Fast EtherChannel

Feature Summary

The Fast EtherChannel feature allows multiple Fast Ethernet point-to-point links to be bundled into one logical link to provide bidirectional bandwidth of up to 800 Mbps. Fast EtherChannel builds on standards-based 802.3 full-duplex Fast Ethernet to provide fault-tolerant, high-speed links between switches, routers, and servers. This feature can be configured between Cisco 7500 series routers and Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI) or between a Cisco 7500 series router or a Cisco 7000 series router with the RSP7000 and RSP700CI and a Catalyst 5000 switch.

Note Using the Fast EtherChannel feature on a Catalyst 5000 switch requires a hardware upgrade. Contact your local sales representative for upgrade details.

Benefits

Fast EtherChannel provides the following benefits and features:

- Logical aggregation of bandwidth
- Load balancing
- Fault tolerance
- Supports all features currently supported on the Fast Ethernet interface
- Fully compatible with Cisco IOS virtual LAN (VLAN) and routing technologies
- Support for host standby using Host Standby Router Protocol (HSRP)—available in Cisco IOS Release 11.1(19)CA and Release 11.1(20)CC
- Support for Cisco Express Forwarding (CEF) and distributed CEF (dCEF)—available in Cisco IOS Release 11.1(20)CC

List of Terms

Cisco Express Forwarding (CEF)—Layer 3 switching technology. CEF can also refer to central CEF mode, one of the two modes of CEF operation that enables a route processor to perform express forwarding.

Distributed CEF (dCEF)—One of two modes of CEF operation that enables line cards to perform the express forwarding between port adapters.

port-channel—Type of interface in Cisco IOS software used to group up to four Fast Ethernet interfaces.

Fast EtherChannel—Feature used to group together multiple full-duplex 802.3 Fast Ethernet to provide fault-tolerant, high-speed links between switches, routers, and servers.

Document Conventions

Command descriptions use these conventions:

- **Boldface** indicates commands and keywords that are entered literally as shown.
- *Italics* indicate arguments for which you supply values; in contexts that do not allow italics, arguments are enclosed in angle brackets (>).
- Square brackets ([ ]) indicate optional elements.
- Braces ({ }) group required choices, and vertical bars (|) separate alternative elements.
- Braces and vertical bars within square brackets ([{ | }]) indicate a required choice within an optional element.

Platforms

This feature is supported on these platforms:

- Cisco 7500 series
- Cisco 7000 series routers with the RSP7000 and RSP7000CI
- Catalyst 5000 switch

Supported MIBs and RFCs

None

Restrictions

If you are using the Fast EtherChannel feature in Cisco IOS Release 11.1 CA or Release 11.1(19)CC (or earlier), you must disable distributing switching on the router.

Functional Description

Fast EtherChannel provides higher bidirectional bandwidth, redundancy, and load sharing. Up to four Fast Ethernet interfaces can be bundled in a port-channel, and the router or switch can support up to four port-channels. The Fast EtherChannel feature is capable of load balancing traffic across the Fast Ethernet links. Unicast, broadcast, and multicast traffic is distributed across the links providing higher performance and redundant parallel paths. In the event of a link failure, traffic is redirected to remaining links within the Fast EtherChannel without user intervention.

In this release of the Fast EtherChannel feature, IP traffic is distributed over the port-channel interface while traffic from other routing protocols is sent over a single link. Bridged traffic is distributed based on the Layer 3 information in the packet. If the Layer 3 information does not exist in the packet, the traffic is sent over the first link.

Fast EtherChannel supports all features currently supported on the Fast Ethernet interface. You must configure these features on the port-channel interface rather than on the individual Fast Ethernet interfaces. Fast EtherChannel connections are fully compatible with Cisco IOS virtual LAN (VLAN) and routing technologies. The Inter-Switch Link (ISL) VLAN trunking protocol can carry multiple VLANs across a Fast EtherChannel, and routers attached to Fast EtherChannel links can provide full multiprotocol routing with support for host standby using Host Standby Router Protocol (HSRP).

