



## Product Overview

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### Note

- For complete syntax and usage information for the commands used in this chapter, see these publications:  
[http://www.cisco.com/en/US/products/ps11846/prod\\_command\\_reference\\_list.html](http://www.cisco.com/en/US/products/ps11846/prod_command_reference_list.html)
- Cisco IOS Release 15.4SY supports only Ethernet interfaces. Cisco IOS Release 15.4SY does not support any WAN features or [commands](#).
- For complete information about the supported chassis, modules, and software features, see the *Release Notes for Cisco IOS Release 15.2SY*:  
[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/15.1SY/release\\_notes.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/15.1SY/release_notes.html)



### Tip

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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## Supervisor Engine 2T-10GE Flash Memory Devices

- **disk0:** (active) and **slavedisk0:** (standby):
  - External CompactFlash Type II slots
  - For CompactFlash Type II flash PC cards sold by Cisco Systems, Inc.
- **bootdisk:** (active) and **slavebootdisk:** (standby): 1-GB internal flash memory

## Supervisor Engine 2T-10GE Ports

- Console ports:
  - EIA/TIA-232 (RS-232) port with RJ-45 connector
  - USB port

By default (**no media-type rj45** configured on the console 0 interface), either connector can be used and if an active USB connection is detected, the RJ-45 connector is deactivated. With the **no media-type rj45** command configured on the console 0 interface, the RJ-45 connector can only be used when there is no active USB connection. With the **media-type rj45** command configured on the console 0 interface, only the RJ-45 connector can be used. See this publication for information about USB drivers:

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Module\\_Installation/Sup\\_Eng\\_Guide/03instal.html#USB\\_Console\\_Port\\_Driver\\_Installation](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Module_Installation/Sup_Eng_Guide/03instal.html#USB_Console_Port_Driver_Installation)




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**Note** With Release 15.1(1)SY, be aware of the [console disconnect](#) feature, which is enabled by default.

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- Ports 1, 2, and 3: Gigabit Ethernet SFP (fiber or 10/100/1000 Mbps RJ-45)
- Ports 4 and 5—10-Gigabit Ethernet X2



**Note**

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- The 1-Gigabit Ethernet ports and the 10-Gigabit Ethernet ports have the same QoS port architecture (2q4t/1p3q4t) unless you disable the 1-Gigabit Ethernet ports with the **platform qos 10g-only** global configuration command. With the 1-Gigabit Ethernet ports disabled, the QoS port architecture of the 10-Gigabit Ethernet ports is 8q4t/1p7q4t.
  - See the [Supervisor Engine 2T-10GE Connectivity Management Processor Configuration Guide](#) for information about the 10/100/1000 Mbps RJ-45 port.
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See the “[How to Configure Optional Interface Features](#)” section on page 11-3 for information about configuring the ports.

# Supervisor Engine 2T-10GE Connectivity Management Processor (CMP)

See this publication:

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/cmp\\_configuration/guide/sup2T\\_10GEcmp.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/cmp_configuration/guide/sup2T_10GEcmp.html)

## Determining System Hardware Capacity

You can determine the system hardware capacity by entering the **show platform hardware capacity** command. This command displays the current system utilization of the hardware resources and displays a list of the currently available hardware capacities, including the following:

- Hardware forwarding table utilization
- Switch fabric utilization
- CPU(s) utilization
- Memory device (flash, DRAM, NVRAM) utilization

This example shows how to display CPU capacity and utilization information for the route processor, the switch processor, and a switching module:

```
Router# show platform hardware capacity cpu
CPU Resources
CPU utilization: Module           5 seconds      1 minute      5 minutes
                   3              0% / 0%        1%            1%
                   7 RP          2% / 0%        1%            1%
Processor memory: Module Bytes:   Total          Used           %Used
                   3              1612928756    164136704     10%
                   7 RP          1569347520    242739196     15%
I/O memory: Module Bytes:      Total          Used           %Used
                   3              268435456     21163672      8%
                   7 RP          268435456     110324056     41%
```

