

## Chapter 37

# Summary of CoS Configuration Statements

The following sections explain each of the class-of-service (CoS) configuration statements. The statements are organized alphabetically.

### adaptive-shaper

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<b>Syntax</b>	<code>adaptive-shaper <i>adaptive-shaper-name</i>;</code>
<b>Hierarchy Level</b>	[edit class-of-service interfaces interface-name unit <i>logical-unit-number</i> ]
<b>Description</b>	<p>For J-series Services Routers only, assign an adaptive shaper to this interface.</p> <p>Adaptive shapers enable bandwidth limits on Frame Relay interfaces when the Services Router receives frames containing the backward explicit congestion notification (BECN) bit.</p>
<b>Options</b>	<i>adaptive-shaper-name</i> —Name of the adaptive shaper.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## adaptive-shapers

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<b>Syntax</b>	<pre>adaptive-shapers {     adaptive-shaper-name {         trigger type shaping-rate (percent percent   rate);     } }</pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	<p>For J-series Services Routers only, define trigger types and associated rates.</p> <p>Adaptive shapers enable bandwidth limits on Frame Relay interfaces when the Services Router receives frames containing the backward explicit congestion notification (BECN) bit.</p>
<b>Options</b>	<p><i>adaptive-shaper-name</i>—Name of the adaptive shaper.</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## buffer-size

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<b>Syntax</b>	buffer-size (percent <i>percentage</i>   remainder   temporal <i>microseconds</i> );
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> ]
<b>Description</b>	Specify buffer size.
<b>Options</b>	<p>percent <i>percentage</i>—Buffer size as a percentage of total buffer.</p> <p>remainder—Remaining buffer available.</p> <p>temporal <i>microseconds</i>—Buffer size as a temporal value. The queuing algorithm starts dropping packets when it queues more than a computed number of bytes. This maximum is computed by multiplying the logical interface speed by the configured temporal value.</p> <p><b>Range:</b> The ranges vary by platform as follows:</p> <p>For T-series and M320 platforms, 1 through 50,000 microseconds.</p> <p>For other M-series routing platforms, 1 through 200,000 microseconds.</p> <p>For IQ PICs on T-series and M320 platforms, 1 through 50,000 microseconds.</p> <p>For IQ PICs on other M-series routing platforms, 1 through 100,000 microseconds.</p>
<b>Default</b>	If you do not include this statement, the default buffer sizes for queues 0 through 7 are 95, 0, 0, 5, 0, 0, 0, and 0 percent.
<b>Usage Guidelines</b>	See “RED Congestion Control” on page 810 and “Configuring Scheduling Maps” on page 835, and “Configuring the Scheduler Buffer Size” on page 837.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## class

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<b>Syntax</b>	class <i>class-name</i> { classification-override { forwarding-class <i>class-name</i> ; } }
<b>Hierarchy Level</b>	[edit class-of-service forwarding-policy]
<b>Description</b>	Configure CoS-based forwarding class.
<b>Options</b>	<i>class-name</i> —Name of the routing policy class.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “CoS Configuration Guidelines” on page 813.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## class-of-service

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<b>Syntax</b>	class-of-service { ... }
<b>Hierarchy Level</b>	[edit]
<b>Description</b>	Configure JUNOS CoS features.
<b>Default</b>	If you do not configure any CoS features, all packets are transmitted from output transmission queue 0.
<b>Usage Guidelines</b>	See “CoS Configuration Guidelines” on page 813.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## classification-override

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<b>Syntax</b>	classification-override { forwarding-class <i>class-name</i> ; }
<b>Hierarchy Level</b>	[edit class-of-service forwarding-policy class <i>class-name</i> ]
<b>Description</b>	For IPv4 packets, override the incoming packet classification, assigning all packets sent to a destination prefix to the same output transmission queue.
<b>Usage Guidelines</b>	See “Configuring CoS-Based Forwarding” on page 863.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	policy-statement in the <i>JUNOS Routing Protocols Configuration Guide</i>

## classifiers

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See the following sections:

classifiers (Application) on page 883

classifiers (Definition) on page 884

### ***classifiers (Application)***

<b>Syntax</b>	classifiers { <i>type</i> ( <i>classifier-name</i>   default); }
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	Apply a CoS aggregate behavior classifier to a logical interface. You can apply a default classifier or one that is previously defined.
<b>Options</b>	<i>classifier-name</i> —Name of the aggregate behavior classifier. <i>type</i> —Traffic type. <b>Values:</b> dscp, dscp-ipv6, exp, ieee-802.1, inet-precedence
<b>Usage Guidelines</b>	See “Classifying Packets by Behavior Aggregate” on page 830.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**classifiers (Definition)**

```

Syntax classifiers {
    type classifier-name {
        import (classifier-name | default);
        forwarding-class class-name {
            loss-priority level {
                code-points [ aliases ] [ 6-bit-patterns ];
            }
        }
    }
}

```

**Hierarchy Level** [edit class-of-service]

**Description** Define a CoS aggregate behavior classifier for classifying packets. You can associate the classifier with a forwarding class or code-point mapping, and import a default classifier or one that is previously defined.

