

Exercise 2: Managing FlexClone Volumes

In this exercise, you explore and manage FlexClone volumes.

Objectives

This exercise focuses on enabling you to create and split a FlexClone volume.

Case Study

The rocket motor division of Zarrot Industries is bringing a new customer relations application online. Before going live, the new application needs to be tested. You make a clone of the customer relations data so that the new application can be realistically tested without risking actual data.

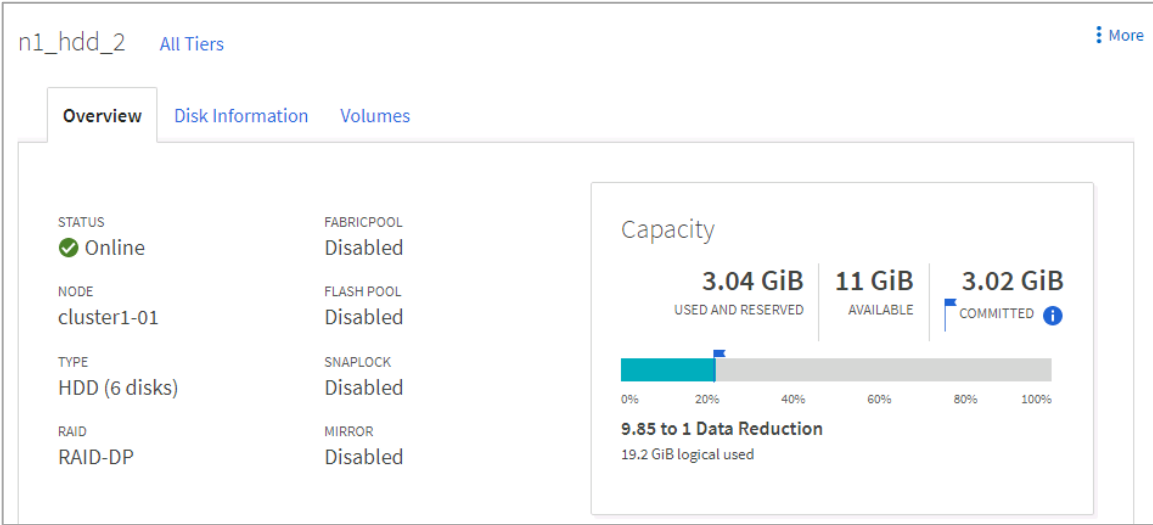
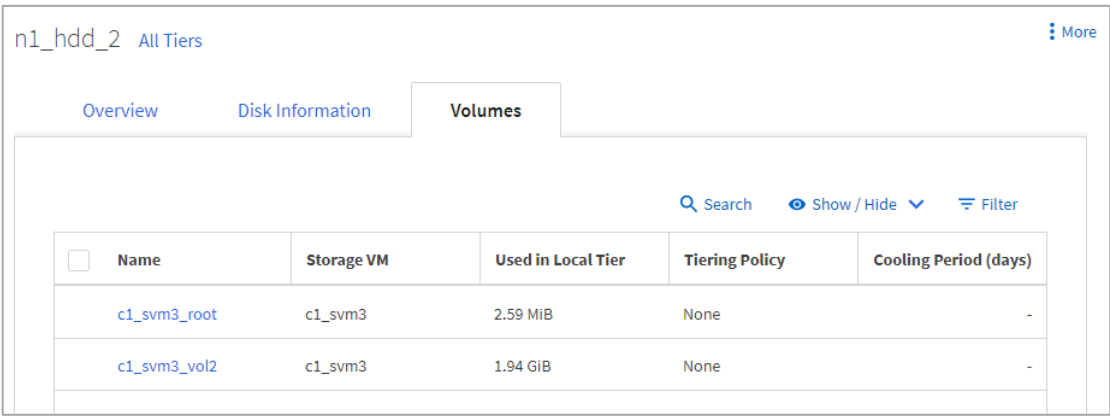
Lab Equipment

