

ETHERCHANNEL

TP U6

SPINELLI Dylan
BTS SIO SISR | PARIS YNOV CAMPUS

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1- Topologie

1.1 – Présentation de la Topologie

Dans ce TP, nous allons utiliser la topologie suivante :

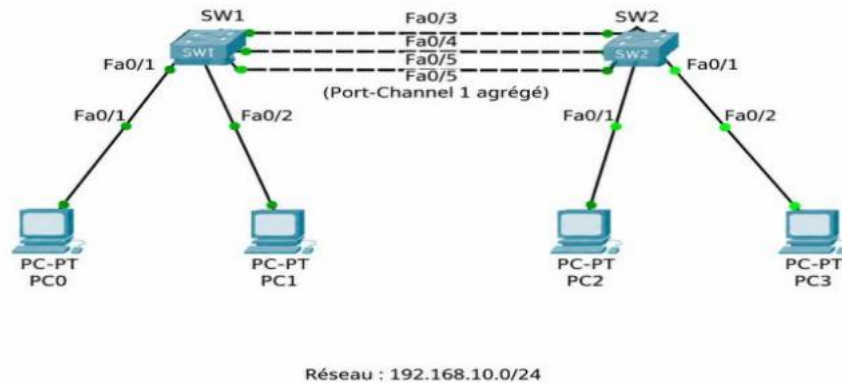
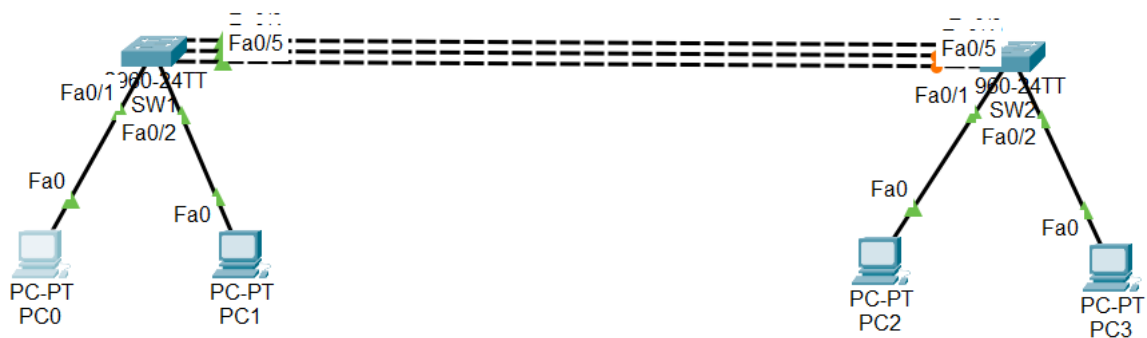


Tableau d'adressage

Équipement	Interface	Adresse IP	Masque	Rôle
PC0	Fa0	192.168.10.10	255.255.255.0	Hôte SW1

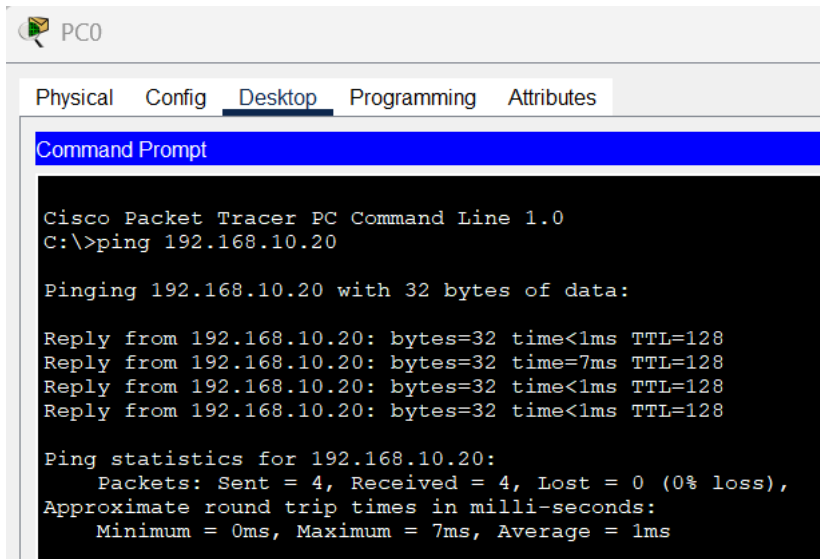
Équipement	Interface	Adresse IP	Masque	Rôle
PC1	Fa0	192.168.10.11	255.255.255.0	Hôte SW1
PC2	Fa0	192.168.10.20	255.255.255.0	Hôte SW2
PC3	Fa0	192.168.10.21	255.255.255.0	Hôte SW2
SW1	Fa0/3-5	—	—	EtherChannel vers SW2
SW2	Fa0/3-5	—	—	EtherChannel vers SW1

