Migrate Standalone Cisco Catalyst 6500 Switch to Cisco Catalyst 6500 Virtual Switching System

Document ID: 109573

Contents

Introduction

This document provides information about the procedure for migrating a standalone Cisco Catalyst 6500 Series Switch to a Cisco Catalyst 6500 Virtual Switching System.

Note: This document provides the common steps that are required for the migration. Exact steps are based on the current switch configuration and can vary slightly from the mentioned procedure.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Knowledge of Virtual Switching Systems (VSS) concepts. For more information, refer to Understanding Virtual Switching Systems.

Components Used

The information in this document is based on the Cisco Catalyst 6500 series switches with Supervisor VS-S720-10G-3C/XL that runs Cisco IOS® Software Release 12.2(33)SXH1 or later.

The information in this document was created from the devices in a specific lab environment. If your network is live, make sure that you understand the potential impact of any command.

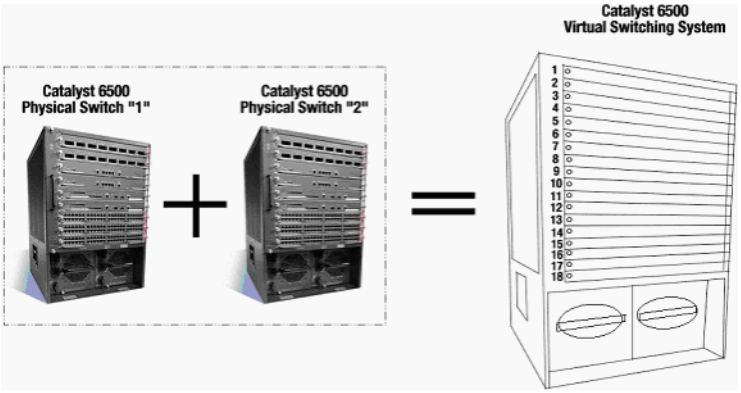
Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Background Information

The Virtual Switching System (VSS) is a new and innovative feature on Cisco Catalyst 6500 series switches that effectively allows clustering of two physical chassis together into a single logical entity. Such a technology allows for new enhancements in all areas of enterprise campus and data center deployment, which includes High Availability, Scalability / Performance, Management and Maintenance.

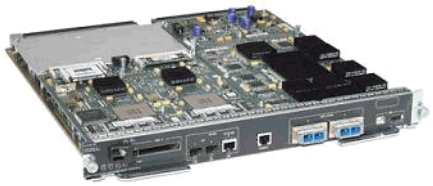
Current implementation of VSS allows you to merge two physical Cisco Catalyst 6500 series switches together into a single logically-managed entity. This figure provides a graphical representation of this concept where two 6509 chassis can be managed as a single 18-slot chassis once VSS is enabled:



Migration Process

Hardware and Software Support

VSS is a software feature available only with the Cisco Catalyst 6500 series switches. In order to enable and configure this feature, this is required:

Hardware	VS-S720-10G-3C/XL 
Software	Cisco IOS Software Release 12.2(33)SXH1 or later

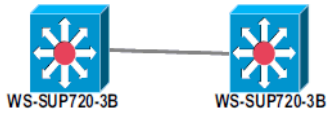
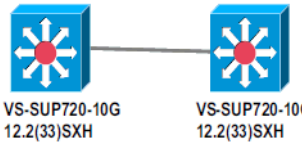
Chassis Supported by Cisco Virtual Switching System

Model Number	Description
WS-C6503-E	E-Series 3-slot chassis
WS-C6504-E	E-Series 4-slot chassis
WS-C6506	6-slot chassis
WS-C6506-E	E-Series 6-slot chassis
WS-C6509	9-slot chassis
WS-C6509-E	E-Series 9-slot chassis
WS-C6509-NEB-A	9-slot vertical Network Equipment Building Standards (NEBS) chassis
WS-C6509-V-E	E-Series 9-slot vertical chassis
WS-C6513	13-slot chassis

This table gives a complete list of the chassis supported with the initial release of Cisco Virtual Switching System. For more information, refer to Cisco Catalyst 6500 Series Virtual Switching System (VSS) 1440.

