Cisco EasyQoS Application for APIC-EM Supported Platforms, Release 1.5.x

First Published: 2017-06-23

Supported Platforms for Cisco EasyQoS, Release 1.5.x

This document describes the supported platforms for Cisco EasyQoS, Release 1.5.x.

Supported Platforms and Software Requirements

The following tables list the supported devices and modules, with their software requirements, for this release.

Note   For information about the supported platforms and software requirements for the other Cisco APIC-EM applications, see the following documents:

- *Cisco Path Trace Application for APIC-EM Supported Platforms*
- *Cisco EasyQoS Application for APIC-EM Supported Platforms*
- *Cisco Active Advisor for APIC-EM Release Notes*
- *Release Notes for Cisco SD-Bonjour*
- *Cisco Integrity Verification Application for APIC-EM Release Notes*
- *Cisco Remote Troubleshooter for APIC-EM Release Notes*
- *Release Notes for Cisco Intelligent Wide Area Network Application (Cisco IWAN App)*
- *Release Notes for Cisco Network Plug and Play*

EasyQoS Support and Limitations

EasyQoS Support by Platform

The following table lists the EasyQoS features that are supported by each type of platform.

Table 1: Cisco Switches

Platform [1]	Marking	Queuing	Shaping	WLAN	Distribution Role with Layer 2 Port-Channel Interface	Distribution Role with Layer 3 Port-Channel Interface	Dynamic QoS
Cisco Catalyst 2960-C Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 2960-CX Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 2960-S Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 2960-S Series (stack)	✓	✓	✓	—	—	—	✓
Cisco Catalyst 2960-X Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 2960-XR Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3560CG Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3560-CX Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3560-X Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3650 Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 3750-X Series	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3750-X Series (stack)	✓	✓	✓	—	—	—	✓
Cisco Catalyst 3850 Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 3850 Series (stack)	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 3850-XS Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 4500 Sup7E Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 4500 Sup8E Series	✓	✓	✓	—	✓	✓	✓

Platform [1]	Marking	Queuing	Shaping	WLAN	Distribution Role with Layer 2 Port-Channel Interface	Distribution Role with Layer 3 Port-Channel Interface	Dynamic QoS
Cisco Catalyst 4500-X Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 6500 (Sup-2T) Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 6500-E (Sup-720) Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 6807-XL (Sup-2T) Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 6840 Series	✓	✓	✓	—	✓	✓	✓
Cisco Catalyst 6880 Series	✓	✓	✓	—	✓	✓	✓
Cisco Nexus 7000 Series	✓	✓	✓	—	—	—	—
Cisco Nexus 7700 Series	✓	✓	✓	—	—	—	—

[1] **Whether queuing and marking or just queuing policies are written to a particular switch platform by the controller depends on the role the device plays in the network (access-layer, distribution-layer, or core-layer) and whether queuing and marking or just queuing policies are supported in the network.**

Cisco Routers

Platform	Marking	Queuing	Shaping	WLAN
Cisco 2900 Series ISR	✓	✓	✓	—
Cisco 3900 Series ISR	✓	✓	✓	—
Cisco 4000 Series ISR	✓	✓	✓	—
Cisco 880 and 881 Series Integrated Services Routers (Specifically, the following routers: C819G-4G-GA-K9, C866VAE-W-E-K9, C881-V-K9, C891-24X/K9, C897VAW-A-K9, C881-K9, CISCO867VAE-K9.)	✓	✓	✓	—

Platform	Marking	Queuing	Shaping	WLAN
Cisco 890 Series Integrated Services Routers [2]	✓	✓	✓	—
Cisco ASR 1000 Series	✓	✓	✓	—
Cisco CSR 1000V Series [3]	✓	✓	✓	—

[2] For a complete list of the type of the Cisco 890 Series Integrated Services Routers supported (by product ID), see the detailed list below this table.

[3] Supports Cisco IOS-XE 3.16 as the minimum software version.

