



Configuring Ethernet Interfaces

This chapter provides information about configuring the Gigabit Ethernet interface on the Cisco NCS 520 Series Router.

For more information about the commands used in this chapter, see the *Cisco IOS XE 3S Command References*.

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Configuring an Interface

This section lists the required configuration steps to configure Gigabit and Ten Gigabit Ethernet interfaces. Follow these steps to configure your interface:

Procedure

Step 1 Router# **configure terminal**

Enters global configuration mode.

Step 2 Do one of the following:

- Router(config)# **interface gigabitethernet slot/port**
- Router(config)# **interface tengigabitethernet slot/port**

Specifies the Gigabit Ethernet or Ten Gigabit Ethernet interface to configure and enters interface configuration mode, where:

- *slot/port*—The location of the interface. See [Specifying the Interface Address on an Interface, on page 2](#).

Note The slot number is always 0.

Step 3 **no negotiation auto**

Example:

```
Router(config-if)# no negotiation auto
```

(Optional) Disables automatic negotiation.

Note Use the **speed** command only when the mode is set to no negotiation auto.

Step 4 **speed { 10 | 100 | 1000 }**

Example:

```
Router(config-if)# speed 1000
```

(Optional) Specifies the speed for an interface to transmit at 10, 100, and 1000 Mbps (1 Gbps), where the default is 1000 Mbps.

Step 5 Router(config-if)# **carrier-delay down msec value**

(Optional) Sets the router to signal within the specified time delay, when an interface goes down, where:

- *down*—Time delay for signalling when the interface goes down.

Step 6 Router(config-if)# **carrier-delay up msec value**

(Optional) Sets the router to signal within the specified time delay, when an interface should be up again, where:

- *up*—Time delay before an interface should be up again.

You must wait for at least 2 msec before bring the interface up again, this is to protect against link flaps.

Step 7 Router(config-if)# **mtu bytes**

(As Required) Specifies the maximum packet size for an interface, where:

- *bytes*— The maximum number of bytes for a packet.

The default is 1500 bytes; the range is from 1500 to 9216.

Step 8 Router(config-if)# **no shutdown**

Enables the interface.

Specifying the Interface Address on an Interface

To configure or monitor Ethernet interfaces, you need to specify the physical location of the interface in the CLI. The interface address format is slot/port, where:

- *slot*—The chassis slot number in the router of the interface.



Note The interface slot number is always 0.

- **subslot**—The subslot of the interface. Interface subslots are always 0.
- **port**—The number of the individual interface port on an interface.

```
Router(config)# interface GigabitEthernet 0/0/0
no ip address
shutdown
negotiation auto
no cdp enable
```

Modifying the Interface MTU Size



Note The router supports only eight unique MTUs.

The Cisco IOS software supports three different types of configurable maximum transmission unit (MTU) options at different levels of the protocol stack:

- **Interface MTU**—The interface checks the MTU value of incoming traffic. Different interface types support different interface MTU sizes and defaults. The interface MTU defines the maximum packet size allowable (in bytes) for an interface before drops occur. If the frame is smaller than the interface MTU size, but is not smaller than the minimum frame size for the interface type (such as 64 bytes for Ethernet), then the frame continues to process.
- **IP MTU**—Can be specified on an interface. If an IP packet exceeds the IP MTU size, then the packet is fragmented.

Encapsulation methods and MPLS MTU labels add additional overhead to a packet. For example, Subnetwork Access Protocol (SNAP) encapsulation adds an 8-byte header, dot1q encapsulation adds a 4-byte header, and each MPLS label adds a 4-byte header (n labels \times 4 bytes).

For the Gigabit Ethernet interface on the router, the default MTU size is 1500 bytes. The maximum configurable MTU is 9216 bytes. The interface automatically adds an additional 22 bytes to the configured MTU size to accommodate some of the additional overhead.

Interface MTU Configuration Guidelines

When configuring the interface MTU size, consider the following guidelines:

- The default interface MTU size accommodates a 1500-byte packet, plus 22 additional bytes to cover the following additional overhead:
 - Layer 2 header—14 bytes
 - Dot1q header—4 bytes
 - CRC—4 bytes

Interface MTU Configuration Task

To modify the MTU size on an interface, use the following command in interface configuration mode:

Command	Purpose
Router(config-if)# mtu <i>bytes</i>	Configures the maximum packet size for an interface, where: <ul style="list-style-type: none"> <i>bytes</i>— Specifies the maximum number of bytes for a packet. The default is 1500 bytes and the maximum configurable MTU is 9216 bytes.

