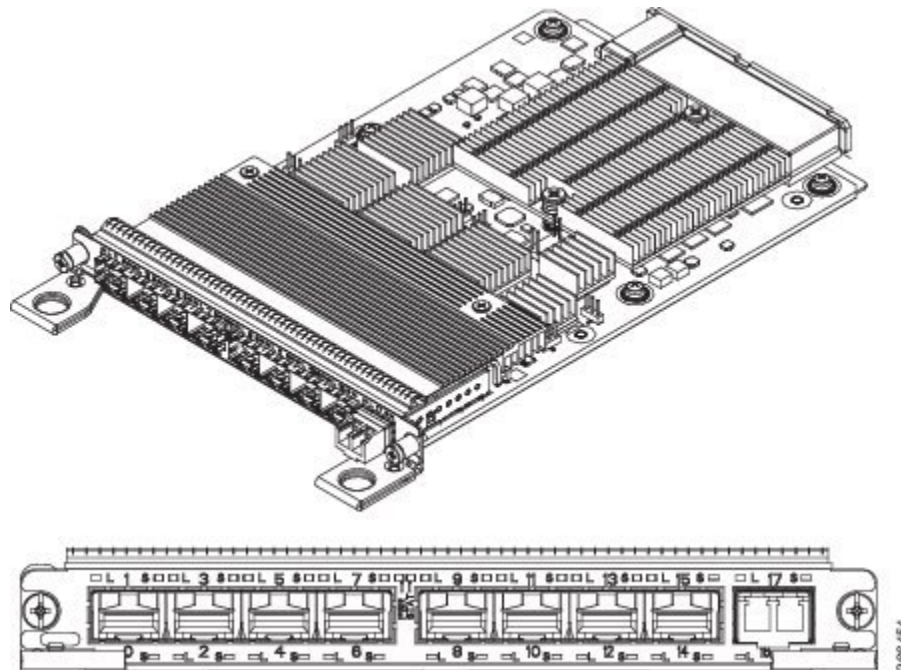




Configuring 8/16-port 1 Gigabit Ethernet (SFP / SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module

The 8/16-port 1 Gigabit Ethernet (SFP / SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module has 8 ports of 1 Gigabit Ethernet and 1 port of 10 Gigabit . The 8/16-port 1 Gigabit Ethernet (SFP / SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module operates on multiple port densities and operating modes. Each physical port can be extended to have 2 ports of 1 Gigabit Ethernet with the use of Compact Small Form-Factor Pluggable (CSFP) module to address high-density port requirements in FTTx deployments.

Figure 1: 8/16-port 1 Gigabit Ethernet (SFP / SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module



Each port on CSFP acts as Transmitter or Receiver and connects to GLC-BX-U SFPs using a single strand fiber. GLC-BX-U SFPs support digital optical monitoring (DOM) functions according to the industry-standard SFF-8472 multisource agreement (MSA). This feature gives the end user the ability to monitor real-time

parameters of the SFP, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.



Note CSFP must be connected only to GLC-BX-U.

This interface module has 8 physical ports of 1 Gigabit Ethernet and 1 physical port of 10 Gigabit Ethernet, but with the support of CSFP, it can support a maximum of 18 ports of 1 Gigabit Ethernet. Thus, the interface module offers enhanced bandwidth.

The following table shows the type of SFPs for 1G and 10G Modules.

Table 1: Type of SFPs for 1G and 10G Modules

| Module | Optics |
|------------|--------|
| 1G Module | SFP |
| | CSFP |
| 10G Module | SFP+ |
| | SFP |
| | CSFP |

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Operating Modes

The interface module supports the following two operating modes:

- Full Subscription
- Over Subscription



Note The interface module supports 8 ports of 1 Gigabit Ethernet + 1 port of 10 Gigabit Ethernet mode by default (except the slots 0, 1, 6, and 9 with XFI Pass through mode).

Full Subscription Mode

Full subscription operating mode supports the bandwidth equal to the number of ports configured.

For example, if you configure 8-port 1GE + 1-port 10GE in full subscription operating mode, then the supported bandwidth is 8 Gigabit Ethernet and 10 Gigabit Ethernet.

The supported operating modes of Full Subscription for ASR 903 NCS 4206 Routers are:

- 16-port 1GE + 1-port 10GE
- 8-port 1GE + 1-port 10 GE
- 18-port 1GE

The supported operating modes of Full Subscription for ASR 907 NCS 4216 Routers are:

- 8-port 1GE + 1-port 10GE
- 8-port 1GE + 1-port 1GE
- 8-port 1GE
- 1-port 10GE

Over Subscription Mode

Over Subscription operating mode is applicable to 1 Gigabit Ethernet ports only. 16-port 1GE and 16-port 1GE + 1-port 10GE operating modes support 8 Gigabit Ethernet and 18 Gigabit Ethernet bandwidth, respectively. 18-port 1GE supports 9 Gigabit Ethernet bandwidth. But, if the total bandwidth exceeds the supported bandwidth, it results in low priority traffic drop.

For example, if you configure 16-port 1GE + 1-port 10GE over subscription operating mode, then 8GE bandwidth is supported for 16 ports of 1 Gigabit Ethernet and 10GE bandwidth is supported for 10 Gigabit Ethernet ports.

