AutoQoS - VoIP

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The AutoQoS -- VoIP feature allows you to automate the delivery of quality of service (QoS) on your network and provides a means for simplifying the implementation and provisioning of QoS for Voice over IP (VoIP) traffic.efr

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.

Prerequisites for AutoQoS - VoIP

- Ensure that no QoS policies (service policies) are attached to the interface. This feature cannot be configured if a QoS policy (service policy) is attached to the interface.
- To include Simple Network Protocol (SNMP) traps (monitored events), the SNMP server must be enabled.

Restrictions for AutoQoS - VoIP

General Restrictions

- The AutoQoS -- VoIP feature is supported on the following interfaces, data-link connection identifiers (DLCIs), and permanent virtual circuits (PVCs) only:

    ◦ Serial interfaces with PPP or High-Level Data Link Control (HDLC)
    ◦ Frame Relay DLCIs in point-to-point subinterfaces only
    ◦ ATM PVCs

The AutoQoS -- VoIP feature is supported on low-speed ATM PVCs in point-to-point subinterfaces only. The AutoQoS -- VoIP feature is supported on high-speed ATM PVCs in any type of subinterface.

Note An ATM PVC is classified as low-speed if its bandwidth is less than or equal to 768 kbps; an ATM PVC is classified as high-speed if its bandwidth is greater than 768 kpbs

- ◦ Frame Relay-to-ATM Interworking links

Serial Interface Restrictions

- For a serial interface with a low-speed link, Multilink PPP (MLP) is configured automatically. The serial interface must have an IP address. When MLP is configured, this IP address is removed and put on the MLP bundle. To ensure that the traffic goes through the low-speed link, the following conditions must be met:

    ◦ The AutoQoS - VoIP feature must be configured at the both ends of the link.
    ◦ The amount of bandwidth configured must be the same on both ends of the link.

Frame Relay DLCI Restrictions

- The AutoQoS -- VoIP feature cannot be configured on a Frame Relay DLCI if a map class is attached to the DLCI.
- If a Frame Relay DLCI is already assigned to one subinterface, the AutoQoS -- VoIP feature cannot be configured from a different subinterface.
- For low-speed Frame Relay DLCIs configured for use on Frame Relay-to-ATM networks, MLP over Frame Relay (MLPoFR) is configured automatically. The subinterface must have an IP address.

When MLPoFR is configured, this IP address is removed and put on the MLP bundle. The AutoQoS -- VoIP feature must also be configured on the ATM side of the network.

- For low-speed Frame Relay DLCIs with Frame Relay-to-ATM Interworking, the AutoQoS -- VoIP feature cannot be configured if a virtual template is already configured for the DLCI.

ATM PVC Restrictions

- For a low-speed ATM PVC, the AutoQoS -- VoIP feature cannot be configured if a virtual template is already configured for the ATM PVC.
- For low-speed ATM PVCs, MLP over ATM (MLPoATM) is configured automatically. The subinterface must have an IP address.

When MLPoATM is configured, this IP address is removed and put on the MLP bundle. The AutoQoS -- VoIP feature must also be configured on the ATM side of the network.

Information About AutoQoS - VoIP

Benefits of AutoQoS - VoIP

The key benefits of the AutoQos -VoIP feature include the following:

- Customers can implement the QoS features required for VoIP traffic without an in-depth knowledge of the following underlying technologies:
  - ◦ PPP
  - ◦ Frame Relay
  - ◦ ATM
  - ◦ Service policies
  - ◦ Link efficiency mechanisms (LEM), such as Link Fragmentation and Interleaving (LFI)
- The AutoQoS -- VoIP feature simplifies QoS implementation and speeds up the provisioning of QoS technology over a Cisco network. It reduces human error and lowers training costs. With the AutoQoS -- VoIP feature, one command (the **auto qos** command) enables QoS for VoIP traffic across every Cisco router and switch.
- Customers can also use existing Cisco IOS commands to modify the configurations automatically generated by the AutoQoS -- VoIP feature as needed to meet specific requirements.
- The Cisco product, CiscoWorks QoS Policy Manager (QPM), can be used in conjunction with the AutoQoS -- VoIP feature to provide a centralized, web-based tool to cost effectively manage and monitor network-wide QoS policies. The AutoQoS -- VoIP feature together with CiscoWorks QPM, eases QoS implementation, provisioning, and management.

