



## Distribution of Remaining Bandwidth Using Ratio

The Distribution of Remaining Bandwidth Using Ratio feature allows service providers to configure a bandwidth-remaining ratio on subinterfaces and class queues. This ratio specifies the relative weight of a subinterface or queue with respect to other subinterfaces or queues. During congestion, the router uses this bandwidth-remaining ratio to determine the amount of excess bandwidth (unused by priority traffic) to allocate to a class of nonpriority traffic. The router allocates excess bandwidth relative to the other subinterface-level queues and class queues configured on the physical interface. By administration of a bandwidth-remaining ratio, traffic priority is not based solely on speed. Instead, the service provider can base priority on alternative factors such as service product and subscription rate.

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### Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and 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.

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

### Prerequisites for Distribution of Remaining Bandwidth Using Ratio

Before enabling the Distribution of Remaining Bandwidth Using Ratio feature, create as many traffic classes as you need by using the class-map command.

## Restrictions for Distribution of Remaining Bandwidth Using Ratio

- Bandwidth-remaining ratios can be used on outbound interfaces only.
- The bandwidth remaining ratio command cannot coexist with another bandwidth command in different traffic classes of the same policy map. For example, the following configuration is not valid and causes an error message to display:

```
policy-map Precl
class precedence_0
bandwidth remaining ratio 10
class precedence_2
bandwidth 1000
```

- The bandwidth remaining ratio command cannot coexist with another bandwidth command in the same class. For example, the following configuration is not valid and causes an error message to display:

```
policy-map Precl
class precedence_0
bandwidth 1000
bandwidth remaining ratio 10
```

- The bandwidth remaining ratio command cannot coexist with the priority command in the same class. For example, the following configuration is not valid and causes an error message to display:

```
policy-map Precl
class precedence_1
priority percent 10
bandwidth remaining ratio 10
```

## Information About Distribution of Remaining Bandwidth Using Ratio

### Benefits of the Distribution of Remaining Bandwidth Using Ratio Feature

The Distribution of Remaining Bandwidth Using Ratio feature allows service providers to prioritize subscriber traffic during periods of congestion. A bandwidth-remaining ratio is used to influence how the router allocates excess bandwidth (unused by priority traffic) to a class of nonpriority traffic. Instead of using only bandwidth rate, the router considers configured minimum bandwidth rates, maximum bandwidth rates, and bandwidth-remaining ratios when determining excess bandwidth allocation. A bandwidth-remaining ratio adds more flexibility in prioritizing traffic and enables you to influence excess bandwidth allocation by basing the bandwidth-remaining ratio on factors other than speed.

With bandwidth-remaining ratios, service providers have more flexibility in assigning priority to subinterfaces and queues during congestion. In addition to speed, you can base the bandwidth-remaining ratio on alternative

factors, such as a service product or subscription rate. In this way, for example, you can give higher weight to subinterfaces that carry business services and lower weight to subinterfaces that carry residential services.

## Bandwidth-Remaining Ratio Functionality

A bandwidth-remaining ratio, specified by the **bandwidth remaining ratio** command, is a value from 1 to 1000 that is used to determine the amount of unused (excess) bandwidth to allocate to a class-level queue or subinterface-level queue during congestion. The router allocates the excess bandwidth relative to the other class-level queues and subinterface-level queues configured on the physical interface. The bandwidth-remaining ratio value does not indicate a percentage. As the name implies, a ratio is used. For example, a subinterface with a bandwidth-remaining ratio of 100 receives 10 times the unused (excess) bandwidth during congestion than a subinterface with a bandwidth-remaining ratio of 10.

Without bandwidth-remaining ratios, the queuing mechanism or scheduler on the router allocates unused (excess) bandwidth equally among the classes or subinterfaces.

With bandwidth-remaining ratios, unused (excess) bandwidth allocation can be based on factors other than the bandwidth rate (for example, the service product or the subscription rate).

