The QoS: Child Service Policy for Priority Class feature allows you to configure a child service policy with nonqueueing-based features and attach the child policy to a priority class.

Finding Feature Information

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, “Feature Information for QoS: Child Service Policy for Priority Class” section on page 11.

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

Contents

- Prerequisites for QoS Child Service Policy for Priority Class, page 2
- Restrictions for QoS Child Service Policy for Priority Class, page 2
- Information About QoS Child Service Policy for Priority Class, page 2
- How to Configure a Child Policy Under a Parent Priority Class, page 3
- Configuration Examples for Configuring a Child Policy Under a Priority Class, page 7
- Additional References, page 9
- Feature Information for QoS: Child Service Policy for Priority Class, page 11
**Prerequisites for QoS Child Service Policy for Priority Class**

- Traffic classes must be configured using the `class-map` command.

**Restrictions for QoS Child Service Policy for Priority Class**

The child policy that you attach to a priority class must be based on nonqueueing features. For example, if you attempt to do any of the following, an error message displays:

- Attach queueing-based child policy—You cannot attach a child service policy that is based on queueing features to a priority class. For example, you cannot attach a bandwidth-based child policy to a class with priority configured.

- Add queueing features to child policy—You cannot add queueing features (such as bandwidth) to a child policy that is already attached to a parent class with priority configured.

- Add priority to parent class—If a queueing-based child policy is already attached to a non-priority class of a parent policy, you cannot then configure the `priority` command for the parent class.

**Information About QoS Child Service Policy for Priority Class**

To configure QoS child service policies for a priority class, you should understand the following concepts:

- QoS Child Service Policy for Priority Class Feature Functionality, page 2
- Priority Class of a Parent Policy, page 2
- Hierarchical Policies, page 3

**QoS Child Service Policy for Priority Class Feature Functionality**

The QoS Child Service Policy for Priority Class feature allows you to configure a child service policy with nonqueueing-based features and attach the child policy to a priority class. In a three-level hierarchical policy, the priority class to which you attach the child policy must be in the middle-level policy. In a two-level hierarchical policy (nested policy), the priority class to which you attach the child policy is in the parent policy.

Previously, you could not attach a child service policy to a priority class even if the child policy contained nonqueueing-based commands. If you attempted to do so, an error message similar to the following displayed:

Please remove priority before attaching a child policy.

**Priority Class of a Parent Policy**

A parent policy contains traffic classes with various queueing and nonqueueing features enabled on the classes. You can give priority to a traffic class by configuring the `priority` command under the class. The router processes the packets belonging to the priority class before processing nonpriority classes.
Hierarchical Policies

A hierarchical policy is a quality of service (QoS) model that enables you to specify QoS behavior at multiple levels of hierarchy. Depending on the type of hierarchical policy that you configure, you can use hierarchical policies to:

- Specify multiple policy maps to shape multiple queues together.
- Apply specific policy map actions on the aggregate traffic.
- Apply class-specific policy map actions.
- Restrict the maximum bandwidth of a virtual circuit (VC) while allowing policing and marking of traffic classes within the VC.

All hierarchical policy types consist of a top-level parent policy and one or more child policies. The service-policy command is used to apply a policy to another policy, and a policy to an interface or subinterface.

How to Configure a Child Policy Under a Parent Priority Class

To configure a child policy under a parent priority class, perform the following configuration tasks:

- Configuring a Child Policy Under a Priority Class, page 3
- Attaching a Hierarchical Service Policy to a Subinterface, page 5

Configuring a Child Policy Under a Priority Class

To configure a child policy under a priority class, complete the following steps.

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `policy-map policy-map-name`
4. `class class-map-name`
5. `police [cir] bps [be] burst-normal [be] burst-excess [conform-action action] [exceed-action action] [violate-action action]`
6. `exit`
7. `exit`
8. `policy-map policy-map-name`
9. `class class-map-name`
10. `priority`
11. `service-policy policy-map-name`
12. `end`
# How to Configure a Child Policy Under a Parent Priority Class

## DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** enable | Enables privileged EXEC mode.  
  - Enter your password if prompted. |

**Example:**
```
Router> enable
```

| **Step 2** configure terminal | Enters global configuration mode. |

**Example:**
```
Router# configure terminal
```

| **Step 3** policy-map policy-map-name | Creates or modifies the child policy map and enters policy-map configuration mode.  
  - Enter the name of the child policy map. The name can be a maximum of 40 alphanumeric characters. |

**Example:**
```
Router(config)# policy-map Business
```

| **Step 4** class class-map-name | Assigns the traffic class you specify to the policy map, and enters policy-map class configuration mode.  
  - Enter the name of the previously configured class map. |

