

Sample Configuration: EtherChannel Between Catalyst Switches Running CatOS and Cisco IOS Software

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Introduction

This document discusses the setup of an EtherChannel between a Catalyst 5500/5000 switch running Catalyst OS (CatOS) and a Catalyst 6500/6000 or Catalyst 4500/4000 switch running Cisco IOS® Software. An EtherChannel bundles individual links into a single logical link that provides higher bandwidth and redundancy between switches or other devices. You can refer to EtherChannel as either Fast EtherChannel (FEC) or Gigabit EtherChannel (GEC); it depends on the speed of the interfaces or ports that you use to form the EtherChannel. This configuration also applies to a Catalyst 4500/4000 or 6500/6000 series switch running CatOS that is connected to a Catalyst 4500/4000 or 6500/6000 series switch running Cisco IOS Software.

The configuration in this document bundles two Fast Ethernet (FE) ports from each of the switches into a FEC. This document uses the term "EtherChannel" to refer to GEC, FEC, port channel, channel, and port group.

This document only shows the configuration files from the switches and the output from the related sample **show** commands. For details on how to configure an EtherChannel, refer to these documents:

- Configuring EtherChannels (for Catalyst 6500/6000 switches running Cisco IOS Software)
- Configuring EtherChannel (for Catalyst 4500/4000 switches running Cisco IOS Software)
- Sample Configuration: EtherChannel Between Catalyst Switches Running CatOS

Prerequisites

Requirements

Before you attempt this configuration, ensure that you have a basic understanding of:

- EtherChannel configuration
- Configuration of Catalyst 6500/6000 and Catalyst 5500/5000 series switches with the Command Line Interface (CLI)

Components Used

The information in this document is based on these software and hardware versions:

- Cisco Catalyst 5505 switch running CatOS 6.4(8) software
- Cisco Catalyst 6509 switch running Cisco IOS Software Release 12.1(20)E

Note: For EtherChannel system requirements on Catalyst switches, refer to System Requirements to Implement EtherChannel on Catalyst Switches.

The information in this document was created from the devices in a specific lab environment. All of the devices started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Background Theory

You can configure EtherChannel unconditionally (with **channel mode on**) or through autonegotiation. When you configure through autonegotiation, the switch negotiates the channel with the far end. To do this, it uses the Cisco proprietary Port Aggregation Protocol (PAgP) (with the **channel mode desirable** command) or the IEEE 802.3ad Link Aggregate Control Protocol (LACP) (with the **channel mode active** or **channel mode passive** commands). In this document, the EtherChannel configuration uses PAgP for autonegotiation.

All Catalyst switches running CatOS system software support PAgP. Catalyst 6500/6000 or 4500/4000 series switches running Cisco IOS System Software also support PAgP. The recommended mode to establish an EtherChannel between devices that support PAgP is desirable mode. PAgP protects against any improper configurations between the two devices. You can use **channel mode on** when the connecting device does not support PAgP and you need to set up the channel unconditionally. You can use the silent or non-silent keywords with auto and desirable channel modes. Catalyst 6500/6000 or 4500/4000 switches have the silent keyword enabled by default on all ports. The Catalyst 5500/5000 series switches have the silent keyword enabled by default on copper ports. For all fiber ports (FE and Gigabit Ethernet [GE]), the 5500/5000 switches have the non-silent keyword enabled by default. Use the default silent or non-silent keyword when you connect between Cisco switches.

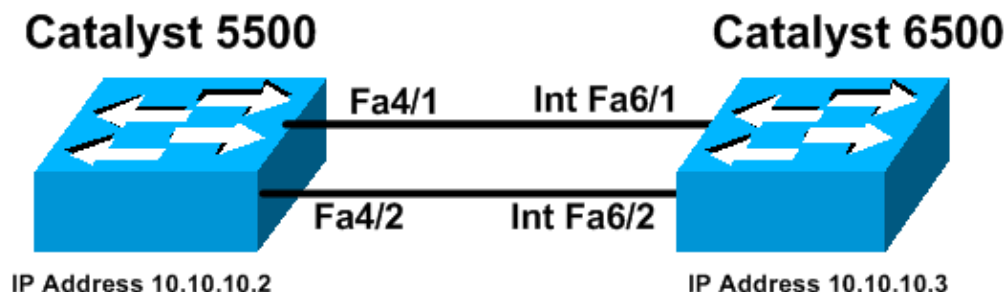
Note: For additional information on PAgP channeling modes and silent/non-silent modes, refer to the *Using PAgP to Configure EtherChannel (Recommended)* section and the *Silent/Non-Silent Mode* section of the document Configuring EtherChannel Between Catalyst 4500/4000, 5500/5000, and 6500/6000 Switches That Run CatOS System Software.

