



FC switch maintenance and replacement

ONTAP MetroCluster

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FC switch maintenance and replacement

Upgrade or downgrade the firmware on a Brocade FC switch

To upgrade or downgrade the firmware on a Brocade FC switch, you must use the Brocade-specific commands to disable the switch, perform and verify the firmware change, and reboot and reenable the switch.

About this task

Confirm that you have checked and performed the following tasks for your configuration:

- Verify that your new firmware version is compatible with your solution. See the [Hardware Universe](#) for more information.
- You have the firmware files.
- The system is properly cabled.
- All paths to the storage shelves are available.
- The disk shelf stacks are stable.
- The FC switch fabric is healthy.
- No failed components are present in the system.
- The system is operating normally.
- You have the admin password and access to an FTP or SCP server.
- Console logging is enabled.

[Enable console logging](#)

The switch fabric is disabled during a firmware upgrade or downgrade, and the MetroCluster configuration relies on the second fabric to continue operation.

Beginning in Fabric OS 9.0.1, SNMPv2 is not supported on Brocade switches. If you upgrade to Fabric OS 9.0.1 or later, you must use SNMPv3 for health monitoring. For more information, see [Configuring SNMPv3 in a MetroCluster configuration](#).

If you are upgrading to Fabric OS v 9.2.x or later, you must have a Brocade TruFOS certificate installed, refer to [Brocade Fabric OS Software Upgrade Guide, 9.2.x](#) for more information.

This task must be performed on each of the switch fabrics in succession so that all switches are running the same firmware version.



This procedure is nondisruptive and takes approximately one hour to complete.

Steps

1. Log in to each of the switches in the fabric.

The examples in the following steps use the switch `FC_switch_A_1`.

2. Disable each of the switches in the fabric:

switchCfgPersistentDisable

If this command is not available, then run the `switchDisable` command.

```
FC_switch_A_1:admin> switchCfgPersistentDisable
```

3. Download the desired firmware version:

firmwareDownload

When prompted for the file name, you must specify the subdirectory or relative path to the firmware file.

You can run the `firmwareDownload` command at the same time on both switches, but you must allow the firmware to download and commit properly before moving to the next step.

```
FC_switch_A_1:admin> firmwaredownload
Server Name or IP Address: 10.64.203.188
User Name: test
File Name: v7.3.1b
Network Protocol(1-auto-select, 2-FTP, 3-SCP, 4-SFTP, 5-HTTP) [1]: 2
Password:
Server IP: 10.64.203.188, Protocol IPv4
Checking system settings for firmwaredownload...
System settings check passed.
```

4. Verify that the firmware was downloaded and committed to both partitions:

firmwareShow

The following example shows that the firmware download is complete as both images are updated:

```
FC_switch_A_1:admin> firmwareShow
Appl      Primary/Secondary Versions
-----
FOS       v7.3.1b
          v7.3.1b
```

5. Reboot the switches:

reboot

Some firmware versions automatically perform an haReboot operation after the firmware download is finished. The reboot in this step is required even if the haReboot has been performed.

```
FC_switch_A_1:admin> reboot
```

6. Check whether the new firmware is for an intermediate firmware level or for a final specified release.

If the download is for the intermediate firmware level, then perform the previous two steps until the specified release is installed.

7. Enable the switches:

switchCfgPersistentEnable

If this command is not available, then the switch should be in the `enabled` state after the `reboot` command is executed.

```
FC_switch_A_1:admin> switchCfgPersistentEnable
```

8. Verify that the switches are online and that all of the devices are properly logged in:

switchShow

```
FC_switch_A_1:admin> switchShow
```

9. Verify that the buffer usage information for a port group or all of the port groups in the switch is displayed properly:

portbuffershow

```
FC_switch_A_1:admin> portbuffershow
```

10. Verify that the current configuration of a port is displayed properly:

portcfgshow

```
FC_switch_A_1:admin> portcfgshow
```

Verify the port settings, such as speed, mode, trunking, encryption, and compression, in the Inter-Switch Link (ISL) output. Verify that the port settings were not affected by the firmware download.

11. Verify the operation of the MetroCluster configuration in ONTAP:

- a. Check whether the system is multipathed:

node run -node node-name sysconfig -a

- b. Check for any health alerts on both clusters:
system health alert show
- c. Confirm the MetroCluster configuration and that the operational mode is normal:
metrocluster show
- d. Perform a MetroCluster check:
metrocluster check run
- e. Display the results of the MetroCluster check:
metrocluster check show
- f. Check for any health alerts on the switches (if present):
storage switch show
- g. Run Config Advisor.

[NetApp Downloads: Config Advisor](#)

- h. After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

12. Wait 15 minutes before repeating this procedure for the second switch fabric.

Upgrading or downgrading the firmware on a Cisco FC switch

To upgrade or downgrade the firmware on a Cisco FC switch you must use the Cisco-specific commands to disable the switch, perform and verify the upgrade, and reboot and reenale the switch.

About this task

Confirm that you have checked and performed the following tasks for your configuration:

- The system is properly cabled.
- All paths to the storage shelves are available.
- The disk shelf stacks are stable.
- The FC switch fabric are healthy.
- All components in the system are healthy.
- The system is operating normally.
- You have the admin password and access to an FTP or SCP server.
- Console logging is enabled.

[Enable console logging](#)

The switch fabric is disabled during the firmware upgrade or downgrade and the MetroCluster configuration relies on the second fabric to continue operation.

You must repeat this task on each of the switch fabrics in succession to ensure that all switches are running the same firmware version.

You must have the firmware files.



This procedure is nondisruptive and takes approximately one hour to complete.

Steps

1. Log in to each of the switches in the fabric.

In the examples, the switches are called FC_switch_A_1 and FC_switch_B_1.

2. Determine whether there is enough space in the bootflash directory on each switch:

dir bootflash

If not, delete the unwanted firmware files by using the `delete bootflash:file_name` command.

3. Copy the kickstart and system files to the switches:

copy source_file target_file

In the following example, the kickstart file (m9200-s2ek9-kickstart-mz.5.2.1.bin) and the system file (m9200-s2ek9-mz.5.2.1.bin) are located on the FTP server 10.10.10.55 in the /firmware/ path.

The following example shows the commands issued on FC_switch_A_1:

```
FC_switch_A_1# copy ftp://10.10.10.55/firmware/m9200-s2ek9-kickstart-  
mz.5.2.1.bin bootflash:m9200-s2ek9-kickstart-mz.5.2.1.bin  
FC_switch_A_1# copy ftp://10.10.10.55/firmware/m9200-s2ek9-mz.5.2.1.bin  
bootflash:m9200-s2ek9-mz.5.2.1.bin
```

4. Disable all of the VSANs on both of the switches in this fabric.

Use the following procedure to disable the VSANs:

- a. Open the config terminal:

config t

- b. Enter: **vsan database**

- c. Check the state of the VSANs:

show vsan

All VSANs must be active.

- d. Suspend the VSANs:

vsan vsan-num suspend

Example: vsan 10 suspend

- e. Check the state of the VSANs again:

show vsan

All VSANs must be suspended.

- f. Exit the config terminal:

end

- g. Save the configuration.

copy running-config startup-config

The following example displays the output for FC_switch_A_1:

```
FC_switch_A_1# config t
Enter configuration commands, one per line.  End with CNTL/Z.
FC_switch_A_1(config)# vsan database
FC_switch_A_1(config-vsan-db)# show vsan
vsan 1 information
    name:VSAN0001  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:up

vsan 30 information
    name:MC1_FCVI_2_30  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:up

vsan 40 information
    name:MC1_STOR_2_40  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:up

vsan 70 information
    name:MC2_FCVI_2_70  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:up

vsan 80 information
    name:MC2_STOR_2_80  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:up

vsan 4079:evfp_isolated_vsan
```



```

vsan 4094:isolated_vsan

FC_switch_A_1(config-vsan-db)# vsan 1 suspend
FC_switch_A_1(config-vsan-db)# vsan 30 suspend
FC_switch_A_1(config-vsan-db)# vsan 40 suspend
FC_switch_A_1(config-vsan-db)# vsan 70 suspend
FC_switch_A_1(config-vsan-db)# vsan 80 suspend
FC_switch_A_1(config-vsan-db)# end
FC_switch_A_1#
FC_switch_A_1# show vsan
vsan 1 information
    name:VSAN0001  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down

vsan 30 information
    name:MC1_FCVI_2_30  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:down

vsan 40 information
    name:MC1_STOR_2_40  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down

vsan 70 information
    name:MC2_FCVI_2_70  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:down

vsan 80 information
    name:MC2_STOR_2_80  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down

vsan 4079:evfp_isolated_vsan

vsan 4094:isolated_vsan

```

5. Install the desired firmware on the switches:

```
install all system bootflash:systemfile_name kickstart  
bootflash:kickstartfile_name
```

The following example shows the commands issued on FC_switch_A_1:

```
FC_switch_A_1# install all system bootflash:m9200-s2ek9-mz.5.2.1.bin  
kickstart bootflash:m9200-s2ek9-kickstart-mz.5.2.1.bin  
Enter Yes to confirm the installation.
```

6. Check the version of the firmware on each switch to make sure the correct version was installed:

```
show version
```

7. Enable all of the VSANs on both of the switches in this fabric.

Use the following procedure to enable the VSANs:

- a. Open the config terminal:

```
config t
```

- b. Enter: **vsan database**

- c. Check the state of the VSANs:

```
show vsan
```

The VSANs must be suspended.