Voici notre topologie réalisée sur cisco packet tracer :



1.2 - Vérification de la connectivité

Ping depuis PC0 vers PC2 :



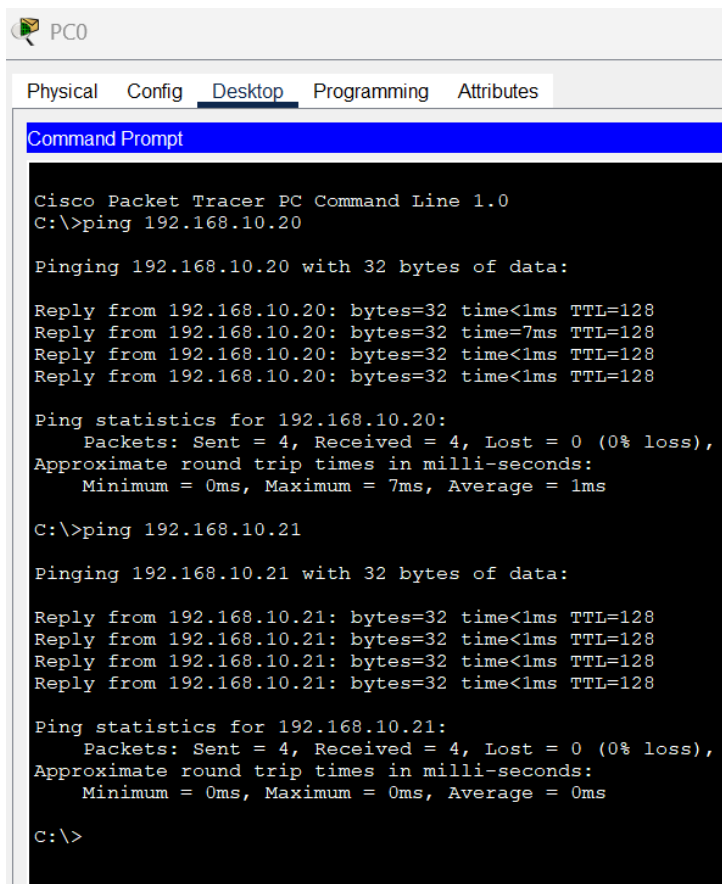
```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.20

Pinging 192.168.10.20 with 32 bytes of data:

Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time=7ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 7ms, Average = 1ms
```

Ping depuis PC0 vers PC3 :



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.20

Pinging 192.168.10.20 with 32 bytes of data:

Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time=7ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 7ms, Average = 1ms

C:\>ping 192.168.10.21

Pinging 192.168.10.21 with 32 bytes of data:

Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Regardons l'état des interfaces sur SW2 :

```
SW2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address     0001.649B.CD59
            Cost        19
            Port        3(FastEthernet0/3)
            Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
            Address     0001.C9C0.8762
            Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time  20

Interface    Role Sts Cost      Prio.Nbr Type
-----
Fa0/4        Altn BLK 19       128.4    P2p
Fa0/3        Root FWD 19       128.3    P2p
Fa0/1        Desg FWD 19       128.1    P2p
Fa0/2        Desg FWD 19       128.2    P2p
Fa0/5        Altn BLK 19       128.5    P2p

SW2#
```

Les interfaces Fa0/1, Fa0/2 et Fa0/3 sont en état « Forwarding »

Les interfaces Fa0/4 et Fa0/5 sont bloquées.