Router#

This example shows how to display EOBC-related statistics for the route processor, the switch processor, and the DFCs:

```
Router# show platform hardware capacity eobc
EOBC Resources
Module           Packets/sec   Total packets   Dropped packets
3               Rx:           25              57626           0
                Tx:           19              45490           0
7 RP           Rx:           36456689392    54747           0
                Tx:           25              66898           0
```

This example shows how to display the current and peak switching utilization:

```
Router# show platform hardware capacity fabric
Bus utilization: current is 100%, peak was 100% at 12:34 12mar45
Fabric utilization: ingress egress
Module channel speed current peak current peak
1 0 20G 100% 100% 12:34 12mar45 100% 100% 12:34 12mar45
1 1 20G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
4 0 20G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
13 0 8G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
```

This example shows how to display information about the total capacity, the bytes used, and the percentage that is used for the flash and NVRAM resources present in the system:

```
Router# show platform hardware capacity flash
Flash/NVRAM Resources
Usage: Module Device          Bytes:      Total          Used          %Used
      3      dfc#3-bootflash:    15990784    0              0%
      7  RP  nvram:                2552192    40640          2%
      7  RP  const_nvram:           1048556    676            1%
      7  RP  bootdisk:             1024196608 99713024       10%
      7  RP  disk0:                 1024655360 77824000        8%
```

This example shows how to display the capacity and utilization of the PFC and DFCs present in the system:

```
Router# show platform hardware capacity forwarding
L2 Forwarding Resources
  MAC Table usage:  Module Collisions Total          Used          %Used
                   6              0 65536          11            1%
  VPN CAM usage:   Total          Used          %Used
                   512              0            0%

L3 Forwarding Resources
  FIB TCAM usage:  Total          Used          %Used
    72 bits (IPv4, MPLS, EoM) 196608          36            1%
    144 bits (IP mcast, IPv6) 32768            7            1%

    detail:        Protocol          Used          %Used
                  IPv4              36            1%
                  MPLS              0             0%
                  EoM              0             0%

                  IPv6              4             1%
                  IPv4 mcast        3             1%
                  IPv6 mcast        0             0%

  Adjacency usage: Total          Used          %Used
                   1048576        175           1%

Forwarding engine load:
  Module          pps  peak-pps  peak-time
  6                8      1972    02:02:17 UTC Thu Apr 21 2005

Netflow Resources
  TCAM utilization:  Module          Created          Failed          %Used
                   6                1                0                0%
  ICAM utilization:  Module          Created          Failed          %Used
                   6                0                0                0%

  Flowmasks:  Mask#  Type          Features
    IPv4:      0  reserved    none
    IPv4:      1  Intf FulNAT_INGRESS NAT_EGRESS FM_GUARDIAN
    IPv4:      2  unused      none
    IPv4:      3  reserved    none

    IPv6:      0  reserved    none
    IPv6:      1  unused      none
    IPv6:      2  unused      none
    IPv6:      3  reserved    none

CPU Rate Limiters Resources
  Rate limiters:  Total          Used          Reserved          %Used
    Layer 3        9                4                1                44%
    Layer 2        4                2                2                50%
```

## ACL/QoS TCAM Resources

Key: ACLent - ACL TCAM entries, ACLmsk - ACL TCAM masks, AND - ANDOR,  
 QoSent - QoS TCAM entries, QoSmsk - QoS TCAM masks, OR - ORAND,  
 Lbl-in - ingress label, Lbl-eg - egress label, LOUsrc - LOU source,  
 LOUdst - LOU destination, ADJ - ACL adjacency

Module	ACLent	ACLmsk	QoSent	QoSmsk	Lbl-in	Lbl-eg	LOUsrc	LOUdst	AND	OR	ADJ
6	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	1%

Router#

This example shows how to display the interface resources:

Router# **show platform hardware capacity interface**

Interface drops:

Module	Total drops:	Tx	Rx	Highest drop port:	Tx	Rx
9		0	2		0	48

Interface buffer sizes:

Module	Bytes:	Tx buffer	Rx buffer
1		12345	12345
5		12345	12345

Router#

This example shows how to display SPAN information:

