



Connecting Cisco Network Capacity Expansion Enhanced Network Modules to the Network

Revised: May 1, 2008, OL-16672-01

This guide describes how to connect Cisco Network Capacity Expansion enhanced network modules to your network. It contains the following sections:

- [Cisco Network Capacity Expansion Enhanced Network Modules, page 1](#)
- [Establishing a Gigabit Ethernet Internal Logical Connection, page 2](#)
- [Online Insertion and Removal of Cisco Network Modules, page 3](#)
- [Related Documents, page 4](#)
- [Obtaining Documentation, Obtaining Support, and Security Guidelines, page 5](#)

Cisco Network Capacity Expansion Enhanced Network Modules

The NME-TPO network module provides WAN bandwidth optimization for the integrated services router (ISR) product family through more efficient packet compression algorithm and Transmission Control Protocol (TCP) optimization.

The NME-TPO network module ships from the factory with the following hardware preinstalled.

| Model | Processor | Memory | USB Storage |
|---------|-----------|--------|-------------|
| NME-TPO | 500 MHz | 1 GB | 512 MB |



Note

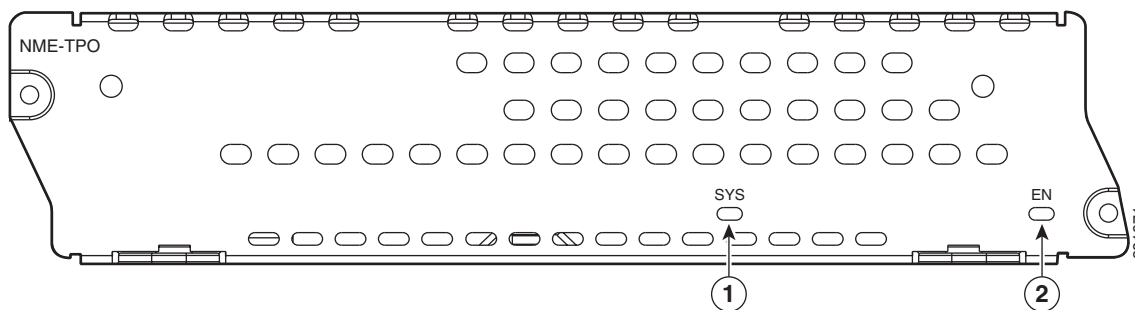
In addition to the NME-TPO network module, there are two Cisco Network Capacity Expansion advanced integration modules (AIM). For information about installing the AIM-TPO-1 or AIM-TPO-2 modules, see the hardware installation guide for your router.



Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

The Cisco Network Capacity Expansion enhanced network module LEDs are shown in Figure 1.

Figure 1 NME-TPO Faceplate



| | | |
|----------|------------|--|
| 1 | SYS | <p>Status of the application</p> <p>Note Do not remove power without first shutting down the application.</p> <p>Flashing (slow)—Application is stable.</p> <p>Flashing (fast)—Error is detected.</p> <p>Off—System is shut down.</p> |
| 2 | EN | <p>Status of the network module:</p> <p>On—Detected by the host Cisco IOS software and enabled.</p> <p>Off—Disabled.</p> |

Establishing a Gigabit Ethernet Internal Logical Connection

Use the Cisco High-Speed Intrachassis Module Interconnect (HIMI) feature to establish a Gigabit Ethernet internal logical connection between two network modules, or between an onboard small-form-factor pluggable (SFP) Gigabit Ethernet module and a network module on a Cisco 3825 router or Cisco 3845 router.

Connections can be established only as follows:

- Between the Gigabit Ethernet port in an installed onboard SFP module on a Cisco 3825 router or Cisco 3845 router
- Between Gigabit Ethernet interfaces in network module slots 1 and 2 on a Cisco 3825 router
- Between Gigabit Ethernet interfaces in network module slots 2 and 4 on a Cisco 3845 router



Note

A module interconnection between the Gigabit Ethernet port on an SFP module on a Cisco 3825 router or a Cisco 3845 router and a network module slot *or* a network module-to-network module cross-connection is permitted at any given time. However, both types of connections cannot be implemented at the same time.

