# l2protocol-tunnel through remote-span

# l2protocol-tunnel

To enable the protocol tunneling on an interface and specify the type of protocol to be tunneled, use the **l2protocol-tunnel** command in global or interface configuration mode. To disable protocol tunneling, use the **no** form of this command.

**Global Configuration**

**l2protocol-tunnel** [**cos cos-value**| **global**| **mac-address**]

**no l2protocol-tunnel**

**Interface Configuration**

**l2protocol-tunnel** [**cdp**| **lldp**| **stp**| **vtp**]

**no l2protocol-tunnel**

## Syntax Description

| | |
|---|---|
| cos cos-value | (Optional) Specifies a class of service (CoS) value globally on all ingress Layer 2 protocol tunneling ports. |
| global | (Optional) Displays global settings. |
| mac-address | (Optional) Displays L2PT MAC address. |
| **cdp** | (Optional) Enables Cisco Discovery Protocol (CDP) tunneling. |
| lldp | (Optional) Enables Link Layer Discovery Protocol (LLDP) tunneling. |
| **stp** | (Optional) Enables Spanning Tree Protocol (STP) tunneling. |
| **vtp** | (Optional) Enables VLAN Trunking Protocol (VTP) tunneling. |

## Command Default

Disabled

## Command Modes

Global configuration (config)

Interface configuration (config-if)

| 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 Release 12.2(17d)SXB. |
| | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| | 15.2(2)T | This command was modified. The **lldp**, cos, global, and mac-address keywords were added. |

**Usage Guidelines**   On all the service provider edge switches, you must enable PortFast BPDU filtering on the 802.1Q tunnel ports by entering these commands:

```
Router(config-if)# spanning-tree bpdufilter enable
Router(config-if)# spanning-tree portfast
```

**Note**   PortFast BPDU filtering is enabled automatically on tunnel ports.

If you do not specify a protocol, all protocols are tunneled.

You can configure protocol tunneling on VLAN and trunk interfaces.

You must enter the **switchport** command once without any keywords to configure the LAN port as a Layer 2 interface before you can enter additional **switchport** commands with keywords. This action is required only if you have not entered the **switchport** command for the interface.

**Examples**   This example shows how to enable a tunneling protocol on an interface:

```
Router> enable
Router# configure terminal
Router#(config)interface FastEthernet 0/0
Router(config-if)# l2protocol-tunnel cdp
```

This example shows how to disable a tunneling protocol on an interface:

```
Router> enable
Router# configure terminal
Router#(config)interface fastEthernet 4/0
Router(config-if)# no l2protocol-tunnel
Protocol tunneling disabled on interface fastEthernet 4/1
```

**Related Commands**

| Command | Description |
|---|---|
| **show l2protocol-tunnel** | Displays the protocols that are tunneled on an interface or on all interfaces. |

| Command | Description |
|---|---|
| **switchport** | Modifies the switching characteristics of the Layer 2-switched interface. |

# l2protocol-tunnel cos

To specify a class of service (CoS) value globally on all ingress Layer-2 protocol tunneling ports, use the **l2protocol-tunnelcos**command in global configuration mode. To return to the default , use the **no** form of this command.

**l2protocol-tunnel cos** *cos-value*

**no l2protocol-tunnel cos**

**Syntax Description**

| *cos-value* | CoS value; valid values are from 0 to 7. |
|---|---|

**Command Default**   The *cos-value* is **5**

**Command Modes**   Global configuration

**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 Release 12.2(17d)SXB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

**Usage Guidelines**   The *cos-value* is the CoS value that you assign to the PDUs on a Layer 2-protocol tunnel port before tunneling the PDUs through the service-provider network.

You can specify a CoS value globally on all ingress Layer 2-protocol tunneling ports. Because the CoS value applies to all ingress tunneling ports, all encapsulated PDUs that are sent out by the Cisco 7600 series router have the same CoS value.