Design Considerations

General QoS Requirements

- Recommended methods and values are configured to meet the QoS requirements for voice traffic.
- The AutoQoS -- VoIP feature takes the interface type and bandwidth into consideration when implementing the following QoS features:
  - ◦ Classification

Classification is used to differentiate the voice packets from the data packets and handle the voice packets appropriately.

- ◦ Low latency queueing (LLQ) - Priority Queueing (PQ)

The LLQ (specifically, PQ) is applied to the voice packets to meet the latency requirements.

- ◦ Compressed Real-Time Protocol (cRTP)

With cRTP, the 40-byte IP header of the voice packet is reduced from 2 to 4 bytes, thereby reducing voice bandwidth requirements. cRTP must be applied at both ends of a network link.

- ◦ LFI

LFI is used to reduce the jitter of voice packets by preventing voice packets from getting delayed behind large data packets in a queue. LFI must be applied at both ends of a network link.

Bandwidth Implications

- The bandwidth of the serial interface determines the speed of the link. The speed of the link in turn determines the configurations generated by the AutoQoS -- VoIP feature.

Note Changing the bandwidth before configuring the AutoQoS -- VoIP feature is not recommended.

The AutoQoS -- VoIP feature uses the bandwidth at the time the feature is configured. AutoQoS -- VoIP does not respond to changes made to bandwidth after the feature is configured.

For example, if the **auto qos voip** command is used to configure the AutoQoS -- VoIP feature on an interface with 1000 Kbps, the AutoQoS -- VoIP feature generates configurations for high-speed interfaces. However, if the bandwidth is later changed to 500 Kbps, the AutoQoS -- VoIP feature will not use the lower bandwidth. The AutoQoS -- VoIP feature retains the higher bandwidth and continues to use the generated configurations for high-speed interfaces.

To force the AutoQoS -- VoIP feature to use the lower bandwidth (and thus generate configurations for the low-speed interfaces), use the **no auto qos voip** command to remove the AutoQoS -- VoIP feature and then reconfigure the feature.

Fragmentation for Frame Relay Networks

- For Frame Relay networks, fragmentation is configured using a delay of 10 milliseconds (ms) and a minimum fragment size of 60 bytes. This ensures that the VoIP packets are not fragmented. However, when the G.711 coder-decoder (codec) is used on low-speed links, the fragment size configured by the AutoQoS -- VoIP feature could be smaller than the size of the G.711 VoIP packet.

To solve this potential problem, choose one of the following:

- ◦ Change the fragment size to the required value.
- ◦ Change the size of the G.711 VoIP packet to a smaller value.

For example, if the AutoQoS -- VoIP feature is configured on a Frame Relay DLCI with 128 Kbps, the fragment size configured by the AutoQoS -- VoIP feature will be 160 bytes. The size of the G.711 VoIP packet will be 160 bytes, minus the bytes in the packet headers for the layers. The workaround is to either change the fragment size from 160 bytes to 220 bytes or change the size of the G.711 VoIP packet from 160 bytes to 80 bytes.

Signaling Protocols

- The AutoQoS -- VoIP feature currently identifies the following signaling protocols:

  - ◦ H.323
  - ◦ H.225 (Unicast only)
  - ◦ Session Initiation Protocol (SIP)
  - ◦ "Skinny" gateway protocol

◦ Media Gateway Control Protocol (MGCP)

Note Access control lists (ACLs) can be configured to identify any additional signaling protocols that may be needed.

Configurations for the Interface Configurations Policy Maps Class Maps and ACLs

The AutoQoS -- VoIP feature automatically creates configurations that are then used for the interface configurations, policy maps, class maps, and ACLs. The interface configurations, policy maps, class maps, and ACLs are created to classify VoIP packets and to provide the appropriate QoS treatment for the network traffic.