The following Cisco 890 Series Integrated Services Routers (identified by product ID) are supported on this release:

- C891F-K9
- C891-24X-K9
- C891FW-A-K9
- C891FW-E-K9
- C892FSP-K9
- C896VA-K9
- C896VAG-LTW-GA-K9
- C897VA-K9
- C897VAW-A-K9
- C897VAW-E-K9
- C897VAM-W-E-K9
- C897VA-M-K9
- C897VAG-LTE-GA-K9
- C897VAB-K9
- C897VAGW-LTW-GAEK9
- C897VAGW-LTE-GAEK9
- C897VAG-LTE-LA-K9
- C898EA-K9
- C898EAG-LTE-GA-K9
- C899G-LTE-GA-K9
- C899G-LTE-LA-K9
- C899G-LTE-VZ-K9

- C899G-LTE-NA-K9

- C899G-LTE-ST-K9

- C899G-LTE-JP-K9

- C899G-LTE-LA-K9

Cisco Wireless LAN Controllers

Platform	Marking	Queuing	Shaping	WLAN	Dynamic QoS
Cisco 2500 Series Wireless LAN Controller	✓	✓	—	✓	—
Cisco 5500 Series Wireless LAN Controller	✓	✓	—	✓	—
Cisco 8500 Series Wireless LAN Controller	✓	✓	—	✓	—

Cisco Enhanced Ethernet Modules

Platform	Marking	Queuing	Shaping	WLAN	Dynamic QoS
Cisco 2900 (SM-ES2-16-P, SM-ES2-24-P, SM-D-ES2-48)	✓	✓	✓	—	✓

EasyQoS Supported Cisco Switches

The following table lists the supported Cisco switches for this Cisco EasyQoS release.

Table 2: Supported Cisco Switches

Supported Switches	Recommended Software Version
Catalyst 2960-C Series switches	Cisco IOS 15.2(1)E1
Catalyst 2960-CX Series switches	Cisco IOS 15.2(4)E2
Catalyst 2960-S Series switches, including stacks	Cisco IOS 15.2(1)E1, 12.2(58)SE2
Catalyst 2960-X/XR Series switches, including stacks	Cisco IOS 15.2(4)E, 15.0.2-EX5

Supported Switches	Recommended Software Version
Catalyst 3560CG Series switches	Cisco IOS 15.0(2)SE5
Catalyst 3560CX Series switches	Cisco IOS 15.2(3)E1
Catalyst 3560-X Series switches	Cisco IOS 15.2(4)E, 12.2(58)SE2
Catalyst 3650 Series switches, including stacks	Cisco IOS 3.6.2aE,16.X
Catalyst 3750-X Series switches, including stacks	Cisco IOS 15.2(4)E, 12.2(55)SE8
Catalyst 3850 Series switches, including stacks [4]	Cisco IOS 3.6.2aE, 16.X
Catalyst 4500(Sup7E) Series switches	Cisco IOS 3.5(2)E, 3.2(8)SG
Catalyst 4500E (Sup8E) Series switches	Cisco 3.3.2XO, 3.6.1E
Catalyst 4500-X Series switches	Cisco 3.3.2SG, 3.6.5E
Catalyst 6500 (Supervisor Engine 720-3C/B) Series switches [5]	Cisco 15.1(2)SY2
Catalyst 6500(Sup-2T) Series switches	Cisco IOS 15.1(2)SY4a, 15.0(1)SY6
Cisco Catalyst 6807-XL Switch	Cisco IOS 15.2(1)SY1a
Cisco Catalyst 6840-X Switch	Cisco IOS 15.2.2-SY
Cisco Catalyst 6880-X Switch	Cisco IOS 15.1(2)SY4a
Cisco Nexus 5000 Series switches	Not supported.

Supported Switches	Recommended Software Version
Cisco Nexus 7000 Series switches 6	NX-OS version 7.2(2) D1(1)

[4] EasyQoS requires IOS XE 3.6.2 and higher. In versions below IOS XE 3.6.2, class-maps with empty actions cannot be configured, and therefore EasyQoS will generate an error.

[5] EasyQoS only supports the Catalyst 6500 Supervisor Engine 720-10GE-3C/3CXL. EasyQoS does not support the Supervisor Engine 720-3B/3BXL.

[6] Current minimum version supported by EasyQoS is NX -OS version 6.2.2 and higher. EasyQoS uses ingress DSCP-to-queue mapping which is supported from NX-OS version 6.2.2 and higher.

