Configuring the Cisco 1GE-CU-SFP and 2GE-CU-SFP Network Interface Modules in Cisco 4000 Series Integrated Services Routers

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Contents

About the Cisco 1GE-CU-SFP and 2GE-CU-SFP Network Interface Modules

The Cisco 1GE-CU-SFP and 2GE-CU-SFP Network Interface Modules (NIMs) are software-configurable high-speed connectivity routing port network interface modules for the Cisco 4000 Series Integrated Services Routers (ISR). These network interface modules provide increased density of Ethernet interfaces on the Cisco 4000 Series ISR.

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Requirements for the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs

Cisco IOS/IOS XE Requirements

Table 1 on page 2 describes Cisco IOS/IOS XE requirements for operating the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs.

Table 1 Cisco IOS/IOS XE Requirements

Supported Platform	IOS/IOS XE release
Cisco 4000 Series ISR	• Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs—Cisco IOS XE release 3.15 or later.

Memory Requirements

Table 2 on page 2 describes the minimum platform memory recommended for operating the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs.

Table 2 Cisco 1GE-CU-SFP and 2GE-CU-SFP Modules Minimum Memory Requirements

Supported Platforms	Flash Memory
Cisco 4000 series ISR	16MB

Finding Support Information for Platforms and Cisco IOS Software Images

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions

Observe the following restrictions when using the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs:

Per VLAN Statistics

- The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs support the following:
  - Input packet number/bytes
  - Output packet number/bytes
  - Unicast/multicast/broadcast input packet number/bytes
  - Unicast/multicast/broadcast output packet number/bytes
- The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs do not support the statistics for per VLAN policy drops and oversubscription drops.
- The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs do not support input classification or the following commands:
  - Plim qos input map *
  - Plim qos input policer *

  - Plim qos input weight *
  - Plim qos input queue strict-priority *
  - Plim qos input queue 0 pause threshold *
- The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs does not support Rj45 1000M force mode.

Configuring the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs

This section describes how to configure the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs and includes information about verifying the configuration.

This section includes the following topics:

Required Configuration Tasks

This section lists the required configuration steps to configure the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs. Some of the required configuration commands implement default values that might be appropriate for your network. If the default value is correct for your network, then you do not need to configure the command. These commands are indicated by "(As Required)" in the Purpose column.

To configure the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs, complete the following steps:

	Command	Purpose
1.	Router# **configure terminal**	Enters global configuration mode.
2.	Router(config)# **interface gigabitethernet** *slot*/*subslot*/*port*[**.***subinterface-number*]	Specifies the Gigabit Ethernet, or Ten Gigabit Ethernet interface to configure, where: • *slot*/*subslot*/*port*—Specifies the location of the interface. See the Specifying the Interface Address on a NIM, page 5. • **.***subinterface-number*—(Optional) Specifies a secondary interface (subinterface) number.

	Command	Purpose
3.	Router(config-if)# **ip address** [*ip-address mask* {**secondary**} | **dhcp** {**client-id** *interface-name*}{**hostname** *host-name*}]	Sets a primary or secondary IP address for an interface that is using IPv4, where: • *ip-address*—Specifies the IP address for the interface. • *mask*—Specifies the mask for the associated IP subnet. • **secondary**—(Optional) Specifies that the configured address is a secondary IP address. If this keyword is omitted, the configured address is the primary IP address. • **dhcp**—Specifies that IP addresses will be assigned dynamically using DHCP. • **client-id** *interface-name*—Specifies the client identifier. The *interface-name* sets the client identifier to the hexadecimal MAC address of the named interface. • **hostname** *host-name*—Specifies the hostname for the DHCP purposes. The *host-name* is the name of the host to be placed in the DHCP option 12 field.
4.	Router(config-if)# **mtu** *bytes*	(As Required) Specifies the maximum packet size for an interface, where: • *bytes*—Specifies the maximum number of bytes for a packet. The default is 1500 bytes; the range is 1500 to 9216.

