

Etherchannel

Intro

STP for protecting from data network storm

Many links between two switches, but the Root link is the only one

If two switches have more than one 1GB link, from customers' view, when they connect through two ports of each (using 2 links), they want to have a higher efficiency or performance(load balance). But STP only let one link working and ban other links.

So tie up Two parallel links logically, to create a higher speed single link logically.

After tie up the links to create a Etherchannel, STP will see the logical links.

To avoid the network storm, when network does flooding, though Etherchannel there is and only one member receiving data packages and then can not resend or retransmit by any other links(members) within this Etherchannel back. So there is not a loop in the Etherchannel.

1.Manual static binding

Trunk

Interface port-channel xx (xx is a number)

2.Dynamic negotiation

LACP link aggregation control protocol

You can also configure which one is for transmit and which one is for backup.

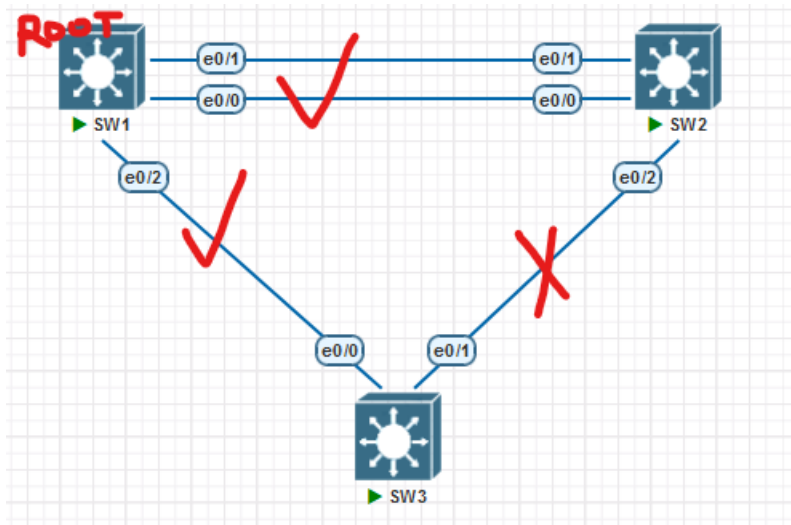
i) active negotiation mode (send)

ii)passive negotiation mode (receive)

two switches can set one active one passive, or 2 active, but can not two passive

between two routers, Etherchannel can be used. But not necessary, because the routing selection protocols have function of preventing loop.

Connection between the switches is using trunk.



1(SW1)

Switch>en

Switch#conf t

Switch(config)#hostname SW1

SW1(config)#interface range ethernet 0/0 - 2

SW1(config-if-range)#shutdown

SW1(config-if-range)#switchport trunk encapsulation dot1q

SW1(config-if-range)#switchport mode trunk

2(SW2)

Switch>en

Switch#conf t

Switch(config)#hostname SW2

SW2(config)#interface range ethernet 0/0 - 2

SW2(config-if-range)#shutdown

SW2(config-if-range)#switchport trunk encapsulation dot1q

SW2(config-if-range)#switchport mode trunk

3(SW3)

Switch>en

```
Switch#conf t
```

```
Switch(config)#hostname SW3
```

```
SW3(config)#interface range ethernet 0/0 - 1
```

```
SW3(config-if-range)#shutdown
```

```
SW3(config-if-range)#switchport trunk encapsulation dot1q
```

```
SW3(config-if-range)#switchport mode trunk
```

4(SW1-3 no shutdown at the same time)

```
SW1(config-if-range)#no shutdown
```

```
SW2(config-if-range)#no shutdown
```

```
SW3(config-if-range)#no shutdown
```

5(Set spanning tree priority of SW1)

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

```
SW1(config)#spanning-tree mode rapid-pvst
```

```
SW1(config)#spanning-tree vlan 1-4094 root primary
```

```
SW1(config)#end
```

```
SW1#show spanning-tree
```

```
SW1#show spanning-tree
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    24577
             Address     aabb.cc00.0100
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    24577 (priority 24576 sys-id-ext 1)
             Address     aabb.cc00.0100
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  300 sec

Interface    Role  Sts  Cost      Prio.Nbr  Type
-----
Et0/0        Desg  FWD  100        128.1     P2p
Et0/1        Desg  FWD  100        128.2     P2p
Et0/2        Desg  FWD  100        128.3     P2p
Et0/3        Desg  FWD  100        128.4     P2p
```

6(Set spanning tree priority of SW2)

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

```
SW2(config)#spanning-tree mode rapid-pvst
```

```
SW2(config)#spanning-tree vlan 1-4094 root secondary
```

SW2(config)#end

SW2#show spanning-tree

```
SW2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    24577
             Address     aabb.cc00.0100
             Cost        100
             Port        1 (Ethernet0/0)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    28673 (priority 28672 sys-id-ext 1)
             Address     aabb.cc00.0200
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Root FWD 100      128.1    P2p
Et0/1                    Altn BLK 100      128.2    P2p
Et0/2                    Desg FWD 100      128.3    P2p
Et0/3                    Desg FWD 100      128.4    P2p
```

Ethernet 0/1 is blocked

7(Set SW3)

SW3(config-if-range)#exit

SW3(config)#spanning-tree mode rapid-pvst

8(Create VLAN 10)