Router# **show platform hardware capacity monitor**

Source sessions: 2 maximum, 0 used

Type	Used
Local	0
RSPAN source	0
ERSPAN source	0
Service module	0

Destination sessions: 64 maximum, 0 used

Type	Used
RSPAN destination	0
ERSPAN destination (max 24)	0

Router#

This example shows how to display the capacity and utilization of resources for Layer 3 multicast functionality:

Router# **show platform hardware capacity multicast**

L3 Multicast Resources

IPv4 replication mode: ingress

IPv6 replication mode: ingress

Bi-directional PIM Designated Forwarder Table usage: 4 total, 0 (0%) used

Replication capability: Module

Module	IPv4 egress	IPv6 egress
5		
9	ingress	ingress

MET table Entries: Module

Module	Total	Used	%Used
5	65526	6	0%

Router#

This example shows how to display information about the system power capacities and utilizations:

Router# **show platform hardware capacity power**

Power Resources

Power supply redundancy mode: administratively redundant

operationally non-redundant (single power supply)

System power: 3795W, 0W (0%) inline, 865W (23%) total allocated

Powered devices: 0 total, 0 Class3, 0 Class2, 0 Class1, 0 Class0, 0 Cisco

Router#

This example shows how to display the capacity and utilization of QoS policer resources for each PFC and DFC:

```
Router# show platform hardware capacity qos
QoS Policer Resources
Aggregate policers: Module                Total      Used      %Used
                   6                    16384     16        1%
Microflow policer configurations: Module  Total      Used      %Used
                   6                    128       1         1%
Netflow policer configurations: Module   Total      Used      %Used
                   6                    384       0         0%
Aggregate policer configs: Module        Total      Used      %Used
                   6                    1024      8         1%
Distributed policers: Total              Used      %Used
                   4096                 1         1%
QoS Tcam Entries: Module                 Total      Used      %Used
                   1                    16384    1171      7%
                   2                    16384    1171      7%
                   3                    16384    1171      7%
```

Router#

This example shows how to display information about the key system resources:

```
Router# show platform hardware capacity system
System Resources
PFC operating mode: PFC4
Supervisor redundancy mode: administratively sso, operationally sso
Switching resources: Module  Part number      Series      CEF mode
                   6        VS-SUP2T-10G      supervisor  CEF
```

Router#

This example shows how to display VLAN information:

```
Router# show platform hardware capacity vlan
VLANs: 4094 total, 10 VTP, 0 extended, 0 internal, 4084 free
Router#
```

## Module Status Monitoring

The supervisor engine polls the installed modules with Switch Communication Protocol (SCP) messages to monitor module status.

The SCP sends a message every two seconds to each module. Module nonresponse after 3 messages (6 seconds) is classified as a failure. CPU\_MONITOR system messages are sent every 30 seconds. After 25 sequential failures (150 seconds), the supervisor engine power cycles the module and sends a CPU\_MONITOR TIMED\_OUT system message and OIR PWRCYCLE system messages.

## Enabling Visual Identification of Modules or Ports

To make a module easy to identify visually, you can configure the blue ID LED (also called the blue beacon LED) on these modules to blink:

- Supervisor Engine 2T-10GE
- WS-X6908-10GE 10-Gigabit Ethernet switching module

This is the command to enable blinking on a module:

```
Router(config)# hw-module slot slot_number led beacon
```

This is the command to disable blinking on a module:

```
Router(config)# no hw-module slot slot_number led beacon
```

To make a port easy to identify visually, you can configure the link LED on these modules to blink:

- Supervisor Engine 2T-10GE
- WS-X6908-10GE 10-Gigabit Ethernet switching module

This is the command to enable blinking on a port:

```
Router(config-if)# led beacon
```

This is the command to disable blinking:

```
Router(config-if)# no led beacon
```

## User Interfaces

- CLI—See [Chapter 3, “Command-Line Interfaces.”](#)
- SNMP—See the *SNMP Configuration Guide*, Cisco IOS Release 15.4SY, at this URL:  
<http://www.cisco.com/en/US/docs/ios-xml/ios/snmp/configuration/15sy/snmp-15-sy-book.html>
- Cisco IOS web browser interface—See the *HTTP Services Configuration Guide*, Cisco IOS Release 15.4SY, at this URL:  
<http://www.cisco.com/en/US/docs/ios-xml/ios/https/configuration/15-sy/https-15-sy-book.html>

## Software Features Supported in Hardware by the PFC and DFC

- Access Control Lists (ACLs) for Layer 3 ports and VLAN interfaces:
  - Permit and deny actions of input and output standard and extended ACLs



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**Note** Flows that require ACL logging are processed in software on the route processor (RP).