	Command	Purpose
5.	Router(config-if)# **standby** [*group-number*] **ip** [*ip-address* [**secondary**]]	(Required for HSRP Configuration Only) Creates (or enables) the HSRP group using its number and virtual IP address, where: • (Optional) *group-number*—Specifies the group number on the interface for which HSRP is being enabled. The range is 0 to 255; the default is 0. If there is only one HSRP group, you do not need to enter a group number. • (Optional on all but one interface if configuring HSRP) *ip-address*—Specifies the virtual IP address of the hot standby router interface. You must enter the virtual IP address for at least one of the interfaces; it can be learned on the other interfaces. • (Optional) **secondary**—Specifies the IP address is a secondary hot standby router interface. If neither router is designated as a secondary or standby router and no priorities are set, the primary IP addresses are compared and the higher IP address is the active router, with the next highest as the standby router. This command enables HSRP but does not configure it further. For additional information on configuring HSRP, refer to the HSRP section of the *Cisco IP Configuration Guide* publication that corresponds to your Cisco IOS software release.
6.	Router(config-if)# **no shutdown**	Enables the interface.

Specifying the Interface Address on a NIM

NIM interface ports begin numbering with “0” from left to right. Single-port NIMs use only the port number 0. To configure or monitor NIM interfaces, you need to specify the physical location of the NIM, and interface in the CLI. The interface address format is *slot/subslot/port*, where:

- *slot*—Specifies the chassis slot number in the Cisco 4000 Series ISR Routers where the SM-X-NIM-ADPTR is installed.
- *subslot*—Specifies the slot of the SM-X-NIM-ADPTR where the NIM is installed.
- *port*—Specifies the number of the individual interface port on a NIM.

The following example shows how to specify the first interface (0) on a NIM installed in the first subslot of a SM-X-NIM-ADPTR (0) installed in chassis slot 1:

```
router(config)# interface gigabitethernet 1/0/0
router(config-if)# no ip address
router(config-if)# shutdown
router(config-if)# negotiation auto
router(config-if)# no cdp enable
```

Modifying the MAC Address on an Interface

The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs use a default MAC address for each port that is derived from the base address that is stored in the electrically erasable programmable read-only memory (EEPROM) on the backplane of the Cisco 4000 series ISR.

To modify the default MAC address of an interface to some user-defined address, use the following command in interface configuration mode:

Command	Purpose
Router(config-if)# **mac-address** *ieee-address*	Modifies the default MAC address of an interface to some user-defined address, where: • *ieee-address*—Specifies the 48-bit Institute of Electrical and Electronics Engineers (IEEE) MAC address written as a dotted triple of four-digit hexadecimal numbers (*xxxx.yyyy.zzzz*).

To return to the default MAC address on the interface, use the **no** form of the command.

Verifying a MAC Address

To verify the MAC address of an interface, use the **show interfaces gigabitethernet** privileged EXEC command and observe the value shown in the “address is” field.

The following example shows that the MAC address is a44c.119e.0884 (bia a44c.119e.0884) for interface 0 on the NIM installed in subslot 0 of the SM-X-NIM-ADPTR installed in slot 1 of the Cisco ISR 4451-X:

```
router# show interface gigabitethernet 1/0/0
GigabitEthernet1/0/0 is up, line protocol is up
  Hardware is NIM-2GE-CU-SFP, address is a44c.119e.0884 (bia a44c.119e.0884)
  Internet address is 3.0.0.1/24
  MTU 1500 bytes, BW 100000 Kbit/sec, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Half Duplex, 100Mbps, link type is force-up, media type is RJ45
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:55, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 440722919
  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
(Additional output removed for readability)
```

Configuring the Hot Standby Router Protocol

The Hot Standby Router Protocol (HSRP) provides high network availability because it routes IP traffic from hosts without relying on the availability of any single router. HSRP is used in a group of routers for selecting an active router and a standby router. (An *active router* is the router of choice for routing packets; a *standby router* is a router that takes over the routing duties when an active router fails, or when preset conditions are met).

