A through Z

channel-group (interface)

To assign and configure an EtherChannel interface to an EtherChannel group, use the **channel-group** command in interface configuration mode. To remove the channel-group configuration from the interface, use the **no** form of this command.

channel-group *channel-group-number* **mode** {**active**| **on**| **passive**}

no channel-group *channel-group-number*

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

channel-group *channel-group-number* **mode on**

no channel-group *channel-group-number*

Cisco ASR 1000 Series Routers

channel-group *channel-group-number* **mode** {**active**| **passive**}

no channel-group

Cisco Catalyst Switches

channel-group *channel-group-number* **mode** {**active**| **on**| **auto [non-silent]**| **desirable [non-silent]**| **passive**}

no channel-group *channel-group-number*

Syntax Description

channel-group-number	Integer that identifies the channel-group. Valid values are from 1 to 256; the maximum number of integers that can be used is 64. • For Fast EtherChannel groups, the number is an integer from 1 to 4. This number is the one previously assigned to the port-channel interface. • On the Cisco ASR 1000 series router, valid values are from 1 to 64.
mode	Specifies the EtherChannel mode of the interface.
active	Enables Link Aggregation Control Protocol (LACP) unconditionally.
on	Enables EtherChannel only.
auto	Places a port into a passive negotiating state in which the port responds to Port Aggregation Protocol (PAgP) packets that it receives but does not initiate PAgP packet negotiation.

non-silent	(Optional) Used with the **auto** or **desirable** mode when traffic is expected from the other device.
desirable	Places a port into an active negotiating state in which the port initiates negotiations with other ports by sending PAgP packets.
passive	Enables LACP only when an LACP device is detected. This is the default state.

Command Default No channel groups are assigned.

Command Modes Interface configuration (config-if)

Command History

Release	Modification
11.1CA	This command was introduced.
12.0(7)XE	Support for this command was implemented on Cisco Catalyst 6000 series switches.
12.1(3a)E3	The number of valid values for the *number*argumentwas changed; see the "Usage Guidelines" section for valid values.
12.2(2)XT	This command was implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	Support for this command was implemented on the Cisco 2600 series, the Cisco 3600 series, and the Cisco 3700 series routers and integrated into Cisco IOS Release 12.2(8)T .
12.2(14)SX	Support for this command was implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Cisco IOS Release 12.2(17d)SXB.
12.2(18)SXE	This command was changed to support advanced QinQ translation on QinQ link bundles using GE-WAN interfaces on an OSM-2+4GE-WAN+ OSM on Cisco 7600 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	Support for this command on the Cisco 7600 router was integrated into Cisco IOS Release 12.2(33)SRB.

Release	Modification
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4.

Usage Guidelines

OSMs are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 32.

IP Address for the Physical Interface

You do not have to disable the IP address that is assigned to a physical interface that is part of a channel group, but Cisco highly recommends doing so.

Layer 2 and Layer 3 Port Channels

You can create both Layer 2 and Layer 3 port channels by entering the **interface port-channel** command or, when the channel-group gets its first physical interface assignment. The port channels are not created at run time, nor are they created dynamically.

You do not have to create a port-channel interface before assigning a physical interface to a channel group. A port-channel interface is automatically created when the channel group gets its first physical interface, if it is not already created.

Propagation of Configuration and Attribute Changes

Any configuration or attribute changes you make to the port-channel interface are propagated to all interfaces within the same channel group as the port channel. (for example, configuration changes are also propagated to the physical interfaces that are not part of the port-channel, but are part of the channel group.)

The on Keyword

When you use the **on**keyword, a usable EtherChannel exists only when a port group in on mode is connected to another port group in the on mode.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

You do not have to create a port-channel interface before assigning a physical interface to a channel group. A port-channel interface is created automatically when the channel group gets its first physical interface, if it is not already created.

Cisco ASR 1000 Series Routers

The Cisco ASR 1000 series router has the following prerequisites and restriction:

- A port-channel must be created before member links are assigned to it.
- IP addresses must be disabled on member links before those links can be included in a port-channel.
- Fast Ethernet interfaces are not supported.

Cisco Catalyst Switches

The number of valid values for *number*depends on the software release. For software releases prior to Cisco IOS Release 12.1(3a)E3, valid values are from 1 to 256; for Cisco IOS Release 12.1(3a)E3, 12.1(3a)E4, and 12.1(4)E1, valid values are from 1 to 64. Cisco IOS Release 12.1 E and later releases support a maximum of 64 values ranging from 1 to 256.

The channel-group number is global and is shared between all the channeling protocols. If a specific channel number is used for the PAgP-enabled interfaces of a channel group, that same channel number cannot be used for configuring a channel that has LACP-enabled interfaces or vice versa.

Entering the **auto** or **desirable** keyword enables PAgP on the specified interface; the command will be rejected if it is issued on an LACP-enabled interface.

The **active** and **passive** keywords are valid on PAgP-disabled interfaces only.

You can change the mode for an interface only if it is the only interface that is designated to the specified channel group.

The **on** keyword forces the bundling of the interface on the channel without any negotiation.

You can manually configure a switch with PAgP on one side and LACP on the other side in the **on** mode.

With the **on** mode, a usable EtherChannel exists only when a port group in **on** mode is connected to another port group in **on** mode.

If you enter the **channel group** command on an interface that is added to a channel with a different protocol than the protocol you are entering, the command is rejected.

If the interface belongs to a channel, the **no** form of this command is rejected.

