4-Port Gigabit Ethernet ISE Line Card for Cisco 12000 Series Internet Router

Feature History

Release	Modification
12.0(25)S	This feature was introduced on the Cisco 12000 Series Internet Routers.
12.0(31)S	The maximum number of egress QoS policies supported on each port and the total number supported on all ports of a 4-Port Gigabit Ethernet ISE line card has changed.

This document describes software functionality added to Cisco IOS Release 12.0 S to support the 4-Port Gigabit Ethernet ISE line card.

This document includes the following sections:

Feature Overview

This document describes the new software functionality and commands added to Cisco IOS Release 12.0S along with the introduction of the 4-Port Gigabit Ethernet ISE line card. The 4-Port Gigabit Ethernet ISE line card provides Cisco 12000 Series Internet Routers with four optical Gigabit Ethernet interfaces on a single line card, while providing full Edge Engine capabilities. Since the total ingress bandwidth of all four ports (4 Gbps) exceeds the throughput capabilities of the line card (2.5 Gbps), a series of **plim qos input** commands were introduced into Cisco IOS to identify high-priority traffic and pass it to the high-priority queues.

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There are two physical layer interface module (PLIM) queues per port (eight queues in all). For each port, one queue is a high-priority (low-latency) queue, and the other is the low-priority queue (queue number 0). These queues are used to manage congestion and possible traffic drops, given that the card throughput is less than the sum of the bandwidths of the four Gigabit Ethernet ports.

Queuing Structure of the 4-Port Gigabit Ethernet ISE Line Card

There are two queues for each Gigabit Ethernet Port for a total of eight queues. In order to determine which queue a particular packet is sent to, the following algorithm is used.

VLAN packets

During the port/VLAN lookup in the RX direction in the field-programmable gate array (FPGA), a VLAN Priority Vector and VLAN Priority Select bits are returned. If the VLAN Priority Select is 1, then the 802.1Q priority bits of the current packet index into the VLAN Priority Vector. The resulting bit is the priority, where 1 indicates high priority and 0 indicates low priority.

If the VLAN Priority Select is 0, then the packet's underlying priority is used. For VLAN encapsulated MPLS packets, the MPLS Exp value is used; for VLAN encapsulated IPv4 packets, the IPv4 TOS/DIFFSERVE value is used; for VLAN encapsulated IPv6 packets, the IPv6 TC value is used.

MPLS packets

The MPLS EXP bits (three-bit field) is extracted from each incoming MPLS packet. The EXP bits are used to index into a table. The resulting table entry is the packet priority.

IPv4 packets

For IPv4 packets, priority is based on the IP TOS octet. The IP TOS octet contains either IP precedence bits (3 bit field) or Differentiated Services (DIFFSERVE) Codepoint (DSCP) bits (six-bit field).

A domain will either use IP TOS Precedence or DSCP as its class of service. There is never a mixture of IP TOS/DSCP in the same domain.

The IP TOS Precedence field is three bits in length. In order to map this field into a single priority (high/low), the three-bit Precedence field is extracted from the packet and looked up in a table. The resulting entry is the priority.

For DSCP, the same IPv4 IP TOS octet is used, but the bits have a different meaning. The 6-bit DSCP field is used as an index into a table. The resulting entry is the priority.

IPv6 packets

The 4-Port Gigabit Ethernet ISE line card interprets the IPv6 traffic class (TC) octet as a Differentiated Services Field (IPv6 DSCP). IPv6 packet priority is based on this six-bit field. The six-bit field of the IPv6 frame indexes a 64 deep x 1 table. The resulting table entry is the packet priority.

Restrictions

Maximum Number of Egress QoS Policies Supported

Starting in Cisco IOS Release 12.0(31)S, the maximum number of egress Quality of Service (QoS) policies supported on each port of the 4-Port Gigabit Ethernet ISE line card is 511. The total number of egress QoS policies supported on all ports of a 4-Port Gigabit Ethernet ISE line card is 1020.

Related Features and Technologies

The features described in this document are a subset of the QoS features available on your Cisco 12000 Series Internet Router. Refer to Cisco.com for more information on QoS.

Related Documents

The following documents provide additional information about installing and configuring the 4-Port Gigabit Ethernet ISE line card:

- *4-Port Gigabit Ethernet ISE Line Card Installation and Configuration Note*
- *Release Notes for Cisco 12000 Series Routers for Cisco IOS Release 12.0 S*
- *Field Diagnostics for the Cisco 12000 Series Internet Router*

You can also find additional information in the installation and configuration guide for your Cisco 12000 Series Internet Router and in the Cisco IOS Release 12.0 documentation set.

