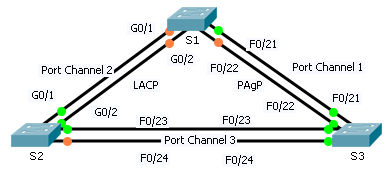
Packet Tracer – Configuring EtherChannel (Instructor Version)

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

1. Topology



1. Objectives

Part 1: Configure Basic Switch Settings

Part 2: Configure an EtherChannel with Cisco PAgP

Part 3: Configure an 802.3ad LACP EtherChannel

Part 4: Configure a Redundant EtherChannel Link

1. Background

Three switches have just been installed. There are redundant uplinks between the switches. Usually, only one of these links could be used; otherwise, a bridging loop might occur. However, using only one link utilizes only half of the available bandwidth. EtherChannel allows up to eight redundant links to be bundled together into one logical link. In this lab, you will configure Port Aggregation Protocol (PAgP), a Cisco EtherChannel protocol, and Link Aggregation Control Protocol (LACP), an IEEE 802.3ad open standard version of EtherChannel.

1. Configure Basic Switch Settings
   1. Configure basic switch parameters.
      1. Assign each switch a hostname according to the topology diagram.

Switch(config)# **hostname S1**

Switch(config)# **hostname S2**

Switch(config)# **hostname S3**

* + 1. Configure all required ports as trunks, depending on the connections between devices.

**Note**: If the ports are configured with dynamic auto mode, and you do not set the mode of the ports to trunk, the links do not form trunks and remain access ports. The default mode on a 2960 switch is dynamic auto.

S1(config)# **interface range g0/1 - 2**

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

S1(config-if-range)# **interface range f0/21 - 22**

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

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

S2(config)# **interface range g0/1 - 2**

S2(config-if-range)# **switchport mode trunk**

S2(config-if-range)# **interface range f0/23 - 24**

S2(config-if-range)# **switchport mode trunk**

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

S3(config)# **interface range f0/21 - 24**

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

S3(config-if-range)# **end**

1. Configure an EtherChannel with Cisco PAgP

**Note**: When configuring EtherChannels, it is recommended to shut down the physical ports being grouped on both devices before configuring them into channel groups. Otherwise, the EtherChannel Misconfig Guard may place these ports into err-disabled state. The ports and port channels can be re-enabled after EtherChannel is configured.

* 1. Configure Port Channel 1.
     1. The first EtherChannel created for this activity aggregates ports F0/22 and F0/21 between **S1** and **S3**. Use the **show interfaces trunk** command to ensure that you have an active trunk link for those two links.

S1# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

F0/21 on 802.1q trunking 1

F0/22 on 802.1q trunking 1

G0/1 on 802.1q trunking 1

G0/2 on 802.1q trunking 1

<output omitted>

* + 1. On both switches, add ports F0/21 and F0/22 to Port Channel 1 with the **channel-group 1 mode desirable** command. The **mode desirable** option enables the switch to actively negotiate to form a PAgP link.

S1(config)# **interface range f0/21 – 22**

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

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

S1(config-if-range)# **no shutdown**

S3(config)# **interface range f0/21 - 22**

S3(config-if-range)# **shutdown**

S3(config-if-range)# **channel-group 1 mode desirable**

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

* + 1. Configure the logical interface to become a trunk by first entering the **interface port-channel** *number*command and then the **switchport mode trunk** command. Add this configuration to both switches.

**Instructor Note**: Packet Tracer 6.0.1 does not grade the **switchport mode trunk** command in port-channel interfaces.

S1(config)# **interface port-channel 1**

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

**Instructor Note**: Packet Tracer 6.0.1 does not grade the **switchport mode trunk** command in port-channel interfaces.

S3(config)# **interface port-channel 1**

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

* 1. Verify Port Channel 1 status.
     1. Issue the **show etherchannel summary** command to verify that EtherChannel is working on both switches. This command displays the type of EtherChannel, the ports utilized, and port states.

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: 1

Number of aggregators: 1

Group Port-channel Protocol Ports

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1 Po1(SU) PAgP F0/21(P) F0/22(P)

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: 1

Number of aggregators: 1

Group Port-channel Protocol Ports

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

1 Po1(SU) PAgP F0/21(P) F0/22(P)

* + 1. If the EtherChannel does not come up, shut down the physical interfaces on both ends of the EtherChannel and then bring them back up again. This involves using the **shutdown** command on those interfaces, followed by a **no shutdown** command a few seconds later.