The following are the supported operating modes of Over Subscription for NCS 4216 Routers:

- 16-port 1GE
- 16-port 1GE + 1-port 10GE
- 18-port 1GE



Note In 18-port 1GE mode, 10 Gigabit Ethernet physical port slot becomes 2 ports of 1 Gigabit Ethernet with insertion of CSFP.



Note By default, the interface module loads in 8-port 1GE + 1-port 10 GE modes (except the slots 0, 1, 6, and 9 with XFI-Pass Through mode. For more information, refer [Optics Matrix](#).



Note Over subscription mode is *not* supported on NCS 4206 Routers.

Traffic is classified as follows:

- High Priority Traffic — Has high priority queue

This is classified as follows:

- DMAC=01-80-C2-xx-xx-xx
- Etype=0x8100, 9100, 9200, 88A8 Cos values=5, 6, 7
- Etype=0806 (ARP), 88F7 (PTP)
- Etype=0x800, TOS 5, 6, 7
- Etype=0x8847, MPLS EXP 5, 6, 7
- Low Priority Traffic — Traffic that does not satisfy the above conditions has low priority queue

Egress Packet Classifiers

During oversubscription, the egress direction classifies the packet based on the following:

- The first 8 ports use the priority-based flow-control (PFC) to ensure that there are no drop in packets.
- The remaining ports do strict priority between High Priority and Low Priority counters.



Note The threshold value is 6 by default (packet with CoS/EXP/DSCP value greater than or equal to 6 is classified as High Priority).

SADT Mode

For more information on SADT mode, see [IP SLA—Service Performance Testing](#).

Bandwidth Mode

Each interface module subslot can be assigned a bandwidth. You can reserve the slots with specific bandwidth so that the interface module that consumes more than the configured bandwidth is not used.



Note The bandwidth mode is *not* supported on ASR 903 Routers and is *only* supported on ASR 907 Routers.

The following table shows the interface module slots for the bandwidth mode.

| IM Subslot | Bandwidth Mode | SADT Operating Mode |
|------------|----------------|--|
| 0 | 8 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 10 Gbps | XFI-Pass Through Mode |
| 1 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | XFI-Pass Through Mode |
| 2 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |
| 3 | Not Available | NA |
| 4 | Not Available | NA |
| 5 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |
| 6 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| 7 | 80 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 100 Gbps | Port Expansion Mode or XFI-Pass Through Mode |

| IM Subslot | Bandwidth Mode | SADT Operating Mode |
|------------|----------------|--|
| 8 | 80 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 100 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| 9 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| 10 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |
| 11 | Not Available | NA |
| 12 | Not Available | NA |
| 13 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |
| 14 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |
| 15 | 8 Gbps | Port Expansion Mode |
| | 10 Gbps | Port Expansion Mode or XFI-Pass Through Mode |
| | 18 Gbps | Port Expansion Mode |
| | 20 Gbps | XFI-Pass Through Mode |

Slot Support on Operating Modes

The following table shows the slots supported on different operating modes on ASR 907 NCS 4216 Routers.

| IM Subslot | SADT Operating Mode | IM Operating Modes | |
|---|-----------------------|---|--------------------------|
| 0, 1 | Port Expansion Mode | Unsupported | |
| | XFI-Pass Through Mode | 8-port 1GE + 1-port 1GE | |
| | | 8-port 1GE | |
| | | 16-port 1GE Over Subscribed | |
| | | 18-port 1GE Over Subscribed | |
| 2, 5, 10, 13, 14, 15 | XFI-Pass Through Mode | 8-port 1GE + 1-port 10GE | |
| | | 16-port 1GE + 1-port 10GE Over Subscribed | |
| | Any | 8-port 1GE + 1-port 1GE | |
| | | 8-port 1GE | |
| | | 16-port 1GE Over Subscribed | |
| | | 18-port 1GE Over Subscribed | |
| | | 1-port 10GE | |
| | 3, 4, 7, 8, 11, 12 | Any | 8-port 1GE + 1-port 10GE |
| | | | 8-port 1GE + 1-port 1GE |
| | | | 8-port 1GE |
| 1-port 10GE | | | |
| 16-port 1GE + 1-port 10GE Over Subscribed | | | |
| 16-port 1GE Over Subscribed | | | |
| 18-port 1GE Over Subscribed | | | |
| 6, 9 | Any | 8-port 1GE + 1-port 1GE | |
| | | 8-port 1GE | |
| | | 1-port 10GE | |
| | | 16-port 1GE Over Subscribed | |
| | | 18-port 1GE Over Subscribed | |

The following table shows the slots supported for different operating modes for ASR 903 routers.

| IM Subslot | IM Operating Modes |
|----------------|--|
| 0, 3, 4, and 5 | 16-port 1GE + 1-port 10GE Fully Subscribed |
| | 8-port 1GE + 1-port 10GE |
| | 18-port 1GE Fully Subscribed |
| 1, 2 | Unsupported |

IOS Port Numbering

The IOS port numbers are different from other typical interface module because of the flexibility of optics choices and operating modes. The IOS port number is even numbered for SFP optics (for example, Gigabit Ethernet 0/x/0) and the additional port on CSFP insertion introduces the odd number (for example, Gigabit Ethernet 0/x/0 and Gigabit Ethernet 0/x/1) as enumerated in the table below.