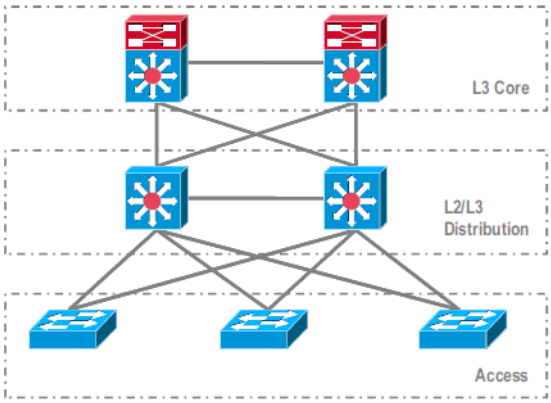
Migration Paths

The table lists some of the possible migration paths to the VSS. This list is only suggestive and not comprehensive.

Initial Setup	Upgrade Required	Final Setup
Two Cisco Catalyst 6500 series switches with WS-SUP720-3B supervisors. 	Hardware Upgrade - Supervisors VS-S720-10G-3C/XL Software Upgrade - Cisco IOS 12.2(33) SXH1 or later	VSS  VS-SUP720-10-G 12.2(33)SXH1 or later
Two Cisco Catalyst 6500 series switches with VS-S720-10G-3C/XL supervisors. 	Software Upgrade - Cisco IOS 12.2(33) SXH1 or later	VSS  VS-SUP720-10-G 12.2(33)SXH1 or later

Migration Overview

Common Configuration in Standalone Environment



Features or Protocols that run between Layer 3 (L3) Core and L2/L3 Distribution:

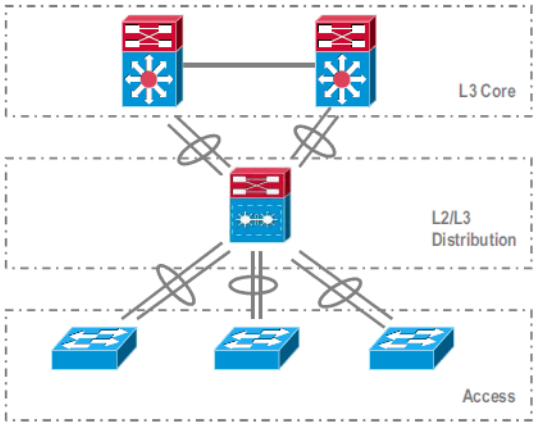
- IP Routing Protocols
- L3 Port Channels or EqualCost MultiPath feature of IP Routing

Features or Protocols that run between L2/L3 Distribution and Access Layer:

- Spanning Tree Protocol
- First Hop Routing Protocols (FHRP)
- Policies: QoS, ACL
- L2 Trunks, VLANs, Port Channels

Migration to VSS

This is a multi-step process, and each step is explained in this section.



Migration steps between Core and Distribution Layer:

- Configuring MultiChassis EtherChannel (MEC)
- Modifying IP Routing configuration and removing commands, which are no more required

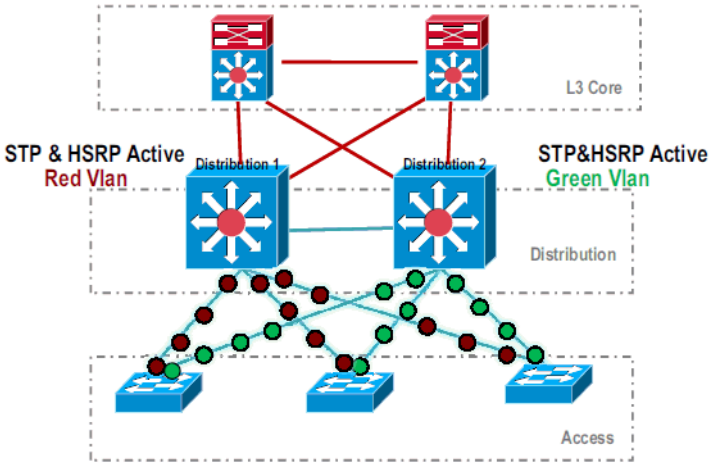
Migration steps between Distribution and Access Layer:

- Configuring MEC
- Keeping Spanning Tree Protocol enabled
- Modifying FHRP commands
- Moving QoS and ACL policies to MEC (if required)
- Moving L2 Trunks configuration to MEC

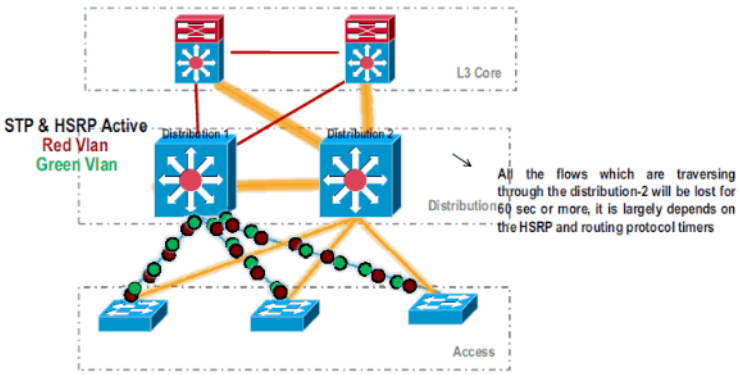
Step By Step Migration Process

Complete these steps:

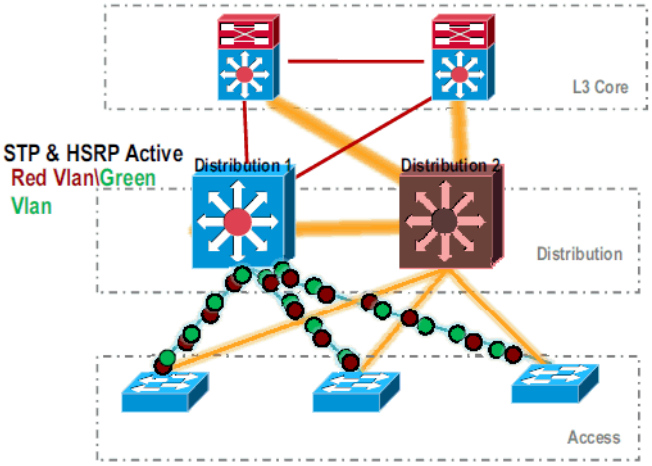
1. In the initial standalone setup, traffic is commonly load-balanced among Distribution switches using VLAN load sharing and HSRP configuration.



2. Modify the HSRP and STP configuration so that *Distribution-1* is active for all flows, and neighboring devices detect this change and send all traffic to *Distribution-1*.



3. Shut down the physical interfaces of *Distribution-2*, so that it is isolated from the network.



.

Once the *Distribution-2* is completely removed from the network, it can be converted to VSS mode without disrupting production traffic.

4. If not previously installed, install the new supervisor (VS-SUP720-10G) and verify the status.

```
Distribution-2#show module
Mod Ports Card Type                                Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  5     5  Supervisor Engine 720 10GE (Active)    VS-S720-10G        SAD104707BB
  9    48  CEF 720 48 port 10/100/1000mb Ethernet WS-X6748-GE-TX     SAL1020NGY3
```

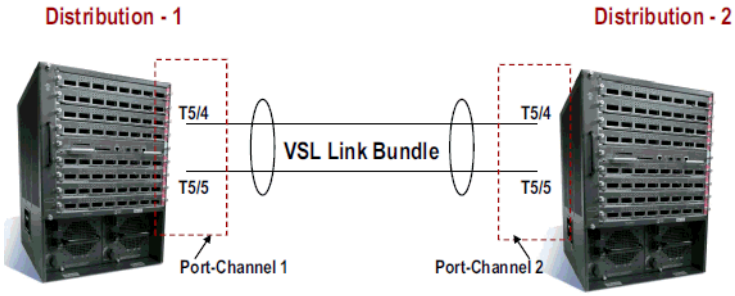
5. Copy VSS compatible Cisco IOS software to the sup-bootdisk:

```
Distribution-2#copy ftp: sup-bootdisk:
Address or name of remote host []? 172.16.85.150
Source filename []? s72033-ipservices_wan_vz.122-33.SXH1.bin
Destination filename [s72033-ipservices_wan_vz.122-33.SXH1.bin]?
Accessing ftp://172.16.85.150/s72033-ipservices_wan_vz.122-33.SXH1.bin...
```