The port-channel (consisting of up to four Fast Ethernet interfaces) is treated as a single interface. Port-channel is used in the Cisco IOS software to maintain compatibility with existing commands on the Catalyst 5000 switch. You create the Fast EtherChannel by using the **interface port-channel** interface configuration command. You can assign up to four Fast Ethernet interfaces to a port-channel by using the **channel-group** interface configuration command.

Configuration Tasks

Configuring a Fast EtherChannel consists of the following required steps:

1. Create a port-channel interface and assign an IP address.
2. Assign the Fast Ethernet interfaces (up to four) to the port-channel interface.

For information on other configuration tasks for the Fast EtherChannel, refer to the "Configure an Ethernet or Fast Ethernet Interface" section in the "Configuring Interfaces" chapter of the *Configuration Fundamentals Configuration Guide*.

For information on other commands that can be used by the Fast EtherChannel, refer to the Cisco IOS Release 11.1 configuration guides.

Configure the Port-Channel Interface

To configure the port-channel interface, perform the following tasks beginning in global configuration mode:

Task		Command
Step 1	Create the port-channel interface and enter interface configuration mode. The channel-number can be 1 to 4.	**interface port-channel** *channel-number*
Step 2	Assign an IP address and subnet mask to the Fast EtherChannel.	**ip address** *ip-address mask*
Step 3	Optionally, assign a static MAC address to the Fast EtherChannel.	**mac-address** *ieee-address*
Step 4	Optionally, enable other supported interface commands to meet your needs and exit when you have finished.	**end**
Step 5	Verify the configuration.	**show interface port-channel**

Note If you configure ISL, you must assign the IP address to the subinterface (for example, **interface port-channel 1.1**—an IP address per VLAN), and you must specify the encapsulation with the VLAN number under that subinterface (for example, **encapsulation isl 100**) for ISL to work.

Note Currently, if you want to use the Cisco Discovery Protocol (CDP), you must configure it only on the port-channel interface and not on the physical Fast Ethernet interface.

Note If you do not assign a static MAC address on the port-channel interface, the Cisco IOS software automatically assigns a MAC address. If you assign a static MAC address and then later remove it, the Cisco IOS software automatically assigns a MAC address.

Caution With Release 11.1(20)CC, Fast EtherChannel supports CEF/dCEF. We recommend that you clear all explicit **ip route-cache distributed** commands from the Fast Ethernet interfaces before enabling dCEF on the port-channel interface. Doing this gives the port-channel interface proper control of its physical Fast Ethernet links. When you enable CEF/dCEF globally, all interfaces that support CEF/dCEF are enabled. When CEF/dCEF is enabled on the port-channel interface, it is automatically enabled on each of the Fast Ethernet interfaces in the channel group. However, if you have previously disabled CEF/dCEF on the Fast Ethernet interface, CEF/dCEF is not automatically enabled. In this case, you must enable CEF/dCEF on the Fast Ethernet interface.

Configure the Fast Ethernet Interfaces

To assign the Fast Ethernet interfaces to the Fast EtherChannel, perform the following tasks beginning in global configuration mode:

Task		Command
Step 1	Create or modify an existing Fast Ethernet interface and enter interface configuration mode.	**interface fastethernet** *slot*/*port-adapter*/*port*
Step 2	If the Fast Ethernet interface already exists and has an IP address assigned, disable the IP address before performing the next step.	**no ip address**
Step 3	Assign the Fast Ethernet interfaces to the Fast EtherChannel. The channel-number is the same as the channel-number you specified when you created the port-channel interface.	**channel-group** *channel-number*
Step 4	Exit interface configuration mode and repeat Step 1 through Step 4 to add up to four Fast Ethernet interfaces to the Fast EtherChannel.	**exit**
Step 5	Exit when you have finished.	**end**
Step 6	Verify the configuration.	**show interface port-channel**

Caution The port-channel interface is the routed interface. Do not enable Layer 3 addresses on the physical Fast Ethernet interfaces. Do not assign bridge groups on the physical Fast Ethernet interfaces because it creates loops. Also, you must disable spanning tree.