All ports in the same channel group must use the same protocol; you cannot run two protocols on one channel group.

PAgP and LACP are not compatible; both ends of a channel must use the same protocol.

You can change the protocol at any time, but this change causes all existing EtherChannels to reset to the default channel mode for the new protocol.

Configure all ports in an EtherChannel to operate at the same speed and duplex mode (full duplex only for LACP mode).

All ports in a channel must be on the same DFC-equipped module. You cannot configure any of the ports to be on other modules.

On systems that are configured with nonfabric-enabled modules and fabric-enabled modules, you can bundle ports across all modules, but those bundles cannot include a DFC-equipped module port.

You do not have to create a port-channel interface before assigning a physical interface to a channel group. A port-channel interface is created automatically when the channel group gets its first physical interface, if it is not already created.

You do not have to disable the IP address that is assigned to a physical interface that is part of a channel group, but it is highly recommended.

You can create both Layer 2 and Layer 3 port channels by entering the **interface port-channel** command or when the channel group gets its first physical interface assignment. The port channels are not created at runtime or dynamically.

Any configuration or attribute changes that you make to the port-channel interface are propagated to all interfaces within the same channel group as the port channel (for example, configuration changes are also propagated to the physical interfaces that are not part of the port channel but are part of the channel group).

When configuring Layer 2 EtherChannels, you cannot put Layer 2 LAN ports into manually created port-channel logical interfaces.

Only the **on** mode is supported when using this command with GE-WAN ports on the OSM-2+4GE-WAN+ OSM to create QinQ link bundles for advanced QinQ translation. Also, you cannot use the **channel-group** command on GE-WAN interfaces if MPLS is configured. You must remove all IP, MPLS, and other Layer 3 configuration commands before using the **channel-group** command with GE-WAN interfaces.

Note The GE-WAN interfaces on an OSM-2+4GE-WAN+ OSM behave slightly differently than other interfaces if you want to move the interface from one group to another. To move most other interfaces, you can enter the **channel-group** command again to delete the interface from the old group and move it to the new group. For GE-WAN ports, however, you must manually remove the interface from the group by entering the **no channel-group** command before assigning it to a new group.

Caution Do not enable Layer 3 addresses on the physical EtherChannel interfaces. Assigning bridge groups on the physical EtherChannel interfaces causes loops in your network.

For a complete list of guidelines, see the "Configuring EtherChannel" section of the *Cisco 7600 Series Router Cisco IOS Software Configuration Guide*.

Fast EtherChannel

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**command in interface configuration mode.

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 Cisco Catalyst 5000 switch.

A maximum of 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.

For more guidelines see the "Configuring EtherChannel" section of the *Cisco 7600 Series Router Cisco IOS Software Configuration Guide* and the "Configuring EtherChannel" section of the *Catalyst 6500 Series Switch Cisco IOS Software Configuration Guide*

Examples

This example shows how to add EtherChannel interface 1/0 to the EtherChannel group that is specified by port-channel 1:

```
Router(config-if)#
channel-group 1 mode on
Router(config-if)#
```

The following example shows how to add interface Fast Ethernet 1/0 to the Fast EtherChannel group specified by port-channel 1:

```
Router(config)#
interface port-channel 1
Router(config-if)#
```

```
exit
Router(config)#
interface fastethernet 1/0
Router(config-if)#
channel-group 1
```

Related Commands

Command	Description
interface	Creates a port-channel virtual interface and puts the CLI in interface configuration mode when the **port-channel** keyword is used.
ip address	Sets a primary or secondary IP address on an interface.
show etherchannel	Displays the EtherChannel information for a channel.
show interfaces port-channel	Displays traffic that is seen by a specific port channel.

clear lldp

To reset either the Link Layer Discovery Protocol (LLDP) traffic counters or the table that contains LLDP information about neighbors, use the **clear lldp** command in privileged EXEC mode.

clear lldp {**counters**| **table**}

Syntax Description

counters	Specifies that the traffic counters are cleared.
table	Specifies that the LLDP table is cleared.

Command Default

The LLDP traffic counters are not reset, and the table of LLDP information is not cleared.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

Usage Guidelines

Use this command for informational purposes or to test a symptom of network malfunction such as packet loss.

Examples

The following example shows how to clear the LLDP counters and display LLDP traffic. The output from the **show lldp traffic** command shows that all the traffic counters have been reset to zero.

```
Device# clear lldp counters
Device# show lldp traffic
LLDP traffic statistics:
    Total frames out: 0
    Total entries aged: 0
    Total frames in: 0
    Total frames received in error: 0
    Total frames discarded: 0
    Total TLVs unrecognized: 0
```

The following example shows how to clear the LLDP table. The output of the **show lldp neighbors** command shows that all information has been deleted from the table.

```
Device# clear lldp table
Device# show lldp neighbors
```

```
Capability codes:
    (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
    (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID           Local Intf     Hold-time  Capability      Port ID
```

Related Commands

Command	Description
show lldp	Displays information about LLDP in the network.

lacp fast-switchover

To enable Link Aggregation Control Protocol (LACP) 1:1 link redundancy, use the **lacp fast-switchover** command in interface configuration mode. To dis able LACP 1:1 link redundancy, use the **no** form of this command.

lacp fast-switchover

no lacp fast-switchover

Syntax Description

This command has no arguments or keywords.

