

# Brocade X6 (FC32-64 Blade) Brocade X6 FCoE Deployment Guide for Cisco UCS

**Deployment Guide** 

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# **Table of Contents**

Chapter 1: Introduction	2
1.1 Topology	2
Chapter 2: Tasks	4
2.1 Prerequisite Checklist	4
2.1.1 Cisco UCS	4
2.1.2 Brocade X6	4
2.2 Configuration Overview	4
2.3 Identify the Blade on the Brocade X6 (FC32-64 Blade) — Task 1	5
2.4 Configure Ports on the Brocade X6 (FC32-64 Blade) — Task 2	5
2.4.1 VF_Port or Enode	5
2.4.2 Ethernet Port Mode	6
2.4.3 FCoE VLAN	7
2.5 Configure the Port Channel on the Brocade X6 (FC32-64 Blade) — Task 3	8
2.6 Configure the Port Channel on the Cisco FI — Task 4	9
2.7 Validate Connectivity and FC Login — Task 5	16
2.8 Create Zoning on the Brocade X6 (FC32-64 Blade) — Task 6	
2.9 Mount LUNs to a Host on the Cisco UCS Blade Server — Task 7	22
2.10 Validate the Port Channel — Task 8	27
2.10.1 Start Storage Traffic	27
2.10.2 Load Balance, Failover/Failback	27
Chapter 3: Conclusion	31
Revision History	32
X6-FCoE-UG100; April 10, 2018	32

# **Chapter 1: Introduction**

Users have two options when connecting Fibre Channel storage to Cisco UCS through an enterprise SAN. The options are either the native FC in NIPV mode or the Fibre Channel over Ethernet (FCoE) protocol.

With the Brocade<sup>®</sup> port blade FC32-64, both options are available along with different FC and FCoE data rates.

This document provides a best practice configuration for deployment of a Cisco UCS using the FCoE option in the Brocade FC32-64. The test configuration uses redundant 40G FCoE links between a Cisco FI 63xx and a Brocade FC32-64. The Brocade FC32-64 supports several other configurations that are out of scope for this deployment guide.

This guide is intended for experienced network and SAN administrators who are familiar with configuring and maintaining a Cisco UCS and Brocade Fabric OS<sup>®</sup> (FOS) switches.

# 1.1 Topology

The topology used to develop this best practice guide is shown in Figure 1.

A Cisco UCS B-series chassis is connected to two FI-6332-16UP on ports 1 through 4.

From each FI, ports 35 and 36 are configured as FCoE uplinks connected to port 9/0 and 9/4 on the FC32-64 port blade in Fabric A and Fabric B. The FCoE links are then aggregated into two port channels, one for each FI/SAN fabric. Each of the links in the port channel is 40GE for a total bandwidth of 80 Gb/s.

An FC storage array is connected to port 6/8 in each FC fabric.

#### Figure 1: Topology Used in the Configuration



Table 1 lists the details for each component in the topology:

#### Table 1: Details of the Topology Components

Vendor	Model	Firmware	Description
Cisco	5108	3.1(2e)A	UCS chassis
Cisco	B200 M3	3.1(2e)A	Blade server
Cisco	6332 16UP	5.0(3)N2(3.12e)	Fabric interconnect
Cisco	QSFP 40G SR BD	N/A	40G Ethernet BiDi optic
Brocade	X6	FOS 8.2.0	SAN director chassis
Brocade	FC32-64	FOS 8.2.0	SAN director port blade
Brocade	QSFP 40G SRBD	N/A	40G Ethernet BiDi optic

# **Chapter 2: Tasks**

A number of tasks must be performed on both the Cisco UCS/FIs and the Brocade X6/FC32-64 before configuring the uplink. These tasks are covered below.

# 2.1 Prerequisite Checklist

### 2.1.1 Cisco UCS

- 1. Install the correct SFP/QSFP. Refer to Table 1.
- 2. Connect the cables from the Cisco FI to the Brocade X6's FC32-64 blade.
- 3. Configure the ports on the Cisco FI as FCoE uplinks.
- 4. Create a VSAN with an FCoE VLAN for each connected Brocade FC fabric.
- 5. Create two vHBAs in a service profile, and assign each vHBA to the VSAN created for FCoE in the previous step.
- 6. The service profile should be associated to all servers that are running FCoE.
- 7. An OS has been installed in the blade server with the Multipath I/O (MPIO) application installed.

#### 2.1.2 Brocade X6

- 1. Insert the Brocade FC32-64 blade in the X6 chassis.
- 2. Upgrade both X6 chassis to FOS 8.2.0 or later.
- 3. Install the correct SFP/QSFP. Refer to Table 1.
- 4. Connect the cables between the Cisco FI and the Brocade FC32-64 blade.
- 5. Connect the FC storage, and assign a LUN to each fabric.

# 2.2 Configuration Overview

In the sections that follow, we will cover the tasks needed to provision FCoE, enable the port channel, and allocate storage to the blade server. In addition, we show the tasks to validate port channel redundancy and traffic load balancing across the links. Listed below are the configuration tasks:

- Task 1: Check the Brocade Blade Identity.
- Task 2: Configure Ports on the Brocade Blade.
- Task 3: Configure the Port Channel for the Brocade Blade.
- Task 4: Configure the Port Channel for Cisco FI Uplinks.
- Task 5: Validate Connectivity and FC Login.
- Task 6: Define Fabric Zones on the Brocade X6.
- Task 7: Mount LUNs to a Host on the Cisco UCS.
- Task 8: Run I/O from an FCoE Host to the FC Storage.

### 2.3 Identify the Blade on the Brocade X6 (FC32-64 Blade) — Task 1

The FC32-64 blade for the X6 chassis has ID 204. To verify the correct installation of the blade and its readiness for use, issue the slotshow command and look for ID 204.

```
FAB-A_X6:FID128:admin> slotshow
                                            FAB-B_X6:FID128:admin> slotshow
Slot
      Blade Type ID
                                            Slot
                                                   Blade Type ID
                        Status
                                                                     Status
_____
                                            _____
 1
      CP BLADE
                 175
                        ENABLED
                                              1
                                                   CP BLADE
                                                              175
                                                                     ENABLED
 2
      CP BLADE
                 175
                        ENABLED
                                              2
                                                   CP BLADE 175
                                                                     ENABLED
 3
                                              3
      UNKNOWN
                        VACANT
                                                   UNKNOWN
                                                                     VACANT
 4
      UNKNOWN
                        VACANT
                                              4
                                                   UNKNOWN
                                                                     VACANT
 5
      SW BLADE
                 178
                                              5
                        ENABLED
                                                   UNKNOWN
                                                                     VACANT
      SW BLADE
                                                   SW BLADE 178
 6
                 178
                                              6
                        ENABLED
                                                                     ENABLED
 7
      CORE BLADE 177
                                              7
                                                   CORE BLADE 177
                        ENABLED
                                                                     ENABLED
      CORE BLADE 177
                                                   CORE BLADE 177
 8
                        ENABLED
                                              8
                                                                     ENABLED
 9
                                              9
      SW BLADE
                 204
                        ENABLED
                                                   SW BLADE
                                                              204
                                                                     ENABLED
                                             10
10
      UNKNOWN
                        VACANT
                                                   UNKNOWN
                                                                     VACANT
11
      UNKNOWN
                        VACANT
                                             11
                                                   UNKNOWN
                                                                     VACANT
                                             12
12
      UNKNOWN
                        VACANT
                                                   UNKNOWN
                                                                     VACANT
```

### 2.4 Configure Ports on the Brocade X6 (FC32-64 Blade) — Task 2

Before configuring the ports on the FC32-64 blade, you must provision VF\_Ports (for FCoE) on the X6 director. The nomenclature is "enode" (per the standard specification).