Using the bandwidth remaining ratio command, the bandwidth-remaining ratio can be configured differently on each subinterface or class. The bandwidth-remaining ratio can range from 1 to 1000. For example, if there are three subscribers, and the bandwidth-remaining ratios are configured as 9, 7, and 1, and if after priority traffic is served, there are 1700 kbps of excess bandwidth, the subscribers get 900 kbps, 700 kbps, and 100 kbps, respectively.

## How to Configure Distribution of Remaining Bandwidth Using Ratio

You can apply bandwidth-remaining ratios to subinterfaces and/or classes queues.

### Configuring and Applying Bandwidth-Remaining Ratios to Subinterfaces



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**Note** You can apply bandwidth-remaining ratios to outbound subinterfaces only.

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#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map** *child-policy-name*
4. **class** *class-map-name*
5. **bandwidth** *bandwidth-kbps*
6. Repeat steps 4 and 5 to configure the additional traffic classes, if needed.
7. **exit**
8. **exit**
9. **policy-map** *parent-policy-name*

10. `class class-default`
11. `bandwidth remaining ratio ratio`
12. `shape {average | peak} cir [bc] [be]`
13. `service-policy child-policy-name`
14. `exit`
15. `exit`
16. `interface type slot / module / port . subinterface [point-to-point | multipoint]`
17. `service-policy output parent-policy-name`
18. `end`

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>policy-map child-policy-name</b> <b>Example:</b> Router(config)# policy-map Child	Creates or modifies a child policy map and enters policy-map configuration mode. <ul style="list-style-type: none"> <li>• Enter the name of the child policy map.</li> </ul>
<b>Step 4</b>	<b>class class-map-name</b> <b>Example:</b> Router(config-pmap)# class precedence_0	Configures the class map and enters policy-map class configuration mode.
<b>Step 5</b>	<b>bandwidth bandwidth-kbps</b> <b>Example:</b> Router(config-pmap-c)# bandwidth 10000	Specifies the bandwidth, in kbps, to be allocated to this traffic class. <ul style="list-style-type: none"> <li>• Enter the amount of bandwidth, in kilobits per second (kbps).</li> </ul>
<b>Step 6</b>	Repeat steps 4 and 5 to configure the additional traffic classes, if needed.	
<b>Step 7</b>	<b>exit</b> <b>Example:</b> Router(config-pmap-c)# exit	Exits policy-map class configuration mode.

	Command or Action	Purpose
Step 8	<b>exit</b> <b>Example:</b> <pre>Router(config-pmap)# exit</pre>	Exits policy-map configuration mode.
Step 9	<b>policy-map</b> <i>parent-policy-name</i> <b>Example:</b> <pre>Router(config)# policy-map Parent</pre>	Creates or modifies a parent policy map and enters policy-map configuration mode. <ul style="list-style-type: none"> <li>• Enter the name of the parent policy map.</li> </ul>
Step 10	<b>class</b> <b>class-default</b> <b>Example:</b> <pre>Router(config-pmap)# class class-default</pre>	Configures the class-default class and enters policy-map class configuration mode. <p><b>Note</b> The router interprets any features that are configured under the class-default class as aggregate features on the subinterface.</p>
Step 11	<b>bandwidth remaining ratio</b> <i>ratio</i> <b>Example:</b> <pre>Router(config-pmap-c)# bandwidth remaining ratio 10</pre>	Specifies the bandwidth-remaining ratio for the subinterface. <ul style="list-style-type: none"> <li>• Enter the ratio.</li> </ul> <p>The ratio is the value used to determine the amount of unused bandwidth to allocate to each queue on the subinterface during periods of congestion. The scheduler allocates the excess bandwidth relative to other subinterfaces. Valid values are 1 to 1000. The default value is 1.</p>
Step 12	<b>shape</b> { <b>average</b>   <b>peak</b> } <i>cir</i> [ <i>bc</i> ] [ <i>be</i> ] <b>Example:</b> <pre>Router(config-pmap-c)# shape average 100000000</pre>	(Optional) Shapes the average or peak rate to the rate that you specify. Enter either the <b>average</b> or <b>peak</b> keyword along with the CIR and any optional arguments. Note the following: <ul style="list-style-type: none"> <li>• <b>average</b>--Specifies average-rate shaping.</li> <li>• <b>peak</b>--Specifies peak-rate shaping.</li> <li>• <b>cir</b>--Specifies the committed information rate (CIR), in bits per second (bps).</li> <li>• (Optional) <b>bc</b>--Specifies the committed burst size, in bits.</li> <li>• (Optional) <b>be</b>--Specifies the excess burst size, in bits.</li> </ul>
Step 13	<b>service-policy</b> <i>child-policy-name</i> <b>Example:</b> <pre>Router(config-pmap-c)# service-policy Child</pre>	Applies the child policy map that you specify to the traffic class. <ul style="list-style-type: none"> <li>• Enter the name of the previously configured child policy map.</li> </ul>