Command Default

LACP 1:1 link redundancy is disabled by default.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SB	Support for this command was implemented on the Cisco 10000 series router and integrated into Cisco IOS Release 12.2(33)SB. The time allowed for a link switchover was modified from the default of 2 seconds to 250 milliseconds.
Cisco IOS XE Release 2.5	This command was integrated into Cisco IOS XE Release 2.5

Usage Guidelines

Prior to entering the **lacp fast-switchover** command, you must ensure the following:

- The port channel protocol type is LACP.
- The **lacp max-bundle 1**command has been entered on the port channel. The **lacp fast-switchover** command will not affect the **lacp max-bundle** command.

When you enable LACP 1:1 link redundancy, based on the system priority and port priority, the port with the higher system priority chooses the link as the active link and the other link as the standby link. When the active link fails, the standby link is selected as the new active link without taking down the port channel. When the original active link recovers, it reverts to its active link status. During this change-over, the port channel is also up.

Note We recommend that you configure two ports only (one active and one hot-standby) in the bundle for optimum performance.

You can enter this command on any port channels with different EtherChannel protocol types of LACP, Port Aggregation Protocol (PAgP), or Fast EtherChannel (FEC).

Examples

This example shows how to enable LACP 1:1 link redundancy:

```
Router(config-if)# lacp fast-switchover
```

This example shows how to disable LACP 1:1 link redundancy:

```
Router(config-if)# no lacp fast-switchover
```

Related Commands

Command	Description
lacp max-bundle	Assigns and configures an EtherChannel interface to an EtherChannel group.
show etherchannel	Displays the EtherChannel information for a channel.

lacp max-bundle

To define the maximum number of active bundled Link Aggregation Control Protocol (LACP) ports allowed in a port channel, use the **lacp max-bundle** command in interface configuration mode. To return to the default settings, use the **no** form of this command.

lacp max-bundle *max-bundles*

no lacp max-bundle

Syntax Description

max-bundles	Maximum number of active bundled ports allowed in the port channel. Valid values are from 1 to 8. On the Cisco ASR 1000 series router, valid values are 1 to 4. The default settings are as follows: • Maximum of 8 bundled ports per port channel. • Maximum of 8 bundled ports and 8 hot-standby ports per port channel if the port channels on both sides of the LACP bundle are configured in the same way. • On the Cisco 10000 series router, maximum of 8 bundled ports per port channel.

Command Default

A maximum number of active bundled ports is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	Support for this command was implemented on the Cisco 10000 series router and integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	Support for this command on the Cisco 7600 router was integrated into Cisco IOS Release 12.2(33)SRB.
12.2(33)SB	On the Cisco 10000 series router, the maximum number of bundled ports per port channel was increased from 4 to 8.

Release	Modification
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines

The value specified in the *max-bundles* argument determines the number of active links that are bundled in the port channel. The remaining links are in hot-standby mode.

On the Cisco 10000 series router, this command requires a Performance Routing Engine 2 (PRE2) or PRE3.

Examples

This example shows how to set 3 ports to bundle in port channel 2:

```
Router(config)# interface port-channel 2
Router(config-if)# lacp max-bundle 3
Router(config-if)#
```

Related Commands

Command	Description
interface port-channel	Creates a port-channel virtual interface and puts the CLI in interface configuration mode.
ip address	Sets a primary or secondary IP address on an interface.
show etherchannel	Displays the EtherChannel information for a channel.
show interfaces port-channel	Displays traffic that is seen by a specific port channel.

lacp min-bundle

To set the minimum number of active links in a Link Aggregation Control Protocol (LACP) bundle, use the **lacp min-bundle** command in interface configuration mode. To return to the default settings, use the **no** form of this command.

lacp min-bundle *min-bundle*

no lacp min-bundle

Syntax Description

min-bundle	Minimum number of bundled ports allowed in the port channel. Valid values are from 1 to 8. The default is 1.

Command Default

The port-channel operational state will be "Down" only when there are no active links in the channel. If there are one or more active links, the port-channel state will be "Up."

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SB	This command was introduced.
Cisco IOS XE Release 2.5	This command was integrated into Cisco IOS XE Release 2.5.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines

Use the **lacp min-bundle** command to configure the minimum number of active links allowed in an LACP bundle. When the number of active links falls below this minimum threshold, the port channel shuts down.

Note LACP and the same minimum bundle value must be configured on each peer in order for both sides of the port channel to be brought down.

Cisco 10000 Series Router

This command requires a Performance Routing Engine 2 (PRE2) or PRE3.

Examples

This example shows how to set the minimum number of active links to 5 ports:

```
Device(config-if)# lacp min-bundle 5
```

Related Commands

Command	Description
interface port-channel	Creates a port-channel virtual interface and enters interface configuration mode.
ip address	Sets a primary or secondary IP address on an interface.
show etherchannel	Displays the EtherChannel information for a channel.
show interfaces port-channel	Displays traffic that is seen by a specific port channel.

lacp port-priority

To set the priority for a physical interface, use the **lacp port-priority** command in interface configuration mode. To return to the default setting, use the **no** form of this command.

lacp port-priority *priority*

no lacp port-priority

Syntax Description

priority	Integer from 1 to 65535 that indicates the priority for the physical interface. The default is 32768. • On the Cisco ASR 1000 series router, the range is 0 to 65535.

Command Default

The default port priority is set.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1(13)EW	This command was introduced on the Cisco Catalyst 4500 series switches.
12.2(14)SX	Support for this command on the Supervisor Engine 720 was integrated into Cisco IOS Release12.2(14)SX.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Cisco IOS Release12.2(17d) SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	Support for this command on the Cisco 7600 router was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.

