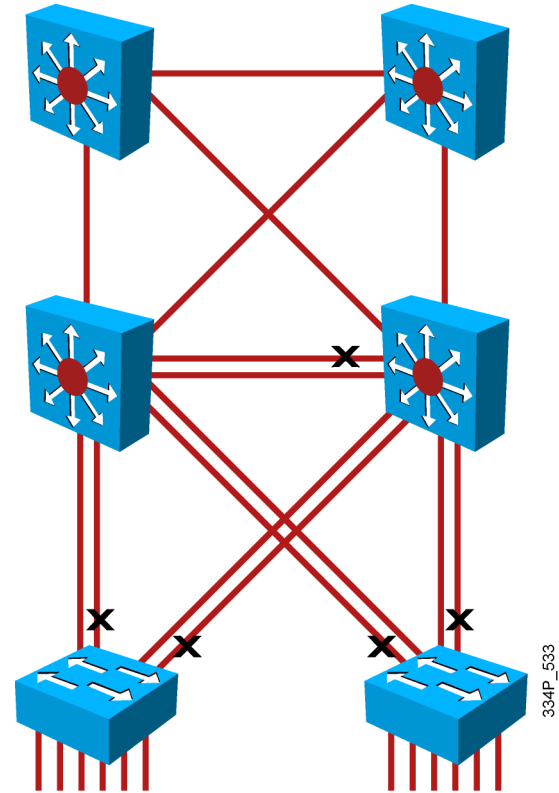




Configuring Link Aggregation with EtherChannel

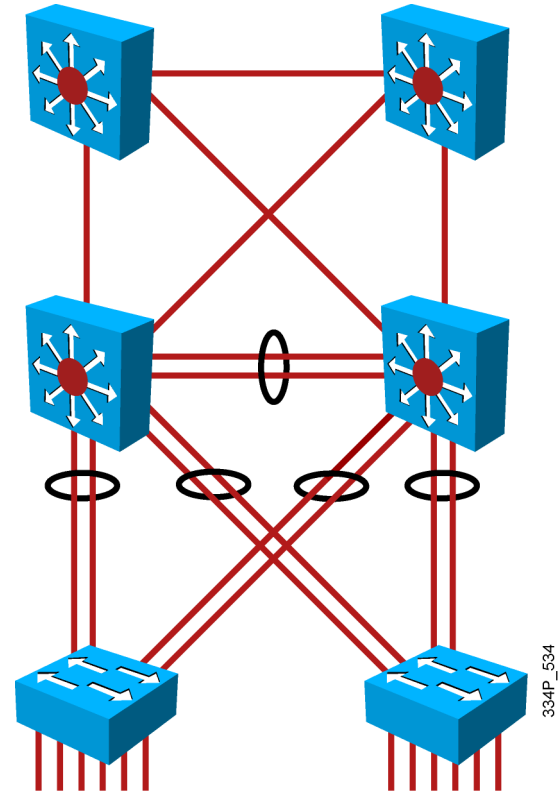
Multiple Links

- **When multiple links aggregate on a switch, congestion occurs.**
- **One solution is to increase uplink speed, but cannot scale indefinitely.**
- **Another solution is to multiply uplinks; loop prevention mechanisms disable some ports.**



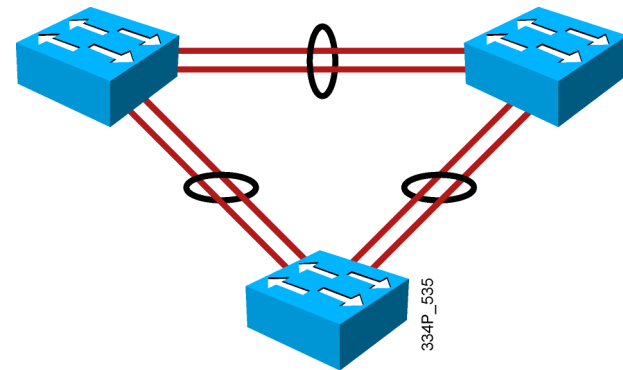
EtherChannel

- **Solution to provide more bandwidth**
- **Logical aggregation of similar links**
- **Viewed as one logical link**
- **Provides load balancing and redundancy**
- **Supported for switch ports (Layer 2) and routed ports (Layer 3)**