	Command or Action	Purpose
		<p>The router applies the QoS actions (features) specified in the child policy map to the traffic class.</p> <p><b>Note</b> The <b>service-policy</b> command typically requires that you specify the direction of the traffic using the input or output keywords. However, when applying a child policy to a parent policy, do not specify a traffic direction.</p>
<b>Step 14</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-pmap-c)# exit</pre>	Exits policy-map class configuration mode.
<b>Step 15</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-pmap)# exit</pre>	Exits policy-map configuration mode.
<b>Step 16</b>	<p><b>interface</b> <i>type slot / module / port . subinterface</i> [<b>point-to-point</b>   <b>multipoint</b>]</p> <p><b>Example:</b></p> <pre>Router(config)# interface GigabitEthernet 1/0/0.1</pre>	<p>Creates or modifies the interface that you specify and enters subinterface configuration mode. Enter the interface type. Note the following:</p> <ul style="list-style-type: none"> <li>• <b>type</b>--Specifies the interface type (for example, Gigabit Ethernet).</li> <li>• <b>slot/module/port.subinterface</b>--Specifies the number of the subinterface that identifies the subinterface (for example, 1/0/0.1).</li> <li>• (Optional) <b>point-to-point</b>--Indicates that the subinterface is a point-to-point subinterface.</li> <li>• (Optional) <b>multipoint</b>--Indicates that the subinterface is a point-to-multipoint subinterface.</li> </ul>
<b>Step 17</b>	<p><b>service-policy output</b> <i>parent-policy-name</i></p> <p><b>Example:</b></p> <pre>Router(config-subif)# service-policy output Parent</pre>	<p>Applies the parent policy map to the subinterface.</p> <ul style="list-style-type: none"> <li>• Enter the <b>output</b> keyword and the name of the parent policy map.</li> </ul> <p><b>Note</b> The router shapes the subinterface traffic to the shaping rate specified in the parent class-default class and applies the QoS actions (features) specified in the child policy map.</p> <p><b>Note</b> During periods of congestion, the router uses the bandwidth-remaining ratio specified in the parent policy map to allocate unused bandwidth on this subinterface relative to other subinterfaces.</p>

	Command or Action	Purpose
Step 18	<b>end</b>  <b>Example:</b>  Router(config-subif)# end	Returns to privileged EXEC mode.