Usage Guidelines

You may assign a port priority to each port on a device running Link Aggregation Control Protocol (LACP). You can specify the port priority by using the **lacp port-priority** command at the command-line interface (CLI) or use the default port priority (32768) that is carried as part of the LACP protocol data unit (PDU) exchanged with the partner. Port priority is used to decide which ports should be put in standby mode when a hardware limitation or the **lacp max-bundle** command configuration prevents all compatible ports from aggregating. Priority is supported only on port channels with LACP-enabled physical interfaces.

Note A high priority number means a low priority.

Port priority together with port number form a port identifier.

To verify the configured port priority, issue the **show lacp** command.

Examples

This example shows how to set a priority of 23700 for an interface:

```
Device> enable
Device#  configure terminal
Device(config)#  interface ethernet0/0
Device(config-if)# lacp port-priority 23700
Device(config-if)#
```

Related Commands

Command	Description
channel-group	Assigns and configures an EtherChannel interface to an EtherChannel group.
debug lacp	Enables debugging of LACP activities.
lacp max-bundle	Defines the maximum number of active bundled LACP ports allowed in a port channel.
lacp system-priority	Sets the priority of the system.
show lacp	Displays information about LACP activity on the device.

lacp rate

To set the rate at which Link Aggregation Control Protocol (LACP) control packets are ingressed to an LACP-supported interface, use the **lacp rate** command in interface configuration mode. To return to the default settings, use the **no** form of this command.

lacp rate {**normal**| **fast**}

no lacp rate

Syntax Description

normal	Specifies that LACP control packets are ingressed at the normal rate, every 30 seconds after the link is bundled.
fast	Specifies that LACP control packets are ingressed at the fast rate, once every 1 second.

Command Default

The default ingressed rate for control packets is 30 seconds after the link is bundled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(18)SXF2	This command was introduced on the Catalyst 6500 series switch.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.

Usage Guidelines

Use this command to modify the duration of a LACP timeout. The LACP timeout value is set on Cisco switches to a value of 90 seconds. Using the **lacp rate** command, you can select the LACP timeout value for a switch to be either 30 seconds or 1 second.

This command is supported only on LACP-enabled interfaces.

Examples

This example shows how to specify the fast (1-second) ingress rate on interface Ethernet 0/1:

```
Router(config)# interface ethernet 0/1
Router(config-if)# lacp rate fast
```

Related Commands

Command	Description
show lacp	Displays LACP information.

lacp system-priority

To set the priority for a system, use the **lacp system-priority** command in global configuration mode. To return to the default setting, use the **no** form of this command.

lacp system-priority *priority*

no lacp system-priority

Syntax Description

priority	Integer from 1 to 65535 that indicates the priority for the system. The default is 32768. • On the Cisco ASR 1000 series router, the range is 0 to 65535.

Command Default

The default system priority is set.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.1(13)EW	This command was introduced on the Cisco Catalyst 4500 series switches.
12.2(14)SX	Support for this command on the Supervisor Engine 720 was integrated into Cisco IOS Release12.2(14)SX.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Cisco IOS Release12.2(17d) SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	Support for this command on the Cisco 7600 router was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.

Usage Guidelines

You can assign a system priority to each device running Link Aggregation Control Protocol (LACP). You can specify the system priority by using the **lacp system-priority** command at the command-line interface (CLI) or use the default system priority (32768) that is carried as part of the LACP protocol data unit (PDU) exchanged with the partner. System priority is used with the MAC address of the device to form the system ID and also is used during negotiation with other systems. Priority is supported only on port channels with LACP-enabled physical interfaces.

Note A high priority number means a low priority.

To verify the configured system priority, issue the **show lacp** command.

Examples

The following example shows how to set a system priority of 25500 for a device:

```
Router> enable
Router# configure terminal
Router(config)# lacp system-priority 25500
```

Related Commands

Command	Description
channel-group	Assigns and configures an EtherChannel interface to an EtherChannel group.
debug lacp	Enables debugging of LACP activities.
lacp port-priority	Sets the priority of a port.
show lacp	Displays information about LACP activity on the device.

lldp

To enable and configure Link Layer Discovery Protocol (LLDP), use the **lldp** command in global configuration mode. To disable LLDP, use the **no** form of this command.

lldp {**holdtime** *seconds*| **reinit** *delay*| **run**| **timer** *rate*| **tlv-select** *tlv*}

no lldp {**holdtime**| **reinit**| **run**| **timer**| **tlv-select** *tlv*}

Syntax Description

holdtime	Specifies the length of time that the receiver must keep the packet.
seconds	Integer in the range from 0 to 65535 that specifies the length of time, in seconds, that the receiver must keep the packet. The default is 120.
reinit	Specifies a delay for LLDP initialization on an interface.
delay	Integer in the range from 2 to 5 that specifies the length of time, in seconds, that LLDP should wait to initialize. The default is 2.
run	Enables LLDP.
timer	Specifies a rate at which LLDP packets are sent.
rate	Integer in the range from 5 to 65534 that specifies how often, in seconds, the Cisco IOS software sends LLDP updates. The default is 30.
tlv-select	Specifies the time-length-value (TLV) elements to send.

tlv	String that identifies the TLV element to use. Valid values are: • **mac-phy-cfg** --IEEE 802.3 MAC/Phy configuration/status TLV • **management-address** --Management address TLV • **port-description** --Port description TLV • **port-vlan** --Port VLAN ID TLV • **system-capabilities** --System capabilities TLV • **system-description** --System description TLV • **system-name** --System name TLV

Command Default

LLDP is globally disabled. No LLDP advertisements are sent.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(37)SE	This command was introduced.
12.2(44)SE	This command was modified. The command default was changed to disabled.
12.2(44)SG	This command was integrated into Cisco IOS Release 12.2(44)SG.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS Release XE3.8S

Usage Guidelines

To enable LLDP, use this command with the **run** keyword.