Table 2: IOS Port Number

| 1G Face Plate Port | SFP Optics | CSFP Optics |
|--------------------|-------------------------|---|
| 0 | Gigabit Ethernet 0/x/0 | Gigabit Ethernet 0/x/0 and Gigabit Ethernet 0/x/1 |
| 1 | Gigabit Ethernet 0/x/2 | Gigabit Ethernet 0/x/2 and Gigabit Ethernet 0/x/3 |
| 2 | Gigabit Ethernet 0/x/4 | Gigabit Ethernet 0/x/4 and Gigabit Ethernet 0/x/5 |
| 3 | Gigabit Ethernet 0/x/6 | Gigabit Ethernet 0/x/6 and Gigabit Ethernet 0/x/7 |
| 4 | Gigabit Ethernet 0/x/8 | Gigabit Ethernet 0/x/8 and Gigabit Ethernet 0/x/9 |
| 5 | Gigabit Ethernet 0/x/10 | Gigabit Ethernet 0/x/10 and Gigabit Ethernet 0/x/11 |
| 6 | Gigabit Ethernet 0/x/12 | Gigabit Ethernet 0/x/12 and Gigabit Ethernet 0/x/13 |
| 7 | Gigabit Ethernet 0/x/14 | Gigabit Ethernet 0/x/14 and Gigabit Ethernet 0/x/15 |

Similarly, the IOS port number on the 10G module also has an even number and the additional port on CSFP insertion is odd numbered as listed in the table below.

Table 3: IOS Port Number

| 10G Face Plate Port | SFP+ | SFP (1G BW) | CSFP (1G BW) |
|---------------------|--------------------------------|--------------------------------|---|
| 8 | Ten Gigabit Ethernet 0/x/16 | Ten Gigabit Ethernet 0/x/16 | Ten Gigabit ethernet 0/x/16 and Gigabit Ethernet 0/x/17 |

Supported Features on the Interface Module

- Supports PTP implementation. PTP is supported on 1G SFP, 10G SFP+, and CSFP ports.
- Supports SyncE.
- Supports both full subscription and over subscription modes.
- Provides multiple combinations of port density in Full subscription and Over Subscription modes.

Benefits

- The interface module has enhanced port density.
- 10 GE port can also operate in 1GE mode.

Restrictions

- In XFI Pass through mode, the interface module goes out of service without any mode configuration on slots 0, 1, 6, and 9. Configure the supported modes on the slots before inserting the interface module.
- This interface module is supported only on Cisco RSP3 module.
- OTN, Wan Phy, and MACsec are *not* supported.
- High Priority Traffic with frame size more than 4500 bytes is *not* supported for oversubscription mode.
- COS, EXP, and DSCP fields in frames with values 5, 6, and 7 respectively, are considered as High Priority Traffic for Oversubscription mode than other control packets.
- 1 G Module ports must have symmetric configuration on both local and peer ends for the ports to come up on the router. For example, if autonegotiation is configured on the local end, it must be configured on the peer end.

Configuring Interface Module

To configure interface module:

```
enable
hw-module subslot 0/4 default
```

Example: Configuring Full Subscription Modes

```

Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface GigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
configure terminal
platform hw-module configuration
hw-module 0/4 NCS4200-1T16G-PS mode mode
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface GigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

```

Example: Configuring Full Subscription Modes

The following are the examples to configure different modes of full subscription.

8-port 1GE + 1-port 10GE Full Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration

```

```

Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

```

```

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 8x1G+1x10G-FS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#

```

8-port 1GE + 1-port 10GE Full Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration

```

Example: Configuring Full Subscription Modes

```

Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 8x1G+1x1G-FS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3 min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

```

8-port 1GE Full Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 8x1G-FS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3 min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration

```

```

Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#

```

1-port 10GE Full Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 1x10G-FS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration

```

Example: Configuring Over Subscription Modes

```
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#
```

Example: Configuring Over Subscription Modes

The following are the examples to configure different modes of over subscription.

16-port 1GE + 1-port 10GE Over Subscription Mode Configuration:

```
Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 16x1G+1x10G-OS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3 min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#
```

18-port 1GE Over Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)# platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 18x1G-OS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3 min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#

```

16-port 1GE Over Subscription Mode Configuration:

```

Router# enable
Router#hw-module subslot 0/4 default
Proceed with setting all interfaces as default for the module? [confirm]%Setting all
interfaces in 0/4 to default state
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration

```

Example: Configuring Egress Classification

```

Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration

Router# configure terminal
Router(config)#platform hw-module configuration
Router(conf-plat-hw-conf)# hw-module 0/4 NCS4200-1T16G-PS mode 16x1G-OS
Interface configs would be defaulted before mode change followed by a soft reset of IM,
will take ~3 min to complete initialization.
-----Do you wish to continue?-----? [yes]: y
Please wait ~3 mins before applying any configs on the IM
Interface GigabitEthernet 0/4/0 set to default configuration
Interface GigabitEthernet 0/4/1 set to default configuration
Interface GigabitEthernet 0/4/2 set to default configuration
Interface GigabitEthernet 0/4/3 set to default configuration
Interface GigabitEthernet 0/4/4 set to default configuration
Interface GigabitEthernet 0/4/5 set to default configuration
Interface GigabitEthernet 0/4/6 set to default configuration
Interface GigabitEthernet 0/4/7 set to default configuration
Interface GigabitEthernet 0/4/8 set to default configuration
Interface GigabitEthernet 0/4/9 set to default configuration
Interface GigabitEthernet 0/4/10 set to default configuration
Interface GigabitEthernet 0/4/11 set to default configuration
Interface GigabitEthernet 0/4/12 set to default configuration
Interface GigabitEthernet 0/4/13 set to default configuration
Interface GigabitEthernet 0/4/14 set to default configuration
Interface GigabitEthernet 0/4/15 set to default configuration
Interface TenGigabitEthernet 0/4/16 set to default configuration
Interface GigabitEthernet 0/4/17 set to default configuration
#

```

Example: Configuring Egress Classification



Note PFC (priority-based flow-control) and egress classification are enabled by default.

The following configuration shows how to modify an egress classification:

```

int gi 0/15/8
flowcontrol egress classify all threshold 7

flowcontrol egress classify ?
    all    classify based on L2-CoS, MPLS-EXP and L3-DSCP
    l2     classify based on L2-CoS
    l3     classify based on L3-DSCP precedence bits
    mpls   classify based on MPLS-EXP

qos-overhead-accounting enable gigabitEthernet 0/15/1
qos-overhead-accounting positive 4

```


Verifying PFC

Use the `show platform hardware pp active bshell` command to verify the PFC (priority-based flow-control).

```
show platform hardware pp active bshell "show counters full"
T_127.xl7 : 1,410,242,436 +2,365
903/sTPOK.xl7 : 1,410,242,436 +2,365
903/sTPKT.xl7 : 1,410,242,436 +2,365
903/sTUCA.xl7 : 1,410,242,436 +2,365
903/sTBYT.xl7 : 95,896,485,648 +160,820
61,375/sR_64.xe134 : 390,320 +786
299/sRPKT.xe134 : 916,242 +786
299/sRXCF.xe134 : 390,320 +786
299/sRXPP.xe134 : 390,320 +786
299/sRPFC_0.xe134 : 362,115 +786
299/sRPFC_1.xe134 : 362,925 +786
299/sRPFC_2.xe134 : 361,555 +786
299/sRPFC_3.xe134 : 362,454 +786
299/sRPFC_4.xe134 : 363,298 +786
299/sRPFC_5.xe134 : 361,532 +786
299/sRPFC_6.xe134 : 362,606 +786
299/sRPFC_7.xe134 : 362,034 +786
299/sRBYT.xe134 : 100,972,834 +50,304
```

Verifying Configuration

Use the `show platform hw-configuration` command to verify the operating modes configured on the interface module.

```
Router#show platform hw-configuration
Slot  Cfg IM Type          Actual IM Type      Op State           Ad State Op Mode
-----
0/0   -                    -                   Empty              N/A           -
0/1   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            16x1G-OS
0/2   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            18x1G-OS
0/3   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            16x1G+1x10G
0/4   -                    -                   Empty              N/A           -
0/5   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            18x1G-OS
0/6   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            16x1G-OS
0/7   -                    -                   Empty              N/A           -
0/8   -                    -                   Empty              N/A           -
0/9   -                    -                   Empty              N/A           -
0/10  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            16x1G+1x10G-OS
0/11  -                    -                   Empty              N/A           -
0/12  -                    -                   Empty              N/A           -
0/13  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M    IS-NR              IS            16x1G+1x10G-OS
```

```

0/14 A900-IMA8CS1Z-M A900-IMA8CS1Z-M IS-NR IS 16x1G+1x10G-OS
0/15 A900-IMA8CS1Z-M A900-IMA8CS1Z-M IS-NR IS 16x1G+1x10G-OS

```

Router#**show platform hw-configuration**

| Slot | Cfg IM Type | Actual IM Type | Op State | Ad State | Op Mode |
|------|------------------|------------------|----------|----------|----------------|
| 0/0 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 18x1G-OS |
| 0/1 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 18x1G-OS |
| 0/2 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/3 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G |
| 0/4 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/5 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/6 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 18x1G-OS |
| 0/7 | - | NCS4200-1H-PK | IS-NR | IS | - |
| 0/8 | - | NCS4200-1H-PK | IS-NR | IS | - |
| 0/9 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 18x1G-OS |
| 0/10 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/11 | - | - | Empty | N/A | - |
| 0/12 | - | - | Empty | N/A | - |
| 0/13 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/14 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/15 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |

Verifying High Priority and Low Priority Counters Configuration

Use **show platform software agent iomd [IM module] fpga dump [port number]** to display the packets of High Priority and Low Priority traffic queue in Over Subscription mode.

```

#show platform software agent iomd 0/8 fpga dump 4
OS LP Drop Q Pkt Cnt :0x0
OS HP Drop Q Pkt Cnt :0x0
OS LP Q Pkt Cnt :0x22906bd0
OS HP Q Pkt Cnt :0x55fdd731

```

Use **show platform software agent iomd [IM module] fpga clear [port number]** to clear High Priority and Low Priority counters in Over Subscription mode.

```

#show platform software agent iomd 0/8 fpga clear 4
OS LP Drop Q Pkt Cnt :0x0
OS HP Drop Q Pkt Cnt :0x0

```

```
OS LP Q Pkt Cnt :0x0
OS HP Q Pkt Cnt :0x0
```

Configuring Bandwidth Mode

To configure bandwidth mode:

```
enable
configure terminal
platform hw-module configuration
bandwidth 0/0 8-gbps
end
```

Verifying Bandwidth Mode Configuration

Use **show platform hw-configuration** command to verify bandwidth mode configuration.