Ces interfaces ont été bloquées par le protocole STP afin d'éviter les boucles entre les switches.
Cela permet d'améliorer la disponibilité du réseau.

2- Etherchannel statique

2.1 – Configuration

Configuration de SW1 :

```
SW1>
SW1>en
SW1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SW1(config)#interface range Fa0/3 - 5
SW1(config-if-range)#channel-group 1 mode on
SW1(config-if-range)#
Creating a port-channel interface Port-channel 1

%LINK-5-CHANGED: Interface Port-channel1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up

SW1(config-if-range)#exit
SW1(config)#exit
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1#write memory
Building configuration...
[OK]
SW1#
```

Configuration de SW2 :

```
SW2>
SW2>
SW2>en
SW2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SW2(config)#interface range Fa0/3 - 5
SW2(config-if-range)#channel-group 1 mode on
SW2(config-if-range)#
Creating a port-channel interface Port-channel 1

%LINK-5-CHANGED: Interface Port-channel1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up

SW2(config-if-range)#exit
SW2(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#write memory
Building configuration...
[OK]
SW2#
```

2.2 – Vérification de la configuration

On vérifie que l'Etherchannel est bien actif :

```
SW1#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)        -          Fa0/3(P) Fa0/4(P) Fa0/5(P)
SW1#
```

SU : Protocole de niveau 2 en cours d'utilisation

P : Ports liés dans un lien Etherchannel

```
SW1#show etherchannel port-channel
Channel-group listing:
-----

Group: 1
-----

Port-channels in the group:
-----

Port-channel: Po1
-----

Age of the Port-channel   = 00d:00h:03m:52s
Logical slot/port        = 2/1          Number of ports = 3
GC                       = 0x00000000    HotStandBy port = null
Port state                = Port-channel
Protocol                  = PAGP
Port Security             = Disabled

Ports in the Port-channel:

Index   Load   Port      EC state   No of bits
-----+-----+-----+-----+-----
0       00    Fa0/3     On         0
0       00    Fa0/4     On         0
0       00    Fa0/5     On         0
Time since last port bundled: 00d:00h:03m:52s  Fa0/5
```

```

SW1#show interfaces port-channel 1
Port-channel1 is up, line protocol is up (connected)
Hardware is EtherChannel, address is 0090.2118.a128 (bia 0090.2118.a128)
MTU 1500 bytes, BW 300000 Kbit, DLY 1000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Half-duplex, 300Mb/s
input flow-control is off, output flow-control is off
Members in this channel: Fa0/3 ,Fa0/4 ,Fa0/5 ,
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  956 packets input, 193351 bytes, 0 no buffer
    Received 956 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 watchdog, 0 multicast, 0 pause input
  0 input packets with dribble condition detected
2357 packets output, 263570 bytes, 0 underruns
  0 output errors, 0 collisions, 10 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier
  0 output buffer failures, 0 output buffers swapped out

```

La bande passante de l'interface port-channel 1 est 300Mb/s. Cela est cohérent avec les 3 interfaces qui ont chacune une bande passante de 100Mb/s.

Ping depuis PC0 vers PC2 :

```

C:\>ping 192.168.10.20

Pinging 192.168.10.20 with 32 bytes of data:

Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

Ping depuis PC0 vers PC3 :

```

C:\>ping 192.168.10.21

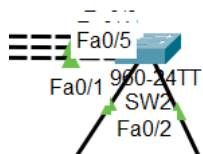
Pinging 192.168.10.21 with 32 bytes of data:

Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128
Reply from 192.168.10.21: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```


On constate que les interfaces Fa0/4 et Fa0/5 sont désormais affichées en vert :



Cela signifie que l'Etherchannel est bien actif.