Supported Platforms

The commands described in this document are supported on the 4-Port Gigabit Ethernet ISE line card in all Cisco 12000 Series Internet Routers.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Supported Standards, MIBs, and RFCs

There are no new standards, MIBs, or RFCs.

Configuration Tasks

Upgrading the FPGA Image

If the line card does not boot and you receive an error message indicating that there is a problem with the Field-Programmable Gate Array (FPGA) image (or if the line card alphanumeric LED display remains frozen in IOS STRT state), you need to upgrade the FPGA image using the **update-fpga** option in the **diag** command.

Note The **diag** command and the **update-fpga** option are documented in the *Field Diagnostics for the Cisco 12000 Series Internet Router* publication. The FPGA image version on the line card must match (or be greater than) the minimum FPGA version required in the Cisco IOS image running on the router.

Command Reference

This section documents new or modified commands for the 4-Port Gigabit Ethernet ISE line card. All other commands used with this feature are documented in the Cisco IOS Release 12.0S command reference publications.

The following commands are described:

- match cos
- set cos
- plim qos input map cos enable
- plim qos input map cos queue
- plim qos input map ip dscp-based
- plim qos input map ip dscp queue
- plim qos input map ip precedence-based
- plim qos input map ip precedence queue
- plim qos input map ipv6 tc queue
- plim qos input map mpls exp queue
- plim qos input queue pause
- plim qos input queue queue-limit
- plim qos input queue weight
- show controller gigabitethernet fpga
- show controller gigabitethernet fpga bm
- show tag-switching alpha-atom ethernet
- show tcam l2-tcam

match cos

To match a packet based on a Layer 2 class of service (CoS) marking, use the **match cos** command in class-map configuration mode. To remove a specific classification, use the **no** form of this command.

match cos *cos-value* [*cos-value cos-value cos-value cos-value*]

no match cos *cos-value* [*cos-value cos-value cos-value cos-value*]

Syntax Description

cos-value	(Optional) Specific IEEE 802.1Q/ISL CoS value. The cos-value is from 0 to 7; up to four CoS values can be specified in one **match cos** statement.

Defaults

This command is disabled by default.

Command Modes

Class-map configuration

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.0(25)S	This command was introduced into the S train.

Usage Guidelines

The **match cos** command is used to classify VLAN traffic based on the 802.1Q priority bits. It is applicable only on an ingress (receive) policy.

Examples

In the following example, the CoS-values of 1, 2, and 3 are successful match criteria for the interface containing the classification policy called cos:

```
Router(config)# class-map cos
Router(config-cmap)# match cos 1 2 3
```

In the following example, classes called voice and video-n-data are created to classify traffic based on the CoS values. QoS treatment is then given to the appropriate packets (in this case, the QoS treatment is priority 64 and bandwidth 512) in the CoS-based-treatment policy map.

```
Router(config)# class-map voice
Router(config-cmap)# match cos 7
Router(config)# class-map video-n-data
Router(config-cmap)# match cos 5
Router(config)# policy-map cos-based-treatment
Router(config-pmap)# class voice
Router(config-pmap-c)# priority 64
Router(config-pmap-c)# exit
Router(config-pmap)# class video-n-data
Router(config-pmap-c)# bandwidth 512
Router(config-pmap-c)# exit
Router(config-pmap)# exit
Router(config)# interface gig0/0.1
Router(config-if)# service-policy input cos-based-treatment
```

The service policy configured in this section is attached to all packets entering Gigabit Ethernet interface 0/0.1. The service policy can be attached to any interface that supports service policies.

Related Commands

Command	Description
class-map	Creates a class map to be used for matching packets to a specified class.
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.
service-policy	Attaches a policy map to an input interface or VC, or an output interface or VC, to be used as the service policy for that interface or VC.
show class-map	Displays all class maps and their matching criteria.

set cos

To set the Layer 2 class of service (CoS) value of an outgoing packet, use the **set cos** policy-map class configuration command. To remove a specific CoS value setting, use the **no** form of this command.

set cos *cos-value*

no set cos *cos-value*

Syntax Description

cos-value	Specific IEEE 802.1Q/ISL CoS value from 0 to 7.