#### 2.4.1 VF\_Port or Enode

Each logical VF\_Port/enode supports an individual FCoE uplink. The maximum number of the VF\_Ports supported on the Brocade X6 is 1600. The index (the first column in the switchshow command output) always starts at 1800. When the VF port is first created, it does not have an address (PID). Once there is a FLOGI, the enode is assigned a PID from a special pool.

- **NOTE:** If you have more uplinks than the number of VF\_Ports/enodes created, an error message is generated in RASLOG showing no more VF\_Port available for login.
- NOTE: No matter how many links in a port channel, it still counts as one uplink and consumes only one enode.

We create 10 enodes in our example, which means that we can now support a total of 10 FCoE port channels on the chassis. We use the following command to create 10 enodes in FC Fabric-A.

FAB-A\_X6:FID128:admin> fcoe --config -enodes 10

Validate that 10 enodes have been created. The following output shows that 10 enodes have been created (output truncated) and that their index is from 1800 to 1809:

FAB-A\_X6:FID128:admin> switchshow | grep -i fcoe 1800 -1 1800 \_\_\_\_\_ \_ \_ \_\_\_ Offline FCoE -1 1801 \_\_\_\_ --1801 \_ \_ Offline FCoE -1 1802 \_\_\_\_\_ \_ \_ \_ \_ Offline 1802 FCOE . . .

-1	1807				Offline	FCoE
-1	1808				Offline	FCoE
-1	1809				Offline	FCoE
	-1 -1 -1	-1 1807 -1 1808 -1 1809	-1 1807 Offline -1 1808 Offline -1 1809 Offline			

Issue the same commands to create and verify 10 enodes on Fabric-B.

#### 2.4.2 Ethernet Port Mode

By default, all ports on the Brocade FC32-64 blade are configured to support the FC protocol. To change the port mode to support the Ethernet protocol, perform the following steps for both Fabric-A and Fabric-B.

```
FAB-A_X6:FID128:admin> portdisable 9/0-3FAB-B_X6:FID128:admin> portdisable 9/0-3FAB-A_X6:FID128:admin> portdisable 9/4-7FAB-B_X6:FID128:admin> portdisable 9/4-7
```

As noted in the topology, we will use port 9/0 and 9/4 in both FC fabrics. Disable the ports before provisioning them for Ethernet. Issue the following command to disable them.

**NOTE:** The Brocade FC32-64 blade has 16 physical QSFP ports. Each QSFP port supports breakout connectivity to 4 individual ports for a total of 64 ports. When a port is used as 40GE, it takes the group of 4 ports; therefore, we need to disable all 4 ports in the group. In this case, we use ports 0-3 and ports 4-7. Only the first port (port 0 and port 4) in the group must be configured. All other ports (ports 1-3 and ports 5-7) in the group are automatically set in a persistently disabled state.

In the following, we go through the configuration and validation of the ports for Fabric-A and Fabric-B.

Configuring 9/0 and 9/4 as Ethernet ports in Fabric-A:

```
FAB-A_X6:FID128:admin> portcfgflexport --proto eth 9/0
Success: Ports 9/0,9/1,9/2,9/3 are configured as port type ETH
FAB-A_X6:FID128:admin> portcfgflexport --proto eth 9/4
Success: Ports 9/4,9/5,9/6,9/7 are configured as port type ETH
```

Configure ports 9/0 and 9/4 as Ethernet ports in Fabric-B as well.

Enable port 9/0 in Fabric-A, and verify that it comes up as an Ethernet port (output truncated).

```
FAB-A_X6:FID128:admin> portenable 9/0
FAB-A_X6:FID128:admin> switchshow
. . .
 64
      9
          0
              024000
                       ___
                            40G
                                    No_Module ETH
                                    No_Module ETH Disabled (Persistent) (QSFP Secondary port)
  65
      9
          1
              024100
                      _ _
                            40G
      9
          2
             024200
                       --
                            40G
                                    No_Module ETH Disabled (Persistent) (QSFP Secondary port)
  66
  67
     9
         3 024300
                      _ _
                            40G
                                    No Module ETH Disabled (Persistent) (QSFP Secondary port)
. . .
```

Enable port 9/4 in Fabric-A, and verify that it comes up as an Ethernet port (output truncated).

```
FAB-A_X6:FID128:admin> portenable 9/4
FAB-A_X6:FID128:admin> switchshow
. . .
  68
        9
            4
                024400
                                40G
                                      No_Module
                          ___
                                                   ETH
        9
            5
                                                   ETH Disabled (Persistent (QSFP Secondary port)
  69
                024500
                                40G
                                      No_Module
                         _ _
  70
        9
                024600
                                40G
                                      No_Module
           6
                         _ _
                                                   ETH Disabled (Persistent (QSFP Secondary port)
   71
        97
                024700
                                40G
                                      No_Module
                                                   ETH Disabled (Persistent) (QSFP Secondary port)
                         _ _
. . .
```

Do the same in Fabric-B.

#### 2.4.3 FCoE VLAN

In the Brocade X6, the default FCoE VLAN ID is 1002. Create an FCoE VLAN to match the one created in the Cisco UCS environment as noted in the topology earlier.

Issue the following commands to create VLAN 1111 in Fabric-A and verify its presence.

FAB-A_X6 FAB-A_X6	FID128:ad FID128:ro	min> fco ot> fcoe	econfig -v show -fabr:	lan 1111 ic	
VLAN	VFID	====== Pri	======================================	FKA	Timeout
1111	128[D]	==== 3[D]	0xefc00[D]	8000[D]	Enabled[D]

Issue the following commands to create VLAN 2222 in Fabric-B and verify its presence.