6. Update the bootvar to load Cisco IOS software copied to the sup-bootdisk:

```
Distribution-2(config)#boot system flash sup-bootdisk:s72033-ipservices_wan_vz.122-33.SXH1.bin
```

7. For the *Distribution-2* switch to run in VSS mode, a Virtual Switch Link (VSL) is required. The current Port Channel link between *Distribution-1* and *Distribution-2* can be utilized to form the VSL.



8. Configure the Virtual Switch attributes:

   a. Virtual Switch Domain Number (unique within the network)

   b. Virtual Switch Number (unique within the domain)

   c. Virtual Switch Link (VSL)

```
Distribution-2(config)#hostname VSS

VSS(config)#switch virtual domain 100

VSS(config-vs-domain)#switch 1


!--- After conversion Distribution-2 will be noted
!--- as Switch 1 in VSS mode.

VSS(config-vs-domain)# exit
VSS(config)#interface port-channel 1
VSS(config-if)#switch virtual link 1

VSS(config-if)#interface TenG 5/4
VSS(config-if)#channel-group 1 mode on
VSS(config-if)#interface TenG 5/5
VSS(config-if)#channel-group 1 mode on
VSS(config-if)# ^Z
VSS#
```

9. Convert the *Distribution-2* switch to VSS mode.

   Note: Issue this command via the switch's console:

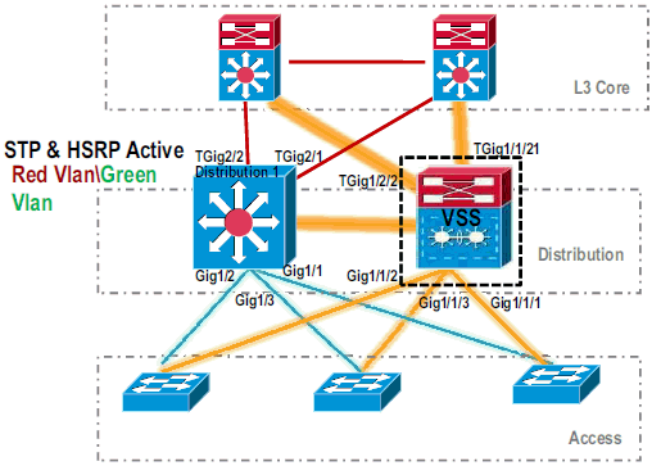
```
VSS#switch convert mode virtual

This command will convert all interface
names to naming convention "interface-type
switch-number/slot/port",
save the running config to startup-config and
reload the switch.
Do you want to proceed? [yes/no]: yes
Converting interface names
Building configuration...


!--- At this point the switch will reboot



!--- snippet of the console output

System detected Virtual Switch configuration...
```

```
 Interface TenGigabitEthernet 1/5/4 is member of
PortChannel 1
 Interface TenGigabitEthernet 1/5/5 is member of
PortChannel 1

!--- snippet of the console output

00:00:23: %PFREDUN-6-ACTIVE: Initializing as ACTIVE
processor for this switch

!--- snippet of the console output

00:00:28: %VSL_BRINGUP-6-MODULE_UP: VSL module in slot 5
switch 1 brought up
Initializing as Virtual Switch Active
```

10. Verify the conversion of the *Distribution-2* switch to VSS mode.

```
VSS#show switch virtual role

Switch  Switch Status  Preempt    Priority   Role     Session ID
        Number         Oper(Conf) Oper(Conf)          Local  Remote
-------------------------------------------------------------------
LOCAL    1     UP      FALSE(N)    110(110)  ACTIVE    0      0

In dual-active recovery mode: No
```

The *Distribution-2* switch is successfully converted and is operating in VSS mode. Pre-configuration steps can also be performed after converting the *Distribution-1* switch. However, pre-configuration helps to reduce the amount of packet loss during migration.