Defaults

This command is disabled by default.

Command Modes

Policy-map class configuration

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.0(25)S	This command was introduced into the S train.

Usage Guidelines

The **set cos** command is used to mark a packet that is being sent to a switch. Switches can leverage Layer 2 header information, including a CoS value marking.

The **set cos** command can be used only in service policies that are attached in the output direction of an interface. Packets entering an interface cannot be set with a CoS value.

The **match cos** and **set cos** commands can be used together to allow routers and switches to interoperate and provide QoS based on the CoS markings.

Layer-2-to-Layer-3 mapping can be configured by matching on the CoS value because switches already can match and set CoS values. If a packet that needs to be marked to differentiate user-defined QoS services is leaving a router and entering a switch, the router should set the CoS value of the packet because the switch can process the Layer 2 header.

Examples

In the following example, the policy map called cos-set is created to assign different CoSs for different types of traffic. This example assumes that the class maps called voice and video-data have already been created.

```
Router(config)# policy-map cos-set
Router(config-pmap)# class voice
Router(config-pmap-c)# set cos 1
Router(config-pmap-c)# exit
Router(config-pmap)# class video-data
Router(config-pmap-c)# set cos 2
Router(config-pmap-c)# exit
Router(config-pmap)# exit
```

This command is applied when you create a service policy in QoS policy-map configuration mode. This service policy is not yet attached to an interface. For information on attaching a service policy to an interface, refer to the "Modular Quality of Service Command-Line Interface" chapter of the *Cisco IOS Quality of Service Solutions Configuration Guide*.

Related Commands

Command	Description
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.
service-policy	Attaches a policy map to an input interface or VC, or an output interface or VC, to be used as the service policy for that interface or VC.
show policy-map	Displays the configuration of all classes for a specified service policy map or all classes for all existing policy maps.
show policy-map class	Displays the configuration for the specified class of the specified policy map.
show policy-map interface	Displays the configuration of all classes configured for all service policies on the specified interface or displays the classes for the service policy for a specific PVC on the interface.

plim qos input map cos enable

To enable classification of ingress VLAN traffic according to the 802.1Q priority bits and place the traffic into appropriate interface queues, use the **plim qos input map cos enable** interface configuration command. To disable classification according to the 802.1Q priority bits, use the **no** form of this command.

plim qos input map cos enable

no plim qos input map cos enable

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

This command can be applied only to VLAN interfaces. The classification of traffic is done based on 802.1Q priority bits, and the traffic is placed on the appropriate interface queue.

If the matching is disabled, then traffic is classified and placed based on IP precedence/DSCP, MPLS EXP, or IPv6 TC bits, as configured on the parent interface.

Examples

The following example enables cos-based classification on the VLAN interface gig1/2.101:

```
Router# config terminal
Router(config)# interface gig1/2.101
Router(config-subif)# plim qos input map cos enable
```

Related Commands

Command	Description
plim qos input map cos queue	Indicates into which queue to place specific traffic.

plim qos input map cos queue

To classify incoming traffic based on 802.1Q priority bits and place it in the specific queue, use the **plim qos input map cos queue** interface configuration command. To stop placing classified traffic into a specific queue, use the **no** form of this command.

plim qos input map cos *cos-value* **queue** *queue*

no plim qos input map cos *cos-value* **queue** *queue*

Syntax Description

cos-value	Specific IEEE 802.1Q/ISL CoS value from 0 to 7.
queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.

Defaults

By default, traffic with 802.1Q priority bits set to 6 or 7 are placed in the low-latency queue and all other traffic is placed in the low-priority queue (queue 0).

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map cos queue** command is only applicable on VLAN interfaces. 802.1Q P bit-based classification must be enabled on the VLAN interface with the **plim qos input map cos enable** command (default configuration).

Examples

The following example causes all traffic coming into the VLAN interface gig1/2.101 with the 802.1Q priority bits set to 4 to use the low-latency interface queue:

```
Router# config terminal
Router(config)# interface gig1/2.101
Router(config-subif)# plim qos input map cos enable
Router(config-subif)# plim qos input map cos 4 queue low-latency
```

Related Commands

Command	Description
plim qos input map cos enable	Enables classification of ingress VLAN traffic according to the 802.1Q priority bits.

plim qos input map ip dscp-based

To enable classification of ingress traffic according the value of the DSCP bits, use the **plim qos input map ip dscp-based** interface configuration command. To disable classification according to the value of the DSCP bits, use the **no** form of this command.

plim qos input map ip dscp-based

no plim qos input map ip dscp-based

Syntax Description

This command has no arguments or keywords.