PAgP and LACP

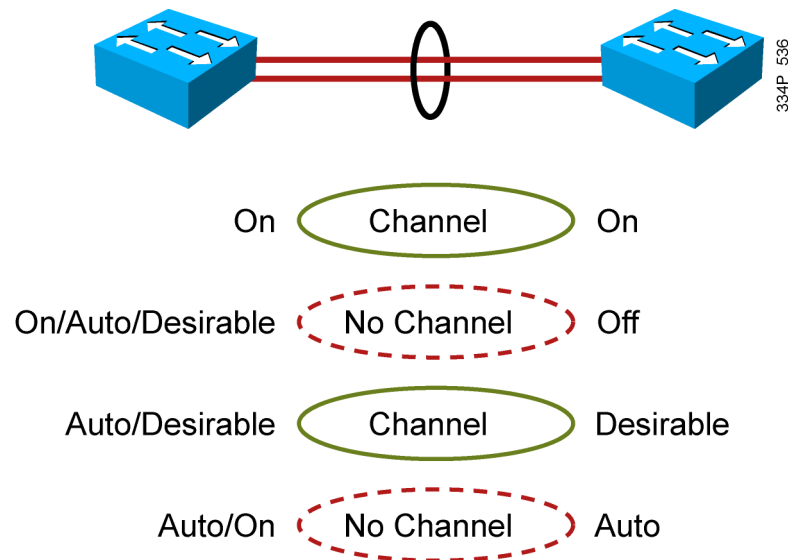
- Protocols to negotiate the EtherChannel link creation and maintenance.
- PAgP is a Cisco proprietary protocol.
- LACP is IEEE 802.3ad standard.
- Static EtherChannel configuration without protocol.



PAgP Modes

PAgP negotiates EtherChannel formation and maintenance:

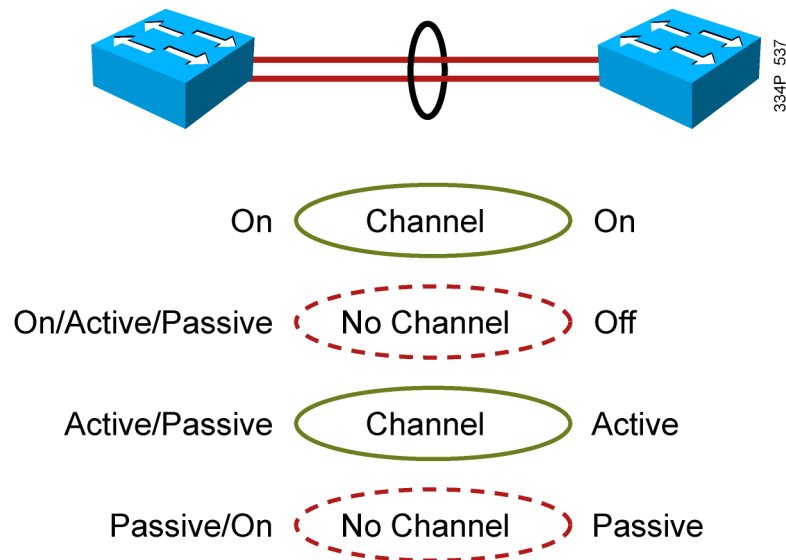
- **On:** channel member without negotiation (no protocol)
- **Desirable:** actively ask if the other side can/will
- **Auto:** passively wait for other side to ask
- **Off:** EtherChannel not configured on interface



LACP Modes

LACP negotiates EtherChannel formation and maintenance:

- **On:** channel member without negotiation (no protocol)
- **Active:** actively ask if the other side can/will
- **Passive:** passively wait for other side to ask
- **Off:** EtherChannel not configured on interface



How to Configure Port Channels Using EtherChannel

Basic tasks:

- Identify the ports to use on each switch.
- Specify PAgP or LACP protocol (optional).
- Configure channel group on interface.
 - Specify a channel group number.
 - Specify the mode (will set protocol).
 - On (no protocol)
 - Auto/desirable (PAgP)
 - Active/passive (LACP)
- Configure port-channel interface.
 - Access or trunk mode and other parameters.
- Verify connectivity.

Guidelines for Configuring EtherChannel

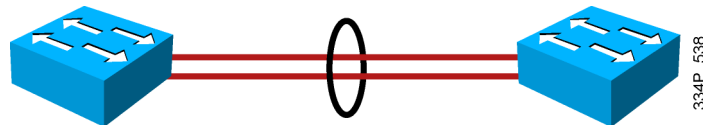
Port-channel interface configuration changes affect the EtherChannel.

The physical interface configuration changes affect the interface only.

EtherChannel cannot be used if SPAN is a destination port.

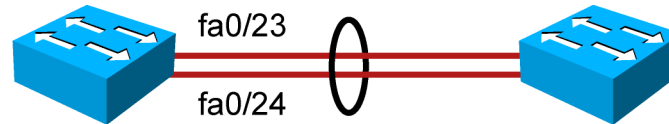
All interfaces within an EtherChannel must have same configuration.

- Same speed and duplex.
- Same mode (access or trunk).
- Same native and allowed VLANs on trunk ports.
- Same access VLAN on access ports.
- Configure these parameters on the port-channel interface.



How to Configure Layer 2 EtherChannel

- Channel group mode options:
 - On
 - Active or passive (LACP)
 - Auto or desirable (PAgP)
- The configuration on a port-channel interface is copied to member interfaces.



```
switch(config)# interface fastethernet 0/23
switch(config-if)# channel-group 1 mode active
switch(config)# interface fastethernet 0/24
switch(config-if)# channel-group 1 mode active
switch(config)# interface port-channel 1
switch(config-if)# switchport mode trunk
switch(config-if)# switchport trunk native vlan 99
switch(config-if)# switchport trunk allowed vlan 2,3,99
```

How to Verify EtherChannel

```
switch# 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
2	Po1 (SU)	-	Fa0/23 (P) Fa0/24 (P)