On all the service-provider edge switches, you must enable PortFast BPDU filtering on the 802.1Q tunnel ports by entering these commands:

```
Router(config-if)# spanning-tree bpdufilter enable
Router(config-if)# spanning-tree portfast
```

**Note**   PortFast BPDU filtering is enabled automatically on tunnel ports.

**Examples**

This example shows how to specify a CoS value on all ingress Layer 2-protocol tunneling ports:

```
Router(config)# l2protocol-tunnel cos 6
Router(config)#
```

**Related Commands**

| Command | Description |
|---------|-------------|
| **show l2protocol-tunnel** | Displays the protocols that are tunneled on an interface or on all interfaces. |

# 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 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. <br><br> • 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. |

# mdix auto

To enable automatic media-dependent interface with crossover detection, use the **mdixauto** command in interface configuration mode. To turn automatic detection off, use the **no** form of this command.

**mdix auto**

**no mdix auto**

**Syntax Description**  This command has no arguments or keywords.

**Command Default**  Enabled

**Command Modes**  Interface configuration (config-if)

**Command History**

| Release | Modification |
|---|---|
| 12.2(17a)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 Release 12.2(17d)SXB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

**Usage Guidelines**  This command is supported on all 10/100 and 10/100/1000 modules except for the following modules:

- WS-X6248-RJ45
- WS-X6248-TELCO
- WS-X6348-RJ-45
- WS-X6348-RJ-21
- WS-X6148-RJ-45
- WS-X6148-RJ-21

**Examples**  This example shows how to enable automatic media-dependent interface with crossover detection:

```
Router(config-if)# mdix auto
Router(config-if)
```
This example shows how to disable automatic media-dependent interface with crossover detection:

```
Router(config-if) no mdix auto
Router(config-if)
```

**Related Commands**

| Command | Description |
|---|---|
| **show interfaces** | Displays the status and traffic statistics for the interfaces in the chassis. |

# port-channel hash-distribution

To set the hash distribution algorithm method, use the port-channel hash-distribution command in global configuration mode. To return to the default settings, use the **no** or **default** form of this command.

**port-channel hash-distribution** {**adaptive**| **fixed**}

{**no**| **default**} **port-channel hash-distribution**

**Syntax Description**

| | |
|---|---|
| **adaptive** | Specifies selective distribution of the bundle select register among the port-channel members. |
| **fixed** | Specifies fixed distribution of the bundle select register among the port-channel members. |
| **default** | Specifies the default setting. |

**Command Default**

**The** hash distribution algorithm method is set to **fixed.**

**Command Modes**

Global configuration (config)

**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. |

**Usage Guidelines**

The EtherChannel load distribution algorithm uses the bundle select register in the port ASIC to determine the port for each outgoing packet. When you use the **adaptive** algorithm, it does not require the bundle select register to be changed for existing member ports. When you use the **fixed** algorithm and you either add or delete a port from the EtherChannel, the switch updates the bundle select register for each port in the EtherChannel. This update causes a short outage on each port.

**Note**     When you change the algorithm, the change is applied at the next member link event. Example events include link down, up, addition, deletion, no shutdown, and shutdown. When you enter the command to change the algorithm, the command console issues a warning that the command does not take effect until the next member link event.

**Examples**    The following example shows how to set the hash distribution algorithm method to adaptive:

```
Router(config)# port-channel hash-distribution adaptive
```

# power inline

To determine how inline power is applied to the device on the specified switch port, use the **powerinline** command in interface configuration mode. To return the setting to its default, use the **no** form of this command.