Defaults

This command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map ip dscp-based** command is only applicable to physical interfaces. Traffic is classified based on the IP DSCP bits.

Examples

The following example enables DSCP-based classification on the interface gig1/2:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map ip dscp-based
```

Related Commands

Command	Description
plim qos input map ip dscp queue	Classifies traffic by the value of the DSCP bits into a specific queue.
plim qos input map ip precedence-based	Enables classification of ingress traffic according to the IP precedence bits.

plim qos input map ip dscp queue

To classify ingress IP traffic by the value of the DSCP bits into a specific queue, use the **plim qos input map ip dscp queue** interface configuration command. To end classification according to the DSCP bits, use the **no** form of this command.

plim qos input map ip dscp *dscp-value* **queue** *queue*

no plim qos input map ip dscp *dscp-value* **queue** *queue*

Syntax Description

dscp-value	Value of the DSCP bits. Values can be one of the following: 0 to 63—Differentiated services codepoint value af11—001010 af12—001100 af13—001110 af21—010010 af22—010100 af23—010110 af31—011010 af32—011100 af33—011110 af41—100010 af42—100100 af43—100110 cs1—Precedence 1 (001000) cs2—Precedence 2 (010000) cs3—Precedence 3 (011000) cs4—Precedence 4 (100000) cs5—Precedence 5 (101000) cs6—Precedence 6 (110000) cs7—Precedence 7 (111000) default—000000 ef—101110 A range of values can be specified separated by a dash "-", or a list of values can be specified.
queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.

Defaults

By default, IP traffic with the DSCP bits equal to EF will use the low-latency queue, and traffic with any other DSCP value will use the low-priority queue.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map ip dscp queue** command is only applicable on physical interfaces. DSCP-based classification must first be enabled on the physical interface using the **plim qos input map ip dscp-based** command.

By default, all IP traffic with the DSCP bits set to EF will use the low-latency queue, while remaining traffic will use the low-priority queue.

Examples

The following example causes all traffic coming into the interface gig1/2 with the DSCP set to 4 to use the low-latency interface queue:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map ip dscp-based
Router(config-if)# plim qos input map ip dscp 4 queue low-latency
```

Related Commands

Command	Description
plim qos input map ip dscp-based	Enables classification of ingress traffic according the DSCP bits.

plim qos input map ip precedence-based

To enable classification of ingress traffic according the IP precedence value, use the **plim qos input map ip precedence-based** interface configuration command. To disable classification according to the precedence value, use the **no** form of this command.

plim qos input map ip precedence-based

no plim qos input map ip precedence-based

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map ip precedence-based** command is only applicable on physical interfaces. Traffic is classified based on the IP precedence bits.

Examples

The following example enables precedence-based classification on the interface gig1/2:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map ip precedence-based
```

Related Commands

Command	Description
plim qos input map ip dscp-based	Enables classification of ingress traffic according a DSCP value.
plim qos input map ip precedence queue	Classifies ingress traffic by a specific IP precedence value.

plim qos input map ip precedence queue

To classify ingress IP traffic based on the value of the precedence bits into a specific queue, use the **plim qos input map ip precedence queue** interface configuration command. To end classification according to a specific value of the precedence bits, use the **no** form of this command.

plim qos input map ip precedence *precedence-value* **queue** *queue*

no plim qos input map ip precedence *precedence-value* [- *precedence-value* | *precedence-value* [*precedence-value ...*]] **queue** *queue*

Syntax Description

precedence-value	Value of the IP precedence bits (0 to 7). A range of values can be specified separated by a dash "-", or a list of values can be specified.
queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.

Defaults

IP traffic with the IP precedence bits set to 6 or 7 uses the low-latency queue; all other traffic uses the low-priority queue.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map ip precedence queue** command is only applicable on physical interfaces. Precedence-based classification must first be enabled on the physical interface using the **plim qos input map ip precedence-based** command.

Examples

The following example causes all traffic coming into the interface gig1/2 with precedence bits set to 4 or 6 to use the low-latency interface queue:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map ip precedence-based
Router(config-if)# plim qos input map ip precedence 4 6 queue low-latency
```

