Lab – Troubleshooting EtherChannel (Instructor Version)

**Instructor Note**: Red font color or Gray highlights indicate text that appears in the instructor copy only.

1. Topology

1. Addressing Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** |
| S1 | VLAN 99 | 192.168.1.11 | 255.255.255.0 |
| S2 | VLAN 99 | 192.168.1.12 | 255.255.255.0 |
| S3 | VLAN 99 | 192.168.1.13 | 255.255.255.0 |
| PC-A | NIC | 192.168.0.2 | 255.255.255.0 |
| PC-C | NIC | 192.168.0.3 | 255.255.255.0 |

1. VLAN Assignments

|  |  |
| --- | --- |
| VLAN | Name |
| 10 | User |
| 99 | Management |

Objectives

Part 1: Build the Network and Load Device Configurations

Part 2: Troubleshoot EtherChannel

1. Background / Scenario

The switches at your company were configured by an inexperienced network administrator. Several errors in the configuration have resulted in speed and connectivity issues. Your manager has asked you to troubleshoot and correct the configuration errors and document your work. Using your knowledge of EtherChannel and standard testing methods, find and correct the errors. Ensure that all of the EtherChannels use Port Aggregation Protocol (PAgP), and that all hosts are reachable.

**Note**: The switches used are Cisco Catalyst 2960s with Cisco IOS Release 15.0(2) (lanbasek9 image). Other switches and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and output produced might vary from what is shown in the labs.

**Note**: Make sure that the switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

**Instructor Note**: Refer to the Instructor Lab Manual for the procedures to initialize and reload devices.

1. Required Resources
* 3 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
* 2 PCs (Windows 7, Vista, or XP with a terminal emulation program, such as Tera Term)
* Console cables to configure the Cisco IOS devices via the console ports
* Ethernet cables as shown in the topology
1. Build the Network and Load Device Configurations

In Part 1, you will set up the network topology, configure basic settings on the PC hosts, and load configurations on the switches.

* 1. Cable the network as shown in the topology.
	2. Configure the PC hosts.
	3. Erase the startup and VLAN configurations and reload the switches.
	4. Load switch configurations.

Load the following configurations into the appropriate switch. All switches have the same passwords. The privileged EXEC password is **class**. The password for console and vty access is **cisco**. As all switches are Cisco devices, the network administrator decided to use Cisco’s PAgP on all port channels configured with EtherChannel. Switch S2 is the root bridge for all VLANs in the topology.

Switch S1 Configuration:

hostname S1

interface range f0/1-24, g0/1-2

shutdown

exit

enable secret class

no ip domain lookup

line vty 0 15

password cisco

login

line con 0

 password cisco

 logging synchronous

 login

 exit

vlan 10

 name User

vlan 99

 Name Management

interface range f0/1-2

 switchport mode trunk

! channel-group 1 mode desirable

 channel-group 1 mode active

 switchport trunk native vlan 99

 no shutdown

interface range f0/3-4

 channel-group 2 mode desirable

 switchport trunk native vlan 99

! switchport mode trunk

 no shutdown

interface f0/6

 switchport mode access

 switchport access vlan 10

 no shutdown

interface vlan 99

 ip address 192.168.1.11 255.255.255.0

interface port-channel 1

 switchport trunk native vlan 99

 switchport mode trunk

interface port-channel 2

 switchport trunk native vlan 99

 switchport mode access

! switchport mode trunk

Switch S2 Configuration:

hostname S2

interface range f0/1-24, g0/1-2

 shutdown

 exit

enable secret class

no ip domain lookup

line vty 0 15

 password cisco

 login

line con 0

 password cisco

 logging synchronous

 login

 exit

vlan 10

 name User

vlan 99

 name Management

spanning-tree vlan 1,10,99 root primary

interface range f0/1-2

 switchport mode trunk

 channel-group 1 mode desirable

 switchport trunk native vlan 99

 no shutdown

interface range f0/3-4

 switchport mode trunk

 channel-group 3 mode desirable

 switchport trunk native vlan 99

! no shutdown

interface vlan 99

 ip address 192.168.1.12 255.255.255.0

interface port-channel 1

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,99

! switchport trunk allowed 1,10,99

interface port-channel 3

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

Switch S3 Configuration:

hostname S3

interface range f0/1-24, g0/1-2

 shutdown

 exit

enable secret class

no ip domain lookup

line vty 0 15

 password cisco

 login

line con 0

 password cisco

 logging synchronous

 login

 exit

vlan 10

 name User

vlan 99

 name Management

interface range f0/1-2

! switchport mode trunk

! channel-group 3 mode desirable

! switchport trunk native vlan 99

! no shutdown

interface range f0/3-4

 switchport mode trunk

! channel-group 2 mode desirable

 channel-group 3 mode desirable

 switchport trunk native vlan 99

 no shutdown

interface f0/18

 switchport mode access

 switchport access vlan 10

 no shutdown

interface vlan 99

 ip address 192.168.1.13 255.255.255.0

! interface port-channel 2

! switchport trunk native vlan 99

! switchport mode trunk

interface port-channel 3

 switchport trunk native vlan 99

 switchport mode trunk

* 1. Save your configuration.
1. Troubleshoot EtherChannel

In Part 2, you must examine the configurations on all switches, make corrections if needed, and verify full functionality.

* 1. Troubleshoot S1.
		1. Use the **show interfaces trunk** command to verify that the port channels are functioning as trunk ports.

S1# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Fa0/1 on 802.1q trunking 99

Fa0/2 on 802.1q trunking 99

Port Vlans allowed on trunk

Fa0/1 1-4094

Fa0/2 1-4094

Port Vlans allowed and active in management domain

Fa0/1 1,10,99

Fa0/2 1,10,99

Port Vlans in spanning tree forwarding state and not pruned

Fa0/1 none

Fa0/2 none

Do port channels 1 and 2 appear as trunked ports? \_\_\_\_\_ No

* + 1. Use the **show etherchannel summary** command to verify that interfaces are configured in the correct port channel, the proper protocol is configured, and the interfaces are in use.

S1# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

------+-------------+-----------+-----------------------------------------------

1 Po1(SD) LACP Fa0/1(I) Fa0/2(I)

2 Po2(SD) PAgP Fa0/3(I) Fa0/4(I)

Based on the output, are there any EtherChannel issues? If issues are found, record them in the space provided below.

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Yes. Port Channel 1 is configured with the Link Aggregation Control Protocol (LACP), and the ports in Port Channel 2 are functioning independently (I = stand-alone).

* + 1. Use the command **show run | begin interface Port-channel** command to view the running configuration beginning with the first port channel interface.

S1# **show run | begin interface Port-channel**

interface Port-channel1

 switchport trunk native vlan 99

 switchport mode trunk

!

interface Port-channel2

 switchport trunk native vlan 99

 switchport mode access

!

interface FastEthernet0/1

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 1 mode active

!

interface FastEthernet0/2

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 1 mode active

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport mode access

 channel-group 2 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport mode access

 channel-group 2 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 switchport access vlan 10

 switchport mode access

!

interface FastEthernet0/7

 shutdown

!

<output omitted>

* + 1. Resolve all problems found in the outputs from the previous **show** commands. Record the commands used to correct the configurations.

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S1(config)# **interface range f0/1-2**

S1(config-if-range)# **no channel-group 1 mode active**

S1(config-if-range)# **channel-group 1 mode desirable**

S1(config-if-range)# **exit**

S1(config)# **interface port-channel 2**

S1(config-if)# **switchport mode trunk**

* + 1. Use the **show interfaces trunk** command to verify trunk settings.

S1# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po1 on 802.1q trunking 99

Po2 on 802.1q trunking 99

Port Vlans allowed on trunk

Po1 1-4094

Po2 1-4094

Port Vlans allowed and active in management domain

Po1 1,10,99

Po2 1,10,99

Port Vlans in spanning tree forwarding state and not pruned

Po1 1,10,99

Po2 1,10,99

* + 1. Use the **show etherchannel summary** command to verify that the port channels are up and in use.

S1# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

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1 Po1(SU) PAgP Fa0/1(P) Fa0/2(P)

2 Po2(SU) PAgP Fa0/3(P) Fa0/4(P)

* 1. Troubleshoot S2.
		1. Issue the command to verify that the port channels are functioning as trunk ports. Record the command used in the space provided below.

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S2# **show interfaces trunk**

S2# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po1 on 802.1q trunking 99

Port Vlans allowed on trunk

Po1 1,99

Port Vlans allowed and active in management domain

Po1 1,99

Port Vlans in spanning tree forwarding state and not pruned

Po1 1,99

Based on the output, are there any issues with the configurations? If issues are found, record them in the space provided below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Port Channel 3 is not present in the output, and VLAN 10 is not allowed in Port Channel 1.

