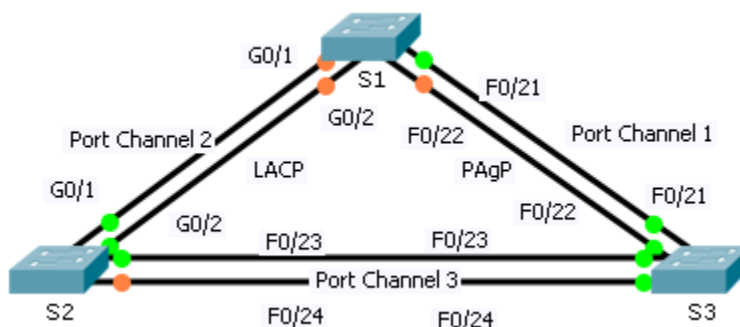


# Packet Tracer – Configuring EtherChannel (Instructor Version)

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

## Topology



## 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**

## 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.

## Part 1: Configure Basic Switch Settings

### Step 1: Configure basic switch parameters.

- Assign each switch a hostname according to the topology diagram.

```
Switch(config)# hostname S1
```

```
Switch(config)# hostname S2
```

```
Switch(config)# hostname S3
```

- 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
```

## Part 2: 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.

### Step 1: Configure Port Channel 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>

- 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
```

- c. 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
```

### Step 2: Verify Port Channel 1 status.

- a. 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
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)
```

- b. 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
-----						
Gi0/1	Desg	FWD	4	128.25	P2p	
Gi0/2	Desg	FWD	4	128.26	P2p	
Po1	Root	FWD	9	128.27	Shr	

## Part 3: Configure an 802.3ad LACP EtherChannel

### Step 1: Configure Port Channel 2.

- a. 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)# shutdown
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
```

### Step 2: Verify Port Channel 2 status.

- 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
1	Po1 (SU)	PAgP	Fa0/21 (P) Fa0/22 (P)
2	Po2 (SU)	LACP	Gig0/1 (P) Gig0/2 (P)

## Part 4: Configure a Redundant EtherChannel Link

### Step 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
```

- a. 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
```

- b. 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
```

### Step 2: Verify Port Channel 3 status.

- a. 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)
```

- b. 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
```