Configuring EtherChannel Between a Catalyst Switch Running CatOS and a Workstation or Server

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Contents

Introduction

This document provides sample configurations on Fast EtherChannel (FEC) that uses Port Aggregation Protocol (PAgP) between a Cisco Catalyst 6000 Switch and a workstation or server. Any Cisco Catalyst 4000, 5000, and 6000 Series Switches that run a Catalyst operating system (CatOS) can be used in the configurations presented in this document to obtain the same results. This includes the Catalyst 2948G, 4912G, and 2980G Switches.

EtherChannel bundles individual Ethernet links into a single logical link that provides bandwidth up to 800 Mbps full−duplex for FastEthernet EtherChannel, or 8 Gbps full−duplex Gigabit EtherChannel (GEC) between a Catalyst 6000 Series Switch and another switch or host. Cisco Catalyst 4000 and 6000 Series Switches support Link Aggregation Control Protocol (LACP) (802.3ad) since CatOS 7.1 software. LACP is another Etherchannel protocol that can be used instead of PAgP.

This document covers configurations that use PAgP, which is a Cisco proprietary protocol. A workstation/server Network Interface Card (NIC) might not support this protocol. Therefore, it is necessary to configure the switch as shown in this document.

For Cisco Catalyst switches that run Cisco IOS® software, refer to EtherChannel Between a Cisco Catalyst Switch That Runs Cisco IOS and a Workstation or Server Configuration Example.

Refer to these links for more information on how to configure EtherChannel and guidelines on Catalyst switches that run CatOS:

- Configuring EtherChannel on Catalyst 6500
- Configuring EtherChannel on Catalyst 5000
- Configuring EtherChannel on Catalyst 4000

Also, make sure that you verify the server NIC documentation for any guidelines for interoperation with Cisco switches. The configuration of NIC adapter is beyond the scope of this document. Configuration options are a proprietary function of the third party NIC adapter vendor.

All Ethernet ports on all modules support EtherChannel (maximum of eight compatibly configured ports). This includes Ethernet ports on a standby supervisor engine. All ports in each EtherChannel must be the same speed and duplex. There is no requirement that ports be contiguous, except for some Catalyst 5000 Switching modules or on the same module. Refer to Configuring Fast EtherChannel and Gigabit EtherChannel for more information.

If a link within an EtherChannel fails, traffic previously carried over the failed link switches to the segments within the EtherChannel that remain.

In the sample configuration in this document, an EtherChannel link is created to carry traffic for one VLAN across two fast Ethernet ports between a Catalyst 6000 Switch and a Windows NT workstation.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

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

- Catalyst 6000 Switch that runs CatOS 6.3(8) software with WS−X6348−RJ−45 FastEthernet switching module
- Windows NT 4.0 Service Pack 6 with Intel Pro/100 S dual port server adapter

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document 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.

Important Notes

This section provides information for Catalyst 4000, 5000, and 6000 Switches that run CatOS.

The Catalyst 4000 and 6000 Series Switches, along with the 2948G and 2980G Switches, support EtherChannel on any combination of ports on different modules as long as they have the same speed/duplex, and the modules are installed in the same switch chassis.

Catalyst 5000 Switches might only support EtherChannel within the same blade and within the same group of ports. This depends on the module. Refer to Configuring Fast EtherChannel and Gigabit EtherChannel for Catalyst 5000 restrictions and guidelines. Issue the **show port capabilities** command to check this. The EtherChannel capacity is explicitly stated, as shown in this output:

```
Cat6000> (enable)show port capabilities 5/1
Model                                          WS−X6348−RJ−45
```

```
Port                                       5/1
Type                                       10/100BaseTX
Speed                                      auto,10,100
Duplex                                     half,full
Trunk encap type                           802.1Q,ISL
Trunk mode                                 on,off,desirable,auto,nonegotiate
Channel                                    yes
Broadcast suppression                      percentage(0-100)
Flow control                               receive-(off,on),send-(off)

!--- Output suppressed.
```

EtherChannel Modes

Mode	Explanation
On	This mode forces the port to channel without PAgP. With the **on** mode, a usable EtherChannel exists only when a port group in **on** mode is connected to another port group in the **on** mode. This mode is used if the NIC does not support PAgP (recommended).
Desirable	The PAgP mode that places a port into an active negotiating state, in which the port initiates negotiations with other ports by sending PAgP packets. This mode is used if the NIC supports PAgP.
silent	The keyword that is used with the **auto** or **desirable** mode when no traffic is expected from the other device to prevent the link from being reported to the Spanning Tree Protocol (STP) as down. (default)
non−silent	The keyword that is used with the **auto** or **desirable** mode when traffic is expected from the other device.

