



Stage 2. Relocate and retire node1

Upgrade controllers

NetApp

November 17, 2023

Table of Contents

- Stage 2. Relocate and retire node1 1
 - Overview 1
 - Relocate non-root aggregates from node1 to node2 1
 - Move NAS data LIFs owned by node1 to node2 4
 - Record node1 information 7
 - Retire node1 11

Stage 2. Relocate and retire node1

Overview

During Stage 2, you relocate non-root aggregates from node1 to node2 and move non-SAN data LIFs owned by node1 to node2, including failed or vetoed aggregates. You also record the necessary node1 information for use later in the procedure and then retire node1.

Steps

1. [Relocating non-root aggregates and NAS data LIFs owned by node1 to node2](#)
2. [Moving NAS data LIFs owned by node1 to node2](#)
3. [Recording node1 information](#)
4. [Retire node1](#)

Relocate non-root aggregates from node1 to node2

Before you can replace node1 with node3, you must move the non-root aggregates from node1 to node2 by using the storage aggregate relocation command and then verifying the relocation.

Steps

1. Relocate the non-root aggregates by completing the following substeps:
 - a. Set the privilege level to advanced:

```
set -privilege advanced
```

- b. Enter the following command:

```
storage aggregate relocation start -node node1 -destination node2 -aggregate  
-list * -ndo-controller-upgrade true
```

- c. When prompted, enter *y*.

Relocation will occur in the background. It could take anywhere from a few seconds to a couple of minutes to relocate an aggregate. The time includes both client outage and non-outage portions. The command does not relocate any offline or restricted aggregates.

- d. Return to the admin level by entering the following command:

```
set -privilege admin
```

2. Check the relocation status by entering the following command on node1:

```
storage aggregate relocation show -node node1
```

The output will display *Done* for an aggregate after it has been relocated.



Wait until all non-root aggregates owned by node1 have been relocated to node2 before proceeding to the next step.

3. Take one of the following actions:

If relocation...	Then..
Of all aggregates is successful	Go to Step 4 .
Of any aggregates fails or is vetoed	<ul style="list-style-type: none">a. Check the EMS logs for the corrective action.b. Perform the corrective action.c. Relocate any failed or vetoed aggregates: <pre>storage aggregate relocation start -node <i>node1</i> - destination <i>node2</i> -aggregate-list * -ndo -controller-upgrade true</pre>d. When prompted, enter <i>y</i>.e. Return to the admin level: <pre>set -privilege admin</pre><p>If necessary, you can force the relocation using one of the following methods:</p><ul style="list-style-type: none">◦ Override veto checks: <pre>storage aggregate relocation start -override -vetoes true -ndo-controller-upgrade</pre>◦ Override destination checks: <pre>storage aggregate relocation start -override -destination-checks true -ndo-controller -upgrade</pre> <p>Refer to References to link to the <i>Disk and aggregate management with the CLI</i> content and the <i>ONTAP 9 Commands: Manual Page Reference</i> for more information about storage aggregate relocation commands.</p>

4. Verify that all the non-root aggregates are online and their state on node2:

```
storage aggregate show -node node2 -state online -root false
```

The following example shows that the non-root aggregates on node2 are online:

```
cluster::> storage aggregate show -node node2 state online -root false
Aggregate      Size Available Used% State   #Vols  Nodes      RAID
Status
-----
aggr_1
      744.9GB 744.8GB      0% online      5 node2
raid_dp,

normal
aggr_2      825.0GB 825.0GB      0% online      1 node2
raid_dp,

normal
2 entries were displayed.
```

If the aggregates have gone offline or become foreign on node2, bring them online by using the following command on node2, once for each aggregate:

```
storage aggregate online -aggregate aggr_name
```

5. Verify that all the volumes are online on node2 by entering the following command on node2 and examining its output:

```
volume show -node node2 -state offline
```

If any volumes are offline on node2, bring them online by using the following command on node2, once for each volume:

```
volume online -vserver vserver-name -volume volume-name
```

The *vserver-name* to use with this command is found in the output of the previous `volume show` command.