EasyQoS Supported Line Cards

The following table lists the line cards that support EasyQoS.

Table 3: Catalyst Switch Line Card Supported by EasyQoS

Cisco Catalyst 6500 and 6807-XL Series Switch Line Cards	Cisco Catalyst 6880-X Series Switch Line Cards	Cisco Catalyst 7000 Series Swtich Line Cards	Cisco Catalyst 7700 Series Swtich Line Cards
VS-S2T-10G-XL and VS-S2T-10G with Gigabit Ethernet ports disabled	C6816-X-LE	N7K-F306CK-25	N77-F324FQ-25, N77-M324FQ-25L
WS-X6748-GE-TX with CFC	C6832-X-LE	—	—
WS-X6748-GE-TX with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL)	C6824-X-LE-40G	—	—
WS-X6748-SFP with CFC	C6840-X-LE-40G	—	—
WS-X6724-SFP with CFC	C6880-X-LE-16P10G	—	—
WS-X6724-SFP with DFC4/DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL)	C6880-X-16P10G	—	—

Cisco Catalyst 6500 and 6807-XL Series Switch Line Cards	Cisco Catalyst 6880-X Series Switch Line Cards	Cisco Catalyst 7000 Series Swtich Line Cards	Cisco Catalyst 7700 Series Swtich Line Cards
WS-X6848-GE-TX	—	—	—
WS-X6908-10G-2T WS-X6908-10G-2TXL		—	—
WS-X6704-10GE with CFC	—	—	—
WS-X6704-10GE with a DFC4/DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL)	—	—	—
C6800-8P10G C6800-8P10G-XL C6800-16P10G C6800-16P10G-XL C6800-32P10G	—	—	—
C6800-32P10G-XL C6800-48P-SFP C6800-48P-SFP-XL C6800-48P-TX C6800-48P-TX-XL	—	—	—

EasyQoS Supported Queues and Line Cards

The following tables lists queues and line cards that are supported by the controller for queuing policies in the Catalyst 6500-E Series and Catalyst 6807-XL with the Catalyst Supervisor Engine 2T.

Table 4: EasyQoS Supported Queues and Line Cards (with Catalyst Supervisor Engine 2T)

Queues	Line Cards
1Q8T (One standard queue with eight configurable tail-drop thresholds)	• WS-X6724-SFP with CFC • WS-X6748-SFP with CFC • WS-X6748-GE-TX with CFC • WS-X6704-10GE with CFC

Queues	Line Cards
2Q4T (Two standard queues with four configurable tail-drop thresholds)	• VS-S2T-10G with Gigabit Ethernet ports enabled • VS-S2T-10G-XL with Gigabit Ethernet ports enabled
2Q8T ingress queuing (Two standard queues, each with eight configurable tail-drop thresholds)	• C6800-48P-SFP • C6800-48P-SFP-XL • C6800-48P-TX • C6800-48P-TX-XL • WS-X6724-SFP • WS-X6748-SFP • WS-X6748-GE-TX **Note** The WS-X6724-SFP, WS-X6848-SFP, and WS-X6748-GE-TX line cards are only supported with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A or WS-F6k-DFC4-AXL).
8Q4T ingress queuing (Eight standard queues, each with four thresholds, each configurable as either WRED-drop or tail-drop)	• VS-S2T-10G, VS-S2T-10G-XL with Gigabit Ethernet ports disabled • WS-X6908-10G-2T, WS-X6908-10G-2TXL
8Q8T ingress queuing (Eight standard queues, each with eight thresholds, each configurable as either WRED-drop or tail-drop)	• WS-X6704-10GE **Note** The WS-X6704-10GE line cards are only supported with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL).
1P3Q4T (One strict-priority queue, three standard queues, four thresholds, each configurable as either WRED-drop or tail-drop)	• VS-S2T-10G with Gigabit Ethernet ports enabled • VS-S2T-10G-XL with Gigabit Ethernet ports enabled

