

Managing Cisco Enhanced Services and Network Interface Modules

The router supports Cisco Enhanced Services Modules (SMs) and Cisco Network Interface Modules (NIMs). The modules are inserted into the router using an adapter, or carrier card, into various slots. For more information, see the following documents:

- Hardware Installation Guide for Cisco 8300 Series Secure Routers

These sections are included in this chapter:

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Information about Cisco Service Modules and Network Interface Modules

The router configures, manages, and controls the supported Cisco Service Modules (SMs), Network Interface Modules (NIMs) and PIM (Pluggable Interface Modules) using the module management facility built in its architecture. This new centralized module management facility provides a common way to control and monitor all the modules in the system regardless of their type and application. All Cisco Enhanced Service and Network Interface Modules supported on your router use standard IP protocols to interact with the host router. Cisco IOS software uses alien data path integration to switch between the modules.

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Modules supported

For information about the interfaces and modules supported by the Cisco 8300 Series Secure Routers, see Hardware Installation Guide for Cisco 8300 Series Secure Routers.

Network Interface Modules and Enhanced Service Modules

For more information on the supported Network Interface Modules and Service Modules, refer to the Cisco 8300 Series Secure Routers datasheet.

Implement SMs and NIMs on your platforms

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Download the module firmware

Module firmware must be loaded to the router to be able to use a service module.

The modules connect to the RP via the internal eth0 interface to download the firmware. Initially, the module gets an IP address for itself via BOOTP. The BOOTP also provides the address of the TFTP server used to download the image. After the image is loaded and the module is booted, the module provides an IP address for the running image via DHCP.

Install SMs and NIMs

For more information, see "Installing and Removing NIMs and SMs" in the Hardware Installation Guide for Cisco 8300 Series Secure Routers.

Access your module through a console connection or Telnet

Before you can access the modules, you must connect to the host router through the router console or through Telnet. After you are connected to the router, you must configure an IP address on the Gigabit Ethernet interface connected to your module. Open a session to your module using the **hw-module session** command in privileged EXEC mode on the router.

To establish a connection to the module, connect to the router console using Telnet or Secure Shell (SSH) and open a session to the switch using the **hw-module session** *slot/subslot* command in privileged EXEC mode on the router.

Use these configuration examples to establish a connection:

- The example shows how to open a session from the router using the **hw-module session** command:

```
Router# hw-module session slot/card
Router# hw-module session 0/1 endpoint 0

Establishing session connect to subslot 0/1
```

- The example shows how to exit a session from the router, by pressing **Ctrl-A** followed by **Ctrl-Q** on your keyboard:

```
type ^a^q
picocom v1.4

port is        : /dev/ttyDASH2
flowcontrol    : none
baudrate is    : 9600
parity is      : none
databits are   : 8
escape is      : C-a
noinit is      : no
noreset is     : no
nolock is      : yes
send_cmd is    : ascii_xfr -s -v -l10
receive_cmd is : rz -vv
```

Online insertion and removal

The router supports online insertion and removal (OIR) of Cisco Enhanced Services Modules and Cisco Network Interface Modules. You can perform these tasks using the OIR function:

Note The router supports OIR of a module, but does not support the hot removal and insertion of a module. Ensure to stop the traffic on these module, before insertion or removal.

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Prepare for online removal of a module

The router supports the OIR of a module, independent of removing another module installed in your router. This means that an active module can remain installed in your router, while you remove another module from one of the subslots. If you are not planning to immediately replace a module, ensure that you install a blank filler plate in the subslot.

Deactivate a module

A module must be deactivated before removing it from the router. To perform a graceful deactivation, use the **hw-module subslot** *slot/subslot* **stop** command in EXEC mode.

Note When you are preparing for an OIR of a module, it is not necessary to independently shut down each of the interfaces before deactivating the module. The **hw-module subslot** *slot/subslot* **stop** command in EXEC mode automatically stops traffic on the interfaces and deactivates them along with the module in preparation for OIR. Similarly, you do not have to independently restart any of the interfaces on a module after OIR.

The example shows how to use the **show facility-alarm status** command to verify if any critical alarm is generated when a module is removed from the system:

```
Router# show facility-alarm status
System Totals  Critical: 18  Major: 0  Minor: 0

Source                    Time                  Severity      Description [Index]
------                    ------                --------      -------------------

Power Supply Bay 1        Sep 28 2020 10:02:34  CRITICAL      Power Supply/FAN Module
Missing [0]
POE Bay 0                 Sep 28 2020 10:02:34  INFO          Power Over Ethernet Module
 Missing [0]
POE Bay 1                 Sep 28 2020 10:02:34  INFO          Power Over Ethernet Module
 Missing [0]
GigabitEthernet0/0/2      Sep 28 2020 10:02:46  INFO         Physical Port Administrative
 State Down [2]
GigabitEthernet0/0/3      Sep 28 2020 10:02:46  INFO         Physical Port Administrative
 State Down [2
xcvr container 0/0/4      Sep 28 2020 10:02:46  INFO          Transceiver Missing - Link
 Down [1]
TenGigabitEthernet0/0/5   Sep 28 2020 10:02:54  CRITICAL      Physical Port Link Down [1]
TenGigabitEthernet0/1/0   Sep 28 2020 10:03:26  INFO         Physical Port Administrative
 State Down [2]
GigabitEthernet1/0/0      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
GigabitEthernet1/0/1      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
GigabitEthernet1/0/2      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
GigabitEthernet1/0/3      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
GigabitEthernet1/0/4      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
GigabitEthernet1/0/5      Sep 28 2020 10:07:35  CRITICAL      Physical Port Link Down [1]
TwoGigabitEthernet1/0/16  Sep 28 2020 10:07:35  INFO         Physical Port Administrative
 State Down [2]
TwoGigabitEthernet1/0/17  Sep 28 2020 10:07:35  INFO         Physical Port Administrative
 State Down [2]
TwoGigabitEthernet1/0/18  Sep 28 2020 10:07:35  INFO         Physical Port Administrative
 State Down [2]
TwoGigabitEthernet1/0/19  Sep 28 2020 10:07:35  INFO         Physical Port Administrative
 State Down [2]
xcvr container 1/0/20     Sep 28 2020 10:04:00  INFO          Transceiver Missing - Link
 Down [1]
xcvr container 1/0/21     Sep 28 2020 10:04:00  INFO          Transceiver Missing - Link
 Down [1]1]
```

