Configuring Dynamic FCoE Using FabricPath

This chapter contains the following sections:

Information About Dynamic FCoE Using FabricPath

Fibre Channel over Ethernet (FCoE) enables I/O consolidation. It permits both LAN and SAN traffic to coexist on the same switch and the same wire. This feature enables you to consolidate multiple separate networks into a single converged infrastructure.

Key values of I/O consolidation using traditional FCoE are as follows:

- Elimination of separate network infrastructures for SAN and LAN traffic.
- Reduction in hardware requirements, such as cabling and server interface cards (NICs and HBAs), and lowering capital expense.
- Reduction in power and cooling requirements for fewer physical assets.
- Increasing deployment agility for multiprotocol networks, which preserves long-term investments while preparing for future uncertainty in protocol needs.

By using FabricPath Ethernet technology, you can take FCoE consolidation even further:

- Create a logical, rather than physical, SAN A/B separation.

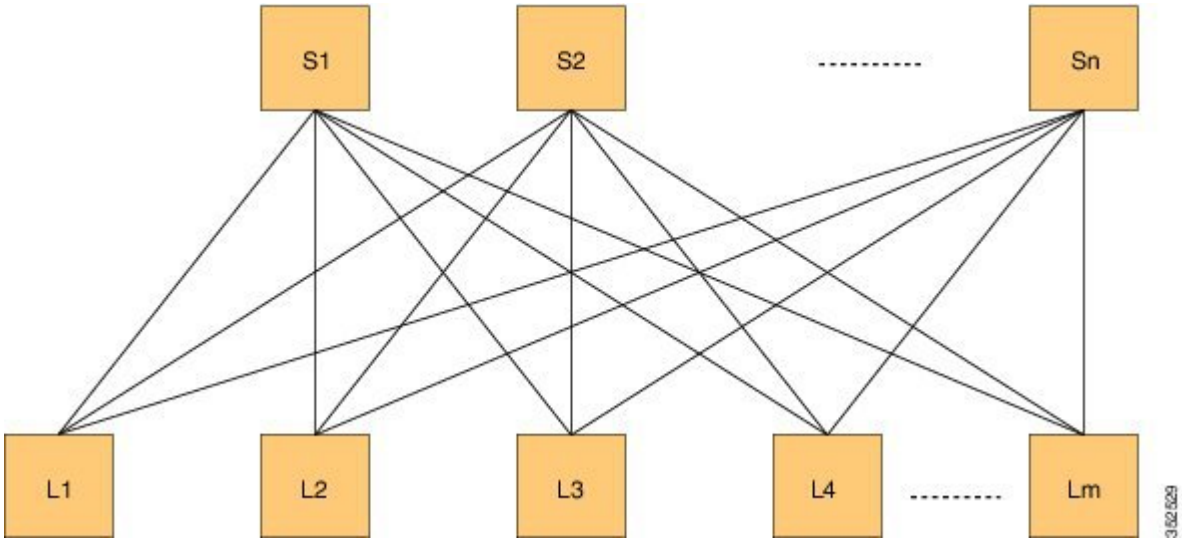
- Efficiently load balance multiprotocol traffic within the data center.
- Dynamically establish relationships between switches, reducing the possibility for human error during configurations.
- Improved high availability percentages as the scale increases.

The FabricPath architecture provides an inherent multipath capability with redundancy to handle node failures. Fabric level redundancy is provided through a double fabric model (SAN A/SAN B). The separation of the two SANs is logically implemented as two different VSANs that map to two different VLANs (VLAN A and B). Fibre channel traffic in SAN A becomes the FCoE traffic in VLAN A, the Fiber Channel traffic in SAN B becomes the FCoE traffic in VLAN B, and the LAN traffic is carried on one or more additional VLANs over the converged Ethernet infrastructure. In this logical environment, the VSAN A/VSAN B configuration protects against fabric-wide control plane failures.

The traditional method of hosts that connect to two separate SANs is still supported with the FCoE over FabricPath architecture. The host is connected to two different leaf nodes that host a disjointed set of VSANs. Beyond these leaf nodes, the fabric is converged on the same infrastructure, but the host continues to see two SAN fabrics.

The following figure shows a FabricPath topology with n spines (S) and m leafs (L). The m leafs communicate to each other through the n spines using FabricPath encapsulation.