Configure

This section presents the information to configure the features described in this document.

Network Diagram

This document uses this network setup:



Guidelines

When active links are aggregated into an EtherChannel, the ports momentarily leave the Spanning Tree and join back as a single, logical port. Until the Spanning Tree reconverges, the network traffic is disrupted.

If you do not use protocols such as PAGP or LACP for the configuration of EtherChannel because of other considerations, make sure that the required parameters are the same on both ends. If they are dissimilar, one end of the channel will go into err-disable mode. To recover the ports from err-disable mode, refer to these:

- Errdisable Port State Recovery on the Cisco IOS Platforms
- Recovering From errDisable Port State on the CatOS Platforms
- Understanding EtherChannel Inconsistency Detection

Configurations

This document uses these configurations:

- Catalyst 5500
- Catalyst 6500

Note: To verify the capabilities for a module or switch port you configure, use the **show port capabilities module** command for switches running CatOS. For switches running Cisco IOS Software, use the **show interfaces capabilities** command.

Note: In the configurations, comments between the outputs appear in blue *italics*.

```
Catalyst 5500
cat5500 (enable) show config
This command shows non-default configurations only.
Use 'show config all' to show both default and non-default configurations.
.....
.....
.....
..
begin
```

```

!
# ***** NON-DEFAULT CONFIGURATION *****
!
!
# time: Wed Jan 28 2004, 09:39:55
!

# version 6.4(2)
!
# errordetection
set errordetection portcounter enable
!
# frame distribution method
set port channel all distribution mac both
!
# vtp
set vtp domain cisco
set vlan 1 name default type ethernet mtu 1500 said 100001 state active
set vlan 1002 name fddi-default type fddi mtu 1500 said 101002 state active
set vlan 1004 name fddinet-default type fddinet mtu 1500 said 101004 state
active stp ieee
set vlan 1005 name trnet-default type trbrf mtu 1500 said 101005 state
active stp ibm
set vlan 1003 name token-ring-default type trcrf mtu 1500 said 101003 state
active mode srb aremaxhop 7 stemaxhop 7 backupcrf off
!
# ip

!--- This is the IP address for management.

set interface sc0 1 10.10.10.2/255.255.255.0 10.10.10.255

!
# set boot command
set boot config-register 0x2102
set boot system flash bootflash:cat5000-supg.6-4-8.bin
!
# mls
set mls nde disable
!
# port channel

!--- Ports are assigned to admin-group 200. Administrative groups
!--- specify which ports can form an EtherChannel together. An administrative group
!--- can contain a maximum of eight ports. This admin-group assignment happens
!--- automatically with the configuration of the port channel. You can also
!--- assign it manually, as done in this example. However, you do not need to assign
!--- the admin-group manually. Let the switch create
!--- the admin-group automatically.
!--- Note: This configuration sets ports 4/1 through 4/4
!--- for port channel, but only configures ports 4/1-2. This is
!--- normal behavior. You can use ports 4/3 and 4/4 for any other purpose.

set port channel 4/1-4 200
!
# default port status is enable
!
!
#module 1 : 0-port Supervisor III
!
#module 2 : 2-port MM MIC FDDI
!
#module 3 : 24-port 10/100BaseTX Ethernet
!
#module 4 : 12-port 10/100BaseTX Ethernet

```

```

!--- This enables port channeling with PAgP and configures desirable silent mode.

set port channel 4/1-2 mode desirable silent
!
#module 5 : 2-port MM OC-3 Dual-Phy ATM

!--- Output suppressed.

end

```

Refer to the Catalyst 5000 Family Command Reference (6.3 and 6.4) for more information on the commands in the configuration.