LLDP packets are sent with a hold-time value. The receiving device ages the LLDP information about the neighbor after the hold time has elapsed.

LLDP is an industry standard version for Cisco Discovery Protocol (CDP). Non-Cisco phones use LLDP to configure voice VLANs. If you install a non-Cisco phone that supports LLDP and do not want to configure a voice VLAN on the phone, then you can use LLDP.

Examples

The following example shows how to configure a hold time of 100 seconds:

```
Device(config)# lldp holdtime 100
```

The following example shows how to set the timer to send LLDP updates every 75 seconds:

```
Device(config)# lldp timer 75
```

Related Commands

Command	Description
show lldp	Displays global LLDP information.

lldp (interface)

To enable Link Layer Discovery Protocol (LLDP) on an interface, use the **lldp**command in interface configuration mode. To disable LLDP on an interface, use the **no** form of this command.

lldp {**med-tlv-select** *tlv*| **receive**| **transmit**}

no lldp {**med-tlv-select** *tlv*| **receive**| **transmit**}

Syntax Description

med-tlv-select	Selects an LLDP Media Endpoint Discovery (MED) time-length-value (TLV) element to send.
tlv	String that identifies the TLV element. Valid values are the following: • i**nventory-management**--LLDP MED Inventory Management TLV • **network-policy** --LLDP MED Network Policy TLV • **power-management** --LLDP MED Power Management TLV
receive	Enables an interface to receive LLDP transmissions.
transmit	Enables LLDP transmission on an interface.

Command Default

LLDP is enabled on supported interfaces.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.

Usage Guidelines

This command is supported on 802.1 media types.

Examples

The following example shows how to disable LLDP transmission on interface Ethernet 0/1:

```
Router# configure terminal
```

```
Router(config)# interface ethernet 0/1
Router(config-if)# no lldp transmit
```

The following example shows how to enable LLDP transmission on interface Ethernet 0/1:

```
Router# configure terminal
Router(config)# interface ethernet 0/1
Router(config-if)# lldp transmit
```

Related Commands

Command	Description
lldp	Enables LLDP globally.

location (interface)

To configure location information for an interface, use the **location**command in interface configuration mode. To remove the location information for an interface, use the **no** form of this command.

location {**additional-location-information** *word*| **civic-location-id** *id* **[port-location]**| **elin-location-id** *id*}

no location {**additional-location-information** *word*| **civic-location-id** *id* **[port-location]**| **elin-location-id** *id*}

Syntax Description

additional-location-information	Configures additional information for a location or place.
word	A word or phrase that provides additional location information.
civic-location-id	Configures civic location information for an interface.
port-location	(Optional) Specifies port-specific attributes.
elin-location-id	Configures emergency location identifier number (ELIN) for an interface.
id	The ID for the civic location or the ELIN location. The ID range is from 1 to 4095. **Note** The identifier for the civic location in the Link-Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED) TLV is limited to 250 bytes or less. To avoid error messages about available buffer space during switch configuration, be sure that the total length of all civic location information specified for each civic location ID does not exceed 250 bytes.

Command Default

Location information for interfaces is not enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(40)SE	This command was introduced.
12.2(55)SE	This command was modified. The **port-location** keyword was added.

Release	Modification
15.1(1)SY	This command was integrated into Cisco IOS Release 15.1(1)SY.

Usage Guidelines

You can use the location command to configure location support for interfaces. When you configure the **location** command on a specific interface or on several interfaces, the location TLVs are transmitted on the respective interfaces every time CDP messages are sent. After entering the location civic-location-idid **port-location** command, you enter civic location port configuration mode. In this mode, you can enter additional location information for every port. Use the help feature (?) for details on the additional information that you can configure in this mode. You can configure the common attributes globally and specific attributes per port. If an attribute is configured both globally and on a port, the port configuration has higher priority.

The civic location identifier must not exceed 250 bytes.

Examples

The following example shows how to enter civic location information for an interface, and to configure additional information for civic location identifier:

```
Device(config)# interface gigabitethernet1/0/1
Device(config-if)# location civic-location-id 1 port-location
Device(config-if-port)# number 3560
Device(config-if-port)# building 10
```

You can verify your settings by entering the show location civic interface command.