- d. Activate the VSANs:

```
no vsan vsan-num suspend
```

Example: no vsan 10 suspend

- e. Check the state of the VSANs again:

```
show vsan
```

All VSANs must be active.

- f. Exit the config terminal:

```
end
```

- g. Save the configuration:

```
copy running-config startup-config
```

The following example displays the output for FC_switch_A_1:

```
FC_switch_A_1# config t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
FC_switch_A_1(config)# vsan database
```

```
FC_switch_A_1(config-vsan-db)# show vsan
```

```
vsan 1 information
```

```
    name:VSAN0001  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down
```

```
vsan 30 information
```

```
    name:MC1_FCVI_2_30  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:down
```

```
vsan 40 information
```

```
    name:MC1_STOR_2_40  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down
```

```
vsan 70 information
```

```
    name:MC2_FCVI_2_70  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:down
```

```
vsan 80 information
```

```
    name:MC2_STOR_2_80  state:suspended
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down
```

```
vsan 4079:evfp_isolated_vsan
```

```
vsan 4094:isolated_vsan
```

```
FC_switch_A_1(config-vsan-db)# no vsan 1 suspend
```

```
FC_switch_A_1(config-vsan-db)# no vsan 30 suspend
```

```
FC_switch_A_1(config-vsan-db)# no vsan 40 suspend
```

```
FC_switch_A_1(config-vsan-db)# no vsan 70 suspend
```

```
FC_switch_A_1(config-vsan-db)# no vsan 80 suspend
```

```
FC_switch_A_1(config-vsan-db)#
```

```
FC_switch_A_1(config-vsan-db)# show vsan
```

```
vsan 1 information
```

```
    name:VSAN0001  state:active
```

```

        interoperability mode:default
        loadbalancing:src-id/dst-id/oxid
        operational state:up

vsan 30 information
    name:MC1_FCVI_2_30  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:up

vsan 40 information
    name:MC1_STOR_2_40  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:up

vsan 70 information
    name:MC2_FCVI_2_70  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:up

vsan 80 information
    name:MC2_STOR_2_80  state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:up

vsan 4079:evfp_isolated_vsan

vsan 4094:isolated_vsan

FC_switch_A_1(config-vsan-db)# end
FC_switch_A_1#

```

8. Verify the operation of the MetroCluster configuration in ONTAP:

- a. Check whether the system is multipathed:

```
node run -node node-name sysconfig -a
```

- b. Check for any health alerts on both clusters:

```
system health alert show
```

- c. Confirm the MetroCluster configuration and that the operational mode is normal:

```
metrocluster show
```

d. Perform a MetroCluster check:

```
metrocluster check run
```

e. Display the results of the MetroCluster check:

```
metrocluster check show
```

f. Check for any health alerts on the switches (if present):

```
storage switch show
```

g. Run Config Advisor.

[NetApp Downloads: Config Advisor](#)

h. After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

9. Repeat this procedure for the second switch fabric.

Upgrading to new Brocade FC switches

If you are upgrading to new Brocade FC switches, you must replace the switches in the first fabric, verify that the MetroCluster configuration is fully operational, and then replace the switches in the second fabric.

- The MetroCluster configuration must be healthy and in normal operation.
- The MetroCluster switch fabrics consist of four Brocade switches.

The illustrations in the following steps show current switches.

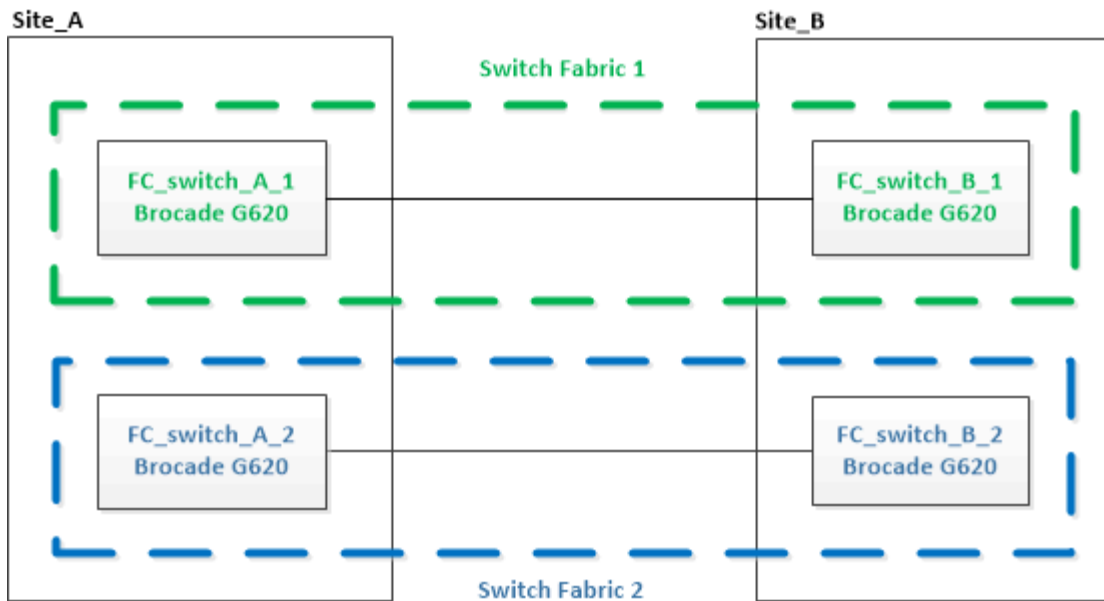
- The switches must be running the most recent supported firmware.

[NetApp Interoperability Matrix Tool](#)

- This procedure is nondisruptive and takes approximately two hours to complete.
- You need the admin password and access to an FTP or SCP server.
- [Enable console logging](#) before performing this task.

The switch fabrics are upgraded one at a time.

At the end of this procedure, all four switches will be upgraded to new switches.

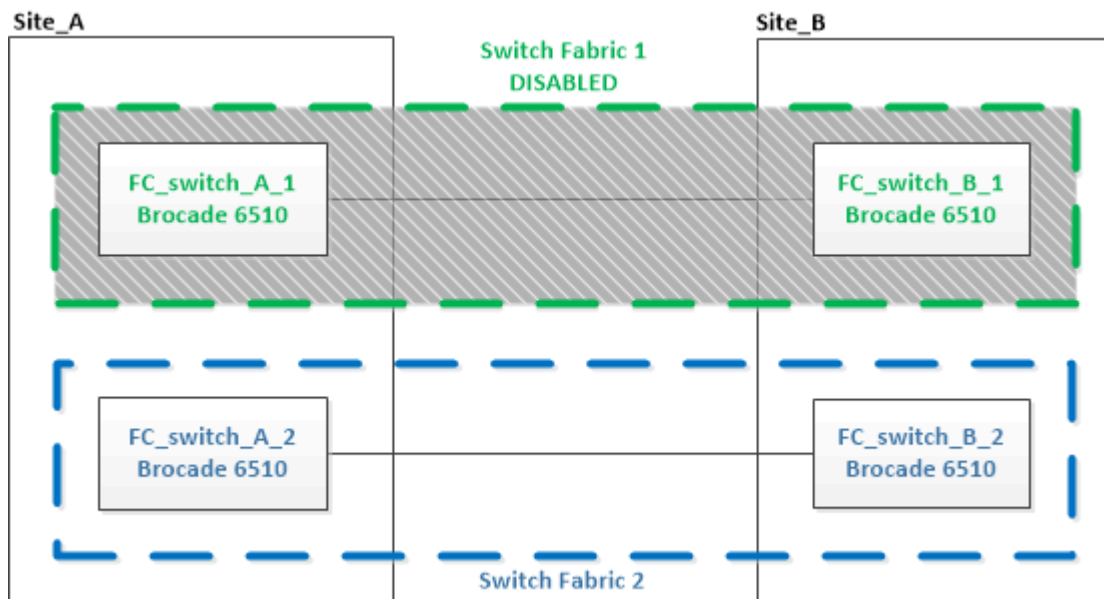


Steps

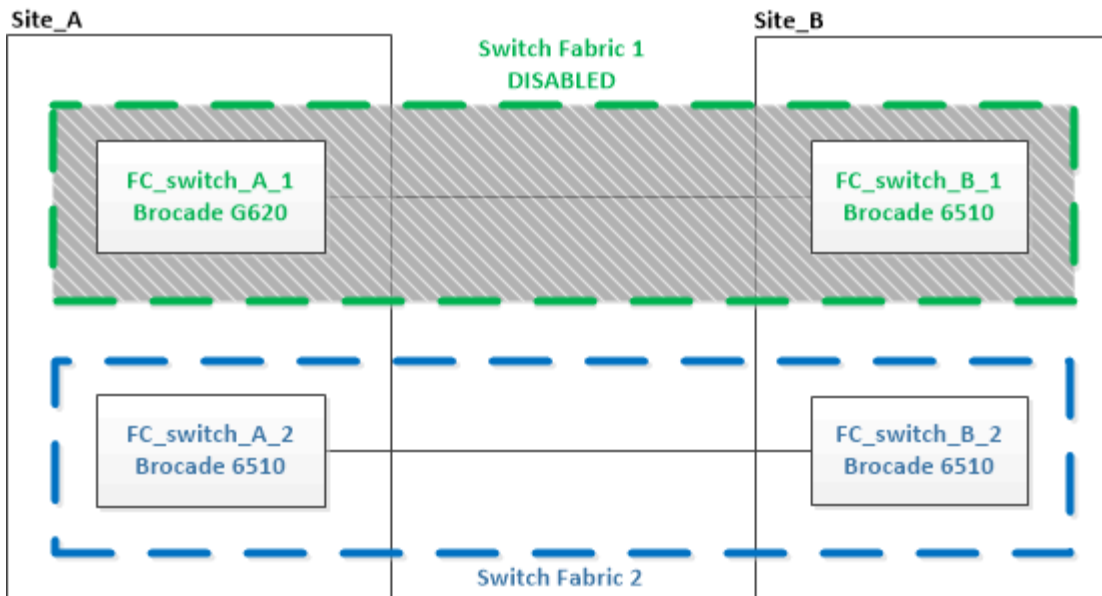
1. Disable the first switch fabric:

```
FC_switch_A_1:admin> switchCfgPersistentDisable
```

```
FC_switch_A_1:admin> switchCfgPersistentDisable
```



2. Replace the old switches at one MetroCluster site.
 - a. Uncable and remove the disabled switch.
 - b. Install the new switch in the rack.