Catalyst 6500

```

Cat6509# show running-config
Building configuration...

Current configuration : 3852 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Cat6509
!
!
redundancy
  main-cpu
    auto-sync standard
ip subnet-zero
!
!
interface port-channel1
  no ip address

!--- This example has configured a Layer 2 (L2) EtherChannel.
!--- You can configure a Layer 3 (L3) EtherChannel on the Catalyst
!--- 6500/6000 switches running Cisco IOS Software; however, this is not
!--- the focus of this document. For details on the Layer 3 EtherChannel configuration,
!--- refer to the document Configuring EtherChannels.

switchport

!--- This command puts the interface in VLAN1, by default.

switchport mode access
!
interface FastEthernet6/1
no ip address

!--- On the Catalyst 6500/6000, you must issue the switchport command once,
!--- without any keywords, to configure the interface as an L2 port.
!--- By default, all the ports are router ports (L3 ports).
!--- On a Catalyst 4500/4000 switch, all ports are L2 ports by default.
!--- You do not need an additional command.

switchport

```

```
!--- This command puts the interface in VLAN1, by default.

switchport mode access

!--- The port is a member of channel group 1 with autonegotiation
!--- that uses PAgP and silent mode.

channel-group 1 mode desirable
!
interface FastEthernet6/2
no ip address

!--- On the Catalyst 6500/6000, you must issue the switchport command once,
!--- without any keywords, to configure the interface as a L2 port.
!--- By default, all the ports are router ports (L3 ports).
!--- On a Catalyst 4500/4000 switch, all ports are L2 ports by default.
!--- You do not need an additional command.

switchport

!--- This command puts the interface in VLAN1, by default.

switchport mode access

!--- The port is a member of channel group 1 with autonegotiation
!--- that uses PAgP and silent mode.

channel-group 1 mode desirable
!
interface FastEthernet6/3
no ip address
!
interface FastEthernet6/4
no ip address
!

!--- Output suppressed.

interface FastEthernet6/45
no ip address
shutdown
!
interface FastEthernet6/46
no ip address
shutdown
!
interface FastEthernet6/47
no ip address
shutdown
!
interface FastEthernet6/48
no ip address
shutdown
!

!--- This is the IP address for management.

ip address 10.10.10.3 255.255.255.0
```

```
!  
ip classless  
no ip http server  
!  
!  
!  
line con 0  
line vty 0 4  
!  
end  
Cat6509#
```

For more information on the commands in the configuration, refer to Catalyst 5000 Family Command Reference (6.3 and 6.4).

Note: If you assign an interface to a VLAN that does not exist, the interface shuts down until you create the VLAN in the VLAN database. For more details, refer to the *Creating or Modifying an Ethernet VLAN* section of Configuring VLANs.

Verify

This section provides information you can use to confirm that your configuration works properly.

Certain **show** commands are supported by the Output Interpreter Tool [☞](#) (registered customers only), which allows you to view an analysis of **show** command output.

To check the port channel in CatOS switches, issue these commands:

- **show port capabilities *module***
- **show port channel**
- **show port *module/port***
- **show port channel info**

To check the Spanning Tree Protocol (STP) status in CatOS switches, issue these commands:

- **show spantree**
- **show spantree *vlan***
- **show spantree *module/port***

To check the port channel in Catalyst 6500/6000 or Catalyst 4500/4000 series switches running Cisco IOS Software, issue these commands:

- **show interfaces capabilities**
- **show interfaces port–channel *port–channel interface number***
- **show etherchannel summary**
- **show etherchannel port–channel**

To check the STP status in Catalyst 6500/6000 or Catalyst 4500/4000 series switches running Cisco IOS Software, issue these commands:

- **show spanning–tree detail**
- **show spanning–tree vlan *vlan number***

Sample show Command Output

Catalyst 5500 Switch

- **show port capabilities module**

This command verifies whether the module is capable of channeling. It also tells which group of ports you can bundle together to form the EtherChannel. In this example, you can group the two ports 4/1–2 or the four ports 4/1–4 to form a channel:

```
cat5500 (enable) show port capabilities 4
Model                               WS-X5203
Port                                4/1
Type                                 10/100BaseTX
Speed                                auto,10,100
Duplex                                half,full
Trunk encap type                      ISL
Trunk mode                            on,off,desirable,auto,nonegotiate
Channel                               4/1-2,4/1-4
Broadcast suppression                 pps(0-150000),percentage(0-100)
Flow control                           no
Security                               yes
Membership                             static,dynamic
Fast start                             yes
QOS scheduling                         rx-(none),tx-(none)
CoS rewrite                             no
ToS rewrite                             no
Rewrite                                no
UDLD                                   yes
AuxiliaryVlan                          no
SPAN                                   source,destination
```

!--- Output suppressed.