Figure 1: FabricPath Topology



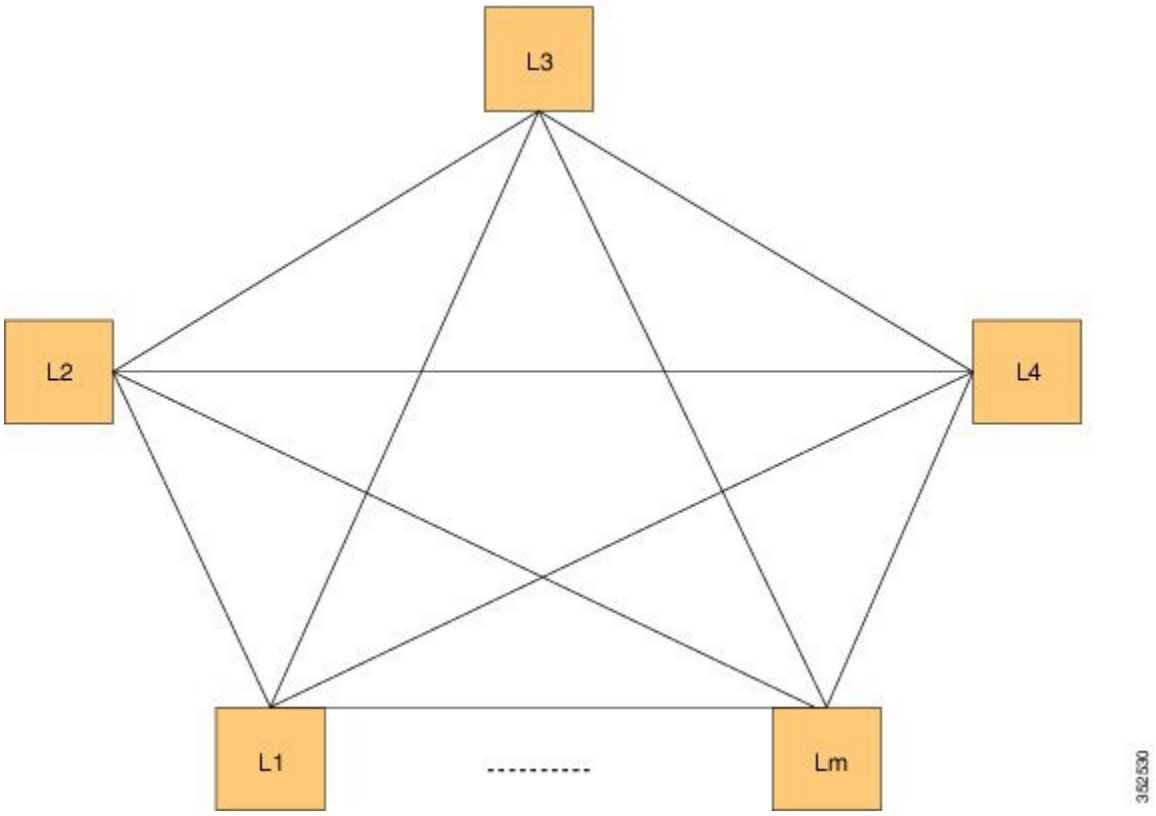
FCoE creates an overlay of FCoE virtual links on top of the underlying Ethernet topology, irrespective of how that Ethernet topology is constructed and which protocol is used to compute the MAC address routes.

In a dynamic FCoE environment, the topology is developed using the leafs as FCoE Forwarder (FCF) switches that are forwarded through transparent spines.

FCoE hosts and FCoE storage devices are connected to a FabricPath topology through the leaf switches. In this configuration, only the leaf switches perform FCoE forwarding (only the leaf switches behave as FCFs); the spine switches just forward MAC-in-MAC encapsulated Ethernet frames that are based on the outer destination MAC address.

The following figure shows the logical FCoE overlay topology of VE_Port to VE_Port virtual links on a FabricPath topology.

Figure 2: FCoE Overlay of VE_Port to VE_Port Virtual Links



Only the FCFs, that are implemented by the leaf switches are part of this overlay topology. This topology is seen by Fabric Shortest Path First (FSPF), for each FCoE VLAN. FSPF computes over which virtual link to forward an FCoE frame based on its DomainID (D_ID). A virtual link is uniquely identified by the pair of MAC addresses associated with the two VE_Ports logically connected by it. Identifying the virtual link is equivalent to identifying which MAC addresses to use for the FCoE encapsulation on the transport network.

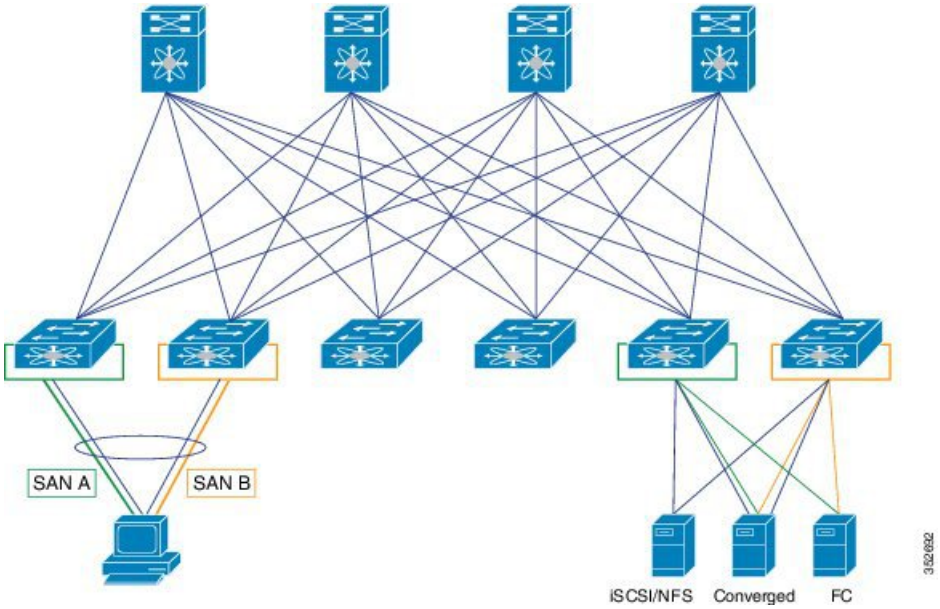
Use L_m as the number of leafs that are feature enabled. The feature might not be enabled on all leafs. The FCoE mesh is basically the leafs where FCoE or FabricPath is enabled.