FAB-B_X6: FAB-B_X6:	FID128:adm FID128:root	in> fcoe :> fcoe -	config -vla show -fabric	an 2222 2	
======================================	VFID	 Pri	FCMAP	FKA	Timeout
2222	128[D]	3[D]	0xefc00[D]	8000[D]	Enabled[D]

- **NOTE:** Brocade FOS version 8.2.0 supports only one FCoE VLAN. If you create a new VLAN, it will override the existing one.
- **NOTE:** Once you have created a port channel, you cannot change the VLAN configuration. To change the VLAN ID, first unprovision or delete any existing port channels; otherwise, an error message similar to following appears.

FAB-A\_X6:FID128:admin> fcoe --config -vlan 1111 VLAN change not allowed if switch having any fcoe enabled port(s) or portchannel(s).

# 2.5 Configure the Port Channel on the Brocade X6 (FC32-64 Blade) — Task 3

Brocade FC32-64 blades support only dynamic port channel (LACP) (not static port channel). The port channel can span multiple blades within an X6 chassis, but it cannot span multiple X6 chassis or virtual fabrics.

We issue the following command on the Brocade X6 to create a port channel named Fab\_A\_PO11 on Fabric-A, and then we include ports 9/0 and 9/4 to be part of the port channel and verify.

FAB-A\_X6:FID128:admin> portchannel --create Fab\_A\_PO11 -type dynamic -key 11 -speed 40G

FAB-A\_X6:FID128:admin> portchannel --add Fab\_A\_PO11 -port 9/0
FAB-A\_X6:FID128:admin> portchannel --add Fab\_A\_PO11 -port 9/4

FAB-A\_X6:FID128:admin> portchannel --show

Name	Туре	Oper-State	Port-Count	Member	Ports
Fab_A_P011	Dynamic	Offline	2	9/0,9/	/ 4

Create a port channel on Brocade Fabric-B.

After creating the port channels, you must enable them on the Brocade X6 in Fabric-A and Fabric-B.

Issue the following commands to enable and verify port channel Fab\_A\_PO11 in Fabric-A with both ports 9/0 and 9/4. Notice that the "Operating State" is "Offline" because the port channel has not yet been configured and enabled on the Cisco FIs.

```
FAB-A_X6:FID128:admin> portchannel --enable Fab_A_P011
FAB-A_X6:FID128:admin> portchannel --show -detail
Name :Fab_A_P011
Type :Dynamic
Key :11
Speed :40G
Autoneg :Off
Admin-state: Enable
Oper-state : Offline
 Admin Key: 0011 - Oper Key 0011
 LACP System ID: 0x8000,c4-f5-7c-2d-a6-22
 PART System ID: 0x0000,00-00-00-00-00
 Portchannel Member count = 2
 Port
             Oper state
                         Sync
                                   Timeout
  _____
  9/0
             Offline
                            0
                                   Long
  9/4
             Offline
                            0
                                   Long
```

Run the same commands to enable and verify port channel Fab\_B\_PO22 in Fabric-B.

Finally you must provision the port channel to be in UCS mode in order to interoperate with the Cisco FCoE port channel.

Issue the following commands to provision the port channel with "ucs" mode in Fabric-A, and verify.

```
FAB-A_X6:FID128:admin> fcoe --enable -portchannel Fab_A_PO11 ucs
Enabling UCS mode will disable VNPort KA on the port
Would you like to continue [y/n]?: y
```

FAB-A\_X6:FID128:admin> fcoe --show -provisionDomainPort(s)/Portchannel(s)2Fab\_A\_P011UCS

```
Total number of port(s) = 1
```

Do the same for Fabric-B and verify.

### 2.6 Configure the Port Channel on the Cisco FI — Task 4

We now go through the steps to configure a port channel for ports 35 and 36 on the FI connected to Fabric-A, as shown in the topology.

- **NOTE:** Enabling the port channel is recommended in order to increase bandwidth, load balancing, and high availability; however, it is not required.
- **NOTE:** Depending on which UCS Manager interface is used, the UI may look different. In this document, we use the UCS Manager HTML interface (not Java based).

The sequence of configuration steps needed to enable the port channel using Cisco UCS Manager is covered next.

1. From the Cisco UCS Manager (UCSM) main screen, click the SAN icon on the left pane under SAN Cloud > Fabric A, right-click FCoE Port Channels, and select Create FCoE Port Channel.

cisco		UCS	S Manager					
	•	ŀ	All	•	SAN	/ S/	AN Cloud / Fabric	A / Uplink
		• S	AN		FCo	E Por	t Channels	
Equipmer		•	SAN Cloud		+	-	Te Advanced Filter	♠ Export
			<ul> <li>Fabric A</li> </ul>		N	ame		Fabric ID
Servers			FC Port Channels	=	_			
			FCoE Port Channels			1217		
몲			Uplink FC Interfaces	Create FC	oE Port	Cha	nnel	
LAN	Ξ		<ul> <li>Uplink FCoE Interfaces</li> </ul>					
0		/	FCoE Interface 1/35	۵				
			FCoE Interface 1/36	۵				
SAN			VSANs					

2. On the next screen, enter ID: 11 and Name: Brocade\_A\_PO11 for Fabric-A, and click Next.



3. In the next window, under the **Ports** middle pane, hold down the **Shift** key to select both port 35 and port 36, click the right arrow (>>) to move them under the **Ports in the port channel** pane, and click **Finish**.



		Create FCoE Port Cha	annel					? ×
0	Set FCoE Port Channel Name	Ports				el		
0	Add Ports	Slot ID Aggr. Po Port	MAC		Slot ID	Aggr. Po	Port	MAC
	- 275,9491,949592	No data available			1	0	35	00:DE:F
				>>	1	0	36	00:DE:F
				<<				
				< Prev		at > 🔪 🧲	Finish	Cancel

4. Click **OK** in the confirmation window.



After creating the port channel, both port 35 and 36 will show up in the **FCoE Port-Channel 11** window, as shown below.

	All	SAN / SAN Cloud / Fab	ric A / FCoE	Port Channels /	FCoE Port-Channel 11						
Equipment	• SAN	General Ports	General Ports Faults Events Statistics								
		Ty Advanced Filter + E	xport 🖷 Prin	nt							
Ľ		Nama	Slot	Dort	Acar Port ID	Transport	Madium	Dole	Tupe	Locale	
Servers	FC Port Channels	Norre	5101	POIL	Aggi. Port ib	Hallaport	Mediain	NOID	Type	Localo	
	▼ FCoE Port Channels	FCoE Interface 1/35	1	35	0	Ether	San	Fcoe Uplink	Physical	External	
品	<ul> <li>FCoE Port-Channel 11 Brocade</li> </ul>	FCoE Interface 1/36	1	36	0	Ether	San	Fcoe Uplink	Physical	External	
LAN	FCoE Interface 1/35										
0	FCoE Interface 1/36										

Repeat the same steps to create a port channel for Fabric-B.