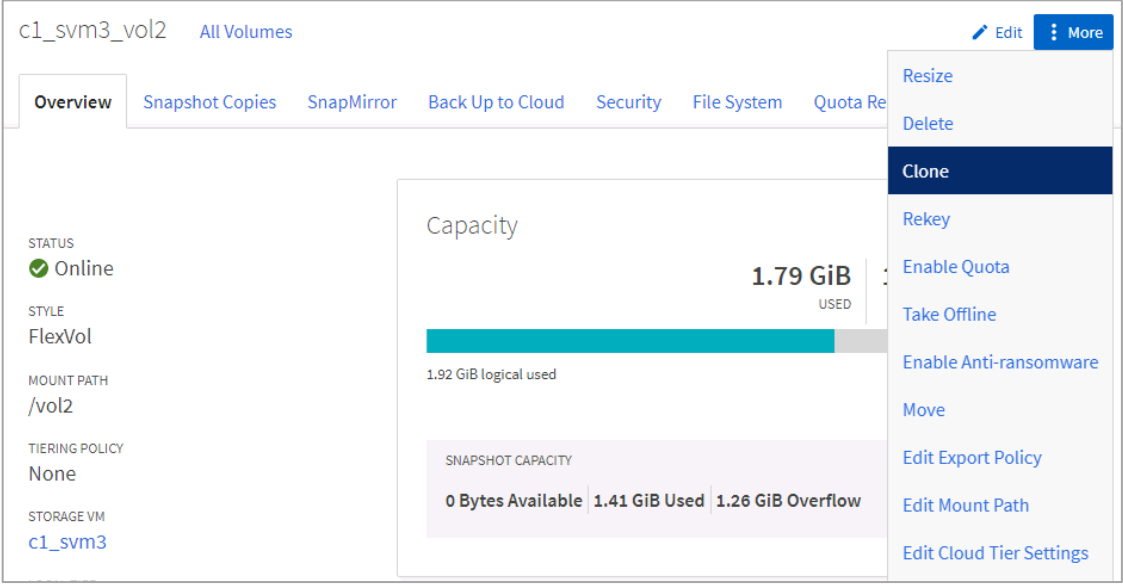
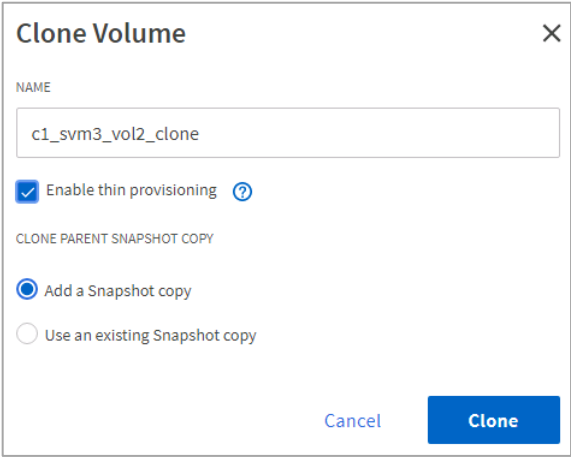
Use the following equipment to complete the exercise:

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

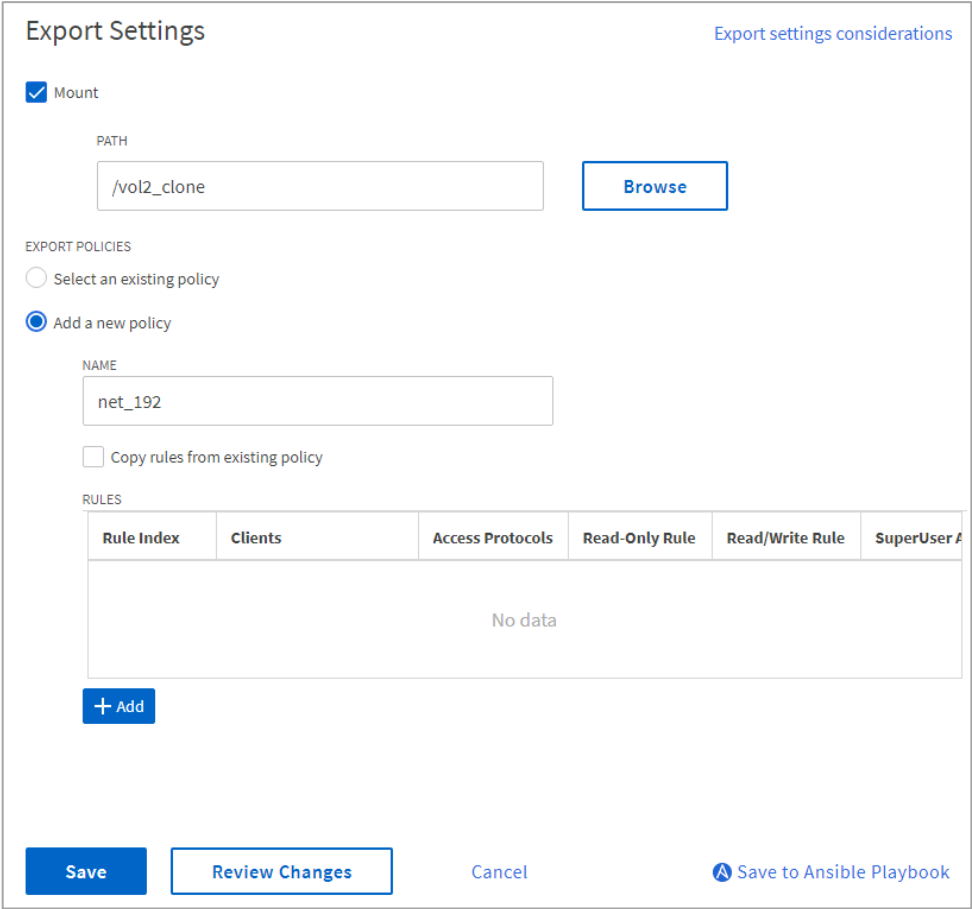
Task 1: Create and Split a FlexClone Volume

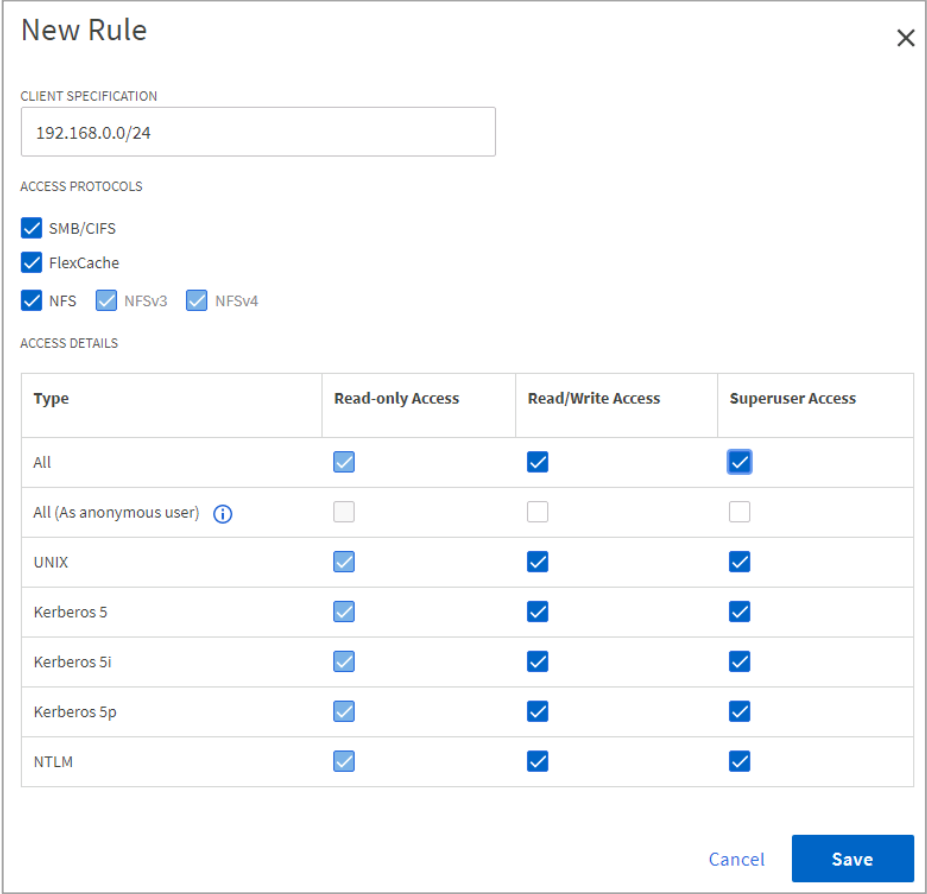
Step	Action
1-1	Log in to NetApp ONTAP System Manager for cluster1 .
1-2	From the System Manager menu, select Storage > Volumes .
1-3	In the Volumes pane, click c1_svm3_vol2 .
1-4	On the c1_svm3_vol2 details page, click the Overview tab, and then click the local storage tier name n1_hdd_2 .