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- Except on MPLS interfaces, reflexive ACL flows after the first packet in a session is processed in software on the RP
- Dynamic ACL flows



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**Note** Idle timeout is processed in software on the RP.

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For more information about PFC and DFC support for ACLs, see [Chapter 71, “Cisco IOS ACL Support.”](#)

- Bidirectional Protocol Independent Multicast (PIM) in hardware—See [“IPv4 Bidirectional PIM” section on page 45-8.](#)

- Dynamic address resolution protocol (ARP) inspection (DAI)—See [Chapter 82, “Dynamic ARP Inspection \(DAI\).”](#)
- Multiple-path Unicast Reverse Path Forwarding (RPF) Check—To configure Unicast RPF Check, see the [“Unicast Reverse Path Forwarding \(uRPF\) Check”](#) section on page 78-6.
- Except on MPLS interfaces, Network Address Translation (NAT) for IPv4 unicast and multicast traffic.

Note the following information about hardware-assisted NAT:

- The PFC and any DFCs do not support NAT of multicast traffic. ([CSCtd18777](#))
- The PFC and any DFCs do not support NAT configured with a route-map that specifies length.
- When you configure NAT and NDE on an interface, the RP processes all traffic in fragmented packets in software.
- To prevent a significant volume of NAT traffic from being sent to the RP, due to either a DoS attack or a misconfiguration, enter the **platform rate-limit unicast acl {ingress | egress}** command.
- NetFlow—See [Chapter 54, “NetFlow Hardware Support.”](#)
- Policy-based routing (PBR)—See [Chapter 35, “Policy-Based Routing \(PBR\).”](#)



**Note**

The PFC and DFC do not provide hardware acceleration for tunnels configured with the **tunnel key** command.

- IPv4 Multicast over point-to-point generic route encapsulation (GRE) Tunnels.
- GRE Tunneling and IP in IP Tunneling—The PFC and DFC support the following **tunnel** commands:
  - **tunnel destination**
  - **tunnel mode gre**
  - **tunnel mode ipip**
  - **tunnel source**
  - **tunnel ttl**
  - **tunnel tos**

Other supported types of tunneling run in software.

The **tunnel ttl** command (default 255) sets the TTL of encapsulated packets.

The **tunnel tos** command, if present, sets the ToS byte of a packet when it is encapsulated. If the **tunnel tos** command is not present and QoS is not enabled, the ToS byte of a packet sets the ToS byte of the packet when it is encapsulated. If the **tunnel tos** command is not present and QoS is enabled, the ToS byte of a packet as modified by PFC QoS sets the ToS byte of the packet when it is encapsulated.

To configure GRE Tunneling and IP in IP Tunneling, see these publications:

<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/configuration/15-sy/ir-impl-tun.html>

To configure the **tunnel tos** and **tunnel ttl** commands, see this publication for more information:

[http://www.cisco.com/en/US/docs/ios/12\\_0s/feature/guide/12s\\_tos.html](http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/12s_tos.html)

Note the following information about tunnels:



- The PFC4 and DFC4 support up to 8 multicast rendezvous points (RP).
  - Each hardware-assisted tunnel must have a unique source. Hardware-assisted tunnels cannot share a source even if the destinations are different. Use secondary addresses on loopback interfaces or create multiple loopback interfaces. (CSCdy72539)
  - Each tunnel interface uses one internal VLAN.
  - Each tunnel interface uses one additional router MAC address entry per router MAC address.
  - The PFC and DFC support PFC QoS features on tunnel interfaces.
  - Tunnels configured with egress features on the tunnel interface are supported in software. Examples of egress features are output Cisco IOS ACLs, NAT (for inside to outside translation), TCP intercept, and encryption.
- VLAN ACLs (VACLs)—To configure VACLs, see [Chapter 76, “VLAN ACLs \(VACLs\).”](#)

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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