1. From the Cisco UCSM main screen, click the SAN icon on the left pane under SAN Cloud > Fabric B, right-click FCoE Port Channels, and select Create FCoE Port Channel.



2. In the next screen, enter ID: 22 and Name: Brocade\_B\_PO22 for Fabric-B, and click Next.

		Create FCoE Port Channel	? ×
0	Set FCoE Port Channel Name	ID : 22	
2	Add Ports	Name : Brocade_B_PO22	
			2
		s Prev Next > Finish Ca	ncel

3. In the next window, under the **Ports** middle pane, hold down the **Shift** key to select both port 35 and port 36, click the right arrow (>>) to move them under the **Ports in the port channel** pane, and click **Finish**.





4. Click **OK** in the confirmation window.



After creating the port channel, both port 35 and port 36 will show up in the FCoE Port-Channel 22 window, as shown below:

	All	SAN / SAN Cloud /	Fabric B / FCol	Port Channels / FCo	E Port-Channel 22					
Equipment	▼ SAN	General Ports	Faults	Events Statistics						
	▼ SAN Cloud	▼ <sub>ℓ</sub> Advanced Filter	🕈 Export 🛛 🖷 P	int						
U	Fabric A     Fabric B	Name	Slot	Port	Aggr. Port ID	Transport	Medium	Role	Туре	Locale
Servers	FC Port Channels	FCoE Interface	1	35	0	Ether	San	Fcoe Uplink	Physical	External
品	▼ FCoE Port Channels	FCoE Interface	1	36	0	Ether	San	Fcoe Uplink	Physical	External
LAN	<ul> <li>FCoE Port-Channel 22 Brocade_E</li> </ul>	-								
A	FCoE Interface 1/35									

# 2.7 Validate Connectivity and FC Login — Task 5

The port channel configuration is now completed on both sides (Cisco FI and Brocade X6). Now validate that the port channels have formed and that connectivity is established.

 From the Cisco UCSM main window, select the SAN icon on the left pane under SAN Cloud > Fabric A, and select FCoE Port-Channel 11 Brocade\_A\_PO11. In the right pane, click the General tab, and verify Physical PC State: Up and FCoE PC State: Up.



Perform the same steps to verify that the FCoE port channel is connected to Fabric-B.

2. Verify that the port channels are up and operational on the Brocade X6 Fabric-A by issuing the portchannel --show command, and check for Admin-state: Enable and Oper-state: Online.

```
FAB-A_X6:FID128:admin> portchannel --show Fab_A_P011
Name :Fab_A_PO11
Type :Dynamic
Key :11
Speed :40G
Autoneg :Off
Admin-state: Enable
 Oper-state : Online
 Admin Key: 0011 - Oper Key 0011
 LACP System ID: 0x8000,c4-f5-7c-2d-a6-22
 PART System ID: 0x8000,00-de-fb-b2-d9-65
 Portchannel Member count = 2
 Port
               Oper state
                                       Timeout
                               Sync
              _____
  *9/0
               Online
                               1
                                       Long
   9/4
               Online
                               1
                                       Long
```

Verify the same on Fabric-B.

```
FAB-B_X6: :FID128admin> portchannel --show Fab_B_P022
Name :Fab_B_PO22
Type :Dynamic
Key :22
Speed :40G
Autoneg :Off
Admin-state: Enable
Oper-state : Online
 Admin Key: 0022 - Oper Key 0022
 LACP System ID: 0x8000,c4-f5-7c-64-5b-62
 PART System ID: 0x8000,00-de-fb-b2-cc-65
 Portchannel Member count = 2
 Port
              Oper state
                             Sync
                                     Timeout
  _ _ _ _ _ _
       _____
 *9/0
              Online
                             1
                                     Long
  9/4
              Online
                             1
                                     Long
```

3. With the port channel up and operational, verify the FIs using LLDP. Issue the following command on Brocade X6 Fabric-A to display its LLDP neighbor information.

FAB-A_X6:FI	D128:admin> lldp	show -nbr					
Local Intf	Dead Interval	Remaining Life	Remote Intf	Chassis ID	Tx	Rx	System Name
9/0	120	93	Eth1/35	00de.fbb2.d85c	142	144	SA-UCS-FI-A
9/4	120	94	Eth1/36	00de.fbb2.d85d	142	144	SA-UCS-FI-A

Showing LLDP neighbor information from the Brocade X6 Fabric-B telnet session.

FAB-B_X6:	AB-B_X6:FID128:admin> lldpshow -nbr									
Local Intf	Dead Interval	Remaining Life	Remote Intf	Chassis ID	Tx	Rx	System Name			
9/0	120	116	Eth1/36	00de.fbb2.cb5d	103	105	SA-UCS-FI-B			
9/4	120	94	Eth1/35	00de.fbb2.cb5c	93	95	SA-UCS-FI-B			

4. Now verify FC device login. Issue the following command to show FCoE devices in Brocade X6 Fabric-A. In the test environment, there is a Cisco UCS B-Series with two blade servers. Each blade server is configured with two vHBAs, and each connects to a different fabric. Here, Fabric-A shows one N\_Port with two NPIV devices representing two blade servers.

_X6:F	ID128:	admin> swi	tchs	how   gre	ep -i fcoe	more		
-1	1800	027040			Online	FCoE VF-Port	1 N Port + 2 NPIV public	2
-1	1801				Offline	FCOE		
-1	1802				Offline	FCOE		
-1	1803				Offline	FCOE		
-1	1804				Offline	FCOE		
-1	1805				Offline	FCOE		
-	_X6:F -1 -1 -1 -1 -1 -1 -1	_X6:FID128: -1 1800 -1 1801 -1 1802 -1 1803 -1 1804 -1 1805	_X6:FID128:admin> swi -1 1800 027040 -1 1801 -1 1802 -1 1803 -1 1804 -1 1805	_X6:FID128:admin> switchsl -1 1800 027040 -1 1801 -1 1802 -1 1803 -1 1804 -1 1805	_X6:FID128:admin> switchshow   gre -1 1800 027040 -1 1801 -1 1802 -1 1803 -1 1804 -1 1805	_X6:FID128:admin> switchshow   grep -i fcoe   -1 1800 027040 Online -1 1801 Offline -1 1802 Offline -1 1803 Offline -1 1804 Offline -1 1805 Offline	_X6:FID128:admin> switchshow   grep -i fcoe   more -1 1800 027040 Online FCoE VF-Port -1 1801 Offline FCoE -1 1802 Offline FCoE -1 1803 Offline FCoE -1 1804 Offline FCoE -1 1805 Offline FCoE	_X6:FID128:admin> switchshow   grep -i fcoe   more -1 1800 027040 Online FCoE VF-Port 1 N Port + 2 NPIV public -1 1801 Offline FCoE -1 1802 Offline FCoE -1 1803 Offline FCoE -1 1804 Offline FCoE -1 1805 Offline FCoE

Verify the same output in Fabric-B.

