

Exercise 2: Creating a FlexGroup Volume

In this optional exercise, you create a NetApp ONTAP FlexGroup volume.

Objectives

This exercise focuses on enabling you to provision a FlexGroup volume

Case Study

Zarrot Industries is expanding with several new product lines. The products are complex, and each requires thousands of parts. Each part must be meticulously described. The number of files that are necessary to store all this information has exploded and is starting to reach the limits of a FlexVol volume. Instead of joining multiple FlexVol volumes together by using junction paths to form a larger namespace, the IT staff has decided to use a FlexGroup volume because of its easier setup and use.

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!
CentOS 8 Linux Server	centos8	192.168.0.21	admin (case sensitive)	Netapp1!

Task 1: Create a FlexGroup Volume

You perform this task in the CLI because of the capacity limitations of the ONTAP simulator. In a production environment, you can use NetApp ONTAP System Manager.

Step	Action
1-1	Open a PuTTY session to cluster1 .

Step	Action																																																								
1-2	<p>Verify the amount of available free space on the data aggregates:</p> <p>storage aggregate show n*</p> <p>Sample output:</p> <table><tr><th>Aggregate</th><th>Size</th><th>Available</th><th>Used%</th><th>State</th><th>#Vols</th><th>Nodes</th><th>RAID Status</th></tr><tr><td>n1_hdd_1</td><td>17.58GB</td><td>14.54GB</td><td>17%</td><td>online</td><td>4</td><td>cluster1-01</td><td>raid_dp, normal</td></tr><tr><td>n1_hdd_2</td><td>14.06GB</td><td>10.98GB</td><td>22%</td><td>online</td><td>3</td><td>cluster1-01</td><td>raid_dp, normal</td></tr><tr><td>n1_hdd_4</td><td>42.19GB</td><td>42.06GB</td><td>0%</td><td>online</td><td>1</td><td>cluster1-01</td><td>raid_dp, normal</td></tr><tr><td>n1_ssd_3</td><td>2.64GB</td><td>1.52GB</td><td>42%</td><td>online</td><td>2</td><td>cluster1-01</td><td>raid_dp, normal</td></tr><tr><td>n2_hdd_1</td><td>17.58GB</td><td>16.53GB</td><td>6%</td><td>online</td><td>4</td><td>cluster1-02</td><td>raid_dp, hybrid, normal</td></tr><tr><td>n2_hdd_4</td><td>56.25GB</td><td>55.02GB</td><td>2%</td><td>online</td><td>3</td><td>cluster1-02</td><td>raid_dp, normal</td></tr></table> <p>6 entries were displayed.</p>	Aggregate	Size	Available	Used%	State	#Vols	Nodes	RAID Status	n1_hdd_1	17.58GB	14.54GB	17%	online	4	cluster1-01	raid_dp, normal	n1_hdd_2	14.06GB	10.98GB	22%	online	3	cluster1-01	raid_dp, normal	n1_hdd_4	42.19GB	42.06GB	0%	online	1	cluster1-01	raid_dp, normal	n1_ssd_3	2.64GB	1.52GB	42%	online	2	cluster1-01	raid_dp, normal	n2_hdd_1	17.58GB	16.53GB	6%	online	4	cluster1-02	raid_dp, hybrid, normal	n2_hdd_4	56.25GB	55.02GB	2%	online	3	cluster1-02	raid_dp, normal
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1-3	<p>Display the current volumes that the storage VM c1_svm2 owns:</p> <p>volume show -vserver c1_svm2</p> <p>Sample output:</p> <table><tr><th>Vserver</th><th>Volume</th><th>Aggregate</th><th>State</th><th>Type</th><th>Size</th><th>Available</th><th>Used%</th></tr><tr><td>c1_svm2</td><td>c1_svm2_root</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>20MB</td><td>17.25MB</td><td>9%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_vol1</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>1GB</td><td>971.9MB</td><td>0%</td></tr></table> <p>2 entries were displayed.</p>	Vserver	Volume	Aggregate	State	Type	Size	Available	Used%	c1_svm2	c1_svm2_root	n2_hdd_1	online	RW	20MB	17.25MB	9%	c1_svm2	c1_svm2_vol1	n1_hdd_1	online	RW	1GB	971.9MB	0%																																
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1-4	<p>Create a FlexGroup volume by using the first data aggregate of each cluster node:</p> <p>volume create -vserver c1_svm2 -volume c1_svm2_fg1 -size 20GB -aggr-list n1_hdd_1,n2_hdd_1 -policy default</p> <p>Sample output:</p> <p>Notice: The FlexGroup volume "c1_svm2_fg1" will be created with the following number of constituents of size 2.50GB: 8.</p>																																																								
1-5	<p>Accept that the constituent size is smaller than the recommended minimum.</p> <p>Sample output:</p> <p>Warning: The constituent size is smaller than the recommended minimum constituent size of 100GB. You should ensure that the size of a 8 constituent FlexGroup volume be at least 800GB (858993459200B), or the performance of the FlexGroup volume will be less than optimal.</p> <p>Do you want to continue? {y n}: y</p>																																																								