Queues	Line Cards
1P3Q8T egress queuing (One strict-priority queue, three standard queues, eight thresholds, each configurable as either WRED-drop or tail-drop)	• WS-X6724-SFP • WS-X6748-SFP • WS-X6748-GE-TX • C6800-48P-SFP • C6800-48P-SFP-XL • C6800-48P-TX • C6800-48P-TX-XL **Note** The above line cards are only supported under the following conditions: • Line card WS-X6724-SFP with CFC, or with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL). • Line card WS-X6748-SFP with CFC, or with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL). • Line card WS-X6748GE-TX with CFC, or with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL).
1P7Q4T egress queuing (One strict-priority queue, seven standard queues, four thresholds, each configurable as either WRED-drop or tail-drop)	• VS-S2T-10G with Gigabit Ethernet ports disabled • VS-S2T-10G-XL with Gigabit Ethernet ports disabled
1P7Q4T egress queuing (One strict-priority queue, seven standard queues, four thresholds, each configurable as either WRED-drop or tail-drop)	• WS-X6816-10G-2T, WS-X6816-10G-2TXL in performance or oversubscription mode
1P7Q8T (One strict-priority queue, seven standard queues, eight thresholds, each configurable as either WRED-drop or tail-drop)	• WS-X6704-10GE **Note** Line card WS-X6704-10GE is only supported with CFC, or with a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL).

Queues	Line Cards
2P6Q4T ingress and egress queuing (Two strict-priority queues, six standard queues, four thresholds, each configurable as either WRED-drop or tail-drop)	• C6800-32P10G • C6800-32P10G-XL • C6800-16P10G • C6800-16P10G-XL • C6800-8P10G • C6800-8P10G-XL

The following tables lists queues and line cards that are supported by the controller for queuing policies in the Catalyst 6500-E Series and Catalyst 6807-XL with the Catalyst Supervisor Engine 720.

Table 5: EasyQoS Supported Queuing Structure and Line Cards (with Catalyst Supervisor Engine 720)

Queuing Structure	Line Cards
1Q8T Ingress queuing structure	• WS-X6724-SFP • WS-X6748-SFP • WS-X6748-GE-TX • WS-X6704-10GE With CFC forwarding card.
2Q4T Ingress queuing structure	• VS-S720-10G • VS-S720-10G-XL • VS-S720-10G-3C • VS-S720-10G-3CXL With Giga Ethernet ports is 'ENABLED'.
2Q8T Ingress queuing structure	• WS-X6724-SFP • WS-X6748-SFP • WS-X6748-GE-TX With WS-F6700-DFC3C or WS-F6700-DFC3CX.

Queuing Structure	Line Cards
8Q4T Ingress queuing structure	• WS-X6708-10G-3C • WS-X6708-10G-3CXL • WS-X6708-10G • WS-X6708-10GE With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC. • VS-S720-10G-3C • VS-S720-10G With Giga Ethernet ports is 'DISABLED'. • WS-X6716-10G • WS-X6716-10GE • WS-X6716-10T With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC and Oversubscription Mode is set as 'PERFORMANCE'.
8Q8T Ingress queuing structure	• WS-X6704-10GE With WS-F6700-DFC3C or WS-F6700-DFC3CX.
1P7Q2T Ingress queuing structure	• WS-X6716-10G • WS-X6716-10GE • WS-X6716-10T With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC and Oversubscription Mode is set as 'OVERSUBSCRIPTION' .
1P3Q8T egress queuing structure	• WS-X6724-SFP • WS-X6748-SFP • WS-X6748-GE-TX With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC.

Queuing Structure	Line Cards
1P3Q4T egress queuing structure	• VS-S720-10G-3C • VS-S720-10G-3CXL • VS-S720-10G • VS-S720-10G-XL With Giga Ethernet ports is 'ENABLED'.
1P7Q4T egress queuing structure	• WS-X6708-10G-3C • WS-X6708-10G-3CXL • WS-X6708-10G • WS-X6708-10GE With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC • WS-X6716-10G • WS-X6716-10GE • WS-X6716-10T • With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC and Oversubscription Mode is set as 'OVERSUBSCRIPTION OR PERFORMANCE'. • VS-S720-10G-3C • VS-S720-10G-3CXL • VS-S720-10G • VS-S720-10G-XL With Giga Ethernet ports is 'DISABLED'.
1P7Q8T egress queuing structure	• WS-X6704-10GE With WS-F6700-DFC3C or WS-F6700-DFC3CX or CFC

Cisco EasyQoS Limitations

The following table describes the Cisco EasyQoS limitations for this release.