For Workstations or Servers

This document provides a configuration for a server that supports FEC without PAgP support.

Note: Check with the NIC vendor for support of Cisco proprietary FEC and PAgP. Some servers might support LACP, which is preferred. Make sure your switch runs Catalyst OS 7.1 or later in order to support LACP.

Once the NIC adapters are teamed and a new connection is formed, the individual NIC adapters are disabled and will not be accessible through the old IP address. Configure the new connection with static IP address, default gateway, and DNS/WINS settings, or for dynamic configuration.

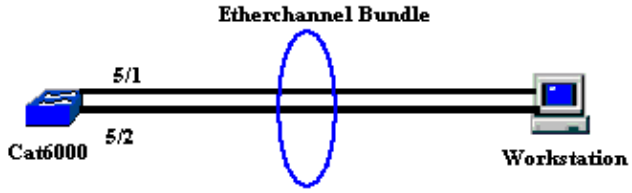
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

Network Diagram

This document uses this network setup:



The EtherChannel should start on a single device and end on a single device. An EtherChannel should not start on a single workstation, or on a switch and end on different workstations or different switches. In the same way, an EtherChannel should not start from two different workstations or different switches and end on a single workstation or on a single switch. As an exception, if Cisco Catalyst 3750 Stack is used as an end−point, the EtherChannel can either start or end on different member switches of the same stack. Refer to Cross−Stack EtherChannel on a Catalyst 3750 Switch Configuration Example for this Cross−Stack EtherChannel configuration.

Configurations

This configuration is applied to the Fast Ethernet ports on the Catalyst 6000 Switch. These are the general configuration tasks:

- Assign a VLAN to the Fast Ethernet ports.
- Disable trunking on the Fast Ethernet ports (highly recommended).
- Enable spanning tree portfast on the Fast Ethernet ports (highly recommended).
- Set EtherChannel modes on the Fast Ethernet ports.
- Configure a EtherChannel load−balance distribution algorithm.

Catalyst 6000

```
!--- Assign the ports to a VLAN (the default is VLAN 1).


 Cat6000 (enable)set vlan 1 5/1-2
 VLAN  Mod/Ports
 ---- ----------------------
 1     1/1-2
       5/1-48
       15/1
 Cat6000 (enable)


!--- Disable trunking on the ports.

Cat6000 (enable)set trunk 5/1-2 off
Port(s) 5/1-2 trunk mode set to off.
Cat6000 (enable)


!--- Enable spanning tree portfast on the ports. Refer to
!--- Using Portfast and Other Commands to Fix Workstation Startup Connectivity Delays
!--- for more information on how to enable portfast.
```

```
Cat6000 (enable)set spantree portfast 5/1-2 enable

Warning: Connecting Layer 2 devices to a fast start port can cause
temporary spanning tree loops. Use with caution.

Spantree ports 5/1-2 fast start enabled.
Cat6000 (enable)



!--- Enable EtherChannel on the ports.
!--- Refer to Configuring EtherChannel on a Catalyst 6000 Switch
!--- for more information on EtherChannel and EtherChannel modes.




!--- Enable EtherChannel with mode on.


Cat6000 (enable)set port channel 5/1-2 mode on
Port(s) 5/1-2 channel mode set to on.
Cat6000 (enable)



!--- Configure the load distribution method to source
!--- MAC (default is destination MAC). This is needed because the
!--- switch might choose only one of the links. There is only one
!--- unique MAC address for the server.


Cat6000 (enable)set port channel all distribution mac source
Channel distribution is set to mac source.
Cat6000 (enable)



!--- Issue the show config <module_number> command to check the configuration.



Cat6000 (enable)show config 5
This command shows non-default configurations only.
Issue show config <mod> all to show both default and non-default configurations.
.........................
begin
!
# ***** NON-DEFAULT CONFIGURATION *****
!
!
#time: Sat Aug 24 2002, 12:34:59
!
# default port status is enable
!
!
#module 5 : 48-port 10/100BaseTX Ethernet
set trunk 5/1  off negotiate 1-1005,1025-4094

!--- Trunking is disabled.

set trunk 5/2  off negotiate 1-1005,1025-4094
```

```
!--- Trunking is disabled.

set spantree portfast    5/1-2 enable

!--- Portfast is enabled on both ports.

set port channel 5/1-2 mode on

!--- On mode is used to form the EtherChannel.

end
Cat6000 (enable)
```