Step	Action																																
1-6	<p>Accept that the storage VM needs to be modified to use 64-bit NFS identifiers.</p> <p>Sample output:</p> <pre>Warning: You are attempting to create a FlexGroup volume in Vserver "c1_svm2", which currently uses 32-bit NFSv3 FSIDs and file IDs. This could result in collisions between different file IDs on the FlexGroup volume. Modify the Vserver to use 64-bit NFSv3 identifiers before using the FlexGroup volume with the commands "set advanced; vserver nfs modify -vserver c1_svm2 -v3-64bit-identifiers enabled". Do you want to continue? {y n}: y</pre>																																
1-7	<p>Convert c1_svm2 to use 64-bit identifiers for NFS to provide support for FlexGroup volumes:</p> <pre>set advanced</pre> <pre>vserver nfs modify -vserver c1_svm2 -v3-64bit-identifiers enabled</pre>																																
1-8	<p>Accept that older NFS client software might no longer operate.</p> <p>Sample output:</p> <pre>Warning: You are attempting to increase the number of bits used for NFSv3 FSIDs and File IDs from 32 to 64 on Vserver "c1_svm2". This could result in older client software no longer working with the volumes owned by Vserver "c1_svm2". Do you want to continue? {y n}: y</pre>																																
1-9	<p>Accept that current NFS client systems should reestablish their mounts.</p> <p>Sample output:</p> <pre>Warning: Based on the changes you are making to the NFS server on Vserver "c1_svm2", it is highly recommended that you remount all NFSv3 clients connected to it after the command completes. Do you want to continue? {y n}: y</pre>																																
1-10	<p>Return to the administrator privilege level:</p> <pre>set admin</pre>																																
1-11	<p>Relist the volumes in c1_svm2:</p> <pre>volume show -vserver c1_svm2</pre> <p>Sample output:</p> <table><thead><tr><th>Vserver</th><th>Volume</th><th>Aggregate</th><th>State</th><th>Type</th><th>Size</th><th>Available</th><th>Used%</th></tr></thead><tbody><tr><td>c1_svm2</td><td>c1_svm2_fg1</td><td>-</td><td>online</td><td>RW</td><td>20GB</td><td>18.75GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_root</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>20MB</td><td>17.20MB</td><td>9%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_vol1</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>1GB</td><td>971.9MB</td><td>0%</td></tr></tbody></table> <p>3 entries were displayed.</p>	Vserver	Volume	Aggregate	State	Type	Size	Available	Used%	c1_svm2	c1_svm2_fg1	-	online	RW	20GB	18.75GB	1%	c1_svm2	c1_svm2_root	n2_hdd_1	online	RW	20MB	17.20MB	9%	c1_svm2	c1_svm2_vol1	n1_hdd_1	online	RW	1GB	971.9MB	0%
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1-12	<p>Display the constituent volumes within the FlexGroup volume:</p> <pre>volume show -volume c1_svm2_fg1* -is-constituent true</pre> <p>Sample output:</p> <table><tr><th>Vserver</th><th>Volume</th><th>Aggregate</th><th>State</th><th>Type</th><th>Size</th><th>Available</th><th>Used%</th></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0001</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0002</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0003</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0004</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0005</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0006</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0007</td><td>n1_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr><tr><td>c1_svm2</td><td>c1_svm2_fg1__0008</td><td>n2_hdd_1</td><td>online</td><td>RW</td><td>2.50GB</td><td>2.34GB</td><td>1%</td></tr></table> <p>8 entries were displayed.</p>	Vserver	Volume	Aggregate	State	Type	Size	Available	Used%	c1_svm2	c1_svm2_fg1__0001	n1_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0002	n2_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0003	n1_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0004	n2_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0005	n1_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0006	n2_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0007	n1_hdd_1	online	RW	2.50GB	2.34GB	1%	c1_svm2	c1_svm2_fg1__0008	n2_hdd_1	online	RW	2.50GB	2.34GB	1%
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1-13	<p>Display the aggregates in which the FlexGroup constituent volumes reside:</p> <pre>volume show -volume c1_svm2_fg1* -is-constituent true -fields aggregate</pre>																																																																								

End of exercise