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cable bundle

To configure a cable interface to belong to an interface bundle, use the **cablebundle**command in interfaceconfiguration mode. To delete a cable interface bundle definition, use the **no** form of this command.

cable bundle *number* [**master**]
no cable bundle *number* [**master**]

Syntax Description

number	Specifies the bundle identifier. Valid range is from 1 to 255.
master	(Optional) Defines the specified interface as primary.

Command Default

No cable interface bundle is defined.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(7)XR	This command was introduced.
12.1(1a)T1	This command was integrated into Cisco IOS Release 12.1(1a)T1.
12.0(8)SC	This command was integrated into Cisco IOS Release 12.0(8)SC
12.1(2)EC1	This command was integrated into Cisco IOS Release 12.1(2)EC1.

Usage Guidelines

You can configure up to four interface bundles. In each bundle, specify one interface as the primary interface by using the optional **master** keyword.

Configure only an IP address on the primary interface. If an IP address is configured and the interface is not specified as the primary interface, any attempt to add an interface to a bundle is rejected.

Specify all generic IP networking information (such as IP address, routing protocols, and switching modes) on the bundle primary interface. Do not specify generic IP networking information on bundle subordinate interfaces.

If you attempt to add an interface to a bundle as non-primary interface and an IP address is assigned to this interface, the command will fail. You must remove the IP address configuration before you can add the interface to a bundle.

If you have configured an IP address on a bundled interface and the interface is not the primary interface, a warning message appears.

Specify generic (not downstream or upstream related) cable interface configurations, such as source-verify or Address Resolution Protocol (ARP) handling, on the primary interface. Do not specify generic configuration on non-primary interfaces.

If you configure an interface as a part of a bundle and it is not the primary interface, all generic cable configuration for this interface is removed. The primary interface configuration will then apply to all interfaces in the bundle.

If you shut down or remove the primary interface in a bundle, no data packets are sent to any of the interfaces in this bundle. Packets are still physically received from non-primary interfaces that have not been shut down,

but those packets will be discarded. Modems connected to those interfaces will not be disconnected immediately, but modems going online are not able to obtain an IP address, download their configuration file, or renew their IP address assignment if the Dynamic Host Configuration Protocol (DHCP) lease expires.

If you shut down a subordinate interface, only this interface is affected.

Examples

The following example shows how to configure interface 25 to be the primary interface:

```
Router(config-if)# cable bundle 25 master
Router(config-if)#
07:28:17: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to down
07:28:18: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to up
```

The following example shows the error message that appears if you try to configure an interface with an IP address that is not the primary interface:

```
Router(config-if)# cable bundle 5
Please remove ip address config first then reenter this command
```

Related Commands

Command	Description
show cable bundle	Displays the forwarding table for the specified interface bundle.

cable helper-address

To specify a destination address for User Datagram Protocol (UDP) broadcast Dynamic Host Configuration Protocol (DHCP) packets, use the **cablehelper-address**command in interface configuration mode. To remove the specified destination address for UDP DHCP packets, use the **no** form of this command.

cable helper-address *ip-address* {**cable-modem** | **host**}
no cable helper-address *ip-address* {**cable-modem** | **host**}

Syntax Description

ip-address	The IP address of a DHCP server. Based on whether you add the **host** or **cable-modem** keyword at the end of the **cablehelper-address** command, it is the IP address of the multiple service operators (MSOs) Cisco Network Registrar (CNR) server or the Internet service providers (ISPs) DHCP server.
cable-modem	Specifies that only cable modem UDP broadcasts are forwarded.
host	Specifies that only host UDP broadcasts are forwarded.

Command Default

This command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.3NA	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If you specify a secondary interface address, the giaddr field in the DHCP requests will be sent to the primary address for DHCP requests received from cable modems, and to the secondary IP address for DHCP requests received from hosts.

Examples

The following example shows how to forward UDP broadcasts from cable modems to the DHCP server at 172.23.66.44:

```
Router(config-if)#
cable helper-address 172.23.66.44 cable-modem
```

The following example shows how to forward UDP broadcasts from hosts to the DHCP server at 172.23.66.44:

```
Router(config-if)# cable helper-address 172.23.66.44 host
```

cablelength

To specify the distance of the cable from the routers to the network equipment, use the **cablelength** command in controller configuration mode. To restore the default cable length, use the **no** form of this command.

cablelength *feet*
no cablelength

Syntax Description

feet	Number of feet in the range of 0 to 450.

Command Default

224 feet for a CT3IP interface processor and Clear Channel T3/E3 network module

49 feet for PA-T3 and PA-2T3 port adapters

450 feet for an interface cable between the near and far-end CSU/DSU device

Command Modes

Controller configuration

Command History

Release	Modification
11.1CA	This command was introduced.
12.2(11)YT	This command was integrated into Cisco IOS Release 12.2(11)YT and implemented on the following platforms: Cisco 2650XM, Cisco 2651XM, Cisco 2691, Cisco 3660 series, Cisco 3725, and Cisco 3745 routers. Support for the Clear Channel T3/E3 network module was added.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

CT3IP Interface Processor and Clear Channel T3/E3 Network Module

The default cable length of 224 feet is used by the CT3IP interface processor and the Clear Channel T3/E3 network module.

PA-T3 and PA-2T3 Port Adapters

The default cable length of 49 feet is used by the PA-T3 and PA-2T3 port adapters.



Note Although you can specify a cable length from 0 to 450 feet, the hardware recognizes only two ranges: 0 to 49 and 50 to 450. For example, entering 35 feet uses the 0 to 49 range. If you later change the cable length to 40 feet, there is no change because 40 is still within the 0 to 49 range. However, if you change the cable length to 50, the 50 to 450 range is used. The actual number you enter is stored in the configuration file.

Cisco 1000 Series Router

The table below lists the cable length distances and their relationships to line buildout for E3 and T3 controllers on Cisco 1000 Series Routers:

Table 1: Cable Length Distances and Line Buildout for E3/T3 Controllers

Interface	Cable Length (Feet)	Buildout
E3	0 to 244	No line buildout
E3	225 to 450	Line buildout
T3	0 to 299	No line buildout
T3	300 to 450	Line buildout

Note Although you can specify a cable length from 0 to 450 feet, the hardware recognizes only two ranges: 0 to 49 and 50 to 450. For example, entering 35 feet uses the 0 to 49 range. If you later change the cable length to 40 feet, there is no change because 40 is still within the 0 to 49 range. However, if you change the cable length to 50, the 50 to 450 range is used. The actual number you enter is stored in the configuration file.

Examples

Cable Length to 300 Feet Example

The following example shows how to set the cable length for the router to 300 feet:

```
Router(config)#
 controller t3 9/0/0
Router(config-controller)#
 cablelength 300
```

Cisco 10000 Series Series Router Example

The following example sets the cable length to 120 feet:

```
Router(config)# controller dsx3 4/0/6
Router(config-controller)# cablelength 120
```

Related Commands

Command	Description
cablelength long	Increases the pulse of a signal at the receiver and decreases the pulse from the transmitter using pulse equalization and line buildout for a T1 cable.
cablelength short	Sets a cable length of 655 feet or shorter for a DS1 link on the Cisco MC3810 or Cisco 2600 and Cisco 3600 series routers.

cablelength (E1 controller)

To fine-tune the pulse of a signal at the receiver for an E1 cable on a Cisco AS5300 or Cisco AS5400, use the **cablelength** command in controller configuration mode. To restore the default receiver sensitivity, use the **no** form of this command.

cablelength {**custom** *gain-value* [**squelch-on**] | **long** [**squelch-on**] | **medium** [**squelch-on**] | **short** [**squelch-on**]}
no cablelength

Syntax Description

custom	Fine-tunes the receiver sensitivity for long-haul, medium-haul, and short-haul applications.
gain-value	Custom gain value for the receiver in the range of 0x1 to 0x3F. These settings are mapped to values in the range of 0 to -45 dB.
long	Fine-tunes the receiver sensitivity for long-haul applications.
medium	Fine-tunes the receiver sensitivity for medium-haul applications.
short	Fine-tunes the receiver sensitivity for short-haul applications.
squelch-on	(Optional) Enables squelch to improve the signal-to-noise ratio.

Command Default

Default receiver sensitivity for E1 cables is applied.

Command Modes

Controller configuration

Command History

Release	Modification
12.3(17)	This command was introduced.

Usage Guidelines

This command is supported on E1 controllers only.

Note The cable line pulse gain values are not dependent upon the E1 line being configured in balanced (120-ohm) mode or unbalanced (75-ohm) mode.

Examples

The following example shows how to fine-tune the receiver sensitivity for an E1 cable on a Cisco AS5300 to support a long-haul configuration:

```
Router(config-controller)# cablelength long squelch-on
```

cablelength long

To increase the pulse of a signal at the receiver and to decrease the pulse from the transmitter using pulse equalization and line build-out for a T1 cable, use the **cablelengthlong**command in controller configuration or interface configuration mode. To return the pulse equalization and line build-out values to their default settings, use the **no** form of this command.

cablelength long *db-gain-value db-loss-value*
no cablelength long

Syntax Description

db-gain-value	Number of decibels (dB) by which the receiver signal is increased. Use one of the following values: • **gain26** • **gain36** The default is 26 dB.
db-loss-value	Number of decibels by which the transmit signal is decreased. Use one of the following values: • **0db** • **-7.5db** • **-15db** • **-22.5db** The default is 0 dB.

Command Default

db-gain-value : **gain26** *db-loss-value*: **0db**

Command Modes

Controller configuration for the Cisco AS5800 and Cisco MC3810. Interface configuration for the Cisco 2600 and Cisco 3600 series routers.

Command History

Release	Modification
11.2	This command was introduced.
11.3	The following keywords were added: **gain26**, **gain36**, **0db**,**-7.5db**,**-15db**,**-22.5db**.
12.0(5)XK	This command was modified to include support as an ATM interface configuration command for the Cisco 2600 and Cisco 3600 series routers and as a controller configuration command for the Cisco AS5800 universal access server.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Cisco AS5800 and Cisco MC3810

Use this command for configuring the controller T1 interface on the Cisco AS5200 access server, on the Cisco AS5800 universal access server, or on the Cisco MC3810 multiservice access concentrator. The **cablelengthlong** command is used to configure DS1 links (meaning, to build CSU/DSU links) when the cable length is no longer than 655 feet.

On the Cisco MC3810, this command is supported on T1 controllers only and applies to Voice over Frame Relay, Voice over ATM, and Voice over HDLC.



Note On the Cisco MC3810, you cannot use the **cablelengthlong** command on a DSX-1 interface only. The **cablelengthlong** command can be used only on CSU interfaces.

A pulse equalizer regenerates a signal that has been attenuated and filtered by a cable loss. Pulse equalization does not produce a simple gain, but it filters the signal to compensate for complex cable loss. A **gain26** receiver gain compensates for a long cable length equivalent to 26 dB of loss, whereas a **gain36** compensates for 36 dB of loss.

The lengthening or *buildingout* of a line is used to control far-end crosstalk. Line build-out attenuates the stronger signal from the customer installation transmitter so that the transmitting and receiving signals have similar amplitudes. A signal difference of less than 7.5 dB is ideal. Line build-out does not produce simple flat loss (also known as *resistive* flat loss). Instead, it simulates a cable loss of 7.5 dB, 15 dB, or 22.5 dB so that the resulting signal is handled properly by the receiving equalizer at the other end.

Cisco 2600 and Cisco 3600 Series Routers

This command is supported on T1 long-haul links only. If you enter the **cablelengthlong** command on a DSX-1 (short-haul) interface, the command is rejected.

The transmit attenuation value is best obtained by experimentation. If the signal received by the far-end equipment is too strong, reduce the transmit level by entering additional attenuation.

Examples

Cisco AS5800 and Cisco MC3810

The following example shows how to increase the receiver gain by 36 decibels and decreases the transmitting pulse by 15 decibels for a long cable on a Cisco AS5800:

```
AS5800(config)# controller t1 0
AS5800(config-controller)# cablelength long gain36 -15db
```

The following example shows how to configure the cable length for controller T1 0 on a Cisco MC3810 to a decibel pulse gain of 36 decibels and a decibel pulse rate of -22.5 decibels:

```
MC3810(config)# controller t1 0
MC3810(config-controller)# cablelength long gain36 -22.5db
```

Cisco 2600 and Cisco 3600 Series Routers

On a Cisco 2600 or Cisco 3600 series router, the following example shows how to specify a pulse gain of 36 decibels and a decibel pulse rate of -7.5 decibels:

```
Router(config)#
 interface atm 0/2
Router(config-if)#
 cablelength long gain36 -7.5db
```

Related Commands

Command	Description
cablelength short	Sets a cable length of 655 feet or shorter for a DS1 link.

cablelength short

To set a cable length of 655 feet or shorter for a DS1 link on the Cisco MC3810, Cisco 2600, Cisco NCS 4200 series, and Cisco 3600 series routers, use the **cablelengthshort** command in controller configuration or interface configuration mode. To delete the **cablelengthshort** value, use the **no** form of this command.

cablelength short *length*
no cablelength short

Syntax Description

length	Specifies a cable length. Use one of the following values: • **133** --Specifies a cable length from 0 to 133 feet. • **266** --Specifies a cable length from 134 to 266 feet. • **399** --Specifies a cable length from 267 to 399 feet. • **533** --Specifies a cable length from 400 to 533 feet. • **655** --Specifies a cable length from 534 to 655 feet.

Command Default

The default is 133 feet for the Cisco AS5200 access server, Cisco AS5800 universal access server, and Cisco MC3810 multiservice access concentrator.

There is no default cable length for the Cisco 2600 and Cisco 3600 series routers.

Command Modes

Controller configuration for the Cisco AS5200 access server, Cisco AS5800 universal access server, and Cisco MC3810 multiservice access concentrator. Interface configuration for the Cisco 2600 and Cisco 3600 series routers.

Command History

Release	Modification
11.3(2)AA	This command was introduced.
12.0(5)XK	This command was modified to include support as an ATM interface command for the Cisco 2600 and 3600 series routers and as a controller configuration command for the Cisco AS5800 universal access server.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
XE 3.18SP	This command was integrated in the Cisco NCS 4200 Series. For Configuring MDL, by default setting of cablelength is short.

Usage Guidelines

Cisco AS5200 Access Server, Cisco AS5800 Universal Access Server, and Cisco MC3810 Multiservice Access Concentrator

On the Cisco MC3810, the **cablelengthshort** command is used to configure DSX-1 links when the cable length is 655 feet or less than 655 feet. On the Cisco MC3810, this command is supported on T1 controllers only.

Note On the Cisco MC3810, you cannot enter the **cablelengthshort** command on a CSU interface. The **cablelengthshort** command can be used only on DSX-1 interfaces.

Cisco 2600 and Cisco 3600 Series Routers

This command is supported on T1 short-haul links only. If you enter the **cablelengthshort** command on a long-haul interface, the command is rejected.

To set cable lengths longer than 655 feet, use the **cablelengthlong** command.

This command is supported on T1 controllers only.