* + 1. Issue the command to verify that interfaces are configured in the correct port channel and the proper protocol is configured.

S2# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

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1 Po1(SU) PAgP Fa0/1(P) Fa0/2(P)

3 Po3(SD) PAgP Fa0/3(D) Fa0/4(D)

Based on the output, are there any EtherChannel issues? If issues are found, record them in the space provided below.

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Yes. Port Channel 3 is down.

* + 1. Use the command **show run | begin interface Port-channel** to view the running configuration beginning with the first port-channel interface.

S2# **show run | begin interface Port-channel**

interface Port-channel1

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,99

 switchport mode trunk

!

interface Port-channel3

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

!

interface FastEthernet0/1

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/2

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 shutdown

 channel-group 3 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 shutdown

 channel-group 3 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 shutdown

!

<output omitted>

* + 1. Resolve all problems found in the outputs from the previous **show** commands. Record the commands used to correct the configuration.

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S2(config)# **interface range f0/3-4**

S2(config-if-range)# **no shutdown**

S2(config-if-range)# **exit**

S2(config)# **interface port-channel 1**

S2(config-if)# **switchport trunk allowed vlan 1,10,99**

* + 1. Issue the command to verify trunk settings.

S2# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po1 on 802.1q trunking 99

Port Vlans allowed on trunk

Po1 1,10,99

Port Vlans allowed and active in management domain

Po1 1,10,99

Port Vlans in spanning tree forwarding state and not pruned

Po1 1,10,99

* + 1. Issue the command to verify that the port channels are functioning. Remember that port channel issues can be caused by either end of the link.

S2# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

------+-------------+-----------+-----------------------------------------------

1 Po1(SU) PAgP Fa0/1(P) Fa0/2(P)

3 Po3(SD) PAgP Fa0/3(D) Fa0/4(D)

* 1. Troubleshoot S3.
		1. Issue the command to verify that the port channels are functioning as trunk ports.

S3# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po3 on 802.1q trunking 99

Port Vlans allowed on trunk

Po3 1-4094

Port Vlans allowed and active in management domain

Po3 1,10,99

Port Vlans in spanning tree forwarding state and not pruned

Po3 1,10,99

Based on the output, are there any issues with the configurations? If issues are found, record them in the space provided below.

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Port Channel 2 is not present in the output.

* + 1. Issue the command to verify that the interfaces are configured in the correct port channel and that the proper protocol is configured.

S3# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 1

Number of aggregators: 1

Group Port-channel Protocol Ports

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3 Po3(SU) PAgP Fa0/3(P) Fa0/4(P)

Based on the output, are there any EtherChannel issues? If issues are found, record them in the space provided below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Port Channel 2 is not present, and Port Channel 3 is incorrectly configured for interfaces f0/3 and f0/4.

* + 1. Use the command **show run | begin interface Port-channel** command to view the running configuration beginning with the first port channel interface.

S3# **show run | begin interface Port-channel**

interface Port-channel3

 switchport trunk native vlan 99

 switchport mode trunk

!

interface FastEthernet0/1

 shutdown

!

interface FastEthernet0/2

 shutdown

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 shutdown

!

<output omitted>

* + 1. Resolve all problems found. Record the commands used to correct the configuration.

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S3(config)# **interface range f0/3-4**

S3(config-if-range)# **channel-group 2 mode desirable**

S3(config-if-range)# **interface range f0/1-2**

S3(config-if-range)# **switchport mode trunk**

S3(config-if-range)# **switchport trunk native vlan 99**

S3(config-if-range)# **channel-group 3 mode desirable**

S3(config-if-range)# **no shutdown**

* + 1. Issue the command to verify trunk settings. Record the command used in the space provided below.

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S3# **show interfaces trunk**

S3# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Po2 on 802.1q trunking 99

Po3 on 802.1q trunking 99

Port Vlans allowed on trunk

Po2 1-4094

Po3 1-4094

Port Vlans allowed and active in management domain

Po2 1,10,99

Po3 1,10,99

Port Vlans in spanning tree forwarding state and not pruned

Po2 1,10,99

Po3 1,10,99

* + 1. Issue the command to verify that the port channels are functioning. Record the command used in the space provided below.