11. Complete these steps to pre-configure VSS *Switch 1*:

    a. Configure MEC using Switch-1's local interfaces. Interfaces of Switch-2 (currently Distribution-1) can be added to MEC after converting it to VSS mode.

    - Configure MEC.
    - Move interface configuration to MEC.
    - Move QoS and ACL policies to MEC.

Initial Configuration

```
interface TenGigabitEthernet1/2/1
 ip address 192.168.4.2 255.255.255.0

interface GigabitEthernet1/1/2
 switchport
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 10,20
```

Configuration Changes

```
!--- MEC to Core layer

VSS(config)# int ten 1/2/1
VSS(config-if)# no ip address
```

```
VSS(config-if)# interface po20
VSS(config-if)# ip address 192.168.4.2 255.255.255.0
VSS(config-if)# no shut
VSS(config-if)# interface ten1/2/1
VSS(config-if)# channel-group 20 mode desirable


!--- MEC to Access layer

VSS(config-if)# interface po10
VSS(config-if)# switchport
VSS(config-if)# switchport trunk encapsulation dot1q
VSS(config-if)# switchport trunk allowed vlan 10,20
VSS(config-if)# no shut
VSS(config-if)# interface gig1/1/2
VSS(config-if)# switchport
VSS(config-if)# channel-group 10 mode desirable
```

Configure Neighboring Devices to accommodate Port Channel

Connection between VSS *Switch-1* and its neighboring devices are down at this moment. Therefore, a port channel is configured without interfering traffic flow through *Distribution-1*.

```
!--- In Core layer devices

Core(config)# int gig 1/1
Core(config-if)# no ip address
Core(config-if)# int po20
Core(config-if)# ip address 192.168.4.1 255.255.255.0
Core(config-if)# no shut
Core(config-if)# int gig 1/1
Core(config-if)# channel-group 20 mode desirable


!--- In Access layer devices

Access(config)# int po10
Access(config-if)# switchport
Access(config-if)# switchport trunk encapsulation dot1q
Access(config-if)# switchport trunk
Access(config-if)# no shut
Access(config-if)# int gig 1/1
Access(config-if)# channel-group 10 mode desirable
```

b. In VSS, both active and standby chassis use active chassis burnt-in MAC address and VLAN IP address. HSRP is no longer required.

- Move HSRP virtual IP addresses to the VLAN interfaces.
- Remove HSRP configuration from the VLAN interfaces.

Initial Configuration

```
interface Vlan10
 ip address 10.1.1.2 255.255.255.0
 standby 10 ip 10.1.1.1
 standby 10 priority 110
!
interface Vlan20
 ip address 20.1.1.2 255.255.255.0
 standby 20 ip 20.1.1.1
 standby 20 priority 110
!
```

Configuration Changes

```
VSS(config)# interface Vlan10
VSS(config-if)# no standby 10 ip 10.1.1.1
VSS(config-if)# no standby 10 priority 110
VSS(config-if)# ip address 10.1.1.1 255.255.255.0
VSS(config-if)# interface Vlan20
VSS(config-if)# no standby 20 ip 20.1.1.1
VSS(config-if)# no standby 20 priority 110
VSS(config-if)# ip address 20.1.1.1 255.255.255.0
```

Note: End devices would be still pointing their ARP entries to initial HSRP MAC address. Until these entries time out or another ARP is sent to update their cache, there is some connectivity loss.

c. Enable the NSF-SSO feature for the IP Routing protocols used. VSS simplifies the routing configuration, so some of the network statements are no longer required. Therefore, they can be removed.