FAB-B	_X6:F	ID128:	admin> swi:	tchs	how   g	rep -i fcoe	more		
1800	-1	1800	017040			Online	FCoE VF-Port	1 N Port +	2 NPIV public
1801	-1	1801				Offline	FCOE		
1802	-1	1802				Offline	FCOE		
1803	-1	1803				Offline	FCOE		
1804	-1	1804				Offline	FCOE		
1805	-1	1805				Offline	FCOE		

5. Also verify that the devices are showing up in the port channel by issuing the following command in Brocade X6 Fabric-A. The first item in the device list is the N Port, and the next two items are the NPIV devices.

FAB-A\_X6:FID128:admin> fcoe --show -login portchannel Fab\_A\_PO11

======================================	Eth-port/LAG	Device WWN	Device MAC	Session MAC
======================================	Fab_A_P011 Fab_A_P011 Fab_A_P011 Fab_A_P011	22:c6:00:de:fb:b2:d8:ff 20:00:00:25:b5:00:00:01 20:00:00:25:b5:00:00:03	00:de:fb:b2:d8:63 00:de:fb:b2:d8:63 00:de:fb:b2:d8:63 00:de:fb:b2:d8:63	<pre>e:fc:00:02:70:40 0e:fc:00:02:70:41 0e:fc:00:02:70:42</pre>

```
Total number of Login(s) = 3
```

Verify the devices in the port channel in Fabric-B.

```
      FAB-B_X6:FID128:admin> fcoe --show -login portchannel Fab_B_PO22

      FCOE VF-Port
      Eth-port/LAG
      Device WWN
      Device MAC
      Session MAC

      1800
      Fab_B_PO22
      22:c7:00:de:fb:b2:cb:ff
      00:de:fb:b2:cb:63
      0e:fc:00:01:70:40

      1800
      Fab_B_PO22
      20:00:00:25:b5:01:00:00
      00:de:fb:b2:cb:63
      0e:fc:00:01:70:41

      1800
      Fab_B_PO22
      20:00:00:25:b5:01:00:01
      00:de:fb:b2:cb:63
      0e:fc:00:01:70:42
```

```
Total number of Login(s) = 3
```

#### 2.8 Create Zoning on the Brocade X6 (FC32-64 Blade) — Task 6

Once the FC device WWNs show up in Brocade X6 fabrics, you can create the fabric zoning between the FCoE host devices and the FC storage. In any large enterprise environment, Brocade's best practice is to use peer zoning to limit the zoning entries/size, which dramatically reduces RSCN handling for any device changes.

**NOTE:** Peer zoning is not required for FCoE-connected devices. You can also use traditional single initiator-target (or multi-) zoning. For larger deployments, peer zoning is strongly recommended.

Perform the following steps to implement peer zoning.

 As a best practice, create aliases for devices in Fabric-A, two for the vHBA in the blade servers and one for the storage port.

```
FAB-A_X6:FID128:admin> alicreate "FI247a_SVR1_HBA1", "20:00:00:25:b5:00:00:01"
FAB-A_X6:FID128:admin> alicreate "FI247a_SVR3_HBA1", "20:00:00:25:b5:00:00:03"
FAB-A_X6:FID128:admin> alicreate "X6a_Storage1a", "52:4a:93:7f:35:f7:11:10"
```

Also create aliases for the devices in Fabric-B, two for the vHBA in the blade servers and one for the storage port.

FAB-B\_X6:FID128:admin> alicreate "FI247b\_SVR1\_HBA2", "20:00:00:25:b5:01:00:00" FAB-B\_X6:FID128:admin> alicreate "FI247b\_SVR3\_HBA2", "20:00:00:25:b5:01:00:01" FAB-B\_X6:FID128:admin> alicreate "X6b\_Storage1b", "52:4a:93:7f:35:f7:11:00"

2. Then create peer zoning in Fabric-A with the storage port as a principal and two vHBAs as members.

```
FAB-A_X6:FID128:admin> zonecreate --peerzone FI247a_Peerzonel -principal
"X6a_Storage1a" -members "FI247a_SVR1_HBA1; FI247a_SVR3_HBA1"
```

Create peer zoning in Fabric-B with the storage port as a principal and two vHBAs as members.

```
FAB-B_X6:FID128:admin> zonecreate --peerzone FI247b_Peerzone1 -principal
"X6b_Storage1b" -members "FI247b_SVR1_HBA2; FI247b_SVR3_HBA2"
```

3. Add peer zoning to the zone configuration, and enable it.

#### Adding peer zoning to the Fabric-A zone configuration:

FAB-A\_X6:FID128:admin> cfgadd "Brocade-Fabric-A", "FI247a\_Peerzone1"

FAB-A\_X6:FID128:admin> cfgenable "Brocade-Fabric-A" You are about to enable a new zoning configuration. This action will replace the old zoning configuration with the current configuration selected. If the update includes changes to one or more traffic isolation zones, the update may result in localized disruption to traffic on ports associated with the traffic isolation zone changes. Do you want to enable 'Brocade-Fabric-A' configuration (yes, y, no, n): [no] y zone config "Brocade-Fabric-A" is in effect Updating flash ...

#### Adding peer zoning to the Fabric-B zone configuration:

FAB-B\_X6:FID128:admin> cfgadd "Brocade-Fabric-B", "FI247b\_Peerzone1"

FAB-B\_X6:FID128:admin> cfgenable Brocade-Fabric-B You are about to enable a new zoning configuration. This action will replace the old zoning configuration with the current configuration selected. If the update includes changes to one or more traffic isolation zones, the update may result in localized disruption to traffic on ports associated with the traffic isolation zone changes. Do you want to enable 'Brocade-Fabric-B' configuration (yes, y, no, n): [no] y zone config "Brocade-Fabric-B" is in effect Updating flash ... 4. Verify the current zoning configuration.

**NOTE:** Output is truncated to highlight the new peer zoning added. Your zoning output may include other entries when added to an existing configuration.

Verify the current zoning configuration in Fabric-A.

Verify the current zoning configuration in Fabric-B.

5. Lastly, check the peer zoning members.

You will see that the storage port is being dedicated as a principal and that the other two vHBA WWNs are being labeled as members of the peer zoning.