HSRP is enabled on an interface by entering the **standby** [*group-number*] **ip** [*ip-address* [**secondary**]] command. The **standby** command is also used to configure various HSRP elements. This document does not discuss more complex HSRP configurations. For additional information on configuring HSRP, refer to the HSRP section of the *Cisco IP Configuration Guide* publication that corresponds to your Cisco IOS XE software release. In the following HSRP configuration, standby group 2 on Gigabit Ethernet port 2/0/0 is configured at a priority of 110 and is also configured to have a preemptive delay should a switchover to this port occur:

```
Router(config)# interface gigabitethernet 2/0/0
Router(config-if)# standby 2 ip 120.12.1.200
Router(config-if)# standby 2 priority 110
Router(config-if)# standby 2 preempt
```

Verifying HSRP

To verify the HSRP information, use the **show standby** command in EXEC mode:

```
Router# show standby
Ethernet0 - Group 0
Local state is Active, priority 100, may preempt
Hellotime 3 holdtime 10
Next hello sent in 0:00:00
Hot standby IP address is 198.92.72.29 configured
Active router is local
Standby router is 198.92.72.21 expires in 0:00:07
Standby virtual mac address is 0000.0c07.ac00
Tracking interface states for 2 interfaces, 2 up:
UpSerial0
UpSerial1
```

Modifying the Interface MTU Size

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

- Interface MTU—Checked by the NIM on traffic coming in from the network. 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 configured on an interface or subinterface. If an IP packet exceeds the IP MTU size, then the packet is fragmented.
- Tag or Multiprotocol Label Switching (MPLS) MTU—Can be configured on an interface or subinterface and allows up to six different labels, or tag headers, to be attached to a packet. The maximum number of labels is dependent on your Cisco IOS software release.

Different encapsulation methods and the number of 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 2-byte header, and each MPLS label adds a 4-byte header (*n* labels x 4 bytes).

For Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs on the Cisco 4000 series ISR, the default MTU size is 1500 bytes. The maximum configurable MTU is 9216 bytes. The NIM automatically adds an additional 22 bytes to the configured MTU size to accommodate some of the additional overhead.

Note In the Cisco 4000 series ISR, 2RU and 2RU-Fixed chassis, the MTU size for the Management Ethernet interface (Interface GigabitEthernet 0) is limited to 4470 bytes.

Interface MTU Configuration Guidelines

When configuring the interface MTU size on a Gigabit Ethernet NIM on a Cisco 4000 series ISR, 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
- If you are using MPLS, be sure that the **mpls mtu** command is configured for a value less than or equal to the interface MTU.
- If you are using MPLS labels, then you should increase the default interface MTU size to accommodate the number of MPLS labels. Each MPLS label adds 4 bytes of overhead to a packet.

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** *bytes*	Configures the maximum packet size for an interface, where: • *bytes*—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 shown in the “MTU” field.

The following example shows an MTU size of 1500 bytes for interface port 0 on the Gigabit Ethernet NIM installed in the top subslot (0) of the SM-X-NIM-ADPTR that is located in slot 2 of the Cisco ISR 4451-X:

```
router# show interface gigabitethernet 2/0/0
```

```
GigabitEthernet 2/0/0 is up, line protocol is up
  Hardware is NIM-2GE-CU-SFP, address is a44c.119e.0884 (bia a44c.119e.0884)
  Internet address is 3.0.0.1/24
  MTU 1500 bytes, BW 100000 Kbit/sec, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Half Duplex, 100Mbps, link type is force-up, media type is RJ45
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:55, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 440722919
  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
     557663005 packets input, 33459780300 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
     451428325 packets output, 27800558158 bytes, 0 underruns
     0 output errors, 0 collisions, 7 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
```

Configuring the Encapsulation Type

By default, the interfaces on the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs support Advanced Research Projects Agency (ARPA) encapsulation. They do not support configuration of service access point or SNAP encapsulation for transmission of frames.