SAN A/B Separation

For Dynamic FCoE, SAN A/B separation is realized in a logical manner across the backbone. As shown in the following illustration, physical SAN A/B separation is maintained from the FCF leafs to the end devices.

Beyond the leafs, FCoE traffic for SANs A and B are carried by FabricPath Equal Cost Multipathing (ECMP) links across all spines, maintaining logical SAN A/B separation.

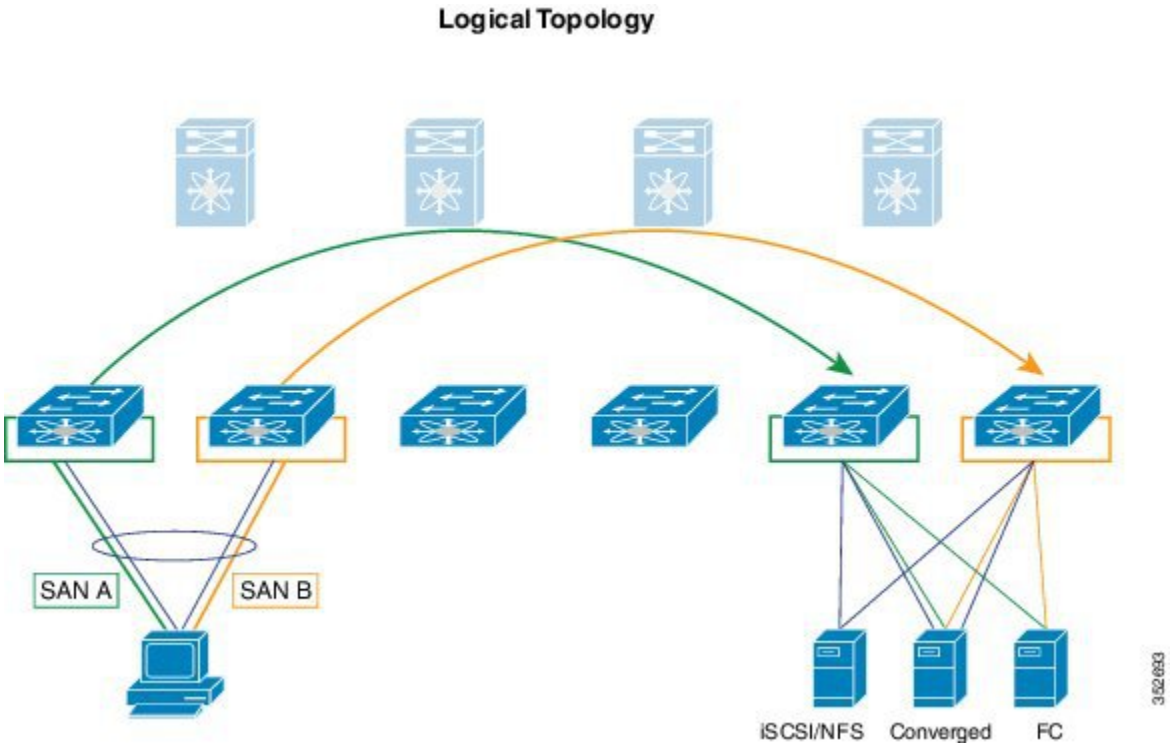
Figure 3: Physical Topology Diagram



In the previous figure, the physical connectivity for the topology follows typical leaf/spine CLOS architectural best practices. Logically, SAN A and SAN B are isolated at the Top of Rack (ToR) switches physically. Once

the traffic enters the FabricPath network, the storage traffic is logically separated (see the following figure) across the network where it is physically separated once more to the storage device edge.

Figure 4: Logical Topology Diagram



Dynamic FCoE gains the additional redundancy that is inherent in the FabricPath network by using the increased spine connectivity. A larger network with a large number of spines means increased reliability and stability for the storage network. This is achieved while retaining the best practices requirements for storage environments.

Load-Balancing FCoE Traffic on a Dynamic VFC

FabricPath provides redundant paths between a source and destination. Because FCoE traffic traverses the FabricPath network with one or more FCoE and non-FCoE nodes (spines, leafs), you must ensure in-order delivery through proper port-channel hashing across the redundant paths. All FabricPath nodes have port-channel hashing enabled that includes the exchange ID. Traffic from a single flow always traverses through only one set of nodes through the network to maintain in-order delivery.

Supported Dynamic FCoE Using FabricPath Topologies

The supported topologies for Dynamic FCoE Using FabricPath are as follows:

- FCoE devices that are directly connected to an FCF leaf
- Traditional FCoE VE_Port connectivity to an FCF leaf

- Legacy FC fabric connected to an FCF leaf
- NPV and FCoE NPV devices that are connected to an FCF leaf
- Native FC devices that are directly connected to an FCF leaf

Note Although physical separation is possible through a multi-topology configuration of FabricPath, it is not required.

Licensing Requirements for Dynamic FCoE Using FabricPath

The following table shows the licensing requirements for this feature:

Product	License Requirement
Fibre Channel over Ethernet	Feature FCoE license and feature FabricPath license for the leaf role.
FabricPath	Feature FabricPath for leaf.