Table 6: Cisco EasyQoS Release Limitations

Platform	Description
Switches	
All Catalyst Switch platforms	EasyQoS does not remove the AutoQoS command/configuration from switch platforms. EasyQoS does not make use of conditional trust, which is the basis of the current AutoQOS implementation. If AutoQOS is applied on a switch, it will fail and notify the customer of the reason for it's failure. It is recommended to manually remove all AutoQoS configurations from switches before implementing EasyQoS policy to switches, or to deploy EasyQoS in environments where AutoQoS is not deployed. EasyQoS supports all supported software versions for these platforms.
Catalyst 2960-S Series Switches	Catalyst 2960S-24TS-S and 2960S-48TS-S switch models are not supported. These switches only support the LAN Lite feature set which does not support class and policy maps. EasyQoS supports all IOS software versions for these models.
Catalyst 2960-SF Series Switches	Catalyst 2960S-F24TS-S and 2960S-F48TS-S switch models are not supported. These switches only support the LAN Lite feature set which does not support class and policy maps. EasyQoS supports all IOS software versions for these models.
The following switches: • Catalyst 2960-S Series Switches • Catalyst 2960-X Series Switches • Catalyst 2960-XR Series Switches • Catalyst 3560-C Series Switches • Catalyst 3560-X Series Switches • Catalyst 3750-X Series Switches	Catalyst 2960-S Series, Catalyst 2960-X Series, Catalyst 2960-XR Series, Catalyst 3560-C Series Switches, Catalyst 3560-X Series, and Catalyst 3750-X Series switches are supported in the role of access switches. These switch platforms will not be supported in the role of distribution or core switches. EasyQoS supports all IOS software versions for these models.
Catalyst 3650 and 3850 Series Switches	A policy-map which contains a class-map which consists of an empty action cannot be applied to an interface prior to IOS XE release 3.6.2. EasyQoS supports Catalyst 3850 and 3650 IOS XE software releases prior to 3.6.2.

Platform	Description
Catalyst 6000 Series Switches with Sup-720 or Sup-2T Supervisors	Catalyst 6000 Series switches with the Sup-720 or the Sup-2T support two Ten Gigabit Ethernet and three Gigabit Ethernet interfaces on the supervisor line card. The three Gigabit Ethernet interfaces can be disabled / enabled via the "mls qos 10g-only / no mls qos 10g-only" (Sup-720) or "platform qos 10g-only / no platform qos 10g-only" (Sup-2T) global configuration commands. The default is for the Gigabit Ethernet interfaces to be active.
	EasyQoS does not configure this command currently, since the decision as to whether the Gigabit Ethernet interfaces are active or inactive is generally based on the need for these interfaces, and outside the scope of QoS configuration. The network administrator should ensure this command is configured appropriately for the requirements of the network before deploying an EasyQoS policy to Catalyst 6000 switches with Sup-720 or Sup-2T supervisors.
	The ingress and egress queuing model supported by the Supervisor interfaces is dependent upon whether the Gigabit Ethernet interfaces are active or inactive. When the Gigabit Ethernet interfaces are active, all interfaces on the Supervisor support a 2Q4T ingress queuing model and a 1P3Q4T egress queuing model, both with CoS-to-queue mapping and CoS-based tail-drop for congestion avoidance. When the Gigabit Ethernet interfaces are inactive, all interfaces on the Supervisor support an 8Q4T ingress queuing model and a 1P7Q4T egress queuing model, both with DSCP-to-queue mapping and DSCP-based WRED for congestion avoidance
	If the network administrator changes the setting of the "mls qos 10g-only" (Sup-720) or "platform qos 10g-only" (Sup-2T)command on a Catalyst 6000 switch after deploying an EasyQoS policy, the network administrator should re-deploy the policy to the switch after Cisco APIC-EM has re-inventoried the switch and updated its internal database regarding the manual change.
	EasyQoS supports all supported software versions for these platforms.

