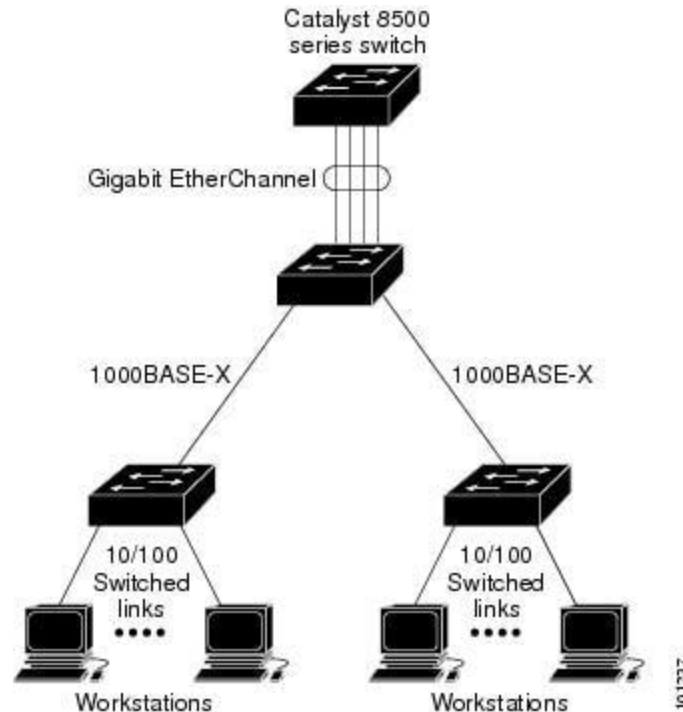


EtherChannel Overview

An EtherChannel consists of individual Gigabit Ethernet links bundled into a single logical link as shown below.



Each EtherChannel can consist of up to eight compatibly configured Ethernet ports. All ports in each EtherChannel must be configured as either Layer 2 or Layer 3 ports. The number of EtherChannels is limited to 48.

You can configure an EtherChannel in one of these modes: Port Aggregation Protocol (PAgP), Link Aggregation Control Protocol (LACP), or On. Configure both ends of the EtherChannel in the same mode:

- When you configure one end of an EtherChannel in either PAgP or LACP mode, the system negotiates with the other end of the channel to determine which ports should become active. If the remote port cannot negotiate an EtherChannel, the local port is put into an independent state and continues to carry data traffic as would any other single link. The port configuration does not change, but the port does not participate in the EtherChannel.
- When you configure an EtherChannel in the on mode, no negotiations take place. The switch forces all compatible ports to become active in the EtherChannel. The

other end of the channel (on the other switch) must also be configured in the on mode; otherwise, packet loss can occur.

Port-Channel Interfaces

When you create an EtherChannel, a port-channel logical interface is involved:

- Layer 2 ports, use the **channel-group** interface configuration command to dynamically create the port-channel logical interface. You also can use the **interface port-channel** *port-channel-number* global configuration command to manually create the port-channel logical interface, but then you must use the **channel-group** *channel-group-number* command to bind the logical interface to a physical port. The *channel-group-number* can be the same as the *port* - channel-number, or you can use a new number. If you use a new number, the **channel-group** command dynamically creates a new port channel.
- With Layer 3 ports, you should manually create the logical interface by using the **interface port-channel** global configuration command followed by the **no switchport** interface configuration command. Then you manually assign an interface to the EtherChannel by using the **channel-group** interface configuration command.

Port Aggregation Protocol

The Port Aggregation Protocol (PAgP) is a Cisco-proprietary protocol that can be run only on Cisco switches and on those switches licensed by vendors to support PAgP.

PAgP facilitates the automatic creation of EtherChannels by exchanging PAgP packets between Ethernet ports.

PAgP Modes

The table below shows the user-configurable EtherChannel PAgP modes for the **channel-group** interface configuration command.

Mode	Description
auto	Places a port into a passive negotiating state, in which the port responds to PAgP packets it receives but does not start PAgP packet negotiation. This setting minimizes the transmission of PAgP packets. This mode is not supported when the EtherChannel members are from different switches in the switch stack (cross-stack EtherChannel).
desirable	Places a port into an active negotiating state, in which the port starts negotiations with other ports by sending PAgP packets. This mode is not supported when the EtherChannel members are from different switches in the switch stack (cross-stack EtherChannel).