**power inline** {**auto** [**max** *max-milliwatts*]| **never**| **police**| **static** [**max** *max-milliwatts*]}

**no power inline [police]**

### Cisco Integrated Services Routers Generation 2 (ISR G2) with Cisco Gigabit EtherSwitch enhanced high-speed WAN interface cards (EHWICs)

**power inline** {**auto**| **never**| **port max** *max-milliwatts*}

**no power inline** {**auto**| **never**| **port max** *max-milliwatts*}

### Cisco 4451-X Integrated Services Router

**power inline** **auto** | [ **max** *max-milliwatts* ]| **never** | **redundant**

**no power inline** **auto** | [ **max** *max-milliwatts* ]| **never** | **redundant**

**Syntax Description**

| | |
|---|---|
| **auto** | Turns on the device discovery protocol and applies power to the device, if found. |
| **max** *max-milliwatts* | (Optional) Specifies the maximum amount of power, in milliwatts, that a device connected to a port can consume. Range: 4000 to 16800. Default: 15400. |
| **never** | Turns off the device discovery protocol and stops supplying power to the device. |
| **police** | Turns on inline power policing; optional if entering the **no** form of the command. Default is disabled. |
| **static** | Allocates power from the system power pool to a port. |
| **port max** *max-milliwatts* | Specifies the maximum power allocated to the port. The maximum power can be set between 4,000 to 20,000 milliwatts. |
| **redundant** | Puts the inline power supply in redundant mode (default mode). (For boost mode, use the no form of the command; for example, **no power inline redundant**.) |

Power is applied when a telephone is detected on the port (**auto**).*max-milliwatts* is 15400 milliwatts. Inline power policing is disabled.

**Command Default**

Power is applied when a telephone is detected on the port (auto). The maximum power limit is 20000 milliwatts. Inline power policing is disabled.

**Command Modes**

Interface configuration (config-if)

**Command History**

| Release | Modification |
|---------|--------------|
| 12.0(5)XU | This command was introduced. |
| 12.2(2)XT | This command was integrated to support switchport creation on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers. |
| 12.2(8)T | This command was integrated into Cisco IOS Release 12.2(8)T to support switchport creation . |
| 12.2(14)SX | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(17b)SXA | This command was changed to include the **static** and **max***max-milliwatts* keywords and arguments. |
| 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)SXH | This command was changed to include the **police** keyword . |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH2 | This command was changed to increase the *max-watts* maximum to 16800 milliwatts for the WS-F6K-48-AF and the WS-F6K-GE48-AF modules. The default setting remains 15400 milliwatts. See the "Usage Guidelines" section for additional information. |
| 15.1(2)T | This command was modified. The **portmax**keyword and *max-milliwatts* argument were added. |
| Cisco IOS XE Release 3.9S | This command was integrated into Cisco IOS XE Release 3.9S. |

**Usage Guidelines**

The **police**keyword appears if you have a WS-F6K-48-AF or other inline power daughter card that supports power monitoring and inline power policing.

Inline power is supported only on switch ports that are connected to an IP phone. Before you enable inline power on a switch port, you must enter the **switchport** command.

The following information applies to WS-F6K-48-AF and WS-F6K-GE48-AF inline power cards:

- In Cisco IOS Release 12.2(33)SXH2 and later releases, the configurable range of maximum power using the max keyword is 4000 to 16800 milliwatts. For earlier releases, the configurable range for maximum power is 4000 to 15400 milliwatts. For all releases, if no maximum power level is configured, the default maximum power is 15400 milliwatts.

**Note**    To support a large number of inline-powered ports using power levels above 15400 milliwatts on an inline power card, we recommend using the static keyword so that the power budget is deterministic.

- In Cisco IOS Release 12.2(33)SXH2 and later releases, when you enter the auto keyword and CDP is enabled on the port, an inline-powered device that supports CDP can negotiate a power level up to 16800 milliwatts unless a lower maximum power level is configured. For earlier releases, the inline-powered device can negotiate a power level up to 15400 milliwatts or the configured maximum power level, if it is configured lower than 15400 milliwatts.

**Cisco ISR G2 with Cisco Gigabit EHWICs**

- The **portmax**keyword and *max-milliwatts* argument are available only on the Firebee cards with Power-over-Ethernet (PoE).