Cisco AS5200 Access Server, Cisco AS5800 Universal Access Server, and Cisco MC3810 Multiservice Access Concentrator

The following example shows how to set the cable length to 266 for the T1 controller in slot 1 on dial shelf 0:

```
Router# configure terminal
Router(config)# controller t1 1/1/0
Router(config-controller)# cablelength short 266
Router(config-controller)# end
```

Cisco 2600 and Cisco 3600 Series Routers

On a Cisco 2600 or Cisco 3600 series router, the following example shows how to specify a cable length from 0 to 133 feet:

```
Router(config)#
 interface atm 0/2
Router(config-if)#
 cablelength short 133
```

Related Commands

Command	Description
cablelength long	Increases the pulse of a signal at the receiver and decreases the pulse from the sender using pulse equalization and line build-out.

card

To preprovision a router slot for an interface card, use the **card**command in global configuration mode. To remove the preprovisioning for a card, use the **no** form of this command.

card {*slot*/*subslot* | *slot*/*subslot*/*bay*} *card-type*
no card {*slot*/*subslot* | *slot*/*subslot*/*bay*} *card-type*

Cisco 10000 Series Router
card *slot*/*subslot* {**lchoc12-1** | **lgigethernet-l** | **1gigethernet-hh-1** | **loc12atm-1** | **loc12pos-1** | **1oc48dpt-pos-1** | **24che1t1-1** | **4chstm-1** | **4cht3-hh-1** | **4oc3atm-1** | **4oc3atm_lr-1** | **4jacket-1** | **6cht3-1** | **6oc3pos-1** | **8e3ds3-1** | **8e3ds3atm-1** | **8fastethernet-1** [**mode** {**e1** | **t1**}]*spa-type*}
no card *slot*/*subslot*

Cisco uBR10012 Universal Broadband Router
card {*slot* {**2jacket-1** | **4jacket-1**} | *slot*/*subslot* | *slot*/*bay*} *card-type* [**license** *license*]
no card {*slot* | *slot*/*subslot* | *slot*/*bay*} *card-type* [**license** *license*]

Syntax Description

slot/subslot	Chassis slot and subslot for the card. The following are the valid values: • *slot* --1 to 8 • *subslot* --0 or 1
slot/subslot/bay	Chassis slot and subslot for the Cisco Wideband SIP, and the bay number in the SIP where the Cisco Wideband SPA is located. The following are the valid values: • *slot* --1 to 3 • *subslot* --0 or 1 (0 is always specified) • *bay* --0 (upper bay) or 1 (lower bay) **Note** The Cisco uBR10012 router running Cisco IOS Release 12.3(21)BC supports *slot/subslot/bay* option.
slot	(Cisco uBR10012 router) Chassis slot for the Cisco SPA Interface Processor (SIP). The valid value of the *slotis*1 or 3.

slot/subslot	(Cisco uBR10012 router) Chassis slot and subslot where the Cisco Cable line card, the Timing, Communication, and Control (TCC) card, Cisco Shared Port Adaptor (SPA), or the Half-Height Gigabit Ethernet (HHGE) line card is located. **Note** Effective with Cisco IOS Release 12.2(33)SCB, the SPA slot numbering is changed to *slot/subslot*. For the Cisco Cable line cards, the valid values are: • *slot* --5 to 8 • *subslot* --0 or 1 For the TCC card, the valid values are: • *slot* --1 or 2 • *subslot* --1 For the HHGE line card, the valid values are: • *slot* --3 or 4 • *subslot* --0 or 1 For the SPA, the valid values are: • *slot* --0 or 3 (for SIP-600) • *slot* --1 (for Wideband SIP) • *subslot* --0 to 3
slot/bay	(Cisco uBR10012 router) Chassis slot and bay where the Cisco Shared Port Adaptor (SPA) is located. For the SPA, the valid values are: • *slot* --1 or 3 (for SIP-600) • *slot* --1 (for Wideband SIP) • *bay* --0 to 3
license	(Cisco uBR10012 router) License supported on the card. For a list of license types supported on the card, see the second table below.
card-type	Type of card for which to preprovision the slot. For a list of the supported cards, which varies by platform, see the first table below.
lchoc12-1	Preprovisions a line card slot for a 1-Port Channelized OC-12/STM-4 line card.
lgigethernet-l	Preprovisions a line card slot for a 1-Port Gigabit Ethernet line card.
1gigethernet-hh-1	Preprovisions a line card slot for a 1-Port Gigabit Ethernet Half-Height line card.
loc12atm-1	Preprovisions a line card slot for a 1-Port OC-12 ATM line card.

loc12pos-1	Preprovisions a line card slot for a 1-Port OC-12 Packet over SONET line card.
1oc48dpt-pos-1	Preprovisions a line card slot for a 1-Port OC-48/STM-16 Packet over SONET line card.
2jacket-1	(Cisco uBR10012 router) Preprovisions a slot for the Cisco Wideband SPA Interface Processor (SIP).
24che1t1-1	Preprovisions a line card slot for a 24-Port Channelized E1/T1 line card.
4chstm-1	Preprovisions a line card slot for a 4-Port Channelized OC-3/STM-1 line card.
4cht3-hh-1	Preprovisions a line card slot for a 4-port Channelized Half-Height line card.
4jacket-1	(Cisco uBR10012 router) Preprovisions a slot for the Cisco SIP-600.
4jacket-1	Preprovisions a line card slot in the Cisco 10000 series router to accept a Cisco 10000 SIP-600.
4oc3atm-1	Preprovisions a line card slot for a 4-Port OC-3/STM-1 ATM line card with intermediate-reach optics.
4oc3atm_lr-1	Preprovisions a line card slot for a 4-Port OC-3/STM-1 ATM line card with long-reach optics.
6cht3-1	Preprovisions a line card slot for a 6-Port Channelized T3 line card.
6oc3pos-1	Preprovisions a line card slot for a 6-Port OC-3/STM-1 Packet over SONET line card.
8e3ds3-1	Preprovisions a line card slot for an 8-Port Unchannelized E3/T3 line card.
8e3ds3atm-1	Preprovisions a line card slot for an 8-Port E3/DS3 ATM line card.
8fastethernet-1	Preprovisions a line card slot for an 8-Port Fast Ethernet Half-Height line card.
mode {**e1**|**t1**}	Indicates the mode of operation of the 24-Port Channelized E1/T1 line card.
spa-type	SPA type to preprovision a SPA interface.

Command Default

An empty card slot is not preprovisioned and cannot be configured or displayed.

The default mode of operation for the 24-Port Channelized E1/T1 line card is E1.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(17)ST	This command was introduced on the Cisco 10000 series routers.
12.0(21)SX	This command was integrated into Cisco IOS Release 12.0(21)SX.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.

Release	Modification
12.2(1)XF1	This command was introduced on the Cisco uBR10012 Universal Broadband Router for the following line cards: • Cisco uBR-LCP-MC28C cable interface line card • Cisco uBR-LCP-MC28C-BNC cable interface line card • Cisco uBR10-1GE Gigabit Ethernet (GigE) uplink line card • Cisco uBR10-1OC12/P-SMI OC-12 POS uplink line card
12.2(4)XF1	Support was added for the Cisco uBR-LCP-MC16C and Cisco uBR-LCP-MC16E cable interface line cards.
12.2(4)BC1	Support was added for the Cisco uBR10-SRP-OC12SML DPT WAN uplink line card.
12.2(8)BC1	Support was added for the Cisco LCP2 line card processor, and all of its combinations with the supported cable interface line cards.
12.2(11)BC3	Support was added for the Cisco uBR10012 OC-48 DPT/POS Interface Module uplink line card and Cisco uBR-MC5X20S cable interface line card.
12.2(15)BX	This command was integrated into Cisco IOS Release 12.2(15)BX.
12.2(15)CX1	Support was added for the Cisco uBR-MC16U/X and Cisco uBR-MC28U/X cable interface line cards.
12.2(15)BC2	Support was added for the Cisco uBR-MC16U/X, Cisco uBR-MC28U/X, and Cisco uBR-MC5X20U cable interface line cards.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB. This command was modified to support the 4-port Channelized Half-Height line card and the 4-Port OC-3/STM-1 ATM line card with long-reach optics by adding the 4cht3-hh-1 and the 4oc3atm_lr-1 keywords.
12.3(7)XI1	This command was integrated into Cisco IOS Release 12.3(7)XI1.
12.3(21)BC	Support was added for the Cisco Wideband SIP and Wideband SPA.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
12.2(33)SB	This command was enhanced to provide the 4jacket-1 keyword and the spa-type option, which enable you to preprovision a line card slot to accept a Cisco 10000 SIP-600 and a SPA interface, respectively. This enhancement was implemented on the Cisco 10000 series router for the PRE3 and PRE4.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco SIP-600 was added. This command was modified to change the addressing format for: • SIPs--From *slot/subslottoslot* • SPAs--From *slot/subslot/baytoslot/bay*

Release	Modification
12.2(33)SCC	This command was modified to support the Cisco UBR-MC20X20V cable interface line card.
12.2(33)SCE	This command was modified to support the Cisco uBR-MC3GX60V cable interface line card.
12.2(33)SCH	This command was modified to support the Cisco 3 Gbps Wideband SPA card.

Usage Guidelines

This command is supported on the Cisco uBR10012 universal broadband router and the Cisco 10000 series routers.

Use this command to preprovision a slot in the router to accept a particular line card, so that you can configure the interface without the card being physically present in the chassis. This command allows system administrators to plan for future configurations, without having to wait for the physical hardware to arrive. When the line card does arrive, the installer can bring the card online by inserting the card into the chassis and connecting the necessary cables, without having to do any further configuration using the command-line interface.

The type of card must be appropriate for the slot being specified. The list of supported card types depends on the Cisco IOS software release in use and your platform. For the latest information about supported hardware for your platform, see the release notes that correspond to your Cisco IOS software release and platform.

The table below lists the types of cards that are supported as *card-types* for the **card** command.

Table 2: Card Types Supported by the card Command

Card Type	Description
lchoc12-1	(Cisco 10000 series router) Preprovisions a line card slot for a 1-Port Channelized OC-12/STM-4 line card.
1gigethernet-1	(Cisco 10000 series and Cisco uBR10012 routers) Preprovisions a slot for a Cisco uBR10-1GE Gigabit Ethernet (GigE) uplink line card.
1gigethernet-hh-1	(Cisco 10000 series router and Cisco uBR10012 routers) Preprovisions a line card slot for a 1-Port Gigabit Ethernet Half-Height line card.
loc12atm-1	(Cisco 10000 series router) Preprovisions a line card slot for a 1-Port OC-12 ATM line card.
1oc12pos-1	(Cisco 10000 series and Cisco uBR10012 routers) Preprovisions a slot for a Cisco uBR10-1OC12/P-SMI OC-12 POS uplink line card.
1oc48dpt-pos-1	(Cisco 10000 series and Cisco uBR10012 routers) Preprovisions a slot for a Cisco uBR10012 OC-48 DPT/POS Interface Module uplink line card.
2cable-tccplus	(Cisco uBR10012 router) Preprovisions a slot for a Timing, Control, and Communications Plus (TCC+) utility card. **Note** This option is informational only, because slots 1/1 and 2/1 can be used only for the TCC+ card.
24che1t1-1	(Cisco 10000 series router) Preprovisions a line card slot for a 24-Port Channelized E1/T1 line card.

Card Type	Description
2oc12srp-sm-lr	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-SRP-OC12SML DPT WAN uplink line card.
24rfchannel-spa-1	(Cisco uBR10012 router) Preprovisions a bay in the Cisco Wideband SIP for the Cisco 1-Gbps Wideband Shared Port Adapter (SPA).
4chstm-1	(Cisco 10000 series router) Preprovisions a line card slot for a 4-Port Channelized OC-3/STM-1 line card.
4cht3-hh-1	(Cisco 10000 series router) Preprovisions a line card slot for a 4-port Channelized Half-Height line card.
4oc3atm-1	(Cisco 10000 series router) Preprovisions a line card slot for a 4-Port OC-3/STM-1 ATM line card with intermediate-reach optics.
4oc3atm_lr-1	(Cisco 10000 series router) Preprovisions a line card slot for a 4-Port OC-3/STM-1 ATM line card with long-reach optics.
5cable-mc520h-d	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20H-D cable interface line card.
5cable-mc520s	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20S cable interface line card.
5cable-mc520s-d	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20S-D cable interface line card.
5cable-mc520u-d	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20U-D cable interface line card.
5cable-mc520u-f	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20U-F cable interface line card.
6cht3-1	(Cisco 10000 series router) Preprovisions a line card slot for a 6-Port Channelized T3 line card.
6oc3pos-1	(Cisco 10000 series router) Preprovisions a line card slot for a 6-Port OC-3/STM-1 Packet over SONET line card.
8e3ds3-1	(Cisco 10000 series router) Preprovisions a line card slot for an 8-Port Unchannelized E3/T3 line card.
8e3ds3atm-1	(Cisco 10000 series router) Preprovisions a line card slot for an 8-Port E3/DS3 ATM line card.
8fastethernet-1 mode {e1 | t1}	(Cisco 10000 series router) Preprovisions a line card slot for an 8-Port Fast Ethernet Half-Height line card and optionally specifies its mode of operation. E1 is the default.
ubr10k-clc-3g60	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR-MC3GX60V cable interface line card.

Card Type	Description
ubr10k-clc-mc2020v	(Cisco uBR10012 router) Preprovisions a slot for a Cisco UBR-MC20X20V cable interface line card.
ubr10k-clc-5x20s	(Cisco uBR10012 router) Preprovisions a slot for a Cisco uBR10-MC5X20S cable interface line card.
SPA-DOCSIS-HD-V1 {**1x10GE** | **3x1GE**}	(Cisco uBR10012 router) Preprovisions a bay in the Cisco SIP-600 for the Cisco 3 Gbps Wideband SPA card.

The license supported depends on the card being specified. The list of supported license types depends on the Cisco IOS software release in use and your platform. For the latest information about supported hardware for your platform, see the release notes that correspond to your Cisco IOS software release and platform.

The table below lists the license supported by a card.

Table 3: License Supported by a card

Card Type	License Supported	Description
Cisco UBR-MC20X20V	0X20	Zero downstream and 20 upstream
	10X20	10 downstream and 20 upstream
	15X20	15 downstream and 20 upstream
	20X20	20 downstream and 20 upstream
	5X20	5 downstream and 20 upstream
	invalid	Invalid license
Cisco uBR-MC3GX60V	0 to 72	Downstream license count
	none	No license
Cisco 3 Gbps Wideband SPA	none	No license
	0 to 71	Downstream license count
	72	Downstream license count

Cisco uBR10012 Universal Broadband Router Usage Guidelines

On the Cisco uBR10012 router, you can use the **card** command to preprovision a router slot for a line card or to preprovision one or more slots for a SPA interface processor (SIP), such as the Cisco Wideband SIP. You can also use the **card** command to preprovision a SIP bay or subslot for a SPA, such as the Cisco Wideband SPA or Cisco 3 Gbps Wideband SPA.

The Cisco uBR10012 universal broadband router has the following card slot requirements:

Note Slot 0/0 is an invalid value for this command.

- Slots 1/1 and 2/1 are reserved for TCC+ utility cards. A utility card and a SPA can co-exist on a Cisco uBR10012 router with an index of 1/1.
- Slots 1/0 through 4/0 are reserved for network uplink line cards.
- Slots 1 and 3 can be used for SIPs. Each SIP occupies two physical slots in a Cisco uBR10012 router (slot pair 1/2 or slot pair 3/4). Slot 1 is recommended for the Cisco Wideband SIP.
- Slot 5/0 through 8/1 are reserved for cable interface line cards.