The only other encapsulation supported by the NIM interfaces is IEEE 802.1Q encapsulation for virtual LANs (VLANs).

Configuring Autonegotiation on an Interface

The 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 Cisco 4000 series ISR, flow control is autonegotiated when autonegotiation is enabled. Autonegotiation is enabled by default.

The following guidelines should be followed regarding autonegotiation:

- 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 re-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 NIM interface on the Cisco 4000 series ISR. Advertisement of flow control occurs.

Disabling Autonegotiation

Autonegotiation is automatically enabled and can be disabled on the Gigabit Ethernet interfaces on the Cisco 4000 series ISR. During autonegotiation, advertisement for flow control, speed, and duplex occurs, depending on the media (fiber or copper) in use. If the interface is connected to a link that has autonegotiation disabled, autonegotiation should either be re-enabled on the other end of the link or disabled on the Gigabit Ethernet NIM, if possible. Both ends of the link will not come up properly if only one end of the link has disabled autonegotiation.

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

- For Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs using RJ-45 copper interfaces—1000 Mbps for speed and full-duplex mode. Link speed is not negotiated when using fiber interfaces.

From a user's perspective, these settings are not really negotiated, but rather are enabled using autonegotiation. The SFPs for Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs support 1000Base-X, and the IEEE 1000Base-X standard for fiber does not support negotiation of link speed.

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

Command	Purpose
Router(config-if)# **no negotiation auto**	Disables autonegotiation on Gigabit Ethernet NIM interfaces on Cisco 4000 series ISR. No advertisement of flow control occurs.

Configuring Speed and Duplex

Note When using the SFP-GE-T, you must configure both the speed and duplex modes.

To configure the speed for a Gigabit Ethernet interface, use the **speed** command in interface configuration mode. To return to the default setting, use the **no** form of this command:

Command	Purpose
Router(config-if)# **speed** {**10** | **100**}	Configures the interface to transmit at 10 Mbps and 100 Mbps

To configure duplex operation on an interface, use the **duplex** command in interface configuration mode. Use the **no** form of this command to return to the default value.

Command	Purpose
Router(config-if)# **duplex** {**full** | **half**}	Specifies full- or half-duplex operation.

Configuring the Media Type

The Gigabit Ethernet NIMs support two media types: RJ-45 and SFP. Use the **media-type** configuration command to select either the RJ-45 or SFP for a given port.

Command	Purpose
Router(config-if)# **media-type** {**rj45** | **sfp**}	Specifies the physical connection on an interface.

Configuring Auto-Media-Detection and Auto-Failover

The Gigabit Ethernet NIMs supports the auto-detection and auto-failover feature. You can configure the media for failover redundancy when the network goes down.

Enabling Auto-Media-Detection

When the media-type is not configured, the auto-select feature is enabled by default. The auto-select feature automatically detects the media that is connected and links it up. If both the media are connected, RJ-45 is preferred as the primary media.

Enabling Auto-Failover

The primary media is explicitly indicated as SFP or RJ-45. When the router receives an indication that the primary media is down, the secondary failover media is enabled. After the switchover, when the primary media is restored, the media switch backs to the primary media depending on the module and SFP type.

To enable auto-detect or auto-failover, use the following commands beginning in global configuration mode:

	Command	Purpose
1.	Router(config)# **interface gigabitethernet** *slot*/*subslot*/*port*.*subinterface-number*	Specifies the Gigabit Ethernet interface to configure, where: • *slot*/*subslot*/*port*—Specifies the location of the interface. See the Specifying the Interface Address on a NIM, page 5. • *subinterface-number*—Specifies a secondary interface (subinterface) number.
2.	Router(config-subif)# **media-type rj45**	Defines RJ-45 as the exclusive media-type.
3.	Router(config-if)# **media-type sfp**	Defines SFP as the exclusive media-type.
4.	Router(config-if)# **media-type auto-select/no media type**	Enables auto-select by default and whichever media comes first is linked.
5.	Router(config-if)# **media-type rj45 auto-failover**	Specifies RJ-45 as the primary media-type and media failovers to SFP if the RJ-45 is down.