This feature also creates interface (or PVC)-specific configurations. These interface (or PVC)-specific configurations are created according to the interface type and the link speed.

Note Links with bandwidths lower than or equal to 768 kpbs are considered low-speed links; links with bandwidths higher than 768 kpbs are considered high-speed links.

How to Configure the AutoQoS - VoIP Feature

Enabling the AutoQoS - VoIP Feature

Before using the **auto qos** command at an interface or an ATM PVC, ensure that the following prerequisites have been met:

- Cisco Express Forwarding (CEF) must be enabled at the interface or ATM PVC.
- If the interface or subinterface has a link speed of 768 kpbs or lower, configure the primary or secondary IP address of the interface by using the **ip address** command.
- For all interfaces or subinterfaces, configure the amount of bandwidth by using the **bandwidth** command. The amount of bandwidth allocated should be based on the link speed of the interface.
- For an ATM PVC, configure the variable bit rate (VBR) by using either the **vbr-nrt** command or the **vbr-rt** command or configure the constant bit rate (CBR) by using the **cbr** command.

Note
- The **auto qos voip**command is not supported on subinterfaces.
- Do not change the bandwidth of the interface before using the **auto qos**command.

>

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **bandwidth** *kilobits*
5. **vbr-nrt** *output-pcr output-scr output-mbs* [*input-pcr*] [*input-scr*] [*input-mbs*]
6. **vbr-rt** *peak-rate average-rate burst*
7. **cbr** *rate*
8. **pvc** [*name*] *vpi* / *vci* [**ces** | **ilmi** | **qsaal** | **smds**]
9. **ip address** *ip-address mask* **secondary**
10. **frame-relay interface-dlci** *dlci* [**ietf** | **cisco**] [**voice-cir** *cir*] [**ppp** *virtual-template-name*]
11. Do one of the following:

    • **auto qos voip [trust] [fr-atm]**
12. **exit**

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	**interface** *type number*
	
	Example:
	
	`Router(config-if)#`
	
	`interface s4/0`
		Configures an interface (or subinterface) type and enters interface configuration mode.
		
		• Enter the interface type number.

	Command or Action	Purpose
Step 4	**bandwidth** *kilobits* **Example:** Router(config-if)# bandwidth 1540 **Example:**	(Optional) Sets a bandwidth value for an interface. • Enter the bandwidth value in kbps. **Note** This step applies only to interfaces and subinterfaces. It is not required for ATM PVCs.
Step 5	**vbr-nrt** *output-pcr output-scr output-mbs* [*input-pcr*] [*input-scr*] [*input-mbs*] **Example:** Router(config-if)# vbr-nrt 10000 5000 32 20000 10000 64 **Example:**	(Optional) Configures the variable bit rate-nonreal time (VBR-NRT) QoS and specifies the output peak cell rate (PCR), output sustainable cell rate (SCR), and output maximum burst cell size (MBS) for an ATM PVC, PVC range, switched virtual circuit (SVC), virtual circuit (VC) class, or VC bundle member. • Enter the output PCR, SCR, and MBS. **Note** This step applies only to ATM PVCs. It is not required for interfaces or subinterfaces.
Step 6	**vbr-rt** *peak-rate average-rate burst* **Example:** Router(config-if)# vbr-rt 640 56 80	(Optional) Configures the real-time VBR for Voice over ATM connections. • Enter the peak information rate (PIR), the average information rate (AIR), and the burst size. **Note** This step applies only to ATM PVCs. It is not required for interfaces or subinterfaces.
Step 7	**cbr** *rate* **Example:** Router(config-if-atm-vc)# cbr 56 **Example:**	(Optional) Configures the CBR for the ATM circuit emulation service (CES) for an ATM PVC. This command can be used in different modes, including ATM-VC configuration mode (for ATM PVCs and SVCs), ATM PVC range configuration mode (for an ATM PVC range), or ATM PVC-in-range configuration mode (for an individual PVC within a PVC range). • Enter the CBR. **Note** This step applies only to ATM PVCs. It is not required for interfaces or subinterfaces.