Verify the peer zoning in Fabric-A.

```
FAB-A_X6:FID128:admin> zoneshow --peerzone all
Defined configuration:
zone: FI247a_Peerzone1
  Property Member: 00:02:00:00:00:03:01:01
  Created by: User
  Principal Member(s):
                X6a_Storagela
   Peer Member(s):
                FI247a_SVR1_HBA1; FI247a_SVR3_HBA1
Effective configuration:
zone: FI247a_Peerzone1
   Property Member: 00:02:00:00:00:03:01:01
   Created by: User
  Principal Member(s):
                52:4a:93:7f:35:f7:11:10
   Peer Member(s):
                20:00:00:25:b5:00:00:01
                20:00:00:25:b5:00:00:03
1 Peer Zones in Eff Cfg
```

#### Verify the peer zoning in Fabric-B.

```
FAB-B_X6:FID128:admin> zoneshow --peerzone all
Defined configuration:
zone: FI247b_Peerzone1
  Property Member: 00:02:00:00:00:03:01:01
  Created by: User
  Principal Member(s):
                X6b_Storage1b
   Peer Member(s):
                FI247b_SVR1_HBA2; FI247b_SVR3_HBA2
Effective configuration:
 zone: FI247b_Peerzone1
  Property Member: 00:02:00:00:00:03:01:01
   Created by: User
  Principal Member(s):
                52:4a:93:7f:35:f7:11:00
   Peer Member(s):
                20:00:00:25:b5:01:00:00
                20:00:00:25:b5:01:00:01
1 Peer Zones in Eff Cfg
```

# 2.9 Mount LUNs to a Host on the Cisco UCS Blade Server — Task 7

After device zoning is completed in both Fabric-A and Fabric-B, assigned LUN(s) from storage should be visible to the host OS in the UCS blade server.

**NOTE:** LUN provisioning steps on the storage array are not shown.

The following is an illustration of how LUN provisioning has been done in this environment.

The WWN of blade server 1 has been added to a host group.

	FORAGE		
DASHBOARD	STORAGE	PROTECTION ANALYSIS SYSTEM MESSAGES	
Hosts	+	▼ JCS-FI247-SRV1   Provisioned 10.00 G >100 to 1	
▶ Volumes	+	Volumes 36.21 M 0	
	Connected Volumes (1)     Host Ports (2)     Protection (0)     Details (0)       PORT		
		20:00:00:25:B5:00:00:01	

A 10G LUN has been provisioned and assigned to this host group.

	ORAGE							
DASHBOARD	STORAGE	PROTECTION ANALYSIS	SYSTEM MESSAGES					
→ Hosts	+	▼ 🖙 UCS-FI247-SRV1   Prov 10.0	visioned Total Reduction 00 G >100 to 1					
▹ Volumes	+							
		Volumes 36.21 M 0						
		Connected Volumes (1) Host Ports	(2) Protection (0) Details (0)					
		NAME						
		0CS-FI247-L01						

In this environment, a VMware ESXi is installed in the blade server. The following are the steps to validate access to the LUN, create a data store, and provision a vDisk to a VM on the data store.

**NOTE:** In this section, we highlight only the validation of LUN access and do not go through a step-by-step configuration. If you have a different OS, your configuration will be different.

Using the vSphere Web Client to log in to the vCenter, which manages the ESXi servers.

<b>vm</b> ware <sup>.</sup>		
User name:	administrator@vsphere.local	VMware®vCenter™ Single Sign-On
Password:	•••••••	
	Use Windows session authentication	
	Login	

Once you log in to the vCenter, check that the newly added LUNs show up on each vHBA path.

Below, a 10-GB LUN shows under vmhba1.

vm Ware* vSphere Web Client ♠ = U   Administrator@VSPHERE.LOCAL -   Hel								
Navigator I	10.18.254.208 🧏 🔒 🕞	🛐 🔯 Actions 👻				=		
Back	Getting Started Summary Monitor	Configure Permissions VMs Resour	ce Pools Datastores	Networks				
	fi ✓ Storage	Storage Adapters			Q Filter	•		
<ul> <li>▼ 10.18.254.208</li> <li>₩ vm1</li> <li>■ 10.18.254.209</li> </ul>	Storage Adapters Storage Devices Datastores	Adapter Type Cisco VIC FCoE HBA	Status e Channel Online	Identifier 20:00:00:25:b5:00:00:00 20:00:0	0.25.b5.01.00.00	Targe*		
	Host Cache Configuration Protocol Endpoints Networking	Image: wide wide wide wide wide wide wide wide	e Channel Online	20.00.00.25.55.00.00.00 20.00.0	0:25:b5:00:00:01	1 *		
	Virtual switches VMkernel adapters Physical adapters TCP/IP configuration	Properties Devices Paths	•	Canacity Operation	G Filter	- Drive T		
	Advanced - Virtual Machines	PURE Fibre Channel Disk (naa.624a93.	1 disk	10.00 GB Attached	Supported	Flash		

And the same 10-GB LUN also shows on the other path, vmhba2.

Vm Ware* vSphere Web Client A = U Administrator@VSPHERE.LOCAL +   He									
Navigator	10.18.254.208	🛐 🔯 Actions 👻							=
Back	Getting Started Summary Monitor	Configure Permissions VI	Ms Resource	Pools Dat	tastores N	Vetworks			
<ul> <li>☑</li> <li>☑</li></ul>	tt → Storage	Storage Adapters							
	Storage Adapters	Adapter	Туре	1	Status	Identifier		Q Filter	Targe *
▶ ☐ 10.18.254.209	Storage Devices :: Datastores Host Cache Configuration	Cisco VIC FCoE HBA	Fibre Cl	annel	Online	20:00:00:25:b5:00:0	0:00 20:00:00	:25:b5:01:00:00	1
		💽 vmhba2	Fibre Cl	annel	Online	20:00:00:25:b5:00:00	0:00 20:00:00	25:b5:00:00:01	1
	Networking     Virtual switches	Adapter Details				-			
	VMkernel adapters	Properties Devices Pa	aths						
	Physical adapters	🗐 📑 🗐 🛛 🖓 All Act	tions 👻 👔 🕶					Q Filter	•
	TCP/IP configuration Advanced	Name PURE Fibre Channel Disk	(naa.624a93	LUN	Type 1 disk	Capacity 10.00 GB	Operational Attached	Hardware Acceleration Supported	Drive T Flash