To return to the default MTU size, use the **no** form of the command.

Verifying the MTU Size

To verify the MTU size for an interface, use the **show interfaces gigabitEthernet** privileged EXEC command and observe the value that is shown in the “MTU” field.

The following example shows an MTU size of 1500 bytes for interface port 0 (the first port) on the Gigabit Ethernet interface in slot 0 of the router:

```
Router# show interface gigabitEthernet 0/0/0
GigabitEthernet0/0/0 is down, line protocol is down
Hardware is 8xGE-4x10GE-FIXED, address is 6073.5cff.8080 (bia 6073.5cff.8080)
MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
```

Configuring the Encapsulation Type

The encapsulation supported by the interfaces is IEEE 802.1Q and IEEE 802.1ad encapsulation for virtual LANs (VLANs).



Note VLANs are only supported on Ethernet Virtual Connection (EVC) service instances and Trunk Ethernet Flow Point (EFP) interfaces. For more information about how to configure these features, see the *Configuring Ethernet Virtual Connections* document.

Configuring Autonegotiation on an Interface

Gigabit Ethernet interfaces use a connection-setup algorithm called *autonegotiation*. Autonegotiation allows the local and remote devices to configure compatible settings for communication over the link. Using autonegotiation, each device advertises its transmission capabilities and then agrees upon the settings to be used for the link.

For the Gigabit Ethernet interfaces on the router, flow control is autonegotiated when autonegotiation is enabled. Autonegotiation is enabled by default.

When enabling autonegotiation, consider these guidelines:

- If autonegotiation is disabled on one end of a link, it must be disabled on the other end of the link. If one end of a link has autonegotiation disabled while the other end of the link does not, the link will not come up properly on both ends.
- Flow control is enabled by default.
- Flow control will be on if autonegotiation is disabled on both ends of the link.

Enabling Autonegotiation

To enable autonegotiation on a Gigabit Ethernet interface, use the following command in interface configuration mode:

Command	Purpose
Router (config-if) # negotiation auto	Enables autonegotiation on a Gigabit Ethernet interface. Advertisement of flow control occurs.

Disabling Autonegotiation

Autonegotiation is automatically enabled and can be disabled on Gigabit Ethernet interfaces. During autonegotiation, advertisement for flow control, speed, and duplex occurs, depending on the media (fiber or copper) in use.

Speed and duplex configurations can be advertised using autonegotiation. However, the only values that are negotiated are:

- For Gigabit Ethernet interfaces using RJ-45 copper interfaces—1000 Mbps for speed and full-duplex mode. Link speed is not negotiated when using fiber interfaces.

To disable autonegotiation, use the following command in interface configuration mode:

Command	Purpose
Router (config-if) # no negotiation auto	Disables autonegotiation on Gigabit Ethernet interfaces. No advertisement of flow control occurs.

Configuring Carrier Ethernet Features

For information about configuring an Ethernet interface as a layer 2 Ethernet virtual circuit (EVC) or Ethernet flow point (EFP), see [Carrier Ethernet Configuration Guide, Cisco IOS XE Release 3S](#).

Saving the Configuration

To save your running configuration to NVRAM, use the following command in privileged EXEC configuration mode:

Command	Purpose
Router# copy running-config startup-config	Writes the new configuration to NVRAM.

For information about managing your system image and configuration files, refer to the [Cisco IOS Configuration Fundamentals Configuration Guide](#) and [Cisco IOS Configuration Fundamentals Command Reference](#) publications that correspond to your Cisco IOS software release.

Shutting Down and Restarting an Interface

You can shut down and restart any of the interface ports on an interface independently of each other. Shutting down an interface stops traffic and enters the interface into an “administratively down” state.

There are no restrictions for online insertion and removal (OIR) of Gigabit Ethernet interfaces; you can remove them at any time.

Command	Purpose
Router(config-if)# shutdown	Restarts, stops, or starts an interface.

To shut down an interface, use the following command in interface configuration mode:

Command	Purpose
Router(config-if)# shutdown	Disables an interface.

To enable traffic on an interface, use the following command in interface configuration mode:

Command	Purpose
Router(config-if)# no shutdown	Restarts a disabled interface.

Verifying the Interface Configuration

Besides using the **show running-configuration** command to display your router configuration settings, you can use the **show interfaces gigabitethernet** command to get detailed information on a per-port basis for your Gigabit Ethernet interface.