Platform	Description
Catalyst 6500 Series Switches with Sup2T	CSCup61257 - Error message not printing if unsupported QoS is applied via SSH/Telnet. The Cisco APIC-EM may have trouble identifying when a QoS policy it has applied has failed due to this bug.
	EasyQoS supports the following software versions for this platform.
	• 15.1(02)SY03, s2t54-adventerprisek9-mz.SPA
	• 151-2.SY3.bin, s2t54-adventerprisek9-mz.SPA
	• 150-1.SY6.bin, s2t54-adventerprisek9-mz.SPA
	• 150-1.SY6.bin listed in the DDTS
	Note This issue may affect other software versions.
Catalyst 6500 Series Switches with Sup2T	Ingress queuing of all ports on the Sup2T differs when the Gigabit Ethernet interfaces are enabled or disabled. Hence, when Cisco APIC-EM pushes ingress marking policies to ports on the Sup2T, the policy may fail.
	EasyQoS supports all Catalyst 6500 software versions which support the Sup2T - 12.2(50)SY and higher.
The following switches: • Catalyst 6500 Series with Sup2T • Catalyst 6880 Series • Catalyst 4000 Series • Catalyst 3850 Series • Catalyst 3650 Series	The Catalyst 6500 Series with Sup2T, Catalyst 6880 Series, Catalyst 4000 Series, Catalyst 3850 Series, and Catalyst 3650 Series switches will only be supported as an access-layer switch or as a distribution-layer switch. Support of a single switch as both a distribution-layer switch and an access-layer switch simultaneously is not supported. Multiple switch platforms of the same model can of course individually be either distribution layer switches or access-layer switches within a single deployment.
	EasyQoS supports all supported software versions of the Catalyst 6500 Series with Sup2T, Catalyst 6880 Series, Catalyst 4000 Series, Catalyst 3850 Series, and Catalyst 3650 Series switches.

Platform	Description
Cisco Nexus 7000 Series Switches	EasyQoS supports the Nexus 7000 Series switches in the role of a campus core switch. Nexus 7000 Series switches with F2 and F2e modules, or Nexus 7000 Series switches with M2 modules are supported.
	Cisco best-practice recommendations for these modules have changed to a 4 ingress and 4 egress queue model. In some scenarios, undeterministic queuing behavior may result from the 8 ingress and 8 egress model, due to the internal switch fabric supporting 4 queues, resulting in bandwidth allocations not being accurately reflected in actual traffic output. The new queuing best practices are designed to provide more deterministic queuing behavior.
	EasyQoS supports all supported software versions for these modules.
Cisco Nexus 7700 Series Switches	EasyQoS supports the Nexus 7000 Series switches in the role of a campus core switch. Nexus 7000 Series switches with F2 and F2e modules, or Nexus 7000 Series switches with M2 modules are supported.
	Cisco best-practice recommendations for these modules have changed to a 4 ingress and 4 egress queue model. In some scenarios, undeterministic queuing behavior may result from the 8 ingress and 8 egress model, due to the internal switch fabric supporting 4 queues, resulting in bandwidth allocations not being accurately reflected in actual traffic output. The new queuing best practices are designed to provide more deterministic queuing behavior.
	EasyQoS supports all supported software versions for these modules.
Cisco Nexus 7000 and 7700 Series Switches	EasyQoS supports the Nexus 7700 Series switches in the role of a campus core switch. Nexus 7700 Series switches with F2e and F3 modules, or Nexus 7700 Series switches with M3 modules are supported.
	Cisco best-practice recommendations for these modules have changed to a 4 ingress and 4 egress queue model. In some scenarios, undeterministic queuing behavior may result from transitioning from 4 ingress queues to 8 egress queues, resulting in bandwidth allocations not being accurately reflected in actual traffic output. The new queuing best practices are designed to provide more deterministic queuing behavior.
	EasyQoS supports all supported software versions for these platforms.
Routers	

