Lab – Troubleshooting EtherChannel

Topology
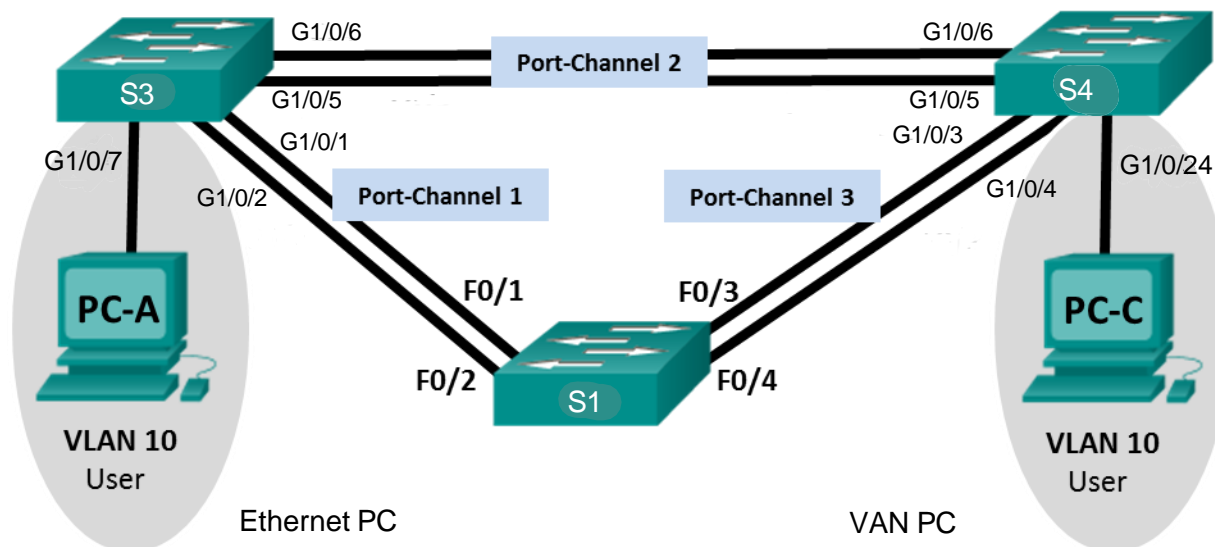
Addressing Table

Device	Interface	IP Address	Subnet Mask
S1	VLAN 99	192.168.1.11	255.255.255.0
S3	VLAN 99	192.168.1.13	255.255.255.0
S4	VLAN 99	192.168.1.14	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

VLAN Assignments

VLAN	Name
10	User
99	Management

Objectives

Part 1: Build the Network and Load Device Configurations

Part 2: Troubleshoot EtherChannel

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: Make sure that the switches have been erased and have no startup configurations.

Required Resources

- 3 Switches
- 2 Virtual PCs (if on-campus)
- Ethernet cables as shown in the topology

Part 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.

Step 1:   Erase the startup and VLAN configurations and reload the switches.

Step 2:   Verify the network is cabled as shown in the topology.

Step 3:   In on-campus, configure the PC hosts.

Step 4:   Load switch configurations.

Load the following configurations into the appropriate switch. 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 S3 Configuration:

```
hostname S3
interface range g1/0/1-24, g1/1/1-4
shutdown
exit
no ip domain lookup
line con 0
 logging synchronous
 exit
vlan 10
 name User
vlan 99
 Name Management
interface range g1/0/1-2
 switchport mode trunk
 channel-group 1 mode active
 switchport trunk native vlan 99
 no shutdown
interface range g1/0/5-6
 channel-group 2 mode desirable
 switchport trunk native vlan 99
 no shutdown
interface g1/0/7
 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 1
 switchport trunk native vlan 99
 switchport mode trunk
interface port-channel 2
 switchport trunk native vlan 99
 switchport mode access
```

Switch S1 Configuration:

```
hostname S1
interface range f0/1-24, g0/1-2
 shutdown
 exit
no ip domain lookup
line con 0
 logging synchronous
 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
interface vlan 99
 ip address 192.168.1.11 255.255.255.0
interface port-channel 1
 switchport trunk native vlan 99
 switchport trunk allowed vlan 1,99
interface port-channel 3
 switchport trunk native vlan 99
 switchport trunk allowed vlan 1,10,99
 switchport mode trunk
```

Switch S4 Configuration:

```
hostname S4
interface range g1/0/1-24, g1/1/1-4
 shutdown
 exit
no ip domain lookup
line con 0
 logging synchronous
 exit
vlan 10
 name User
vlan 99
 name Management
interface range g1/0/3-4
interface range g1/0/5-6
 switchport mode trunk
 channel-group 3 mode desirable
 switchport trunk native vlan 99
 no shutdown
interface g1/0/24
 switchport mode access
 switchport access vlan 10
 no shutdown
interface vlan 99
 ip address 192.168.1.14 255.255.255.0
interface port-channel 3
 switchport trunk native vlan 99
 switchport mode trunk
```

Part 2: Troubleshoot EtherChannel

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

Step 1: Troubleshoot S3.

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

```
S3# show interfaces trunk
S3#
```

Do port channels 1 and 2 appear as trunked ports?

⇨   Port channels 1 and 2 do not appear as trunked ports

b. 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.