VSS *Switch-1*

```
VSS#show running-config | begin ospf
router ospf 1
 log-adjacency-changes
 network 10.1.1.0 0.0.0.255 area 0
 network 20.1.1.0 0.0.0.255 area 0
 network 192.168.4.0 0.0.0.255 area 0
 network 192.168.5.0 0.0.0.255 area 0

!--- rest of output elided


!--- Previous L3 interfaces are merged as MEC, hence some
routing statements are no longer required.


VSS(config)# router ospf 1
VSS(config-router)# nsf
VSS(config-router)# no network 192.168.5.0 0.0.0.255 area 0
```

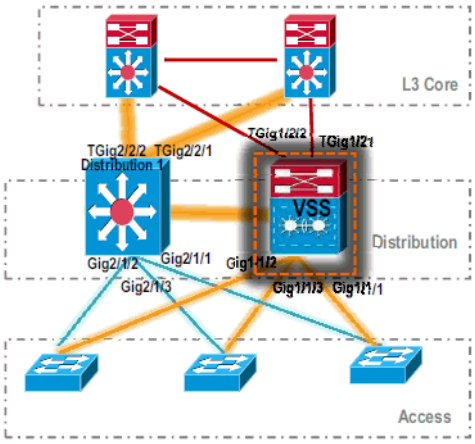
Core

```
Core#show running-config | begin ospf
router ospf 1
 log-adjacency-changes
 network 192.168.4.0 0.0.0.255 area 0
 network 192.168.5.0 0.0.0.255 area 0

!--- rest of output elided


!--- Previous L3 interfaces are merged as MEC, hence some
routing statements are no longer required.


Core(config)# router ospf 1
Core(config-router)# nsf
Core(config-router)# no network 192.168.5.0 0.0.0.255 area 0
```

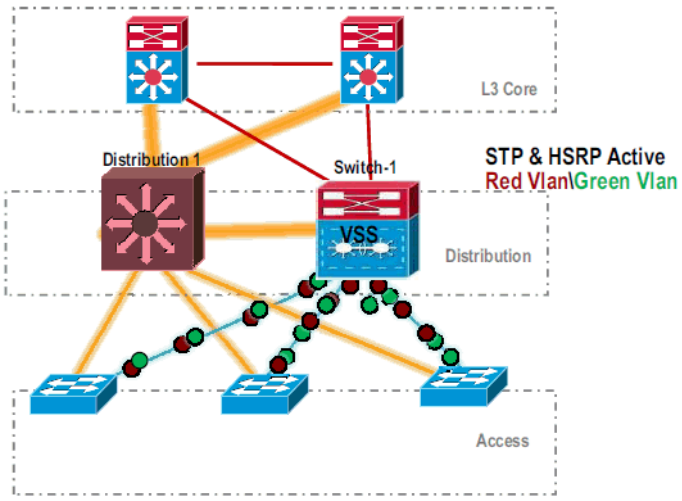
d. Modify STP configuration so that VSS *Switch-1* becomes the root for all VLANs.

12. Verify VSS *Switch-1* configuration and connectivity.

- Enable VSS Switch-1 interfaces.
- Verify L2 connectivity to Access layer devices.
- Verify L3 connectivity to Core layer devices.



13. After VSS *Switch-1* connectivity is verified, shut down the interfaces of *Distribution-1* to switch the traffic over to VSS.