6. Enter the following command on node2:

```
storage failover show -node node2
```

The output should display the following message:

```
Node owns partner's aggregates as part of the nondisruptive controller
upgrade procedure.
```

7. Verify that node1 does not own any non-root aggregates that are online:

```
storage aggregate show -owner-name node1 -ha-policy sfo -state online
```

The output should not display any online non-root aggregates, which have already been relocated to

node2.

Move NAS data LIFs owned by node1 to node2

Before you can replace node1 with node3, you must move the NAS data LIFs owned by node1 to node2 if you have a two-node cluster, or to a third node if your cluster has more than two nodes. The method you use depends on whether the cluster is configured for NAS or SAN.

About this task

Remote LIFs handle traffic to SAN LUNs during the upgrade procedure. Moving SAN LIFs is not necessary for cluster or service health during the upgrade. You must verify that the LIFs are healthy and located on appropriate ports after you bring node3 online.

Steps

1. List all the NAS data LIFs hosted on node1 by entering the following command and capturing the output:

```
network interface show -data-protocol nfs|cifs -curr-node node1
```

The system displays the NAS data LIFs on node1, as shown in the following example:

```
cluster::> network interface show -data-protocol nfs|cifs -curr-node
node1
```

Is	Logical	Status	Network	Current	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
vs0					
	a0a	up/down	10.63.0.53/24	node1	a0a
true					
	data1	up/up	10.63.0.50/18	node1	e0c
true					
	rads1	up/up	10.63.0.51/18	node1	e1a
true					
	rads2	up/down	10.63.0.52/24	node1	e1b
true					
vs1					
	lif1	up/up	192.17.176.120/24	node1	e0c
true					
	lif2	up/up	172.17.176.121/24	node1	e1a
true					

2. Take one of the following actions:

If node1...	Then...
Has interface groups of VLANs configured	Go to Step 3 .
Does not have interface groups or VLANs configured	Skip Step 3 and go to Step 4 .

Use the `network port vlan show` command to display information about the network ports attached to VLANs, and use the `network port ifgrp show` command to display information about the port interface groups.

3. Take the following steps to migrate any NAS data LIFs hosted on interface groups and VLANs on node1:
 - a. Migrate the LIFs hosted on any interface groups and the VLANs on node1 to a port on node2 that is capable of hosting LIFs on the same network as that of the interface groups by entering the following command, once for each LIF:

```
network interface migrate -vserver Vserver_name -lif LIF_name -destination
-node node2 -destination-port netport|ifgrp
```

- b. Modify the home port and the home node of the LIFs and VLANs in [Substep a](#) to the port and node currently hosting the LIFs by entering the following command, once for each LIF:

```
network interface modify -vserver Vserver_name -lif LIF_name -home-node
node2 - home-port netport|ifgrp
```

4. Take one of the following actions:

If the cluster is configured for...	Then...
NAS	Complete Step 5 through Step 8 .
SAN	Disable all the SAN LIFs on the node to take them down for the upgrade: <pre>network interface modify -vserver Vserver-name -lif LIF_name -home-node node_to_upgrade -home-port netport ifgrp -status -admin down</pre>

5. Migrate NAS data LIFs from node1 to node2 by entering the following command, once for each data LIF:

```
network interface migrate -vserver Vserver-name -lif LIF_name -destination
-node node2 -destination-port data_port
```

6. Enter the following command and examine its output to verify that LIFs have been moved to the correct ports and that the LIFs have the status of up by entering the following command on either node and examining the output:

```
network interface show -curr-node node2 -data-protocol nfs|cifs
```

7. Enter the following command to modify the home node of the migrated LIFs:

```
network interface modify -vserver Vserver-name -lif LIF_name -home-node node2
-home-port port_name
```