Tip A preprovisioned card is displayed the same way as a card physically present in the chassis. Some **show** commands might also list the preprovisioned card in their displays. In addition, using the **card** command does not change the output of the ENTITY-MIB, which displays physically and logical components installed in the router.

When a line card is inserted in the Cisco uBR10012 chassis, the router performs the following actions, depending on whether the card slot is preprovisioned for the card:

- If the inserted line card matches the type of line card preprovisioned for the slot, the system applies the preprovisioned configuration to the line card.
- If the line card slot was not preprovisioned, the system applies a basic configuration to the line card and adds that configuration to the running configuration file.
- If the line card slot was preprovisioned for one type of line card, but another type of line card has been inserted, the system replaces the preprovisioned configuration (in the running configuration file) with a basic configuration for the line card that was actually inserted. The startup configuration file is not changed.

Tip Use the **showrunning-config|includecard**command to display which slots, if any, are preprovisioned for a particular card type.

The **noversionofthe**command removes the preprovisioning information from the given card slot. This also removes all configuration information for that card slot, as well as any information in the SNMP MIB database about the card and its card slot.

Cisco 10000 Series Router Usage Guidelines

You must specify a line card slot and subslot, and the line card for which you want to preprovision the line card slot.

If you insert a line card into a line card slot that has been preprovisioned for a different line card, the line card will fail.

You can specify a mode of operation for the 24-Port Channelized E1/T1 line card. If you do not, the line card operates in the E1 mode.

In Cisco IOS releases earlier than 12.0(28)S, 12.2(16)BX, and 12.3(7)XI1, you used only the card command to change the provisioning of a line card slot. It was not necessary to remove the old line card before using the card command to change the line card provisioning.

In Cisco IOS releases after 12.0(28)S, 12.2(16)BX, and 12.3(7)XI1, you must deactivate the installed line card using the hw-module and no card commands before using the card command to provision the line card slot for a different line card. This is a general best practice when using the **card** command.

Examples

Cisco uBR10012 Universal Broadband Router Examples

The following example shows a list of supported card types, and then shows that slot 8/0 is being preprovisioned for a Cisco uBR10-MC5X20S cable interface line card. The cable interface for slot 8/0/0 can then be configured.

```
Router# config t
Router(config)# card 8/0 ?

  5cable-mc520h-d     create a uBR10000 line card with MC520H-D
  5cable-mc520s       create a uBR10000 line card with MC520S
  5cable-mc520s-d     create a uBR10000 line card with MC520S-D
  5cable-mc520u-d     create a uBR10000 line card with MC520U-D
  5cable-mc520u-f     create a uBR10000 line card with MC520U
  ubr10k-clc-3g60     create a uBR10000 line card with MC3Gx60
  ubr10k-clc-5x20s    create a uBR10000 line card with MC520S
  ubr10k-clc-mc2020v  create a uBR10000 line card with MC20x20
Router(config)# card 8/0
ubr10k-clc-5x20s
Router(config)# int c8/0/0

Router(config-if)#
```

The following example shows how to preprovision a Cisco Wideband SIP:

```
Router# configure terminal
Router(config)# card 1 2jacket-1
```

The following example shows how to preprovision a Cisco Wideband SPA on a Cisco Wideband SIP:

```
Router# configure terminal
Router(config)# card 1/0 24rfchannel-spa-1
```

The following example shows how to preprovision a Cisco SIP-600:

```
Router# configure terminal
Router(config)# card 3 4jacket-1
```

The following example shows how to preprovision a Cisco Wideband SPA on a Cisco SIP-600:

```
Router# configure terminal
Router(config)# card 3/0 24rfchannel-spa-1
```

The following example shows how to preprovision a Cisco 3 Gbps Wideband SPA on a Cisco SIP-600:

```
Router# configure terminal
Router(config)# card 1/0 SPA-DOCSIS-HD-V1 1x10GE license 1
```

Cisco 10000 Series Router Examples

The following example preprovisions line card slot 2 to accept a 24-Port Channelized E1/T1 line card operating in E1 mode:

```
Router(config)# card 2/
0 24che1t1-1
 mode e1
```

The following example shows how to change the provisioning for line card slot 5 from the 1-Port Gigabit Ethernet Half-Height line card to the 4-Port OC-3/STM-1 ATM line card.

```
Router(config)# hw-module subslot 5/0 shut
Aug 22 21:52:19.619 UTC: %IPCOIR-3-TIMEOUT: Timeout waiting for a response from slot 5/0.
Aug 22 21:52:19.619 UTC: %IPCOIR-2-CARD_UP_DOWN: Card in slot 5/0 is down.  Notifying
1gigethernet-hh-1 driver.
Aug 22 21:52:21.627 UTC: %LINK-3-UPDOWN: Interface GigabitEthernet5/0/0, changed state to
down
Aug 22 21:52:22.627 UTC: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet5/0/0,
 changed state to down
Router(config)# no card 5/0 1gigethernet-hh-1
Aug 22 21:53:20.008 UTC: %C10K-3-DEACTIVATED: card in slot [5/0] disabled.
Router(config)# card 5/0 4oc3atm-1
[ Remove the 1-Port Gigabit Ethernet Half-Height line card and
insert the 4-Port OC-3/STM-1 ATM line card ]
```

Related Commands

Command	Description
show interface	Displays the current configuration and status for a specified interface type.

card type (T1-E1)

To configure a T1 or E1 card type, use the **cardtype** command in global configuration mode. To deselect the card type on non-SPA platforms, use the **no** form of this command. The no form of this command is not available on the SPA platforms.

card type {**t1** | **e1**} *slot* [*bay*]
no card type {**t1** | **e1**} *slot* [*bay*]

Channelized T1/E1 Shared Port Adapters
card type {**t1** | **e1**} *slot subslot*

Syntax Description

t1	Specifies T1 connectivity of 1.544 Mbps through the telephone switching network, using AMI or B8ZS coding.
e1	Specifies a wide-area digital transmission scheme used predominantly in Europe that carries data at a rate of 2.048 Mbps.
slot	Chassis slot number. Refer to the appropriate hardware manual for slot information. For SIPs, refer to the platform-specific SPA hardware installation guide or the corresponding "Identifying Slots and Subslots for SIPs and SPAs" topic in the platform-specific SPA software configuration guide.
bay	(Optional) Card interface bay number in a slot (route switch processor [RSP] platform only). This option is not available on other platforms.
subslot	(Channelized T/E1 Shared Port Adapters Only) Secondary slot number on a SPA interface processor (SIP) where a SPA is installed. Refer to the platform-specific SPA hardware installation guide and the corresponding "Specifying the Interface Address on a SPA" topic in the platform-specific SPA software configuration guide for subslot information.

Command Default

No default behavior or values

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(5)XE	This command was introduced.
12.0(7)T	This command was integrated into Cisco IOS Release 12.0(7)T.
12.3(1)	This command was integrated into Cisco IOS Release 12.3(1) and support was added for Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745 platforms.
12.2S	This command was integrated into Cisco IOS Release 12.2S.

Release	Modification
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE to support SPAs on the Cisco 7600 series routers and Catalyst 6500 series switches.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S to support SPAs on Cisco 12000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
XE 3.18SP	This command was integrated into Cisco NCS 4200 Series.

Usage Guidelines

Changes made using this command on non-SPA platforms, do not take effect unless the **reload** command is used or the router is rebooted.

Channelized T1/E1 Shared Port Adapters

There is no card type when the SPA is inserted for first time. The user must configure this command before they can configure individual ports.

The no form of this command is not available on the SPA platforms. To change an existing card type on SPA platforms, perform the following steps:

1. Remove the SPA from its subslot.
2. Save the configuration.
3. Reboot the router.
4. Insert the new SPA into the subslot.
5. Configure the new card using this command.

Examples

The following example configures T1 data transmission on slot 1 of the router:

```
Router(config)# card type t1 1
```

The following example configures all ports of an 8-Port Channelized T1/E1 SPA, seated in slot 5, subslot 2, in T1 mode:

```
Router(config)# card type t1 5 2
```

Related Commands

Command	Description
controller	Configures a T1 or E1 controller and enters controller configuration mode.
reload	Reloads the operating system.
show controller	Displays the controller state that is specific to controller hardware
show interface serial	Displays the serial interface type and other information.

card type (T3-E3)

To configure a T3 or E3 card type, use the **cardtype** command in global configuration mode. To deselect the card type, use the **no** form of this comand. The no form of this command is not supported on the 2-Port and 4-Port Clear Channel T3/E3 SPA on Cisco 12000 series routers.

T3 or E3 Controllers
card type {**t3** | **e3**} *slot*
no card type {**t3** | **e3**} *slot*

Clear Channel T3/E3 Shared Port Adapters
card type {**t3** | **e3**} *slot subslot*
no card type {**t3** | **e3**} *slot subslot*

Clear Channel T3/E3 Shared Port Adapters on Cisco 12000 Series Routers
card type {**t3** | **e3**} *slot subslot*

Syntax Description

t3	Specifies T3 connectivity of 44210 kbps through the network, using B8ZS coding.
e3	Specifies a wide-area digital transmission scheme used predominantly in Europe that carries data at a rate of 34010 kbps.
slot	Slot number of the interface.
subslot	(Clear Channel T3/E3 Shared Port Adapters Only) Secondary slot number on a SIP where a SPA is installed. Refer to the platform-specific SPA hardware installation guide and the corresponding "Specifying the Interface Address on a SPA" topic in the platform-specific SPA software configuration guide for subslot information.

Command Default

No default behavior or values.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.1(1)T	This command was introduced.
12.2(11)YT	This command was integrated into Cisco IOS Release 12.2(11)YT and implemented on the following platforms: Cisco 2650XM, Cisco 2651XM, Cisco 2691, Cisco 3660 series, Cisco 3725, and Cisco 3745 routers.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.3(1)	This command was integrated into Cisco IOS Release 12.3(1) and support was added for Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745 platforms.
12.2S	This command was integrated into Cisco IOS Release 12.2S.

Release	Modification
12.2(25)S3	This command was integrated into Cisco IOS Release 12.2(25)S3 to support SPAs on the Cisco 7304 routers.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE to support SPAs on the Cisco 7600 series routers and Catalyst 6500 series switches.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S to support SPAs on the Cisco 12000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Usage guidelines vary slightly from platform to platform as follows:

T3 or E3 Controllers

Once a card type is issued, you enter the **nocardtype** command and then another **cardtype** command to configure a new card type. You must save the configuration to the NVRAM and reboot the router in order for the new configuration to take effect.

When the router comes up, the software comes up with the new card type. Note that the software will reject the configuration associated with the old controller and old interface. You must configure the new controller and serial interface and save it.

Clear Channel T3/E3 Shared Port Adapters

To change all the SPA ports from T3 to E3, or vice versa, you enter the **nocardtype** command and then another **cardtype** command to configure a new card type.

When the router comes up, the software comes up with the new card type. Note that the software will reject the configuration associated with the old controller and old interface. You must configure the new controller and serial interface and save it.

Clear Channel T3/E3 Shared Port Adapters on Cisco 12000 Series Routers

The no form of this command is not available on the 2-Port and 4-Port Clear Channel T3/E3 SPA on Cisco 12000 series routers. To change an existing card type on Cisco 12000 series routers, perform the following steps:

1. Remove the SPA from its subslot.
2. Save the configuration.
3. Reboot the router.
4. Insert the new SPA into the subslot.
5. Configure the new card using this command.

Examples

The following example shows T3 data transmission configured in slot 1:

```
Router(config)# card type t3 1
```

The following example configures all ports of 2-Port and 4-Port Clear Channel T3/E3 SPA, seated in slot 5, subslot 2, in T3 mode:

```
Router(config)# card type t3 5 2
```

Related Commands

Command	Description
controller	Configures a T3 or E3 controller and enters controller configuration mode.
reload	Reloads the operating system.
show interface serial	Displays the serial interface type and other information.

card-protection

Use this command to configure card protection that protects traffic when the interface module is out of service, there is any software failure, or any hardware issues.

Card Protection Creation Commands:

card-protection *CPGN*

card-protection {*primary* | *backup*}

card-protection *revertive time*

Card Protection Maintenance Commands:

card-protection *CPGN* [**manual** {*primary* | *backup*} | **force** {*primary* | *backup*} | **lockout**]

Use **no card-protection** *CPGN* [**manual** {*primary* | *backup*} | **force** {*primary* | *backup*} | **lockout**] command to remove the configuration.

Syntax Description

Syntax Description:

CPGN	The card protection number 1 to 16 refers to the Card Protection Group Number (CPGN).
primary	Configures the primary card in card protection.
backup	Configures the backup card in card protection.
revertive time (Optional)	Configures card protection in revertive mode. The value ranges from 30 seconds to 720 seconds.
manual	Configures manual switch on primary or backup card in card protection. Traffic switches to selected card if there is no fault condition on that card.
force	Configures force switch on primary or backup card in card protection. Traffic switches to selected card, even if there is a fault on the card.
lockout	Configures lockout on backup card in card protection. Prevents card protection switching and forces traffic to remain on the primary card.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
XE Everest 16.7.1	This command was integarted into the Cisco NCS 4200 Series and Cisco ASR 900 Series.

Usage Guidelines

For the **manual** option, traffic switches to selected card if there is no fault condition on that card. It has lower priority than alarm and card failure. For the **force** option, traffic switches to selected card if there is fault condition. It has higher priority than manual, alarms and card failure. For the **lockout** option, it prevents card protection switching and forces traffic to remain on the primary card. The **revertive time** option has the lowest priority.

Examples

```
enable
configure terminal
card-protection [1-16]
primary slot 0 bay 0
backup slot 0 bay 5
end
card-protection 4
card-protection [manual {backup|primary} | force {backup|primary} | lockout]
end
```

Related Commands

Command	Description
show card-protection CPGN detail	Verifies the card protection configuration.

carrier-delay

To modify the default carrier delay time on a main physical interface, use the **carrier-delay** command in interface configuration or template configuration mode. To return to the default carrier delay time, use the **no** form of this command.

Conventional Carrier Delay
carrier-delay {*seconds* | **msec** *milliseconds*}
no carrier-delay

Asymmetric Carrier Delay for Cisco IOS XE Routing Platforms
carrier-delay [**up** | **down**] {*seconds* | **msec** *milliseconds*}
no carrier-delay [**up** | **down**]

Syntax Description

seconds	For Conventional Carrier Delay: • Specifies the carrier transition delay, in seconds. The range is from 0 to 60. The default is 2. For Asymmetric Carrier Delay: • *seconds* indicate the unit use for configuration.
msec *milliseconds*	For Conventional Carrier Delay: • Specifies the carrier transition delay, in milliseconds. The range is from 0 to 1000. For Asymmetric Carrier Delay: • **msec** *milliseconds* indicate the unit use for configuration.
up	(Optional) Indicates that the carrier-delay configuration is for up link.
down	(Optional) Indicates that the carrier-delay configuration is for down link

Command Default

The default carrier delay (conventional) is 2 seconds.