Prerequisites for Dynamic FCoE Using FabricPath

Dynamic FCoE prerequisites are as follows:

- You must enable FabricPath.
- You must enable feature fcoe for the FCF leafs.
- You must assign the highest FabricPath cost to the MCT if there is a vPC+ MCT on the FCF leafs.
-
- You must enable mode fabric path on the VLANs that are mapped to VSANs in all the leaf nodes.

Guidelines and Limitations for Dynamic FCoE Using FabricPath

Dynamic FCoE Using FabricPath has the following guidelines and limitations:

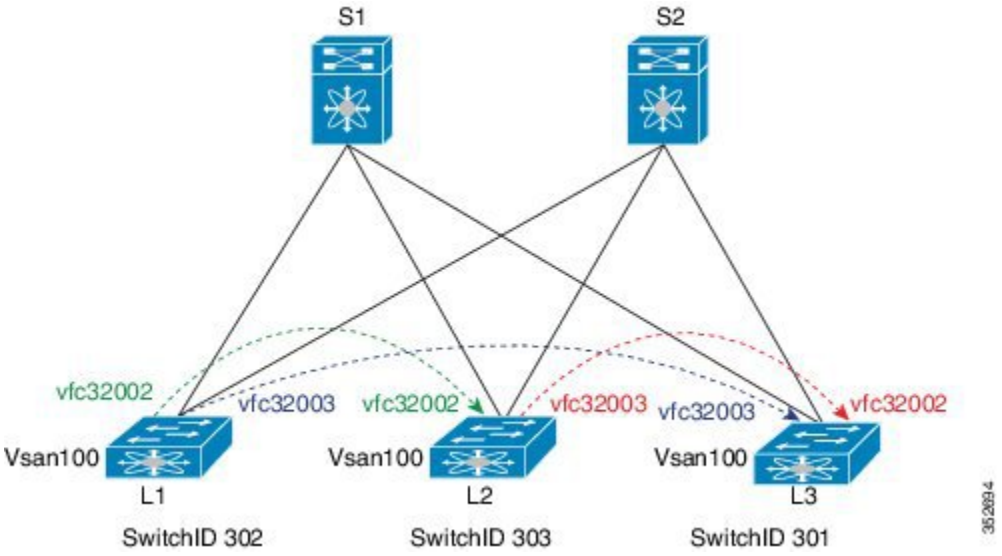
- You must enable feature FCoE on the FabricPath leaf node.
- You must enable mode FabricPath on FCoE VLANs used for storage traffic.
- The minimum number of switches for a FabricPath deployment is one switch. However, if you are going to have a separation of SAN A/B, you need to have two spine switches. Otherwise, there is no separation at all.
- You must statically define the FabricPath switch ID. Changing a switch ID is required for a dynamic vFC. Some traffic loss might occur during a switch ID change. We recommend that you statically configure switch IDs.

- A multichassis EtherChannel trunk (MCT) must be of the highest Intermediate System-to-Intermediate System (IS-IS) cost which is 16777215. FCoE VLANs do not come up as an MCT. Fabric IS-IS should be high so that FCoE/FTP traffic does not go through.
- You should ensure the following:
  - Define the FCoE VLAN in a separate topology and explicitly prune the MCT links.
  - Configure a higher cost on MCT to avoid using it for regular forwarding.
- Shutting a VFC dynamically is not recommended because a Layer 2 Multipathing (L2MP) loop might occur and result in traffic loss.
- If you want to take a certain data path for a VSAN, use a FabricPath multitopology in the Dynamic FCoE Using FabricPath topology.

Configuration Topology Example

The following figure represents the configuration example that will be described in the following sections.

Figure 5: Configuration Example



Note The component labels in the previous diagram are for illustrative purposes only.

Configuring Dynamic FCoE Using FabricPath

Procedure

Step 1 Establish the FabricPath infrastructure.
All spines and leafs must have FabricPath infrastructure configured. See Configuring All Leafs in the FabricPath Topology, on page 9.

Step 2 Configure spines for FCoE traffic.
See Configuring All Leafs in the FabricPath Topology, on page 9

Step 3 Configure non-FCoE leafs for FCoE traffic.
A leaf needs this configuration for failover cases. See Configuring All Leafs in the FabricPath Topology, on page 9.

Step 4 Configure leafs for FCoE (FCF) processing.
A leaf needs this configuration for failover cases.

1. See Configuring FCF Leafs, on page 10.
2. See Configuring FCoE and FabricPath-Enabled VLANs, on page 11.

   Note If vPC or vPC+ was enabled on the leaf, follow the steps at Increasing the FabricPath Cost for a vPC+ Peer Link for FCF Leafs, on page 12.

Step 5 Configure ports on leafs for FC/FCoE.

If vPC or vPC+ is enabled, follow the steps at Increasing the FabricPath Cost for a vPC+ Peer Link for FCF Leafs, on page 12.

Related Topics

Enabling FabricPath, on page 8
Configuring All Leafs in the FabricPath Topology, on page 9
Configuring FCF Leafs, on page 10
Configuring FCoE and FabricPath-Enabled VLANs, on page 11
Defining FabricPath VLANs, on page 12
Increasing the FabricPath Cost for a vPC+ Peer Link for FCF Leafs, on page 12

Enabling FabricPath

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.