Related Commands

Command	Description
location	Configures the location information for an endpoint.
show location	Displays the location information for an endpoint.

show lacp

To display Link Aggregation Control Protocol (LACP) and multi-chassis LACP (mLACP) information, use the **show lacp** command in either user EXEC or privileged EXEC mode.

show lacp {*channel-group-number* {**counters**| **internal [detail]**| **neighbor [detail]**}| **multi-chassis [load-balance]** {**group** *number*| **port-channel** *number*}| **sys-id**}

Cisco ASR 901 Series Aggregation Services Router

show lacp {*channel-group-number* {**counters**| **internal [detail]**| **neighbor [detail]**| **sys-id**}}

Syntax Description

channel-group- number	(Optional) Number of the channel group. The following are valid values: • Cisco IOS 12.2 SB and Cisco IOS XE 2.4 Releases--from 1 to 64 • Cisco IOS 12.2 SR Releases--from 1 to 308 • Cisco IOS 12.2 SX Releases--from 1 to 496 • Cisco IOS 15.1S Releases—from 1 to 564 • Cisco ASR 901 Series Aggregation Services Router—from 1 to 8
counters	Displays information about the LACP traffic statistics.
internal	Displays LACP internal information.
neighbor	Displays information about the LACP neighbor.
detail	(Optional) Displays detailed internal information when used with the **internal** keyword and detailed LACP neighbor information when used with the **neighbor** keyword.
multi-chassis	Displays information about mLACP.
load-balance	Displays mLACP load balance information.
group	Displays mLACP redundancy group information,

number	Integer value used with the **group** and **port-channel** keywords. • Values from 1 to 4294967295 identify the redundancy group. • Values from 1 to 564 identify the port-channel interface.
port-channel	Displays mLACP port-channel information.
sys-id	Displays the LACP system identification. It is a combination of the port priority and the MAC address of the device

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	Support for this command on the Cisco 7600 router was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE Release 2.4	This command was integrated into Cisco IOS XE Release 2.4.
12.2(33)SRE	This command was modified. The **multi-chassis**, **group**, and **port-channel**keywords and *number* argument were added.
15.1(3)S	This command was modified. The **load-balance** keyword was added.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.

Usage Guidelines

Use the **show lacp** command to troubleshoot problems related to LACP in a network.

If you do not specify a value for the argument *channel-group-number*, all channel groups are displayed. Values in the range of 257 to 282 are supported on the CSM and the FWSM only.

Examples

Examples

This example shows how to display the LACP system identification using the **show lacp sys-id**command:

```
Device> show lacp sys-id

8000,AC-12-34-56-78-90
```

The system identification is made up of the system priority and the system MAC address. The first two bytes are the system priority, and the last six bytes are the globally administered individual MAC address that is associated to the system.

Examples

This example shows how to display the LACP statistics for a specific channel group:

```
Device# show lacp 1 counters

               LACPDUs          Marker       LACPDUs
Port       Sent   Recv     Sent   Recv     Pkts Err
-------------------------------------------------------
Channel group: 1
  Fa4/1    8      15       0      0          3    0
  Fa4/2    14     18       0      0          3    0
  Fa4/3    14     18       0      0          0
  Fa4/4    13     18       0      0          0
```

The output displays the following information:

- The LACPDUs Sent and Recv columns display the LACPDUs that are sent and received on each specific interface.
- The LACPDUs Pkts and Err columns display the marker-protocol packets.

The following example shows output from a **show lacp***channel-group-number***counters**command:

```
Device1# show lacp 5 counters

              LACPDUs          Marker      Marker Response    LACPDUs
Port       Sent   Recv     Sent   Recv     Sent   Recv      Pkts Err
---------------------------------------------------------------------
Channel group: 5
Gi5/0/0     21     18       0      0        0      0         0
```

The following table describes the significant fields shown in the display.

Table 1: show lacp channel-group-number counters Field Descriptions

Field	Description
LACPDUs Sent Recv	Number of LACP PDUs sent and received.
Marker Sent Recv	Attempts to avoid data loss when a member link is removed from an LACP bundle.
Marker Response Sent Recv	Cisco IOS response to the Marker protocol.
LACPDUs Pkts Err	Number of LACP PDU packets transmitted and the number of packet errors.

The following example shows output from a **show lacp internal**command:

```
Device1# show lacp 5 internal

Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode
Channel group 5
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi5/0/0   SA      bndl      32768         0x5       0x5     0x42        0x3D
```

The following table describes the significant fields shown in the display.

Table 2: show lacp internal Field Descriptions

Field	Description
Flags	Meanings of each flag value, which indicates a device activity.
Port	Port on which link bundling is configured.
Flags	Indicators of device activity.
State	Activity state of the port. States can be any of the following: • Bndl--Port is attached to an aggregator and bundled with other ports. • Susp--Port is in suspended state, so it is not attached to any aggregator. • Indep--Port is in independent state (not bundled but able to switch data traffic). This condition differs from the previous state because in this case LACP is not running on the partner port. • Hot-sby--Port is in hot standby state. • Down--Port is down.
LACP port Priority	Priority assigned to the port.
Admin Key	Defines the ability of a port to aggregate with other ports.
Oper Key	Determines the aggregation capability of the link.
Port Number	Number of the port.

Field	Description
Port State	State variables for the port that are encoded as individual bits within a single octet with the following meaning: • bit0: LACP_Activity • bit1: LACP_Timeout • bit2: Aggregation • bit3: Synchronization • bit4: Collecting • bit5: Distributing • bit6: Defaulted • bit7: Expired

Examples

This example shows how to display internal information for the interfaces that belong to a specific channel:

```
Device# show lacp 1 internal

Flags:  S - Device sends PDUs at slow rate. F - Device sends PDUs at fast rate.
        A - Device is in Active mode.       P - Device is in Passive mode.
Channel group 1
                            LACPDUs     LACP Port    Admin   Oper    Port     Port
Port      Flags    State    Interval    Priority     Key     Key     Number   State
Fa4/1     saC      bndl     30s         32768        100     100     0xc1     0x75
Fa4/2     saC      bndl     30s         32768        100     100     0xc2     0x75
Fa4/3     saC      bndl     30s         32768        100     100     0xc3     0x75
Fa4/4     saC      bndl     30s         32768        100     100     0xc4     0x75
Device#
```

The following table describes the significant fields shown in the display.

