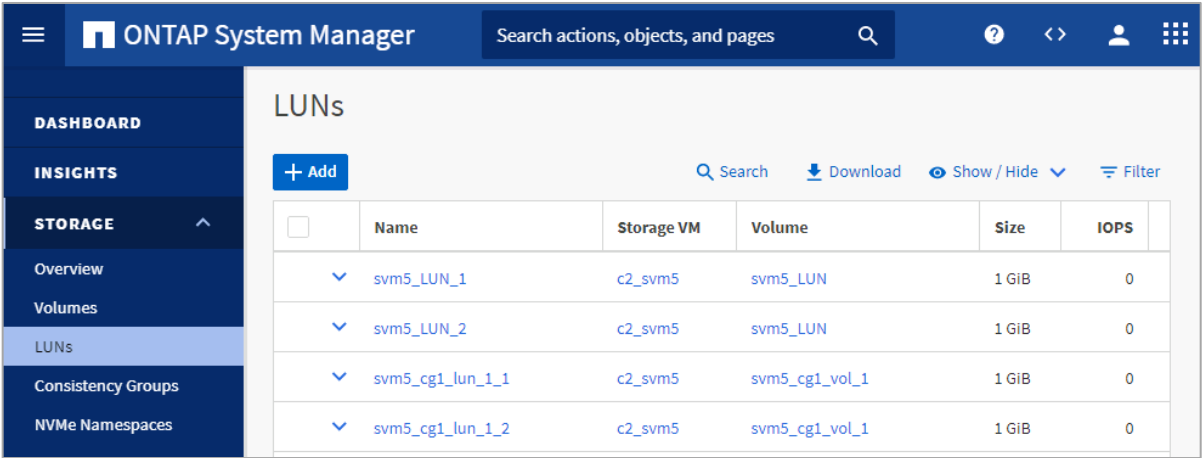
SearchShow / HideFilter

| <input type="checkbox"/> | Name | Snapshot Copy Time | SnapMirror Label | Consistency |
|--------------------------|------|--------------------|------------------|-------------|
|--------------------------|------|--------------------|------------------|-------------|

| Step | Action |
|------|--|
| 5-11 | <p>Assign the snapshot copy the name 1st_CG_Snapshot and click Save.</p>  |
| 5-12 | <p>Verify the creation of the consistency group snapshot.</p>  |
| 5-13 | <p>In the Consistency Groups page, click Add and select Using new LUNs.</p>  |

| Step | Action |
|------|--|
| 5-14 | <p>In the Add Consistency Group dialog box, specify the following settings:</p> <ul style="list-style-type: none"> • Name: svm5_cg1 • Number of LUNs: 2 • Capacity per LUN: 1 GiB • Host Operating System: Windows (default) • LUN Format: Windows 2008 (default) • Initiator group: c2_svm5_ig1 (default)  |
| 5-15 | Click More Options . |
| 5-16 | Scroll down the Add Consistency Group page to the Protection section and click Schedule Snapshot Copies (Local) . |

| Step | Action | | | | | | | | | | | | | | | | |
|--------------|--|--|-------------------------|----------|------------------|--------|---|--|---|-------|---|------------------------|---|--------|---|--|---|
| 5-17 | <p>Select the default-1weekly Snapshot policy and click Save.</p> <div><div>Protection</div><div><div><input checked="" type="checkbox"/> Schedule Snapshot Copies (Local)</div><div>SNAPSHOT POLICY</div><div>default-1weekly</div><table><thead><tr><th>Schedule ...</th><th>Maximum Snapshot Copies</th><th>Schedule</th><th>SnapMirror Label</th></tr></thead><tbody><tr><td>hourly</td><td>6</td><td>At 5 minutes past the hour, every hour</td><td>-</td></tr><tr><td>daily</td><td>2</td><td>At 12:10 AM, every day</td><td>-</td></tr><tr><td>weekly</td><td>1</td><td>At 12:15 AM, only on Sunday, every month</td><td>-</td></tr></tbody></table><div><input type="checkbox"/> Enable SnapMirror (Remote)</div><div><div>Save</div><div>Cancel</div></div></div></div> | Schedule ... | Maximum Snapshot Copies | Schedule | SnapMirror Label | hourly | 6 | At 5 minutes past the hour, every hour | - | daily | 2 | At 12:10 AM, every day | - | weekly | 1 | At 12:15 AM, only on Sunday, every month | - |
| Schedule ... | Maximum Snapshot Copies | Schedule | SnapMirror Label | | | | | | | | | | | | | | |
| hourly | 6 | At 5 minutes past the hour, every hour | - | | | | | | | | | | | | | | |
| daily | 2 | At 12:10 AM, every day | - | | | | | | | | | | | | | | |
| weekly | 1 | At 12:15 AM, only on Sunday, every month | - | | | | | | | | | | | | | | |
| 5-18 | <p>In the Consistency Groups page, click svm5_cg1 and observe the protection status.</p> <div><div>Consistency Groups</div><div><div><div>+ Add</div><div>Delete</div><div>Protect</div></div><div><div>Search</div><div>Filter</div></div></div><div><div><div>Name</div><div>svm4_cg1</div><div>svm5_cg1</div></div><div><div>svm5_cg1</div><div>All Consistency Groups</div><div><div>Edit</div><div>More</div></div><div><div>Overview</div><div>Snapshot Copies</div><div>SnapMirror (Remote)</div></div><div><div><div>STORAGE VM</div><div>c2_svm5</div></div><div><div>Snapshot Copies (Local)</div><div><div>STATUS</div><div>Protected</div></div><div><div>SNAPSHOT POLICY</div><div>default-1weekly</div></div><div><div>SnapMirror (Remote)</div><div><div>Show uninitialized</div></div><div><div>STATUS</div><div>Unprotected</div></div></div><div><div>Capacity</div><div><div>300 KiB</div><div>1.47 GiB</div><div>USED</div><div>AVAILABLE</div></div><div><div>0%</div><div>20%</div><div>40%</div><div>60%</div><div>80%</div><div>100%</div></div></div><div><div>Volumes</div></div></div></div></div></div></div> | | | | | | | | | | | | | | | | |

| Step | Action |
|------|---|
| 5-19 | <p>Expand the Volumes section and observe the volumes that are members of the consistency group.</p>  |
| 5-20 | <p>From the System Manager menu, select Storage > LUNs and observe the newly created LUNs that are members of the consistency group volume.</p>  |

End of exercise