**Examples**    The following example shows how to set the inline power to the off mode on a switch port:

```
Router(config)# interface fastethernet5/1
Router(config-if)# switchport
Router(config-if)# power inline never
```
The following example shows how to allocate power from the system power pool to a switch port:

```
Router(config)# interface fastethernet5/1
Router(config-if)# switchport
Router(config-if)# power inline static max 15000
```
The following example shows how to turn on inline power policing to a switch port:

```
Router(config)# interface gigabitethernet6/3
Router(config-if)# switchport
Router(config-if)# power inline police
```

**Examples**    The following example shows how to turn on inline power to a switch port:

```
Router(config)# interface gigabitethernet
0/1/3
Router(config-if)#
power inline
auto{!-condition!}
```

The following example shows how to set maximum inline power to a switch port:

```
Router(config)# interface
 gigabitethernet
0/1/3
```

The following example shows how to disable inline power to the switch port:

```
Router(config)# interface
```

```
gigabitethernet
```
```
0/1/3
Router(config-if)# power inline
 never{!-condition!}
```

**Examples**    The following example shows auto option for power inline command configured on the front panel Gigabit
Ethernet port.

```
Router(config)# interface gigabitEthernet 0/0/0
Router(config-if)# power inline auto
```
In this example, an attempt is made to configure the inline power to be in boost mode by using the **no** form
of the **power inline redundant** command. The inline power mode is not changed to boost mode because that
requires a total power available in redundant mode of 1000W.

```
Router# show power
Main PSU :
Configured Mode : Boost
Current runtime state same : Yes
Total power available : 2000 Watts
POE Module :
Configured Mode : Boost
Current runtime state same : Yes
Total power available : 1000 Watts
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# no power inline redundant
*Jan 31 03:42:40.947: %PLATFORM_POWER-6-MODEMISMATCH: Inline power not in Boost mode
Router(config)# exit
*Jan 31 03:36:13.111: %SYS-5-CONFIG_I: Configured from console by console
Router# show power
Main PSU :
Configured Mode : Boost
Current runtime state same : Yes
Total power available : 1450 Watts
POE Module :
Configured Mode : Boost
Current runtime state same : No
Total power available : 500 Watts
```
In this example, power for the main power supply is configured to be in boost mode by using the **no** form of
the **power main redundant** command. This sets the power for the main power supply in boost mode to be
1450 W and the inline power in redundant mode as 500W.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# no power main redundant
Router(config)#
*Jan 31 03:35:22.284: %PLATFORM_POWER-6-MODEMATCH: Inline power is in Redundant mode
Router(config)#
Router(config)# exit
Router#
*Jan 31 03:36:13.111: %SYS-5-CONFIG_I: Configured from console by console
Router# show power
Main PSU :
Configured Mode : Boost
Current runtime state same : Yes
Total power available : 1450 Watts
POE Module :
Configured Mode : Redundant
Current runtime state same : Yes
Total power available : 500 Watts
Router#
```

**Related Commands**

| Command | Description |
| --- | --- |
| **show power inline** | Displays the power status for the specified port or for all ports. |
| **switchport priority extend** | Determines how the telephone connected to the specified port handles priority traffic received on its incoming port. |
| **switchport voice vlan** | Configures the voice VLAN on the port. |

# remote-span

To configure a virtual local area network (VLAN) as a remote switched port analyzer (RSPAN) VLAN, use the **remote-span** command in config-VLAN mode. To remove the RSPAN designation, use the **no** form of this command.

**remote-span**

**no remote-span**

**Syntax Description**    This command has no arguments or keywords.

**Command Default**    This command has no default settings.

**Command Modes**    Config-VLAN mode

**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 Release 12.2(17d)SXB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

**Usage Guidelines**    This command is not supported in the VLAN database mode.

You can enter the **show vlan remote-span** command to display the RSPAN VLANs in the Cisco 7600 series router.

**Examples**    This example shows how to configure a VLAN as an RSPAN VLAN:

```
Router(config-vlan)# remote-span
Router(config-vlan)
```
This example shows how to remove the RSPAN designation:

```
Router(config-vlan)# no remote-span
Router(config-vlan)
```

**Related Commands**

| Connect | Description |
|---------|-------------|
| **show vlan remote-span** | Displays a list of RSPAN VLANs. |