Sw1

SW1#conf t

SW1(config)#vlan 10

SW1(config-vlan)#end

SW1#show spanning-tree vlan 10

```
SW1#show spanning-tree vlan 10
VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    24586
             Address     aabb.cc00.0100
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    24586 (priority 24576 sys-id-ext 10)
             Address     aabb.cc00.0100
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Desg FWD 100      128.1    P2p
Et0/1                    Desg FWD 100      128.2    P2p
Et0/2                    Desg FWD 100      128.3    P2p
```

Sw2

SW2#conf t

SW2(config)#vlan 10

SW2(config-vlan)#end

SW2#show spanning-tree vlan 10

```
SW2#show spanning-tree vlan 10
VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    24586
             Address     aabb.cc00.0100
             Cost        100
             Port        1 (Ethernet0/0)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    28682 (priority 28672 sys-id-ext 10)
             Address     aabb.cc00.0200
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role  Sts  Cost      Prio.Nbr  Type
-----
Et0/0                    Root  FWD  100        128.1     P2p
Et0/1                    Altn  BLK  100        128.2     P2p
Et0/2                    Desg  FWD  100        128.3     P2p
```

Sw3

SW3(config)#vlan 10

SW3(config-vlan)#end

SW3#show spanning-tree vlan 10

```
SW3#show spanning-tree vlan 10
VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    24586
             Address     aabb.cc00.0100
             Cost        100
             Port        1 (Ethernet0/0)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32778 (priority 32768 sys-id-ext 10)
             Address     aabb.cc00.0300
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role  Sts  Cost      Prio.Nbr  Type
-----
Et0/0                    Root  FWD  100        128.1     P2p
Et0/1                    Altn  BLK  100        128.2     P2p
```

9(set etherchannel)

Sw1

SW1(config)#interface range ethernet 0/0 - 1

SW1(config-if-range)#channel-group ?

<1-255> Channel group number

auto Enable LACP auto on this interface

SW1(config-if-range)#channel-group 12 mode on

Creating a port-channel interface Port-channel 12

SW1(config-if-range)#end

SW1#show interfaces status

```
SW1#show interfaces status
```

Port	Name	Status	Vlan	Duplex	Speed	Type
Et0/0		connected	trunk	a-full	auto	RJ45
Et0/1		connected	trunk	a-full	auto	RJ45
Et0/2		connected	trunk	a-full	auto	RJ45
Et0/3		connected	1	a-full	auto	RJ45
Po12		connected	trunk	a-full	auto	

Sw2

SW2#conf t

SW2(config)#interface range ethernet 0/0 - 1

SW2(config-if-range)#channel-group 12 mode on

Creating a port-channel interface Port-channel 12

SW2(config-if-range)#end

SW2#show interfaces status

```
SW2#show interfaces status
```

Port	Name	Status	Vlan	Duplex	Speed	Type
Et0/0		connected	trunk	a-full	auto	RJ45
Et0/1		connected	trunk	a-full	auto	RJ45
Et0/2		connected	trunk	a-full	auto	RJ45
Et0/3		connected	1	a-full	auto	RJ45
Po12		connected	trunk	a-full	auto	

10(set po12)

Sw1

SW1#conf t

SW1(config)#interface port-channel 12

SW1(config-if)#switchport trunk encapsulation dot1q

SW1(config-if)#switchport mode trunk

SW1(config-if)#end

SW1#show etherchannel summary

```

SW1#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       N - not in use, no aggregation
        f - failed to allocate aggregator

        M - not in use, minimum links not met
        m - not in use, port not aggregated due to minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

        A - formed by Auto LAG

Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
12     Po12(SU)      -           Et0/0(P)   Et0/1(P)

```

Sw2

SW2#conf t

SW2(config)#interface port-channel 12

SW2(config-if)#switchport trunk encapsulation dot1q

SW2(config-if)#switchport mode trunk

SW2(config-if)#end

SW2#show etherchannel summary

```

SW2#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       N - not in use, no aggregation
        f - failed to allocate aggregator

        M - not in use, minimum links not met
        m - not in use, port not aggregated due to minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

        A - formed by Auto LAG

Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
12     Po12(SU)      -           Et0/0(P)   Et0/1(P)

```

11(check spanning tree VLAN 10 result)

Sw1

```
SW1#show spanning-tree vlan 10

VLAN0010
  Spanning tree enabled protocol rstp
    Root ID    Priority    24586
               Address     aabb.cc00.0100
               This bridge is the root
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

    Bridge ID  Priority    24586 (priority 24576 sys-id-ext 10)
               Address     aabb.cc00.0100
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
               Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/2                    Desg FWD 100      128.3   P2p
Po12                     Desg FWD 56       128.65  P2p
```

Sw2

```
SW2#show spanning-tree vlan 10

VLAN0010
  Spanning tree enabled protocol rstp
    Root ID    Priority    24586
               Address     aabb.cc00.0100
               Cost        56
               Port        65 (Port-channel12)
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

    Bridge ID  Priority    28682 (priority 28672 sys-id-ext 10)
               Address     aabb.cc00.0200
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
               Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/2                    Desg FWD 100      128.3   P2p
Po12                     Root FWD 56       128.65  P2p
```

Sw3

```
SW3#show spanning-tree vlan 10

VLAN0010
  Spanning tree enabled protocol rstp
    Root ID    Priority    24586
               Address     aabb.cc00.0100
               Cost        100
               Port        1 (Ethernet0/0)
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

    Bridge ID  Priority    32778 (priority 32768 sys-id-ext 10)
               Address     aabb.cc00.0300
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
               Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Root FWD 100      128.1   P2p
Et0/1                    Altn BLK 100      128.2   P2p
```