Platform	Description
Cisco ASR 1000 Router Platforms	EasyQoS supports ASR 1000 platforms with IOS XE 3.8.0(S) / IOS 15.3(1)S and higher. However, the ingress marking policy pushed by EasyQoS varies based upon the IOS XE version as well as the NBAR2 protocol pack version. EasyQoS will push an ingress marking policy to ASR 1000 platforms based on the following criteria: 1 If the device is running IOS XE 03.16.04/ IOS 15.3(1)S or later and has Advanced Protocol Pack 22 or later, EasyQoS will push a policy-map which includes the business-relevance attribute for marking. This is because the business-relevant attribute requires a minimum version of IOS XE 03.16.04 and Advanced Protocol Pack 22. ASR 1000 platforms require an Advanced Enterprise Services (AES) or Advanced IP Services (AIS) license for NBAR2 Advanced Protocol Pack. 2 Otherwise, if the device is running IOS XE3.16, 3.15 and 3.14, or has a Standard Protocol Pack installed, or runs a older protocol pack which does not support metadata information, EasyQoS will not push any ingress marking policy. 3 Otherwise, EasyQoS will push a policy-map which includes "match protocol" commands, with the subset of the protocols that exist on the protocol pack on that device. EasyQoS will always push a queuing policy to the device.

Platform	Description
Cisco ISR 4000 Series Router Platforms	EasyQoS supports the ISR 4321, 4331, 4351, and 4431 platforms with IOS XE 3.13.2(S) / IOS 15.4(3)S and higher (minimum releases supported by the platforms). EasyQoS supports the ISR 4451-X platforms with IOS XE 3.10.0(S) / IOS 15.3(3)S and higher (minimum releases supported by the platforms). However, the ingress marking policy pushed by EasyQoS varies based upon the IOS XE version as well as the NBAR2 protocol pack version. EasyQoS will push an ingress marking policy to ISR 4000 Series platforms based on the following criteria: 1 If the device is running IOS XE 3.16.1S or later and has Advanced Protocol Pack 14.0.0 or later, EasyQoS will push a policy-map which includes the business-relevance attribute for marking. This is because the business-relevant attribute requires a minimum version of IOS XE 3.16.1S and Advanced Protocol Pack 14.0.0. ISR 4000 Series platforms require an Application Experience (AppX) license for NBAR2 Advanced Protocol Pack. 2 Otherwise, if the device is running IOS XE3.16, 3.15 and 3.14, or has a Standard Protocol Pack installed, or runs a older protocol pack which does not support metadata information, EasyQoS will not push any ingress marking policy. 3 Otherwise, EasyQoS will push a policy-map which includes "match protocol" commands, with the subset of the protocols that exist on the protocol pack on that device. EasyQoS will always push a queuing policy to the device.

Platform	Description
Cisco ISR G2 Series Router Platforms	EasyQoS supports the ISR G2 platforms with IOS 15.2(4)M and NBAR2 Protocol Pack 2.1.0 and higher. However the ingress marking policy pushed by EasyQoS varies based upon the IOS version as well as the NBAR2 protocol pack version. EasyQoS will push an ingress marking policy to ISR G2 Series platforms based on the following criteria: 1 If the device is running IOS 15.5(3)M1 or later and has Advanced Protocol Pack 14.0.0 or later, EasyQoS will push a policy-map which includes the business-relevance attribute for marking. This is because the business-relevant attribute requires a minimum version of IOS 15.5(3)M1 and Advanced Protocol Pack 14.0.0. ISR G2 Series platforms require a Data license for NBAR2 Advanced Protocol Pack. 2 Otherwise, if the device has a Standard Protocol Pack installed, or runs a older protocol pack which does not support metadata information, EasyQoS will not push any ingress marking policy. 3 Otherwise, EasyQoS will push a policy-map which includes "match protocol" commands, with the subset of the protocols that exist on the protocol pack on that device. EasyQoS will always push a queuing policy to the device.
Cisco ISR 800 Series Routers	EasyQos pushes AVC/NBAR-based ingress classification and marking policies to all Ethernet interfaces on Cisco ISR 800 Series routers - including Layer 2 switch ports built into the platform. Although the policy is applied to the switch-port interfaces, the policy has no function. EasyQoS supports all supported software versions for these platforms.

