



Replace NVIDIA SN2100 switches

Cluster and storage switches

NetApp

October 03, 2022

This PDF was generated from https://docs.netapp.com/us-en/ontap-systems-switches/switch-nvidia-sn2100/replace_sn2100_switch_cluster.html on October 03, 2022. Always check docs.netapp.com for the latest.

Table of Contents

- Replace NVIDIA SN2100 switches. 1
 - Replace a NVIDIA SN2100 cluster switch 1
 - Replace a NVIDIA SN2100 storage switch 11

Replace NVIDIA SN2100 switches

Replace a NVIDIA SN2100 cluster switch

Replacing a defective NVIDIA SN2100 switch in a cluster network is a nondisruptive procedure (NDU).

Before you begin

The following conditions must exist before performing the switch replacement in the current environment and on the replacement switch.

- Existing cluster and network infrastructure:
 - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
 - All cluster ports must be up.
 - All cluster logical interfaces (LIFs) must be up and on their home ports.
 - The ONTAP `cluster ping-cluster -node node1` command must indicate that basic connectivity and larger than PMTU communication are successful on all paths.
- NVIDIA SN2100 replacement switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.
 - The node connections are ports swp1 through swp14.
 - All Inter-Switch Link (ISL) ports must be disabled on ports swp15 and swp16.
 - The desired reference configuration file (RCF) and Cumulus operating system image switch must be loaded onto the switch.
 - Initial customization of the switch must be complete, as detailed in:

Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

About this task

The examples in this procedure use the following switch and node nomenclature:

- The names of the existing NVIDIA SN2100 switches are *sw1* and *sw2*.
- The name of the new NVIDIA SN2100 switch is *nsw2*.
- The node names are *node1* and *node2*.
- The cluster ports on each node are named *e3a* and *e3b*.
- The cluster LIF names are *node1_clus1* and *node1_clus2* for *node1*, and *node2_clus1* and *node2_clus2* for *node2*.
- The prompt for changes to all cluster nodes is `cluster1::*>`
- Breakout ports take the format: *swp[port]s[breakout port 0-3]*. For example, four breakout ports on swp1 are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.



The following procedure is based on the following cluster network topology:

```
cluster1::*> network port show -ipspace Cluster
```

Node: node1

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

Node: node2

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

```
cluster1::*> network interface show -vserver Cluster
```

		Logical	Status	Network	Current	
Current Is						
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port	
Home						

Cluster						
	node1_clus1	up/up	169.254.209.69/16	node1	e3a	
true	node1_clus2	up/up	169.254.49.125/16	node1	e3b	

```

true
node2_clus1 up/up 169.254.47.194/16 node2 e3a
true
node2_clus2 up/up 169.254.19.183/16 node2 e3b
true

```

```
cluster1::~*> network device-discovery show -protocol lldp
```

Node/	Local	Discovered			
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform	
node1	/lldp				
	e3a	sw1 (b8:ce:f6:19:1a:7e)	swp3	-	
	e3b	sw2 (b8:ce:f6:19:1b:96)	swp3	-	
node2	/lldp				
	e3a	sw1 (b8:ce:f6:19:1a:7e)	swp4	-	
	e3b	sw2 (b8:ce:f6:19:1b:96)	swp4	-	

```
cumulus@sw1:~$ net show lldp
```

LocalPort	Speed	Mode	RemoteHost	RemotePort
swp3	100G	Trunk/L2	sw2	e3a
swp4	100G	Trunk/L2	sw2	e3a
swp15	100G	BondMember	sw2	swp15
swp16	100G	BondMember	sw2	swp16

```
cumulus@sw2:~$ net show lldp
```

LocalPort	Speed	Mode	RemoteHost	RemotePort
swp3	100G	Trunk/L2	sw1	e3b
swp4	100G	Trunk/L2	sw1	e3b
swp15	100G	BondMember	sw1	swp15
swp16	100G	BondMember	sw1	swp16

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh`

where x is the duration of the maintenance window in hours.

2. Change the privilege level to advanced, entering y when prompted to continue: `set -privilege`

advanced

The advanced prompt (*>) appears.

3. Install the appropriate RCF and image on the switch, nsw2, and make any necessary site preparations.

If necessary, verify, download, and install the appropriate versions of the RCF and Cumulus software for the new switch. If you have verified that the new switch is correctly set up and does not need updates to the RCF and Cumulus software, continue to step 3. See [Setup and configure the NVIDIA SN2100 switches](#) for further details.

