Configuring MQC Support for IP Sessions

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The MQC Support for IP Sessions feature provides modular quality of service (QoS) command-line interface (CLI) provisioning on Cisco Intelligent Services Gateway (ISG) IP sessions. It makes the full set of modular QoS CLI (MQC) syntax available for the sessions, whether they are configured locally or downloaded from a remote authentication, authorization, and accounting (AAA) server.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions for MQC Support for IP Sessions

General Restrictions

Creation of IP sessions over PPP sessions is not supported.

Note This document uses the generic term PPP to cover all protocol types. Examples of protocols include PPP over Ethernet (PPPoE) and PPP over ATM (PPPoA).

The specific protocol supported varies by platform. For example, the Cisco 7600 series router does not support PPPoA or PPP over Ethernet over ATM (PPPoEoA). For information about the Cisco 7600 series router, see the Cisco 7600 Series Cisco IOS Configuration Guide for the Cisco IOS release you are using.

Only the marking and policing features work in upstream traffic. All queuing, policing, and marking MQC features work in downstream traffic.

Class-level queues are allowed only at the child level in session policy maps. All other levels must have a single-level policy and use the default queues.

IP sessions over Gigabit EtherChannel (GEC) are not supported.

Because IP sessions cannot be load-balanced, load balancing is not supported on any system.

Cisco 10000 Series Routers

ISG policer support is limited to traffic-class sessions on the Cisco 10000 series router.

IP sessions over ATM virtual circuits (VCs) do not support queuing policy maps on the Cisco 10000 series router. However, you can configure queuing policy maps for point-to-point interfaces on ATM subinterfaces.

Access-side interface redundancy for port-channel links is not supported on the Cisco 10000 series router. However, core-side redundancy is supported on the Cisco 10000 series router.

Cisco 7600 Series Routers

Traffic classes are not supported.

IP sessions on ATM interfaces are not supported.

IP sessions are not supported on ambiguous IEEE 802.1Q in 802.1Q (QinQ) subinterfaces.

Beginning in Cisco IOS Release 12.2(33)SRE, one to one access-side interface redundancy for port-channel links is supported, but only on the Ethernet Services Plus (ES+) line cards. However, core-side redundancy is supported on the Cisco 7600 series router.

Information About MQC Support for IP Sessions

Supported Interfaces

MQC on IP sessions is supported through the following interfaces, arranged by system:

- Cisco 10000 series systems
  - Physical Ethernet

- ◦ .1Q, QinQ (unambiguous only)
- Cisco 7200 and Cisco 7300 series systems

  - ◦ Physical Ethernet
  - ◦ .1Q, QinQ (unambiguous only)
  - ◦ Nonqueuing MQC over ATM
  - ◦ ATM 1483 RBE and ATM routed permanent virtual circuits (PVCs)
  - ◦ Generic routing encapsulation (GRE) tunnel. Policy maps are not allowed on the session and tunnel simultaneously.
- Cisco 7600 series systems

  - ◦ Gigabit Ethernet with .1Q or QinQ subinterfaces
  - ◦ Routed bridge encapsulation (RBE)
  - ◦ Permanent virtual connection (PVC)

MQC is not supported on the following interfaces:

- Bridge-Group Virtual Interface (BVI)
- GEC
- Interfaces configured for Layer 2 Tunnel Protocol (L2TP) sessions (on L2TP Network Servers (LNS))

The following features and configurations are used on MQC on IP sessions:

- ISG policer for traffic classes

Note Traffic classes are not supported on Cisco 7600 series systems.

ISG Policers

You can create configurations to work on an IP session with multiple traffic classes, and with one or more of the traffic classes acting as a policer. ISG policer is retained for backward compatibility and is fully supported if you do not want to migrate to MQC now. Note that ISG policing is supported on traffic classes, but MQC is not supported for traffic classes.

An ISG session can be configured with the ISG policer (also called dynamic rate limiting) or MQC, but not both. You should either use the ISG policer or migrate fully to MQC. If you do not migrate fully from ISG policer to MQC, a misconfiguration will occur.

Precedence Order in Policy Maps

A policy map can be attached to one or more interfaces to specify a service policy. Configuration sources combined with context determines which QoS policy map is applied. The three configuration sources and their general order of precedence are as follows:

1 Per-user (per-subscriber) configuration
2 Service profile
3 Interface configuration

This order of precedence shows the general condition, that is, service profiles and per-user configurations have higher priority than interface configurations.

However, a change of authorization (CoA) per-user push replaces the current per-user configuration for any overlapping or common feature. Similarly, when a new service logs in, its configuration replaces any

overlapping feature, from previously configured service profiles, that is not already in effect from a per-user configuration source

If the new service then logs off, the previously existing configuration is reapplied if no higher-precedence configuration source is in effect.

Given those precedence qualifications, the policy map is determined as follows:

- If there is no policy map on the session, the incoming policy map is not applied.
- If an existing policy map is configured from a higher priority source than an incoming one, the incoming policy map is not applied.
- If an existing policy map is configured from a lower priority source than an incoming one, the incoming policy map replaces it.