For details about configuring HIMI connections, see the *Cisco High-Speed Intrachassis Module Interconnect (HIMI) Configuration Guide* on Cisco.com:

http://www.cisco.com/en/US/docs/ios/12_4/12_4_mainline/srdesfm1.html

Online Insertion and Removal of Cisco Network Modules

Some Cisco routers allow you to replace network modules without switching off the router or affecting the operation of other interfaces. This feature is called *online insertion and removal* (OIR). OIR of a module provides uninterrupted operation to network users, maintains routing information, and ensures session preservation.



Caution

Unlike other network modules, Cisco Network Capacity Expansion enhanced network modules use USB storage. Online removal of network modules without proper shutdown can cause file system corruption and might render the USB storage unusable. You must shut down the operating system on the network module in an orderly way before removing or powering down the network module.



Caution

Cisco routers support OIR with identical modules only. If you remove a module, install in its place another module exactly like the one you removed. If you remove a 2-slot module (along with any installed WAN or voice interface cards), install another module and card combination exactly like the one you removed.

For descriptions of informational and error messages that may appear on the console during this procedure, see the hardware installation guide for your router.

To perform online removal of a network module and insertion of a replacement, follow these steps, with the router in privileged EXEC mode:

Step 1 Initiate a network module session by using the following command:

```
Router# service-module transport-Opt-Service-Engine slot/unit session

Trying 10.10.10.1, 2065 ... Open

SE-Module> enable
SE-Module#
```

Step 2 Save the running configuration of the network module by using the following command from the SE-Module# prompt:

```
SE-Module# copy running-config tftp tftp-server-address filename
```

Step 3 Exit the network module session by pressing **Control-Shift-6**, followed by pressing **x**.

Step 4 Shut down the network module interface:

```
Router (config)# interface transport-Opt-Service-Engine slot/unit
Router (config-if)# shutdown
Router (config-if)# exit
```

Step 5 On the router, clear the transport-Opt-Service-Engine console session by using the following command:

```
Router# service-module transport-Opt-Service-Engine slot/unit session clear
```

Step 6 Perform a graceful shutdown of the network module disk drive by using the following command:

```
Router# service-module transport-Opt-Service-Engine slot/unit shutdown
```

Step 7 Check the status of the network module:

```
Router# service-module transport-Opt-Service-Engine slot/unit status
Service Module is Cisco Transport-Opt-Service-Engine4/0
```

```
Service Module supports session via TTY line 258
Service Module is Shutdown
Service Module is in fail open
Service Module status is not available
```

- Step 8** Loosen the two captive screws that are holding the network module in the chassis slot.
- Step 9** Slide the network module out of the slot.
- Step 10** Align the replacement network module with the guides in the chassis slot, and slide it gently into the slot.



Note If the router is not fully configured with network modules, make sure that blank panels fill the unoccupied chassis slots to provide proper airflow.

- Step 11** Push the module into place until you feel its edge connector mate securely with the connector on the backplane.
- Step 12** Check that the network module LEDs are on. This inspection ensures that connections are secure and that the new unit is operational.
- Step 13** Initiate a network module session by using the following command:

```
Router# service-module transport-Opt-Service-Engine slot/unit session
```

```
Trying 10.10.10.1, 2129 ... Open
```

```
SE-Module> enable
SE-Module#
```

- Step 14** Restore the running configuration of the network module by using the following command from the service module prompt:

```
SE-Module# copy tftp running-config tftp-server-address filename
```

- Step 15** Exit the network module session by pressing **Control-Shift-6**, followed by pressing **x**.

- Step 16** The network module interface is still in shutdown mode. Return the network module interface to active state by using the following command:

```
Router (config)# interface transport-Opt-Service-Engine slot/unit
Router (config-if)# no shutdown
Router (config-if)# exit
```

Related Documents

For additional information, see the following documents and resources.

| Related Topic | Document Title |
|--|--|
| Cisco Network Capacity Expansion application configuration | Cisco Network Capacity Expansion feature guide |

| Related Topic | Document Title |
|--|--|
| Regulatory compliance and safety information | <i>Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information</i> http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html |
| Cisco IOS software website and reference documentation | <i>Cisco IOS Software</i> http://www.cisco.com/web/psa/products/index.html?c=268438303 |

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

CCDE, CCENT, Cisco Eos, Cisco Lumin, Cisco Nexus, Cisco StadiumVision, Cisco TelePresence, Cisco WebEx, the Cisco logo, DCE, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn and Cisco Store are service marks; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, CCVP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, MediaTone, MeetingPlace, MeetingPlace Chime Sound, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0809R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

© 2008 Cisco Systems, Inc. All rights reserved.