- **show port channel**

This command, along with the **show port** command, verifies the status of the port channel.

```
cat5500 (enable) show port channel
Port  Status      Channel          Admin Ch
      Mode                Group Id
-----
4/1   connected    desirable silent    200   865
4/2   connected    desirable silent    200   865
-----

Port  Device-ID          Port-ID          Platform
-----
4/1   Switch             Fa6/1           cisco Catalyst 6000
4/2   Switch             Fa6/2           cisco Catalyst 6000
-----

cat5500 (enable)
```

- **show port module/port**

```
cat5500 (enable) show port 4/1
Port  Name              Status      Vlan      Level  Duplex  Speed  Type
-----
4/1                     connected  1         normal a-full a-100 10/100BaseTX
```

!--- Output suppressed.

Port	Status	Channel Mode	Admin Ch Group	Ch Id
4/1	connected	desirable silent	200	865
4/2	connected	desirable silent	200	865

!--- Output suppressed.

```
cat5500 (enable) show port 4/2
```

Port	Name	Status	Vlan	Level	Duplex	Speed	Type
4/2		connected	1	normal	a-full	a-100	10/100BaseTX

!--- Output suppressed.

Port	Status	Channel Mode	Admin Ch Group	Ch Id
4/1	connected	desirable silent	200	865
4/2	connected	desirable silent	200	865

!--- Output suppressed.

• show port channel info

```
cat5500 (enable) show port channel info  
Switch Frame Distribution Method: Mac both
```

Port	Status	Channel mode	Admin Channel group	Channel id	Speed	Duplex	Vlan
4/1	connected	desirable silent	200	865	a-100	a-full	1
4/2	connected	desirable silent	200	865	a-100	a-full	1

Port	ifIndex	Oper-group	Neighbor Oper-group	Oper-Distribution Method	PortSecurity/Dynamic port
4/1	334	1	65537	Mac both	
4/2	334	1	65537	Mac both	

Port	Device-ID	Port-ID	Platform
4/1	Switch	Fa6/1	cisco Catalyst 6000
4/2	Switch	Fa6/2	cisco Catalyst 6000

!--- Output suppressed.

• show spantree

The STP commands verify if you have all the ports within a channel grouped together and in the forwarding state.

```

cat5500 (enable) show spantree 1
VLAN 1
Spanning tree enabled
Spanning tree type          IEEE

Designated Root             00-30-40-a7-a4-00
Designated Root Priority    32768
Designated Root Cost       0
Designated Root Port       1/0
Root Max Age 20 sec        Hello Time 2 sec    Forward Delay 15 sec

Bridge ID MAC ADDR         00-30-40-a7-a4-00
Bridge ID Priority         32768
Bridge Max Age 20 sec      Hello Time 2 sec    Forward Delay 15 sec

Port                        Vlan Port-State    Cost  Priority Portfast  Channel_id
-----
2/1-2                      1    not-connected    19    32 disabled  0
3/1                        1    not-connected    100   32 disabled  0
3/2                        1    not-connected    100   32 disabled  0
3/3                        1    not-connected    100   32 disabled  0
3/4                        1    not-connected    100   32 disabled  0
3/5                        1    not-connected    100   32 disabled  0
3/6                        1    not-connected    100   32 disabled  0
3/7                        1    not-connected    100   32 disabled  0
3/8                        1    not-connected    100   32 disabled  0
3/9                        1    not-connected    100   32 disabled  0
3/10                      1    not-connected    100   32 disabled  0
3/11                      1    not-connected    100   32 disabled  0
3/12                      1    not-connected    100   32 disabled  0
3/13                      1    not-connected    100   32 disabled  0
3/14                      1    not-connected    100   32 disabled  0
3/15                      1    not-connected    100   32 disabled  0
3/16                      1    not-connected    100   32 disabled  0
3/17                      1    not-connected    100   32 disabled  0
3/18                      1    not-connected    100   32 disabled  0
3/19                      1    not-connected    100   32 disabled  0
3/20                      1    not-connected    100   32 disabled  0
3/21                      1    not-connected    100   32 disabled  0
3/22                      1    not-connected    100   32 disabled  0
3/23                      1    not-connected    100   32 disabled  0
3/24                      1    not-connected    100   32 disabled  0
4/1-2                   1    forwarding    12    32 disabled  865
4/3                      1    forwarding       19    32 disabled  0
4/4                      1    forwarding       19    32 disabled  0
4/5                      1    not-connected    100   32 disabled  0
4/6                      1    not-connected    100   32 disabled  0
4/7                      1    not-connected    100   32 disabled  0
4/8                      1    not-connected    100   32 disabled  0
4/9                      1    not-connected    100   32 disabled  0
4/10                     1    not-connected    100   32 disabled  0
4/11                     1    not-connected    100   32 disabled  0
4/12                     1    not-connected    100   32 disabled  0
cat5500 (enable)