```
#show platform hw-configuration
Slot  Cfg IM Type          Actual IM Type          Op State          Ad State Op Mode          BW
-----
0/0   -                    -                    Empty            N/A      -
0/1   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G-OS
0/2   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       18x1G-OS
0/3   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G+1x10G
0/4   -                    -                    Empty            N/A      -
0/5   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       18x1G-OS
20-gbps
0/6   A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G-OS
0/7   -                    -                    Empty            N/A      -
0/8   -                    -                    Empty            N/A      -
0/9   -                    -                    Empty            N/A      -
0/10  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G+1x10G-OS
0/11  -                    -                    Empty            N/A      -
0/12  -                    -                    Empty            N/A      -
0/13  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G+1x10G-OS
0/14  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G+1x10G-OS
0/15  A900-IMA8CS1Z-M      A900-IMA8CS1Z-M      IS-NR            IS       16x1G+1x10G-OS
#
```

```
#show platform hw-configuration
Slot  Cfg IM Type          Actual IM Type          Op State          Ad State Op Mode          BW
-----
0/0   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       18x1G-OS
10-gbps
0/1   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       18x1G-OS
0/2   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       18x1G
0/3   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       16x1G+1x10G
0/4   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       16x1G+1x10G-OS
0/5   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       16x1G+1x10G-OS
0/6   NCS4200-1T16G-PS     NCS4200-1T16G-PS     IS-NR            IS       18x1G-OS
0/7   -                    NCS4200-1H-PK         IS-NR            IS       -
```

| | | | | | |
|------|------------------|------------------|-------|-----|----------------|
| 0/8 | - | NCS4200-1H-PK | IS-NR | IS | - |
| 0/9 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 18x1G-OS |
| 0/10 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/11 | - | - | Empty | N/A | - |
| 0/12 | - | - | Empty | N/A | - |
| 0/13 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/14 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |
| 0/15 | NCS4200-1T16G-PS | NCS4200-1T16G-PS | IS-NR | IS | 16x1G+1x10G-OS |

Interface Module Rules

NCS 4206 ASR 903 Routers or Cisco RSP3C-400-S Rules for A900-IMA8CS1Z NCS4200-1T16G-PS

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|--|
| 0 | <ul style="list-style-type: none"> 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed 16 x 1GigE (CSFP) + 1 x 10GigE (SFP+) Fully subscribed 18-port 1GE Fully subscribed | The IM cannot be in slot 0 if IMA1C is in slot 4 |
| 1 | Not Supported | — |
| 2 | Not Supported | — |
| 3 | <ul style="list-style-type: none"> 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed 16-port 1GE (CSFP) + 1 x 10GE (SFP+) Fully subscribed 18-port 1GE Fully subscribed | — |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|--------------|
| 4 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed • 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Fully subscribed • 18-port 1GE Fully subscribed | — |
| 5 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed • 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Fully subscribed • 18-port 1GE Fully subscribed | — |

**NCS 4216 ASR 907 Routers or Cisco RSP3C (Port Expansion Mode) Rules for A900-IMA8CS1Z
NCS4200-1T16G-PS**



Note

- If IMA8S, IMA8T, IMA8S1Z, and IMA8T1Z are in any slot, SADT cannot be configured.
- If the IMA8CS1Z interface module is not present in a slot, mode update through hw sub-slot mode is not allowed. The existing mode configuration applies to the interface module that is reinserted, and you can subsequently update the mode.

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|--------------|
| 0 | Not supported | — |
| 1 | Not supported | — |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|---|---|
| 2 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10GE Fully subscribed | For Slot 2 in 8-port 1GE Fully Subscribed or 16-port/18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode, IMA8Z or IMA2F cannot be in slot 4. |
| 3 | All modes are supported | If IMA8Z or IMA2F is present in slot 3, the IM cannot be used in slots 5, 9, 13 and 15. |
| 4 | All modes are supported | If IMA8Z or IMA2F is present in slot 4, the IM cannot be used in slots 2, 6, 10 and 14. |
| 5 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 3, the IM cannot be used in slots 5, 9, 13 and 15. |
| 6 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 4, the IM cannot be used in slots 2, 6, 10 and 14. |
| 7 | All modes are supported | — |
| 8 | All modes are supported | — |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|---|
| 9 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 3, the IM cannot be used in slots 5, 9, 13 and 15. |