	Command	Purpose
6.	Router(config-if)# **media-type sfp auto-failover**	Specifies SFP as the primary media-type and media failovers to RJ-45 if the SFP is down.

Configuring a Subinterface on a VLAN

You can configure subinterfaces on the Gigabit Ethernet NIM interfaces on a VLAN using IEEE 802.1Q encapsulation. Cisco Discovery Protocol (CDP) is disabled by default on the Gigabit Ethernet NIM interfaces and subinterfaces on the Cisco 4000 series ISR.

To configure a NIM interface on a VLAN, use the following commands beginning in global configuration mode:

	Command	Purpose
1.	Router(config)# **interface gigabitethernet** *slot*/*subslot*/*port***.***subinterface-number*	Specifies the Gigabit Ethernet interface to configure, where: • *slot*/*subslot*/*port*—Specifies the location of the interface. See the Specifying the Interface Address on a NIM, page 5. • *subinterface-number*—Specifies a secondary interface (subinterface) number.
2.	Router(config-subif)# **encapsulation dot1q** *vlan-id*	Defines the encapsulation format as IEEE 802.1Q (“dot1q”), where *vlan-id* is the number of the VLAN (1–4094).
3.	Router(config-if)# **ip address** *ip-address mask* [**secondary**]	Sets a primary or secondary IP address for an interface, where: • *ip-address*—Specifies the IP address for the interface. • *mask*—Specifies the mask for the associated IP subnet. • **secondary**—(Optional) Specifies that the configured address is a secondary IP address. If this keyword is omitted, the configured address is the primary IP address.

Verifying Subinterface Configuration on a VLAN

To verify the configuration of a subinterface and its status on the VLAN, use the **show vlans** privileged EXEC command.

The following example shows the status of subinterface number 1 on port 0 on the NIM in VLAN number 200:

```
Router# show vlans
VLAN ID:200 (IEEE 802.1Q Encapsulation)

Protocols Configured:         Received:       Transmitted:
          IP                  0                  2

VLAN trunk interfaces for VLAN ID 200:

GigabitEthernet1/0/0.1 (200)

      IP:12.200.21.21

      Total 0 packets, 0 bytes input
      Total 2 packets, 120 bytes output
```

Saving the Configuration

To save your running configuration to nonvolatile random-access memory (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 on a Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs

You can shut down and restart any of the interface ports on Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs 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) on Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs. Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs can be removed from a SM-X-NIM-ADPTR at any time. SM-X-NIM-ADPTRs populated with any type of Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs can be removed from the router at any time.

If you are preparing for an OIR of a Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs, it is not necessary to independently shut down each of the interfaces prior to deactivation of the NIM. The **hw-module subslot stop** command automatically stops traffic on the interfaces and deactivates them along with the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs in preparation for OIR.

In similar fashion, you do not need to independently restart any interfaces on a Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs after OIR of a Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs or SM-X-NIM-ADPTR.

To shut down an interface on Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs, use the following command in interface configuration mode:

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

To restart an interface on Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs, use the following command in interface configuration mode:

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

Configuring Ethernet Flow Control

To configure Ethernet flow control per queue per port, use the following commands in the interface configuration mode:

Command	Purpose
Router(config-if)# **plim qos input queue 0 pause enable**	Enables Ethernet flow control pause frame generation on a queue. By default pause is enabled.

Verifying the Interface Configuration

Besides using the **show running-configuration** command to display your Cisco 4000 series ISR configuration settings, you can use the **show interfaces gigabitethernet** command to get detailed information on a per-port basis for your Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs.

Verifying Per-Port Interface Status

To find detailed interface information on a per-port basis for the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs, use the **show interfaces gigabitethernet** command.