- c. Disable the new switches by running the following command on both switches:

```
switchCfgPersistentDisable
```

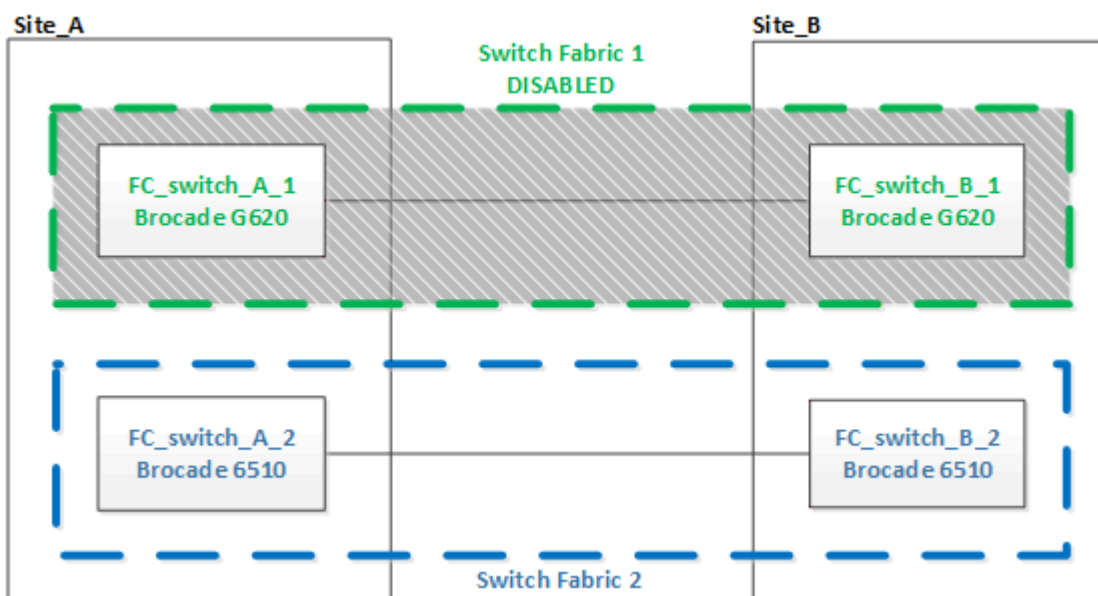
```
FC_switch_A_1:admin> switchCfgPersistentDisable
```

- d. Cable the new switch using the recommended port assignments.

[Port assignments for FC switches](#)

- e. Repeat these substeps at the partner MetroCluster site to replace the second switch in the first switch fabric.

Both switches in fabric 1 have been replaced.



3. Power up the new switches and let them boot up.
4. Configure the Brocade FC switches using one of the following procedures:

[Configure Brocade FC switches with RCF files](#)

[Configure the Brocade FC switches manually](#)

5. Save the switch configuration:

```
cfgSave
```

6. Wait 10 minutes to allow the configuration to stabilize.
7. Confirm connectivity to the disks by entering the following command on any one of the MetroCluster nodes:

```
run local sysconfig -v
```

The output shows the disks attached to the initiator ports on the controller, and identifies the shelves connected to the FC-to-SAS bridges:

```
node_A_1> run local sysconfig -v
NetApp Release 9.3.2X18: Sun Dec 13 01:23:24 PST 2017
System ID: 4068741258 (node_A_1); partner ID: 4068741260 (node_B_1)
System Serial Number: 940001025471 (node_A_1)
System Rev: 70
System Storage Configuration: Multi-Path HA**<=== Configuration should
be multi-path HA**
.
.
.
slot 0: FC Host Adapter 0g (QLogic 8324 rev. 2, N-port, <UP>)**<===
Initiator port**
    Firmware rev:      7.5.0
    Flash rev:         0.0.0
    Host Port Id:      0x60130
    FC Node Name:      5:00a:098201:bae312
    FC Port Name:      5:00a:098201:bae312
    SFP Vendor:        UTILITIES CORP.
    SFP Part Number:    FTLF8529P3BCVAN1
    SFP Serial Number:  URQ0Q9R
    SFP Capabilities:   4, 8 or 16 Gbit
    Link Data Rate:     16 Gbit
    Switch Port:        brcd6505-fcs40:1
**<List of disks visible to port\>**
    ID      Vendor  Model      FW      Size
    brcd6505-fcs29:12.126L1527  : NETAPP  X302_HJUPI01TSSM NA04
847.5GB (1953525168 512B/sect)
    brcd6505-fcs29:12.126L1528  : NETAPP  X302_HJUPI01TSSA NA02
847.5GB (1953525168 512B/sect)
```



```

.
.
.
**<List of FC-to-SAS bridges visible to port\>**
FC-to-SAS Bridge:
brcd6505-fcs40:12.126L0      : ATTO      FibreBridge6500N 1.61
FB6500N102980
brcd6505-fcs42:13.126L0      : ATTO      FibreBridge6500N 1.61
FB6500N102980
brcd6505-fcs42:6.126L0       : ATTO      FibreBridge6500N 1.61
FB6500N101167
brcd6505-fcs42:7.126L0       : ATTO      FibreBridge6500N 1.61
FB6500N102974
.
.
.
**<List of storage shelves visible to port\>**
brcd6505-fcs40:12.shelf6: DS4243  Firmware rev. IOM3 A: 0200
IOM3 B: 0200
brcd6505-fcs40:12.shelf8: DS4243  Firmware rev. IOM3 A: 0200
IOM3 B: 0200
.
.
.

```

8. Returning to the switch prompt, verify the switch firmware version:

```
firmwareShow
```

The switches must be running the most recent supported firmware.

[NetApp Interoperability Matrix Tool](#)

9. Simulate a switchover operation:

a. From any node's prompt, change to the advanced privilege level:

```
set -privilege advanced
```

You need to respond with "y" when prompted to continue into advanced mode and see the advanced mode prompt (*>).

b. Perform the switchover operation with the `-simulate` parameter:

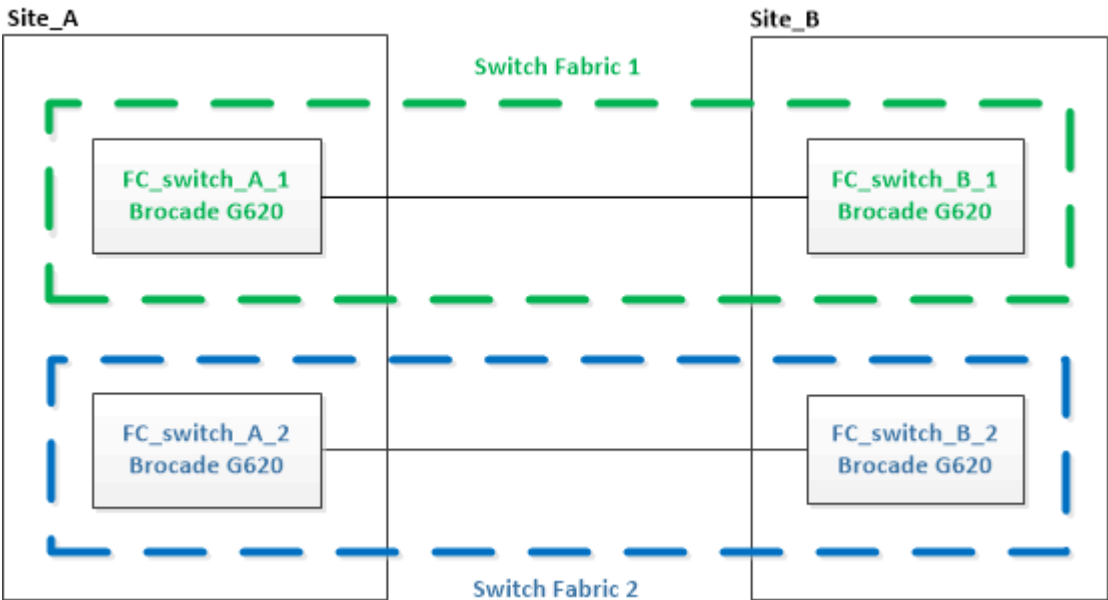
```
metrocluster switchover -simulate
```

c. Return to the admin privilege level:

```
set -privilege admin
```

10. Repeat the previous steps on the second switch fabric.

After repeating the steps, all four switches have been upgraded and the MetroCluster configuration is in normal operation.