3- EtherChannel avec LACP

3.1 – Réinitialisation et reconfiguration avec LACP

Suppression de la configuration existante :

```
SW1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)#
SW1(config)#interface range Fa0/3 - 5
SW1(config-if-range)#no channel-group 1 mode on
SW1(config-if-range)#
%LINK-3-UPDOWN: Interface Port-channel1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to down

SW1(config-if-range)#exit
SW1(config)#
SW1(config)#no interface port-channel 1
SW1(config)#
SW1(config)#

SW2>en
SW2#
SW2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#
SW2(config)# interface range Fa0/3 - 5
SW2(config-if-range)#
SW2(config-if-range)#no channel-group 1 mode on
SW2(config-if-range)#
%LINK-3-UPDOWN: Interface Port-channel1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to down

SW2(config-if-range)#exit
SW2(config)#
SW2(config)#no interface port-channel 1
SW2(config)#
SW2(config)#
```

Configuration de SW1 :

```
SW1(config)#interface range Fa0/3 - 5
SW1(config-if-range)# channel-group 1 mode active
SW1(config-if-range)#
Creating a port-channel interface Port-channel 1

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

SW1(config-if-range)#exit
SW1(config)#
```

Configuration de SW2 :

```
SW2(config)#interface range Fa0/3 - 5
SW2(config-if-range)#channel-group 1 mode passive
SW2(config-if-range)#
Creating a port-channel interface Port-channel 1

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

SW2(config-if-range)#
SW2(config-if-range)#exit
SW2(config)#
SW2(config)#
```

On vérifie que l'Etherchannel est bien actif :

```
SW1#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)          LACP       Fa0/3(P) Fa0/4(P) Fa0/5(P)
SW1#
```

Cette fois ci, le protocole utilisé est bien LACP

3.2 - Test de la configuration

On lance un ping continu de PC0 vers PC2 :

```
C:\>ping 192.168.10.20 -n 500

Pinging 192.168.10.20 with 32 bytes of data:

Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
```

On désactive l'interface Fa0/3 :

```
SW1(config)#int fa0/3
SW1(config-if)#shutdown

SW1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

SW1(config-if)#
```

Le ping n'est pas interrompu :

[illegible]

```
SW1#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)	LACP	Fa0/3 (D) Fa0/4 (P) Fa0/5 (P)

L'interface Fa0/3 est désactivée

```
Ping statistics for 192.168.10.20:
    Packets: Sent = 160, Received = 160, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 19ms, Average = 0ms
```

Le ping a été interrompu pendant 19ms

4- Configuration EtherChannel avec PAgP

4.1 – Configuration PAgP

PAgP est le protocole Cisco. Il utilise les modes « desirable » et « auto ».

On réinitialise la configuration sur SW1 :

```
SW1(config)#
SW1(config)#interface range Fa0/3 - 5
SW1(config-if-range)#
SW1(config-if-range)#no channel-group 1 mode active
SW1(config-if-range)#
%LINK-3-UPDOWN: Interface Port-channel1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to down

SW1(config-if-range)#exit
SW1(config)#
SW1(config)#
```

SW2 :

```
SW2(config)#
SW2(config)#interface range Fa0/3 - 5
SW2(config-if-range)#no channel-group 1 mode passive
SW2(config-if-range)#exit
SW2(config)#
SW2(config)#
```

On configure ensuite PAgP :

SW1 :

```
SW1(config)#interface range Fa0/3 - 5
SW1(config-if-range)#channel-group 1 mode desirable
SW1(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

SW1(config-if-range)#exit
SW1(config)#
```

SW2 :

```
SW2(config)#interface range Fa0/3 - 5
SW2(config-if-range)#channel-group 1 mode auto
SW2(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up
```

PAgP desirable : LACP active

PAgP auto : LACP passive

PAgP est un protocole utilisable uniquement sur les équipements Cisco.

```
SW1#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	Fa0/3 (D) Fa0/4 (P) Fa0/5 (P)

SW1#

```
SW2#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	Fa0/3 (D) Fa0/4 (P) Fa0/5 (P)

SW2#