The following example provides sample output for interface port 0 on the NIM located in the top subslot (0) of the SM-X-NIM-ADPTR that is installed in slot 2 of the Cisco ISR 4451-X:

```
router# show interface gigabitethernet 2/0/0
GigabitEthernet2/0/0 is up, line protocol is up
  Hardware is NIM-2GE-CU-SFP, address is a44c.119e.0884 (bia a44c.119e.0884)
  Internet address is 3.0.0.1/24
  MTU 1500 bytes, BW 100000 Kbit/sec, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Half Duplex, 100Mbps, link type is force-up, media type is RJ45
  output flow-control is on, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:55, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 440722919
  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
     557663005 packets input, 33459780300 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
     451428325 packets output, 27800558158 bytes, 0 underruns
     0 output errors, 0 collisions, 7 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
```

Using show Commands to Check SFP Module Status

You can use various **show** commands to view information specific to SFP optical transceiver modules.

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

- show hw-module subslot *slot/subslot* transceiver *port* **idprom**
- show hw-module subslot *slot/subslot* transceiver *port* **idprom detail**
- show hw-module subslot *slot/subslot* transceiver *port* **idprom brief**
- show hw-module subslot *slot/subslot* transceiver *port* **idprom dump**

Following are sample output of several **show** commands for SFP modules.

The following **show hw-module subslot** command sample output is for Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs:

```
Router# show hw-module subslot 2/0 transceiver 0 idprom
IDPROM for transceiver GigabitEthernet2/0/0:
Description = SFP optics (type 3)
Transceiver Type: = GE SX (19)
Product Indentifier (PID) = FTRJ8519P1BNL-C6
Vendor Revision = A
Serial Number (SN) = FNS1037R8DH
Vendor Name = CISCO-FINISAR
Vendor OUI (IEEE company ID) = 00.90.65 (36965)
CLEI code = IPUIALJRAA
Cisco part number = 10-2143-01
Device State = Enabled.
Date code (yy/mm/dd) = 06/09/14
Connector type = LC.
Encoding = 8B10B
NRZ
Nominal bitrate = GE (1300 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 Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs:

```
Router# show hw-module subslot 2/0 transceiver 0 idprom dump
IDPROM for transceiver GigabitEthernet2/0/0:
Description = SFP optics (type 3)
Transceiver Type: = GE SX (19)
Product Indentifier (PID) = FTRJ8519P1BNL-C6
Vendor Revision = A
Serial Number (SN) = FNS1037R8DH
Vendor Name = CISCO-FINISAR
Vendor OUI (IEEE company ID) = 00.90.65 (36965)
CLEI code = IPUIALJRAA
Cisco part number = 10-2143-01
Device State = Enabled.
SFP IDPROM Page 0xA0:
000: 03 04 07 00 00 00 01 00 00 00
010: 00 01 0D 00 00 00 37 1B 00 00
020: 43 49 53 43 4F 2D 46 49 4E 49
030: 53 41 52 20 20 20 00 00 90 65
040: 46 54 52 4A 38 35 31 39 50 31
050: 42 4E 4C 2D 43 36 41 20 20 20
060: 03 52 00 74 00 1A 00 00 46 4E
070: 53 31 30 33 37 52 38 44 48 20
080: 20 20 20 20 30 36 30 39 31 34
090: 20 20 58 80 01
```