Table 3: show lacp internal Field Descriptions

Field	Description
State	Current state of the port; allowed values are as follows: • bndl--Port is attached to an aggregator and bundled with other ports. • susp--Port is in a suspended state; it is not attached to any aggregator. • indep--Port is in an independent state (not bundled but able to switch data traffic. In this case, LACP is not running on the partner port). • hot-sby--Port is in a hot-standby state. • down--Port is down.
LACPDUs Interval	Interval setting.
LACP Port Priority	Port-priority setting.
Admin Key	Defines the ability of a port to aggregate with other ports.
Oper Key	Determines the aggregation capability of the link.
Port Number	Port number.
Port State	Activity state of the port. • See the Port State description in the show lacp internal Field Descriptions table for state variables.

Examples

This example shows how to display the information about the LACP neighbors for a specific port channel:

```
Device# show lacp 1 neighbors

Flags:  S - Device sends PDUs at slow rate. F - Device sends PDUs at fast rate.
        A - Device is in Active mode.       P - Device is in Passive mode.
Channel group 1 neighbors
          Partner                Partner
Port      System ID              Port Number     Age     Flags
Fa4/1     8000,00b0.c23e.d84e     0x81            29s     P
Fa4/2     8000,00b0.c23e.d84e     0x82            0s      P
Fa4/3     8000,00b0.c23e.d84e     0x83            0s      P
Fa4/4     8000,00b0.c23e.d84e     0x84            0s      P
          Port          Admin     Oper      Port
          Priority      Key       Key       State
Fa4/1     32768         200       200       0x81
```

```
Fa4/2      32768          200        200        0x81
Fa4/3      32768          200        200        0x81
Fa4/4      32768          200        200        0x81
Device#
```

The following table describes the significant fields shown in the display.

Table 4: show lacp neighbors Field Descriptions

Field	Description
Port	Port on which link bundling is configured.
Partner System ID	Peer's LACP system identification (sys-id). It is a combination of the system priority and the MAC address of the peer device.
Partner Port Number	Port number on the peer device
Age	Number of seconds since the last LACP PDU was received on the port.
Flags	Indicators of device activity.
Port Priority	Port priority setting.
Admin Key	Defines the ability of a port to aggregate with other ports.
Oper Key	Determines the aggregation capability of the link.
Port State	Activity state of the port. See the Port State description in the show lacp internal Field Descriptions table for state variables.

If no PDUs have been received, the default administrative information is displayed in braces.

Related Commands

Command	Description
clear lacp counters	Clears the statistics for all interfaces belonging to a specific channel group.
lacp port-priority	Sets the priority for the physical interfaces.
lacp system-priority	Sets the priority of the system.

show lldp

To display information about one or all neighboring devices discovered using Link Layer Discovery Protocol (LLDP), use the **show lldp**command in privileged EXEC mode.

show lldp [**entry** {*****| *word*}| **errors**| **interface** [**ethernet** *number*]| **neighbors** [**ethernet** *number*| **detail**]| **traffic**]

Syntax Description

entry	(Optional) Displays detailed information for a specific neighbor entry.
*****	(Optional) Displays detailed information about all the LLDP neighbors.
word	(Optional) Name of the neighbor about which information is requested.
errors	(Optional) Displays LLDP computational errors and overflows.
interface	(Optional) Displays status and configuration of an interface on which LLDP is enabled.
ethernet	(Optional) Displays an IEEE 802.3 interface on which LLDP is enabled.
number	(Optional) Integer that identifies the interface.
neighbors	(Optional) Displays neighbor entries. **Note** If the device ID has more than 20 characters, the ID will be truncated to 20 characters in command output because of display constraints.
detail	(Optional) Displays detailed information about a neighbor (or neighbors) including network address, enabled capabilities, hold time, and software version.
traffic	(Optional) Displays LLDP statistics.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(50)SY	Modified **show lldp neighbors detail** output to parse and display management addresses OID in ASN.1 notation.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

Usage Guidelines

Use this command to monitor LLDP activity in a network.

When you use the **neighbors** keyword, the device ID is truncated to 20 characters in the command output because of display constraints. The **show lldp neighbors** command functions correctly; only the device ID display is truncated. For detailed neighbor information, use the **show lldp neighbors detail** command.

Examples

The following is sample output from the **show lldp entry *** command. Information about all the LLDP neighbors is displayed, including device ID, capabilities, addresses, hold time, and version.

```
Device# show lldp entry *

Capability codes:
    (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
    (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Chassis id: aabb.cc00.1f01
Port id: Et1/0
Port Description: Ethernet1/0
System Name: R1.example.com
System Description:
Cisco IOS Software, Solaris Software (UNIX-JS-M)
12.2(20070524:210936) [user1-sierra-0522 105]
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Fri 25-May-07 10:52 by user1
Time remaining: 136 seconds
System Capabilities: B,R
Enabled Capabilities: R
Management Addresses - not advertised
Auto Negotiation - not supported
Physical media capabilities - not advertised
Media Attachment Unit type - not advertised
------------------------------------------------
Total entries displayed: 1
```

The table below describes the significant fields in the output.