EtherChannel PAgP Modes

Link Aggregation Control Protocol

The LACP is defined in IEEE 802.3ad and enables Cisco switches to manage Ethernet channels between switches that conform to the IEEE 802.3ad protocol. LACP facilitates the automatic creation of EtherChannels by exchanging LACP packets between Ethernet ports.

By using LACP, the switch or switch stack learns the identity of partners capable of supporting LACP and the capabilities of each port. It then dynamically groups similarly configured ports into a single logical link (channel or aggregate port). Similarly configured ports are grouped based on hardware, administrative, and port parameter constraints. For example, LACP groups the ports with the same speed, duplex mode, native VLAN, VLAN range, and trunking status and type. After grouping the links into an EtherChannel, LACP adds the group to the spanning tree as a single switch port.

LACP Modes

The table below shows the user-configurable EtherChannel LACP modes for the **channel-group** interface configuration command.

Mode	Description
active	Places a port into an active negotiating state in which the port starts negotiations with other ports by sending LACP packets.
passive	Places a port into a passive negotiating state in which the port responds to LACP packets that it receives, but does not start LACP packet negotiation. This setting minimizes the transmission of LACP packets.

EtherChannel LACP Modes

Configuring Layer 2 EtherChannels

You configure Layer 2 EtherChannels by assigning ports to a channel group with the **channel-group** interface configuration command. This command automatically creates the port-channel logical interface.

If you enabled PAgP on a port in the **auto** or **desirable** mode, you must reconfigure it for either the **on** mode or the LACP mode before adding this port to a cross-stack EtherChannel. PAgP does not support cross-stack EtherChannels.

Beginning in privileged EXEC mode, follow these steps to assign a Layer 2 Ethernet port to a Layer 2 EtherChannel. This procedure is required.

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify a physical port, and enter interface configuration mode. Valid interfaces include physical ports. For a PAgP EtherChannel, you can configure up to eight ports of the same type and speed for the same group.

		<p>For a LACP EtherChannel, you can configure up to 16 Ethernet ports of the same type. Up to eight ports can be active, and up to eight ports can be in standby mode.</p>
Step 3	<pre> switchport mode { access trunk } switchport access vlan <i>vlan-id</i> </pre>	<p>Assign all ports as static-access ports in the same VLAN, or configure them as trunks. If you configure the port as a static-access port, assign it to only one VLAN. The range is 1 to 4094.</p>
Step 4	<pre> channel-group <i>channel -</i> <i>group-</i> <i>number</i> mode { auto [non- silent] desirable [non- silent] on } { active passive } </pre>	<p>Assign the port to a channel group, and specify the PAgP or the LACP mode. For <i>channel-group-number</i>, the range is 1 to 48.</p> <p>For mode, select one of these keywords:</p> <p>auto — Enables PAgP only if a PAgP device is detected. It places the port into a passive negotiating state, in which the port responds to PAgP packets it receives but does not start PAgP packet negotiation. This keyword is not supported when EtherChannel members are from different switches in the switch stack.</p> <p>desirable — Unconditionally enables PAgP. It places the port into an active negotiating state, in which the port starts negotiations with other ports by sending PAgP packets. This keyword is not supported when EtherChannel members are from different switches in the switch stack.</p>

		<p>on — Forces the port to channel without PAgP or LACP. In the on mode, an EtherChannel exists only when a port group in the on mode is connected to another port group in the on mode.</p> <p>non-silent —(Optional) If your switch is connected to a partner that is PAgP-capable, configure the switch port for nonsilent operation when the port is in the auto or desirable mode. If you do not specify non-silent, silent is assumed. The silent setting is for connections to file servers or packet analyzers. This setting allows PAgP to operate, to attach the port to a channel group, and to use the port for transmission.</p> <p>active —Enables LACP only if a LACP device is detected. It places the port into an active negotiating state in which the port starts negotiations with other ports by sending LACP packets.</p> <p>passive — Enables LACP on the port and places it into a passive negotiating state in which the port responds to LACP packets that it receives, but does not start LACP packet negotiation.</p> <p>For information on compatible modes for the switch and its partner, see the “PAgP Modes” section and the “LACP Modes” section.</p>
Step 5	end	Return to privileged EXEC mode.

Step 6	show running-config	Verify your entries.
Step 7	copy running-config startup-config	(Optional) Save your entries in the configuration file.