Replacing a Brocade FC switch

You must use this Brocade-specific procedure to replace a failed switch.

About this task

You need the admin password and access to an FTP or SCP server.

[Enable console logging](#) before performing this task.

In the following examples, FC_switch_A_1 is the healthy switch and FC_switch_B_1 is the impaired switch. The switch port usage in the examples is shown in the following table:

Port connections	Ports
FC-VI connections	0, 3
HBA connections	1, 2, 4, 5
FC-to-SAS bridge connections	6, 7
ISL connections	10, 11

The examples show two FC-to-SAS bridges. If you have more, you must disable and subsequently enable the additional ports.



This procedure is nondisruptive and takes approximately two hours to complete.

Your switch port usage should follow the recommended assignments.

- [Port assignments for FC switches](#)

Steps

1. Fence off the switch undergoing replacement by disabling the ISL ports on the healthy switch in the fabric and the FC-VI and HBA ports on the impaired switch (if the impaired switch is still operating):

- a. Disable the ISL ports on the healthy switch for each port:

```
portcfgpersistentdisable port-number
```

```
FC_switch_A_1:admin> portcfgpersistentdisable 10  
FC_switch_A_1:admin> portcfgpersistentdisable 11
```

- b. If the impaired switch is still operational, disable the FC-VI and HBA ports on that switch for each port:

```
portcfgpersistentdisable port-number
```

```
FC_switch_B_1:admin> portcfgpersistentdisable 0  
FC_switch_B_1:admin> portcfgpersistentdisable 1  
FC_switch_B_1:admin> portcfgpersistentdisable 2  
FC_switch_B_1:admin> portcfgpersistentdisable 3  
FC_switch_B_1:admin> portcfgpersistentdisable 4  
FC_switch_B_1:admin> portcfgpersistentdisable 5
```

2. If the impaired switch is still operational, gather the output from the switchshow command.

```
FC_switch_B_1:admin> switchshow  
  switchName: FC_switch_B_1  
  switchType: 71.2  
  switchState:Online  
  switchMode: Native  
  switchRole: Subordinate  
  switchDomain:      2  
  switchId:   fffc01  
  switchWwn:  10:00:00:05:33:86:89:cb  
  zoning:      OFF  
  switchBeacon: OFF
```

3. Boot and preconfigure the new switch prior to physically installing it:

- a. Power up the new switch and let it boot up.
- b. Check the firmware version on the switch to confirm that it matches the version of the other FC switches:

```
firmwareShow
```

- c. Configure the new switch by following the Brocade procedures in [Configure the FC switches](#).



At this point, the new switch is not cabled to the MetroCluster configuration.

- d. Disable the FC-VI, HBA, and storage ports on the new switch, and the ports connected to the FC-SAS bridges.

```
FC_switch_B_1:admin> portcfgpersistentdisable 0
FC_switch_B_1:admin> portcfgpersistentdisable 1
FC_switch_B_1:admin> portcfgpersistentdisable 2
FC_switch_B_1:admin> portcfgpersistentdisable 3
FC_switch_B_1:admin> portcfgpersistentdisable 4
FC_switch_B_1:admin> portcfgpersistentdisable 5

FC_switch_B_1:admin> portcfgpersistentdisable 6
FC_switch_B_1:admin> portcfgpersistentdisable 7
```

4. Physically replace the switch:
- Power off the impaired FC switch.
 - Power off the replacement FC switch.
 - Uncable and remove the impaired switch, carefully noting which cables connected to which ports.
 - Install the replacement switch in the rack.
 - Cable the replacement switch exactly as the old switch was cabled.
 - Power on the new FC switch.
5. To enable ISL encryption, refer to [Configure the Brocade FC switches manually](#).

If you are enabling ISL encryption, you need to complete the following tasks:

- Disable the virtual fabric
- Set the payload
- Set the authentication policy
- Enable ISL encryption on Brocade switches

6. Complete the configuration of the new switch:

- a. Enable the ISLs:

```
portcfgpersistentenable port-number
```

```
FC_switch_B_1:admin> portcfgpersistentenable 10
FC_switch_B_1:admin> portcfgpersistentenable 11
```

- b. Verify the zoning configuration:

```
cfg show
```

- c. On the replacement switch (FC_switch_B_1 in the example), verify that the ISLs are online:

switchshow

```
FC_switch_B_1:admin> switchshow
switchName: FC_switch_B_1
switchType: 71.2
switchState:Online
switchMode: Native
switchRole: Principal
switchDomain:      4
switchId:   fffc03
switchWwn:  10:00:00:05:33:8c:2e:9a
zoning:      OFF
switchBeacon: OFF

Index Port Address Media Speed State  Proto
=====
...
10   10   030A00 id   16G      Online FC E-Port
10:00:00:05:33:86:89:cb "FC_switch_A_1"
11   11   030B00 id   16G      Online FC E-Port
10:00:00:05:33:86:89:cb "FC_switch_A_1" (downstream)
...
```

- d. Enable the storage ports that connect to the FC bridges.

```
FC_switch_B_1:admin> portcfgpersistentenable 6
FC_switch_B_1:admin> portcfgpersistentenable 7
```

- e. Enable the storage, HBA, and FC-VI ports.

The following example shows the commands used to enable the ports connecting HBA adapters:

```
FC_switch_B_1:admin> portcfgpersistentenable 1
FC_switch_B_1:admin> portcfgpersistentenable 2
FC_switch_B_1:admin> portcfgpersistentenable 4
FC_switch_B_1:admin> portcfgpersistentenable 5
```

The following example shows the commands used to enable the ports connecting the FC-VI adapters:

```
FC_switch_B_1:admin> portcfgpersistentenable 0
FC_switch_B_1:admin> portcfgpersistentenable 3
```

7. Verify that the ports are online:

```
switchshow
```

8. Verify the operation of the MetroCluster configuration in ONTAP:

a. Check whether the system is multipathed:

```
node run -node node-name sysconfig -a
```

b. Check for any health alerts on both clusters:

```
system health alert show
```

c. Confirm the MetroCluster configuration and that the operational mode is normal:

```
metrocluster show
```

d. Perform a MetroCluster check:

```
metrocluster check run
```

e. Display the results of the MetroCluster check:

```
metrocluster check show
```

f. Check for any health alerts on the switches (if present):

```
storage switch show
```

g. Run [Config Advisor](#).

h. After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

Renaming a Brocade FC switch

You might need to rename a Brocade FC switch to ensure consistent naming throughout your configuration.

About this task

[Enable console logging](#) before performing this task.

Steps

1. Persistently disable the switch or switches in one fabric:

```
switchcfgpersistentdisable
```

The following example shows the output for the **switchcfgpersistentdisable** command:

```
7840_FCIP_2:admin> switchcfgpersistentdisable
Switch's persistent state set to 'disabled'
2018/03/09-07:41:06, [ESM-2105], 146080, FID 128, INFO, 7840_FCIP_2, VE
Tunnel 24 is DEGRADED.
2018/03/09-07:41:06, [ESM-2104], 146081, FID 128, INFO, 7840_FCIP_2, VE
Tunnel 24 is OFFLINE.

7840_FCIP_2:admin>
```

2. Rename the switch or switches:

switchname new-switch-name

If you are renaming both switches in the fabric, use the same command on each switch.

The following example shows the output for the **switchname new-switch-name** command:

```
7840_FCIP_2:admin> switchname FC_switch_1_B
Committing configuration...
Done.
Switch name has been changed.Please re-login into the switch for the
change to be applied.
2018/03/09-07:41:20, [IPAD-1002], 146082, FID 128, INFO, FC_switch_1_B,
Switch name has been successfully changed to FC_switch_1_B.
7840_FCIP_2:admin>
```

3. Reboot the switch or switches:

reboot

If you are renaming both switches in the fabric, reboot both switches. Once the reboot is complete, the switch is renamed in all places.