## Configuring and Applying Bandwidth-Remaining Ratios to Class Queues

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map** *child-policy-name*
4. **class** *class-map-name*
5. **shape** {average | peak} *cir* [*bc*] [*be*]
6. **bandwidth remaining ratio** *ratio*
7. Repeat steps 4, 5 and 6 for each class queue that you want to define, specifying the bandwidth-remaining ratio as applicable.
8. **exit**
9. **exit**
10. **policy-map** *parent-policy-name*
11. **class** *class-default*
12. **shape** {average | peak} *cir* [*bc*] [*be*]
13. **bandwidth remaining ratio** *ratio*
14. **service-policy** *child-policy-name*
15. **exit**
16. **exit**
17. **interface** *type slot / module / port . subinterface* [**point-to-point** | **multipoint**]
18. **service-policy output** *parent-policy-name*
19. **end**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b>  Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b>  Router# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<p><b>policy-map</b> <i>child-policy-name</i></p> <p><b>Example:</b></p> <pre>Router(config)# policy-map Child</pre>	<p>Creates or modifies a child policy map and enters policy-map configuration mode.</p> <ul style="list-style-type: none"> <li>• Enter the name of the child policy map.</li> </ul>
<b>Step 4</b>	<p><b>class</b> <i>class-map-name</i></p> <p><b>Example:</b></p> <pre>Router(config-pmap)# class precedence_0</pre>	<p>Configures the class map and enters policy-map class configuration mode.</p>
<b>Step 5</b>	<p><b>shape</b> {<b>average</b>   <b>peak</b>} <i>cir</i> [<i>bc</i>] [<i>be</i>]</p> <p><b>Example:</b></p> <pre>Router(config-pmap-c)# shape average 100000000</pre>	<p>(Optional) Shapes the average or peak rate to the rate that you specify.</p> <ul style="list-style-type: none"> <li>• Enter either the <b>average</b> or <b>peak</b> keyword along with the CIR and any optional arguments. Note the following: <ul style="list-style-type: none"> <li>• <b>average</b>--Specifies average-rate shaping.</li> <li>• <b>peak</b>--Specifies peak-rate shaping.</li> <li>• <b>cir</b>--Specifies the committed information rate (CIR), in bits per second (bps).</li> <li>• (Optional) <b>bc</b>--Specifies the committed burst size, in bits.</li> <li>• (Optional) <b>be</b>--Specifies the excess burst size, in bits.</li> </ul> </li> </ul>
<b>Step 6</b>	<p><b>bandwidth remaining ratio</b> <i>ratio</i></p> <p><b>Example:</b></p> <pre>Router(config-pmap-c)# bandwidth remaining ratio 10</pre>	<p>Specifies the bandwidth-remaining ratio for the traffic class.</p> <ul style="list-style-type: none"> <li>• Enter the bandwidth-remaining ratio. The ratio is the value used to determine the amount of unused bandwidth to allocate to each queue on the subinterface during periods of congestion. The queueing mechanism or scheduler allocates the excess bandwidth relative to other subinterfaces. Valid values are 1 to 1000. The default value is 1.</li> </ul> <p><b>Note</b> In a hierarchical policy map structure, the <b>bandwidth remaining ratio</b> <i>ratio</i> command must be used for at least one class. Using it in other classes is optional. When this command is not explicitly enabled in the other classes, the queueing mechanism uses 1 as the default.</p>
<b>Step 7</b>	<p>Repeat steps 4, 5 and 6 for each class queue that you want to define, specifying the bandwidth-remaining ratio as applicable.</p>	



