



Unified QoS–Locally Generated Packet Prioritization on Cisco 12000 Series Router, Integrated Services Engine Line Cards

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Feature History

Release	Modification
12.0(32)S	This feature was introduced on the Cisco 12000 Series Router, Integrated Services Engine (ISE) line cards.

This feature module provides information on Unified QoS–Locally Generated Packet Prioritization in the following sections:

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Unified QoS–Locally Generated Packet Prioritization Feature Overview

The Unified QoS–Locally Generated Packet Prioritization feature on Integrated Services Engine (ISE) line cards brings the Route Processor Packet Prioritization scheme up-to-date and in conformance with the latest Route Processor Packet Prioritizing scheme implemented on the Cisco 12000 SIP-400 and Cisco 12000 SIP-600 Shared Port Adapters (SPAs).

With Unified QoS–Locally Generated Packet Prioritization provides the following feature updates:

- Route processor packets with an IP precedence of 7 and an MPLS exp of 7 are treated as regular traffic and not as control plane packets. This gives customers more QoS configuration options.

- Non-drop flag (VIP - very important packet) is set only for important route processor generated packets (not implemented on the 4-Port Gigabit Ethernet ISE Line Card).

Locally generated packets are primarily Layer 2 packets and other control packets that are time-sensitive for the router.

Table 1 shows a matrix of the locally generated packet prioritization scheme.

Table 1 Locally Generated Packet Prioritization Scheme

Packet / Configuration	Important Packet Set VIP = 1		Unimportant Packet Set VIP = 0	
	PAK_PRIORITY (flag = 1) (important packet)		No PAK_PRIORITY (flag=0)	
	non-IP non-Tag	IP/Tag All prec values	Important prec 6	Unimportant prec != 6
no MQC	LLQ	LLQ	LLQ	Default Q
MQC with priority class (LLQ is used)	prec6Q defQ	prec6Q defQ	matchedQ Default Q	matchedQ Default Q
MQC without priority class	prec6Q LLQ	prec6Q LLQ	matchedQ LLQ	matchedQ Default Q

The *matchedQ* priority flag indicates that packets are sent to the queue associated with the first matched class for the packet. ACL or any other class may be matched as well. If the first matched class does not have a queue, egress packets are sent to the Default Q or the low latency queue (LLQ).

The PAK_PRIORITY flag is set by the protocol code for prioritization on the egress card and exists in the packet until the packet is transmitted by the egress card.

IP packets may have *prec = 6* set. For the Layer 2 packets, this is a flag.

The following types of control packets are flagged with PAK_PRIORITY and receive higher priority than other packets:

- HDLC keepalives
- FR LMI packets
- HDLC Station
- PPP Station
- FR ISIS
- CLNS
- PPP control packets
- ATM OAM
- IP bad TTL
- IP and MPLS that need fragmentation
- IPv6 control traffic
- MLD report, ICMPv6 type is 131
- ARP

- IGRP hello
- FR keepalive (LMI)
- L2TP control packets
- BFD messages

Benefits

Unified QoS–Locally Generated Packet Prioritization provides customers with the following benefits:

- More QoS configuration options
- Consistent behavior of all Integrated Services Engine (ISE) line cards
- Prioritization by configured MQC policy

Restrictions

The following restrictions apply to the ISE ATM line cards:

- VIP packets sent to the slow path queue may cause additional latency.
- If no policy is configured, all low latency queue (LLQ) packets are sent to the default queue.
- Queues are subject to one of 2 admission policies: Queue Limit or Weighted Random Early Detection (WRED).
- OAM packets from Cisco IOS Release 12.0(30)S are processed by the line card CPU as distributed OAM (dOAM). Distributed OAM (dOAM) is the default. For distributed OAM (dOAM), all important packets are sent to the low latency queue (LLQ) if it is present, otherwise they are sent to the default queue. The prec6 queue is used by the route processor only if distributed OAM (dOAM) is disabled.

The following restrictions apply to the ISE channelized line cards:

- PPP/MLPPP control packets use a special queue for port 1022.
- When the queue for prec6 is not present, important non-control packets use a special queue for port 1022

The following restrictions apply to the 4-Port OC-12 line card:

- The high and low ports for the three physical egress ports use the same queues and are defined by the MQC policy. The high and low ports are used for:
 - control data for DPT L2 packets
 - high priority packets for customer traffic and control plane traffic (the total bandwidth should not be more than 25% of the total port bandwidth)
 - low (normal) priority traffic
- Egress packets that have a precedence that is higher than the configured threshold or that are classified as important are sent through the high priority port.

Related Features and Technologies

Cisco IOS Quality of Service (QoS) Solutions for Cisco 12000 Series Routers

Related Documents

Refer to the following documents for information on configuring multicast traffic.

- *Cisco 12000 Series Router Configuration Guide for Cisco IOS Release 12.0S*

Also refer to the Installation and Configuration Guide for a specific Cisco 12000 Series Router.

Supported Platforms

The Unified QoS–Locally Generated Packet Prioritization feature is supported on the following Cisco 12000 Series Router, Integrated Services Engine (ISE) line cards running Cisco IOS Release 12.0(32)S:

- POS line cards
 - 1-port OC48c/STM16c POS
 - 1-port CHOC48/STM16>OC12/STM4>OC3/STM1>DS3/E3
 - 4-port OC12c/STM16c POS
 - 4-port CHOC12/STM4>OC3/STM1>DS3/E3
 - 16-port OC3c/STM1c POS
 - 4-port OC3c/STM1c POS
 - 8-port OC3c/STM1c POS
- Ethernet line cards
 - 4-port Gigabit Ethernet ISE Line Card
- ATM line cards
 - 4-port OC12/STM4 ATM LC
 - 8-port OC3/STM1 ATM LC
 - 4-port OC-3/STM-1 ATM LC
- Channelized line cards
 - 1-port OC12 DS1
- DPT line cards
 - 4-port OC-12
 - 2-port OC-12
- POS SPAs
 - 1-port OC-192c/STM-64 POS SPA
 - 2-port OC48-POS/RPR SPA SPA
- Serial SPAs
 - 2-port T3/E3 Serial SPA
 - 4-port T3/E3 Serial SPA
- Channelized SPAs
 - 2-port Channelized T3 to DS0 SPA
 - 4-port Channelized T3 to DS0 SPA

- Ethernet SPAs
 - 8-port Fast Ethernet SPA
 - 1-port 10-Gigabit Ethernet SPA
 - 5-port 10 Gigabit Ethernet SPA
 - 10-port Gigabit Ethernet SPA

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported, and support for existing standards has not been modified.

MIBs

No new or modified MIBs are supported, and support for existing MIBs has not been modified.

RFCs

No new or modified RFCs are supported, and support for existing RFCs has not been modified.

Prerequisites

No prerequisites are required for this feature.

Configuration Tasks

No configurations are required for this feature.

Command Reference

No new or modified CLI commands were introduced for the Unified QoS—Locally Generated Packet Prioritization feature in Cisco IOS Release 12.0(32)S.

Glossary

ISE	Integrated Services Engine
LLQ	Low latency queue
QoS	Quality Of Service. Measure of performance for a transmission system that reflects its transmission quality and service availability.
RED	Random Early Detection
SPA	Shared port adapter. A SPA is a modular, platform-independent port adapter that inserts into a subslot of a compatible SIP carrier card to provide network connectivity and increased interface port density. The SPA provides the interface between the network and the SIP.
WRED	Weighted Random Early Detection. Queueing method that ensures that high-precedence traffic has lower loss rates than other traffic during times of congestion.

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