#### Set Patch Selection Policy = Round Robin (VMware) on the new LUN.

vmware vSphere Web Clie	ent <b>A</b> ≣						0   Administrator	@VSPHERE	LOCAL 🕶   He
Navigator I	10.18.254.208 🏾 🏭 🛃 🕞	🛐 🐼 Actions 👻							=
Back	Getting Started Summary Monitor	Configure Permissions VMs Resour	ce Pool	s Datas	tores Netw	orks			
<ul> <li>✓ 10.18.254.230</li> <li>✓ 및 UCS-FCoE</li> </ul>	++	Storage Devices						Q. Filter	
⇒ ∎ 10.18.254.208	Storage Devices	Name	LUN	Туре	Capacity	Operational State	Hardware Acceleration	Drive Type	Transport
▶ 10.18.254.209	Datastores	PURE Fibre Channel Disk (naa.624a93	1	disk	10.00 GB	Attached	Supported	Flash	Fibre Channel
	Host Cache Configuration	Local SEAGATE Disk (naa.5000c5007	0	disk	279.40	Attached	Not supported	HDD	Parallel SCSI
	Protocol Endpoints Networking Virtual switches VMkernel adapters Physical adapters TCP/IP configuration Advanced Virtual Machines VM Startup/Shutdown Agent VM Settings Swap file location	Device Details           Properties         Paths           Partition Details         Partition Format           Partition Format         GPT           Primary Partitions         0           > Logical Partitions         0           Multipathing Policies         Path Selection Policy         Round Ro Storage Array Type Policy	bin (VM TP_ALU	ware) 📥		-		Edit M	Aultipathing

#### Now create a data store on the new LUN.

vmware <sup>®</sup> vSphere Web Client ♠≡							
Navigator I	10.18.254.208	🔄 🛃 🧔 Actions 👻					
Back	Getting Started Summary Monitor	Configure Permissions VMs	Resource Pools	Datastores Net	works		
<ul> <li>✓ ② 10.18.254.230</li> <li>✓ 🔂 UCS-FCoE</li> </ul>	•• Storage	Datastores	🎡 Actions 👻				
▽	Storage Adapters	Name	Status	1,000	Capacity		
10 18 254 200	Storage Devices	datastore1	Normal	VMFS 5	272 GB		
10.18.254.209	Datastores Host Cache Configuration	PURE1	🕑 Normal	VMFS 5	9.75 GB		

#### Configure a 2-GB LUN from this data store to a VM.

vmware vSphere Web Client त≡							
Navigator I	🗗 vm1 🛛 👰 🕨 🖾 🕼	🚱 Actions 👻					
A Back	Getting Started Summary Monitor	Configure Permissions	Snapshots Datastores Networks				
III III IIII IIIIIIIIIIIIIIIIIIIIIIII	"	VM Hardware					
▼ □ UCS-FCoE ▼ □ 10.18.254.208	VM Hardware	► CPU	2 CPU(s), 0 MHz used				
₩ vm1 [] 10.18.254.209	VM Options VM SDRS Rules	<ul> <li>Hard disk 1</li> </ul>	15.00 GB				
	vApp Options	2 00 GB					
	Guest User Mappings	VM storage policy					
	Policies Type	Thick provision lazy zeroed					
		Location	PURE1 (8.9 GB free)				
		Network adapter 1	VM Network (disconnected)				
		Ivideo card	4.00 MB				
		▶ Other	Additional Hardware				
		Compatibility	ESXi 6.5 and later (VM version 13)				

In this environment, we have deployed an Ubuntu VM. Log in to the VM, and issue the following command to check that the new 2-GB disk shows up.

root@ubuntu238:~# lsblk NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT sda 8:0 0 15G 0 disk â""â"€sdal 8:1 0 15G 0 part / sdb 8:16 0 2G 0 disk

# 2.10 Validate the Port Channel — Task 8

In order to validate the load balancing and redundancy of the port channels, we run continuous storage traffic from the VM that we provisioned.

### 2.10.1 Start Storage Traffic

In this environment, we have deployed an Ubuntu VM on the ESXi of a Cisco UCS blade server. From this VM, we use Medusa<sup>®</sup> Labs Test Tool (MLTT) to drive I/O toward the new disk, in this case /dev/sdb.

NOTE: Any other storage I/O generating tool can be used instead.

The base test command looks like this.

root@ubuntu238:~# maim --perf-mode -t8 -b4k -%r50 -Q16 -f/dev/sdb ... Creating I/O threads Target 1: '/dev/sdb' Size: 2GB / 0x80000000 LB Size: 512B Last LBA: 0x3FFFFF Inquiry: VMware Virtual disk 2.0 Starting I/O threads START: Fri Mar 2 13:14:34 2018 MAIM v3.6.1 (linux26-x64) 03/02/18 13:14:34: FILE:/dev/sdb File Size:10MB b:4KB t:8 1:17 Q:16 m:11 Test: Profile 00:00:00:05: FOPS: 66 IO/S: 36740.60 MB/s: 143.52 PEND: 117 CPU: 19 00:00:00:10: FOPS: 143 IO/S: 37898.00 MB/s: 148.04 PEND: 121 CPU: 18 00:00:00:15: FOPS: 216 IO/S: 38146.20 MB/s: 149.01 PEND: 118 CPU: 18

### 2.10.2 Load Balance, Failover/Failback

With I/O running on the VM on the Cisco UCS blade server, validate that traffic is distributed equally between the port channel in both fabrics (Fabric-A and Fabric-B). Also, verify the load balancing between the member links of a port channel.

1. From the Brocade X6 in Fabric-A, we see traffic on both port 9/0 and port 9/4. The running I/O profile is configured with 50% Read/Write, and we see evenly balanced traffic across both ports in both directions (Tx and Rx).

FAB-A_X6	FID128	:admin>	portpe	erfshow	9/0-9/4	l -tx -rx	2				
	0		1		2		3		4		
	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	
slot 9:	20.1m 0	20.9m	0 1	0	0 2	0	0 3	0	20.3m 4	19.6m	
	TX	RX	ТХ	RX	TX	RX	TX	RX	TX	RX	
slot 9:	20.3m 0	20.0m	0 1	0	0 2	0	0 3	0	20.7m 4	20.5m	
	TX	RX	TX ======	RX	TX	RX	TX	RX	TX	RX	
slot 9:	20.8m	21.0m	0	0	0	0	0	0	21.1m	20.5m	

On the Brocade X6 in Fabric-B, we also see the same amount of I/O throughput running on ports 9/0 and 9/4.

FAB-B_X6	:FID128	:admin>	portper	fshow 9	/0-9/4	-tx -rx				
	0		1		2		3		4	
	TX	RX	тх	RX	TX	RX	ТХ	RX	ТХ	RX
slot 9:	20.1m 0	20.4m	0 1	0	0 2	0	0 3	0	21.3m 4	20.2m
	TX	RX	TX	RX	TX	RX	ТХ	RX	TX	RX
slot 9:	21.1m 0	20.6m	0 1	0	0 2	0	0 3	0	20.6m 4	21.2m
	TX	RX	ТХ	RX	TX 	RX	TX	RX	TX	RX
slot 9:	19.3m	20.2m	0	0	0	0	0	0	21.Om	20.5m

FAR-R X6:FID128:admins portperfehow 9/0-9/4 -ty -ry

Verify redundancy of the port channels by failing a link member of the port channel in Fabric-A.
 In this case, port 9/0 in X6 Fabric-A is disabled; consequently, the traffic fails over to port 9/4, now carrying a double load

(output truncated). The time it takes to fail over is dependent on the SCSI timeout setting in the host OS or FC driver.