```

• **show spantree module/port**

```

cat5500 (enable) show spantree 4/1
Port                        Vlan Port-State    Cost  Priority Portfast  Channel_id
-----
4/1-2                   1    forwarding    12    32 disabled  865
cat5500 (enable) show spantree 4/2

```

Port	Vlan	Port-State	Cost	Priority	Portfast	Channel_id
4/1-2 cat5500 (enable)	1	forwarding	12	32	disabled	865

Note: The output of `show spantree module/port` for ports 4/1 and 4/2 displays identical results. This is because they are grouped together in one channel with the channel ID of 865.

Catalyst 6500 Switch

- **show interfaces capabilities**

This command verifies whether the module is capable of channeling.

```
Cat6509# show interfaces capabilities module 6
FastEthernet6/1
  Model: WS-X6348-RJ-45
  Type: 10/100BaseTX
  Speed: 10,100,auto
  Duplex: half,full
  Trunk encap. type: 802.1Q,ISL
  Trunk mode: on,off,desirable,nonegotiate
  Channel: yes
  Broadcast suppression: percentage(0-100)
  Flowcontrol: rx-(off,on),tx-(none)
  Membership: static
  Fast Start: yes
  QoS scheduling: rx-(1q4t), tx-(2q2t)
  CoS rewrite: yes
  ToS rewrite: yes
  Inline power: yes
  SPAN: source/destination
  UDLD: yes
  Link Debounce: yes
  Link Debounce Time: no
FastEthernet6/2
  Model: WS-X6348-RJ-45
  Type: 10/100BaseTX
  Speed: 10,100,auto
  Duplex: half,full
  Trunk encap. type: 802.1Q,ISL
  Trunk mode: on,off,desirable,nonegotiate
  Channel: yes
  Broadcast suppression: percentage(0-100)
  Flowcontrol: rx-(off,on),tx-(none)
  Membership: static
  Fast Start: yes
  QoS scheduling: rx-(1q4t), tx-(2q2t)
  CoS rewrite: yes
  ToS rewrite: yes
  Inline power: yes
  SPAN: source/destination
  UDLD: yes
  Link Debounce: yes
  Link Debounce Time: no
```

- **show interfaces port-channel port-channel interface number**

This command checks the status of the port channel. It also tells you which ports form this channel.

```
Cat6509# show interfaces port-channel 1
Port-channel1 is up, line protocol is up
  Hardware is EtherChannel, address is 0009.1267.27d9 (bia 0009.1267.27d9)
```

```

    MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
      reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Full-duplex, 100Mb/s
input flow-control is off, output flow-control is off
Members in this channel: Fa6/1 Fa6/2
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/2000/0/0 (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
  126880 packets input, 10173099 bytes, 0 no buffer
  Received 126758 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  0 input packets with dribble condition detected
  6101 packets output, 1175124 bytes, 0 underruns
  0 output errors, 0 collisions, 2 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier
  0 output buffer failures, 0 output buffers swapped out
Cat6509#

```

- **show etherchannel summary**

This command displays the one-line summary per channel group. In this sample output, you can see the flag **P** with the ports **Fa6/1** and **Fa6/2** . This implies that these ports form the port channel.

```

Cat6509# 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
Number of channel-groups in use: 1
Number of aggregators: 1

Group Port-channel Protocol Ports
-----+-----+-----+-----
1 Po1(SU) PAgP Fa6/1(P) Fa6/2(P)

```

- **show etherchannel port-channel**

This command displays the port channel information.

```

Cat6509# show etherchannel port-channel

Channel-group listing:
-----

Group: 1
-----
Port-channels in the group:
-----

Port-channel: Po1
-----

Age of the Port-channel = 00d:00h:02m:25s

```

```
Logical slot/port = 14/1 Number of ports = 2  
GC = 0x00010001 HotStandBy port = null  
Port state = Port-channel Ag-Inuse  
Protocol = PAgP
```