Unsupported Cisco EasyQoS Applications—Cisco Wireless LAN Controllers

The following EasyQoS applications are not supported when applying a policy for the Cisco Wireless Controllers:

- t-mobile-web-services
- 4chan
- nate-com
- the-atlantic
- ted

- xbox-web-portal

- swagbucks

- tagged-com

- foursquare

- blaze-news

- cnbc

- the-daily-beast

- monster-com

- cbs

- sky-news

- liveperson

- asus

- yellowpages-us

- european-union-web-portal

- tinyurl

- major-league-baseball-com

- unite-airlines

- dangdang

- usbank

- hollywood-reporter

- entertainment-weekly

- foodnetwork

- indiegogo

- investopedia

- mint-com

- whitepages

- patch-com

- disney-web-portal

- buffer-com

- playstation-web-portal

- livestrong-com

- letv-com

- pbs-web-portal

- pocket

- publishers-clearing-house

- usaa

- worldstarhiphop

- backpage

- sfgate

Service and Support

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What's New in Cisco Product Documentation at:

http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.

Related Documentation

The following publications are available for the Cisco APIC-EM:

Cisco APIC-EM Controller Documentation

For this type of information...	See this document...
Release information, including new features, system requirements, and open and resolved caveats.	*Cisco Application Policy Infrastructure Controller Enterprise Module Release Notes*
Installation and configuration of the controller, including post-installation tasks.	*Cisco Application Policy Infrastructure Controller Enterprise Module Installation Guide*
Introduction to the Cisco APIC-EM GUI and its applications.	*Cisco Application Policy Infrastructure Controller Enterprise Module Quick Start Guide* [7]
Configuration of user accounts, RBAC scope, security certificates, authentication and password policies, and global discovery settings. Monitoring and managing Cisco APIC-EM services. Backup and restore. Cisco APIC-EM APIs.	*Cisco Application Policy Infrastructure Controller Enterprise Module Administrator Guide*

For this type of information...	See this document...
Troubleshooting the controller, including the installation, services, and passwords. Developer console. How to contact the Cisco Technical Assistance Center (TAC).	*Cisco Application Infrastructure Controller Enterprise Module Troubleshooting Guide*
Tasks to perform before updating the controller to the latest version. Software update instructions. Tasks to perform after an update.	*Cisco Application Infrastructure Controller Enterprise Module Upgrade Guide*

7   Available from the APIC-EM controller **System Info** window.

Cisco IWAN Application Documentation

For this type of information...	See this document...
Release information, including open and resolved caveats for the Cisco IWAN application.	*Cisco IWAN Application on APIC-EM Release Notes*
Using the Cisco IWAN application.	*Cisco IWAN Application on APIC-EM User Guide*

Cisco Network Plug and Play Application Documentation

For this type of information...	See this document...
Release information, including open and resolved caveats for the Cisco Plug and Play application. Supported Cisco devices for Cisco Network Plug and Play.	*Release Notes for Cisco Network Plug and Play*
Configuration of devices using Cisco Network Plug and Play.	*Configuration Guide for Cisco Network Plug and Play on Cisco APIC-EM* *Cisco Open Plug-n-Play Agent Configuration Guide*

For this type of information...	See this document...
Cisco Network Plug and Play solution overview. Main workflows used with the Cisco Network Plug and Play solution. Deployment of the Cisco Network Plug and Play solution. Tasks for using proxies with the Cisco Network Plug and Play solution. Configuration of a DHCP server for APIC-EM controller auto-discovery. Troubleshooting procedures for the Cisco Network Plug and Play solution.	*Solution Guide for Cisco Network Plug and Play*
Information about using the Cisco Plug and Play Mobile App.	*Mobile Application User Guide for Cisco Network Plug and Play* (also accessible in the app through Help)

Cisco APIC-EM Developer Documentation

The Cisco APIC-EM developer website is located on the Cisco DevNet website.

For this type of information...	See this document...
API functions, parameters, and responses.	APIC-EM API Reference Guide
Tutorial introduction to controller GUI, DevNet sandboxes and APIC-EM NB REST API.	Getting Started with Cisco Application Policy Infrastructure Controller Enterprise Module (APIC-EM)
Hands-on coding experience calling APIC-EM NB REST API from Python.	APIC-EM Learning Labs

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