To remove a Fast Ethernet interface from a Fast EtherChannel, perform the following tasks beginning in global configuration mode:

Task		Command
Step 1	Specify the Fast Ethernet interface and enter interface configuration mode.	**interface fastethernet** *slot*/*port-adapter*/*port*
Step 2	Remove the Fast Ethernet interface from the channel group.	**no channel-group**
Step 3	Exit when you have finished.	**end**

The Cisco IOS software automatically removes a Fast Ethernet interface from the Fast EtherChannel if the interface goes down, and the software automatically adds the Fast Ethernet interface to the Fast EtherChannel when the interface is back up.

Currently, Fast EtherChannel relies on keepalives to detect whether the line protocol is up or down. Keepalives are enabled by default on the Fast Ethernet interfaces. If the line protocol on the interface goes down because it did not receive a keepalive signal, the Fast EtherChannel detects that the line protocol is down and removes the interface from the Fast EtherChannel. However, if the line protocol remains up because keepalives are disabled on the Fast Ethernet interface, the Fast EtherChannel cannot detect this link failure (other than a cable disconnect) and does not remove the interface from the Fast EtherChannel even if the line protocol goes down. This can result in unpredictable behavior. The implementation of the Port Aggregation Protocol (PAgP) in a subsequent release of this feature will remove the dependency on keepalives.

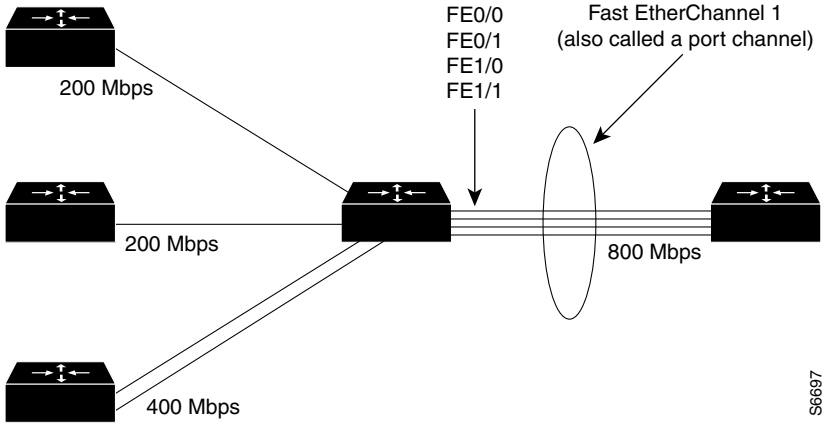
See the “Configuration Example” section, later in this document, for configuration examples.

You can monitor the status of the Fast EtherChannel interface by using the **show interfaces port-channel** EXEC command.

Configuration Example

Figure 1 shows four point-to-point Fast Ethernet interfaces that are aggregated into a single Fast EtherChannel interface.

Figure 1 Fast Ethernet Interfaces Aggregated into a Fast EtherChannel



Following is an example of how to create a Fast EtherChannel (port-channel interface) with four Fast Ethernet interfaces. In this example, ISL is enabled on the Fast EtherChannel, and an IP address is assigned to the subinterface.

```
router# configure terminal
router(config)# interface port-channel 1
router(config-if)# no shutdown
router(config-if)# exit
router(config)# interface port-channel 1.1
router(config-if)# ip address 1.1.1.10 255.255.255.0
router(config-if)# encapsulation isl 100
router(config-if)# exit
router(config)# interface fastethernet 0/0/0
router(config-if)# no ip address
router(config-if)# channel-group 1
Fast Ethernet 0/0 added as member-1 to port-channel1.
router(config-if)# exit
router(config)# interface fastethernet 0/1/0
router(config-if)# no ip address
router(config-if)# channel-group 1
Fast Ethernet 0/1 added as member-2 to port-channel1.
router(config-if)# exit
router(config)# interface fastethernet 1/0/0
router(config-if)# no ip address
router(config-if)# channel-group 1
Fast Ethernet 1/0 added as member-3 to port-channel1.
router(config-if)# exit
router(config)# interface fastethernet 1/1/0
router(config-if)# no ip address
router(config-if)# channel-group 1
Fast Ethernet 1/1 added as member-4 to port-channel1.
router(config-if)# exit
router(config)# exit
router#
```