*Table 5: show lldp entry * Field Descriptions*

Field	Description
Capability Codes	Type of device that can be discovered. Possible values are as follows: R--Router B--Bridge T--Telephone C--DOCSIS Cable Device W--WLAN Access Point P--Repeater S--Station O--Other
Chassis id	Identifier assigned to the device.
Port id	Identifier of the interface.
Port Description	Description of the interface.
System Name	Name of the device within the network.
System Description	Description of the software operating on the device.
Time remaining	Time remaining before the information is aged out.
System Capabilities	Possible capabilities of the device.
Enabled Capabilities	Subset of possible capabilities that are enabled.
Management Addresses	Layer 3 addresses of the management interface.
Auto Negotiation	Supported and enabled status of all interface autonegotiation capabilities.
Physical media capabilities	Physical characteristics of the interface on which LLDP operates.
Media Attachment Unit type	Numeric value representing the type of the media attachment unit.
Total entries displayed	Number of neighbor devices for which information is displayed.

The following is sample output from the **show lldp neighbors** command showing information about neighboring devices discovered using LLDP.

```
Device# show lldp neighbors

Capability codes:
    (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
    (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID           Local Intf     Hold-time  Capability      Port ID
R1                  Et1/0          150        R               Et1/0

Total entries displayed: 1
```

The table below describes the significant fields shown in the output.

Table 6: show lldp neighbors Field Descriptions

Field	Description
Capability Codes	See the show lldp entry * Field Descriptions table for details.
Device ID	Name of the neighbor device. **Note** If the device ID has more than 20 characters, the ID will be truncated to 20 characters in command output because of display constraints.
Local Intf	Local interface through which this neighbor is connected.
Hold-time	Amount of time (in seconds) the current device will hold the LLDP advertisement from a sending device before discarding it.
Capability	Type of device listed in the LLDP Neighbors table. Values correspond to the values of the capability codes.
Port ID	Interface and port number of the neighboring device.
Total entries displayed	Number of neighbor devices for which information is displayed.

The following is sample output from the **show lldp neighbors** command showing information about neighboring devices discovered using LLDP:

```
Device# show lldp neighbors detail

------------------------------------------------
Chassis id: aabb.cc00.6502
Port id: Et2/0
Port Description: Ethernet2/0
System Name: r101

System Description:
```

```
Cisco IOS Software, Solaris Software (UNIX-P-M), Experimental Version 12.2(20081021:182811)
 [yonhan-CSCsm33589-flo_dsgs7 105]
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 31-Oct-08 11:20 by yonhan

Time remaining: 105 seconds
System Capabilities: B,R
Enabled Capabilities: R
Management Addresses:
    IP: 192.168.1.1
    OID:
        1.3.6.1.4.1.16361.1.69.2.2.
Auto
```

The table below describes the significant fields shown in the output.

Table 7: show lldp neighbors detail Field Descriptions

Field	Description
Chassis id	Identifier assigned to the device.
Port id	Identifier of the interface.
Port Description	Description of the interface.
System Name	Name of the device within the network.
System Description	Description of the software operating on the device.
Time remaining	Time remaining before the information is aged out.
System Capabilities	Possible capabilities of the device.
Enabled Capabilities	Subset of possible capabilities that are enabled.
Management Addresses	Layer 3 addresses of the management interface.
Auto	Supported and enabled status of all interface autonegotiation capabilities.

The following is sample output from the **show lldp interface** command for Ethernet interface 0/1:

```
Device# show lldp interface ethernet 0/1

Ethernet0/1:
    Tx: enabled
    Rx: enabled
    Tx state: IDLE
    Rx state: WAIT FOR FRAME
```

The table below describes the significant fields shown in the output.

Table 8: show lldp interface Field Descriptions

Field	Description
Tx	Ability of the interface to transmit advertisements.

Field	Description
Rx	Ability of the interface to receive advertisements.
Tx state	Current finite state machine state of the interface in transmit mode.
Rx state	Current finite state machine state of the interface in receive mode.

The following is sample output from the **show lldp errors** command:

```
Device# show lldp errors

LLDP errors/overflows:
    Total memory allocation failures: 0
    Total encapsulation failures: 0
    Total input queue overflows: 0
    Total table overflows: 0
```

The table below describes the significant fields shown in the output.

Table 9: show lldp errors Field Descriptions

Field	Description
Total memory allocation failures	Number of memory allocation failures.
Total encapsulation failures	Number of LLDP packet encapsulation failures.
Total input queue overflows	Number of times incoming advertisements exceeded the capacity of the LLDP input queue.
Total table overflows	Number of times the LLDP table rejected advertisements because it was full.

The following is sample output from the **show lldp traffic**command:

```
Device# show lldp traffic

LLDP traffic statistics:
    Total frames out: 277
    Total entries aged: 0
    Total frames in: 328
    Total frames received in error: 0
    Total frames discarded: 0
    Total TLVs unrecognized: 0
```

The table below describes the significant fields shown in the output.

Table 10: show lldp traffic Field Descriptions

Field	Definition
Total frames out	Number of advertisements sent from the device.

Field	Definition
Total entries aged	Number of neighbor device entries aged out.
Total frames in	Number of advertisements received by the device.
Total frames received in error	Number of times the LLDP advertisements contained errors of any type.
Total frames discarded	Number of times the LLDP process discarded an incoming advertisement.
Total TLVs unrecognized	Number of TLVs that could not be processed because the content of the TLV was not recognized by the device or the content fields were incorrectly specified.