Configuring EtherChannel

EtherChannel is a port link aggregation technology that enables you to bundle multiple switch interfaces together to act as a single aggregate link, increasing bandwidth with the added advantage of resiliency.

In this exercise, you will learn how to configure Layer 2 and Layer 3 static EtherChannel.
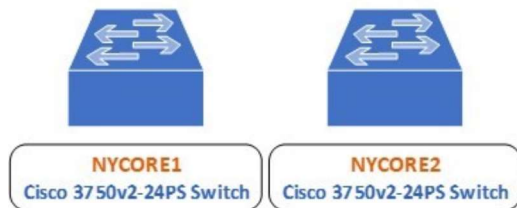
Learning Outcomes

After completing this exercise, you will be able to:

- Examine and configure layer 2 and layer 3 static etherchannel
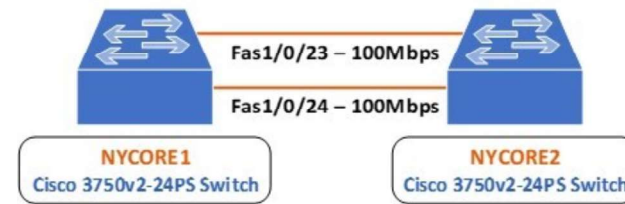
Your Devices

You will be using the following devices in this lab. Please make sure these are powered on before proceeding.

- **NYCORE1** (Cisco 3750v2-24PS Switch)
- **NYCORE2** (Cisco 3750v2-24PS Switch)

Lab Diagram

Your configurations for **EtherChannel** will focus on the following segment of the lab topology:

You can see that there are two physical **FastEthernet** connections between **NYCORE1** and **NYCORE2** on interfaces **1/0/23** and **1/0/24**. You will create an aggregated link or an **EtherChannel** to bundle together these two links, so they logically appear as follows:
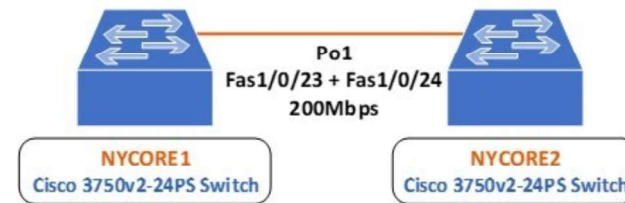
> **Note:** *The term **EtherChannel** and **Port-Channel** can be used interchangeably to refer to the bundle of aggregated links, but **Port-Channel** or **Po** is the **keyword** used when configuring the interface.*

Task 1 - Configuring Static Layer 2 EtherChannel

Step 1

For the purposes of the previous exercises, these two links were shutdown. In this step, you will bring them back up before configuring port aggregation. To do so, connect to the command line interface of **NYCORE2** and issue the following commands:

```
NYCORE2>enable
NYCORE2#configure terminal
NYCORE2(config)#interface range fastethernet 1/0/23 -
24
NYCORE2(config-if-range)#no shutdown
NYCORE2(config-if-range)#
```

```
*Mar  1 00:21:01.529: %LINK-3-UPDOWN: Interface
FastEthernet1/0/23, changed state to up
*Mar  1 00:21:01.554: %LINK-3-UPDOWN: Interface
FastEthernet1/0/24, changed state to up
*Mar  1 00:21:02.535: %LINEPROTO-5-UPDOWN: Line
protocol on Interface FastEthernet1/0/23, changed state
to up
*Mar  1 00:21:02.560: %LINEPROTO-5-UPDOWN: Line
protocol on Interface FastEthernet1/0/24, changed state
to up
NYCORE2(config-if-range)#exit
NYCORE2(config)#
```

Step 2

On **NYCORE2**, assign a **channel group** with an ID of **1** to each of the
FastEthernet 1/0/23 and **1/0/24** interfaces. Make sure to configure a **mode** of
on to configure the **EtherChannel** statically:

```
NYCORE2(config)#interface fastethernet 1/0/23
NYCORE2(config-if)#channel-group 1 mode on
Creating a port-channel interface Port-channel 1
NYCORE2(config-if)#exit
*Mar  1 00:06:10.214: %LINK-3-UPDOWN: Interface Port-
channel1, changed state to up
*Mar  1 00:06:11.221: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Port-channel1, changed state to
up
NYCORE2(config)#interface fastethernet 1/0/24
NYCORE2(config-if)#channel-group 1 mode on
NYCORE2(config-if)#exit
NYCORE2(config)#exit
NYCORE2#
```

Notice that interface **Port-channel 1 changed state to up** once you created it.

Step 3

Go to **NYCORE1** and configure the same settings as on **NYCORE2**:

```
NYCORE1#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE1(config)#interface fastethernet 1/0/23
NYCORE1(config-if)#channel-group 1 mode on
Creating a port-channel interface Port-channel 1
NYCORE1(config-if)#exit
NYCORE1(config)#
*Mar  1 00:09:56.388: %LINK-3-UPDOWN: Interface Port-
channel1, changed state to up
*Mar  1 00:09:57.394: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Port-channel1, changed state to
up
NYCORE1(config)#interface fastethernet 1/0/24
NYCORE1(config-if)#channel-group 1 mode on
NYCORE1(config-if)#exit
NYCORE1(config)# exit
NYCORE1#
*Mar  1 00:10:17.326: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Vlan1, changed state to down
*Mar  1 00:10:19.993: %SYS-5-CONFIG_I: Configured from
console by console
*Mar  1 00:10:24.414: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Vlan1, changed state to up
NYCORE1#
```

You will notice similar syslog messages here including the change of state of
interface VLAN **1** as well. This is normal behavior.