```
SFP IDPROM Page 0xA2:
000: 6D 00 E3 00 67 00 F3 00 98 58
010: 69 78 90 88 71 48 1D 4C 01 F4
020: 17 70 03 E8 25 19 02 F5 25 19
030: 04 A9 E3 EE 01 DF 8F C5 02 EC
040: 00 00 00 00 00 00 00 00 00 00
050: 00 00 00 00 00 00 00 00 00 00
060: 00 00 00 00 00 00 00 00 3E 5D
070: 01 79 C0 5B AC 86 01 00 00 00
080: 00 AA FF FD 01 00 00 00 01 00
090: 00 00 00 00 00 3A 1B 70 80 D8
100: 00 62 00 28 00 22 00 00 00 00
110: 82 F8 05 40 00 00 05 40 00 00
120: 00 00 00 00 00 00 00 01 49 50
130: 55 49 41 4C 4A 52 41 41 31 30
140: 2D 32 31 34 33 2D 30 31 56 30
150: 31 20 89 FB 55 00 00 00 00 78
160: 00 00 00 00 00 00 00 00 00 00
170: 00 00 00 00 00 00 00 00 00 00
180: 00 00 00 00 00 00 00 00 00 00
190: AA AA 53 46 50 2D 47 45 2D 53
200: 20 20 20 20 20 20 20 20 20 20
210: 20 20 00 00 00 00 00 00 00 00
220: 00 00 00 A2 00 00 00 00 00 00
230: 00 00 00 00 00 00 00 00 00 00
240: 00 00 00 00 00 00 00 00 00 40
250: 00 40 00 00 00 00
Router#
```

Configuration Examples

This section includes the following configuration examples:

Basic Interface Configuration

The following example shows how to enter the global configuration mode to specify the interface that you want to configure, configure an IP address for the interface, and save the configuration. This example configures interface port 0 on the Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs that is located in subslot 0 of the SM-X-NIM-ADPTR that is installed in slot 2 of the Cisco ISR 4451-X:

```
! 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 2/0/0
!
! Configure an IP address.
!
Router(config-if)# ip address 192.168.50.1 255.255.255.0
```

```
!
! Start the interface.
!
Router(config-if)# no shut
!
! Save the configuration to NVRAM.
!
Router(config-if)# exit
Router# copy running-config startup-config
```

MAC Address Configuration

The following example shows how to change the default MAC address on the interface to 1111.2222.3333:

```
! 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 2/0/0
!
! Modify the MAC address.
!
Router(config-if)# mac-address 1111.2222.3333
```

MTU Configuration

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

Note **Note:** The Cisco 1GE-CU-SFP and 2GE-CU-SFP NIMs automatically adds an additional 22 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 2/0/0
!
! Configure the interface MTU.
!
Router(config-if)# mtu 9216
```

VLAN Configuration

The following example shows how to create the subinterface number 268 on NIM interface port 2 (the third port), and configure the subinterface 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.
!
! Specify the interface address
!
Router(config)# interface gigabitethernet 2/0/1.268
!
! Configure dot1q encapsulation and specify the VLAN ID.
!
Router(config-subif)# encapsulation dot1q 268
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Regulatory Compliance and Safety Information	Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information
Connecting Cisco 6-port GE SFP Service Modules and Cisco 4-port GE SFP and 1-port 10 GE SFP Service Modules	Connecting the Cisco 6-port GE SFP Service Modules and Cisco 4-port GE SFP and 1-port 10 GE SFP Service Modules to the Network
Configuring Cisco 6-port GE SFP Service Modules and Cisco 4-port GE SFP and 1-port 10 GE SFP Service Modules	Software Configuration Guide for the Cisco 6-port GE SFP Service Module and Cisco 4-port GE SFP and 1-port 10 GE SFP Service Module
Installing Cisco 1GE-CU-SFP and 2GE-CU-SFP Network Interface Modules	Installing the Cisco 1GE-CU-SFP and 2GE-CU-SFP Network Interface Modules in Cisco 4000 Series Integrated Services Routers
Documentation Roadmap for the Cisco ISR 4000 Series Routers	Documentation Roadmap for the Cisco ISR 4000 Series Routers
Hardware Installation Guide for the Cisco ISR 4000 Series Routers	Hardware Installation Guide for the Cisco ISR 4000 Routers Integrated Services Router
Software Configuration Guide for the Cisco ISR 4000 Series Routers	Software Configuration Guide for the Cisco ISR 4000 Series Routers

MIBs

MIB	MIBs Link
RFC1407–MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html