Product Overview

Note

- For complete syntax and usage information for the commands used in this chapter, see these publications:

  http://www.cisco.com/en/US/products/ps11845/prod_command_reference_list.html
- Cisco IOS Release 15.0SY supports only Ethernet interfaces. Cisco IOS Release 15.0SY 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 15.0SY*:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/15.0SY/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

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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
- 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

- 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.

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

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                              IPv4     IPv6
                          5                                  egress   egress
                          9                                 ingress  ingress
  MET table Entries: 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 2, "Command-Line Interfaces."
- SNMP—See the *SNMP Configuration Guide*, Cisco IOS Release 15.0SY, 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 15.0SY, 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

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

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

    Note Idle timeout is processed in software on the RP.

  For more information about PFC and DFC support for ACLs, see Chapter 67, "Cisco IOS ACL Support."
- Bidirectional Protocol Independent Multicast (PIM) in hardware—See "IPv4 Bidirectional PIM" section on page 42-8.

- Dynamic address resolution protocol (ARP) inspection (DAI)—See Chapter 78, "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 74-5.
- 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 50, "NetFlow Hardware Support."
- Policy-based routing (PBR)—See Chapter 32, "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

  Note the following information about tunnels:

  - The PFC4 and DFC4 support up to 8 multicast rendevous 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 72, "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

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