| 10 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 4, the IM cannot be used in slots 2, 6, 10 and 14. |
| 11 | All modes are supported | If the IM is in slot 11, IMA8S, IMA8T, IMA8S1Z, and IMA8T1Z cannot be used in slots 1, 5, 9, 13 and 15. |
| 12 | All modes are supported | If the IM is in slot 12, IMA8S, IMA8T, IMA8S1Z, and IMA8T1Z cannot be used in slots 0, 2, 6, 10 and 14. |
| 13 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 3, the IM cannot be used in slots 5, 9, 13 and 15. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|---|
| 14 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 4, the IM cannot be used in slots 2, 6, 10 and 14. |
| 15 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed | If IMA8Z or IMA2F is present in slot 3, the IM cannot be used in slots 5, 9, 13 and 15. |

**NCS 4216 ASR 907 Routers or Cisco RSP3C (XFI-Pass Through Mode) for A900-IMA8CS1Z
NCS4200-1T16G-PS**



Note IMA8S, IMA8T, IMA8S1Z, and IMA8T1Z cannot be used in any slot.

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|---|---|
| 0 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed | <ul style="list-style-type: none"> • If the IM is in slot 0 in 8-port 1GE Fully subscribed mode or in 16-port/18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, the IM in Slot 12 can only be in 8-port 1GE (SFP) Fully subscribed mode or in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, 1-port 10GE Fully subscribed mode. • If Slot 0 is in 8-port 1G Fully subscribed mode or 16-port/18-port 1GE, or 16-port/18-port 1G Over subscribed or 1-port 10G Fully subscribed mode or 8-port 1G + 1-port 1G Fully subscribed mode. • If Slot 0 is in 8-port 1G Fully subscribed mode or 16-port/18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, then IMA8Z or IMA2F cannot be in slot 12. • IF IMA8CS1Z-M is in slot 0, then NCS4200 1T8S-10CS (10G_CEM) in slot 12 is not supported. • IF IMA8CS1Z-M is in slot 0 then NCS4200-1T8S-10CS (5G_CEM) in slot 12 is supported. |
| 1 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed | <ul style="list-style-type: none"> • If Slot 1 is in 8-port 1G Fully subscribed or 16-port/18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, the IMA8Z or IMA2F or IMA2Z cannot be in slot 11. • If the IM is in slot 1, then NCS4200-1T8S-10CS (10G_CEM) in slot 11 is not supported. • If the IM is in slot 1, then NCS4200-1T8S-10CS (5G_CEM) in slot 11 is supported. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|--|
| 2 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed • 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed • 16-port/18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10G Fully subscribed • 8-port 1GE Fully subscribed | <ul style="list-style-type: none"> • If Slot 2 is in 8-port 1G + 1-port 10G Fully subscribed mode, or 16-port 1G + 1-port 10G Over subscribed mode, then no IM can be present in slot 12. • If Slot 2 is in 8-port 1G + 1-port 10G Fully subscribed mode, or 16-port 1G + 1-port 10G Over subscribed mode, then IMA8Z or IMA2F cannot be in slot 4. • If the IM in slot 2, then NCS4200-1T8S-10CS (10G_CEM) in slot 12 is not supported. • If the IM is in slot 2, then NCS4200-1T8S-10CS (5G_CEM) in slot 12 is not supported. • If the IM is in slot 2 then NCS4200-48T1E1-CE in slot 12 is not supported. • If the IM is in slot 2 then NCS4200-48T3E3-CE in slot 12 is not supported. |
| 3 | All modes are supported. | <ul style="list-style-type: none"> • If IMA8Z or IMA2F is in slot 3, then the IM is not supported on slots 5, 9, 13, and 15. • If Slot 3 has IMA8Z or IMA2F, then no IM can be present in slots 5, 9, 13, and 15. |
| 4 | All modes are supported. | <ul style="list-style-type: none"> • If IMA8Z or IMA2F is in slot 4, then the IM is not supported in slots 2, 6, 10, and 14. • If Slot 4 has IMA8Z or IMA2F, then no IM can be present in slots 2, 6, 10, and 14. |
| 5 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed • 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Over subscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10GE Fully subscribed • 8-port 1GE Fully subscribed | <ul style="list-style-type: none"> • If the IM is in slot 5 in 8-port 1GE + 1-port 10GE Fully subscribed mode or in 16-port 1GE + 1-port 10GE Oversubscribed mode, the the IM in slot 11 can only be in 8-port 1GE Fully subscribed mode or in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, or 1-port 10 GE Fully subscribed mode. • If Slot 5 is in 8-port 1G + 1-port 10G Fully subscribed, or 16-port 1G + 1-port 10G Over subscribed mode, then IMA8Z or IMA2F cannot be in slot 3. • If the IM is in slot 5, then NCS4200-1T8S-10CS (10G_CEM) in slot 11 is not supported. • If the IM is in slot 5, then NCS4200-1T8S-10CS (5G_CEM) in slot 11 is supported. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|--|--|
| 6 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed mode • 16-port 1GE (CSFP) Oversubscribed • 18-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10 GE Fully subscribed | <ul style="list-style-type: none"> • If Slot 6 is in 8-port 1GE fully subscribed, or 16-port 1GE Over subscribed, or 18-port 1GE Over subscribed or 8-port 1GE + 1-port 1GE fully subscribed or 1-port 10GE Fully subscribed mode, then IMA8Z or IMA2F cannot be in slot 4. |
| 7 | All modes are supported | — |