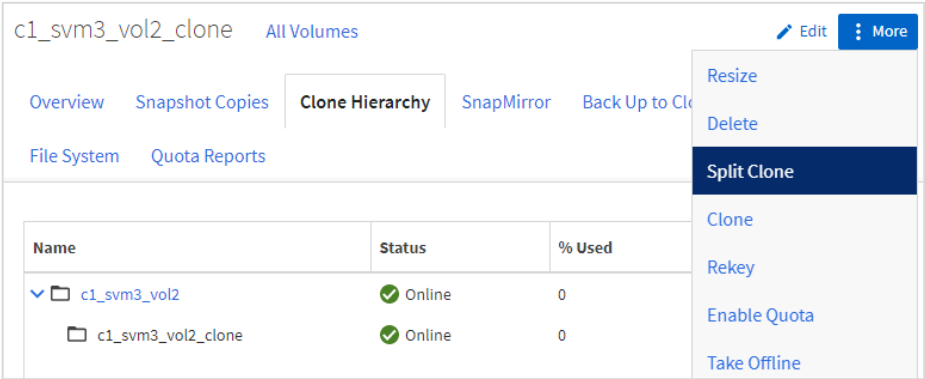
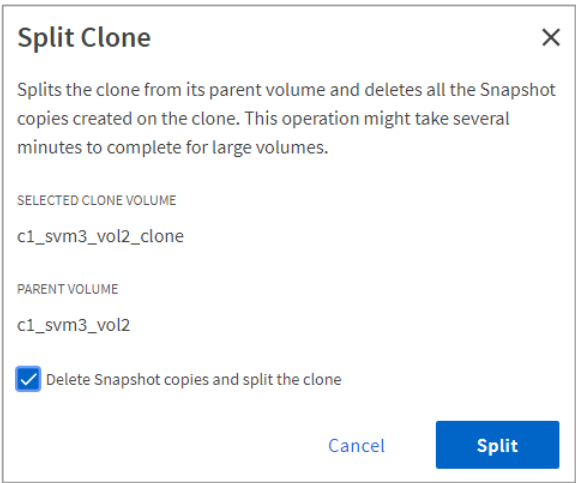
Step	Action
1-5	<p>Examine the Overview tab of the local tier, and then answer the following questions:</p> <ul style="list-style-type: none"> How much of the aggregate capacity is used? _____ What is the data reduction ratio? _____ 
1-6	Click the Volumes tab.
1-7	<p>Observe the number of volumes in the aggregate and the amount of storage space that each volume uses in the local tier.</p> 
1-8	Click c1_svm3_vol2 to return to the volume page.