- a. You can download the applicable Cumulus software for your cluster switches from the *NVIDIA Support* site. Follow the steps on the Download page to download the Cumulus Linux for the version of ONTAP software you are installing.
 - b. The appropriate RCF is available from the [NVIDIA Cluster and Storage Switches](#) page. Follow the steps on the Download page to download the correct RCF for the version of ONTAP software you are installing.
4. On the new switch nsw2, log in as admin and shut down all of the ports that will be connected to the node cluster interfaces (ports swp1 to swp14).

If the switch that you are replacing is not functional and is powered down, go to Step 4. The LIFs on the cluster nodes should have already failed over to the other cluster port for each node.

```
cumulus@nsw2:~$ net add interface swp1s0-3, swp2s0-3, swp3-14 link down
cumulus@nsw2:~$ net pending
cumulus@nsw2:~$ net commit
```

5. Disable auto-revert on the cluster LIFs: `network interface modify -vserver Cluster -lif * -auto-revert false`

```
cluster1::~*> network interface modify -vserver Cluster -lif * -auto
-revert false
```

```
Warning: Disabling the auto-revert feature of the cluster logical
interface may effect the availability of your cluster network. Are you
sure you want to continue? {y|n}: y
```

6. Shut down the ISL ports swp15 and swp16 on the SN2100 switch sw1:

```
cumulus@sw1:~$ net add interface swp15-16 link down
cumulus@sw1:~$ net pending
cumulus@sw1:~$ net commit
```

7. Remove all the cables from the SN2100 sw1 switch, and then connect them to the same ports on the SN2100 nsw2 switch.
8. Bring up the ISL ports swp15 and swp16 between the sw1 and nsw2 switches.

The following commands enable ISL ports swp15 and swp16 on switch sw1:

```
cumulus@sw1:~$ net del interface swp15-16 link down
cumulus@sw1:~$ net pending
cumulus@sw1:~$ net commit
```

The following example shows that the ISL ports are up on switch sw1:

```
cumulus@sw1:~$ net show interface
```

State	Name	Spd	MTU	Mode	LLDP	Summary
UP	swp15	100G	9216	BondMember	nsw2 (swp15)	Master: cluster_isl(UP)
UP	swp16	100G	9216	BondMember	nsw2 (swp16)	Master: cluster_isl(UP)

The following example shows that the ISL ports are up on switch nsw2:

```
cumulus@nsw2:~$ net show interface
```

State	Name	Spd	MTU	Mode	LLDP	Summary
UP	swp15	100G	9216	BondMember	sw1 (swp15)	Master: cluster_isl(UP)
UP	swp16	100G	9216	BondMember	sw1 (swp16)	Master: cluster_isl(UP)

9. Verify that port e3b is up on all nodes: `network port show -ipspace Cluster`

The output should be similar to the following:

```
cluster1::*> network port show -ipspace Cluster
```

Node: node1

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

Node: node2

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

10. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:


```
cluster1::*> network device-discovery show -protocol lldp
```

Node/	Local	Discovered			
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform	
node1	/lldp				
	e3a	sw1 (b8:ce:f6:19:1a:7e)	swp3	-	
	e3b	nsw2 (b8:ce:f6:19:1b:b6)	swp3	-	
node2	/lldp				
	e3a	sw1 (b8:ce:f6:19:1a:7e)	swp4	-	
	e3b	nsw2 (b8:ce:f6:19:1b:b6)	swp4	-	

11. Verify that all node cluster ports are up: `net show interface`

```
cumulus@nsw2:~$ net show interface
```

State	Name	Spd	MTU	Mode	LLDP	Summary
UP	swp3	100G	9216	Trunk/L2		Master:
	bridge(UP)					
UP	swp4	100G	9216	Trunk/L2		Master:
	bridge(UP)					
UP	swp15	100G	9216	BondMember	sw1 (swp15)	Master:
	cluster_isl(UP)					
UP	swp16	100G	9216	BondMember	sw1 (swp16)	Master:
	cluster_isl(UP)					

12. Verify that both nodes each have one connection to each switch: `net show lldp`

The following example shows the appropriate results for both switches:

```
cumulus@sw1:~$ net show lldp
```

LocalPort	Speed	Mode	RemoteHost	RemotePort
swp3	100G	Trunk/L2	node1	e3a
swp4	100G	Trunk/L2	node2	e3a
swp15	100G	BondMember	nsw2	swp15
swp16	100G	BondMember	nsw2	swp16

```
cumulus@nsw2:~$ net show lldp
```