**Example:**
```
Router(config-pmap)# class video
```

| **Step 5** police [cir] bps [bc] burst-normal [be] burst-excess [conform-action action] [exceed-action action] [violate-action action] | Configures traffic policing on the basis of the arguments and keywords specified, as described below:  
  - cir is the committed information rate.  
  - bps specifies the average rate in bits per second (bps).  
  - bc is the normal or committed burst (bc) size used by the first token bucket for policing.  
  - burst-normal specifies the committed burst size in bytes.  
  - be is the excess burst (be) size used by the second token bucket for policing.  
  - burst-excess specifies the excess burst in bytes.  
  - conform-action action specifies the action to take on packets that conform to the rate limit.  
  - exceed-action action specifies the action to take on packets that exceed the rate limit, but not the peak information rate (PIR).  
  - violate-action action specifies the action to take on packets that continuously exceed the PIR limit. |

**Example:**
```
Router(config-pmap-c)# police 4000000 2000 5000 conform-action transmit exceed-action set-dscp-transmit 5
```

| **Step 6** exit | Exits policy-map class configuration mode. |

**Example:**
```
Router(config-pmap-c)# exit
```

| **Step 7** exit | Exits policy-map configuration mode. |

**Example:**
```
Router(config-pmap)# exit
```
**Command or Action** | **Purpose**
--- | ---
**Step 8** | Creates or modifies the top-level parent policy (nested policy), or the middle-level policy (three-level hierarchical policy).

**policy-map** policy-map-name

*Example:*
Router(config-pmap)# policy-map Premium

- Enter the name of the parent policy map or the middle-level policy map. The name can be a maximum of 40 alphanumeric characters.

**Step 9** | Assigns the traffic class you specify to the policy map. and enters policy-map class configuration mode.

class class-map-name

*Example:*
Router(config-pmap)# class Gold

- Enter the name of the previously configured class map.

**Step 10** | Assigns priority to the traffic class.

priority

*Example:*
Router(config-pmap-c)# priority

**Step 11** | Applies a child policy to the parent or middle-level priority class.

service-policy policy-map-name

*Example:*
Router(config-pmap-c)# service-policy Business

- Enter the name of the previously configured child policy map.

**Note** For three-level hierarchical policies, after applying the child policy to the middle-level priority class, you must then apply the middle-level policy to the parent policy.

**Step 12** | (Optional) Exits policy-map class configuration mode and returns to privileged EXEC mode.

dep

*Example:*
Router(config-pmap-c)# end

**Attaching a Hierarchical Service Policy to a Subinterface**

To attach a hierarchical service policy to a subinterface, complete the following steps.

**Restrictions**

- Ingress queueing is not supported. Any service policy (policy map) in which a queueing mechanism has been configured must be attached to the subinterface using the **output** keyword of the **service-policy** command.
- For ATM interfaces, policy maps on the interface or subinterface are not supported. For ATM interfaces, service policies must be attached to the virtual circuit (VC).

**SUMMARY STEPS**

1. enable
2. configure terminal
3. interface type slot/module/port.subinterface [point-to-point]
4. `service-policy {input | output} policy-map-name`
5. `end`

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Router&gt; enable</code></td>
<td>Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Router# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> <code>interface type slot/module/port.subinterface</code></td>
<td>Configures or modifies a subinterface, and enters subinterface configuration mode. Note the following about the keywords and arguments:</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Router(config)# interface atm 1/0/2.1</code></td>
<td>type is the interface type (for example, ATM).</td>
</tr>
<tr>
<td></td>
<td>slot/module/port is the slot, module, and port number of the interface card (for example, 1/0/0).</td>
</tr>
<tr>
<td></td>
<td>.subinterface is the number of the subinterface (for example, .1)</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>For ATM interfaces you must attach the service policy to the VC.</td>
</tr>
<tr>
<td><strong>Step 4</strong> `service-policy {input</td>
<td>output} policy-map-name`</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Router(config-subif)# service-policy input Premium</code></td>
<td>Enter the name of the parent policy map.</td>
</tr>
<tr>
<td></td>
<td>The <strong>input</strong> keyword indicates to apply the features in the policy map to inbound packets. The <strong>output</strong> keyword indicates to apply the features in the policy map to outbound packets.</td>
</tr>
<tr>
<td></td>
<td>Policy maps in which a queueing feature has been configured must be attached using the <strong>output</strong> keyword. You cannot use the <strong>input</strong> keyword.</td>
</tr>
<tr>
<td><strong>Step 5</strong> <code>end</code></td>
<td>(Optional) Exits subinterface configuration mode and returns to privileged EXEC mode.</td>
</tr>
</tbody>
</table>
Configuration Examples for Configuring a Child Policy Under a Priority Class