Ports in the Port-channel:

```
Index Load Port EC state No of bits  
-----+-----+-----+-----+-----  
1 55 Fa6/1 Desirable-S1 4  
0 AA Fa6/2 Desirable-S1 4
```

```
Time since last port bundled: 00d:00h:01m:03s Fa6/1  
Time since last port Un-bundled: 00d:00h:01m:05s Fa6/1
```

- **show spanning-tree detail**

This command verifies if the channel is in the forwarding state for a particular VLAN.

```
Cat6509# show spanning-tree detail
```

```
VLAN1 is executing the IEEE compatible Spanning Tree protocol  
Bridge Identifier has priority 32768, address 00d0.029a.8001  
Configured hello time 2, max age 20, forward delay 15  
Current root has priority 32768, address 0030.40a7.a400  
Root port is 833 (Port-channell), cost of root path is 12  
Topology change flag not set, detected flag not set  
Number of topology changes 0 last change occurred 00:23:59 ago  
Times: hold 1, topology change 35, notification 2  
hello 2, max age 20, forward delay 15  
Timers: hello 0, topology change 0, notification 0, aging 300
```

Port 833 (Port-channell) of VLAN1 is forwarding

```
Port path cost 12, Port priority 128, Port Identifier 131.65.  
Designated root has priority 32768, address 0030.40a7.a400  
Designated bridge has priority 32768, address 0030.40a7.a400  
Designated port id is 131.97, designated path cost 0  
Timers: message age 2, forward delay 0, hold 0  
Number of transitions to forwarding state: 1  
BPDU: sent 1, received 718
```

- **show spanning-tree vlan *vlan number***

This command displays spanning tree information for VLAN1.

```
Cat6509# show spanning-tree vlan 1
```

```
VLAN0001  
Spanning tree enabled protocol ieee  
Root ID Priority 32768  
Address 0030.40a7.a400  
Cost 12  
Port 833 (Port-channell)  
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
```

```
Bridge ID Priority 32768  
Address 00d0.029a.8001  
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  
Aging Time 300
```

```
Interface Role Sts Cost Prio.Nbr Type
```

```
-----  
Po1 Root FWD 12 128.833 P2p
```

Special Consideration with Use of Unconditional on Channel Mode

Cisco recommends the use of PAgP for port channel configuration, as this document describes. If you configure the EtherChannel unconditionally (with use of **channel mode on**) for any reason, you should create a port channel. This section provides the procedure. If you create a port channel, you avoid possible problems with STP during the configuration process. STP loop detection can disable the ports if you configure one side as a channel before the other side becomes a channel.

1. To set the ports for port channeling to disable mode on the CatOS switch, issue the **set port disable module/port** command.
2. Create the port channel (port group) on the Cisco IOS switch, and set the channel mode to on.
3. Create the port channel on the CatOS switch, and set the channel mode to on.
4. To reenble the ports that you disabled earlier on the first CatOS switch, issue the **set port enable module/port** command.

Troubleshoot

Performance Issues with EtherChannels

Performance issues with EtherChannels are caused by several conditions. Common causes include the incorrect load balancing algorithm and port specific physical layer issues.

To better understand and configure the load balancing algorithm, refer to these documents:

- The Understanding How EtherChannel Frame Distribution Works section of Catalyst 6500 Series Software Configuration Guide, 8.6.
- The Understanding Load Balancing section of Catalyst 6500 Series Cisco IOS Software Configuration Guide, 12.2SX.

For information on how to troubleshoot physical layer issues, refer to Troubleshooting Switch Port and Interface Problems.

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Related Information

- **Configuring EtherChannel Between Catalyst 4500/4000, 5500/5000, and 6500/6000 Switches That Run CatOS System Software**
- **Configuring LACP (802.3ad) Between a Catalyst 6500/6000 and a Catalyst 4500/4000**
- **System Requirements to Implement EtherChannel on Catalyst Switches**
- **Catalyst 6500 Series Switches Configuration Guides**
- **Catalyst 5000 Family Software Configuration Guide (6.3 and 6.4)**
- **Catalyst 4000 Series Switches Configuration Guides**

- **Catalyst 5500 Series Switches Technical Support**
 - **Catalyst 6500 Series Switches Technical Support**
 - **EtherChannel Technical Support Page**
 - **LAN Product Support**
 - **LAN Switching Technology Support**
 - **Technical Support – Cisco Systems**
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