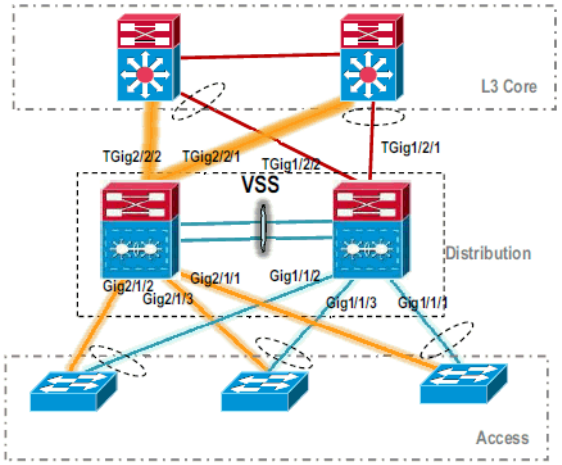


14. Repeat the conversion steps on the *Distribution-1* switch to bring that in preferred VSS standby mode.

```
Distribution-1(config)#hostname VSS

VSS(config)#switch virtual domain 100

VSS(config-vs-domain)#switch 2


!--- After conversion Distribution-1 will be noted
!--- as Switch 2 in VSS mode.

VSS(config-vs-domain)# exit
VSS(config)#interface port-channel 2
VSS(config-if)#switch virtual link 2

VSS(config-if)#interface TenG 5/4
VSS(config-if)#channel-group 2 mode on
VSS(config-if)#interface TenG 5/5
VSS(config-if)#channel-group 2 mode on
VSS(config-if)# ^Z
VSS#

VSS#switch convert mode virtual

This command will convert all interface
names to naming convention "interface-type
switch-number/slot/port",
save the running config to startup-config and
reload the switch.
Do you want to proceed? [yes/no]: yes
Converting interface names
Building configuration...


!--- At this point the switch will reboot



!--- snippet of the console output

System detected Virtual Switch configuration...
 Interface TenGigabitEthernet 2/5/4 is member of
PortChannel 2
 Interface TenGigabitEthernet 2/5/5 is member of
PortChannel 2

!--- snippet of the console output

00:00:23: %PFREDUN-6-ACTIVE: Initializing as ACTIVE
processor for this switch

!--- snippet of the console output

00:00:28: %VSL_BRINGUP-6-MODULE_UP: VSL module in slot 5
switch 2 brought up
```

Initializing as Virtual Switch Standby

15. After the VSS standby switch boots up, the VSS active configuration is automatically synchronized to VSS standby. On boot up, interfaces of VSS standby (*Switch-2*) are in shutdown state.



16. Finalize the virtual switch configuration.

Note: This final, critical step is applicable only for a first-time conversion. If the switch has been converted or partially converted already, you cannot use this command. An error message is generated if the switch is converted or partially converted:

```
11:27:30: %PM-SP-4-ERR_DISABLE: channel-misconfig error detected
on Po110, putting Gi9/2 in err-disable state
```

You can issue this command to automatically configure the standby virtual switch configuration on the active virtual switch:

```
VSS#switch accept mode virtual

This command will bring in all VSL configurations from the standby
switch and populate it into the running configuration.
In addition the startup configurations will be updated with the
new merged configurations.
Do you want proceed? [yes/no]: yes
Merging the standby VSL configuration. . .
Building configuration...
```

Note: Be aware that the **switch accept mode virtual** command is no longer needed in Cisco IOS Software Release 12.2 SXI as the configurations are merged automatically.

17. Add the *Switch-2* interfaces to MEC.

- **VSS**

```
!--- To Core layer

VSS(config)# interface range tengig 1/2/1, tengig2/2/1
VSS(config-if-range)# channel-group 20 mode desirable
VSS(config-if-range)# no shut


!--- To Access layer

VSS(config)# interface range gig 1/1/2, gig 2/1/2
VSS(config-if-range)# switchport
VSS(config-if-range)# channel-group 10 mode desirable
VSS(config-if-range)# no shut
```

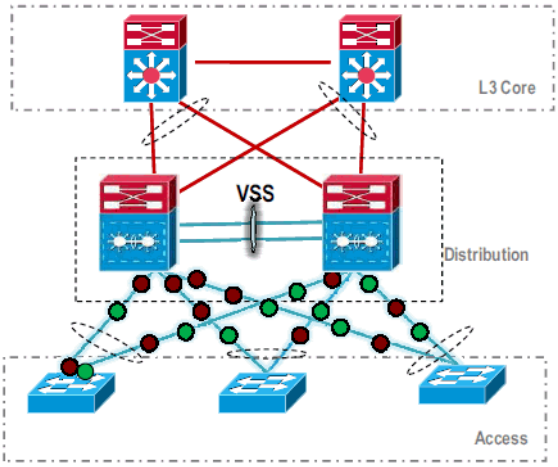
- **VSS Neighbor - Core**

```
Core(config)# interface range gig 1/1, gig 1/2
Core(config-if-range)# channel-group 20 mode desirable
Core(config-if-range)# no shut
```

- **VSS Neighbor - Access**

```
Access(config)# interface range gig 1/1, gig 1/2
Access(config-if-range)# channel-group 10 mode desirable
Access(config-if-range)# no shut
```

Migration to VSS is complete. At this point, both switches of VSS are running and traffic is load-balanced on all uplink interfaces.



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