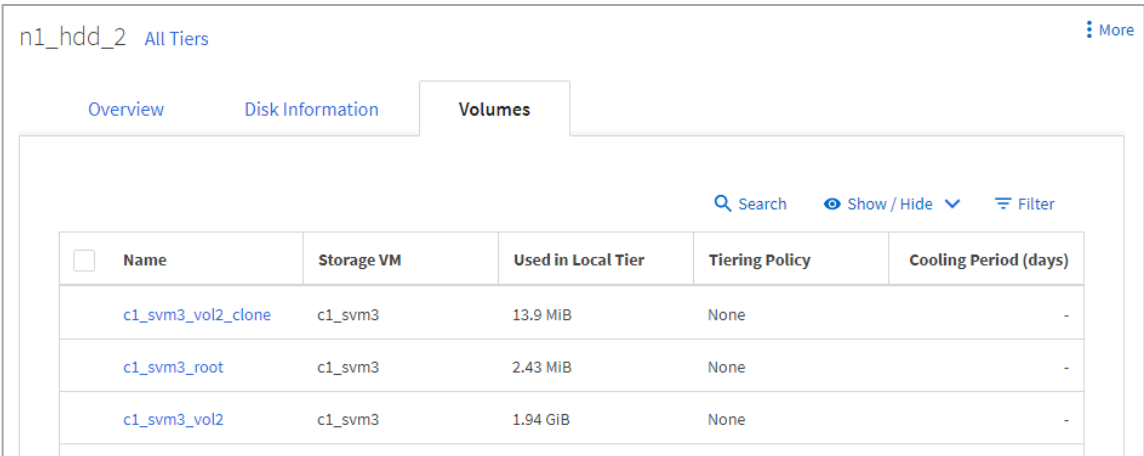
Step	Action
1-9	<p>From the More menu, select Clone.</p>  <p>The screenshot shows the 'c1_svm3_vol2' volume page. The 'More' menu is open, displaying options: Resize, Delete, Clone (highlighted), Rekey, Enable Quota, Take Offline, Enable Anti-ransomware, Move, Edit Export Policy, Edit Mount Path, and Edit Cloud Tier Settings. The volume details on the left include: STATUS: Online, STYLE: FlexVol, MOUNT PATH: /vol2, TIERING POLICY: None, and STORAGE VM: c1_svm3. The Capacity section shows 1.79 GiB USED and 1.92 GiB logical used. The SNAPSHOT CAPACITY section shows 0 Bytes Available, 1.41 GiB Used, and 1.26 GiB Overflow.</p>
1-10	<p>In the Clone Volume dialog box, specify the following settings:</p> <ul style="list-style-type: none"> • Name: c1_svm3_vol2_clone • Enable thin provisioning: <selected> • Add a Snapshot copy: <selected> (default)  <p>The screenshot shows the 'Clone Volume' dialog box. The NAME field contains 'c1_svm3_vol2_clone'. The 'Enable thin provisioning' checkbox is checked. Under 'CLONE PARENT SNAPSHOT COPY', the 'Add a Snapshot copy' radio button is selected. The 'Cancel' and 'Clone' buttons are at the bottom right.</p>
1-11	Click Clone .