	Command or Action	Purpose
Step 2	switch(config)# **install feature-set fabricpath**	Installs the FabricPath feature set on the switch.
Step 3	switch(config)# **feature-set fabricpath**	Enables the FabricPath feature set on the switch.
Step 4	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to enable FabricPath:

```
switch# configure terminal
switch(config)# install feature-set fabricpath
switch(config)# feature-set fabricpath
switch(config)# copy running-config startup-config
```

Configuring All Leafs in the FabricPath Topology

Quality of Service (QoS) settings are enabled on the spine. FCFs are not being established.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **install feature-set fabricpath**	Installs the FabricPath feature set on the switch.
Step 3	switch(config)# **feature-set fabricpath**	Enables the FabricPath feature set on the switch.
Step 4	switch(config)# **system qos**	Enters system class configuration mode.
Step 5	switch(config-sys-qos)# **service-policy type {network-qos | qos | queuing} [input | output]** *fcoe-default-policy-name*	Sets up the service policy for the system to specify the default policy map for FCoE traffic. Four predefined policy-maps for FCoE are as follows: • service-policy type qos input fcoe-default-in-policy • service-policy type queuing input fcoe-default-in-policy • service-policy type queuing output fcoe-default-out-policy • service-policy type network-qos fcoe-default-nq-policy

	Command or Action	Purpose
		Note Before enabling FCoE on a Cisco Nexus device, you must attach the predefined FCoE policy maps to the type qos, type network-qos, and type queuing policy maps.
Step 6	switch(config-sys-qos)# **vlan** *vlan-id*	Enters VLAN configuration mode. The VLAN number range is from 1 to 4096.
Step 7	switch(config-vlan)# **mode fabricpath**	Configures the VLANs as FabricPath VLANs.
Step 8	switch(config-vlan)# **interface** [**ethernet** *slot/port* | **port-channel** *channel-no*]	Enters interface configuration mode and specifies the interfaces that you want to configure as FabricPath. The port number within a particular slot can be from 1 to 128. The port channel number assigned to the EtherChannel logical interface can be from 1 to 4096.
Step 9	switch(config-if)# **switchport mode fabricpath**	Specifies interfaces as FabricPath ports.
Step 10	switch(config-if)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Configuring FCF Leafs

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **feature fcoe**	Enables the FCoE capability.
Step 3	switch(config)# **fcoe fka-adv-period** *interval*	Configures the advertisement interval for the fabric. The default value is 8 seconds. The range is from 4 to 60 seconds.
Step 4	switch(config)# **fabricpath switch-id** *switch-id-value*	Configures the switch ID. The range is from 1 to 4094.
Step 5	switch(config)# **vlan** *vlan-id*	Enters VLAN configuration mode. The VLAN number range is from 1 to 4096.
Step 6	switch(config)# **vsan database**	Enters VSAN configuration mode.

	Command or Action	Purpose
Step 7	switch(config-vsan-db)# **vsan** *vsan-id*	Configures VSAN.
Step 8	switch(config-vsan-db)# **show vpc**	Displays information about the vPC. **Note** If vPC is enabled, perform the following procedure at Increasing the FabricPath Cost for a vPC+ Peer Link for FCF Leafs, on page 12.
Step 9	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to configure FCF leafs:

```
switch# configure terminal
switch(config)# feature fcoe
switch(config)# fcoe fka-adv-period 20
switch(config)# fabricpath switch-id 5
switch(config)# vlan 100

switch(config-vsan-db)# vsan database
switch(config-vsan-db)# vsan 100
switch(config-vsan-db)# show vpc
```

Configuring FCoE and FabricPath-Enabled VLANs

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **vlan** *vlan-id*	Enters VLAN configuration mode. The VLAN number range is from 1 to 4096.
Step 3	switch(config-vlan)# **fcoe** [**vsan** *vsan-id*]	Enables FCoE for the specified VLAN. If you do not specify a VSAN number, a mapping is created from this VLAN to the VSAN with the same number. Configures the mapping from this VLAN to the specified VSAN.

This example shows how to configure FCoE and FabricPath-Enabled VLANs:

```
switch# configure terminal
switch(config)# vlan 100
switch(config-vlan)# fcoe vsan 10
```

Defining FabricPath VLANs

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **vlan** *vlan-id*	Enter VLAN configuration mode. The VLAN number range is from 1 to 4096.
Step 3	switch(config-vlan)# **mode fabricpath**	Configures the operational mode of the VLAN.

This example shows how to define a FabricPath VLAN:

```
switch# configure terminal
switch(config)# vlan 100
switch(config-vlan)# mode fabricpath
switch(config-vlan)# copy running-config startup-config
```

Increasing the FabricPath Cost for a vPC+ Peer Link for FCF Leafs

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **show vpc**	Based on the output of the **show vpc** command, you have three options: • If the **show vpc** command is not available, do not continue with this procedure. • If vPC+ is not in the command output, do not continue with this procedure. • If vPC+ is in the command output, perform the remaining steps in this procedure.
Step 3	switch(config)# **interface** [**ethernet** *slot/port* | **port-channel** *channel-no*]	Enters interface configuration mode and specifies the interfaces that you want to configure as FabricPath. The port number within a particular slot can be from 1 to 128. The port channel number assigned to the EtherChannel logical interface can be from 1 to 4096.
Step 4	switch(config-if)# **fabricpath isis metric** *default-metric*	Configures the metric for the MCT interface. You must set the *default-metric* to 16777215.