	Command or Action	Purpose
<b>Step 8</b>	<b>exit</b> <b>Example:</b> <pre>Router(config-pmap-c)# exit</pre>	Exits policy-map class configuration mode.
<b>Step 9</b>	<b>exit</b> <b>Example:</b> <pre>Router(config-pmap)# exit</pre>	Exits policy-map configuration mode.
<b>Step 10</b>	<b>policy-map</b> <i>parent-policy-name</i> <b>Example:</b> <pre>Router(config)# policy-map Parent</pre>	Creates or modifies a parent policy map and enters policy-map configuration mode. <ul style="list-style-type: none"> <li>• Enter the name of the parent policy map.</li> </ul>
<b>Step 11</b>	<b>class</b> <b>class-default</b> <b>Example:</b> <pre>Router(config-pmap)# class class-default</pre>	Configures the class-default class and enters policy-map class configuration mode. <b>Note</b> The router interprets any features that are configured under the class-default class as aggregate features on the subinterface.
<b>Step 12</b>	<b>shape</b> { <b>average</b>   <b>peak</b> } <i>cir</i> [ <i>bc</i> ] [ <i>be</i> ] <b>Example:</b> <pre>Router(config-pmap-c)# shape average 100000000</pre>	(Optional) Shapes the average or peak rate to the rate that you specify. <ul style="list-style-type: none"> <li>• Enter either the <b>average</b> or <b>peak</b> keyword along with the CIR and any optional arguments. Note the following:               <ul style="list-style-type: none"> <li>• <b>average</b>--Specifies average-rate shaping.</li> <li>• <b>peak</b>--Specifies peak-rate shaping.</li> <li>• <b>cir</b>--Specifies the committed information rate (CIR), in bits per second (bps).</li> <li>• (Optional) <b>bc</b>--Specifies the committed burst size, in bits.</li> <li>• (Optional) <b>be</b>--Specifies the excess burst size, in bits.</li> </ul> </li> </ul>
<b>Step 13</b>	<b>bandwidth remaining ratio</b> <i>ratio</i> <b>Example:</b> <pre>Router(config-pmap-c)# bandwidth remaining ratio 10</pre>	(Optional for class-default or other classes in a hierarchical policy map structure) Specifies the bandwidth-remaining ratio for the subinterface. <ul style="list-style-type: none"> <li>• Enter the bandwidth-remaining ratio. The ratio is the value used to determine the amount of unused bandwidth to allocate to each queue on the subinterface during periods of congestion. The queueing mechanism or scheduler allocates the excess</li> </ul>

	Command or Action	Purpose
		<p>bandwidth relative to other subinterfaces. Valid values are 1 to 1000. The default value is 1.</p> <p><b>Note</b> In a hierarchical policy map structure, the <b>bandwidth remaining ratio</b> <i>ratio</i> command must be used for at least one class. Using it in other classes is optional. When this command is not explicitly enabled in the other classes, the queuing mechanism uses 1 as the default.</p>
<b>Step 14</b>	<p><b>service-policy</b> <i>child-policy-name</i></p> <p><b>Example:</b></p> <pre>Router(config-pmap-c)# service-policy Child</pre>	<p>Applies the child policy map that you specify to the traffic class.</p> <ul style="list-style-type: none"> <li>Enter the name of the child policy map. The router applies the QoS actions (features) specified in the child policy map to the traffic class.</li> </ul> <p><b>Note</b> The <b>service-policy</b> command typically requires that you specify the direction of the traffic using the <b>input</b> or <b>output</b> keywords. However, when applying a child policy map to a parent policy map, do not specify traffic direction.</p>
<b>Step 15</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-pmap-c)# exit</pre>	Exits policy-map class configuration mode.
<b>Step 16</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-pmap)# exit</pre>	Exits policy-map configuration mode.
<b>Step 17</b>	<p><b>interface</b> <i>type slot / module / port . subinterface</i> [<b>point-to-point</b>   <b>multipoint</b>]</p> <p><b>Example:</b></p> <pre>Router(config)# interface GigabitEthernet 1/0/0.1</pre>	<p>Creates or modifies the interface that you specify and enters subinterface configuration mode.</p> <ul style="list-style-type: none"> <li>Enter the interface type. Note the following: <ul style="list-style-type: none"> <li><b>type</b>--Specifies the interface type (for example, Gigabit Ethernet).</li> <li><b>slot/module/port.subinterface</b>--Specifies the number of the subinterface that identifies the subinterface (for example, 1/0/0.1).</li> <li>(Optional) <b>point-to-point</b>--Indicates that the subinterface is a point-to-point subinterface.</li> <li>(Optional) <b>multipoint</b>--Indicates that the subinterface is a point-to-multipoint subinterface.</li> </ul> </li> </ul>

	Command or Action	Purpose
Step 18	<b>service-policy output</b> <i>parent-policy-name</i> <b>Example:</b> Router(config-subif)# service-policy output Parent	Attaches the parent policy map to the subinterface. <ul style="list-style-type: none"> <li>Enter the <b>output</b> keyword and the name of the parent policy map.</li> </ul> <b>Note</b> When congestion occurs, the class queues receive bandwidth according to the specified class-level bandwidth-remaining ratios.
Step 19	<b>end</b> <b>Example:</b> Router(config-subif)# end	Returns to privileged EXEC mode.