Verifying Per-Port Interface Status

To find detailed interface information on a per-port basis for the Gigabit Ethernet interface, use the **show interfaces Gi0/0/0** command.

The following example provides sample output for interface port 0 on the interface located in slot 0 of the router:

```

Router# show interface Gi0/0/0
Gi0/0/0 is up, line protocol is up
Hardware is 8xGE-4x10GE-FIXED, address is 6073.5cff.8087 (bia 6073.5cff.8087)
MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full Duplex, 1000Mbps, link type is auto, media type is RJ45
output flow-control is off, input flow-control is on
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

```

Verifying Interface Status

You can use various **show** commands to view information specific to SFP, SFP+, CWDM, and DWDM optical transceiver modules.



Note The **show interface transceiver** command is *not* supported on the router.

To check or verify the status of an SFP Module or SFP+ Module, use the following **show** commands:

Command	Purpose
<pre> Router# show hw-module slot/subslot transceiver port idprom </pre>	<p>Displays information for the transceiver identification programmable read only memory (idprom).</p> <p>Note Transceiver types must match for a connection between two interfaces to become active.</p>

Command	Purpose
Router# show hw-module <i>slot/subslot</i> transceiver <i>port</i> idprom status	Displays information for the transceiver initialization status. Note The transmit and receive optical power that is displayed by this command is useful for troubleshooting Digital Optical Monitoring (DOM). For interfaces to become active, optical power must be within required thresholds.
Router# show hw-module <i>slot/subslot</i> transceiver <i>port</i> idprom dump	Displays a dump of all EEPROM content that is stored in the transceiver.

Following are sample output of several **show** commands for SFP Modules and SFP+ Modules.

The following show hw-module subslot command sample output is for SFP-GE-S:

```
Router# show hw-module subslot 0/0 transceiver 9 idprom
IDPROM for transceiver GigabitEthernet0/0/0:Description = SFP optics (type 3) Transceiver
Type: = GE SX (19) Product Identifier (PID) = FTRJ8519P1BNL-C6Vendor Revision = ASerial
Number (SN) = FNS1037R8DHVendor Name = CISCO-FINISARVendor OUI (IEEE company ID) = 00.90.65
(36965)CLEI code = IPUIALJRAACisco part number = 10-2143-01Device State = Enabled.Date
code (yy/mm/dd) = 06/09/14Connector type = LC.Encoding = 8B10BNRZNominal bitrate = GE (1300
Mbits/s) Minimum bit rate as % of nominal bit rate = not specifiedMaximum bit rate as %
of nominal bit rate = not specified
```

The following show hw-module subslot command sample output is for CWDM 1490:

```
Router# show hw-module subslot 0/0 transceiver 2 idpromIDPROM for transceiver
GigabitEthernet0/0/2:Description = SFP optics (type 3) Transceiver Type: = GE CWDM 1490
(28) Product Identifier (PID) = FWDM-16217D49CSCVendor Revision = CSerial Number (SN) =
FNS10500HA9Vendor Name = CISCO-FINISARVendor OUI (IEEE company ID) = 00.90.65 (36965)CLEI
code = CNTRVX0FAACisco part number = 10-1884-01Device State = Enabled.Date code (yy/mm/dd)
= 06/12/12Connector type = LC.Encoding = 8B10BNRZNominal bitrate = (2700 Mbits/s) Minimum
bit rate as % of nominal bit rate = not specifiedMaximum bit rate as % of nominal bit rate
= not specified
```

The following show hw-module subslot command sample output is for an SFP+ module:

```
Router# show
hw-module subslot 2/2 transceiver 9 idprom brief
IDPROM for transceiver TenGigabitEthernet0/0/9:
Description = SFP or SFP+ optics (type 3)
Transceiver Type: = SFP+ 10GBASE-SR (273)
Product Identifier (PID) = SFP-10G-SR
Vendor Revision = 1
Serial Number (SN) = JUS1803G2FT
Vendor Name = CISCO-JDSU
Vendor OUI (IEEE company ID) = 00.01.9C (412)
CLEI code = COUIA8NCAA
Cisco part number = 10-2415-03
Device State = Enabled.
Date code (yy/mm/dd) = 14/01/18
Connector type = LC.
Encoding = 4b5b
NRZ
Manchester
```



```
Nominal bitrate = (10300 Mbits/s)
Minimum bit rate as % of nominal bit rate = not specified
Maximum bit rate as % of nominal bit rate = not specified
```