	Command or Action	Purpose
Step 8	**pvc** [*name*] *vpi* / *vci* [**ces**	**ilmi**	**qsaal**	**smds**] **Example:** Router(config-if)# pvc 1/32 **Example:**	(Optional) Creates or assigns a name to an ATM PVC and specifies the encapsulation type on an ATM PVC. • Enter the ATM network virtual path identifier (VPI) and the ATM network virtual channel identifier (VCI) for the ATM PVC. **Note** This step applies only to ATM PVCs. It is not required for interfaces or subinterfaces.
Step 9	**ip address** *ip-address mask* **secondary** **Example:** Router(config-if)# ip address 10.10.100.1 255.255.255.0	(Optional) Sets a primary or secondary IP address for an interface. **Note** Applies only to low-speed interfaces (that is, interfaces with link speeds of 768 kbps or lower.)
Step 10	**frame-relay interface-dlci** *dlci* [**ietf**	**cisco**] [**voice-cir** *cir*] [**ppp** *virtual-template-name*] **Example:** Router(config-if)# frame-relay interface-dlci 100 **Example:**	(Optional) Assigns a DLCI to a specified Frame Relay subinterface on the router or access server, or assigns a specific PVC to a DLCI, or applies a virtual template configuration for a PPP session. • Enter the DLCI number. **Note** This step applies only to Frame Relay interfaces (either low-speed or high-speed).

	Command or Action	Purpose
Step 11	Do one of the following: • **auto qos voip [trust] [fr-atm]** **Example:** Router(config-if)# auto qos voip **Example:** **Example:** Router(config-fr-dlci)# auto qos voip **Example:**	Configures the AutoQoS -- VoIP feature. **Note** For low-speed Frame Relay DLCIs interconnected with ATM PVCs in the same network, the **fr-atm** keyword must be explicitly configured in the **auto qos voip** command to configure the AutoQoS - VoIP feature properly. That is, the command must be configured as **auto qos voip fr-atm**.
Step 12	**exit** **Example:** Router(config-if)# exit	(Optional) Returns to interface configuration mode.

FAQs and Troubleshooting Tips

Below are answers to frequently asked questions (FAQs) and tips for troubleshooting situations that you may encounter when configuring or using the AutoQoS -- VoIP feature.

Why can't I configure the AutoQoS - VoIP feature?

- To configure the feature, CEF must be is enabled. Verify that CEF is enabled on your network.
- Also, the feature cannot be enabled if a service policy is already attached to the interface. Determine whether there is a service policy attached to the interface. If so, remove the service policy from the interface.

Why isn't the AutoQoS - VoIP feature supported on my router?

- The AutoQoS -- VoIP feature is supported only on the IP Plus image for lower-end platforms. Verify that you have the IP Plus image installed on your router.

Why are some of my QoS configurations still present after I disable the AutoQoS - VoIP feature?

- You have to manually disable any QoS configurations that were modified by the AutoQoS -- VoIP feature.

Why did my low-speed network link go down when I enabled the AutoQoS - VoIP feature?

- Ensure that AutoQoS -- VoIP is enabled on both sides of the network link.

Why can't I establish an end-to-end connection on the Frame Relay link?

- Check the bandwidth on both sides of the Frame Relay link. The bandwidth on both sides of the link must be the same, otherwise a fragmentation size mismatch occurs and a connection cannot be established.

Note For more help, see the FAQs and Troubleshooting Tips, page 9 section.

What to Do Next

If the interface configurations, policy maps, class maps, and ACLs created (on the basis of the configurations created by the AutoQoS - VoIP feature) do not meet the needs of your network, the interface configurations, policy maps, class maps, and ACLs can be modified using the appropriate Cisco IOS commands.

Note While you can modify the interface configurations, policy maps, class maps, and ACLs, they may not be removed properly when the AutoQoS -- VoIP feature is disabled using the **no auto qos**command. You may need to manually remove any modified interface configurations, policy maps, class maps, and ACLs. For more information about the **no auto qos**command, see the Cisco IOS Quality of Service Solutions Command Reference.