The following example shows the output for the **reboot** command:

```
7840_FCIP_2:admin> reboot
Warning: This command would cause the switch to reboot
and result in traffic disruption.
Are you sure you want to reboot the switch [y/n]?y
2018/03/09-07:42:08, [RAS-1007], 146083, CHASSIS, INFO, Brocade7840,
System is about to reload.
Rebooting! Fri Mar 9 07:42:11 CET 2018

Broadcast message from root (ttyS0) Fri Mar 9 07:42:11 2018...

The system is going down for reboot NOW !!
INIT: Switching to runlevel: 6
INIT:
2018/03/09-07:50:48, [ESM-1013], 146104, FID 128, INFO, FC_switch_1_B,
DP0 Configuration replay has completed.
2018/03/09-07:50:48, [ESM-1011], 146105, FID 128, INFO, FC_switch_1_B,
DP0 is ONLINE.

*** CORE FILES WARNING (03/09/18 - 08:00:00 ) ***
10248 KBytes in 1 file(s)
use "supportsave" command to upload

*** FFDC FILES WARNING (03/09/18 - 08:00:00 ) ***
520 KBytes in 1 file(s)
```

4. Persistently enable the switches: **switchcfgpersistenable**

The following example shows the output for the **switchcfgpersistenable** command:


```

FC_switch_1_B:admin> switchcfgpersistentenable
Switch's persistent state set to 'enabled'
FC_switch_1_B:admin>
FC_switch_1_B:admin>
FC_switch_1_B:admin> 2018/03/09-08:07:07, [ESM-2105], 146106, FID 128,
INFO, FC_switch_1_B, VE Tunnel 24 is DEGRADED.
2018/03/09-08:07:10, [ESM-2106], 146107, FID 128, INFO, FC_switch_1_B,
VE Tunnel 24 is ONLINE.

FC_switch_1_B:admin>

```

```

FC_switch_1_B:admin> switchshow
switchName:      FC_switch_1_B
switchType:      148.0
switchState:     Online
switchMode:      Native
switchRole:      Subordinate
switchDomain:     6
switchId:        fffc06
switchWwn:       10:00:50:eb:1a:9a:a5:79
zoning:          ON (CFG_FAB_2_RCF_9_3)
switchBeacon:    OFF
FC Router:       OFF
FC Router BB Fabric ID: 128
Address Mode:    0
HIF Mode:        OFF

```

Index	Port	Address	Media	Speed	State	Proto
0	0	060000	id	16G	Online	FC F-Port
		50:0a:09:81:06:a5:5a:08				
1	1	060100	id	16G	Online	FC F-Port
		50:0a:09:83:06:a5:5a:08				

5. Verify that the switch name change is visible from the ONTAP cluster prompt:

storage switch show

The following example shows the output for the **storage switch show** command:

```

cluster_A::*> storage switch show
(storage switch show)

```

Monitor	Symbolic	Is
Switch	Name	Vendor
Status	Model	Switch WWN
Monitored		
-----	-----	-----

Brocade_172.20.7.90	RTP-FC01-510Q40	Brocade Brocade7840
		1000c4f57c904bc8 true
ok		
Brocade_172.20.7.91	RTP-FC02-510Q40	Brocade Brocade7840
		100050eb1a9aa579 true
ok		
Brocade_172.20.7.92		

Disabling encryption on Brocade FC switches

You might need to disable encryption on Brocade FC switches.

Steps

1. Send an AutoSupport message from both sites indicating the beginning of maintenance.

```
cluster_A::> autosupport invoke -node * -type all -message MAINT=4h
```

```
cluster_B::> autosupport invoke -node * -type all -message MAINT=4h
```

2. Verify the operation of the MetroCluster configuration from Cluster A.

- a. Confirm the MetroCluster configuration and that the operational mode is normal:

metrocluster show

```
cluster_A::> metrocluster show
```

- b. Perform a MetroCluster check:

metrocluster check run

```
cluster_A::> metrocluster check run
```

- c. Display the results of the MetroCluster check:

metrocluster check show

```
cluster_A::> metrocluster check show
```

3. Check the status of both switches:

fabric show

```
switch_A_1:admin> fabric show
```

```
switch_B_1:admin> fabric show
```

4. Disable both switches:

switchdisable

```
switch_A_1:admin> switchdisable
```

```
switch_B_1:admin> switchdisable
```

5. Check the available paths for the nodes on each cluster:

sysconfig

```
cluster_A::> system node run -node node-name -command sysconfig -a
```

```
cluster_B::> system node run -node node-name -command sysconfig -a
```

As the switch fabric is now disabled, the System Storage Configuration should be Single-Path HA.

6. Check the aggregate status for both clusters.

```
cluster_A::> aggr status
```

```
cluster_B::> aggr status
```

System output should show the aggregates are mirrored and normal for both clusters:

```
mirrored,normal
```

7. Repeat the following substeps from the admin prompt on both switches.

a. Show which ports are encrypted:

portenccompshow

```
switch_A_1:admin> portenccompshow
```

b. Disable encryption on the encrypted ports:

portcfgencrypt - disable port-number

```
switch_A_1:admin> portcfgencrypt --disable 40
switch_A_1:admin> portcfgencrypt --disable 41
switch_A_1:admin> portcfgencrypt --disable 42
switch_A_1:admin> portcfgencrypt --disable 43
```

c. Set the authentication type to all:

authUtil --set -a all

```
switch_A_1:admin> authUtil --set -a all
```

d. Set the authentication policy on the switch. to off:

authutil --policy -sw off

```
switch_A_1:admin> authutil --policy -sw off
```

e. Set the authentication Diffie-Hellman group to * :

authutil --set -g *

```
switch_A_1:admin> authUtil --set -g *
```

f. Delete the secret key database:

secAuthSecret --remove -all

```
switch_A_1:admin> secAuthSecret --remove -all
```

- g. Confirm that encryption is disabled on the ports:

portenccompshow

```
switch_A_1:admin> portenccompshow
```

- h. Enable the switch:

switchenable

```
switch_A_1:admin> switchenable
```

- i. Confirm the status of the ISLs:

islshow

```
switch_A_1:admin> islshow
```

8. Check the available paths for the nodes on each cluster:

sysconfig

```
cluster_A::> system node run -node * -command sysconfig -a
```

```
cluster_B::> system node run -node * -command sysconfig -a
```

The system output should indicate that System Storage Configuration has changed back to Quad-Path HA.

9. Check the aggregate status for both clusters.

```
cluster_A::> aggr status
```

```
cluster_B::> aggr status
```

The system should show that the aggregates are mirrored and normal for both clusters as shown in the following system output:

```
mirrored,normal
```

10. Verify the operation of the MetroCluster configuration from Cluster A.

a. Perform a MetroCluster check:

metrocluster check run

```
cluster_A::> metrocluster check run
```

b. Display the results of the MetroCluster check:

metrocluster check show

```
cluster_A::> metrocluster check show
```

11. Send an AutoSupport message from both sites indicating the end of maintenance.

```
cluster_A::> autosupport invoke -node node-name -type all -message  
MAINT=END
```

```
cluster_B::> autosupport invoke -node node-name -type all -message  
MAINT=END
```

Change ISL properties, ISL ports, or the IOD/OOD configuration on a Brocade switch

You might need to add ISLs to a switch if you are adding or upgrading hardware such as additional or faster controllers or switches.

Before you begin

Ensure that the system is properly configured, that all fabric switches are operational, and that no errors exist.

[Enable console logging](#) before performing this task.

If the equipment on the ISL link changes and the new link configuration no longer supports the current configuration----trunking and ordered delivery----then the fabric needs to be reconfigured for the correct routing policy: either in-order-deliver (IOD) or out-of-order-delivery (OOD).



To make changes to OOD from ONTAP software, use the following steps: [Configuring in-order delivery or out-of-order delivery of frames on ONTAP software](#)

Steps

1. Disable the FCVI and storage HBA ports:

```
portcfgpersistntdisable port number
```

By default the first 8 ports (ports 0 through 7) are used for FCVI and Storage HBA. The ports must be

persistently disabled so that the ports remain disabled in the event of a switch reboot.

The following example shows ISL ports 0—7 being disabled on both switches:

```
Switch_A_1:admin> portcfgpersistentdisable 0-7
Switch_B_1:admin> portcfgpersistentdisable 0-7
```

2. Change the ISL ports as required.

Option	Step
To change the speed of an ISL port...	<p>Use the <code>portcfgspeed port number port speed</code> command on both switches on the fabric.</p> <p>In the following example, you change the ISL port speed from 40 Gbps to 16 Gbps:</p> <pre>brocade_switch_A_1:admin> portcfgspeed 40 16</pre> <p>You can verify that the speed has changed using the <code>switchshow</code> command:</p> <pre>brocade_switch_A_1:admin> switchshow</pre> <p>You should see the following output:</p> <div><pre>. . . 40 40 062800 id 16G No_Sync FC Disabled . . .</pre></div>
To change the distance of an ISL port...	Use the <code>portcfglongdistance port number port distance</code> command on both switches in the fabric.
To remove an ISL...	Disconnect the link.
To add an ISL...	Insert SFPs into the ports you are adding as ISL ports. Ensure that these ports are listed in Install a fabric-attached MetroCluster for the switch to which you are adding them.
To relocate an ISL...	Relocating an ISL is the same as removing and then adding an ISL. First, remove the ISL by disconnecting the link and then insert SFPs into the ports you are adding as ISL ports.



When you make changes to ISL ports you might also need to apply additional settings recommended by the WDM vendor. Refer to the WDM vendor documentation for guidance.

3. Reconfigure for out-of-order delivery (OOD) or in-order-delivery (IOD).



If the routing policies remain the same, you do not need to reconfigure and this step can be ignored. The ONTAP configuration needs to match the fabric configuration. If the fabric is configured for OOD, then ONTAP must also be configured for OOD. The same applies for IOD.