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

```
S3# show etherchannel summary
Flags:  D - down         P - 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
        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   Gig1/0/1(I) Gig1/0/2(I)
2      Po2(SD)                PAgP   Gig1/0/5(I) Gig1/0/6(I)
S3#
```

Based on the output, there are errors in the satus of the ports in both Port-Channels (Po1 and Po2).

- Port channel 1 (Po1 – LACP):

  + The Po1 (Port-channel 1) group is in SD state which means that "Layer2 Down)

  + Ports (GigabitEthernet1/0/1 and GigabitEthernet1/0/2) are in "I" state (stand-alone)

- Port channel 2 (Po2 – PAgP):

  + The Po2 (Port-channel 2) group is in the "SD" state, indicating the Layer2 Down

  + Ports (Gi1/0/5 and Gi1/0/6) are also in the "I" state (stand-alone).

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

```
S3> ena
S3# 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 GigabitEthernet1/0/1
 switchport trunk native vlan 99
 switchport mode trunk
 channel-group 1 mode active
!
interface GigabitEthernet1/0/2
 switchport trunk native vlan 99
 switchport mode trunk
 channel-group 1 mode active
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
 switchport trunk native vlan 99
 switchport mode trunk
 channel-group 2 mode desirable
!
interface GigabitEthernet1/0/6
 switchport trunk native vlan 99
 switchport mode trunk
 channel-group 2 mode desirable
!
interface GigabitEthernet1/0/7
 switchport access vlan 10
 switchport mode access
!
interface GigabitEthernet1/0/8
 --More--
```

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

Command lines for Switch S3:

- For port-channel 1 (Po1):

interface gi1/0/5

no shutdown

switchport mode trunk

interface gi1/0/6

no shutdown

switchport mode trunk

interface range gi1/0/5-6

switchport trunk native vlan 99

switchport mode trunk

- For port-channel 2 (Po2):

interface gi1/0/1

no shutdown

switchport mode trunk

interface gi1/0/2

no shutdown

switchport mode trunk

interface range gi1/0/1-2

switchport trunk native vlan 99

switchport mode trunk

d. Use the **show interfaces trunk** command to verify trunk settings.

```
S3# show interface 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           1-1005
Po2           1-1005

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           10
```

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

```
S3# show etherchannel summary
Flags:  D - down          P - 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
        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    Gig1/0/1(P) Gig1/0/2(P)
2      Po2(SU)          PAgP    Gig1/0/5(P) Gig1/0/6(P)
S3#
```

Step 2:   Troubleshoot S1.

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

   ⇨   show interface trunk

```
S1# show interface trunk
Port          Mode         Encapsulation  Status        Native vlan
Po1           on           802.1q         trunking      99
Po3           on           802.1q         trunking      99

Port          Vlans allowed on trunk
Po1           1,99
Po3           1,10,99

Port          Vlans allowed and active in management domain
Po1           1,99
Po3           1,10,99

Port          Vlans in spanning tree forwarding state and not pruned
Po1           1,99
Po3           1,10,99

S1#
```

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

   ⇨   Based on the output, there are not any issues with the configurations.

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

=> show etherchannel summary

```
S1> ena
S1# show etherchannel summary
Flags:  D - down          P - 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
        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(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.

=> Based on the output, there are not any EtherChannel issues

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

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

        ⇨   There are not any problems found in the outputs from the previous show commands.

    f.   Issue the command to verify trunk settings.

    g.   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.

Step 3: Troubleshoot S4.

    a.   Issue the command to verify that the port channels are functioning as trunk ports.

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

        ⇨   Yes, the port-channel 1 is not configured as the trunk port

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

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

        ⇨   Yes, the port-channel 1 is "SD" (Layer2Down) and ports are "I" (stand-alone)

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

    d.   Resolve all problems found. Record the commands used to correct the configuration.

       -   For port-channel 1 (Po1):

         interface gi1/0/5

         no shutdown

         switchport mode trunk

         interface gi1/0/6

         no shutdown

         switchport mode trunk

         interface range gi1/0/5-6

         switchport trunk native vlan 99

         switchport mode trunk

e. Issue the command to verify trunk settings. Record the command used in the space provided below.
    ⇨ Show interface trunk

```
S4> ena\
Translating "ena\"
% Unknown command or computer name, or unable to find computer address

S4> ena
S4# show interface 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           1-1005
Po3           1-1005

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
```

f. Issue the command to verify that the port channels are functioning. Record the command used in the space provided below.
    ⇨ show etherchannel summary

```
S4# show etherchannel summary
Flags:  D - down          P - 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
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 3
Number of aggregators:           3

Group  Port-channel  Protocol    Ports
------+------------+-----------+-------------------------

1      Po1(SD)          -
2      Po2(SU)         PAgP    Gig1/0/5(P) Gig1/0/6(P)
3      Po3(SU)         PAgP    Gig1/0/3(P) Gig1/0/4(P)
S4#
```

Step 4: Verify EtherChannel and Connectivity.

a. Use the **show interfaces etherchannel** command to verify full functionality of the port channels.

    b.   Verify connectivity of the management VLAN.

Can S1 ping S2? => Yes

Can S1 ping S3? => Yes

Can S2 ping S3? => Yes

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

Would PC-A be able to ping PC-C? => Yes

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms


C:\>
```