Verifying the Configuration

SUMMARY STEPS

1. **enable**
2. **show auto qos** [**interface** [*interface type*]]
3. **show policy-map interface** [*interface type*]
4. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

Step 2	**show auto qos** [**interface** [*interface type*]]
	
	Example:
	
	`Router#`
	`show auto qos interface s4/0`
		(Optional) Displays the interface configurations, policy maps, class maps, and ACLs created on the basis of automatically generated configurations.
		
		• The interface configurations, policy maps, class maps, and ACLs can be displayed for a specific interface or all interfaces.

Step 3	**show policy-map interface** [*interface type*]
	
	Example:
	
	`Router#`
	`show policy-map interface s4/0`
	
	Example:
		(Optional) Displays the packet statistics of all classes that are configured for all service policies either on the specified interface or subinterface or on a specific PVC on the interface.
		
		• The packet statistics can be displayed for a specific interface, subinterface, PVC, or all interfaces, subinterfaces, or PVCs.

Step 4	**exit** **Example:** `Router# exit`	(Optional) Exits privileged EXEC mode.

Configuration Examples for AutoQoS - VoIP

Examples Configuring the AutoQoS - VoIP Feature

When the **auto qos voip** command is used to configure the AutoQoS -- VoIP feature, configurations are generated. These configurations are then used to create interface configurations, policy maps, class maps, and aCLs.

This section contains the following examples of configuring the AutoQoS -- VoIP feature on the interfaces, PVCs, and links.

Configuring the AutoQoS - VoIP Feature on a High-Speed Serial Interface Example

In this example, the AutoQoS -- VoIP feature is configured on the high-speed serial interface s1/2.

```
Router> enable
Router# configure terminal

Router(config)# interface s1/2

Router(config-if)# bandwidth 1540

Router(config-if)# auto qos voip

Router(config-if)#
  exit
```

Configuring the AutoQoS - VoIP Feature on a Low-Speed Serial Interface Example

In this example, the AutoQoS -- VoIP feature is configured on the low-speed serial interface s1/3.

```
Router# configure terminal

Router(config)# interface s1/3

Router(config-if)# bandwidth 512

Router(config-if)# ip address 10.10.100.1 255.255.255.0

Router(config-if# auto qos voip

Router(config-if)#
  exit
```

Configuring the AutoQoS - VoIP Feature on High-Speed Frame Relay Interfaces Example

In this example, the AutoQoS -- VoIP feature is configured on the high-speed serial point-to-point Frame Relay subinterface s4/1.2.

```
Router> enable
Router# configure terminal

Router(config)# interface s4/1.2 point-to-point

Router(config-if)# bandwidth 1540

Router(config-if)# frame-relay interface-dlci 100

Router(config-fr-dlci)# auto qos voip

Router(config-if)#
  exit
```

Configuring the AutoQoS - VoIP Feature on Low-Speed Frame Relay Interfaces Example

In this example, the AutoQoS -- VoIP feature is configured on the low-speed point-to-point Frame Relay subinterface s4/2.1.

```
Router# configure terminal

Router(config)# interface s4/2.1 point-to-point

Router(config-if)# bandwidth 512

Router(config-if)# ip address 10.10.100.1 255.255.255.0

Router(config-if)# frame-relay interface-dlci 100

Router(config-fr-dlci)# auto qos voip

Router(config-if)#
 exit
```

Configuring the AutoQoS - VoIP Feature on a High-Speed ATM PVC Example

In this example, the AutoQoS -- VoIP feature is configured on the high-speed point-to-point ATM PVC ATM5/0.1.

```
Router# configure terminal

Router(config)# interface ATM5/0.1 point-to-point

Router(config-if)# pvc 1/32

Router(config-if)# vbr-nrt 1540 1540

Router(config-if)# auto qos voip

Router(config-if)#
 exit
```

Configuring the AutoQoS - VoIP Feature on a Low-Speed ATM PVC Example

In this example, the AutoQoS -- VoIP feature is configured on a low-speed point-to-point ATM PVC ATM5/0.2.

```
Router# configure terminal

Router(config)# interface ATM5/0.2 point-to-point

Router(config-if)# ip address 10.10.100.1 255.255.255.0

Router(config-if)# pvc 1/32

Router(config-if)# vbr-nrt 512 512

Router(config-if)# auto qos voip

Router(config-if)#
 exit
```