Template configuration (config-template)

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
10.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Release	Modification
12.2(33)SRD	This command was modified. The **up** and **down** keywords were added.
12.2(33)SXI	This command was modified. Support for the **up** and **down** keywords was added.
Cisco IOS XE Release 2.3	This command was modified. Support for Cisco ASR 1000 Series Aggregation Services Routers was added.
15.2(2)E	This command was integrated into Cisco IOS Release 15.2(2)E. This command is supported in template configuration mode.
Cisco IOS XE Release 3.6E	This command was integrated into Cisco IOS XE Release 3.6E. This command is supported in template configuration mode.
Cisco IOS XE Fuji 16.8.x	The **up** and **down** keywords were added to the **no** form of the command
Cisco IOS XE 17.16.1a	This command is extended to the following Cisco IOS XE platforms: • Cisco 1000 Series Integrated Services Routers • Cisco 4000 Series Integrated Services Routers • Cisco Catalyst 8200 and 8300 Series Edge platforms • Cisco Catalyst 8500L Series Edge platforms • Cisco 1100 Terminal Services Gateway

Usage Guidelines

The default carrier transition delay is 10 milliseconds on all Ethernet interfaces. This enables the carrier-delay time to ensure fast link detection.

Conventional Carrier Delay

If a link goes down and comes back before the carrier delay timer expires, the down state is effectively filtered, and the rest of the software on the router is not aware that a link-down event has occurred. Therefore, a large carrier delay timer results in fewer link-up/link-down events being detected. However, setting the carrier delay time to 0 means that *every* link-up/link-down event is detected.

In most environments a lower carrier delay is better than a higher one. The exact value that you choose depends on the nature of the link outages that you expect in your network and how long you expect those outages to last.

If data links in your network are subject to short outages, especially if those outages last less than the time required for your IP routing to converge, you should set a relatively long carrier delay value to prevent these short outages from causing disruptions in your routing tables. If outages in your network tend to be longer, you might want to set a shorter carrier delay so that the outages are detected sooner and the IP route convergence begins and ends sooner.

The following restrictions apply to carrier delay configuration:

- The Fast Link and Carrier Delay features are mutually exclusive. If you configure one feature on an interface, the other is disabled automatically.
- Administrative shutdown of an interface will follow carrier delay configuration.

Asymmetric Carrier Delay

Cisco IOS releases that support the **up** and **down** keywords allow asymmetric carrier delay (ACD) configuration. ACD allows you to configure separate delay times for link-up and link-down event notification on physical interfaces that support ACD, such as the SIP-200- and SIP-400-based interfaces. With ACD, link-up and link-down events can be notified with different delay times.

The following restrictions apply to ACD configurations:

- You cannot configure ACD on an interface if conventional carrier delay (the **carrier-delay** command without an **up** or **down** keyword) is configured on the interface.
- Link-down and link-up carrier delay times are configured in milliseconds, using the **msec** keyword, or in seconds.

Asymmetric carrier delay is supported by the following Ethernet Shared Port Adapters (SPA)s on Cisco ASR 1000 Series Aggregation Services Routers:

- SPA-1X10GE-L-V2
- SPA-2X1GE-V2
- SPA-4X1FE-TX-V2
- SPA-5X1GE-V2
- SPA-8X1GE-V2
- SPA-8X1FE-TX-V2
- SPA-10X1GE-V2

From Cisco IOS XE 17.16.1a, asymmetric carrier delay is supported on the following platforms:

- Cisco 1000 Series Integrated Services Routers
- Cisco 4000 Series Integrated Services Routers
- Cisco Catalyst 8200 and 8300 Series Edge platforms
- Cisco Catalyst 8500L Series Edge platforms
- Cisco 1100 Terminal Services Gateway

Asymmetric carrier delay is supported on the following service modules and network interface modules on Cisco 4000 Series Integrated Services Routers:

- SM-X-6X1G
- NIM-1GE-CU-SFP
- NIM-2GE-CU-SFP

Asymmetric carrier delay is supported on the following service modules and network interface modules on Cisco Catalyst 8200 and 8300 Series Edge platforms:

- C-NIM-1X
- C-NIM-4X

- C-NIM-8T
- C-SM-16P4M2X and C-SM-40P8M2X
- C-NIM-2T
- C-NIM-1M

Examples

The following example shows how to change the carrier delay to 5 seconds:

```
Router(config)# interface serial2/3/0
Router(config-if)# carrier-delay 5
```

The following example shows how to change the carrier delay to 5 seconds for an interface template:

```
Device# configure terminal
Device(config)# template user-template1
Device(config-template)# carrier-delay 5
Device(config-template)# end
```

Asymmetric Carrier Delay

The following example shows how to configure a carrier delay of 8 seconds for link-up transitions and 50 milliseconds for link-down transitions:

```
Router(config)# interface GigabitEthernet2/0/0
Router(config-if)# carrier-delay up 8
Router(config-if)# carrier-delay down msec 50
```

The following example shows the output of the **show interfaces** command after the **carrier-delay** command is configured on the Gigabit Ethernet interface:

```
Router# show interfaces GigabitEthernet 0/1/0

GigabitEthernet0/1/0 is up, line protocol is up
  Hardware is SPA-8X1GE-V2, address is 001a.3046.9410 (bia 001a.3046.9410)
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload ½55, rxload ½55
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 1000Mbps, link type is auto, media type is 1000BaseBX10U
  output flow-control is on, input flow-control is on
  Asymmetric Carrier-Delay Up Timer is 4 sec
  Asymmetric Carrier-Delay Down Timer is 500 msec
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts (0 IP multicasts)
     0 runts, 0 giants, 0 throttles
```

```
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 watchdog, 0 multicast, 0 pause input
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 1 interface resets
0 unknown protocol drops
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier, 0 pause output
0 output buffer failures, 0 output buffers swapped out
```

cem

To enter circuit emulation (CEM) configuration mode, use the **cem** command in global configuration mode.

cem *slot*/*port*/*channel*

Syntax Description

slot	Slot number in which the Circuit Emulation over IP (CEoIP) network module (NM) is installed on the networking device.
/ *port*	Port number on the CEoIP NM. The slash mark is required between the *slot* argument and the *port* argument.
/ *channel*	Channel number that identifies the channel that you want to configure (T1/E1 only). The channel number on a serial port is always 0. The slash mark is required between the *port* argument and the *channel* argument.

Command Default

CEM configuration mode is not available.

Command Modes

Global configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
XE 3.18SP	This command was integrated on Cisco NCS 4200 Series.
XE Everest 16.5.1	This command was integrated on Cisco NCS 4200 Series and Cisco ASR 900 Series Routers.

Usage Guidelines

Use this command to enter CEM configuration mode to allow the configuration of all CEM options.

Examples

The following example shows how to enter CEM configuration mode:

```
Router(config)# cem 1/2/0
Router(config-cem)#
```

Related Commands

Command	Description
clear cem	Clears CEM statistics.
show cem	Displays CEM statistics.

cem-group

To create a circuit emulation (CEM) channel from one or more time slots of a T1 or E1 line of an NM-CEM-4TE1 network module, use the **cem-group** command in controller configuration mode. To remove a CEM group and release the associated time slots, use the **no** form of this command.

cem-group *group-number* {**unframed** | **timeslots** *time-slot-range* [**speed** *kbps*]}
no cem-group *group-number*

cem-group *group-number* **framed**

Syntax Description

For NCS 4200 Series:

cem-group *cem-group-number* **cep**

group-number	Channel number to be used for this group of time slots. • For T1 ports, the range is from 0 to 23. • For E1 ports, the range is from 0 to 30. • For 4xC37.94 interface, only 0 group-number is supported.
unframed	Specifies that a single CEM channel is being created including all time slots and the framing structure of the line.
framed	Specifies that a single CEM channel is being created including all the timeslots and framing configured.
timeslots	Specifies that a list of time slots is to be used as specified by the *time-slot-range* argument.
time-slot-range	List of the time slots to be included in the CEM channel. The list may include commas and hyphens with no spaces between the numbers. The range of time slots supported for 4xC37.94 interface is from 1 to 12.
speed	(Optional) Specifies the speed of the channels by specifying the number of kbps of each time slot to be used. This keyword applies only to T1 channels.
kbps	(Optional) Speed of the channel, in kbps. Must be one of the following: • **56** --Specifies a speed of 56 kbps where only the seven most significant bits (MSBs) of each eight-bit time slot are used. • **64** --Specifies a speed of 64 kbps where all eight bits of each eight-bit time slot are used.
cep	Configures Circuit Emulation Service over Packet (CEP) mode.

Command Default

No CEM groups are defined.

Command Modes

Controller configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
15.1(2)SNH	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.
XE 3.18 SP	Support for this command was introduced on NCS 4200 Series.
XE Everest 16.5.1	This command was implemented on the Cisco ASR 920 Routers and Cisco NCS 4200 Series.
XE Fuji 16.8.x	The framed keyword was introduced for Cisco ASR 900 Routers and Cisco NCS 4200 Series Routrers.

Usage Guidelines

Use this command to create CEM channels on the T1 or E1 network module, NM-CEM-4TE1. A maximum of 64 channels may be created on an NM-CEM-4TE1.

Examples

The following example shows how to create circuit emulation group number 0 with a single CEM channel including all time slots and the framing structure of the line on an NM-CEM-4TE1.

```
Router(config-controller)# cem-group 0
 unframed
```

The following example shows how to create circuit emulation channel number 6 with T1 channel time slots one through four, nine, and ten using all eight bits of each time slot on an NM-CEM-4TE1.

```
Router(config-controller)# cem-group 6 timeslots 1-4,9,10
 speed 64
```

Examples

For NCS 4200 Series routers, the following example shows the configuration of CEP:

```
enable
configure terminal
controller Mediatype 0/5/0
controller sonet 0/5/0
sts-1 1
mode unframed
cem-group 100 cep
end
```

Examples

For 4-Ports C37.94 interface module, the following example shows the configuration:

```
enable
configure terminal
controller c3794 0/0/0
timeslots3
end
```

Examples

To configure framed SAToP:

```
enable
configure terminal
controller mediatype 0/5/0
mode sonet
controller sonet 0/5/0
cem-group0 framed
end
```

Related Commands

Command	Description
cem	Enters circuit emulation configuration mode.
show cem circuit	Displays the CEM statistics for the configured CEM circuits.

channel-group

To configure serial WAN on a T1 or E1 interface, use the **channel-group** command in controller configuration mode. To clear a channel group, use the **no** form of this command.

Cisco 2600 Series
channel-group *channel-group-number* **timeslots** *range* [**speed** {**56** | **64**}] [**aim** *aim-slot-number*]
no channel-group *channel-group-number*

Cisco 2611 (Cisco Signaling Link Terminal [SLT])
channel-group *channel-number*
no channel-group *channel-number*

Cisco ASR 901 Series, Cisco 2600XM Series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745
channel-group *channel-group-number* {**timeslots** *range* [**speed** {**56** | **64**}] | **unframed**} [**aim** *aim-slot-number*]
no channel-group [*channel-group-number* **timeslots** *range*]

Cisco AS5350 and Cisco AS5400 Series
channel-group *channel-group-number*
no channel-group *channel-group-number*

Cisco MC3810
channel-group *channel-number* **timeslots** *range* [**speed** {**56** | **64**}]
no channel-group [*channel-number* **timeslots** *range*]

Syntax Description

channel-group-number	Channel-group number on the Cisco 2600 series, Cisco 2600XM, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745 routers. When a T1 data line is configured, channel-group numbers can be values from 0 to 23. When an E1 data line is configured, channel-group numbers can be values from 0 to 30. Valid values can be 0 or 1 on the Cisco AS5350 and Cisco AS5400.
timeslots *range*	Specifies one or more time slots separated by commas, and spaces or ranges of time slots belonging to the channel group separated by a dash. The first time slot is numbered 1. • For a T1 controller, the time slots range from 1 to 24. • For an E1 controller, the time slots range from 1 to 31. You can specify a time slot range (for example, 1-29), individual time slots separated by commas (for example 1, 3, 5), or a combination of the two (for example 1-14, 15, 17-31). See the "Examples" section for samples of different timeslot ranges.

speed {**56**|**64**}	(Optional) Specifies the speed of the underlying DS0s in kilobits per second. Valid values are 56 and 64. The default line speed when configuring a T1 controller is 56 kbps on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, Cisco 3745, and Cisco MC3810. The default line speed when configuring an E1 controller is 64 kbps on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, Cisco 3745, and Cisco MC3810. The line speed controls real-time (VBR-RT) traffic shaping, and the maximum burst size (MBS) is 255 cells.
aim *aim-slot-number*	(Optional) Directs HDLC traffic from the T1/E1 interface to the AIM-ATM-VOICE-30 digital signaling processor (DSP) card on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745.
channel-number	Number of the channel. Valid values can be 0 or 1 on the Cisco SLT (Cisco 2611).
unframed	Specifies the use of all 32 time slots for data. None of the 32 time slots is used for framing signals on the Cisco ASR 901 Series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745. This keyword is applicable to E1 only.

Command Default

The T1/E1 line is connected to the Motorola MPC-860x processor serial communication controller (SCC) or network module with two voice or WAN interface card (VIC or WIC) slots and 0/1/2 FastEthernet ports DSCC4 by default on Cisco 2600 series, Cisco 2600XM, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745 routers.

There is no default behavior or values on the Cisco SLT (Cisco 2611).

The serial interface object encapsulation is set to HDLC on a network access server (NAS) (Cisco AS5350 and Cisco AS5400 series routers).

The default line speed is 56 kbps when a T1 controller is configured on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, Cisco 3745, and the Cisco MC3810.

The default line speed is 64 kbps when an E1 controller is configured on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, Cisco 3745, and the Cisco MC3810.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
11.3MA	This command was introduced on the Cisco MC3810.
12.0	This command was integrated into Cisco IOS Release 12.0 on the Cisco MC3810.
12.0(7)XE	This command was implemented on the Catalyst 6000 family switches.
12.1(1)E	This command was integrated into Cisco IOS Release 12.1(1)E.

Release	Modification
12.1(1)T	This command was modified to accommodate two channel groups on a port on 1- and 2-port T1/E1 multiflex voice or WAN interface cards on the Cisco 2600 and Cisco 3600 series routers.
12.1(3a)E3	The number of valid values for the *kbps*argument was changed on the Cisco MC3810; see the "Usage Guidelines" section for valid values.
12.2(11)T	This command was implemented on the Cisco AS5350 and Cisco AS5400.
12.2(15)T	The **aim** keyword was added for use on the Cisco 2600 series (including the Cisco 2691), Cisco 2600XM, Cisco 3660, Cisco 3725, and Cisco 3745.
12.3(1)	The **unframed** keyword was added for use on the Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.4(3)S	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.

Usage Guidelines

Use this command to direct HDLC traffic from the T1/E1 interface to the AIM-ATM-VOICE-30 DSP card. A channel group is created using Advanced Integration Module (AIM) HDLC resources when a **channel-group** command with the **aim** keyword is parsed during system initialization or when the command is entered during configuration. You must specify the **aim** keyword under a T1/E1 controller port to direct HDLC traffic from the T1/E1 interface to the AIM-ATM-VOICE-30 DSP card on the Cisco 2600 series, Cisco 2600XM series, Cisco 2691, Cisco 3631, Cisco 3660, Cisco 3725, and Cisco 3745.