This section provides the following configuration examples:

- **Configuring a Police-Based Child Policy Under a Priority Class: Example, page 7**
- **Attaching a Bandwidth-Based Child Policy to a Priority Class—Invalid Configuration: Example, page 7**
- **Attaching Bandwidth to a Child Policy Attached to a Priority Class—Invalid Configuration: Example, page 8**
- **Attaching Priority to a Parent Policy with a Queueing-Based Child Policy—Invalid Configuration: Example, page 8**

### Configuring a Police-Based Child Policy Under a Priority Class: Example

The following example configuration shows how to configure a child policy with policing enabled and attach it to a priority class of a parent policy.

```plaintext
policy-map Child
  class class1
  police 10000
!
policy-map Parent
  class P2
  priority
  service-policy Child
```

### Attaching a Bandwidth-Based Child Policy to a Priority Class—Invalid Configuration: Example

As shown in the following example configuration, the router does not allow you to attach a bandwidth-based child policy to a priority class of a parent policy. This is an invalid configuration.

```plaintext
policy-map Child
  class class1
  bandwidth 100
!
policy-map Parent
  class P2
  priority
  service-policy Child

Please remove priority before attaching a child policy.
!
!
show policy-map
policy-map Child
  class class1
  bandwidth 100
!
policy-map Parent
  class P2
  priority
```
Attaching Bandwidth to a Child Policy Attached to a Priority Class—Invalid Configuration: Example

As shown in the following example configuration, the router does not allow you to add the `bandwidth` command to a child policy that is already attached to a priority class of a parent policy. This is an invalid configuration.

```
policy-map Child
  class class1
  police cir 10000 bc 1500 conform-action transmit exceed-action drop
!
policy-map Parent
  class P2
  priority
  service-policy Child
!
policy-map Child
  class class1
  bandwidth 10
```

`Cannot configure ‘bandwidth’ in child policy with ‘priority’ in parent`.

```
show policy-map
```

```
policy-map Child
  class class1
  police cir 10000 bc 1500 conform-action transmit exceed-action drop
!
policy-map Parent
  class P2
  priority
  service-policy Child
!
```

Attaching Priority to a Parent Policy with a Queueing-Based Child Policy—Invalid Configuration: Example

As shown in the following example configuration, the router does not allow you to assign priority to a class of a parent policy when a queueing-based child policy is already attached to the parent class. This is an invalid configuration.

```
policy-map Child
  class class1
  bandwidth 10
!
policy-map Parent
  class P2
  police cir 10000 bc 1500 conform-action transmit exceed-action drop
  service-policy Child
!
! policy-map Parent
  class P2
  priority
  service-policy Child
```

`Cannot configure ‘priority’ in parent policy with queueing-related child policy.`.


```plaintext
class class1
    bandwidth 10
!
policy-map Parent
class P2
    police cir 10000 bc 1500 conform-action transmit exceed-action drop
service-policy Child
```

## Additional References

The following sections provide references related to the QoS: Child Service Policy for Priority Class feature.

### Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples</td>
<td><em>Cisco IOS Quality of Service Solutions Command Reference</em></td>
</tr>
<tr>
<td>Hierarchical policies and policy maps</td>
<td>“Applying QoS Features Using the MQC” module</td>
</tr>
<tr>
<td>Traffic shaping and traffic policing</td>
<td>“Policing and Shaping Overview” module</td>
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### Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.</td>
<td>—</td>
</tr>
</tbody>
</table>

### MIBs

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<thead>
<tr>
<th>MIB</th>
<th>MIBs Link</th>
</tr>
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<tbody>
<tr>
<td>No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified.</td>
<td>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></td>
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</table>

### RFCs

<table>
<thead>
<tr>
<th>RFC</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>No new or modified RFCs are supported, and support for existing RFCs has not been modified.</td>
<td>—</td>
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</table>
## Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td><a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a></td>
</tr>
</tbody>
</table>
Table 1 lists the release history for this feature.

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Note
Table 1 lists only the Cisco IOS XE Software release that introduced support for a given feature in a given Cisco IOS XE Software release train. Unless noted otherwise, subsequent releases of that Cisco IOS XE Software release train also support that feature.

Table 1 | Feature Information for QoS: Child Service Policy for Priority Class
---|---|---
Feature Name | Releases | Feature Information
---|---|---
QoS: Child Service Policy for Priority Class | Cisco IOS XE Release 2.1 | This feature was introduced on Cisco ASR 1000 Series Routers. The following sections provide information about this feature:
- Information About QoS Child Service Policy for Priority Class, page 2
- How to Configure a Child Policy Under a Parent Priority Class, page 3

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