## Configuration Examples for Distribution of Remaining Bandwidth Using Ratio

### Example Configuring Bandwidth-Remaining Ratios on Ethernet Subinterfaces

The following example shows how to configure bandwidth-remaining ratios on an Ethernet subinterface using a hierarchical policy. In the example, Gigabit Ethernet subinterface 1/0/0.1 is shaped to 100 Mbps. During congestion, the router uses the bandwidth-remaining ratio of 10 to determine the amount of excess bandwidth (unused by priority traffic) to allocate to the nonpriority traffic on subinterface 1/0/0.1, relative to the other subinterface-level and class-level queues on the interface.

```

policy-map Child
  class precedence_0
    bandwidth 10000
  class precedence_1
    shape average 100000
    bandwidth 100
policy-map Parent
  class class-default
    bandwidth remaining ratio 10
    shape average 100000000
    service-policy Child
interface GigabitEthernet1/0/0.1
  encapsulation dot1Q 100
  ip address 10.1.0.1 255.255.255.0
  service-policy output Parent
  
```

### Example Verifying Bandwidth-Remaining Ratios on Class Queues

In the following sample configuration, `vlan10_policy` is applied on the Gigabit Ethernet subinterface 1/0/0.10 and `vlan20_policy` is applied on the Gigabit Ethernet subinterface 1/0/0.20. During congestion on the interface, subinterface Gigabit Ethernet 1/0/0.20 has 10 times more available bandwidth than subinterface Gigabit Ethernet 1/0/0.10 because the bandwidth-remaining ratio for subinterface Gigabit Ethernet 1/0/0.20 is 10

times more than the bandwidth-remaining ratio for subinterface 1/0/0.10: 100 on subinterface 1/0/0.20 and 10 on subinterface 1/0/0.10.

When congestion occurs within a subinterface level, the class queues receive bandwidth according to the class-level bandwidth-remaining ratios. In the example, the bandwidth for classes precedence\_0, precedence\_1, and precedence\_2 is allocated based on the bandwidth-remaining ratios of the classes: 20, 40, and 60, respectively.

#### Router# show policy-map

```
Policy Map child-policy
  Class precedence_0
    Average Rate Traffic Shaping
    cir 500000 (bps)
    bandwidth remaining ratio 20 <---- Class-level ratio
  Class precedence_1
    Average Rate Traffic Shaping
    cir 500000 (bps)
    bandwidth remaining ratio 40 <---- Class-level ratio
  Class precedence_2
    Average Rate Traffic Shaping
    cir 500000 (bps)
    bandwidth remaining ratio 60 <---- Class-level ratio
Policy Map vlan10_policy
  Class class-default
    Average Rate Traffic Shaping
    cir 1000000 (bps)
    bandwidth remaining ratio 10 <---- Subinterface-level ratio
    service-policy child-policy
Policy Map vlan20_policy
  Class class-default
    Average Rate Traffic Shaping
    cir 1000000 (bps)
    bandwidth remaining ratio 100 <---- Subinterface-level ratio
    service-policy child-policy
interface GigabitEthernet1/0/0.10
  encapsulation dot1Q 10
  snmp trap link-status
  service-policy output vlan10_policy
interface GigabitEthernet1/0/0.20
  encapsulation dot1Q 20
  snmp trap link-status
  service-policy output vlan20_policy
```