This step should be executed in the following scenarios:

- More than one ISL formed a trunk before the change, but after the change, trunking is no longer supported. In this case, you must configure the fabric for OOD.
- There is one ISL before the change and multiple ISLs after the change.
- If multiple ISLs form a trunk, configure the fabric for IOD. If multiple ISLs **cannot** form a trunk, configure the fabric for OOD.
- Persistently disable the switches using the `switchcfgpersistentdisable` command as shown in the following example:

```
Switch_A_1:admin> switchcfgpersistentdisable
Switch_B_1:admin> switchcfgpersistentdisable
```

- a. Configure the trunking mode for each ISL `portcfgtrunkport port number` as shown in the following table:

Scenario	Steps
Configure the ISL for trunking \(\IOD\)	<p>Set the <code>portcfgtrunkport port number</code> to 1:</p> <pre>FC_switch_A_1:admin> portcfgtrunkport 20 1 FC_switch_A_1:admin> portcfgtrunkport 21 1 FC_switch_B_1:admin> portcfgtrunkport 20 1 FC_switch_B_1:admin> portcfgtrunkport 21 1</pre>
Configure the ISL for trunking \(\OOD\)	<p>Set the <code>portcfgtrunkport port number</code> to 0:</p> <pre>FC_switch_A_1:admin> portcfgtrunkport 20 0 FC_switch_A_1:admin> portcfgtrunkport 21 0 FC_switch_B_1:admin> portcfgtrunkport 20 0 FC_switch_B_1:admin> portcfgtrunkport 21 0</pre>

- b. Configure the fabric for IOD or OOD as required.

Scenario	Steps
----------	-------

Configure the fabric for IOD	<p>Set the three settings of IOD, APT, and DLS using the <code>iodset</code>, <code>aptpolicypolicy</code>, and <code>dlsreset</code> commands as shown in the following example:</p> <pre> Switch_A_1:admin> iodset Switch_A_1:admin> aptpolicy 1 Policy updated successfully. Switch_A_1:admin> dlsreset FC_switch_A_1:admin> portcfgtrunkport 40 1 FC_switch_A_1:admin> portcfgtrunkport 41 1 Switch_B_1:admin> iodset Switch_B_1:admin> aptpolicy 1 Policy updated successfully. Switch_B_1:admin> dlsreset FC_switch_B_1:admin> portcfgtrunkport 20 1 FC_switch_B_1:admin> portcfgtrunkport 21 1 </pre>
Configure the fabric for OOD	<p>Set the three settings of IOD, APT, and DLS using the <code>iodreset</code>, <code>aptpolicypolicy</code>, and <code>dlsset</code> commands as shown in the following example:</p> <pre> Switch_A_1:admin> iodreset Switch_A_1:admin> aptpolicy 3 Policy updated successfully. Switch_A_1:admin> dlsset FC_switch_A_1:admin> portcfgtrunkport 40 0 FC_switch_A_1:admin> portcfgtrunkport 41 0 Switch_B_1:admin> iodreset Switch_B_1:admin> aptpolicy 3 Policy updated successfully. Switch_B_1:admin> dlsset FC_switch_B_1:admin> portcfgtrunkport 40 0 FC_switch_B_1:admin> portcfgtrunkport 41 0 </pre>

c. Enable the switches persistently:

`switchcfgpersistentenable`

```

switch_A_1:admin>switchcfgpersistentenable
switch_B_1:admin>switchcfgpersistentenable

```

If this command does not exist, use the `switchenable` command as shown in the following example:

```
brocade_switch_A_1:admin>  
switchenable
```

- d. Verify the OOD settings using the `iodshow`, `aptpolicy`, and `dlsshow` commands as shown in the following example:

```
switch_A_1:admin> iodshow  
IOD is not set  
  
switch_A_1:admin> aptpolicy  
  
Current Policy: 3 0(ap)  
  
3 0(ap) : Default Policy  
1: Port Based Routing Policy  
3: Exchange Based Routing Policy  
0: AP Shared Link Policy  
1: AP Dedicated Link Policy  
command aptpolicy completed  
  
switch_A_1:admin> dlsshow  
DLS is set by default with current routing policy
```



You must run these commands on both switches.

- e. Verify the IOD settings using the `iodshow`, `aptpolicy`, and `dlsshow` commands as shown in the following example:

```

switch_A_1:admin> iodshow
IOD is set

switch_A_1:admin> aptpolicy
Current Policy: 1 0(ap)

3 0(ap) : Default Policy
1: Port Based Routing Policy
3: Exchange Based Routing Policy
0: AP Shared Link Policy
1: AP Dedicated Link Policy
command aptpolicy completed

switch_A_1:admin> dlsshow
DLS is not set

```



You must run these commands on both switches.

4. Verify that the ISLs are online and trunked (if the linking equipment supports trunking) using the `islshow` and `trunkshow` commands.



If FEC is enabled, the deskew value of the last online port of the trunk group might show a difference of up to 36 although the cables are all of the same length.

Are ISLs trunked?	You see the following system output...
Yes	<p>If the ISLs are trunked, only a single ISL appears in the output for the <code>islshow</code> command. Either port 40 or 41 can appear depending on which is the trunk master. The output of <code>trunkshow</code> should one trunk with ID “1” listing both the physical ISLs on ports 40 and 41. In the following example the ports 40 and 41 are configured for use as an ISL:</p> <pre> switch_A_1:admin> islshow 1: 40-> 40 10:00:00:05:33:88:9c:68 2 switch_B_1 sp: 16.000G bw: 32.000G TRUNK CR_RECOV FEC switch_A_1:admin> trunkshow 1: 40-> 40 10:00:00:05:33:88:9c:68 2 deskew 51 MASTER 41-> 41 10:00:00:05:33:88:9c:68 2 deskew 15 </pre>

No	<p>If the ISLs are not trunked, both ISLs appear separately in the outputs for <code>islshow</code> and <code>trunkshow</code>. Both commands list the ISLs with their ID of “1” and “2”. In the following example, the ports “40” and “41” are configured for use as an ISL:</p> <pre> switch_A_1:admin> islshow 1: 40-> 40 10:00:00:05:33:88:9c:68 2 switch_B_1 sp: 16.000G bw: 16.000G TRUNK CR_RECOV FEC 2: 41-> 41 10:00:00:05:33:88:9c:68 2 switch_B_1 sp: 16.000G bw: 16.000G TRUNK CR_RECOV FEC switch_A_1:admin> trunkshow 1: 40-> 40 10:00:00:05:33:88:9c:68 2 deskey 51 MASTER 2: 41-> 41 10:00:00:05:33:88:9c:68 2 deskey 48 MASTER </pre>
----	--

5. Run the `spinfab` command on both switches to verify that the ISLs are healthy:

```
switch_A_1:admin> spinfab -ports 0/40 - 0/41
```

6. Enable the ports that were disabled in step 1:

```
portenable port number
```

The following example shows ISL ports “0” through “7” being enabled:

```
brocade_switch_A_1:admin> portenable 0-7
```

Replacing a Cisco FC switch

You must use Cisco-specific steps to replace a failed Cisco FC switch.

Before you begin

You need the admin password and access to an FTP or SCP server.

[Enable console logging](#) before performing this task.

About this task

This procedure is nondisruptive and takes approximately two hours to complete.

In the examples in this procedure, `FC_switch_A_1` is the healthy switch and `FC_switch_B_1` is the impaired switch. The switch port usage in the examples is shown in the following table:

Role	Ports
FC-VI connections	1, 4

HBA connections	2, 3, 5, 6
FC-to-SAS bridge connections	7, 8
ISL connections	36, 40

The examples show two FC-to-SAS bridges. If you have more, you must disable and subsequently enable the additional ports.

Your switch port usage should follow the recommended assignments.

- [Port assignments for FC switches](#)

Steps

1. Disable the ISL ports on the healthy switch to fence off the impaired switch.

These steps are performed on the healthy switch.

- a. Enter configuration mode:

```
conf t
```

- b. Disable the ISL ports on the healthy switch with the `interface` and `shut` commands.

```
FC_switch_A_1# conf t
FC_switch_A_1(config)# interface fc1/36
FC_switch_A_1(config)# shut
FC_switch_A_1(config)# interface fc1/40
FC_switch_A_1(config)# shut
```

- c. Exit configuration mode and copy the configuration to the startup configuration.

```
FC_switch_A_1(config)# end
FC_switch_A_1# copy running-config startup-config
FC_switch_A_1#
```

2. Fence off the FC-VI and HBA ports on the impaired switch (if it is still running).

These steps are performed on the impaired switch.

- a. Enter configuration mode:

```
conf t
```

- b. If the impaired switch is still operational, disable the FC-VI and HBA ports on the impaired switch with the `interface` and `shut` commands.

```
FC_switch_B_1(config)# interface fc1/1
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/4
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/2-3
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/5-6
FC_switch_B_1(config)# shut
```

- c. Exit configuration mode and copy the configuration to the startup configuration.

```
FC_switch_B_1(config)# end
FC_switch_B_1# copy running-config startup-config
FC_switch_B_1#
```

3. If the impaired switch is still operational, determine the WWN for the switch:

```
show wwn switch
```

```
FC_switch_B_1# show wwn switch
Switch WWN is 20:00:54:7f:ee:e3:86:50
FC_switch_B_1#
```

4. Boot and preconfigure the replacement switch, prior to physically installing it.

At this point the replacement switch is not cabled to the MetroCluster configuration. The ISL ports on the partner switch are disabled (in shut mode) and offline.

- Power on the replacement switch and let it boot up.
- Check the firmware version on the replacement switch to confirm that it matches the version of the other FC switches:

```
show version
```

- Configure the replacement switch as described in the *MetroCluster Installation and Configuration Guide*, skipping the “Configuring zoning on a Cisco FC switch” section.