The **show interfaces trunk** and **show spanning-tree** commands also show the port channel as one logical link.

S1# **show interfaces trunk**

Port Mode Encapsulation Status Native vlan

Gig0/1 on 802.1q trunking 1

Gig0/2 on 802.1q trunking 1

Po1 on 802.1q trunking 1

<output omitted>

S1# **show spanning-tree**

VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 32769

Address 0001.436E.8494

Cost 9

Port 27(Port-channel 1)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)

Address 000A.F313.2395

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

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Gi0/1 Desg FWD 4 128.25 P2p

Gi0/2 Desg FWD 4 128.26 P2p

Po1 Root FWD 9 128.27 Shr

1. Configure an 802.3ad LACP EtherChannel
   1. Configure Port Channel 2.
      1. In 2000, the IEEE released 802.3ad, which is an open standard version of EtherChannel. Using the previous commands, configure the link between **S1** and **S2** on ports G0/1 and G0/2 as an LACP EtherChannel. You must use a different port channel number on **S1** than 1, because you already used that in the previous step. To configure a port channel as LACP, use the interface configuration mode **channel-group** *number* **mode active** command. Active mode indicates that the switch actively tries to negotiate that link as LACP, as opposed to PAgP.

**Instructor Note**: Packet Tracer 6.0.1 does not grade the **switchport mode trunk** command in port-channel interfaces.

S1(config)# **interface range g0/1 - 2**

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

S1(config-if-range)# **channel-group 2 mode active**

S1(config-if-range)# **no shutdown**

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

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

S2(config)# **interface range g0/1 - 2**

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

S2(config-if-range)# **channel-group 2 mode active**

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

S2(config-if-range)# **interface port-channel 2**

S2(config-if)# **switchport mode trunk**

* 1. Verify Port Channel 2 status.
     1. Use the **show** commands from Part 1 Step 2 to verify the status of Port Channel 2. Look for the protocol used by each port.

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

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1 Po1(SU) PAgP Fa0/21(P) Fa0/22(P)

2 Po2(SU) LACP Gig0/1(P) Gig0/2(P)

1. Configure a Redundant EtherChannel Link
   1. Configure Port Channel 3.

There are various ways to enter the **channel-group** *number***mode** command:

S2(config)# **interface range f0/23 - 24**

S2(config-if-range)# **channel-group 3 mode ?**

active Enable LACP unconditionally

auto Enable PAgP only if a PAgP device is detected

desirable Enable PAgP unconditionally

on Enable Etherchannel only

passive Enable LACP only if a LACP device is detected

* + 1. On switch **S2**, add ports F0/23 and F0/24 to Port Channel 3 with the **channel-group 3 mode passive** command. The **passive** option indicates that you want the switch to use LACP only if another LACP device is detected. Statically configure Port Channel 3 as a trunk interface.

**Instructor Note**: Packet Tracer 6.0.1 does not grade the **switchport mode trunk** command in port-channel interfaces.

S2(config)# **interface range f0/23 - 24**

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

S2(config-if-range)# **channel-group 3 mode passive**

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

S2(config-if-range)# **interface port-channel 3**

S2(config-if)# **switchport mode trunk**

* + 1. On switch **S3**, add ports F0/23 and F0/24 to Port Channel 3 with the **channel-group 3 mode active** command. The **active** option indicates that you want the switch to use LACP unconditionally. Statically configure Port Channel 3 as a trunk interface.

**Instructor Note**: Packet Tracer 6.0.1 does not grade the **switchport mode trunk** command in port-channel interfaces.

S3(config)# **interface range f0/23 - 24**

S3(config-if-range)# **shutdown**

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

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

S3(config-if-range)# **interface port-channel 3**

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

* 1. Verify Port Channel 3 status.
     1. Use the **show** commands from Part 1 Step 2 to verify the status of Port Channel 3. Look for the protocol used by each port.

S2# **show etherchannel summary**

<output omitted>

Number of channel-groups in use: 2

Number of aggregators: 2

Group Port-channel Protocol Ports

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

2 Po2(SU) LACP Gig0/1(P) Gig0/2(P)

3 Po3(SU) LACP Fa0/23(P) Fa0/24(P)

* + 1. Port Channel 2 is not operative because spanning tree protocol placed some ports into blocking mode. Unfortunately, those ports were Gigabit ports. To restore these ports, configure **S1** to be **primary** root for VLAN 1 or set the priority to **24576**.

S1(config)# **spanning-tree vlan 1 root primary**

or

S1(config)# **spanning-tree vlan 1 priority 24576**