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S3# **show etherchannel summary**

S3# **show etherchannel summary**

Flags: D - down P - bundled in port-channel

 I - stand-alone s - suspended

 H - Hot-standby (LACP only)

 R - Layer3 S - Layer2

 U - in use f - failed to allocate aggregator

 M - not in use, minimum links not met

 u - unsuitable for bundling

 w - waiting to be aggregated

 d - default port

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

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2 Po2(SU) PAgP Fa0/3(P) Fa0/4(P)

3 Po3(SU) PAgP Fa0/1(P) Fa0/2(P)

* 1. Verify EtherChannel and Connectivity.
		1. Use the **show interfaces etherchannel** command to verify full functionality of the port channels.

S1# **show interfaces etherchannel**

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FastEthernet0/1:

Port state = Up Mstr In-Bndl

Channel group = 1 Mode = Desirable-Sl Gcchange = 0

Port-channel = Po1 GC = 0x00010001 Pseudo port-channel = Po1

Port index = 0 Load = 0x00 Protocol = PAgP

Flags: S - Device is sending Slow hello. C - Device is in Consistent state.

 A - Device is in Auto mode. P - Device learns on physical port.

 d - PAgP is down.

Timers: H - Hello timer is running. Q - Quit timer is running.

 S - Switching timer is running. I - Interface timer is running.

Local information:

 Hello Partner PAgP Learning Group

Port Flags State Timers Interval Count Priority Method Ifindex

Fa0/1 SC U6/S7 H 30s 1 128 Any 5001

Partner's information:

 Partner Partner Partner Partner Group

Port Name Device ID Port Age Flags Cap.

Fa0/1 S2 0cd9.96e8.6f80 Fa0/1 23s SC 10001

Age of the port in the current state: 0d:00h:38m:38s

----

FastEthernet0/2:

Port state = Up Mstr In-Bndl

Channel group = 1 Mode = Desirable-Sl Gcchange = 0

Port-channel = Po1 GC = 0x00010001 Pseudo port-channel = Po1

Port index = 0 Load = 0x00 Protocol = PAgP

Flags: S - Device is sending Slow hello. C - Device is in Consistent state.

 A - Device is in Auto mode. P - Device learns on physical port.

 d - PAgP is down.

Timers: H - Hello timer is running. Q - Quit timer is running.

 S - Switching timer is running. I - Interface timer is running.

Local information:

 Hello Partner PAgP Learning Group

Port Flags State Timers Interval Count Priority Method Ifindex

Fa0/2 SC U6/S7 H 30s 1 128 Any 5001

Partner's information:

 Partner Partner Partner Partner Group

Port Name Device ID Port Age Flags Cap.

Fa0/2 S2 0cd9.96e8.6f80 Fa0/2 7s SC 10001

Age of the port in the current state: 0d:00h:38m:38s

----

FastEthernet0/3:

Port state = Up Mstr In-Bndl

Channel group = 2 Mode = Desirable-Sl Gcchange = 0

Port-channel = Po2 GC = 0x00020001 Pseudo port-channel = Po2

Port index = 0 Load = 0x00 Protocol = PAgP

Flags: S - Device is sending Slow hello. C - Device is in Consistent state.

 A - Device is in Auto mode. P - Device learns on physical port.

 d - PAgP is down.

Timers: H - Hello timer is running. Q - Quit timer is running.

 S - Switching timer is running. I - Interface timer is running.

Local information:

 Hello Partner PAgP Learning Group

Port Flags State Timers Interval Count Priority Method Ifindex

Fa0/3 SC U6/S7 H 30s 1 128 Any 5002

Partner's information:

 Partner Partner Partner Partner Group

Port Name Device ID Port Age Flags Cap.

Fa0/3 S3 0cd9.96d2.5100 Fa0/3 5s SC 20001

Age of the port in the current state: 0d:00h:28m:48s

----

FastEthernet0/4:

Port state = Up Mstr In-Bndl

Channel group = 2 Mode = Desirable-Sl Gcchange = 0

Port-channel = Po2 GC = 0x00020001 Pseudo port-channel = Po2

Port index = 0 Load = 0x00 Protocol = PAgP

Flags: S - Device is sending Slow hello. C - Device is in Consistent state.

 A - Device is in Auto mode. P - Device learns on physical port.

 d - PAgP is down.

Timers: H - Hello timer is running. Q - Quit timer is running.

 S - Switching timer is running. I - Interface timer is running.