	Command or Action	Purpose
Step 5	switch(config-if)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to increase the FabricPath for a vPC+ peer link:

```
switch# configure terminal
switch(config)# show vpc
switch(config)# interface ethernet 1/11
switch(config-if)# fabricpath isis metric 16777210
```

Instantiation and Initialization of Dynamic VFC

Dynamic FCoE enables the capability of creating both a virtual Fibre Channel port (VFC), as well as instantiating the Inter-Switch Link port type (VE_Port/TE Port). Enabling FCoE and FabricPath on the same VLAN should serve as a trigger to instantiation and initialization of the Dynamic VFCs in TE mode. The process is as follows:

1. Every FCF leaf is uniquely identified by a global FCF-MAC address.
2. Every FCF leaf floods an FIP unsolicited multicast discovery advertisement to ALL-FCF MAC addresses and source MAC addresses that are set to its global FCF-MAC address on the FabricPath-enabled FCoE VLANs. This is triggered by two factors:
   a. Feature FCoE is enabled on the leaf.
   b. FabricPath is enabled on the FCoE VLANs.
3. All FCF leafs on this FabricPath cloud should receive this multicast advertisement on the corresponding FCoE-enabled FP VLAN. Upon receiving this FIP multicast frame, a dynamic VFC in VE mode is created between the two FCF leaf nodes.
4. Only one dynamic VFC in TE mode is between any two FCF leafs.
5. The dynamic VFCs can be differentiated based on their VFC ID range. All dynamic VFCs obtain an ID that is greater than 32000.
6. The VFC might have multiple FabricPath FCoE VLANs up. The VLANs might or might not be in the same topology.
7. Every FCF leaf is one hop away. For all VE paths that use FabricPath, a default fixed FSPF cost value is used.

Verifying the Dynamic FCoE Using FabricPath Configuration

To display Dynamic FCoE Using FabricPath configuration information, perform one of the following tasks:

Command	Purpose
show interface brief	Displays a brief summary of the interface configuration information.
show interface vfc	Displays the configuration information of virtual Fibre Channel interfaces.
show vpc	Displays the configuration information of virtual port channels.
show topology	Displays topology information for connected SAN switches.
show fcoe	Displays the status of FCoE parameters on the switch.
show running-config	Displays the configuration that is currently running on the switch.
show fcoe dce	Displays the Dynamic FCoE database using FabricPath.

show interface brief Command

```
switch(config)# show interface brief
--------------------------------------------------------------------------------
Ethernet      VLAN    Type Mode   Status  Reason                   Speed     Por
t
Interface                                                                     Ch
#
--------------------------------------------------------------------------------
Eth1/1        1       eth  access up      none                       10G(D) --
Eth1/2        1       eth  access down    Link not connected         10G(D) --
Eth1/3        1       eth  access up      none                       10G(D) --
Eth1/4        1       eth  access up      none                       10G(D) --
Eth1/5        1       eth  access up      none                       10G(D) --
Eth1/6        1       eth  access up      none                       10G(D) --
Eth1/7        1       eth  access up      none                       10G(D) --
Eth1/8        1       eth  access down    SFP not inserted           10G(D) --
Eth1/9        1       eth  access down    SFP validation failed      10G(D) --
Eth1/10       1       eth  access down    SFP not inserted           10G(D) --
Eth1/11       1       eth  f-path up      none                       10G(D) --
Eth1/12       1       eth  access down    SFP not inserted           10G(D) --
Eth1/13       1       eth  access up      none                       10G(D) --
Eth1/14       1       eth  access up      none                       10G(D) --
Eth1/15       1       eth  access down    SFP validation failed      10G(D) --
Eth1/16       1       eth  access down    Link not connected         10G(D) --
Eth1/17       1       eth  access up      none                       10G(D) --
Eth1/18       1       eth  access up      none                       10G(D) --
Eth1/19       1       eth  access down    SFP validation failed      10G(D) --
Eth1/20       1       eth  access up      none                       10G(D) --
Eth1/21       1       eth  access down    SFP validation failed      10G(D) --
Eth1/22       1       eth  access up      none                       10G(D) --
Eth1/23       1       eth  access down    SFP validation failed      10G(D) --
Eth1/24       1       eth  access down    SFP not inserted           10G(D) --
Eth1/25       1       eth  access up      none                       10G(D) --
Eth1/26       1       eth  access up      none                       10G(D) --
Eth1/27       1       eth  access up      none                       10G(D) --
Eth1/28       1       eth  access up      none                       10G(D) --
Eth1/29       1       eth  access up      none                       10G(D) --
Eth1/30       1       eth  access down    SFP not inserted           10G(D) --
```

```
Eth1/31       1       eth  access down    SFP not inserted           10G(D) --
Eth1/32       1       eth  access down    SFP not inserted           10G(D) --

--------------------------------------------------------------------------------
Port   VRF          Status IP Address                              Speed    MTU
--------------------------------------------------------------------------------
mgmt0  --           up     10.193.52.117                           1000     1500

--------------------------------------------------------------------------------
Interface  Vsan   Admin  Admin   Status      Bind                Oper    Oper
                 Mode   Trunk               Info                Mode    Speed
                        Mode                                            (Gbps)
--------------------------------------------------------------------------------
vfc32002   1      E     on     trunking    54:7f:ee:b1:8a:00       TE   10
vfc32003   1      E     on     trunking    54:7f:ee:73:e8:00       TE   10
```