Step 4

To confirm your **EtherChannel** is operational, use the following command on the

NYCORE1 switch:

```
NYCORE1#show etherchannel summary
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H sh- 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
------+------------+-----------+----------------------
------------------------
1      Po1(SU)          -        Fa1/0/23(P)
Fa1/0/24(P)
NYCORE1#
```

It appears that the **EtherChannel** has been created and it is operational.

Step 5

You can view further details about this **EtherChannel** configuration with the following command:

```
NYCORE1#show interfaces port-channel 1 etherchannel
Age of the Port-channel   = 0d:00h:06m:48s
Logical slot/port    = 10/1       Number of ports = 2
GC                   = 0x00000000     HotStandBy port =
null
Port state           = Port-channel Ag-Inuse
```

```
Protocol              =     -
Port security         = Disabled
Ports in the Port-channel:
Index   Load   Port      EC state         No of bits
------+------+------+-----------------+----------
  0     00     Fa1/0/23 On                    0
  0     00     Fa1/0/24 On                    0
Time since last port bundled:    0d:00h:06m:38s
Fa1/0/24
Time since last port Un-bundled: 0d:00h:06m:48s
Fa1/0/24
NYCORE1#
```

You have successfully configured a static **EtherChannel** configuration.

Task 2 - Configuring Static Layer 3 EtherChannel

Once an **EtherChannel Port-Channel** has been created, it is possible, just like physical interfaces, to configure it as a routable port. That is, it can be configured to have an IP address and to function just like a router interface would.

In this exercise, you will configure the **EtherChannel** interfaces on both **NYCORE1** and **NYCORE2** as **Layer 3 EtherChannel** interfaces.

> It is important to first remove the current **EtherChannel** configuration in order to avoid **Layer2** and **Layer3** configuration mismatches.

Step 1

First, you will clear all of the EtherChannel configurations that you have created until now on both **NYCORE1** and **NYCORE2**. To do so, implement the following commands:

NYCORE1

```
NYCORE1#configure terminal
```

```
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE1(config)#interface range fastethernet 1/0/23 -
24
NYCORE1(config-if-range)#no channel-group 1
NYCORE1(config-if-range)#exit
NYCORE1(config)#no interface port-channel 1
NYCORE1(config)#exit
NYCORE1#
```

NYCORE2

```
NYCORE2#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
```

```
NYCORE2(config)#interface range fastethernet 1/0/23 -
24
NYCORE2(config-if-range)#no channel-group 1
NYCORE2(config-if-range)#exit
NYCORE2(config)#no interface port-channel 1
NYCORE2(config)#exit
NYCORE2#
```

You will see a series of syslog messages indicating that the interfaces have gone down.

Step 2

On **NYCORE1**, configure both the **FastEthernet 1/0/23** and **1/0/24** interfaces as routed interfaces and assign them to **channel-group 1** with a **mode** of **on**:

```
NYCORE1#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE1(config)#interface range fastethernet 1/0/23 -
24
NYCORE1(config-if-range)#no switchport
NYCORE1(config-if-range)#channel-group 1 mode on
Creating a port-channel interface Port-channel 1
NYCORE1(config-if-range)#
NYCORE1(config-if-range)#exit
NYCORE1(config)#
```

Although they are not shown above, a syslog message will indicate that ports are going down and coming back up. The most important syslog message should be the one indicating that the **port-channel 1** has come up.

Step 3

You have made the physical interfaces routed ports. This means the new **port-channel 1** interface is also a routed port. Here you will assign an IP address of **192.168.18.1/24** to this routed port:

> A **routed port** by definition is one that can have an IP address assigned to it. This is also called a **Layer3** port. If assigning an IP address is successful, then the **EtherChannel** created is indeed **Layer3**.

```
NYCORE1(config)#interface port-channel 1
NYCORE1(config-if)#ip address 192.168.18.1
255.255.255.0
NYCORE1(config-if)#exit
NYCORE1(config)#
```

The assignment of the IP address is successful.

Step 4

Similarly, configure the other end of the **Etherchannel** connection on **NYCORE2** with the following commands. Assign an address of **192.168.18.2/24** on this interface:

```
NYCORE2#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE2(config)#interface range fastethernet 1/0/23 -
24
NYCORE2(config-if-range)#no switchport
NYCORE2(config-if-range)#channel-group 1 mode on
Creating a port-channel interface Port-channel 1
NYCORE2(config-if-range)#exit
NYCORE2(config)#interface port-channel 1
NYCORE2(config-if)#ip address 192.168.18.2
255.255.255.0
NYCORE2(config-if)#exit
NYCORE2(config)#exit
NYCORE2#
```

Syslog messages are generated once again but are omitted from the above output.

Step 5

Test the connectivity between the two ends of the **EtherChannel** link by pinging **NYCORE1** from **NYCORE2**:

```
NYCORE2#ping 192.168.18.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.18.1, timeout
is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip
```

```
min/avg/max = 1/4/8 ms
NYCORE2#
```

The ping is successful.

Step 6

Examine the **EtherChannel** summary on **NYCORE2**:

```
NYCORE2#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
------+-------------+-----------+---------------------
------------------------
1       Po1(RU)          -         Fa1/0/23(P)
Fa1/0/24(P)
NYCORE2#
```

In the Port-channel column, notice the flags **(RU)**. **R** indicates a routed or **Layer3 EtherChannel** and **U** indicates that the **port-channel** is up.

You have successfully configured a **Layer3 EtherChannel** link.