Note A critical alarm (Active Card Removed OIR Alarm) is generated even if a module is removed after performing graceful deactivation.

Deactivating modules and Interfaces in different command modes

You can deactivate a module and its interfaces using the **hw-module subslot** command in one of these modes:

1. **hw-module subslot** *slot/subslot* **shutdown unpowered**

   If you choose to deactivate your module and its interfaces by executing the **hw-module subslot** *slot/subslot* **shutdown unpowered** command in global configuration mode, you are able to change the configuration in such a way that no matter how many times the router is rebooted, the module does not boot. This command is useful when you need to shut down a module located in a remote location and ensure that it does not boot automatically when the router is rebooted.

   ```
   Router(config)# hw-module subslot 0/2 shutdown unpowered
   ```

   Deactivates the module located in the specified slot and subslot of the router, where:

   - *slot*—Specifies the chassis slot number where the module is installed.
   - *subslot*—Specifies the subslot number of the chassis where the module is installed.
   - **shutdown**—Shuts down the specified module.
   - **unpowered**—Removes all interfaces on the module from the running configuration and the module is powered off.

2. **hw-module subslot** *slot/subslot* [**reload** | **stop** | **start**]

   If you choose to use the **hw-module subslot** *slot/subslot* **stop** command in EXEC mode, you cause the module to gracefully shut down. The module is rebooted when the **hw-module subslot** *slot/subslot* **start** command is executed.

   ```
   Router# hw-module subslot 0/2 stop
   ```

   Deactivates the module in the specified slot and subslot, where:

   - *slot*—Specifies the chassis slot number where the module is installed.
   - *subslot*—Specifies the subslot number of the chassis where the module is installed.
   - **reload**—Stops and restarts the specified module.
   - **stop**—Removes all interfaces from the module and the module is powered off.
   - **start**—Powers on the module similar to a physically inserted module in the specified slot. The module firmware reboots and the entire module initialization sequence is executed in the IOSd and Input/Output Module daemon (IOMd) processes.

Reactivate a module

If, after deactivating a module using the **hw-module subslot** *slot/subslot* **stop** command, you want to reactivate it without performing an OIR, use one of these commands (in privileged EXEC mode):

- **hw-module subslot** *slot/subslot* **start**
- **hw-module subslot** *slot/subslot* **reload**

Verify the deactivation and activation of a module

When you deactivate a module, the corresponding interfaces are also deactivated. This means that these interfaces will no longer appear in the output of the **show interface** command.

1. To verify the deactivation of a module, enter the **show hw-module subslot all oir** command in privileged EXEC configuration mode.

   Observe the "Operational Status" field associated with the module that you want to verify. In this example, the module located in subslot 1 of the router is administratively down.

```
Router# show hw-module subslot all oir

  Module                   Model               Operational Status
---------------------- -------------------- ------------------------

subslot 0/0             4M-2xSFP+            ok

subslot 0/1             C-NIM-8M             ok
subslot 0/4             VDSP-CC              ok
```

2. To verify activation and proper operation of a module, enter the **show hw-module subslot all oir** command and observe "ok" in the **Operational Status** field as shown in the following example:

```
Router# show hw-module subslot all oir

 Module                   Model               Operational Status
---------------------- -------------------- ------------------------

subslot 0/0             4M-2xSFP+            ok

subslot 0/1             C-NIM-8M             ok
subslot 0/4             VDSP-CC              ok
```

Manage modules and interfaces

The router supports various modules. For a list of supported modules, see Modules supported, on page 2. The module management process involves bringing up the modules so that their resources can be utilized. This process consists of tasks such as module detection, authentication, configuration by clients, status reporting, and recovery.

For a list of small-form-factor pluggable (SFP) modules supported on your router, see the "Installing and Upgrading Internal Modules and FRUs" section in the Hardware Installation Guide for Cisco 8300 Series Secure Routers.

The following sections provide additional information on managing the modules and interfaces:

- Manage module interfaces, on page 6

Manage module interfaces

After a module is in service, you can control and monitor its module interface. Interface management includes configuring clients with **shut** or **no shut** commands and reporting on the state of the interface and the interface-level statistics.

Configuration examples

This section provides examples of deactivating and activating modules.

Deactivating a module configuration: Example

You can deactivate a module to perform OIR of that module. The following example shows how to deactivate a module (and its interfaces) and remove power to the module. In this example, the module is installed in subslot 0 of the router.

```
Router(config)# hw-module subslot 1/0 shutdown unpowered
```

Activating a module configuration: Example

You can activate a module if you have previously deactivated it. If you have not deactivated a module and its interfaces during OIR, then the module is automatically reactivated upon reactivation of the router.

The following example shows how to activate a module. In this example, the module is installed in subslot 0, located in slot 1 of the router:

```
Router(config)# no hw-module subslot 1/0 shutdown unpowered
```