The following is a partial example of a configuration file. The MAC address is automatically added to the Fast Ethernet interface when the interfaces are added to the Fast EtherChannel.

Note If you do not assign a static MAC address on the port-channel interface, the Cisco IOS software automatically assigns a MAC address. If you assign a static MAC address and then later remove it, the Cisco IOS software automatically assigns a MAC address.

```
interface Port-channel1
 ip address 1.1.1.10 255.255.255.0
!
interface Port-channel1.1
 encapsulation isl 100
!
interface FastEthernet0/0/0
 mac-address 00e0.1476.7600
 no ip address
 channel-group 1
!
interface FastEthernet0/1/0
 mac-address 00e0.1476.7600
 no ip address
 channel-group 1
!
interface FastEthernet1/0/0
 mac-address 00e0.1476.7600
 no ip address
 channel-group 1
!
interface FastEthernet1/1/0
 mac-address 00e0.1476.7600
 no ip address
 channel-group 1
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.2 command references.

- **channel-group**
- **clear counters**
- **clear interface**
- **interface port-channel**
- **show interfaces port-channel**

channel-group

To assign a Fast Ethernet interface to a Fast EtherChannel group, use the **channel-group** interface command. To remove a Fast Ethernet interface from a Fast EtherChannel group, use the **no** form of the command.

channel-group *channel-number*
no channel-group *channel-number*

Syntax Description

channel-number	Port-channel number previously assigned to the port-channel interface when using the **interface port-channel** global configuration command. Range is 1 to 4.

Default

No channel group is assigned.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

Before you assign a Fast Ethernet interface to a Fast EtherChannel group, you must first create a port-channel interface. To create a port-channel interface, use the **interface port-channel** global configuration command.

If the Fast Ethernet interface has an IP address assigned, you must disable it before adding the Fast Ethernet interface to the Fast EtherChannel. To disable an existing IP address on the Fast Ethernet interface, use the **no ip address** interface configuration command.

The Fast EtherChannel feature allows multiple Fast Ethernet point-to-point links to be bundled into one logical link to provide bidirectional bandwidth of up to 800 Mbps. Fast EtherChannel can be configured between Cisco 7500 series routers and Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI) or between a Cisco 7500 series router or a Cisco 7000 series router with the RSP7000 and RSP700CI and a Catalyst 5000 switch.

Up to four Fast Ethernet interfaces can be added to a Fast EtherChannel group.

Caution The port-channel interface is the routed interface. Do not enable Layer 3 addresses on the physical Fast Ethernet interfaces. Do not assign bridge groups on the physical Fast Ethernet interfaces because it creates loops. Also, you must disable spanning tree.

To display information about the Fast EtherChannel, use the **show interfaces port-channel** EXEC command.

Example

The following example adds Fast Ethernet 1/0 to the Fast EtherChannel group specified by port-channel 1:

```
Router(config)# interface port-channel 1
Router(config-if)# ip address 1.1.1.10 255.255.255.0
Router(config)# interface fastethernet 1/0/0
Router(config-if)# channel-group 1
```

Related Command

interface port-channel
show interfaces port-channel

clear counters

To clear the interface counters, use the **clear counters** EXEC command.

clear counters [*type number*]

Syntax Description

type	(Optional) Interface type; one of the keywords listed in Usage Guidelines.
number	(Optional) Port number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command was modified in Cisco IOS Release 11.1 CA to include the **port-channel** interface type keyword.

This command clears all the current interface counters from the interface unless the optional arguments *type* and *number* are specified to clear only a specific interface type (serial, Ethernet, Token Ring, and so on).

Note This command will not clear counters retrieved using SNMP, but only those seen with the **show interface** EXEC command.

Keyword	Interface Type
async	Asynchronous interface
bri	Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI)
dialer	Dialer interface
ethernet	Ethernet interface
fast-ethernet	Fast Ethernet interface
fddi	Fiber Distributed Data Interface (FDDI)
hssi	High-Speed Serial Interface (HSSI)
lex	LAN Extender interface
loopback	Loopback interface
null	Null interface
port-channel	Fast EtherChannel interface
pos	Packet OC-3 interface
serial	Synchronous serial interface
tokenring	Token Ring interface
tunnel	Tunnel interface
vg-anylan	100VG-AnyLAN port adapter

Example

The following example clears the interface counters on a Fast Etherchannel interface:

```
Router# show interface port-channel 1
Port-channel1 is up, line protocol is up
  Hardware is FEChannel, address is 0060.83d8.4420 (bia 0000.0000.0000)
  Internet address is 64.1.1.3/24
...
No. of active members in this channel: 4
        Member 0: FastEthernet1/0/0
        Member 1: FastEthernet4/0/0
        Member 2: FastEthernet10/0/0
        Member 3: FastEthernet11/0/0
  Last input 00:00:00, output never, output hang never
  Last clearing of "show interface" counters 11w2d
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/300, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2295286 packets input, 142305812 bytes, 0 no buffer
     Received 2294327 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast
     0 input packets with dribble condition detected
     2420593 packets output, 184050286 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffers copied, 0 interrupts, 0 failures
Router# clear counter port-channel 1
Clear "show interface" counters on all interfaces [confirm]
%CLEAR-5-COUNTERS: Clear counter on all interfaces by console 1
Router# show interface port-channel 1
Port-channel1 is up, line protocol is up
  Hardware is FEChannel, address is 0060.83d8.4420 (bia 0000.0000.0000)
  Internet address is 64.1.1.3/24
  MTU 1500 bytes, BW 400000 Kbit, DLY 100 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec), fdx
  ARP type: ARPA, ARP Timeout 04:00:00
    No. of active members in this channel: 4
        Member 0: FastEthernet1/0/0
        Member 1: FastEthernet4/0/0
        Member 2: FastEthernet10/0/0
        Member 3: FastEthernet11/0/0
  Last input 00:00:01, output never, output hang never
  Last clearing of "show interface" counters 00:00:03
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/300, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     1 packets input, 62 bytes, 0 no buffer
     Received 1 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast
     0 input packets with dribble condition detected
     1 packets output, 62 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffers copied, 0 interrupts, 0 failures
```

Related Command

show interfaces port-channel

clear interface

To reset the hardware logic on an interface, use the **clear interface** EXEC command.

clear interface *type number*

Syntax Description

type	Interface type; one of the keywords listed in Usage Guidelines.
number	Port number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command was modified in Cisco IOS Release 11.1 CA to include the **port-channel** interface type keyword.

Under normal circumstances, you do not need to clear the hardware logic on interfaces.

Keyword	Interface Type
async	Async interface
atm	Asynchronous Transfer Mode (ATM) interface
bri	Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI)
ethernet	Ethernet interface
fddi	Fiber Distributed Data Interface (FDDI)
hssi	High-Speed Serial Interface (HSSI)
loopback	Loopback interface
null	Null interface
port-channel	Fast EtherChannel interface
pos	Packet OC-3 Interface Processor
serial	Synchronous serial interface
tokenring	Token Ring interface
tunnel	Tunnel interface
vg-anylan	100VG-AnyLAN port adapter

Example

The following example resets the interface logic on Fast Etherchannel interface 1:

```
Router# clear interface port-channel 1
```

interface port-channel

To specify a Fast EtherChannel and enter interface configuration mode, use the **interface port-channel** global configuration command.

interface port-channel *channel-number*

Syntax Description

channel-number	Channel number assigned to this port-channel interface. Range is 1 to 4.

Default

None

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

The Fast EtherChannel feature allows multiple Fast Ethernet point-to-point links to be bundled into one logical link to provide bidirectional bandwidth of up to 800 Mbps. Fast EtherChannel can be configured between Cisco 7500 series routers and Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI) or between a Cisco 7500 series router or a Cisco 7000 series router with the RSP7000 and RSP700CI and a Catalyst 5000 switch.

You can configure the port-channel interface as you would do to any Fast Ethernet interface.

After you create a port-channel interface, you assign Fast Ethernet interfaces (up to four) to it. For information on how to assign a Fast Ethernet interface to a port-channel interface, refer to the **channel-group** interface configuration command.

Caution The port-channel interface is the routed interface. Do not enable Layer 3 addresses on the physical Fast Ethernet interfaces. Do not assign bridge groups on the physical Fast Ethernet interfaces because it creates loops. Also, you must disable spanning tree.

Note If you configure ISL, you must assign the IP address to the subinterface (for example, **interface port-channel 1.1**—an IP address per VLAN), and you must specify the encapsulation with the VLAN number under that subinterface (for example, **encapsulation isl 100**) for ISL to work.

Note Currently, if you want to use the Cisco Discovery Protocol (CDP), you must configure it only on the port-channel interface and not on the physical Fast Ethernet interface.

Note If you do not assign a static MAC address on the port-channel interface, the Cisco IOS software automatically assigns a MAC address. If you assign a static MAC address and then later remove it, the Cisco IOS software automatically assigns a MAC address.

Caution With Release 11.1(20)CC, the Fast EtherChannel supports CEF/dCEF. We recommend that you clear all explicit **ip route-cache distributed** commands from the Fast Ethernet interfaces before enabling dCEF on the port-channel interface. Doing this gives the port-channel interface proper control of its physical Fast Ethernet links. When you enable CEF/dCEF globally, all interfaces that support CEF/dCEF are enabled. When CEF/dCEF is enabled on the port-channel interface, it is automatically enabled on each of the Fast Ethernet interfaces in the channel group. However, if you have previously disabled CEF/dCEF on the Fast Ethernet interface, CEF/dCEF is not automatically enabled. In this case, you must enable CEF/dCEF on the Fast Ethernet interface.

Example

The following example creates a port-channel interface with a channel group number of 1 and adds three Fast Ethernet interfaces to port-channel 1:

```
Router(config)# interface port-channel 1
Router(config-if)# ip address 1.1.1.10 255.255.255.0
Router(config)# interface fastethernet 1/0/0
Router(config-if)# channel-group 1
Router(config)# interface fastethernet 4/0/0
Router(config-if)# channel-group 1
Router(config)# interface fastethernet 5/0/0
Router(config-if)# channel-group 1
```

Related Commands

channel-group
show interfaces port-channel

show interfaces port-channel

To display the information about the Fast EtherChannel on Cisco 7500 series routers and Cisco 7000 series routers with the RSP7000 and RSP7000CI, use the **show interfaces port-channel** EXEC command.

show interfaces port-channel [*channel-number*]

Syntax Description

channel-number (Optional) Port channel number. Range is 1 to 4.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

Sample Display

The following is sample output from the **show interfaces port-channel** command:

```
Router# show interfaces port-channel 1
Port-channel1 is up, line protocol is up
  Hardware is FEChannel, address is 0000.0ca8.6220 (bia 0000.0000.0000)
  MTU 1500 bytes, BW 400000 Kbit, DLY 100 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive not set, fdx
  ARP type: ARPA, ARP Timeout 04:00:00
    No. of active members in this channel: 4
        Member 0 : FastEthernet1/0/0
        Member 1 : FastEthernet1/1/0
        Member 2 : FastEthernet4/0/0
        Member 3 : FastEthernet4/1/0
  Last input 01:22:13, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     223 packets input, 11462 bytes, 0 no buffer
     Received 1 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast
     0 input packets with dribble condition detected
     192 packets output, 13232 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

Table 1 describes significant fields in this output.