Configuring the AutoQoS - VoIP Feature for Frame Relay-to-ATM Interworking Example

In this example, the AutoQoS -- VoIP feature is configured for Frame Relay-to-ATM Interworking. The AutoQoS -- VoIP feature is configured on the serial point-to-point subinterface s1/3.1.

```
Router# configure terminal

Router(config)# interface s1/3.1 point-to-point

Router(config-if)# bandwidth 512

Router(config-if)# ip address 10.10.100.1 255.255.255.0

Router(config-if)# frame-relay interface-dlci 100

Router(config-if)# auto qos voip fr-atm

Router(config-if)#
 exit
```

In this configuration, the optional **fr-atm** keyword is used to enable the AutoQoS -- VoIP feature for the Frame Relay-to-ATM Interworking.

Note The ATM-to-ATM side of the network needs no special configuration to distinguish it from the ATM-to-Frame Relay side of the network.

Examples Verifying the AutoQoS - VoIP Feature Configuration

When the **auto qos voip** command is used to configure the AutoQoS -- VoIP feature, configurations are generated. These configurations are then used to create interface configurations, policy maps, class maps,

and ACLs. The **show auto qos interface** command can be used to verify the contents of the interface configurations, policy maps, class maps, and ACLs.

This section contains the following sample output of the **show auto qos interface** command for interfaces, PVCs, and links.

Note   The **show auto qos interface** command output displays only those configurations created by the AutoQoS - VoIP feature.

Sample show auto qos interface Command Output for a High-Speed Serial Interface

The following is sample output of the **show auto qos**command for a high-speed serial interface:

```
Router# show auto qos interface s6/0
 Serial6/0 -
 !
  interface Serial6/0
    service-policy output AutoQoS-Policy-UnTrust
```

Sample show auto qos interface Command Output for a Low-Speed Serial Interface

The following is sample output of the **show auto qos interface**command for a low-speed serial interface:

```
Router# show auto qos interface s6/0
 Serial6/0 -
 !
  interface Serial6/0
   no ip address
   encapsulation ppp
   no fair-queue
   ppp multilink
   multilink-group 2001100126
 !
  interface Multilink2001100126
   bandwidth 512
   ip address 10.10.100.1 255.255.255.0
   service-policy output AutoQoS-Policy-UnTrust
   ppp multilink
   ppp multilink fragment-delay 10
   ppp multilink interleave
   ip rtp header-compression iphc-format
```

Sample show auto qos Interface Command Output for a High-Speed Frame Relay Interface

The following is sample output of the **show auto qos**command for a high-speed Frame Relay interface:

```
Router# show auto qos interface s6/1.1
 Serial6/1.1: DLCI 100 -
 !
  interface Serial6/1
   frame-relay traffic-shaping
 !
  interface Serial6/1.1 point-to-point
   frame-relay interface-dlci 100
    class AutoQoS-VoIP-FR-Serial6/1-100
 !
  map-class frame-relay AutoQoS-VoIP-FR-Serial6/1-100
   frame-relay cir 1540000
   frame-relay bc 15400
   frame-relay be 0
   frame-relay mincir 1540000
   service-policy output AutoQoS-Policy-UnTrust
```

✎

Note The output of the **show autoqos interface** command for high-speed Frame Relay interfaces is similar to the output for low-speed Frame Relay interfaces. The only difference is that Frame Relay Fragmentation and cRTP are not configured for high-speed Frame Relay interfaces.