LocalPort	Speed	Mode	RemoteHost	RemotePort
swp3	100G	Trunk/L2	node1	e3b
swp4	100G	Trunk/L2	node2	e3b
swp15	100G	BondMember	sw1	swp15
swp16	100G	BondMember	sw1	swp16

13. Enable auto-revert on the cluster LIFs: `cluster1::*> network interface modify -vserver Cluster -lif * -auto-revert true`

14. On switch nsw2, bring up the ports connected to the network ports of the nodes.

```
cumulus@nsw2:~$ net del interface swp1-14 link down
cumulus@nsw2:~$ net pending
cumulus@nsw2:~$ net commit
```

15. Display information about the nodes in a cluster: `cluster show`

This example shows that the node health for node1 and node2 in this cluster is true:

```
cluster1::*> cluster show
```

Node	Health	Eligibility
node1	true	true
node2	true	true

16. Verify that all physical cluster ports are up: `network port show ipspace Cluster`

```
cluster1::*> network port show -ipspace Cluster
```

```
Node node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----

e3a	Cluster	Cluster		up	9000	auto/10000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/10000	healthy
false							

```
Node: node2
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----

e3a	Cluster	Cluster		up	9000	auto/10000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/10000	healthy
false							

17. Verify that the cluster network is healthy:

```
cumulus@sw1:~$ net show lldp
```

LocalPort	Speed	Mode	RemoteHost	RemotePort
-----	-----	-----	-----	-----
swp3	100G	Trunk/L2	node1	e3a
swp4	100G	Trunk/L2	node2	e3a
swp15	100G	BondMember	nsw2	swp15
swp16	100G	BondMember	nsw2	swp16

18. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system switch ethernet log setup-password` and `system switch ethernet log enable-collection`

Enter: `system switch ethernet log setup-password`

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: <return>
```

```
The switch name entered is not recognized.
```

```
Choose from the following list:
```

```
sw1
```

```
nsw2
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: sw1
```

```
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
```

```
Do you want to continue? {y|n}::[n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: nsw2
```

```
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
```

```
Do you want to continue? {y|n}:: [n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

Followed by: `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log enable-collection
```

```
Do you want to enable cluster log collection for all nodes in the  
cluster?
```

```
{y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*>
```



If any of these commands return an error, contact NetApp support.

19. Initiate the switch log collection feature: `system switch ethernet log collect -device *`

Wait for 10 minutes and then check that the log collection was successful using the command: `system switch ethernet log show`

```
cluster1::*> system switch ethernet log show
```

```
Log Collection Enabled: true
```

Index	Switch	Log Timestamp	Status
1	sw1 (b8:ce:f6:19:1b:42)	4/29/2022 03:05:25	complete
2	nsw2 (b8:ce:f6:19:1b:96)	4/29/2022 03:07:42	complete

20. Change the privilege level back to admin: `set -privilege admin`

21. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

Replace a NVIDIA SN2100 storage switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace NVIDIA SN2100 storage switches.

Before you begin

You must verify that the following conditions exist before installing the Cumulus software and RCFs on a NVIDIA SN2100 storage switch:

- Your system can support NVIDIA SN2100 storage switches.
- You must have downloaded the applicable RCFs.
- The [Hardware Universe](#) provides full details of supported ports and their configurations.

About this task

The existing network configuration must have the following characteristics:

- Ensure that all troubleshooting steps have been completed to confirm that your switch needs replacing.
- Management connectivity must exist on both switches.



Make sure that all troubleshooting steps have been completed to confirm that your switch needs replacing.

The replacement NVIDIA SN2100 switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and Cumulus operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

Procedure summary

This procedure replaces the second NVIDIA SN2100 storage switch sw2 with the new NVIDIA SN2100 switch nsw2. The two nodes are node1 and node2.

Steps to complete:

- Confirm the switch to be replaced is sw2.
- Disconnect the cables from switch sw2.
- Reconnect the cables to switch nsw2.
- Verify all device configurations on switch nsw2.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all - message MAINT=xh`

x is the duration of the maintenance window in hours.

2. Change the privilege level to advanced, entering **y** when prompted to continue: `set -privilege advanced`
3. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1:

`storage port show -port-type ENET`

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID

node1	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30
node2	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

4. Verify that storage switch sw1 is available: `network device-discovery show`