## Example: Verifying Bandwidth Remaining Ratios

The following sample output from the show policy-map interface command indicates that bandwidth-remaining ratios are configured on class-level queues in the policy maps named vlan10\_policy and child-policy, which are attached to Gigabit Ethernet subinterface 1/0/0.10.

```
Router# show policy-map interface GigabitEthernet 1/0/0.10
GigabitEthernet1/0/0.10
  Service-policy output: vlan10_policy
    Class-map: class-default (match-any)
      0 packets, 0 bytes
      5 minute offered rate 0 bps, drop rate 0 bps
    Match: any
    Queueing
      queue limit 64 packets
      (queue depth/total drops/no-buffer drops) 0/0/0
```

```

(pkts output/bytes output) 0/0
shape (average) cir 1000000, bc 4000, be 4000
target shape rate 1000000
bandwidth remaining ratio 10
Service-policy : child-policy
  Class-map: precedence_0 (match-all)
    0 packets, 0 bytes
    5 minute offered rate 0 bps, drop rate 0 bps
    Match: ip precedence 0
    Queueing
    queue limit 64 packets
    (queue depth/total drops/no-buffer drops) 0/0/0
    (pkts output/bytes output) 0/0
    shape (average) cir 500000, bc 2000, be 2000
    target shape rate 500000
    bandwidth remaining ratio 20
  Class-map: precedence_1 (match-all)
    0 packets, 0 bytes
    5 minute offered rate 0 bps, drop rate 0 bps
    Match: ip precedence 1
    Queueing
    queue limit 64 packets
    (queue depth/total drops/no-buffer drops) 0/0/0
    (pkts output/bytes output) 0/0
    shape (average) cir 500000, bc 2000, be 2000
    target shape rate 500000
    bandwidth remaining ratio 40
  Class-map: precedence_2 (match-all)
    0 packets, 0 bytes
    5 minute offered rate 0 bps, drop rate 0 bps
    Match: ip precedence 2
    Queueing
    queue limit 64 packets
    (queue depth/total drops/no-buffer drops) 0/0/0
    (pkts output/bytes output) 0/0
    shape (average) cir 500000, bc 2000, be 2000
    target shape rate 500000
    bandwidth remaining ratio 60
  Class-map: class-default (match-any)
    0 packets, 0 bytes
    5 minute offered rate 0 bps, drop rate 0 bps
    Match: any

    queue limit 64 packets
    (queue depth/total drops/no-buffer drops) 0/0/0
    (pkts output/bytes output) 0/0

```

The following sample output from the show policy-map interface command indicates that bandwidth-remaining ratios are configured on class-level queues in the policy maps named vlan20\_policy and child-policy, which are attached to Gigabit Ethernet subinterface 1/0/0.20.

```

Router# show policy-map interface GigabitEthernet 1/0/0.20
GigabitEthernet1/0/0.20
  Service-policy output: vlan20_policy
    Class-map: class-default (match-any)
      0 packets, 0 bytes
      5 minute offered rate 0 bps, drop rate 0 bps
      Match: any
      Queueing
      queue limit 64 packets
      (queue depth/total drops/no-buffer drops) 0/0/0
      (pkts output/bytes output) 0/0
      shape (average) cir 1000000, bc 4000, be 4000