8. Verify whether the LIF is using the port as its home or current port. If the port is not home or current port then go to [Step 9](#):

```
network interface show -home-node node2 -home-port port_name
```

```
network interface show -curr-node node_name -curr-port port_name
```

9. If the LIFs are using the port as a home port or current port, then modify the LIF to use a different port:

```
network interface migrate -vserver Vserver-name -lif LIF_name  
-destination-node node_name -destination-port port_name
```

```
network interface modify -vserver Vserver-name -lif LIF_name -home-node  
node_name -home-port port_name
```

10. If the ports currently hosting data LIFs are not going to exist on the new hardware, remove them from the broadcast domain now:

```
network port broadcast-domain remove-ports -ip-space Default -broadcast-domain  
Default -ports node:port
```

11. If any LIFs are down, set the administrative status of the LIFs to "up" by entering the following command, once for each LIF:

```
network interface modify -vserver Vserver-name -lif LIF_name -home-node  
nodename -status-admin up
```



For MetroCluster configurations, you might not be able to change the broadcast domain of a port because it is associated with a port hosting the LIF of a destination storage virtual machine (SVM). Enter the following command from the corresponding source SVM on the remote site to reallocate the destination LIF to an appropriate port:

```
metrocluster vsync resync -vserver Vserver_name
```

12. Enter the following command and examine its output to verify that there are no data LIFs remaining on node1:

```
network interface show -curr-node node1 -role data
```

13. If you have interface groups or VLANs configured, complete the following substeps:

- a. Remove the VLANs from the interface groups by entering the following command:

```
network port vlan delete -node nodename -port ifgrp_name -vlan-id VLAN_ID
```

- b. Enter the following command and examine its output to see if there are any interface groups configured on the node:

```
network port ifgrp show -node nodename -ifgrp ifgrp_name -instance
```

The system displays interface group information for the node as shown in the following example:


```
cluster::> network port ifgrp show -node node1 -ifgrp a0a -instance
Node: node1
Interface Group Name: a0a
Distribution Function: ip
Create Policy: multimode_lacp
MAC Address: 02:a0:98:17:dc:d4
Port Participation: partial
Network Ports: e2c, e2d
Up Ports: e2c
Down Ports: e2d
```

- c. If any interface groups are configured on the node, record the names of those groups and the ports assigned to them, and then delete the ports by entering the following command, once for each port:

```
network port ifgrp remove-port -node nodename -ifgrp ifgrp_name -port
netport
```

Record node1 information

Before you can shut down and retire node1, you must record information about its cluster network, management, and FC ports as well as its NVRAM System ID. You need that information later in the procedure when you map node1 to node3 and reassign disks.

Steps

1. Enter the following command and capture its output:

```
network route show
```

The system displays output similar to the following example:

```
cluster::> network route show
```

Vserver	Destination	Gateway	Metric
-----	-----	-----	-----
iscsi vserver	0.0.0.0/0	10.10.50.1	20
node1	0.0.0.0/0	10.10.20.1	10
....			
node2	0.0.0.0/0	192.169.1.1	20

2. Enter the following command and capture its output:

```
vserver services name-service dns show
```

The system displays output similar to the following example:

```
cluster::> vserver services name-service dns show
```

Vserver	State	Domains	Name Servers
node 1 2 10.10.60.10, 10.10.60.20	enabled	alpha.beta.gamma.netapp.com	
vs_base1 10.10.60.10, 10.10.60.20	enabled	alpha.beta.gamma.netapp.com, beta.gamma.netapp.com,	
...			
vs_peer1 10.10.60.10, 10.10.60.20	enabled	alpha.beta.gamma.netapp.com, gamma.netapp.com	

- Find the cluster network and node-management ports on node1 by entering the following command on either controller:

```
network interface show -curr-node node1 -role cluster,intercluster,node-  
mgmt,cluster-mgmt
```