```
cluster1::*> network device-discovery show protocol lldp
Node/          Local Discovered
Protocol      Port  Device (LLDP: ChassisID)  Interface  Platform
-----
node1/lldp
          e3a   sw1 (b8:ce:f6:19:1b:42)  swp3       -
node2/lldp
          e3a   sw1 (b8:ce:f6:19:1b:42)  swp4       -
cluster1::*>
```

5. Run the `net show interface` command on the working switch to confirm that you can see both nodes and all shelves: `net show interface`

```
cumulus@sw1:~$ net show interface

State  Name      Spd  MTU  Mode          LLDP                               Summary
-----
...
...
UP      swp1      100G  9216  Trunk/L2      node1 (e3a)                        Master:
bridge(UP)
UP      swp2      100G  9216  Trunk/L2      node2 (e3a)                        Master:
bridge(UP)
UP      swp3      100G  9216  Trunk/L2      SHFFG1826000112 (e0b)            Master:
bridge(UP)
UP      swp4      100G  9216  Trunk/L2      SHFFG1826000112 (e0b)            Master:
bridge(UP)
UP      swp5      100G  9216  Trunk/L2      SHFFG1826000102 (e0b)            Master:
bridge(UP)
UP      swp6      100G  9216  Trunk/L2      SHFFG1826000102 (e0b)            Master:
bridge(UP)
...
...
```

6. Verify the shelf ports in the storage system: `storage shelf port show -fields remote-device, remote-port`

```
cluster1::*> storage shelf port show -fields remote-device, remote-port
shelf    id  remote-port  remote-device
-----  --  -
3.20     0   swp3        sw1
3.20     1   -           -
3.20     2   swp4        sw1
3.20     3   -           -
3.30     0   swp5        sw1
3.20     1   -           -
3.30     2   swp6        sw1
3.20     3   -           -
cluster1::*>
```

7. Remove all cables attached to storage switch sw2.
8. Reconnect all cables to the replacement switch nsw2.
9. Recheck the health status of the storage node ports: `storage port show -port-type ENET`

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30
node2							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

10. Verify that both switches are available: `net device-discovery show`


```
cluster1::*> network device-discovery show protocol lldp
```

Node/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform
-----	----	-----	-----	-----
node1/lldp				
	e3a	sw1 (b8:ce:f6:19:1b:96)	swp1	-
	e7b	nsw2 (b8:ce:f6:19:1a:7e)	swp1	-
node2/lldp				
	e3a	sw1 (b8:ce:f6:19:1b:96)	swp2	-
	e7b	nsw2 (b8:ce:f6:19:1a:7e)	swp2	-

```
cluster1::*>
```

11. Verify the shelf ports in the storage system: storage shelf port show -fields remote-device, remote-port

```
cluster1::*> storage shelf port show -fields remote-device, remote-port
```

shelf	id	remote-port	remote-device
-----	--	-----	-----
3.20	0	swp3	sw1
3.20	1	swp3	nsw2
3.20	2	swp4	sw1
3.20	3	swp4	nsw2
3.30	0	swp5	sw1
3.20	1	swp5	nsw2
3.30	2	swp6	sw1
3.20	3	swp6	nsw2

```
cluster1::*>
```

12. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the two commands: system switch ethernet log setup-password and system switch ethernet log enable-collection

Enter: system switch ethernet log setup-password

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: <return>
```

```
The switch name entered is not recognized.
```

```
Choose from the following list:
```

```
sw1
```

```
nsw2
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: sw1
```

```
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
```

```
Do you want to continue? {y|n}::[n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: nsw2
```

```
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
```

```
Do you want to continue? {y|n}:: [n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

Followed by: `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log enable-collection
```

```
Do you want to enable cluster log collection for all nodes in the  
cluster?
```

```
{y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*>
```



If any of these commands return an error, contact NetApp support.

13. Initiate the switch log collection feature: `system switch ethernet log collect -device *`

Wait for 10 minutes and then check that the log collection was successful using the command: `system switch ethernet log show`

```
cluster1::*> system switch ethernet log show
```

```
Log Collection Enabled: true
```

Index	Switch	Log Timestamp	Status
-----	-----	-----	-----
1	sw1 (b8:ce:f6:19:1b:42)	4/29/2022 03:05:25	complete
2	nsw2 (b8:ce:f6:19:1b:96)	4/29/2022 03:07:42	complete

14. Change the privilege level back to admin: `set -privilege admin`

15. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

Copyright Information

Copyright © 2022 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.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

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.