| 8 | All modes are supported | — |
| 9 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) Fully subscribed • 16-port/18-port 1GE (CSFP) Oversubscribed • 16-port 1GE (CSFP) Oversubscribed • 8-port 1GE + 1-port 1GE Fully subscribed • 1-port 10 GE Fully subscribed | <p>If Slot 9 is in 8-port 1GE fully subscribed, or 16-port 1GE Over subscribed mode, or 18-port 1GE Over subscribed mode or 8-port 1GE + 1-port 1GE fully subscribed or 1-port 10GE Fully subscribed mode, then IMA8Z or IMA2F cannot be in slot 3.</p> |
| 10 | <ul style="list-style-type: none"> • 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed • 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed • 16-port/18-port 1GE (CSFP) Oversubscribed • 8-port 1GE+1-port 1GE Fully subscribed • 1-port 10 GE Fully subscribed • 8-port 1G Fully subscribed | <ul style="list-style-type: none"> • If Slot 10 and 14 are in 8-port 1GE + 1-port 10GE Fully subscribed, or 16-port 1GE + 1-port 10GE Over subscribed mode, then IMA8Z IMA2F cannot be in Slot 4. • If IM is in slot 10 then NCS4200-1T8S-10CS (10G_CEM) in slot 12 is not supported. • If IM is in slot 10, then NCS4200-1T8S-10CS (5G_CEM) in slot 12 is supported. |

Interface Module Rules

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|--------------|
| 11 | All modes are supported | |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|---|
| | | <ul style="list-style-type: none"> • IM can be in slot 11, only in 8-port 1GE (SFP) Fully subscribed mode, or in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, or 1-port 10 GE Fully subscribed mode if IPSEC is used (FLSASR907-IPSEC). • If the IM is slot 11, and in 8-port 1GE + 1 x 10GigE Fully subscribed mode, or in 16-port 1GE + 1-port 10GE Oversubscribed mode, then the IM in Slots 5 and 15 can only be in 8-port 1GE (SFP) Fully subscribed mode, or in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE +1-port 1GE Fully subscribed or 1-port 10GE Fully subscribed mode. • If the IM is in slot 11, and in 8-port 1GE Fully subscribed mode, or in 16-port 1GE Oversubscribed mode, or in 18-port 1GE Oversubscribed mode or in 8-port 1GE + 1-port 1GE Fully subscribed or 1-port 10GE Fully subscribed, then the IM in Slot 15 can only be in 8-port 1GE (SFP) Fully subscribed mode, OR in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 1-port 10GE Fully subscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode. • IF IMA2Z is in slot 11, then the IM is in slot 15 only in 8-port 1GE (SFP) Fully subscribed mode, OR in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode, and no IM can be present in slot 1. • If IMA8Z or IMA2F is in slot 11, then the IM is in slots 5, 13 and 15 in 8-port 1GE Fully Subscribed, or in 16-port/18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode, and no IM can be present in slot 1. • If NCS4200-1T8S-10CS (10G_CEM) is in slot 11, then the IM in slots 5, 13 and 15 are in only 8-port 1GE Fully Subscribed, or in 16/18-port 1GE Oversubscribed mode, and the IM in slot 1 not supported. • If NCS4200-1T8S-10CS (5G_CEM) is in slot 11, then the IM in slot 15 is in only 8-port 1GE Fully Subscribed, OR in 16/18-port 1GE Oversubscribed mode. • If NCS4200-48T1E1-CE is in slot 11, then the IM is in slot 15 is in only 8-port 1GE Fully Subscribed, or |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|---|
| | | <p>in 16/18-port 1GE Oversubscribed mode.</p> <ul style="list-style-type: none">• If NCS4200-48T3E3-CE is in slot 11, then the IM in slot 15 is in only 8-port 1GE Fully Subscribed, or in 16-port/18-port 1GE Oversubscribed mode. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|--------------|
| 12 | All modes are supported | |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|------------------------------|--|
| | | <ul style="list-style-type: none"> • If the IM is in slot 12, and in 8-port 1GE + 1-port 10GE Fully subscribed mode, or in 16-port 1GE + 1-port 10GE Oversubscribed mode, then no IM can be present in Slot 0, and the IM in Slot 2 can only be in 8-port 1GE (SFP) Fully subscribed mode, OR in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode. • If the IM is in slot 12 and in 8-port 1GE Fully subscribed mode or in 16-port 1GE Oversubscribed mode, or in 18-port 1GE Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode, then the IM in Slot 2 can only be in 8-port 1GE (SFP) Fully subscribed mode, OR in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode. • If IMA2Z is in slot 12, then the IM is in slots 2 and 10 in 8-port 1GE (SFP) Fully subscribed mode, or in 16-port/18-port 1GE (CSFP) Oversubscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode or 1-port 10GE Fully subscribed mode. • If Slot 12 has IMA2Z, then slots 2 and 10 in 8-port 1GE Fully subscribed mode, or 16-port/18-port 1GE Over subscribed mode or 1-port 10GE Fully subscribed mode or 8-port 1G + 1-port 1GE Fully subscribed mode. • If IMA8Z OR IMA2F is in slot 12, then the IM in slots 2, 10 and 14 in 8-port 1GE Fully Subscribed, or in 16-port/18-port 1GE Oversubscribed mode and 1-port 10GE Fully subscribed mode or 8-port 1GE + 1-port 1GE Fully subscribed mode, and no IM can be present from Slot 1 to Slot 0. • If NCS4200-1T8S-10CS (10G_CEM) is in slot 12, then the IM in slots 2, 10 and 14 are in only 8-port 1GE Fully Subscribed, OR in 16-port/18-port 1GE Oversubscribed mode, and the IM in slot 0 not supported. • If NCS4200-1T8S-10CS (5G_CEM) is in slot 12, then the IM in slot 2 is in only 8-port 1GE Fully Subscribed, OR in 16-port/18-port 1GE Oversubscribed mode. • If NCS4200-48T1E1-CE is in slot 12, then the IM in slot 2 is in only 8-port 1GE Fully Subscribed, OR in 16-port/18-port 1GE Oversubscribed mode. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|---|--|