The system displays the cluster, intercluster, node-management, and cluster-management LIFs for the node in the cluster, as shown in the following example:

```
cluster::> network interface show -curr-node <node1>
        -role cluster,intercluster,node-mgmt,cluster-mgmt
```

Current Is Vserver Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Port
-----	-----	-----	-----	-----	-----
vserver1	cluster mgmt	up/up	192.168.x.xxx/24	node1	e0c
true					
node1	intercluster	up/up	192.168.x.xxx/24	node1	e0e
true					
	clus1	up/up	169.254.xx.xx/24	node1	e0a
true					
	clus2	up/up	169.254.xx.xx/24	node1	e0b
true					
	mgmt1	up/up	192.168.x.xxx/24	node1	e0c
true					

5 entries were displayed.



Your system might not have intercluster LIFs.

- Capture the information in the output of the command in [Step 3](#) to use in the section [Map ports from node1 to node3](#).

The output information is required to map the new controller ports to the old controller ports.

- Enter the following command on node1:

```
network port show -node node1 -type physical
```

The system displays the physical ports on the node as shown in the following example:

```
sti8080mcc-htp-008::> network port show -node sti8080mcc-htp-008 -type
physical
```

Node: sti8080mcc-htp-008

Port	IPspace	Broadcast Domain	Link	MTU	Speed (Mbps) Admin/Oper	Health Status	Ignore Health Status
e0M	Default	Mgmt	up	1500	auto/1000	healthy	false
e0a	Default	Default	up	9000	auto/10000	healthy	false
e0b	Default	-	up	9000	auto/10000	healthy	false
e0c	Default	-	down	9000	auto/-	-	false
e0d	Default	-	down	9000	auto/-	-	false
e0e	Cluster	Cluster	up	9000	auto/10000	healthy	false
e0f	Default	-	up	9000	auto/10000	healthy	false
e0g	Cluster	Cluster	up	9000	auto/10000	healthy	false
e0h	Default	Default	up	9000	auto/10000	healthy	false

9 entries were displayed.

6. Record the ports and their broadcast domains.

The broadcast domains will need to be mapped to the new ports on the new controller later in the procedure.

7. Enter the following command on node1:

```
network fcp adapter show -node node1
```

The system displays the FC ports on the node, as shown in the following example:

```
cluster::> fcp adapter show -node <node1>
```

Node	Adapter	Connection Established	Host Port Address
node1	0a	ptp	11400
node1	0c	ptp	11700
node1	6a	loop	0
node1	6b	loop	0

4 entries were displayed.

8. Record the ports.

The output information is required to map the new FC ports on the new controller later in the procedure.

9. If you did not do so earlier, check whether there are interface groups or VLANs configured on node1 by entering the following commands:

```
network port ifgrp show
```

```
network port vlan show
```

You will use the information in the section [Map ports from node1 to node3](#).

10. Take one of the following actions:

If you...	Then...
Recorded the NVRAM System ID number in the section Prepare the nodes for the upgrade .	Go on to the next section, Retire node1 .
Did not record the NVRAM System ID number in the section Prepare the nodes for the upgrade	Complete Step 11 and Step 12 and then continue to Retire node1 .

11. Enter the following command on either controller:

```
system node show -instance -node node1
```

The system displays information about node1 as shown in the following example:

```
cluster::> system node show -instance -node <node1>
      Node: node1
      Owner:
      Location: GD1
      Model: FAS6240
      Serial Number: 700000484678
      Asset Tag: -
      Uptime: 20 days 00:07
      NVRAM System ID: 1873757983
      System ID: 1873757983
      Vendor: NetApp
      Health: true
      Eligibility: true
```

12. Record the NVRAM System ID number to use in the section [Install and boot node3](#).

Retire node1

To retire node1, you must disable the HA pair with node2, shut node1 down correctly, and remove it from the rack or chassis.