[Fabric-attached MetroCluster installation and configuration](#)

You will configure zoning later in this procedure.

- Disable the FC-VI, HBA, and storage ports on the replacement switch.

```

FC_switch_B_1# conf t
FC_switch_B_1(config)# interface fc1/1
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/4
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/2-3
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/5-6
FC_switch_B_1(config)# shut
FC_switch_B_1(config)# interface fc1/7-8
FC_switch_B_1(config)# shut
FC_switch_B_1# copy running-config startup-config
FC_switch_B_1#

```

5. Physically replace the impaired switch:

- a. Power off the impaired switch.
- b. Power off the replacement switch.
- c. Uncable and remove the impaired switch, carefully noting which cables connected to which ports.
- d. Install the replacement switch in the rack.
- e. Cable the replacement switch exactly as the impaired switch was cabled.
- f. Power on the replacement switch.

6. Enable the ISL ports on the replacement switch.

```

FC_switch_B_1# conf t
FC_switch_B_1(config)# interface fc1/36
FC_switch_B_1(config)# no shut
FC_switch_B_1(config)# end
FC_switch_B_1# copy running-config startup-config
FC_switch_B_1(config)# interface fc1/40
FC_switch_B_1(config)# no shut
FC_switch_B_1(config)# end
FC_switch_B_1#

```

7. Verify that the ISL ports on the replacement switch are up:

```
show interface brief
```

8. Adjust the zoning on the replacement switch to match the MetroCluster configuration:

- a. Distribute the zoning information from the healthy fabric.

In this example, FC_switch_B_1 has been replaced and the zoning information is retrieved from FC_switch_A_1:

```
FC_switch_A_1(config-zone)# zoneset distribute full vsan 10
FC_switch_A_1(config-zone)# zoneset distribute full vsan 20
FC_switch_A_1(config-zone)# end
```

- b. On the replacement switch, verify that the zoning information was properly retrieved from the healthy switch:

show zone

```
FC_switch_B_1# show zone
zone name FC-VI_Zone_1_10 vsan 10
  interface fc1/1 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/4 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/1 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/4 swwn 20:00:54:7f:ee:b8:24:c0

zone name STOR_Zone_1_20_25A vsan 20
  interface fc1/2 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/3 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/5 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/6 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/2 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/3 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/5 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/6 swwn 20:00:54:7f:ee:b8:24:c0

zone name STOR_Zone_1_20_25B vsan 20
  interface fc1/2 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/3 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/5 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/6 swwn 20:00:54:7f:ee:e3:86:50
  interface fc1/2 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/3 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/5 swwn 20:00:54:7f:ee:b8:24:c0
  interface fc1/6 swwn 20:00:54:7f:ee:b8:24:c0
FC_switch_B_1#
```

- c. Find the WWNs of the switches.

In this example, the two switch WWNs are as follows:

- FC_switch_A_1: 20:00:54:7f:ee:b8:24:c0
- FC_switch_B_1: 20:00:54:7f:ee:c6:80:78


```
FC_switch_B_1# show wwn switch
Switch WWN is 20:00:54:7f:ee:c6:80:78
FC_switch_B_1#

FC_switch_A_1# show wwn switch
Switch WWN is 20:00:54:7f:ee:b8:24:c0
FC_switch_A_1#
```

- a. Remove zone members that do not belong to the switch WWNs of the two switches.

In this example, “no member interface” in the output shows that the following members are not associated with the switch WWN of either of the switches in the fabric and must be removed:

- zone name FC-VI_Zone_1_10 vsan 10
 - interface fc1/1 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/2 swwn 20:00:54:7f:ee:e3:86:50
- zone name STOR_Zone_1_20_25A vsan 20
 - interface fc1/5 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/8 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/9 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/10 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/11 swwn 20:00:54:7f:ee:e3:86:50
- zone name STOR_Zone_1_20_25B vsan 20
 - interface fc1/8 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/9 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/10 swwn 20:00:54:7f:ee:e3:86:50
 - interface fc1/11 swwn 20:00:54:7f:ee:e3:86:50 The following example shows the removal of these interfaces:

```

FC_switch_B_1# conf t
FC_switch_B_1(config)# zone name FC-VI_Zone_1_10 vsan 10
FC_switch_B_1(config-zone)# no member interface fc1/1 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/2 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# zone name STOR_Zone_1_20_25A vsan
20
FC_switch_B_1(config-zone)# no member interface fc1/5 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/8 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/9 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/10 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/11 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# zone name STOR_Zone_1_20_25B vsan
20
FC_switch_B_1(config-zone)# no member interface fc1/8 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/9 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/10 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# no member interface fc1/11 swwn
20:00:54:7f:ee:e3:86:50
FC_switch_B_1(config-zone)# save running-config startup-config
FC_switch_B_1(config-zone)# zoneset distribute full 10
FC_switch_B_1(config-zone)# zoneset distribute full 20
FC_switch_B_1(config-zone)# end
FC_switch_B_1# copy running-config startup-config

```

b. Add the ports of the replacement switch to the zones.

All the cabling on the replacement switch must be the same as on the impaired switch:

```

FC_switch_B_1# conf t
FC_switch_B_1(config)# zone name FC-VI_Zone_1_10 vsan 10
FC_switch_B_1(config-zone)# member interface fc1/1 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/2 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# zone name STOR_Zone_1_20_25A vsan 20
FC_switch_B_1(config-zone)# member interface fc1/5 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/8 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/9 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/10 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/11 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# zone name STOR_Zone_1_20_25B vsan 20
FC_switch_B_1(config-zone)# member interface fc1/8 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/9 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/10 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# member interface fc1/11 swwn
20:00:54:7f:ee:c6:80:78
FC_switch_B_1(config-zone)# save running-config startup-config
FC_switch_B_1(config-zone)# zoneset distribute full 10
FC_switch_B_1(config-zone)# zoneset distribute full 20
FC_switch_B_1(config-zone)# end
FC_switch_B_1# copy running-config startup-config

```

c. Verify that the zoning is properly configured:

```
show zone
```

The following example output shows the three zones:

```

FC_switch_B_1# show zone
  zone name FC-VI_Zone_1_10 vsan 10
    interface fc1/1 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/2 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/1 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/2 swwn 20:00:54:7f:ee:b8:24:c0

  zone name STOR_Zone_1_20_25A vsan 20
    interface fc1/5 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/8 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/9 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/10 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/11 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/8 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/9 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/10 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/11 swwn 20:00:54:7f:ee:b8:24:c0

  zone name STOR_Zone_1_20_25B vsan 20
    interface fc1/8 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/9 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/10 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/11 swwn 20:00:54:7f:ee:c6:80:78
    interface fc1/5 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/8 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/9 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/10 swwn 20:00:54:7f:ee:b8:24:c0
    interface fc1/11 swwn 20:00:54:7f:ee:b8:24:c0
FC_switch_B_1#

```

d. Enable the connectivity to storage and the controllers.

The following example shows the port usage:

```

FC_switch_A_1# conf t
FC_switch_A_1(config)# interface fc1/1
FC_switch_A_1(config)# no shut
FC_switch_A_1(config)# interface fc1/4
FC_switch_A_1(config)# shut
FC_switch_A_1(config)# interface fc1/2-3
FC_switch_A_1(config)# shut
FC_switch_A_1(config)# interface fc1/5-6
FC_switch_A_1(config)# shut
FC_switch_A_1(config)# interface fc1/7-8
FC_switch_A_1(config)# shut
FC_switch_A_1# copy running-config startup-config
FC_switch_A_1#

```

9. Verify the operation of the MetroCluster configuration in ONTAP:

- a. Check whether the system is multipathed:

```
node run -node node-name sysconfig -a
```

- b. Check for any health alerts on both clusters:

```
system health alert show
```

- c. Confirm the MetroCluster configuration and that the operational mode is normal:

```
metrocluster show
```

- d. Perform a MetroCluster check:

```
metrocluster check run
```

- e. Display the results of the MetroCluster check:

```
metrocluster check show
```

- f. Check for any health alerts on the switches (if present):

```
storage switch show
```

- g. Run Config Advisor.

[NetApp Downloads: Config Advisor](#)

- h. After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

Change ISL properties and the IOD/OOD configuration on a Cisco FC switch

You can add Inter-Switch Links (ISLs), change ISL speed, and reconfigure in-order delivery (IOD) or out of-order delivery (OOD) settings on a Cisco FC switch.

Add ISLs to a Cisco FC switch

You might need add ISLs to a switch if you are adding or upgrading hardware, for example, adding or upgrading to faster controllers or faster switches.

About this task

Perform these steps on both switches in the fabric to verify ISL connectivity.

Steps

1. Disable the ISL ports of the ISLs to be added on both switches in the fabric:

```
FC_switch_A_1#config t
```

Enter the following configuration commands, one per line. Enter CTRL-Z after you have entered all of the configuration commands.

```
FC_switch_A_1(config)# interface fc1/36
FC_switch_A_1(config-if)# shut
FC_switch_A_1(config)# end
```

2. Insert SFPs into the ports you are adding as ISL ports, and cable them according to [Cable a fabric-attached MetroCluster configuration](#).

Verify that these ports are listed in the cabling documentation for the switch model that you are adding them to.