Note Neither the Cisco AS5400 series NAS nor the Cisco MC3810 is supported with the integrated voice and data WAN on T1/E1 interfaces using the AIM-ATM-VOICE-30 module.

If previous **channel-group** commands are configured with the **aim** keyword, subsequent **channel-group** commands without the **aim** keyword are rejected. Similarly, if a regular **channel-group** command is followed by another **channel-group** command with the **aim** keyword implemented, the second command is rejected on the Cisco 2600 and Cisco 2600XM.

A channel group using AIM HDLC resources is deleted only when a **nochannel-group** command is entered.

By default, the**channel-group** command on a NAS sets the serial interface object encapsulation to HDLC. You must override the default by entering the **encapsulationss7** command for that serial interface object. Once you override the default, encapsulation cannot be changed again for that object. The SS7 encapsulation option is new to the Integrated Signaling Link Terminal feature and is available only for interface serial objects created by the**channel-group** command. The Integrated Signaling Link Terminal feature added SLT functionality on Cisco AS5350 and Cisco AS5400 platforms.

A digital SS7 link can be deleted by entering the **nochannel-group***channel-group-number* command on the associated T1/E1 controller. The link must first be stopped using the **noshutdown** command. It is not necessary to remove the channel ID association first.

Use the **channel-group** command in configurations where the router or access server must communicate with a T1 or E1 fractional data line. The channel group number may be arbitrarily assigned and must be unique

for the controller. The time-slot range must match the time slots assigned to the channel group. The service provider defines the time slots that comprise a channel group.

Note Channel groups, channel-associated signaling (CAS) voice groups, DS0 groups, and time-division multiplexing (TDM) groups all use group numbers. All group numbers configured for channel groups, CAS voice groups, and TDM groups must be unique on the local Cisco MC3810 concentrator. For example, you cannot use the same group number for a channel group and for a TDM group. Furthermore, on the Cisco MC3810, only one channel group can be configured on a controller.

The channel group number can be 0 or 1 on the Cisco SLT (Cisco 2611).

The **channel-group** command also applies to Voice over Frame Relay, Voice over ATM, and Voice over HDLC on the Cisco MC3810.

Examples

The following example shows basic configuration directing HDLC traffic from the T1/E1 interface to the AIM-ATM-VOICE-30 DSP card, starting in global configuration mode:

```
Router(config)# controller e1 1/0
Router(config-controller)# clock source internal
Router(config-controller)# channel-group 0 timeslots 1-31 aim 0
```

The following example explicitly sets the encapsulation type to PPP to override the HDLC default:

```
Router# configure terminal
Router(config)# controller t1 6/0
Router(config-controller)# channel-group 2 timeslots 3 aim 0
Router(config-controller)# exit
Router(config)# interface serial 6/0:2
Router(config-if)# encapsulation ppp
Router(config-if)# ip address 10.0.0.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# end
```

The following example shows how to explicitly set the encapsulation type to SS7 to override the HDLC default using the Integrated Signaling Link Terminal feature. This example uses an 8PRI DFC card inserted into slot 7, and DS0-timeslot 3 on trunk 5 of that card is used as an SS7 link:

```
Router# configure terminal
Router(config)# controller t1 7/5
Router(config-controller)# channel-group 2 timeslots 3
Router(config-controller)# exit
Router(config)# interface serial 7/5:2
Router(config-if)# encapsulation ss7
Router(config-if)# channel-id 0
Router(config-if)# no shutdown
Router(config-if)# end
```

The following example defines three channel groups. Channel-group 0 consists of a single time slot, channel-group 8 consists of seven time slots and runs at a speed of 64 kbps per time slot, and channel-group 12 consists of two time slots.

```
Router(config-controller)# channel-group 0 timeslots 1
Router(config-controller)# channel-group 8 timeslots 5,7,12-15,20 speed 64
Router(config-controller)# channel-group 12 timeslots 2
```

The following example configures a channel group on controller T1 0 on a Cisco MC3810:

```
Router(config)# controller T1 0
Router(config-controller)# channel-group 10 timeslots 10-64
```

The following example configures a channel group on controller E1 1 and specifies that all time slots are used for data:

```
controller e1 1
channel-group 1 unframed
```



Note SS7 digital F-link support for the 8PRI line card requires use of a third onboard TDM stream to route trunk DS0 messages to the onboard MGCs.

Related Commands

Command	Description
framing	Specifies the frame type for the T1 or E1 data line.
invert data	Enables channel inversion.
linecode	Specifies the line code type for the T1 or E1 line.
voice-card	Configures a card with voice processing resources and enters voice card configuration mode.
encapsulation	Sets the encapsulation type.

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.

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.
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.

channel-protocol (interface)

To enable Port Aggretation Control Protocol (PAgP) or Link Aggregation Control Protocol (LACP) on an interface to manage channeling, use the**channel-protocol** command in interface configuration mode. Use the **no** form of this command to deselect the protocol.

channel-protocol {**lacp** | **pagp**}
no channel-protocol

Syntax Description

lacp	Specifies LACP to manage channeling.
pagp	Specifies PAgP to manage channeling.

Command Default

pagp

Command Modes

Interface configuration

Command History

Release	Modification
10.2	This command was introduced.
12.1(11b)EX	Support for this command was introduced on the Catalyst 6500 series switches.
12.1(12c)EA1	Support for this command was introduced on the Catalyst 2900 series switches.
12.1(13)E	Support for this command on the Catalyst 6500 series switches was extended to Cisco IOS Release 12.1(13)E. This command was changed to support the use of the **nochannel-protocol** command (without arguments) to deselect the protocol.
12.1(13)EW	Support for this command was introduced on the Catalyst 4500 series switches.
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.

Usage Guidelines

This command is valid on multiple interfaces (for example, Fast Ethernet) and routers and switches including the Cisco 2900, 4500/4000, 6500/6000, and 7600 series.

Examples

The following example shows how to set the lacp.

```
(config-if)# channel-protocol lacp
```

channelized

To configure the T3/E3 controller for channelized mode, use the **channelized** command in controller configuration mode. To configure the T3/E3 controller for unchannelized mode, use the**no** form of this command.

channelized
no channelized

Syntax Description

This command has no arguments or keywords.

Command Default

The T3 controller is channelized.

The E3 controller is channelized.

Maximum transmission unit (MTU) size is set to 1500.

MTU size is set to 4470.

Command Modes

Controller configuration

Command History

Release	Modification
12.0(14)S	This command was introduced.
12.1(5a)E	This command was integrated into Cisco IOS Release 12.1(5a)E.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
XE 3.18SP	This command was integrated into Cisco NCS 4200 Series.
XE Everest 16.5.1	This command was integrated into Cisco NCS 4200 Series.

Usage Guidelines

Use the no channelized controller configuration command to configure the T3/E3 controller for unchannelized mode for Cisco NCS 4200 Series. When you configure the PA-MC-2T3+ port adapter on a Cisco 7500 series router with the no channelized command, the MTU size is set to 4470. In channelized mode, the default MTU size is 1500. The change in MTU sizes will cause a memory recarve and CBus complex to occur, disrupting all traffic on the router for several minutes.

The following message will be displayed when commands initiate switching between channelized and unchannelized modes on a Cisco 7500 series router:

```
Change to subrate mode will cause cbus complex reset. Proceed? [yes/no]:
Y
```

Type Y for “yes” at the end of the warning. At the prompt, type ^Z to exit. You will exit configuration mode and enter unchannelized mode.

Caution The no channelized command removes all channel groups from a channelized T3 interface. If you have already configured channel groups, use this command with caution.

Examples

Cisco 7500 Series Router

The following example shows how to configure unchannelized mode on a PA-MC-2T3+ port adapter in slot 1 of a Versatile Interface Processor version 2 (VIP2) or VIP4 in a Cisco 7500 series router:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# controller T3 1/1/0
Router(config-controller)# no channelized
Change to subrate mode will cause cbus complex reset. Proceed? [yes/no]:
Y
^Z
```

Cisco 10000 Series Router

The following example eliminates the T1 interfaces to create a full-rate T3 interface:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# controller T3 2/0/0
Router(config-controller)# no channelized
Router(config-controller)# exit
Router(config)#
```

Cisco NCS 4200 Series

The following example shows how to configure channelized controller as T3 interface.

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# controller T3 0/4/40
Router(config-controller)# channelized
```

The following example shows how to configure channelized controller as E3 interface.

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# controller E3 0/4/40
Router(config-controller)# channelized mode e1
```

class cem

To configure CEM interface parameters in a class that is applied to CEM interfaces together, use the **class cem** command in global configuration mode. This command works in the same manner for CEM interfaces as the pseudowire-class command does for xconnect.

class cem *class name*

Syntax Description

Syntax Description

class name	The name of a CEM interface parameters class.

Command Default

CEM configuration mode is not available.

Command Modes

Global configuration

Command History

Release	Modification
XE 3.18 SP	Support for this command was introduced on NCS 4200 Series.
XE Everest 16.5.1	This command was integrated into the Cisco NCS 4200 Series and Cisco ASR 900 Series Routers.

Usage Guidelines

The **class cem** command allows you to configure CEM interface parameters in a class that is applied to CEM interfaces together. A class cem command includes the following configuration settings:

- dejitter-buffer dejitter-in-ms
- idle-pattern 8-bit-idle-pattern
- payload-size payload-size-in-ms

Note The **rtp-present** command cannot be configured from **class cem** and has to be configured from the interface for NCS 4200 Series routers.

Note You can improve the performance of packet reordering on TDM/PWE connections by using the increasing the size of the dejitter buffer using the dejitter-buffer parameter.

Examples

The following example shows how to enter CEM interface parameters:

```
enable
configure terminal
class cem mycemclass
payload-size 512
dejitter-buffer 10
```

```
idle-pattern 0x55
exit
interface cem 0/0
no ip address
cem 0
cem class mycemclass
xconnect 10.10.10.10 200 encapsulation mpls
exit
```

Related Commands

Command	Description
clear cem	Clears CEM statistics.
show cem	Displays CEM statistics.

clear aim

To clear the data compression Advanced Interface Module (AIM) daughter card registers and reset the hardware, use the **clearaim** command in privileged EXEC mode.

clear aim *element-number*

Syntax Description

element-number	Number of AIM slot. AIM slots begin with 0.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **clearaim**command is used to reset the data compression AIM hardware. This command is used if the compression Advanced Interface Module (CAIM) hardware becomes "stuck" or hangs for some reason. The CAIM registers are cleared, and the hardware is reset upon execution. All compression history is lost when the CAIM is reset.

This command is supported only on Cisco 2600 series routers.

Examples

The following example shows how to use the **clearaim** command. This command will reset the hardware, flushing the buffers and history for all compression tasks currently under operation:

```
Router# clear aim 0
Router#
1w0d: %CAIM-6-SHUTDOWN: CompressionAim0 shutting down
1w0d: %CAIM-6-STARTUP: CompressionAim0 starting up
```

Related Commands

Command	Description
show pas caim	Displays the IDPROM contents for each AIM board in the Cisco 2600 series routers.
test aim eeprom	Tests the data compression AIM after it is installed in a Cisco 2600 series router.

clear cable-diagnostics tdr

To clear a specific interface or clear all interfaces that support Time Domain Reflectometry (TDR), use the **clearcable-diagnosticstdr**command in privileged EXEC mode.

clear cable-diagnostics tdr [**interface** *interface interface-number*]

Syntax Description

interface *interface*	(Optional) Specifies the interface type; possible valid values are **ethernet**, **fastethernetgigabitethernet**, and **tengigabitethernet**. See the "Usage Guidelines" section for additional valid values.
interface-number	Module and port number; see the "Usage Guidelines" section for valid values.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC

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

The valid values for *interface* include the**ge-wan**, **atm**, and **pos** keywords that are supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

See the *Release Notes for Cisco IOS Release 12.2 SX on the Catalyst 6500 and Cisco 7600 Supervisor Engine 720, Supervisor Engine 32, and Supervisor Engine 2* for the list of modules that support TDR

Examples

This example shows how to clear a specific interface:

```
Router# clear cable-diagnostics tdr interface gigabitethernet 4/1
Router#
```

Related Commands

Command	Description
show cable-diagnostics tdr	Displays the test results for the TDR cable diagnostics.
test cable-diagnostics	Tests the condition of 10-Gigabit Ethernet links or copper cables on 48-port 10/100/1000 BASE-T modules.

clear catalyst6000 traffic-meter

To clear the traffic meter counters, use the **clear catalyst6000 traffic-meter**command in privileged EXEC mode.

clear catalyst6000 traffic-meter

Syntax Description

This command has no arguments or keywords.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC

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.

Examples

This example shows how to clear the traffic meter counters:

```
Router# clear catalyst6000 traffic-meter
Router#
```

clear cem

To clear circuit emulation (CEM) statistics, use the **clearcem** command in privileged EXEC mode.

clear cem {*slot* | *slot*/*port*/*channel* | **all**}

Syntax Description

slot	Clears the statistics for all CEM channels on the card in the specified slot (if the card is a Circuit Emulation over IP [CEoIP] card).
slot	Specifies the slot of the CEM channel to clear.
/ *port*	Specifies the port of the CEM channel to clear. The slash mark is required between the *slot* argument and the *port* argument.
/ *channel*	Specifies the CEM channel to clear. The slash mark is required between the *port* argument and the *channel* argument.
all	Clears the statistics for all CEM channels on the router.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.

Examples

The following example shows how to clear CEM statistics for CEM channel number 10 on the card installed in slot 1, port 1.

```
Router# clear cem 1/1/10
```

Related Commands

Command	Description
cem	Enters CEM configuration mode.
show cem	Displays CEM statistics.

clear controller

To reset the T1 or E1 controller, use the **clearcontroller**command in user EXEC or privileged EXEC mode.

Cisco 7200 Series and Cisco 7500 Series Routers
clear controller {**t1** | **e1**} *slot*/*port*

Cisco AS5200 Series and Cisco AS5300 Series Routers
clear controller {**t1** | **e1**} *number*

Syntax Description

t1	T1 controller.
e1	E1 controller.
slot / *port*	Backplane slot number and port number on the interface. Refer to your hardware installation manual for the specific slot and port numbers.
number	Network interface module (NIM) number, in the range from 0 to 2.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
10.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example resets the T1 controller at slot 4, port 0 on a Cisco 7500 series router:

```
Router# clear controller t1 4/0
```

The following example resets the E1 controller at NIM 0:

```
Router# clear controller e1 0
```

Related Commands

Command	Description
controller	Configures a T1, E1, or J1 controller and enters controller configuration mode.

clear controller lex

To reboot the LAN Extender chassis and restart its operating software, use the **clearcontrollerlex** command in privileged EXEC mode.

clear controller lex *number* [**prom**]

Cisco 7500 Series
clear controller lex *slot*/*port* [**prom**]

Cisco 7200 Series and 7500 Series with a Packet over SONET Interface Processor
clear controller lex [*type*] *slot*/*port*

Cisco 7500 Series with Ports on VIP Cards
clear controller lex [*type*] *slot*/*port-adapter*/*port*

Syntax Description

number	Number of the LAN Extender interface corresponding to the LAN Extender to be rebooted.
prom	(Optional) Forces a reload of the PROM image, regardless of any Flash image.
slot	Number of the slot being configured. Refer to the appropriate hardware manual for slot and port information.
port	Number of the port being configured. Refer to the appropriate hardware manual for slot and port information.
type	(Optional) Specifies the interface type. See Table 4 under the **clearcounters** command for keywords.
port-adapter	Number of the port adapter being configured. Refer to the appropriate hardware manual for information about port adapter compatibility.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(15)T	This command is no longer supported in Cisco_IOS Mainline or Technology-based (T) releases. It may continue to appear in Cisco_IOS 12.2S-family releases.