Verify

Use this section to confirm that your configuration works properly.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

debug and show Commands

On the Catalyst 6000 Switch, you can issue these commands:

- **show port <module/port>** This command is used to verify if the port is connected.

```
Cat6000 (enable)show port 5/1
Port  Name                 Status     Vlan       Duplex Speed Type
----- -------------------- ---------- ---------- ------ ----- ------------
 5/1                       connected  1          a-full a-100 10/100BaseTX

...(output suppressed)

Port  Status     Channel              Admin Ch
                 Mode                 Group Id
----- ---------- -------------------- ----- -----
 5/1  connected  on                      73   769
 5/2  connected  on                      73   769
----- ---------- -------------------- ----- -----


!--- Output suppressed.

Cat6000 (enable)
```

- **show port channel <module/port>** This command is used to verify that the two ports have properly formed the EtherChannel.

```
!--- The Channel ID is automatically assigned. If it
!--- is not present, the EtherChannel has not been formed.


Cat6000 (enable)show port channel
Port  Status     Channel              Admin Ch
                 Mode                 Group Id
----- ---------- -------------------- ----- -----
 5/1  connected  on                      73   769
 5/2  connected  on                      73   769

Port  Device-ID                      Port-ID                  Platform
----- ------------------------------ ------------------------ ----------------
```

```
 5/1
 5/2
Cat6000 (enable)
```

- **show cam dynamic <module/port>** This command is used to verify if the switch has learned the MAC address of the connected workstation.

```
!--- If there are no entries, try to ping
!--- from the workstation. If there are still
!--- no entries, verify that the workstation sends traffic.


Cat6000 (enable)show cam dynamic 5/1
* = Static Entry. + = Permanent Entry. # = System Entry. R = Router Entry.
X = Port Security Entry $ = Dot1x Security Entry

VLAN  Dest MAC/Route Des    [CoS]  Destination Ports or VCs / [Protocol Type]
----  ------------------    -----  ---------------------------------------
1     aa-bb-cc-dd-ee-ff             5/1-2 [ALL]


!--- Notice that the MAC address of the
!--- workstation is learned on the bundled port.


Total Matching CAM Entries Displayed  =1
Cat6000 (enable)
```

- **show channel traffic** This command displays the traffic utilization on the EtherChannel ports.

Note: The Channel Id must match the Id displayed in **show port channel <module/port>**.

```
Cat6000 (enable)show channel traffic
ChanId Port  Rx-Ucst Tx-Ucst Rx-Mcst Tx-Mcst Rx-Bcst Tx-Bcst
------ ----- ------- ------- ------- ------- ------- -------
   769  5/1    0.00%  40.00%   0.00%  48.74% 100.00%   0.00%
   769  5/2    0.00%  60.00%   0.00%  51.26%   0.00% 100.00%
Cat6000 (enable)


!--- By default, load distribution is set to destination MAC.
!--- If the load is not evenly distributed, change it to source MAC.
```

- **show channel info** This command displays port information for all channels.

```
Cat6000 (enable)show channel info
Chan Port  Status       Channel                Admin Speed Duplex Vlan
id                           mode                     group
---- ----- ---------- -------------------- -----    -----   ------   ----
 769  5/1  connected  on                           73   a-100  a-full     1
 769  5/2  connected  on                           73   a-100  a-full     1

Chan Port  if-   Oper-group Neighbor   Chan  Oper-Distribution PortSecurity/
id         Index            Oper-group cost  Method            Dynamic Port
---- ----- ----- ---------- ---------- ----- -----------------
769  5/1    69              145       12    mac source
769  5/2    69              145       12    mac source


!--- Output suppressed.


Chan  Port  Trunk-status Trunk-type    Trunk-vlans
id
-----  ----- ------------ ------------- ---------------------------------------
```

```
 769  5/1    not-trunking negotiate       1-1005,1025-4094
 769  5/2    not-trunking negotiate       1-1005,1025-4094

!--- Output suppressed.


Chan Port  STP Port  Portfast     Port      Port     Port
id              priority                       Guard   vlanpri  vlanpri-vlans
---- ----- -------- ------------ ------- ------- --------------------------------
 769  5/1         32     enable       default       0
 769  5/2         32     enable       default       0

!--- Output suppressed.
```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- **Configuring EtherChannel on Catalyst 6000 Switches**
- **Creating and Maintaining VLANs**
- **Understanding EtherChannel Load Balancing and Redundancy on Catalyst Switches**
- **System Requirements to Implement EtherChannel on Catalyst Switches**
- **Technical Support & Documentation − Cisco Systems**

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