```

## Example: Verifying Bandwidth Remaining Ratios

```

target shape rate 1000000
bandwidth remaining ratio 100
Service-policy : child-policy
Class-map: precedence_0 (match-all)
  0 packets, 0 bytes
  5 minute offered rate 0 bps, drop rate 0 bps
  Match: ip precedence 0
  Queueing
  queue limit 64 packets
  (queue depth/total drops/no-buffer drops) 0/0/0
  (pkts output/bytes output) 0/0
  shape (average) cir 500000, bc 2000, be 2000
  target shape rate 500000
  bandwidth remaining ratio 20
Class-map: precedence_1 (match-all)
  0 packets, 0 bytes
  5 minute offered rate 0 bps, drop rate 0 bps
  Match: ip precedence 1
  Queueing
  queue limit 64 packets
  (queue depth/total drops/no-buffer drops) 0/0/0
  (pkts output/bytes output) 0/0
  shape (average) cir 500000, bc 2000, be 2000
  target shape rate 500000
  bandwidth remaining ratio 40
Class-map: precedence_2 (match-all)
  0 packets, 0 bytes
  5 minute offered rate 0 bps, drop rate 0 bps
  Match: ip precedence 2
  Queueing
  queue limit 64 packets
  (queue depth/total drops/no-buffer drops) 0/0/0
  (pkts output/bytes output) 0/0
  shape (average) cir 500000, bc 2000, be 2000
  target shape rate 500000
  bandwidth remaining ratio 60
Class-map: class-default (match-any)
  0 packets, 0 bytes
  5 minute offered rate 0 bps, drop rate 0 bps
  Match: any

  queue limit 64 packets
  (queue depth/total drops/no-buffer drops) 0/0/0
  (pkts output/bytes output) 0/0

```

The following sample output from the show policy-map command indicates that a bandwidth-remaining ratio of 10 is configured on the parent class-default class of the policy map named vlan10\_policy.

```

Router# show policy-map vlan10_policy
Policy Map vlan10_policy
Class class-default
  Average Rate Traffic Shaping
  cir 1000000 (bps)
  bandwidth remaining ratio 10
  service-policy child-policy

```

The following sample output from the show policy-map command indicates that a bandwidth-remaining ratio of 100 is configured on the parent class-default class of the policy map named vlan20\_policy.

```

Router# show policy-map vlan20_policy
Policy Map vlan20_policy
Class class-default
  Average Rate Traffic Shaping

```

```

cir 1000000 (bps)
bandwidth remaining ratio 100
service-policy child-policy

```

The following sample output from the show policy-map command indicates that bandwidth-remaining ratios of 20, 40, and 60 are configured on the class queues precedence\_0, precedence\_1, and precedence\_2, respectively.

```

Router# show policy-map child-policy
Policy Map child-policy
Class precedence_0
  Average Rate Traffic Shaping
  cir 500000 (bps)
  bandwidth remaining ratio 20
Class precedence_1
  Average Rate Traffic Shaping
  cir 500000 (bps)
  bandwidth remaining ratio 40
Class precedence_2
  Average Rate Traffic Shaping
  cir 500000 (bps)
  bandwidth remaining ratio 60

```

## Additional References

### Related Documents

Related Topic	Document Title
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	<i>Cisco IOS Quality of Service Solutions Command Reference</i>
Congestion avoidance	"Congestion Avoidance Overview" module
Class maps, policy maps, hierarchical policy maps, Modular Quality of Service Command-Line Interface (CLI) (MQC)	"Applying QoS Features Using the MQC" module
Traffic shaping, traffic policing	"Policing and Shaping Overview" module

### Standards

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

**MIBs**

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE Software releases, and feature sets, use Cisco MIB Locator found at the following URL:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs 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.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Distribution of Remaining Bandwidth Using Ratio

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.



**Table 1: Feature Information for Distribution of Remaining Bandwidth Using Ratio**

<b>Feature Name</b>	<b>Releases</b>	<b>Feature Information</b>
MQC--Distribution of Remaining Bandwidth Using Ratio	Cisco IOS XE Release 2.1	<p>The Distribution of Remaining Bandwidth Using Ratio feature allows service providers to configure a bandwidth-remaining ratio on subinterfaces and class queues. This ratio specifies the relative weight of a subinterface or queue with respect to other subinterfaces or queues. During congestion, the router uses this bandwidth-remaining ratio to determine the amount of excess bandwidth (unused by priority traffic) to allocate to a class of nonpriority traffic.</p> <p>In Cisco IOS XE Release 2.1, this feature was introduced on Cisco ASR 1000 Series Routers.</p> <p>The following commands were introduced or modified: <b>bandwidth remaining ratio</b>, <b>show policy-map</b>, <b>show policy-map interface</b>.</p>