Local information:

 Hello Partner PAgP Learning Group

Port Flags State Timers Interval Count Priority Method Ifindex

Fa0/4 SC U6/S7 H 30s 1 128 Any 5002

Partner's information:

 Partner Partner Partner Partner Group

Port Name Device ID Port Age Flags Cap.

Fa0/4 S3 0cd9.96d2.5100 Fa0/4 6s SC 20001

Age of the port in the current state: 0d:00h:28m:48s

----

Port-channel1:

Age of the Port-channel = 0d:00h:57m:52s

Logical slot/port = 2/1 Number of ports = 2

GC = 0x00010001 HotStandBy port = null

Port state = Port-channel Ag-Inuse

Protocol = PAgP

Port security = Disabled

Ports in the Port-channel:

Index Load Port EC state No of bits

------+------+------+------------------+-----------

 0 00 Fa0/1 Desirable-Sl 0

 0 00 Fa0/2 Desirable-Sl 0

Time since last port bundled: 0d:00h:38m:38s Fa0/1

Time since last port Un-bundled: 0d:00h:42m:15s Fa0/2

----

Port-channel2:

Age of the Port-channel = 0d:00h:57m:48s

Logical slot/port = 2/2 Number of ports = 2

GC = 0x00020001 HotStandBy port = null

Port state = Port-channel Ag-Inuse

Protocol = PAgP

Port security = Disabled

Ports in the Port-channel:

Index Load Port EC state No of bits

------+------+------+------------------+-----------

 0 00 Fa0/3 Desirable-Sl 0

 0 00 Fa0/4 Desirable-Sl 0

Time since last port bundled: 0d:00h:28m:48s Fa0/4

Time since last port Un-bundled: 0d:00h:28m:51s Fa0/4

* + 1. Verify connectivity of the management VLAN.

Can S1 ping S2? \_\_\_\_\_ Yes

Can S1 ping S3? \_\_\_\_\_ Yes

Can S2 ping S3? \_\_\_\_\_ Yes

* + 1. Verify connectivity of PCs.

Can PC-A ping PC-C? \_\_\_\_\_ Yes

If EtherChannels are not fully functional, connectivity between switches does not exist, or connectivity between hosts does not exist. Troubleshoot to resolve any remaining issues.

**Note**: It may be necessary to disable the PC firewall for pings between the PCs to succeed.

1. Device Configs - Final
2. Switch S1

S1#show run

Building configuration...

Current configuration : 2241 bytes

!

version 15.0

no service pad

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname S1

!

boot-start-marker

boot-end-marker

!

enable secret 4 06YFDUHH61wAE/kLkDq9BGho1QM5EnRtoyr8cHAUg.2

!

no aaa new-model

system mtu routing 1500

!

no ip domain-lookup

!

spanning-tree mode pvst

spanning-tree extend system-id

!

vlan internal allocation policy ascending

!

interface Port-channel1

 switchport trunk native vlan 99

 switchport mode trunk

!

interface Port-channel2

 switchport trunk native vlan 99

 switchport mode trunk

!

interface FastEthernet0/1

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/2

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 2 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 2 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 switchport access vlan 10

 switchport mode access

!

interface FastEthernet0/7

 shutdown

!

interface FastEthernet0/8

 shutdown

!

interface FastEthernet0/9

 shutdown

!

interface FastEthernet0/10

 shutdown

!

interface FastEthernet0/11

 shutdown

!

interface FastEthernet0/12

 shutdown

!

interface FastEthernet0/13

 shutdown

!

interface FastEthernet0/14

 shutdown

!

interface FastEthernet0/15

 shutdown

!

interface FastEthernet0/16

 shutdown

!

interface FastEthernet0/17

 shutdown

!

interface FastEthernet0/18

 shutdown

!

interface FastEthernet0/19

 shutdown

!

interface FastEthernet0/20

 shutdown

!

interface FastEthernet0/21

 shutdown

!

interface FastEthernet0/22

 shutdown

!

interface FastEthernet0/23

 shutdown

!

interface FastEthernet0/24

 shutdown

!

interface GigabitEthernet0/1

 shudown

!

interface GigabitEthernet0/2

 shudown

!

interface Vlan1

 no ip address

!

interface Vlan99

 ip address 192.168.1.11 255.255.255.0

!

ip http server

ip http secure-server

!

line con 0

 password cisco

 logging synchronous

 login

line vty 0 4

 password cisco

 login

line vty 5 15

 password cisco

 login

!

end

1. Switch S2

S2#show run

Building configuration...