Step	Action																					
1-12	<p>In the Volumes pane, click the name of the new clone volume.</p> <div><div>Volumes</div><div><div><div>+ Add</div><div>More</div></div><div><div>Search</div><div>Download</div><div>Show / Hide</div><div>Filter</div></div></div><table><tr><th><input type="checkbox"/></th><th>Name</th><th>Storage VM</th><th>Status</th><th>Capacity</th><th>IOPS</th><th>Latency (ms)</th></tr><tr><td></td><td><input type="text" value="clone"/></td><td><input type="text" value=""/></td><td><input type="text" value=""/></td><td><input type="text" value=""/></td><td><input type="text" value=""/></td><td><input type="text" value=""/></td></tr><tr><td><input checked="" type="checkbox"/></td><td>c1_svm3_vol2_clone</td><td>c1_svm3</td><td>Online</td><td><div><div>731 MiB used</div><div>2.14 GiB available</div><div>3 GiB</div></div></td><td>0</td><td></td></tr></table></div>	<input type="checkbox"/>	Name	Storage VM	Status	Capacity	IOPS	Latency (ms)		<input type="text" value="clone"/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input checked="" type="checkbox"/>	c1_svm3_vol2_clone	c1_svm3	Online	<div><div>731 MiB used</div><div>2.14 GiB available</div><div>3 GiB</div></div>	0	
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1-13	<p>On the volume details page, click the Clone Hierarchy tab, and then observe the parent Snapshot copy name.</p> <div><div><div>c1_svm3_vol2_clone</div><div>All Volumes</div><div>EditMore</div></div><div><div>Overview</div><div>Snapshot Copies</div><div>Clone Hierarchy</div><div>SnapMirror</div><div>Back Up to Cloud</div><div>Security</div><div>File System</div><div>Quota Reports</div></div><table><tr><th>Name</th><th>Status</th><th>% Used</th><th>Total Size</th></tr><tr><td><input checked="" type="checkbox"/> <input type="checkbox"/> c1_svm3_vol2</td><td>Online</td><td>0</td><td>3 GiB</td></tr><tr><td><input type="checkbox"/> c1_svm3_vol2_clone</td><td>Online</td><td>0</td><td>3 GiB</td></tr></table></div>	Name	Status	% Used	Total Size	<input checked="" type="checkbox"/> <input type="checkbox"/> c1_svm3_vol2	Online	0	3 GiB	<input type="checkbox"/> c1_svm3_vol2_clone	Online	0	3 GiB									
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1-14	<p>Click Edit.</p> <div><div><div>c1_svm3_vol2_clone</div><div>All Volumes</div><div>EditMore</div></div><div><div>Overview</div><div>Snapshot Copies</div><div>Clone Hierarchy</div><div>SnapMirror</div><div>Back Up to Cloud</div><div>Security</div><div>File System</div><div>Quota Reports</div></div><table><tr><th>Name</th><th>Status</th><th>% Used</th><th>Total Size</th></tr><tr><td><input checked="" type="checkbox"/> <input type="checkbox"/> c1_svm3_vol2</td><td>Online</td><td>0</td><td>3 GiB</td></tr><tr><td><input type="checkbox"/> c1_svm3_vol2_clone</td><td>Online</td><td>0</td><td>3 GiB</td></tr></table></div>	Name	Status	% Used	Total Size	<input checked="" type="checkbox"/> <input type="checkbox"/> c1_svm3_vol2	Online	0	3 GiB	<input type="checkbox"/> c1_svm3_vol2_clone	Online	0	3 GiB									
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Step	Action
1-15	<p>In the Export Settings section of the Edit Volume page, specify the following settings:</p> <ul style="list-style-type: none"> Mount: <selected> Mount Path: /vol2_clone Add a new policy: <selected> Export policy name: net_192 
1-16	Click Add to create a new export rule.