Usage Guidelines

The **clearcontrollerlex** command halts operation of the LAN Extender and performs a cold restart.

Without the **prom** keyword, if an image exists in Flash memory, and that image has a newer software version than the PROM image, and that image has a valid checksum, then this command runs the Flash image. If any one of these three conditions is not met, this command reloads the PROM image.

With the **prom** keyword, this command reloads the PROM image, regardless of any Flash image.

Examples

The following example halts operation of the LAN Extender bound to LAN Extender interface 2 and causes the LAN Extender to perform a cold restart from Flash memory:

```
Router#
clear controller lex 2
reload remote lex controller? [confirm] yes
```

The following example halts operation of the LAN Extender bound to LAN Extender interface 2 and causes the LAN Extender to perform a cold restart from PROM:

```
Router#
clear controller lex 2 prom
reload remote lex controller? [confirm] yes
```

clear controller wanphy

T o clear the triggered alarm counters for the Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter and reset it to zero, use the **clearcontrollerwanphy**commandin Privileged EXEC mode.

clear controller wanphy *slot*/*subslot*/*port*

Syntax Description

slot	The SIP slot number in which the Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter has been installed.
subslot	The subslot number in which the Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter has been installed.
port	The port number of the Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter. **Note** There is only 1 port (0) in the Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter.

Command Default

No default values are available.

Command Modes

Privileged EXEC Mode (EXEC)

Command History

Release	Modification
Cisco IOS XE Release 3.3.0S	This command was introduced on the Cisco ASR 1000 Series Routers.

Usage Guidelines

The **clearcontrollerwanphy**command has been introduced on the Cisco ASR 1000 Series Router in Cisco IOS XE Release 3.3.0S. This command is used to clear the counter of alarms generated, and reset it back to zero.

Examples

The following example shows the output of the **showcontrollerswanphy** command. The example shows the alarm counter values for the line, path, and section alarms:

```
Router# show controllers wanphy 0/1/0
TenGigabitEthernet0/1/0
Mode of Operation: WAN Mode
SECTION
  LOF = 1             LOS    = 0                              BIP(B1) = 22
LINE
  AIS = 1             RDI    = 0          FEBE = 0            BIP(B2) = 3099
PATH
  AIS = 1             RDI    = 0          FEBE = 4            BIP(B3) = 4
  LOP = 0             NEWPTR = 0          PSE  = 0            NSE     = 0
WIS ALARMS
  SER    = 1          FELCDP = 0          FEAISP = 0
  WLOS   = 0          PLCD   = 0
  LFEBIP = 857        PBEC   = 4
Active Alarms[All defects]: None
Active Alarms[Highest Alarms]: None
Alarm reporting enabled for: SF SWLOF B1-TCA B2-TCA PLOP WLOS
```

```
  Rx(K1/K2): 00/00  Tx(K1/K2): 00/00
  S1S0 = 00, C2 = 0x1A
PATH TRACE BUFFER: STABLE
  Remote J1 Byte : wert
BER thresholds:  SD = 10e-6  SF = 10e-3
TCA thresholds:  B1 = 10e-6  B2 = 10e-6  B3 = 10e-6
[Output is Cut]
```

The following example shows how to clear the alarm counter values and reset it back to zero:

```
Router# clear controller wanphy 0/1/0
```

The following example shows that the alarm counter values are cleared and have been reset to zero:

```
Router# show controllers wanphy 0/1/0
TenGigabitEthernet0/1/0
Mode of Operation: WAN Mode
SECTION
  LOF = 0             LOS    = 0                            BIP(B1) = 0
LINE
  AIS = 0             RDI    = 0          FEBE = 0          BIP(B2) = 0
PATH
  AIS = 0             RDI    = 0          FEBE = 0          BIP(B3) = 0
  LOP = 0             NEWPTR = 0          PSE  = 0          NSE     = 0
WIS ALARMS
  SER    = 0          FELCDP = 0          FEAISP = 0
  WLOS   = 0          PLCD   = 0
  LFEBIP = 0          PBEC   = 0
```

Related Commands

Command	Description
show controllers wanphy	Displays the SPA mode (LAN/WAN), alarms, and J1 byte string value.

clear controller vdsl

To reset the VDSL line related counters, use the **clearcontrollervdsl** command in privileged EXEC mode.

clear controller vdsl *slot/subslot/port number*

Syntax Description

vdsl	VDSL2 controller.
slot	Controller slot number.
subslot	Controller subslot number.
port number	Controller port number.

Command Default

None.

Command Modes

Privileged EXEC mode.

Command History

Release	Modification
15.0(1)M1	This command was first introduced.

Usage Guidelines

None.

Examples

The following example shows how to reset the VDSL line related counters.

```
Router#clear controller vdsl 0/2/0
```

Related Commands

Command	Description
show controller vdsl	Displays VDSL controller related information.

clear counters

To clear the interface counters, use the **clearcounters** command in user EXEC or privileged EXEC mode.

clear counters commandclear counters [*interface-type interface-number*]

Cisco 7200 Series and 7500 Series with a Packet over SONET Interface Processor
clear counters [*interface-type*] *slot/port*

Cisco 7500 Series with Ports on VIP Cards
clear counters [*interface-type*] *slot/port-adapter/port*

Cisco 7600 Series
clear counters [*interface interface-number* | **null** *interface-number* | **port-channel** *number* | **vlan** *vlan-id*]

Syntax Description

interface-type	(Optional) Specifies the interface type; one of the keywords listed in Table 1 .
interface -number	(Optional) Specifies the interface number displayed with the **showinterfaces** command.
slot	Slot number. Refer to the appropriate hardware manual for slot and port information.
port	Port number. Refer to the appropriate hardware manual for slot and port information.
port-adapter	Port adapter number. Refer to the appropriate hardware manual for information about port adapter compatibility.
interface	(Optional) Interface type; possible valid values are **ethernet**, **fastethernetgigabitethernet**, and **tengigabitethernet**. See the "Usage Guidelines" section for additional valid values.
interface-number	(Optional) Module and port number; see the "Usage Guidelines" section for valid values.
null *interface-number*	(Optional) Specifies the null interface; the valid value is **0**.
port-channel *number*	(Optional) Specifies the channel interface; valid values are a maximum of 64 values ranging from 1 to 256.
vlan *vlan-id*	(Optional) Specifies the VLAN ID; valid values are from 1 to 4094.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
11.2F	The **virtual-access** keyword was added.

Release	Modification
11.3	The following keywords were added or modified: • **vg-anylan** keyword was added. • **posi** keyword was changed to **pos**.
12.2(15)T	The **ethernet** and **serial** keywords were removed because the LAN Extension feature is no longer available in Cisco IOS software.
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 clears all the current interface counters from the interface unless the optional arguments *interface*-type and *interface*-numberare specified to clear only a specific interface type (serial, Ethernet, Token Ring, and so on). The table below lists the command keywords and their descriptions.

Note This command does not clear counters retrieved using Simple Network Management Protocol (SNMP), but only those seen with the **showinterface** command. However, variables seen with the **showinterface** command that could affect routing, such as load and reliability, or non-cumulative variables, such as input or output rates, are not cleared.

The *interface-number* argument designates the module and port number. Valid values for *interface-number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

Table 4: clear counters Interface Type Keywords

Keyword	Interface Type
async	Asynchronous interface
bri	ISDN BRI
dialer	Dialer interface
ethernet	Ethernet interface
fast-ethernet	Fast Ethernet interface
fddi	FDDI
hssi	High-Speed Serial Interface (HSSI)
line	Terminal line

Keyword	Interface Type
loopback	Loopback interface
null	Null interface
port-channel	Port channel interface
pos	Packet OC-3 interface
serial	Synchronous serial interface
switch	Switch interface
tokenring	Token Ring interface
tunnel	Tunnel interface (IEEE 02.5)
vg-anylan	100VG-AnyLAN port adapter
virtual-access	Virtual-access interface (Refer to the *Cisco IOS Dial Technologies Command Reference* for details on virtual templates.)
virtual-template	Virtual-template interface (Refer to the *Cisco IOS Dial Technologies Command Reference* for details on virtual templates.)
virtual-tokenring	Virtual Token Ring interface

Examples

The following example shows how to clear all interface counters:

```
Router#
 clear counters
```

The following example shows how to clear the Packet OC-3 interface counters on a POSIP card in slot 1 on a Cisco 7500 series router:

```
Router#
 clear counters pos 1/0
```

The following example shows how to clear the interface counters on a Fast EtherChannel interface:

```
Router# clear counter port-channel 1
Clear "show interface" counters on all interfaces [confirm] Y
%CLEAR-5-COUNTERS: Clear counter on all interfaces by console 1
```

Related Commands

Command	Description
show interfaces	Displays the statistical information specific to a serial interface.
show interfaces port-channel	Displays the information about the Fast EtherChannel on Cisco 7500 series routers and Cisco 7000 series routers with the RSP7000 and RSP7000CI.
show queueing interface	Displays queuing information.

clear debug platform condition all

To remove the debug conditions applied to a platform, use the **clear debug platform condition all** command in privileged EXEC mode.

clear debug platform condition all

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE Release 3.10.0S	This command was introduced on the Cisco ASR 1000 Series Aggregation Services Routers.

The following example shows how to remove the conditional debugging applied to the platform.

```
Router# clear debug platform condition all
```

clear diagnostic event-log

To clear the diagnostic event logs for a specific module or event type, use the **cleardiagnosticevent-log**command in Priveleged exec mode.

clear diagnostic event-log {**event-type** {**error** | **info** | **warning**} | **module** {**num** | *slot subslot* | **all**}}

Syntax Description

event-type error	Specifies clearing error events.
event-type info	Specifies clearing informative events.
event-type warning	Specifies clearing warning events.
module *num* | *slotsubslot*	Specifies clearing events for a specific module.
module all	Specifies clearing all linecards.

Command Default

This command has no default settings.

Command Modes

Priveleged Exec mode(#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced on the Supervisor Engine 720.

Usage Guidelines

The **cleardiagnosticevent-log** command clears all the events for all the modules.

The **cleardiagnosticevent-logmodule***num* command clears events only for a specific module.

The **cleardiagnosticevent-logevent-type**command clears only specific event types such as error, informative, or warning events.

Examples

This example shows how to clear error event logs:

```
Router# clear diagnostic event-log event-type error
```

This example shows how to clear event logs on module 3:

```
Router# clear diagnostic event-log module 3
```

This example shows how to clear error event logs on all the modules:

```
Router# clear diagnostic event-log module all
```

Related Commands

Command	Description
show diagnostic events	Displays the diagnostic event log

clear dsip tracing

To clear Distributed System Interconnect Protocol (DSIP) tracing statistics (trace logging), use the **cleardsiptracing** command in privileged EXEC mode.

clear dsip tracing {**counters** | **tracing**} [**control** | **data** | **ipc**]

Syntax Description

counters	DSIP counters.
tracing	DSIP tracing buffers.
control	(Optional) Control counters or tracing buffers.
data	(Optional) Data counters or tracing buffers.
ipc	(Optional) Inter-process communication counters or tracing buffers.

Command Default

If no option is specified, all control, data, and inter-process communication counters or tracing buffers are cleared.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(2)AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command to clear the counters displayed with the **showdsiptracing** EXEC command.

Examples

In the following example, the DSIP counters are cleared (including data, control, and ipc counters):

```
Router# clear dsip tracing
```

Related Commands

Command	Description
show dsip tracing	Displays DSIP tracing buffer information.
show dsip version	Displays DSIP version information.

clear facility-alarm

To clear alarm conditions and reset the alarm contacts, use the **clearfacility-alarm**command in privileged EXEC mode.

clear facility-alarm [**critical** | **major** | **minor** | **source pem** {**0** | **1**}]

Syntax Description

critical	(Optional) Clears all critical alarms.
major	(Optional) Clears all major alarms.
minor	(Optional) Clears all minor alarms.
source pem {**0** | **1**}	(Optional--Cisco uBR10012 only) Clears all alarms for either the first or second Power Entry Module (PEM).

Command Default

If specified without any options, clears all facility alarms with the exception of:

- An alarm that illuminates the CRIT, MIN, or MAJ LED
- A visual alarm (DC lightbulb) that is wired to the DB-25 connector on a power supply

If specified without any options, clears all facility alarms.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(17)SL	This command was introduced on the Cisco 10000 series router.
12.2(1)XF1	This command was introduced for the Cisco uBR10012 router.
12.2(16)BX	This command was introduced on the PRE2.
12.2(31)SB2	This command was introduced on the PRE3 for the Cisco 10000 series router.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1 on the Cisco ASR 1000 Series Routers.

Usage Guidelines

Cisco ASR 1000 Series Routers

The clear facility-alarm command clears audible alarms. A recurrence of the original alarm source after the original alarm condition is removed restarts the audible alarm.

The clear facility-alarm command does not clear an alarm that illuminates the CRIT, MIN, or MAJ LED. This command does not turn off a visual alarm (DC light bulb) that is wired to the DB-25 connector on a power supply.

To clear a CRIT, MIN, or MAJ alarm LED or a visual alarm, you must resolve the alarm condition. For example, if a critical alarm LED is illuminated because an active SPA was removed without a graceful deactivation of the SPA, the only way to resolve that alarm is to replace the SPA.

Cisco uBR10012 Universal Broadband Router

The **clearfacility-alarm** command clears the contacts to an external alarm panel. Only a recurrence of the original alarm source after the original alarm condition is removed can restart the audible alarm. These alarms are displayed by the **showfacility-alarmstatus**command.

The alarm LEDs remain lit on the Performance Routing Engine (PRE) as long as the alarm condition continues and is not cleared by the **clearfacility-alarm** command. An alarm can only be removed from the list by correcting the issue that is triggering the alarm.