The following show hw-module subslot command sample output is for an SFP+ module:

```
Router# show hw-module subslot 0/3 transceiver 9 status

The Transceiver in slot 0 subslot 0 port 9 is enabled.
Module temperature = +24.773 C
Transceiver Tx supply voltage = 3291.3 mVolts
Transceiver Tx bias current = 6024 uAmps
Transceiver Tx power = -2.3 dBm
Transceiver Rx optical power = -2.9 dBm
```

The following sample output is for SFP-GE-SX:

```
Router# show hw-module subslot 0/0 transceiver 9 idprom dump
IDPROM for transceiver GigabitEthernet0/0/0:Description = SFP optics (type 3) Transceiver
Type: = GE SX (19) Product Identifier (PID) = FTRJ8519P1BNL-C6Vendor Revision = ASerial
Number (SN) = FNS1037R8DHVendor Name = CISCO-FINISARVendor OUI (IEEE company ID) = 00.90.65
(36965)CLEI code = IPUIALJRAACisco part number = 10-2143-01Device State = Enabled.
SFP IDPROM Page 0xA0:000: 03 04 07 00 00 00 01 00 00 00010: 00 01 0D 00 00 00 37 1B 00
00020: 43 49 53 43 4F 2D 46 49 4E 49030: 53 41 52 20 20 20 00 00 90 65040: 46 54 52 4A 38
35 31 39 50 31050: 42 4E 4C 2D 43 36 41 20 20 20060: 03 52 00 74 00 1A 00 00 46 4E070: 53
31 30 33 37 52 38 44 48 20080: 20 20 20 20 30 36 30 39 31 34090: 20 20 58 80 01
SFP IDPROM Page 0xA2:000: 6D 00 E3 00 67 00 F3 00 98 58010: 69 78 90 88 71 48 1D 4C 01
F4020: 17 70 03 E8 25 19 02 F5 25 19030: 04 A9 E3 EE 01 DF 8F C5 02 EC040: 00 00 00 00 00
00 00 00 00 00050: 00 00 00 00 00 00 00 00 00 00060: 00 00 00 00 00 00 00 00 3E 5D070: 01
79 C0 5B AC 86 01 00 00 00080: 00 AA FF FD 01 00 00 00 01 00090: 00 00 00 00 00 3A 1B 70
80 D8100: 00 62 00 28 00 22 00 00 00 00110: 82 F8 05 40 00 00 05 40 00 00120: 00 00 00 00
00 00 00 01 49 50130: 55 49 41 4C 4A 52 41 41 31 30140: 2D 32 31 34 33 2D 30 31 56 30150:
31 20 89 FB 55 00 00 00 78160: 00 00 00 00 00 00 00 00 00 000170: 00 00 00 00 00 00 00
00 00 00180: 00 00 00 00 00 00 00 00 00 00190: AA AA 53 46 50 2D 47 45 2D 53200: 20 20 20
20 20 20 20 20 20210: 20 20 00 00 00 00 00 00 00 00220: 00 00 00 A2 00 00 00 00 00 00230:
00 00 00 00 00 00 00 00 00 00240: 00 00 00 00 00 00 00 00 40250: 00 40 00 00 00 00Router#
```



Note VID for optics that are displayed in **show inventory** command and vendor revision that is shown in **idprom detail** command output are stored in different places in Idprom.

Configuration Examples

This section includes the following configuration examples:

MTU Configuration

The following example shows how to set the MTU interface to 9216 bytes.



Note The interface automatically adds an additional 38 bytes to the configured MTU interface size.

```
! Enter global configuration mode.
```

```
!
Router# configure terminal
! Enter configuration commands, one per line. End with CNTL/Z.
!
! Specify the interface address
!
Router(config)# interface gigabitEthernet 0/0/1
!
! Configure the interface MTU.
!
Router(config-if)# mtu 9216
```

VLAN Encapsulation

The following example shows how to configure the interface port 2 (the third port), and configure the first interface on the VLAN with the ID number 268, using IEEE 802.1Q encapsulation:

```
! Enter global configuration mode.
!
Router# configure terminal
! Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface gigabitEthernet 0/0/5
!
! Specify the interface address
!
Router(config-if)# service instance 10 ethernet
!
! Configure dot1q encapsulation and specify the VLAN ID.
!
Router(config-if-srv)# encapsulation dot1q 268
```

VLANs are only supported on EVC service instances and Trunk EFP interfaces. For more information about how to configure these features, see the [Carrier Ethernet Configuration Guide, Cisco IOS XE Release 3S](#).