Related Commands

Command	Description
plim qos input map ip precedence-based	Enables classification of ingress traffic according an IP precedence value.

plim qos input map ipv6 tc queue

To classify ingress IPv6 traffic based on the value of the traffic-class bits into a specific queue, use the **plim qos input map ipv6 tc queue** interface configuration command. To end classification of IPv6 traffic based on the traffic-class bits, use the **no** form of this command.

plim qos input map ipv6 tc *tc-value* **queue** *queue*

no plim qos input map ipv6 tc *tc-value* **queue** *queue*

Syntax Description

tc-value	Value of the traffic-class bits. Values can be one of the following: 0 to 63—Differentiated services codepoint value af11—001010 af12—001100 af13—001110 af21—010010 af22—010100 af23—010110 af31—011010 af32—011100 af33—011110 af41—100010 af42—100100 af43—100110 cs1—Precedence 1 (001000) cs2—Precedence 2 (010000) cs3—Precedence 3 (011000) cs4—Precedence 4 (100000) cs5—Precedence 5 (101000) cs6—Precedence 6 (110000) cs7—Precedence 7 (111000) default—000000 ef—101110 A range of values can be specified separated by a dash "-", or a list of values can be specified.
queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.

Defaults

The default is to have classify traffic with the traffic-class set to 46 to the low-latency queue.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map ipv6 tc queue** command is only applicable on physical interfaces.

Only the most significant six bits of the traffic-class octet is used for the classification.

By default, IPv6 traffic with a traffic-class value equal to EF uses the low-latency queue, and all other traffic uses the low-priority queue.

Examples

The following example causes all traffic coming into the interface gig1/2 with traffic-class bits set to af11, af12, or af13 to use the low-latency interface queue:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map ipv6 tc af11-af13 queue low-latency
```

plim qos input map mpls exp queue

To classify ingress MPLS traffic based on the value of the EXP bits into a specific queue, use the **plim qos input map mpls exp queue** interface configuration command. To end classification of MPLS traffic, use the **no** form of this command.

plim qos input map mpls exp *exp-value* **queue** *queue*

no plim qos input map mpls exp *exp-value* **queue** *queue*

Syntax Description

exp-value	Value of the EXP bits (0 to 7). A range of values can be specified separated by a dash "-", or a list of values can be specified.
queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.

Defaults

MPLS traffic with EXP bits set to 6 or 7 use the low-latency queue; all other traffic uses the low-priority queue.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input map mpls exp queue** command is applicable for physical interfaces only. By default, traffic with the EXP bits set to 6 or 7 uses the low-latency queue, and all other traffic uses the low-priority queue.

Examples

The following example causes all traffic coming into the interface gig1/2 with EXP bits set to 4 to use the low-latency interface queue:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input map mpls exp 4 queue low-latency
```

plim qos input queue pause

To enable Ethernet flow control pause frame generation on a queue, use the **plim qos input queue pause** interface configuration command. To disable pause frame generation for a queue, use the **no** form of this command.

plim qos input queue *queue* **pause {enable | threshold** *threshold-percent*}

no plim qos input queue *queue* **pause {enable | threshold** *threshold-percent*}

Syntax Description

queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.
enable	Enables pause frame generation on the specified queue.
threshold-percent	Percentage of the queue that must be full before a pause frame is sent to the remote end. The default value is 90 percent when the command is enabled.

Defaults

This command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input queue pause** command is only applicable to physical interfaces.

If the receive queue for a port becomes full, a pause frame can be transmitted on that port that tells neighboring devices to delay sending more packets for a specified period of time.

Pause frame generation must be enabled if the pause threshold is to have any effect. If pause frame generation is enabled, and a pause threshold is not configured, a default of 90 percent of the corresponding queue size is used.

This command can be used to configure each queue on each port.