show interface vfc Command

```
switch(config)# show interface vfc 32002
vfc32002 is trunking
    Dynamic VFC Peer MAC is 54:7f:ee:b1:8a:00
    Hardware is Ethernet
    Port WWN is 2d:01:54:7f:ee:73:e6:78
    Admin port mode is E, trunk mode is on
    snmp link state traps are enabled
    Port mode is TE
    Port vsan is 1
    Trunk vsans (admin allowed and active) (1,100)
    Trunk vsans (up)                       (100)
    Trunk vsans (isolated)                 ()
    Trunk vsans (initializing)             (1)
    1 minute input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    1 minute output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
      0 frames input, 0 bytes
      0 frames output, 0 bytes
    Interface last changed at Mon Feb 14 19:46:53 2011

switch(config)# show interface vfc 32003
vfc32003 is trunking
    Dynamic VFC Peer MAC is 54:7f:ee:73:e8:00
    Hardware is Ethernet
    Port WWN is 2d:02:54:7f:ee:73:e6:78
    Admin port mode is E, trunk mode is on
    snmp link state traps are enabled
    Port mode is TE
    Port vsan is 1
    Trunk vsans (admin allowed and active) (1,100)
    Trunk vsans (up)                       (100)
    Trunk vsans (isolated)                 ()
    Trunk vsans (initializing)             (1)
    1 minute input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    1 minute output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
      0 frames input, 0 bytes
      0 frames output, 0 bytes
    Interface last changed at Mon Feb 14 19:49:23 2011


================================================================================
```

show vpc Command

```
switch(config)# show vpc
   vPC domain id : 300 vPC+ switch id : 1550
   vPC Peer-link status
   ---------------------------------------------------------------------
   id   Port   Status Active vlans
   --   ----   ------ --------------------------------------------------
   1    Po1    up     -
```

show topology Command

```
switch(config)# show topology
FC Topology for VSAN 100 :
--------------------------------------------------------------------------------
       Interface  Peer Domain Peer Interface     Peer IP Address(Switch Name)
--------------------------------------------------------------------------------
         vfc32002  0x0b(11)         vfc32002  10.193.52.108(nc-9)
         vfc32003 0x64(100)         vfc32003  10.193.52.118(o2-356)
```

show fcoe Command

```
switch(config)# show fcoe
Global FCF details
        FCF-MAC is 54:7f:ee:73:e6:20
        FC-MAP is 0e:fc:00
        FCF Priority is 128
        FKA Advertisement period for FCF is 8 seconds

VFC MAC details
```

show running-config Command

```
switchconfig)# show running-config

!Command: show running-config
!Time: Mon Feb 14 19:58:47 2011

version 7.0(3)N1(1)
feature fcoe

install feature-set fabricpath
feature-set fabricpath

feature telnet
feature lldp

username admin password 5 $1$1dLADwhf$7Ip2IYSMp/0nsII8rU5qh/  role network-admin
no password strength-check
ip domain-lookup
system qos
  service-policy type qos input fcoe-default-in-policy
  service-policy type queuing input fcoe-default-in-policy
  service-policy type queuing output fcoe-default-out-policy
  service-policy type network-qos fcoe-default-nq-policy
snmp-server user admin network-admin auth md5 0x95d13d5b1da2ee92b77769b4c177a94b
 priv 0x95d13d5b1da2ee92b77769b4c177a94b localizedkey
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO

vlan 1
vlan 100
  fcoe vsan 100
  mode fabricpath
vrf context management
  ip route 0.0.0.0/0 10.193.48.1
vsan database
  vsan 100


interface vfc32002
  bind mac-address 54:7f:ee:b1:8a:00
  dce
  switchport mode E
  no shutdown

interface vfc32003
  bind mac-address 54:7f:ee:73:e8:00
```

```
  dce
  switchport mode E
  no shutdown

interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11
  switchport mode fabricpath

interface Ethernet1/12

interface Ethernet1/13

interface Ethernet1/14

interface Ethernet1/15

interface Ethernet1/16

interface Ethernet1/17

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21

interface Ethernet1/22

interface Ethernet1/23

interface Ethernet1/24

interface Ethernet1/25

interface Ethernet1/26

interface Ethernet1/27

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface mgmt0
  vrf member management
  ip address 10.193.52.117/21
line console
```

```
line vty
fabricpath domain default
fabricpath switch-id 302
```

show fcoe dce Command

```
switch# show fcoe dce

Dynamic VFC MAC details :
------------------------------------------------------------
   Interface    Peer-swid       Peer-mac
------------------------------------------------------------
   vfc32002     303             54:7f:ee:b1:8a:00
   vfc32003     301             54:7f:ee:73:e8:00
```

