

## Switchport Aggregate - EtherChannel

## One Picture Summary

### Load Balance on Ether Channel

#### How to distribute traffic among ports:

Hash algorithm uses Ip & mac address, and port number of each frame to output a binary pattern which will be used as index to select port in etherchannel.

#### Load balance configure

```
switch(config)# port-channel load-balance src-dst-ip
```

#### Verify the load balance results

```
Switch# show etherchannel port-channel
```

Each link component will be displayed along with a hex "Load" value.

### Port Aggregation Protocol (PAgP)

#### Basic Operation:

- Cisco proprietary
- PAgP packets are periodically exchange on etherchannel, neighbor device ID and port capability are learned and compared.
- All ports have exactly same switchport configuration, access or trunk, VLAN, speed, duplex mode etc.
- Switchport parameter change on one port will automatically be propagated to the other ports
- Up to 8 ports can be grouped to one EtherChannel

#### Operation mode:

**ON:** no PAgP packets exchange, Aggregated by default.

**Desirable:** proactively send out PAgp packets to negotiate

**Auto:** wait for far-end initialize the negotiation.

#### Operation submode

**Silent:** default submode, set up ether channel anyway after 15 Secs waiting if no PAgP packets received from far-end

**Non-silent:** no ether channel set up until PAgP packet received from far-end.

**Default mode:** silent with desirable or auto.

#### Pre-requisite for ether channel setup

ON to ON, desirable to desirable or auto

### PAgP Configuration

#### Configure PAgP EtherChannel:

```
Switch(config)# interface fa0/1
```

```
Switch(config-if)# channel-protocol pagp
```

```
Switch(config-if)# channel-group xx mode {on | {auto | desirable} [non-silent]}
```

### Link Aggregation Control Protocol (LACP)

#### Basic Operation:

- Standard based
- LACP packets are periodically exchange on etherchannel
- All ports should have exactly same switchport configuration, access or trunk, VLAN, speed, duplex mode etc.
- Switchport parameter change on one port will automatically be propagated to the other ports
- Up to 16 ports in Etherchannel, 8 activated, 8 standby
- LACP assigns system priority (2 byte priority + 6 byte switch MAC address, 1~65535, defaultly 32768) to each switch.
- Switch with lowest system priority selects 8 ports which have lowest port priority (2 byte priority + 2 byte port number, 1~65535, defaultly 32768) to actively participate in etherchannel.

#### Operation mode:

- **ON:** no Negotiation exchanged, aggregated forcely.
- **Passive:** waits for far-end to initialize the aggregation.
- **Active,** proactively initial the aggregation.

### LACP Configuration

#### Configure LACP EtherChannel:

```
Switch(config)# lacp system-priority xxxx
```

```
Switch(config)# interface fa0/1
```

```
Switch(config-if)# lacp port-priority xxxx
```

```
Switch(config-if)# channel-protocol lacp
```

```
Switch(config-if)# channel-group xx mode {on | passive | active}
```

```
Switch(config)# interface port-channel xxx
```

```
Switch(config-if)# switchport encapsulation dot1q
```

### Troubleshooting

```
Switch# show etherchannel port
```

```
Switch# show etherchannel summary
```

```
Switch# show interface fa0/0 etherchannel
```

```
Switch# show etherchannel load-balance
```