Steps

- 1. Verify the number of nodes in the cluster:


```
cluster show
```

The system displays the nodes in the cluster, as shown in the following example:

```
cluster::> cluster show
Node                Health  Eligibility
-----
node1                true   true
node2                true   true
2 entries were displayed.
```

- 2. Disable storage failover, as applicable:

If the cluster is...	Then...
A two-node cluster	<div>a. Disable cluster high availability by entering the following command on either node: cluster ha modify -configured false</div> <div>a. Disable storage failover: storage failover modify -node node1 -enabled false</div>
A cluster with more than two nodes	<div>Disable storage failover: storage failover modify -node node1 -enabled false</div>



If you do not disable storage failover, a controller upgrade failure can occur which can disrupt data access and lead to data loss.

- 3. Verify that storage failover was disabled:

```
storage failover show
```

The following example shows the output of the `storage failover show` command when storage failover has been disabled for a node:

```

cluster::> storage failover show

```

Node	Partner	Takeover Possible	State Description
node1	node2	false	Connected to node2, Takeover is not possible: Storage failover is disabled
node2	node1	false	Node owns partner's aggregates as part of the nondisruptive controller upgrade procedure. Takeover is not possible: Storage failover is disabled

2 entries were displayed.

4. Verify the data LIF status:

```
network interface show -role data -curr-node node2 -home-node node1
```

Look in the **Status Admin/Oper** column to see if any LIFs are down. If any LIFs are down, consult the [Troubleshoot](#) section.

5. Take one of the following actions:

If the cluster is...	Then...
A two-node cluster	Go to Step 6 .
A cluster with more than two nodes	Go to Step 8 .

6. Access the advanced privilege level on either node:

```
set -privilege advanced
```

7. Verify that the cluster HA has been disabled:

```
cluster ha show
```

The system displays the following message:

```
High Availability Configured: false
```

If cluster HA has not been disabled, repeat [Step 2](#).

8. Check whether node1 currently holds epsilon:

```
cluster show
```

Because there is the possibility of a tie in a cluster that has an even number of nodes, one node has an extra fractional voting weight called epsilon. Refer to [References](#) to link to the *System Administration Reference* for more information.



If you have a four-node cluster, epsilon might be on a node in a different HA pair in the cluster.

If you are upgrading a HA pair in a cluster with multiple HA pairs, you must move epsilon to the node of a HA pair not undergoing a controller upgrade. For example, if you are upgrading nodeA/nodeB in a cluster with the HA pair configuration nodeA/nodeB and nodeC/nodeD, you must move epsilon to nodeC or nodeD.

The following example shows that node1 holds epsilon:

```
cluster::*> cluster show
```

Node	Health	Eligibility	Epsilon
node1	true	true	true
node2	true	true	false

9. If node1 holds epsilon, then mark epsilon false on the node so that it can be transferred to the node2:

```
cluster modify -node node1 -epsilon false
```

10. Transfer epsilon to node2 by marking epsilon true on node2:

```
cluster modify -node node2 -epsilon true
```

11. Verify that the change to node2 occurred:

```
cluster show
```

```
cluster::*> cluster show
```

Node	Health	Eligibility	Epsilon
node1	true	true	false
node2	true	true	true

The epsilon for node2 should now be true and the epsilon for node1 should be false.

12. Verify whether the setup is a two-node switchless cluster:

```
network options switchless-cluster show
```



```
cluster::*> network options switchless-cluster show  
  
Enable Switchless Cluster: false/true
```

The value of this command must match the physical state of the system.

13. Return to the admin level:

```
set -privilege admin
```

14. Halt node1 from the node1 prompt:

```
system node halt -node node1
```



Attention: If node1 is in same chassis as node2, do not power off the chassis by using the power switch or by pulling the power cable. If you do so, node2, which is serving data, will go down.

15. When the system prompts you to confirm that you want to halt the system, enter *y*.

The node stops at the boot environment prompt.

16. When node1 displays the boot environment prompt, remove it from the chassis or the rack.

You can decommission node1 after the upgrade is completed. See [Decommission the old system](#).

Copyright information

Copyright © 2023 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.