| | | <ul style="list-style-type: none"> If NCS4200-48T3E3-CE is in slot 12, then the IM in slot 2 is in only 8-port 1GE Fully Subscribed, or in 16-port/18-port 1GE Oversubscribed mode. |
| 13 | <ul style="list-style-type: none"> 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed 16-port/18-port 1GE (CSFP) Oversubscribed 8-port 1GE + 1-port 1GE Fully subscribed 1-port 10 GE Fully subscribed 8-port 1G Fully subscribed | <ul style="list-style-type: none"> If IPSEC is used (FLSASR907-IPSEC) then the IM can be in slot 13, only in 8-port 1GE (SFP) Fully subscribed mode, or in 16-port/18-port 1GE (CSFP) Oversubscribed mode. NCS4200-1T8S-10CS (10G_CEM) in slot 11 is not supported; but NCS4200-1T8S-10CS (5G_CEM) in slot 11 is supported. If the IM in slot 13 is configured in 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed mode, or in 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed mode, or Fully Subscribed mode, then IPSEC cannot be configured. If Slot 13 is in 8-port 1GE + 1-port 10GE Fully subscribed mode, or 16-port 1GE + 1-port 10GE Over subscribed mode, then IMA8Z or IMA2F cannot be in slot 3. If the IM is in slot 13, then NCS4200-1T8S-10CS (10G_CEM) in slot 11 is not supported. If the IM is in slot 13, then NCS4200-1T8S-10CS (5G_CEM) in slot 11 is supported. |
| 14 | <ul style="list-style-type: none"> 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed 16-port/18-port 1GE (CSFP) Oversubscribed 8-port 1GE + 1-port 1GE Fully subscribed 1-port 10 GE Fully subscribed 8-port 1GE Fully subscribed | <ul style="list-style-type: none"> If 10G Y.1564/SADT is used, then the IM can be in slot 14 only in 8-port 1GE (SFP) Fully subscribed mode, or in 16-port/18-port 1GE (CSFP) Oversubscribed mode, or 8-port 1GE + 1-port 1GE Fully subscribed mode, or 1-port 10GE Fully subscribed mode. NCS4200-1T8S-10CS (10G_CEM) in slot 12 is not supported, but NCS4200-1T8S-10CS (5G_CEM) in slot 12 is supported. If Slot 14 is in 8-port 1GE + 1-port 10GE Fully subscribed mode or 16-port 1GE + 1-port 10GE Over subscribed mode, then IMA8Z or IMA2F cannot be in slot 4. If the IM is in slot 14, then NCS4200-1T8S-10CS (10G_CEM) in slot 12 is not supported. If the IM is in slot 14, then NCS4200-1T8S-10CS (5G_CEM) in slot 12 is supported. |

| Slot Number | Supported IM Operating Modes | Restrictions |
|-------------|---|--|
| 15 | <ul style="list-style-type: none"> 8-port 1GE (SFP) + 1-port 10GE (SFP+) Fully subscribed 16-port 1GE (CSFP) + 1-port 10GE (SFP+) Oversubscribed 16-port/18-port 1GE (CSFP) Oversubscribed 8-port 1GE + 1-port 1GE Fully subscribed 1-port 10 GE Fully subscribed 8-port 1GE Fully subscribed | <ul style="list-style-type: none"> If IMA8CS1Z-M is in slot 15 in 8-port 1GE + 1-port 10GE Fully subscribed mode, or in 16-port 1GE + 1-port 10GE Oversubscribed mode, then the IM cannot be present in slot 11. If Slot 15 is in 8-port 1GE + 1-port 10GE Fully subscribed mode, or 16-port 1GE + 1-port 10GE Oversubscribed mode, then no IM is supported on slot 11. If Slot 15 is in 8-port 1GE + 1-port 10GE Fully subscribed, Or 16-port 1GE + 1-port 10GE Oversubscribed mode, then IMA8Z or IMA2F cannot be in slot 3. If the IM is in slot 15, then NCS4200-1T8S-10CS (10G_CEM) in slot 11 is not supported. If the IM is in slot 15, then NCS4200-1T8S-10CS (5G_CEM) in slot 11 is not supported. If the IM is in slot 15, then NCS4200-48T1E1-CE in slot 11 is not supported. If the IM is in slot 15, then NCS4200-48T3E3-CE in slot 11 is not supported. |

Associated Commands

The following table shows the Associated Commands for interface module configuration:

| Commands | Links |
|---|---|
| show platform software agent iomd [<i>im module</i>] dump fpga [<i>port number</i>] | http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/interface/command/ir-cr-book/ir-s5.html#wp6318513600 |
| show platform software agent iomd [<i>im module</i>] clear fpga [<i>port number</i>] | http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/interface/command/ir-cr-book/ir-s5.html#wp6318513600 |

Additional References

Related Documents

| Related Topic | Document Title |
|--------------------|--|
| Cisco IOS commands | Cisco IOS Master Commands List, All Releases |

| Related Topic | Document Title |
|---------------|--|
| Compact-SFP | Cisco SFP Modules for Gigabit Ethernet Applications Data Sheet |

Standards and RFCs

| Standard/RFC | Title |
|--------------|--|
| — | <i>There are no standards and RFCs for this feature.</i> |

MIBs

| MIB | MIBs Link |
|-----|--|
| — | <p><i>There are no MIBs for this feature.</i></p> <p>http://www.cisco.com/go/mibs</p> |

Technical Assistance

| Description | Link |
|---|--|
| <p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p> | <p>http://www.cisco.com/cisco/web/support/index.html</p> |

Additional References