Inheritance Rules on Cisco 10000 Series Systems

The inheritance rules on Cisco 10000 series systems for policies and queues from the parent interface are as follows:

- When a session that does not have a policy map starts, it inherits the policy and queues from the immediate parent that has a policy; for example, a subinterface or main interface.
- When a session with an inherited policy receives a policy from a RADIUS server, it first removes the inherited policy and then applies the policy from the RADIUS server.
- When a session that does not have a policy starts and its parent interfaces also do not have a policy but a policy is later attached to the parent, there are two possible outcomes:

  - The policy is attached to the main interface, and sessions directly on that interface inherit it. Sessions on subinterfaces under the main interface that do not have a policy of their own also inherit it.
  - The policy is attached to the subinterface, and sessions under that subinterface inherit it.

- When a user removes a policy from the parent interface, there are two possible outcomes:

  - The policy is removed from a subinterface and is uninherited from any sessions on the subinterface that inherited the policy from it. If the main interface has a policy, sessions on the subinterface from which the policy was removed inherit that.
  - The policy is removed from the main interface and is uninherited from the main interface and also from any sessions under its subinterfaces that inherited this policy.

- When a session that does not already have a policy receives one from the RADIUS server, you need only install the new policy. However when a session that already has a policy inherited from the parent receives a new one from the RADIUS server, you must first uninherit the parent policy and then install the new one.
- When a session policy is removed, the session inherits the policy from its nearest parent, subinterface, or main interface that has a policy.

How to Configure MQC Support for IP Sessions

Configuring Local Subscriber Profile for MQC Support

To configure a QoS policy map to define a service policy, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map type service** *service-name*
4. **service-policy** *policy-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**policy-map type service** *service-name* **Example:** `Router# (config)# policy-map type service service1`	Enters policy-map configuration mode. Specifies the policy-map name and its service configuration.
Step 4	**service-policy** *policy-name* **Example:** `Router# (config-service-policymap)# service-policy service-policy1`	Configures the service policy.

For information about configuring a local service profile, see the section "Configuring Per-Session QoS Using the ISG Framework" in the "Configuring ISG Control Policies" chapter in the *Cisco IOS Intelligent Services Gateway Configuration Guide*.

Configuring ISG QoS for IP Sessions

To associate a previously configured traffic class with a policy map, perform these steps:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map type service** *service-name*
4. **class type traffic** *class-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**policy-map type service** *service-name* **Example:** `Router# (config)# policy-map type service`	Enters policy-map configuration mode. Specifies the policy-map name and its service configuration.
Step 4	**class type traffic** *class-name* **Example:** `Router# (config-service-policymap)# class type traffic`	Associates a previously configured traffic class with the policy map.

Configuration Examples for MQC Support for IP Sessions

QoS Policy-Map Service Profile and Command Policy-Map Configurations Example

The following example shows how to configure a QoS policy map, a service profile, and a command policy map. The command policy map is then configured onto interface GigabitEthernet 0/0/0 with the **service-policy** keyword.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# class-map match-any EF-customer
Router(config-cmap)# match access-group name CUSTOMER-EF
Router(config-cmap)# class-map match-any EF-WAN
Router(config-cmap)# match qos-group 6
Router(config-cmap)# policy-map PREMIUM_MARK_IN
Router(config-pmap)# class EF-customer
Router(config-pmap-c)# set cos 6
Router(config-pmap-c)# set dscp ef
Router(config-pmap-c)# set qos-group 6
Router(config-pmap-c)# class class-default
Router(config-pmap-c)# set dscp af11
Router(config-pmap-c)# set qos-group 1
Router(config-pmap-c)# set cos 1
Router(config-pmap-c)# policy-map PREMIUM_UB_OUT
Router(config-pmap)# class EF-WAN
Router(config-pmap-c)# police cir 200000000
Router(config-pmap-c-police)# priority
Router(config-pmap-c)# class class-default
Router(config-pmap-c)# policy-map type service PREMIUM_SERVICE
Router(config-service-policymap)# service-policy input PREMIUM_MARK_IN
Router(config-service-policymap)# service-policy output PREMIUM_UB_OUT
Router(config-service-policymap)# policy-map type control INT
Router(config-control-policymap)# class type control always event account-logon
Router(config-control-policymap-class-control)# 1 service-policy type service name
PREMIUM_SERVICE
Router(config-control-policymap-class-control)# interface GigabitEthernet0/0/0
Router(config-if)# ip address 10.0.0.1 255.255.255.0
Router(config-if)# pppoe enable group global
Router(config-if)# service-policy type control INT
```

Additional References

Related Documents

Related Topic	Document Title
How to configure ISG control policies	"Configuring ISG Control Policies" module in this guide
How to configure QoS policies using the MQC	*Cisco IOSQuality of Service Solutions Configuration Guide*
ISG commands	*Cisco IOS Intelligent Services Gateway Command Reference*

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for MQC Support for IP Sessions

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1   Feature Information for MQC Support for IP Sessions

Feature Name	Releases	Feature Information
MQC Support for IP Sessions	12.2(33)SRC 15.0(1)S	Provides MQC provisioning on Cisco ISG IP sessions. The following commands were introduced or modified: **policy-map** and **service-policy**.

Feature Name	Releases	Feature Information
ISG: Session: Multicast: Coexistance	12.2(33)SRE	In Cisco IOS Release 12.2(33)SRE, ISG Session Multicast Coexistence feature support was added on Cisco 7600 series routers.