FAB-A	A_X6:1	FID128:a	admin> ]	portdisa	able 9/0	); portp	perfshow	v 9/0-9,	′4 -tx	r-rx	
		0		1		2		3		4	
		TX	RX	ТХ	RX	TX	RX	TX	RX	TX	RX
slot	9:	0	0	0	0	0	0	0	0	20.5m	21.0m
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
=====		=======		=======	=======						
slot	9:	0	0	0	0	0	0	0	0	20.6m	21.Om
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
===== slot	===== 9:	0	0	0	0	0	0	======= 0	===== 0	======= 170.5k	======================================
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
=====				=======							
slot	9:	0	0	0	0	0	0	0	0	200	100
=====	=====	=======	=======	=======	=======					=======	
slot	9:	0	0	0	0	0	0	0	0	800	600
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	ТХ	RX	TX	RX
=====	=====		=======	=======		=======	=======		======		========
slot	9:	0	0	0	0	0	0	0	0	26.5m	25.3m
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
=====	=====									41 0	
s⊥ot	9:	U	U	U	U	U	U	U	U	41.9m	43.Um

# 3. By re-enabling port 9/0 in Fabric-A, observe that the traffic falls back, load-balanced on both member links of the port channel (output truncated).

FAB-A	A_X6:	FID128:	admin>	portena	erfshow	9/0-9/4 -tx -rx					
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
slot	9:	0	0	0	0	0	0	0	0	38.8m	38.6m
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
===== slot	===== 9:	====== 0	0	0	0	====== 0	0	0	===== 0	40.5m	41.1m
•••											
=====		======	======		======	======	======	======	=====	========	
slot	9:	1.0k 5	00	0	0	0	0	0	0	200	1.4k
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
								======	=====		1 11-
SIOU	9.	13./K	5.4K	1	0	0	0	0	0	21.5K	I.IK
		0		1	<b></b>	2	<b></b>	3	<b></b>	4	5.11
		-1'X =======	RX ======	.TX ========	RX ========		RX ========		RX ======		RX ========
slot	9:	22.1m	21.6m	0	0	0	0	0	0	21.7m	21.3m
		0		1		2		3		4	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
=====		======	======		======	======	======	======	=====	========	
slot	9:	19.7m	19.8m	0	0	0	0	0	0	19.8m	19.8m
			DV		ъv		ъv	с ПV	DV	4	DV
		1A =======	кл ======	1A ========	кл =======	1A =======	кл =======	TV TV	кл =====	1X ========	кл =======
slot	9:	20.8m	20.9m	0	0	0	0	0	0	21.Om	20.7m

4. To validate redundancy across fabrics, fail both member links in the port channel in Fabric-A, and observe that the traffic fails over to Fabric-B (output truncated).

	_			1		,		,			
FAB-1	3_X(	6:FID128	3:admin>	portpe	erfshow	9/0-9/4	4 -tx -:	rx			
slot	9:	100 0	100	0 1	0	0 2	0	0 3	0	100 4	100
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
slot	9:	4.6m 0	4.6m	0 1	0	0 2	0	0 3	0	4.2m 4	4.4m
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
slot	9:	38.8m	37.2m	0	0	0	0	0	 0	38.3m	38.8m

FAB-A\_X6:FID128:admin> portdisable 9/0; portdisable 9/4

5. Re-enabling the links in Fabric-A redistributes traffic equally across both fabrics once the ports are back online. Shown below is Fabric-A after the links in the port channel are back online and traffic resumes on the port channel.

FAB-A	A_X A X	5:FID128 5:FID128	3:admin> 3:admin>	porte	nable 9/ erfshow	0; port 9/0-9/4	tenable 4 -tx -:	9/4 rx			
· · ·											
slot	9:	100 0 TX	100 RX	0 1 TX	0 RX	0 2 TX	0 RX	0 3 TX	0 RX	100 4 TX	100 RX
slot	9:	====== 100 0 TX	100 RX	0 1 TX	0 RX	0 2 TX	======= 0 RX	======= 0 3 TX	====== 0 RX	100 4 TX	100 RX
slot	9:	8.2m 0 TX	8.1m RX	0 1 TX	0 RX	0 2 TX	0 RX	0 3 TX	0 RX	8.3m 4 TX	7.9m
slot	9:	20.1m 0 TX	20.1m RX	0 1 TX	0 RX	0 2 TX	0 RX	0 3 TX	0 RX	20.7m 4 TX	20.2m RX
====: slot	===: 9:	22.Om	21.8m	====== 0	 0	0	 0	 0	====== 0	20.8m	21.0m

And the traffic in Fabric-B will return to normal as before. As you can see below, the traffic in Fabric-B was reduced by half after the port channel in Fabric-A resumed operation.

FAB-B\_X6:FID128:admin> portperfshow 9/0-9/4 -tx -rx

slot 9:	40.1m 0	40.2m	0 1	0	0 2	0	0 3	0	40.7m 4	39.8m
		RX ========		RX =======		RX =======		RX ======	=	RX ========
slot 9	41.0m 0	40.9m	0 1	0	0 2	0	0 3	0	39.5m 4	39.2m
	TX	RX	ΤX	RX	TX	RX	TX	RX	TX	RX
slot 9	26.6m 0	26.3m	0 1	0	0 2	0	0 3	0	26.6m 4	25.7m
	TX	RX	ΤX	RX	TX	RX	TX	RX	TX	RX
====== slot 9:	TX ======== 20.5m 0	RX ====================================	TX ====== 0 1	RX ======= 0	TX 	RX ======== 0	TX ======== 0 3	RX ====== 0	TX ======= 20.8m 4	RX ======= 20.1m
====== slot 9:	TX ======== 20.5m 0 TX	RX 20.3m RX	TX 0 1 TX	RX 0 RX	TX 0 2 TX	RX ======= 0 RX	TX 0 3 TX	RX ====== 0 RX	TX ====== 20.8m 4 TX	RX 20.1m RX

# **Chapter 3: Conclusion**

With the Brocade FC32-64 blade in the X6 director, users have the option to connect UCS FI uplinks with native Fibre Channel in NIPV mode or the Fibre Channel over Ethernet (FCoE) protocol.

With this best practice guide for deploying FCoE uplinks from the Cisco UCS to the Brocade SAN with the Brocade X6 (FC32-64 blade), the user is guided through configuration of FCoE uplinks with link aggregation (port channels), providing redundancy and load sharing of storage traffic. The steps outlined in the validation section demonstrate redundant FCoE port channels to dual FC fabrics and how to validate the configuration before entering production.

Broadcom

# **Revision History**

### X6-FCoE-UG100; April 10, 2018

Initial release.