Examples

The following example shows how to clear all facility alarms on the router:

```
Router# clear facility-alarm
Clearing all alarms
```

The following example shows how to clear all critical facility alarms on the router:

```
Router# clear facility-alarm critical

Clearing critical alarms
```

The following example shows how to clear minor facility alarms only:

```
Router# clear facility-alarm minor
Clearing minor alarms
```

Cisco uBR10012 Universal Broadband Router

The following example shows how to clear all alarms for both PEM modules on a Cisco uBR10012 universal broadband router:

```
Router# clear facility-alarm source pem 0
Router# clear facility-alarm source pem 1
```

Related Commands

Command	Description
facility-alarm	Sets the temperature thresholds at which the processor generates a critical, major, or minor alarm to warn of potential equipment damage.
facility-alarm critical exceed-action shutdown	Allows automatic router shutdown.
show facility-alarm	Displays the status of a generated alarm.

clear hub

To reset and reinitialize the hub hardware connected to an interface of a Cisco 2505 or Cisco 2507 router, use the **clearhub**command in user EXEC or privileged EXEC mode.

clear hub commandclear hub ethernet *number*

Syntax Description

ethernet	Hub in front of an Ethernet interface.
number	Hub number to clear, starting with 0. Because there is only one hub, this number is 0.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example clears hub 0:

```
Router#
 clear hub ethernet 0
```

Related Commands

Command	Description
hub	Enables and configures a port on an Ethernet hub of a Cisco 2505 or Cisco 2507 router.

clear hub counters

To set the hub counters on an interface of a Cisco 2505 or Cisco 2507 router to zero, use the **clearhubcounters** command in user EXEC or privileged EXEC mode.

clear hub counters commandclear hub counters [**ether** *number* [*port* [*end-port*]]]

Syntax Description

ether	(Optional) Hub in front of an Ethernet interface.
number	(Optional) Hub number for which to clear counters. Because there is currently only one hub, this number is 0. If you specify the keyword **ether**, you must specify the *number*.
port	(Optional) Port number on the hub. On the Cisco 2505 router, port numbers range from 1 to 8. On the Cisco 2507 router, port numbers range from 1 to 16. If a second port number follows, this port number indicates the end of a port range. If you do not specify a port number, counters for all ports are cleared.
end-port	(Optional) Ending port number of a range.

Command Default

If no port numbers are specified, counters for all ports are cleared.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example shows how to clear the counters displayed by a **showhub** command for all ports on hub 0:

```
Router#
 clear hub counters ether 0
```

Related Commands

Command	Description
show hub	Displays information about the hub (repeater) on an Ethernet interface of a Cisco 2505 or Cisco 2507 router.

clear interface

To reset the hardware logic on an interface, use the **clearinterface** command in user EXEC or privileged EXEC mode.

clear interface commandclear interface {*type number* [*name-tag*] | **range** *type number*}

Cisco 7200 Series and Cisco 7500 Series with a Packet OC-3 Interface Processor
clear interface {*type slot*/*port* | **range** *type number*}

Cisco 7500 Series with Ports on VIP Cards
clear interface *type slo* **t**/*port-adapter*/*port*

Cisco 7500 Series
clear interface *type slot*/*port* [**:** *channel-group*]

Cisco 7500 Series with a CT3IP Port Adapter
clear interface *type slot*/*port-adapter*/*port* [**:** *t1-channel*]

Syntax Description

type	Interface type; it is one of the keywords listed in Table 1 .
number	Port, connector, or interface card number.
name-tag	(Optional for use with the Redundant Link Manager [RLM] feature) Logic name to identify the server configuration so that multiple server configurations can be entered.
range	Clears all the interfaces within the specified range.
slot	Number of the slot being configured. Refer to the appropriate hardware manual for slot and port information.
/ *port*	Number of the port being configured. Refer to the appropriate hardware manual for slot and port information.
port-adapter	Number of the port adapter being configured. Refer to the appropriate hardware manual for information about port adapter compatibility.
: *channel-group*	(Optional) Channel number, on Cisco 7500 series routers that support channelized T1. The range is from 0 to 23. This number is preceded by a colon.
: *t1-channel*	(Optional) For the CT3IP port adapter, the T1 channel is a number between 1 and 28. T1 channels on the CT3IP are numbered 1 to 28 rather than the more traditional zero-based scheme (0 to 27) used with other Cisco products. This numbering scheme ensures consistency with telco numbering schemes for T1 channels within channelized T3 equipment.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
11.3	This command was modified. The following changes were made: • The **vg-anylan** keyword was added • The **posi** keyword was changed to **pos**
12.0(3)T	This command was modified. The following optional argument was added for the RLM feature: • *name-tag*
15.0(1)M	This command was modified in a release earlier than Cisco IOS Release 15.0(1)M. The **range** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was implemented on the Cisco ASR 1000 Series Aggregation Services Routers.

Usage Guidelines

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

This command clears all the current interface hardware logic unless the type and number arguments are specified to clear only a specific interface type (serial, Ethernet, Token Ring, and so on). The table below lists the command keywords and their descriptions.

Table 5: clear interface Type Keywords

Keyword	Interface Type
acr	Virtual Automatic Call Reconnect (ACR) interface
analysis-module	Cisco network analysis service module
async	Async interface
atm	ATM interface
auto-template	Auto-Template interface
bdi	Bridge-Domain interface
bri	ISDN BRI
bvi	Bridge-Group Virtual interface
cdma-ix	CDMA Ix interface

Keyword	Interface Type
container	Container interface
ctunnel	CTunnel interface
dialer	Dialer interface
esconphy	ESCON interface
ethernet	Ethernet interface
fcpa	Fiber Channel
fddi	FDDI
filter	Filter interface
filtergroup	Filter Group interface
gigabitethernet	Gigabit Ethernet IEEE 802.3z
gmpls	MPLS interface
hssi	High-Speed Serial Interface (HSSI)
lex	Lex interface
longreachethernet	Long-Reach Ethernet interface
loopback	Loopback interface
lspvif	LSP virtual interface
mfr	Multilink Frame Relay bundle interface
multilink	Multilink-group interface
multiservice	Multiservice interface
null	Null interface
port-channel	Ethernet Channel of interfaces
portgroup	Portgroup interface
pos	Packet over SONET.
pos-channel	POS Channel of interfaces
sbc	Session Border Controller
serial	Synchronous serial interface
service-engine	Cisco service engine module
sslvpn-vif	SSLVPN Virtual Interface

Keyword	Interface Type
switch	Switch interface
sysclock	Telecom-Bus Clock Controller
tokenring	Token Ring interface
tunnel	Tunnel interface
vasileft	VasiLeft interface
vasiright	VasiRight interface
vg-anylan	100VG-AnyLAN port adapter
vif	PGM Multicast Host interface
virtual-dot11radio	Virtual dot11 interface
virtual-ppp	Virtual PPP interface
virtual-tokenring	Virtual Token Ring interface
vlan	Catalyst VLAN
vmi	Virtual Multipoint interface
voabypassin	VOA-Bypass-In interface
voabypassout	VOA-Bypass-Out interface
voafilterin	VOA-Filter-In interface
voafilterout	VOA-Filter-Out interface
voain	VOA-In interface
voaout	VOA-Out interface

Examples

The following example shows how to reset the interface logic on HSSI interface 1:

```
Router#
 clear interface hssi 1
```

The following example shows how to reset the interface logic on Packet OC-3 interface 0 on the POSIP in slot 1:

```
Router#
 clear interface pos 1/0
```

The following example shows how to reset the interface logic on T1 0 on the CT3IP port adapter in slot 9:

```
Router#
 clear interface serial 9/0/0:0
```

The following example shows how to reset the interface logic on Fast EtherChannel interface 1:

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

The following example shows how to reset demonstrates the use of the **clearinterface** command with the RLM feature:

```
Router# clear interface loopback 1
Router#
02:48:52: rlm 1: [State_Up, rx ACTIVE_LINK_BROKEN] over link [10.1.1.1(Loopback1), 10.1.4.1]
02:48:52: rlm 1: link [10.1.1.2(Loopback2), 10.1.4.2] requests activation
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] is deactivated
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] = socket[10.1.1.1, 10.1.4.1]
02:48:52: rlm 1: [State_Recover, rx USER_SOCKET_OPENED] over link [10.1.1.1(Loopback1),
10.1.4.1] for user RLM_MGR
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] is opened
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.5.1] = socket[10.1.1.1, 10.1.5.1]
02:48:52: rlm 1: [State_Recover, rx USER_SOCKET_OPENED] over link [10.1.1.1(Loopback1),
10.1.5.1] for user RLM_MGR
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.5.1] is opened
02:48:52: rlm 1: [State_Recover, rx START_ACK] over link [10.1.1.2(Loopback2), 10.1.4.2]
02:48:52: rlm 1: link [10.1.1.2(Loopback2), 10.1.4.2] is activated
02:48:52: rlm 1: [State_Up, rx LINK_OPENED] over link [10.1.1.1(Loopback1), 10.1.4.1]
Router# show rlm group 1 status
RLM Group 1 Status
 User/Port: RLM_MGR/3000
 Link State: Up          Last Link Status Reported: Up_Recovered
 Next tx TID: 4          Last rx TID: 0
 Server Link Group[r1-server]:
  link [10.1.1.1(Loopback1), 10.1.4.1] = socket[standby, 10.1.1.1, 10.1.4.1]
  link [10.1.1.2(Loopback2), 10.1.4.2] = socket[active, 10.1.1.2, 10.1.4.2]
 Server Link Group[r2-server]:
  link [10.1.1.1(Loopback1), 10.1.5.1] = socket[opening, 10.1.1.1, 10.1.5.1]
  link [10.1.1.2(Loopback2), 10.1.5.2] = socket[opening, 10.1.1.2, 10.1.5.2]
Router#
02:49:52: rlm 1: [State_Up, rx UP_RECOVERED_MIN_TIMEOUT]
02:49:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] requests activation
02:49:52: rlm 1: [State_Switch, rx SWITCH_ACK] over link [10.1.1.1(Loopback1), 10.1.4.1]
02:49:52: rlm 1: link [10.1.1.2(Loopback2), 10.1.4.2] is deactivated
02:49:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] is activated
```

Related Commands

Command	Description
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
show rlm group	Displays the status of the RLM group.
shutdown (RLM)	Shuts down all of the links under the RLM group.

clear interface cem

T o clear the cem channel, use the **clearinterfacecem**commandin privilege exec mode.

clear interface cem *slot*/*subslot*/*port*

Syntax Description

slot	Slot number where the SIP is installed.
subslot	Subslot number of the SIP where CEOPS SPA has been installed and circuit emulation has been configured.
port	Port number of the interface on the CEOPS SPA where circuit emulation has been configured.

Command Default

No default behavior or values.

Command Modes

Privilege Exec Mode (Exec)

Command History

Release	Modification
Cisco IOS XE Release 3.3.0S	This command was introduced.

Usage Guidelines

The **clearinterfacecem**command has been introduced on Cisco ASR 1000 Series Router in Cisco IOS XE Release 3.3.0S. The **clearinterfacecem** command is used to clear the statistics information of the cem group.

Examples

The following example shows how to clear the cem channel using the clear interface cem command:

```
Router# clear interface cem
```

Related Commands

Command	Description
show interfaces cem	Displays the statistics of the cem group.

clear interface fastethernet

To reset the controller for a specified Fast Ethernet interface, use the **clearinterfacefastethernet** command in privileged EXEC mode.

Cisco 4500 and Cisco 4700 Series
clear interface fastethernet *interface-number*

Cisco 7200 and Cisco 7500 Series
clear interface fastethernet *slot/port*

Cisco 7500 Series with a VIP
clear interface fastethernet *slot/port-adapter/port*

Syntax Description

interface-number	Port, connector, or interface card number. On a Cisco 4500 or Cisco 4700 Series router, specifies the number of the network processor module (NPM). The numbers are assigned at the factory at the time of installation or when added to a system.
slot	Slot number. Refer to the appropriate hardware manual for slot and port information.
/ *port*	Port number. Refer to the appropriate hardware manual for slot and port information.
/ *port-adapter*	Port adapter number. Refer to the appropriate hardware manual for information about port adapter compatibility.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

Cisco 4500 Series

The following example resets the controller for Fast Ethernet interface 0 on a Cisco 4500:

```
Router#
 clear interface fastethernet 0
```

Cisco 7200 and Cisco 7500 Series

The following example resets the controller for the Fast Ethernet interface located in slot 1, port 0 on a Cisco 7200 series router or Cisco 7500 series router:

```
Router#
 clear interface fastethernet 1/0
```

Cisco 7500 SerieswithaVIP

The following example resets the controller for the Fast Ethernet interface located in slot 1, port adapter 0, port 0 on a Cisco 7500 series router with a virtual interface processor (VIP):

```
Router#
 clear interface fastethernet 1/0/0
```

Related Commands

Command	Description
clear counters	Clears the interface counters.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show interfaces serial	Displays information about a serial interface.

clear interface gigabitethernet

To clear the hardware logic on a Gigabit Ethernet IEEE 802.3z interface, use the **clearinterfacegigabitethernet** command in privileged EXEC mode.

clear interface gigabitethernet *number*

Syntax Description

number	Gigabit Ethernet interface number; see the "Usage Guidelines" section for valid values.

Command Default

This command has no default settings.

Command Modes

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

Usage Guidelines

The *number* argument designates the module and port number. Valid values for *number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

Examples

This example shows how to clear the hardware logic on a Gigabit Ethernet IEEE 802.3z interface:

```
Router#
clear interface gigabitethernet 5
Router#
```

Related Commands

Command	Description
show interfaces status	Displays the interface status or a list of interfaces in an error-disabled state on LAN ports only.

clear interface serial

To reset the statistical information specific to a serial interface, use the **clearinterfaceserial**command in user EXEC or privileged EXEC mode.

clear interface serial *dial-shelf/slot/t3-port* **:** *t1-num* **:** *chan-group*

Syntax Description

dial-shelf	Dial shelf chassis in the Cisco AS5800 access server that contains the CT3 interface card.
/ *slot*	Location of the CT3 interface card in the dial shelf chassis.
/ *t3-port*	T3 port number. The only valid value is 0.
: *t1-num*	T1 time slot in the T3 line. The value can be from 1 to 28.
: *chan-group*	Channel group identifier.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **clearinterfaceserial**command clears the interface hardware. To reset the counters for an interface, use the **clearcounters**command with the **serial** keyword specified. To confirm at the prompt, use the **showinterfacesserial**command.

Examples

The following example clears the interface hardware, disconnecting any active lines:

```
Router# clear interface serial 1/4/0:2:23
```

Related Commands

Command	Description
clear counters	Clears the interface counters.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show interfaces fastethernet	Displays information about a fastethernet interface.

clear interface vlan

To clear the hardware logic on a virtual local area network (VLAN), use the **clearinterfacevlan** command in privileged EXEC mode.

clear interface vlan *vlan-id*

Syntax Description

vlan-id	VLAN ID; valid values are from 1 to 4094.

Command Default

This command has no default settings.

Command Modes

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 theSupervisor 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.

Examples

This example shows how to clear the hardware logic on a specific VLAN:

```
Router#
clear interface vlan 5
Router#
```

Related Commands

Command	Description
show interfaces status	Displays the interface status or a list of interfaces in an error-disabled state on LAN ports only.

clear ipc statistics

To clear all interprocess communication (IPC) statistics, use the **clearipcstatistics** command in privileged EXEC mode.

clear ipc statistics

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(15)T	This command was introduced.

Usage Guidelines

The **clearipcstatistics**command clears all the IPC statistics and is useful for troubleshooting issues with IPC services.