Sample show auto qos interface Command Output for a Low-Speed Frame Relay Interface

The following is sample output of the **show auto qos**command for a low-speed Frame Relay interface:

```
Router# show auto qos interface s6/1.1
 Serial6/1.1: DLCI 100 -
 !
  interface Serial6/1
   frame-relay traffic-shaping
 !
  interface Serial6/1.1 point-to-point
   frame-relay interface-dlci 100
    class AutoQoS-VoIP-FR-Serial6/1-100
   frame-relay ip rtp header-compression
 !
 map-class frame-relay AutoQoS-VoIP-FR-Serial6/1-100
   frame-relay cir 512000
   frame-relay bc 5120
   frame-relay be 0
   frame-relay mincir 512000
   service-policy output AutoQoS-Policy-UnTrust
   frame-relay fragment 640
```

Sample show auto qos interface Command Output for a High-Speed ATM PVC

The following is sample output of the **show auto qos**command for a high-speed ATM PVC:

```
Router# show auto qos interface a2/0.1
 ATM2/0.1: PVC 1/100 -
 !
  interface ATM2/0.1 point-to-point
  pvc 1/100
    tx-ring-limit 3
    service-policy output AutoQoS-Policy-UnTrust
```

Sample show auto qos interface Command Output for a Low-Speed ATM PVC

The following is sample output of the **show auto qos**command for a low-speed ATM PVC:

```
Router# show auto qos interface a2/0.1
 ATM2/0.1: PVC 1/100 -
 !
  interface ATM2/0.1 point-to-point
  pvc 1/100
    tx-ring-limit 3
    encapsulation aal5mux ppp Virtual-Template200
 !
  interface Virtual-Template200
  bandwidth 512
  ip address 10.10.100.1 255.255.255.0
  service-policy output AutoQoS-Policy-UnTrust
  ppp multilink
  ppp multilink fragment-delay 10
  ppp multilink interleave
```

Sample show auto qos interface Command Output for Frame Relay-to-ATM Interworking Links

The following is sample output of the **show auto qos**command for Frame Relay-to-ATM Interworking
links:

```
Router# show auto qos interface s6/1.1
 Serial6/1.1: DLCI 100 -
 !
  interface Serial6/1
   frame-relay traffic-shaping
 !
  interface Serial6/1.1 point-to-point
   frame-relay interface-dlci 100 ppp Virtual-Template200
    class AutoQoS-VoIP-FR-Serial6/1-100
 !
  interface Virtual-Template200
   bandwidth 512
   ip address 10.10.100.1 255.255.0.0
   service-policy output AutoQoS-Policy-UnTrust
   ppp multilink
   ppp multilink fragment-delay 10
   ppp multilink interleave
 !
 map-class frame-relay AutoQoS-VoIP-FR-Serial6/1-100
   frame-relay cir 512000
   frame-relay bc 5120
   frame-relay be 0
   frame-relay mincir 512000
```

Additional References

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco
Feature Navigator enables you to determine which software images support a specific software release,
feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn . An
account on Cisco.com is not required.

Note   The table below 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.

Related Documents

Related Topic	Document Title
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	*Cisco IOS Quality of Service Solutions Command Reference*
LFI and cRTP	"Header Compression" module
Packet classification	"Classifying Network Traffic" module
LLQ	"Configuring Weighted Fair Queueing" module
Service policies (policy maps)	"Applying QoS Features Using the MQC" module

Related Topic	Document Title
Frame Relay and ATM commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	*Cisco IOS Wide-Area Networking Command Reference*
Frame Relay configuration	"Configuring Frame Relay" module
MLPPP	"Configuring Media-Independent PPP and Multilink PPP" module
SNMP	"Configuring SNMP Support" module
CiscoWorks QoS Policy Manager (QPM)	Product information available online at Cisco.com

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing standards has not been modified by this feature.	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing standards has not been modified by this feature.	--

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for AutoQoS - VoIP

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 AutoQoS - VoIP*

Feature Name	Releases	Feature Information
AutoQoS--VoIP	12.2(15)T Cisco IOS XE 3.1.0 SG	The AutoQoS -- VoIP feature allows you to automate the delivery of quality of service (QoS) on your network and provides a means for simplifying the implementation and provisioning of QoS for Voice over IP (VoIP) traffic.
		The following commands are new or modified: **auto qos voip**, **show auto qos**.
		In Cisco IOS XE 3.1.0 SG, this feature was integrated.

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