3. Configure the ISL ports by following the steps in [Cabling the ISLs between MetroCluster sites](#).
4. Enable all ISL ports (if not enabled) on both switches in the fabric:

```
FC_switch_A_1# config t
```

Enter the following configuration commands, one per line. End with CTRL-Z after you have entered all of the configuration commands.

```
FC_switch_A_1# interface fc1/36
FC_switch_A_1(config-if)# no shut
FC_switch_A_1(config)# end
```

5. Verify that the ISLs are established between both switches:

```
show topology isl
```

6. Repeat the procedure on the second fabric:

```

-----
-----

```

		Local			Remote			VSAN	Cost	I/F	PC
I/F	Band	PC	Domain	SwName	Port	Port	SwName	Domain	PC	Stat	Stat
Speed	width										

16g	1	0x11	cisco9	fc1/36	fc1/36	cisco9	0xbc	1	1	15	up
	64g										up
16g	1	0x11	cisco9	fc1/40	fc1/40	cisco9	0xbc	1	1	15	up
	64g										up
16g	1	0x11	cisco9	fc1/44	fc1/44	cisco9	0xbc	1	1	15	up
	64g										up
16g	1	0x11	cisco9	fc1/48	fc1/48	cisco9	0xbc	1	1	15	up
	64g										up

Change ISL port speeds on a Cisco FC switch

You can change the speed of ISL ports on a switch to improve the quality of the ISL, for example, lowering the speed on ISLs traveling a greater distance.

About this task

Perform these steps on both switches in the fabric to verify ISL connectivity.

Steps

1. Disable the ISL ports for the ISLs that you want to change the speed for on both switches in the fabric:

```
FC_switch_A_1# config t
```

Enter the following configuration commands, one per line. End with CTRL-Z after you have entered all of the configuration commands.

```
FC_switch_A_1(config)# interface fc1/36
FC_switch_A_1(config-if)# shut
FC_switch_A_1(config)# end
```

2. Change the speed of the ISL ports on both switches in the fabric:

```
FC_switch_A_1# config t
```

Enter the following configuration commands, one per line. End with CTRL-Z after you have entered all of the configuration commands.

```
FC_switch_A_1(config)# interface fc1/36
FC_switch_A_1(config-if)# switchport speed 16000
```



Speeds for the ports are 16 = 16,000 Gbps, 8 = 8,000 Gbps, and 4 = 4,000 Gbps.

Verify that the ISL ports for your switch are listed in [Install a fabric-attached MetroCluster configuration](#).

3. Enable all ISL ports (if not enabled) on both switches in the fabric:

```
FC_switch_A_1# config t
```

Enter the following configuration commands, one per line. End with CTRL-Z after you have entered all of the configuration commands.

```
FC_switch_A_1(config)# interface fc1/36
FC_switch_A_1(config-if)# no shut
FC_switch_A_1(config)# end
```

4. Verify that the ISLs are established between both switches:

```
show topology isl
```

```
-----
-----
I/F      Local Remote VSAN Cost I/F  PC
I/F      Band PC Domain SwName Port Port SwName Domain PC Stat Stat
Speed width
-----
-----
16g      1 0x11 cisco9 fc1/36 fc1/36 cisco9 0xbc 1 1 15 up up
16g      64g
16g      1 0x11 cisco9 fc1/40 fc1/40 cisco9 0xbc 1 1 15 up up
16g      64g
16g      1 0x11 cisco9 fc1/44 fc1/44 cisco9 0xbc 1 1 15 up up
16g      64g
16g      1 0x11 cisco9 fc1/48 fc1/48 cisco9 0xbc 1 1 15 up up
16g      64g
```

5. Repeat the procedure for the second switch fabric.

Reconfigure the VSAN to guarantee IOD or OOD of frames

The standard IOD settings are recommended. You should only reconfigure OOD if necessary.

Reconfigure IOD

Perform the following step to reconfigure IOD of frames.

Steps

1. Enter configuration mode:

```
conf t
```

2. Enable the in-order guarantee of exchanges for the VSAN:

```
in-order-guarantee vsan <vsan-ID>
```



For FC-VI VSANs (FCVI_1_10 and FCVI_2_30), you must enable in-order guarantee of frames and exchanges only on VSAN 10.

- a. Enable load balancing for the VSAN:

```
vsan <vsan-ID> loadbalancing src-dst-id
```

- b. Exit configuration mode:

```
end
```

- c. Copy the running-config to the startup-config:

```
copy running-config startup-config
```

The commands to configure IOD of frames on FC_switch_A_1:

```
FC_switch_A_1# config t
FC_switch_A_1(config)# in-order-guarantee vsan 10
FC_switch_A_1(config)# vsan database
FC_switch_A_1(config-vsan-db)# vsan 10 loadbalancing src-dst-id
FC_switch_A_1(config-vsan-db)# end
FC_switch_A_1# copy running-config startup-config
```

The commands to configure IOD of frames on FC_switch_B_1:

```
FC_switch_B_1# config t
FC_switch_B_1(config)# in-order-guarantee vsan 10
FC_switch_B_1(config)# vsan database
FC_switch_B_1(config-vsan-db)# vsan 10 loadbalancing src-dst-id
FC_switch_B_1(config-vsan-db)# end
FC_switch_B_1# copy running-config startup-config
```

Reconfigure OOD

Perform the following steps to reconfigure OOD of frames.

Steps

1. Enter configuration mode:

```
conf t
```

2. Disable the in-order guarantee of exchanges for the VSAN:

```
no in-order-guarantee vsan <vsan-ID>
```

3. Enable load balancing for the VSAN:

```
vsan <vsan-ID> loadbalancing src-dst-id
```

4. Exit configuration mode:

```
end
```

5. Copy the running-config to the startup-config:

```
copy running-config startup-config
```

The commands to configure OOD of frames on FC_switch_A_1:

```
FC_switch_A_1# config t
FC_switch_A_1(config)# no in-order-guarantee vsan 10
FC_switch_A_1(config)# vsan database
FC_switch_A_1(config-vsan-db)# vsan 10 loadbalancing src-dst-id
FC_switch_A_1(config-vsan-db)# end
FC_switch_A_1# copy running-config startup-config
```

The commands to configure OOD of frames on FC_switch_B_1:

```

FC_switch_B_1# config t
FC_switch_B_1(config)# no in-order-guarantee vsan 10
FC_switch_B_1(config)# vsan database
FC_switch_B_1(config-vsan-db)# vsan 10 loadbalancing src-dst-id
FC_switch_B_1(config-vsan-db)# end
FC_switch_B_1# copy running-config startup-config

```



When configuring ONTAP on the controller modules, OOD must be explicitly configured on each controller module in the MetroCluster configuration.

[Learn about configuring IOD or OOD of frames on ONTAP software.](#)

Change the vendor or model of FC switches

You might need to to change the vendor for FC switches from Cisco to Brocade or vice versa, change the switch model, or change both.

About this task

- This procedure applies when you are using NetApp validated switches.
- [Enable console logging](#) before performing this task.
- You must perform the steps in this procedure on one Fabric at a time, for both Fabrics in the configuration.

Steps

1. Check the health of the configuration.
 - a. Check that the MetroCluster is configured and in normal mode on each cluster: **metrocluster show**

```

cluster_A::> metrocluster show
Cluster                               Entry Name                               State
-----
Local: cluster_A                      Configuration state configured
Mode                                  normal
AUSO Failure Domain auso-on-cluster-
disaster
Remote: cluster_B                     Configuration state configured
Mode                                  normal
AUSO Failure Domain auso-on-cluster-
disaster

```

- b. Check that mirroring is enabled on each node: **metrocluster node show**

```
cluster_A::> metrocluster node show
```

DR	Configuration	DR
Group Cluster Node	State	Mirroring Mode
1	cluster_A	
	node_A_1	configured enabled normal
	cluster_B	
	node_B_1	configured enabled normal

2 entries were displayed.

c. Check that the MetroCluster components are healthy: **metrocluster check run**

```
cluster_A::> metrocluster check run
```

Component	Result
nodes	ok
lifs	ok
config-replication	ok
aggregates	ok

4 entries were displayed.

Command completed. Use the "metrocluster check show -instance" command or sub-commands in "metrocluster check" directory for detailed results.

To check if the nodes are ready to do a switchover or switchback operation, run "metrocluster switchover -simulate" or "metrocluster switchback -simulate", respectively.

d. Check that there are no health alerts: **system health alert show**

2. Configure the new switches before installation.

Follow the steps in [Configure the FC switches](#).

3. Disconnect the connections from the old switches by removing the connections in the following order:

- Disconnect the MetroCluster FC and FCVI interfaces.
- Disconnect the ATTO FibreBridge bridges.
- Disconnect the MetroCluster ISLs.

4. Power off the old switches, remove the cables, and physically replace the old switches with the new switch.

5. Cable the switches in the following order:

You must follow the steps in [Cabling a fabric-attached MetroCluster configuration](#).

- a. Cable the ISLs to the remote site.
 - b. Cable the ATTO FibreBridge bridges.
 - c. Cable the MetroCluster FC and FCVI interfaces.
6. Power up the switches.
7. Verify that the MetroCluster configuration is healthy by repeating [Step 1](#).
8. Repeat Step 1 to Step 7 for the second Fabric in the configuration.

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