Step	Action
1-17	<p>In the New Rule window, specify the following settings:</p> <ul style="list-style-type: none"> Client specification: 192.168.0.0/24 Grant all types of access to users whose identity is verified using any of the authentication methods. 
1-18	Click Save to create the new rule.
1-19	Click Save to complete your changes to the volume.
1-20	From PuTTY, log in to your Linux system.
1-21	<p>Create the directory /mnt/clone:</p> <pre>mkdir /mnt/clone</pre>
1-22	<p>Mount the clone volume to your Linux computer:</p> <pre>mount -t nfs 192.168.0.62:/vol2_clone /mnt/clone</pre>
1-23	<p>Navigate to the clone volume:</p> <pre>cd /mnt/clone</pre>
1-24	<p>Create a file called clonefile:</p> <pre>echo "Edited from a FlexClone..." >> clonefile.txt</pre>

Step	Action
1-25	<p>List the contents of the clone directory:</p> <pre>ls</pre> <p>Sample output:</p> <pre>clonefile.txt file1 file2 hugefile</pre>
1-26	<p>Review the contents of the file on the parent volume, and then verify that although the clone and parent share data blocks, they function as separate volumes:</p> <pre>cd ../svm3/vol2</pre> <pre>ls</pre> <p>Sample output:</p> <pre>file1 file2 hugefile</pre>
1-27	Return to System Manager for cluster1.
1-28	<p>In the volume details view of the clone, from the More menu, select Split Clone.</p> 
1-29	<p>In the Split Clone dialog box, select Delete Snapshot copies and split the clone, and then click Split.</p> <p>Note: The split takes some time.</p> 

Step	Action
1-30	On the Volumes page, review the status. Note: When the split finishes, the clone no longer shares blocks with the parent and is a separate volume.
1-31	From the System Manager menu, select Storage > Tiers , and then select n1_hdd_2 .
1-32	Click the Volumes tab, and then answer the following questions: <ul style="list-style-type: none"> Has the amount of Used Space increased, decreased, or remained the same? _____ Is there an ONTAP software efficiency feature that would explain why or why not? _____ 

Task 2: Enable Logical Space Reporting and Enforcement

Step	Action
2-1	Open a PuTTY session to cluster1.
2-2	View the available and used physical space and available and used logical space in vol2 and its clones in c1_svm3: <pre>volume show -vserver c1_svm3 -volume c1_svm3_vol2* -fields available,physical-used,logical-used,logical-available</pre> <p>Sample output:</p> <pre>vserver volume available physical-used logical-used logical-available ----- c1_svm3 c1_svm3_vol2 1.06GB 1.94GB 3.00GB - c1_svm3 c1_svm3_vol2_clone 2.84GB 13.92MB 1.92GB - 2 entries were displayed.</pre>
2-3	Enable logical space reporting for vol2 and its clones: <pre>volume modify -vserver c1_svm3 -volume c1_svm3_vol2* -is-space-reporting-logical true</pre>

Step	Action																		
2-4	Enable logical space enforcement on vol2 and its clones: <code>volume modify -vserver c1_svm3 -volume c1_svm3_vol2* -is-space-enforcement-logical true</code>																		
2-5	Type y to confirm the exception for any volumes that are not thin-provisioned.																		
2-6	View the differences in available and used physical space and available and used logical space in the NFS volumes in c1_svm3: <code>volume show -vserver c1_svm3 -volume c1_svm3_vol2* -fields available,physical-used,logical-used,logical-available</code> Sample output: <table><tr><th>vserver</th><th>volume</th><th>available</th><th>physical-used</th><th>logical-used</th><th>logical-available</th></tr><tr><td>c1_svm3</td><td>c1_svm3_vol2</td><td>1.06GB</td><td>1.94GB</td><td>3.00GB</td><td>1.06GB</td></tr><tr><td>c1_svm3</td><td>c1_svm3_vol2_clone</td><td>2.84GB</td><td>13.92MB</td><td>1.92GB</td><td>949.8MB</td></tr></table> 2 entries were displayed.	vserver	volume	available	physical-used	logical-used	logical-available	c1_svm3	c1_svm3_vol2	1.06GB	1.94GB	3.00GB	1.06GB	c1_svm3	c1_svm3_vol2_clone	2.84GB	13.92MB	1.92GB	949.8MB
vserver	volume	available	physical-used	logical-used	logical-available														
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End of exercise