Examples

The following example shows how to clear all of the statistics used by IPC services. A **showipcstatus** command is issued first to display the current IPC counters for a local IPC server. The **clearipcstatistics** command is then entered to clear and reset the counters. A final **showipcstatus** command is issued to show that all the counters, except those counters that show the packets sent since the clearing, are reset to zero.

```
Router# show ipc status
IPC System Status
Time last IPC stat cleared : never
This processor is the IPC master server.
Do not drop output of IPC frames for test purposes.
1000 IPC Message Headers Cached.
                                                    Rx Side      Tx Side
Total Frames                                            189          140
Total from Local Ports                                  189           70
Total Protocol Control Frames                            70           44
Total Frames Dropped                                      0            0
                          Service Usage
Total via Unreliable Connection-Less Service            145            0
Total via Unreliable Sequenced Connection-Less Svc        0            0
Total via Reliable Connection-Oriented Service           44           70
                    IPC Protocol Version 0
Total Acknowledgements                                   70           44
Total Negative Acknowledgements                           0            0
                          Device Drivers
Total via Local Driver                                    0            0
Total via Platform Driver                                 0           70
Total Frames Dropped by Platform Drivers                  0            0
                   Reliable Tx Statistics
Re-Transmission                                                        0
Re-Tx Timeout                                                          0
         Rx Errors                              Tx Errors
Unsupp IPC Proto Version          0  Tx Session Error                  0
Corrupt Frame                     0  Tx Seat Error                     0
Duplicate Frame                   0  Destination Unreachable           0
Out-of-Sequence Frame             0  Tx Test Drop                      0
```

```
Dest Port does Not Exist          0  Tx Driver Failed                  0
Rx IPC Msg Alloc Failed           0  Ctrl Frm Alloc Failed             0
Unable to Deliver Msg             0
         Buffer Errors                          Misc Errors
IPC Msg Alloc                     0  IPC Open Port                     0
Emer IPC Msg Alloc                0  No HWQ                            0
IPC Frame PakType Alloc           0  Hardware Error                    0
IPC Frame MemD Alloc              0
         Tx Driver Errors
No Transport                      0
MTU Failure                       0
Dest does not Exist               0
Router# clear ipc statistics
Router# show ipc status
IPC System Status
Time last IPC stat cleared : 00:00:03
This processor is the IPC master server.
Do not drop output of IPC frames for test purposes.
1000 IPC Message Headers Cached.
                                                        Rx Side     Tx Side
Total Frames                                                 26           0
Total from Local Ports                                       26           0
Total Protocol Control Frames                                 0           0
Total Frames Dropped                                          0           0
Service Usage
Total via Unreliable Connection-Less Service                 26           0
Total via Unreliable Sequenced Connection-Less Svc            0           0
Total via Reliable Connection-Oriented Service                0           0
IPC Protocol Version 0
Total Acknowledgements                                        0           0
Total Negative Acknowledgements                               0           0
                          Device Drivers
Total via Local Driver                                        0           0
Total via Platform Driver                                     0           0
Total Frames Dropped by Platform Drivers                      0           0
                    Reliable Tx Statistics
Re-Transmission                                                           0
Re-Tx Timeout                                                             0
         Rx Errors                              Tx Errors
Unsupp IPC Proto Version          0  Tx Session Error                  0
Corrupt Frame                     0  Tx Seat Error                     0
Duplicate Frame                   0  Destination Unreachable           0
Out-of-Sequence Frame             0  Tx Test Drop                      0
Dest Port does Not Exist          0  Tx Driver Failed                  0
Rx IPC Msg Alloc Failed           0  Ctrl Frm Alloc Failed             0
Unable to Deliver Msg             0
         Buffer Errors                          Misc Errors
IPC Msg Alloc                     0  IPC Open Port                     0
Emer IPC Msg Alloc                0  No HWQ                            0
IPC Frame PakType Alloc           0  Hardware Error                    0
IPC Frame MemD Alloc              0
         Tx Driver Errors
No Transport                      0
MTU Failure                       0
Dest does not Exist               0
```

Related Commands

Command	Description
show ipc	Displays IPC statistics.

clear lacp counters

To clear the statistics for all interfaces belonging to a specific channel group, use the **clearlacpcounters** command in privileged EXEC mode.

clear lacp [*channel-group*] **counters**

Syntax Description

channel-group	(Optional) Channel group number; valid values are from 1 to 256.

Command Default

None

Command Modes

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

Usage Guidelines

If you do not specify a *channel-group*, all channel groups are cleared.

If you enter this command for a channel group that contains members in PAgP mode, the command is ignored.

Examples

This example shows how to clear the statistics for a specific group:

```
Router# clear lacp 1 counters
Router#
```

Related Commands

Command	Description
show lacp	Displays LACP information.

clear platform netint

To clear the interrupt-throttling counters for the platform, use the **clear platform netint** command in privileged EXEC mode.

clear platform netint

Syntax Description

This command has no arguments or keywords.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17b)SXA	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.

Examples

This example shows how to clear the interrupt-throttling counters for the platform:

```
Router#
clear platform netint
Router#
```

Related Commands

Command	Description
show platform netint	Displays the platform network-interrupt information.

clear platform software vnic-if-nvtable

To clear the virtual router's persistent interface database on the original VM and update the interface mapping to the hypervisor, use the **clear platform software vnic-if-nvtable** command in EXEC mode.

clear platform software vnic-if-nvtable

Command Default

No default.

Command Modes

EXEC

Command History

Release	Modification
Cisco IOS XE 3.9S	This command was introduced on the Cisco CSR 1000V.

Usage Guidelines

When the Cisco CSR 1000V boots for the first time, the vNICs on the hypervisor are mapped to the Gigabit Ethernet network interfaces on the router. The system maintains a database for mapping the interfaces, and the mapping stays persistent as long as vNICs are not removed from the system.

The **clear platform software vnic-if-nvtable** command is used when you clone the Cisco CSR 1000V configuration to a new VM. You enter the command on the cloned VM instance of the Cisco CSR 1000V so that the Gigabit Ethernet router interfaces on the cloned VM map to new vNICs. If the interface mapping from the original VM is not cleared on the cloned VM, then the Cisco CSR 1000V feature license may be invalidated.

Use the **show platform software vnic-if interface-mapping** command to verify the updated interface mapping.

Example

The following example clears the Cisco CSR 1000V interface mapping to the vNICs on the hypervisor:

```
se-10-0-0-0(config)# clear platform software vnic-if-nvtable
```

Related Commands

Command	Description
show platform software vnic-if interface-mapping	Displays the mapping between the virtual Network Interface Cards (vNICs) on the VM and the network interfaces on a virtual router.

Note Starting with the IOS XE 17.1 release, you no longer need to execute the `clear platform software vnic-int interface` command before you remove the vNIC configuration from the hypervisor. This command will be deprecated in a future release.

clear rbscp

To reset and restart a Rate Based Satellite Control Protocol (RBSCP) tunnel, use the **clearrbscp** command in privileged EXEC mode.

clear rbscp [**tunnel** *tunnel-number*]

Syntax Description

tunnel	(Optional) Resets and restarts the RBSCP tunnel interface specified in the *tunnel-number* argument. If a tunnel interface is not specified, all RBSCP tunnels are reset and restarted. • *tunnel-number* --Number of the tunnel interface in the range from 0 to 2147483647.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.

Usage Guidelines

The **clearrbscp** command resets the tunnel interface to its initial state and this clears RBSCP statistical information. Use this command for troubleshooting issues with RBSCP tunnels.

Examples

The following example shows how to clear the RBSCP statistics. A **showrbscpstatistics** command is issued first to display the current RBSCP counters for tunnel interface 0. The **clearrbscp** command is then entered to reset and restart tunnel interface 0. All the counters for tunnel interface 0 are reset to zero. A final **showrbscpstatistics** command is issued to show that all the counters, except those counters that show the packets sent since the clearing, are reset to zero.

```
Router# show rbscp statistics tunnel 0
Tunnel0 is up, line protocol is up
RBSCP protocol statistics:
  Init FWD-TSNs sent 15, received 11
  TUNNEL-UPs sent 10, received 5
  CLOSEDs sent 3, received 2
  TSNs sent 40, resent 2, lost by sender 1
  TSNs received 36 (duplicates 2)
  FWD-TSNs sent 144 (heartbeats 2)
  FWD-TSNs received 120 (ignored 1)
  FWD-TSNs caused 3 packet drops, 0 whole window drops
  SACKs sent 10, received 6 (ignored 1)
  Recovered with RTX 1
  Received with delay 2
  Most released at once 5
  Failed sends into the: tunnel 1, network 0
  Dropped due to: excess delay 0, tmit queue full 0
  Max on any queue: num packets: 12, num bytes: 0
  Max outstanding: 0
Router# clear rbscp tunnel 0
Tunnel0: cleared statistics
Router# show rbscp statistics tunnel 0
Tunnel0 is up, line protocol is up
RBSCP protocol statistics:
  Init FWD-TSNs sent 0, received 0
```

```
TUNNEL-UPs sent 0, received 0
CLOSEDs sent 0, received 0
TSNs sent 0, resent 0, lost by sender 0
TSNs received 0 (duplicates 0)
FWD-TSNs sent 26 (heartbeats 0)
FWD-TSNs received 0 (ignored 0)
FWD-TSNs caused 0 packet drops, 0 whole window drops
SACKs sent 0, received 0 (ignored 0)
Recovered with RTX 0
Received with delay 0
Most released at once 0
Failed sends into the: tunnel 0, network 0
Dropped due to: excess delay 0, tmit queue full 0
Max on any queue: num packets: 0, num bytes: 0
Max outstanding: 0
```

Related Commands

Command	Description
show rbscp	Displays RBSCP state and statistical information.

clear service-module serial

To reset an integrated CSU/DSU, use the **clearservice-moduleserial**command in privileged EXEC mode.

clear service-module serial *number*

Syntax Description

number	Number of the serial interface.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command only in severe circumstances (for example, when the router is not responding to a CSU/DSU configuration command).

This command terminates all DTE and line loopbacks that are locally or remotely configured. It also interrupts data transmission through the router for up to 15 seconds. The software performs an automatic software reset in case of two consecutive configuration failures.

The CSU/DSU module is not reset with the **clearinterface** command.



Caution If you experience technical difficulties with your router and intend to contact customer support, refrain from using this command. This command erases the router's past CSU/DSU performance statistics. To clear only the CSU/DSU performance statistics, issue the **clearcounters**command.

Examples

The following example show how to reset the CSU/DSU on a router:

```
Router# clear service-module serial 0
```

Related Commands

Command	Description
clear counters	Clears the interface counters.
test service-module	Performs self-tests on an integrated CSU/DSU serial interface module, such as a 4-wire, 56/64-kbps CSU/DSU.

clear top counters interface report

To clear the TopN reports, use the **cleartopcountersinterfacereport** command in privileged EXEC mode.

clear top counters interface report *number*

Syntax Description

number	(Optional) Number of ports to be displayed; valid values are from 1 to 5000 physical ports.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(18)SXE	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.

Usage Guidelines

This command is supported on Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet ports only. LAN ports on the OSMs are also supported.

The **cleartopinterfacereport** command clears all the completed reports. It does not clear the pending TopN reports. When you specify a report number, the TopN task is cleared regardless of its status.

Examples

This example shows how to clear all TopN tasks:

```
Router# clear top counters interface report 1000

04:00:06: %TOPN_COUNTERS-5-DELETED: TopN report 1 deleted by the console
04:00:06: %TOPN_COUNTERS-5-DELETED: TopN report 2 deleted by the console
04:00:06: %TOPN_COUNTERS-5-DELETED: TopN report 3 deleted by the console
04:00:06: %TOPN_COUNTERS-5-DELETED: TopN report 4 deleted by the console1/24/
Router#
```

This example shows the output if you attempt to clear a pending TopN task:

```
Router# clear top counters interface report 4

04:52:12: %TOPN_COUNTERS-5-KILLED: TopN report 4 killed by the sattili onvty0 (9.10.69.9)
Router#
```

Related Commands

Command	Description
collect top counters interface	Lists the TopN processes and specific TopN reports.
show top counters interface report	Displays TopN reports and information.

clock

To configure the port clocking mode for the 1000BASE-T transceivers, use the **clock** command in interface configuration mode. To return to the default settings,use the **no** form of this command.

clock {**auto** | **active** [**prefer**] | **passive** [**prefer**]}
no clock

Syntax Description

auto	Enables the automatic-clock configuration.
active	Enables the active operation.
prefer	(Optional) Negotiates the specified mode with the far end of the link.
passive	Enables the passive operation.

Command Default

auto

Command Modes

Interface configuration

Command History

Release	Modification
12.2(17a)SX	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.

Usage Guidelines

This command is supported on the 1000BASE-T transceivers only.

If the clock mode of the near end of a link does not match the clock mode of the far end, the line protocol does not come up.

The active and passive clock status is determined during the auto negotiation process before the transmission link is established.

The **clock** command supports the following configurations:

- **auto** --Auto negotiates with the far end of the link but preference is given to the active-clock switch.
- **active** --Uses a local clock to determine transmitter-operation timing.
- **passive** --Recovers the clock from the received signal and uses the recovered clock to determine transmitter-operation timing.
- **active prefer** --Auto negotiates with the far end of the link but preference is given to the active-clock switch.
- **passive prefer** --Auto negotiates with the far end of the link but preference is given to the passive-clock switch.

Enter the **show running-config interface** command to display the current clock mode.

Enter the **show interfaces** command to display the clock mode that is negotiated by the firmware.

Examples

This example shows how to enable the active-clock operation:

```
Router(config-if)# clock active
Router(config-if)#
```

Related Commands

Command	Description
show interfaces	Displays traffic that is seen by a specific interface.
show running-config interface	Displays the status and configuration of the module or Layer 2 VLAN.

clock destination

To specify the IP address of a Precision Time Protocol clock destination, use the **clockdestination** command in interface configuration mode. To remove a clock destination configuration, use the **no** form of this command.

clock destination *clock-ip-address*
no clock destination *clock-ip-address*

Syntax Description

clock-ip-address	IP address of the clock destination.

Command Default

No default behavior or values.

Command Modes

Clock port configuration (config-ptp-port)

Command History

Release	Modification
15.0(1)S	This command was introduced.

Usage Guidelines

If the clock port is set to primary mode with unicast and negotiation is disabled, you can only configure a single destination. If the clock port is set to primary mode with unicast negotiation, you do not need to use this command because the device uses negotiation to determine the IP address of PTP subordinate devices.

Examples

The following example shows how to configure a PTP clock destination:

```
Device> enable
Device# configure terminal
Device(config)# ptp clock ordinary domain 0
Device(config-ptp-clk)# clock-port masterPort master
Device(config-ptp-port)# clock destination 192.168.1.2
Device(config-ptp-port)# end
```

Related Commands

Command	Description
clock source	Specifies a PTP clock source.

clock mode

To configure the clock mode of a serial circuit emulation (CEM) channel, use the **clockmode** command in CEM configuration mode. To reset the clock mode to its default, use the **no** form of this command.

clock mode {**normal** | **split**}
no clock mode

Syntax Description

normal	Specifies normal mode, in which the DCE, whether it is a CEM over IP (CEoIP) data port or the external data device, provides both the receive clock and the transmit clock to the DTE.
split	Specifies split mode, in which the DCE, whether it is a CEoIP data port or the external device, provides the receiver clock to the DTE and the DTE provides the transmit clock to the DCE.

Command Default

The serial CEM channel clock defaults to normal mode.

Command Modes

CEM configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.

Usage Guidelines

This command applies only to serial ports.

Examples

The following example shows how to configure the CEM clock for normal mode.

```
Router(config-cem)# clock mode normal
```

Related Commands

Command	Description
cem	Enters circuit emulation configuration mode.
clock rate	Configures the clock rate of a serial port.
clock source	Configures the clock source of a serial port.
show cem	Displays CEM statistics.