Configuration Output Examples for Dynamic FCoE Using FabricPath

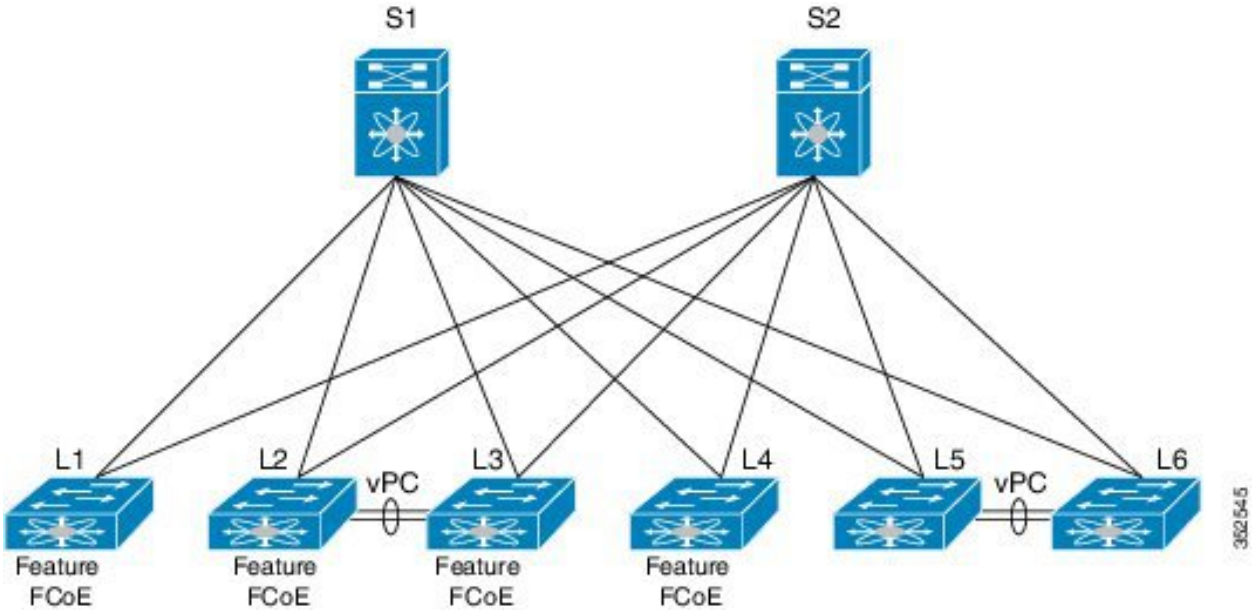
The following output examples show how to configure Dynamic FCoE using FabricPath. You must enter the **feature fabricpath** command and configure the appropriate links as FabricPath core ports.

This example covers VSAN 100 and VSAN 200.

The following is a description of the topology example:

- S1 and S2 are FabricPath spines.
- L1 through L4 are FCF leafs.
- L5 and L6 are non-FCoE leafs.

Figure 6: Sample Dynamic FCoE Configuration



This example shows the configuration on S1 and S2:

```
switch# show running-config
system qos
  service-policy type qos input fcoe-default-in-policy
  service-policy type queuing input fcoe-default-in-policy
  service-policy type queuing output fcoe-default-out-policy
  service-policy type network-qos fcoe-default-nq-policy
vlan 100
    mode fabric path
vlan 200
     mode fabric path
```

This example shows the configuration on L5 and L6 non-FCoE leafs:

```
switch# show running-config
system qos
  service-policy type qos input fcoe-default-in-policy
  service-policy type queuing input fcoe-default-in-policy
  service-policy type queuing output fcoe-default-out-policy
  service-policy type network-qos fcoe-default-nq-policy
vlan 100
    mode fabric path
vlan 200
     mode fabric path
```

This example shows the configuration on L1 - FCF leaf (VSAN 100)

```
switch# show running-config
feature fcoe
vlan 100
    mode fabric path
    fcoe vsan 100
vlan 200
     mode fabric path

vsan database
     vsan 100

fabricpath switch-id 301

fcoe fka-adv-period  20
```

This example shows the configuration on the L4 FCF leaf (VSAN 100, VSAN 200):

```
switch# show running-config
feature fcoe
vlan 100
    mode fabric path
    fcoe vsan 100
vlan 200
     mode fabric path
     fcoe vsan 200
vsan database
     vsan 100
     vsan 200

fabricpath switch-id  304

fcoe fka-adv-period 20
```

This example shows the configuration on the L2 FCF leaf (VSAN 100):

```
switch# show running-config
feature fcoe

vlan 100
    mode fabric path
    fcoe vsan 100
vlan 200
     mode fabric path

vsan database
```

```
     vsan 100

fabricpath switch-id 302

fcoe fka-adv-period 20

switch# show vpc
vPC domain id                     : 1
vPC+ switch id                    : 123

:
vPC Peer-link status
---------------------------------------------------------------
id Port Status Active vlans
-- ---- ------ --------------------------------------------
1  Po93 up     1,10,20,30,101,201,500
interface port-channel93
           fabricpath isis metric 16777215
```

This example shows the configuration on the L3 FCF leaf (VSAN 200):

```
switch# show running-config
feature fcoe

vlan 100
    mode fabric path

vlan 200
     mode fabric path
     fcoe vsan 200
vsan database
     vsan 200

fabricpath switch-id 303

fcoe fka-adv-period 20

switch# show vpc
vPC domain id        : 1
vPC+ switch id       : 123

:
---------------------------------------------------------------
id Port Status Active vlans
-- ---- ------ --------------------------------------------
1  Po93 up     1,10,20,30,101,201,500
interface port-channel93
  fabricpath isis metric 16777215
```

For additional configuration output examples, refer Configuration Output Examples for Dynamic FCoE Using FabricPath.