Examples

The following example configures flow control pause frame generation on the low-latency queue when it is 85 percent full:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input queue low-latency pause enable
Router(config-if)# plim qos input queue low-latency pause threshold 85
```

plim qos input queue queue-limit

To specify a maximum queue size for the low-priority queue, use the **plim qos input queue queue-limit** interface configuration command. To disable the queue limitation, use the **no** form of this command.

plim qos input queue *queue* **queue-limit** *size*

no plim qos input queue *queue* **queue-limit** *size*

Syntax Description

queue	Specifies the low-priority queue that is represented by queue number 0.
size	Maximum size for the queue in Kbytes. Values can be 64, 128, 192, 256, 320, 384, or 448.

Defaults

Default size of each queue is 256 Kbytes.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input queue queue-limit** command sets the limit for the low-priority queue only. The queue limit for the low-latency queue is automatically adjusted such that the sum of the queue limits for the low- and high-priority queues is 512 Kbytes. For example, if you want to allocate 384 Kbytes for the low-latency queue, you need to assign 128 Kbytes to the low-priority queue (0). This automatically assigns the remainder of the queue (512K - 128K = 384K) to the low-latency queue.

Examples

The following example sets the queue-limit for the low-priority queue (0) to 448 Kbytes and the low-latency queue to 64 Kbytes (512-448=64):

```
Router(config-if)# plim qos input queue 0 queue-limit 448
```

plim qos input queue weight

To configure the deficit-round-robin (DRR) quantum used by the interface queues, use the **plim qos input queue weight** interface configuration command. To return the DRR quantum value to its default, use the **no** form of this command.

plim qos input queue *queue* **weight** *weight*

no plim qos input queue *queue* **weight** *weight*

Syntax Description

queue	Specifies the queue to use: low-latency—implies the high-priority queue 0 (queue number)—represents the low-priority queue.
weight	DRR weight on the ingress stream.

Defaults

The default weight is equal to the MTU of the interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

The **plim qos input queue weight** command is only applicable to physical interfaces.

The calculation of the quantum is as follows: quantum (bytes) = MTU (bytes) + (weight - 1)*512.

Examples

In the following example, the quantum programmed for the low-latency queue for interface gig1/2 is 1536 + (10-1)*512 = 6144 bytes, assuming that the MTU is 1536 bytes:

```
Router# config terminal
Router(config)# interface gig1/2
Router(config-if)# plim qos input queue low-latency weight 10
```

show controller gigabitethernet fpga

To display information for the Gigabit Ethernet interface controllers, use the **attach** privileged EXEC command to connect to the line card, and then use the **show controller gigabitehternet fpga** command. Alternatively, use the **execute-on** privileged EXEC command as a prefix to the **show controller gigabitehternet fpga** command from the RP image.

show controller gigabitethernet *port* **fpga** {**core** [**shadow**] | **interrupt-stats** | **regs** | **tcam** | **tx-port-map**}

Syntax Description

port	Physical port on the 4-Port Gigabit Ethernet ISE line card (0 to 3).
core	Displays the contents of the FPGA core registers.
shadow	(Optional) For the **core** keyword, the **shadow** keyword specifies to display the software copy of the FPGA core registers.
interrupt-stats	Displays the number of recoverable errors corrected on each FPGA component since the line card was reloaded.
regs	Displays the contents of all FPGA registers, including the core and tcam registers.
tcam	Displays the FPGA TCAM interface.
tx-port-map	Displays the egress side mapping of the virtual to the physical port of the line card.

Defaults

There are no defaults for this command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(25)S	This command was introduced.

Usage Guidelines

Use the **core** keyword to display the contents of the FPGA core registers. These registers provide information about the FPGA firmware version, interrupt masks, state of the FPGA components, and so forth.

Related Commands

Command	Description
show controller gigabitethernet fpga bm	Displays buffer management information for the Gigabit Ethernet interface controllers.

show controller gigabitethernet fpga bm

To display buffer management information for the Gigabit Ethernet interface controllers, use the **attach** privileged EXEC command to connect to the line card, and then use the **show controller gigabitehternet fpga bm** command. Alternatively, use the **execute-on** privileged EXEC command as a prefix to the **show controller gigabitehternet fpga bm** command from the RP image.

show controller gigabitethernet *port* **fpga bm** {**config** [**hardware**] | **queues** | **rxsram** *start-address number* | **statistics** [**hardware**]| **txsram** *start-address number*}

Syntax Description

port	Physical port on the 4-Port Gigabit Ethernet ISE line card (0 to 3).
config	Displays information about the queue mapping, receive queue configuration, and transmit queue configuration for the port number specified as *port*.
hardware	Displays the buffer management configuration read from the FPGA registers. If the hardware keyword is not specified, the command displays the buffer management configuration saved in the software (shadow copy).
queues	Displays information about the various queue pointers.
rxsram	Displays the receive QDR SRAM.
start-address	For the **rxsram** and **txsram** keywords, specifies the SRAM logical starting address (0 to FFFF) of the QDR.
number	For the **rxsram** and **txsram** keywords, specifies the number of 8-byte words to read (0 to FFFF) from the QDR.
statistics	Displays the status of the various queues.
txsram	Displays the transmit QDR SRAM.

Defaults

There are no defaults for this command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(25)S	This command was introduced.

Examples

The following example output displays the configuration of the queues:

```
Router# show controller gigabitethernet 1 fpga bm config
Queue Mapping information:
        DSCP -> Queue Map:
                00000000 00000000 00000000 00000000
                00000000 00000000 11111111 11111111
        IPv6 TC -> Queue Map:
                00000000 00000000 00000000 00000000
                00000000 00000010 00000000 00000000
        MPLS Exp -> Queue Map:00000011
```

```
Rx Queue Config information:
        Queue 0:
                Queue size: 256 kbytes
                DRR Weight: 1500 bytes
                Pause-frame Generation: Disabled
                Pause-frame Threshold: 230 kbytes
        Queue 1:
                Queue size: 256 kbytes
                DRR Weight: 1500 bytes
                Pause-frame Generation: Disabled
                Pause-frame Threshold: 230 kbytes

Tx Queue Config information:
        Queue 0:
                Backpressure threshold set for MTU 1500 bytes.
```

Related Commands

Command	Description
show controller gigabitethernet fpga	Displays information for the Gigabit Ethernet interface controllers.

show tag-switching alpha-atom ethernet

To display Ethernet over MPLS forwarding table details in the switching engine hardware for the Gigabit Ethernet interface, use the **attach** privileged EXEC command to connect to the line card, and then use the **show tag-switching alpha-atom ethernet** command. Alternatively, use the **execute-on** privileged EXEC command as a prefix to the **show tag-switching alpha-atom ethernet** command from the RP.

show tag-switching alpha-atom ethernet [**port** *port-number* **vlan** *vlan-id*] [**detail**]

Syntax Description

port	Specifies the port.
port-number	Physical port on the 4-Port Gigabit Ethernet ISE line card (0 to 3).
vlan	Specifies the VLAN.
vlan-id	ID number of the VLAN (0 to 4095).
detail	(Optional) Displays detailed information. When this keyword is not used, summary information is displayed.

Defaults

There are no defaults for this command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(25)S	This command was introduced.

Examples

The following example shows the status of VC programming in the switching engine hardware:

```
LC-Slot2# show tag-switching alpha-atom ethernet port 1 vlan 100 detail

Start address of AToM root: 0x7410E000
Default PLU leaf:           0x784E60F8 (8190 refs)
Default rewrite in TLU: 0x700926E0 (1 ref incl. one from default leaf)

Index  Port/VLAN      Root Loc   Root Value  Leaf Address (PLU/CPU)
5                     0x7410E014 0x8089CC1E  0x0089CC1E/0x784E60F0
   FCR         Leaf Value           TLU Addess (TLU/CPU)
   AT2TAG       0x800080001E00492E   0x0000492E/0x700925C0
Rewrite struct for Leaf
   [0-7]: oi 0x1E001912 oq 0x4020 in 7 ab 0x40 hl 40 gp 170 tl 8 loq 0x8018
1/2 mtu 1488
          2 tags: 18 17
          current counters 1500, 25 last reported 1500, 25
```

The fields of user significance are the number of tags that will be imposed when a frame is tunneled over this port/vlan, and the statistics (number of packets and bytes that hit this lookup entry).

show tcam l2-tcam

To display information about the Ternary Content Addressable Memory (TCAM) for a specific port on the Gigabit Ethernet interface, use the **attach** privileged EXEC command to connect to the line card, and then use the **show tcam l2-tcam** command. Alternatively, use the **execute-on** privileged EXEC command as a prefix to the **show tcam l2-tcam** command from the RP image.

show tcam l2-tcam [**inst-info** | **statistics** | **appl-l2-tcam** | **region** [regional-id] [**config** | **statistics**]]

Syntax Description

inst-info	(Optional) Displays instance-related TCAM information.
statistics	(Optional) Displays the global TCAM manager statistics.
appl-l2-tcam	(Optional) Displays information about applications using the L2 TCAM.
region	(Optional) Displays regional information about the TCAM.
regional-id	(Optional) ID of the region for which to display the information.
config	Displays regional configuration information.
statistics	Displays regional statistics.

Defaults

There are no defaults for this command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(25)S	This command was introduced.