Table 1 Show Interfaces Port Channel (Fast EtherChannel) Field Descriptions

Field	Description
Port-channel1 is up, line protocol is up	Indicates if the interface hardware is currently active and can transmit and receive or if it has been taken down by an administrator.
Hardware is	Hardware type (Fast EtherChannel).
address is	Address being used by the interface.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the **bandwidth** interface configuration command.
Encapsulation	Encapsulation method assigned to the interface.
loopback	Indicates if loopbacks are set.
keepalive	Indicates if keepalives are set.
fdx	Indicates the interface is operating in full-duplex mode.
ARA type	ARP type on the interface.
ARP timeout	Number of hours, minutes, and seconds an ARP cache entry will stay in the cache.
No. of active members in this channel: 4	Number of Fast Ethernet interfaces that are currently active (not down) and part of the Fast EtherChannel group.
Member 0: FastEthernet1/0/0	Specific Fast Ethernet interface that is part of the Fast EtherChannel group.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
last clearing	Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. *** indicates the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31}ms (and less then 2^{32}ms) ago.
Queueing strategy	First-in, first-out queuing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).

Table 1 Show Interfaces Port Channel (Fast EtherChannel) Field Descriptions (Continued)

Field	Description
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped because a queue was full.
5 minute input rate 5 minute output rate	Average number of bits and packets received or transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes (input)	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum might not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating LAN station or far-end device does not match the checksum calculated from the data received. On a LAN, this usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of collisions or a station transmitting bad data. On a serial link, CRCs usually indicate noise, gain hits or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. On a serial line, this is usually the result of noise or other transmission problems.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.
abort	Illegal sequence of ones bit on the interface.
watchdog	Number of times watchdog receive timer expired. It happens when receiving a packet with length greater than 2048.
multicast	Number of multicast packets received.
input packets with dribble condition detected	Dribble bit error indicates that a frame is slightly too long. This frame error counter is incremented just for informational purposes; the router accepts the frame.
packets output	Total number of messages transmitted by the system.

Table 1 Show Interfaces Port Channel (Fast EtherChannel) Field Descriptions (Continued)

Field	Description
bytes (output)	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the far-end transmitter has been running faster than the near-end router's receiver can handle.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this might not balance with the sum of the enumerated output errors, as some datagrams can have more than one error, and others can have errors that do not fall into any of the specifically tabulated categories.
collisions	Number of messages retransmitted due to an Ethernet collision. This is usually the result of an overextended LAN (Ethernet or transceiver cable too long, more than two repeaters between stations, or too many cascaded multiport transceivers). A packet that collides is counted only once in output packets.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within a certain interval. If the system notices that the carrier detect line of an interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an unrecoverable interface processor error occurred, or when an interface is looped back or shut down.
babbles	The transmit jabber timer expired.
late collision	Number of late collisions. Late collision happens when a collision occurs after transmitting the preamble.
deferred	Deferred indicates that the chip had to defer while ready to transmit a frame because the carrier was asserted.
lost carrier	Number of times the carrier was lost during transmission.
no carrier	Number of times the carrier was not present during the transmission.
output buffer failures	Number of times that a packet was not output from the output hold queue because of a shortage of MEMD shared memory.
output buffers swapped out	Number of packets stored in main memory when the output queue is full; swapping buffers to main memory prevents packets from being dropped when output is congested. The number is high when traffic is bursty.

Related Command

interface port-channel