Current configuration : 2476 bytes

!

version 15.0

no service pad

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname S2

!

boot-start-marker

boot-end-marker

!

enable secret 4 06YFDUHH61wAE/kLkDq9BGho1QM5EnRtoyr8cHAUg.2

!

no aaa new-model

system mtu routing 1500

!

no ip domain-lookup

!

spanning-tree mode pvst

spanning-tree extend system-id

spanning-tree vlan 1,10,99 priority 24576

!

vlan internal allocation policy ascending

!

interface Port-channel1

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

!

interface Port-channel3

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

!

interface FastEthernet0/1

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/2

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 channel-group 1 mode desirable

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport trunk allowed vlan 1,10,99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 shutdown

!

interface FastEthernet0/7

 shutdown

!

interface FastEthernet0/8

 shutdown

!

interface FastEthernet0/9

 shutdown

!

interface FastEthernet0/10

 shutdown

!

interface FastEthernet0/11

 shutdown

!

interface FastEthernet0/12

 shutdown

!

interface FastEthernet0/13

 shutdown

!

interface FastEthernet0/14

 shutdown

!

interface FastEthernet0/15

 shutdown

!

interface FastEthernet0/16

 shutdown

!

interface FastEthernet0/17

 shutdown

!

interface FastEthernet0/18

 shutdown

!

interface FastEthernet0/19

 shutdown

!

interface FastEthernet0/20

 shutdown

!

interface FastEthernet0/21

 shutdown

!

interface FastEthernet0/22

 shutdown

!

interface FastEthernet0/23

 shutdown

!

interface FastEthernet0/24

 shutdown

!

interface GigabitEthernet0/1

 shudown

!

interface GigabitEthernet0/2

 shudown

!

interface Vlan1

 no ip address

!

interface Vlan99

 ip address 192.168.1.12 255.255.255.0

!

ip http server

ip http secure-server

!

line con 0

 password cisco

 logging synchronous

 login

line vty 0 4

 password cisco

 login

line vty 5 15

 password cisco

 login

!

end

1. Switch S3

S3#show run

Building configuration...

Current configuration : 2239 bytes

!

version 15.0

no service pad

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname S3

!

boot-start-marker

boot-end-marker

!

enable secret 4 06YFDUHH61wAE/kLkDq9BGho1QM5EnRtoyr8cHAUg.2

!

no aaa new-model

system mtu routing 1500

!

no ip domain-lookup

!

spanning-tree mode pvst

spanning-tree extend system-id

!

vlan internal allocation policy ascending

!

interface Port-channel2

 switchport trunk native vlan 99

 switchport mode trunk

!

interface Port-channel3

 switchport trunk native vlan 99

 switchport mode trunk

!

interface FastEthernet0/1

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/2

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 3 mode desirable

!

interface FastEthernet0/3

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 2 mode desirable

!

interface FastEthernet0/4

 switchport trunk native vlan 99

 switchport mode trunk

 channel-group 2 mode desirable

!

interface FastEthernet0/5

 shutdown

!

interface FastEthernet0/6

 shutdown

!

interface FastEthernet0/7

 shutdown

!

interface FastEthernet0/8

 shutdown

!

interface FastEthernet0/9

 shutdown

!

interface FastEthernet0/10

 shutdown

!

interface FastEthernet0/11

 shutdown

!

interface FastEthernet0/12

 shutdown

!

interface FastEthernet0/13

 shutdown

!

interface FastEthernet0/14

 shutdown

!

interface FastEthernet0/15

 shutdown

!

interface FastEthernet0/16

 shutdown

!

interface FastEthernet0/17

 shutdown

!

interface FastEthernet0/18

 switchport access vlan 10

 switchport mode access

!

interface FastEthernet0/19

 shutdown

!

interface FastEthernet0/20

 shutdown

!

interface FastEthernet0/21

 shutdown

!

interface FastEthernet0/22

 shutdown

!

interface FastEthernet0/23

 shutdown

!

interface FastEthernet0/24

 shutdown

!

interface GigabitEthernet0/1

 shudown

!

interface GigabitEthernet0/2

 shudown

!

interface Vlan1

 no ip address

!

interface Vlan99

 ip address 192.168.1.13 255.255.255.0

!

ip http server

ip http secure-server

!

line con 0

 password cisco

 logging synchronous

 login

line vty 0 4

 password cisco

 login

line vty 5 15

 password cisco

 login

!

end