**Options** *classifier-name*—Name of the aggregate behavior classifier.

*type*—Traffic type.

**Values:** dscp, dscp-ipv6, exp, ieee-802.1, inet-precedence

The remaining statements are explained separately.

**Usage Guidelines** See “Classifying Packets by Behavior Aggregate” on page 830.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**code-point**

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Syntax code-point [ aliases ] [ 6-bit-patterns ];

```

**Hierarchy Level** [edit class-of-service rewrite-rules *type rewrite-name forwarding-class class-name*]

**Description** Specify one or more DSCP code-point aliases or bit sets for association with a forwarding class.

**Options** *alias*—Name of the DSCP alias.

*bits*—Value of the code-point bits, in binary code.

**Usage Guidelines** See “Rewriting Packet Header Information” on page 854.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## code-point-aliases

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<b>Syntax</b>	code-point-aliases { type { alias-name bits; } }
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	Define an alias for a DSCP bit set.
<b>Options</b>	<i>alias-name</i> —Name of the DSCP alias.  <i>bits</i> —Six-bit value of the code-point bits, in binary code.  <i>type</i> —Traffic type. <b>Values:</b> dscp, dscp-ipv6, exp, ieee-802.1, inet-precedence
<b>Usage Guidelines</b>	See “Defining Code-Point Aliases” on page 818.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## code-points

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See the following sections:

code-points (Forwarding Class) on page 885

code-points (Frame Relay DE Bit Loss-Priority Map) on page 886

### ***code-points (Forwarding Class)***

<b>Syntax</b>	code-points [ <i>aliases</i> ] [ <i>6-bit-patterns</i> ];
<b>Hierarchy Level</b>	[edit class-of-service classifiers <i>type classifier-name</i> forwarding-class <i>class-name</i> ]
<b>Description</b>	Specify one or more DSCP code-point aliases or bit sets for association with a forwarding class.
<b>Options</b>	<i>aliases</i> —Name of the DSCP alias.  <i>6-bit-patterns</i> —Value of the code-point bits, in binary code.
<b>Usage Guidelines</b>	See “Classifying Packets by Behavior Aggregate” on page 830.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**code-points (Frame Relay DE Bit Loss-Priority Map)**

<b>Syntax</b>	code-points [ <i>values</i> ];
<b>Hierarchy Level</b>	[edit class-of-service loss-priority-maps frame-relay-de <i>map-name</i> loss-priority <i>level</i> ]
<b>Description</b>	For J-series Services Routers only, associate a set of code-point values with a loss priority.
<b>Options</b>	<i>values</i> —Code-point values, 0 or 1.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**default-channel**

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<b>Syntax</b>	default-channel;
<b>Hierarchy Level</b>	[edit class-of-service virtual-channel-groups <i>group-name</i> <i>virtual-channel-name</i> ]
<b>Description</b>	For J-series Services Routers only, specify the default channel. You must configure one of the virtual channels in the group to be the default. Any traffic not explicitly directed to a virtual channel is transmitted by way of this default.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	scheduler-map (Virtual Channels) on page 916, shaping-rate (Virtual Channels) on page 921, virtual-channel-group on page 924, virtual-channel-groups on page 925, virtual-channels on page 925

## drop-probability

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See the following sections:

drop-probability (Interpolated Value) on page 887

drop-probability (Percentage) on page 887

### ***drop-probability (Interpolated Value)***

<b>Syntax</b>	drop-probability [ <i>values</i> ];
<b>Hierarchy Level</b>	[edit class-of-service drop-profiles <i>profile-name</i> interpolate]
<b>Description</b>	Define up to 64 values for interpolating drop probabilities.
<b>Options</b>	[ <i>values</i> ]—Data points for interpolated packet drop probability. <b>Range:</b> 0 through 100
<b>Usage Guidelines</b>	See “Configuring RED Drop Profiles” on page 853.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

### ***drop-probability (Percentage)***

<b>Syntax</b>	drop-probability <i>percentage</i> ;
<b>Hierarchy Level</b>	[edit class-of-service drop-profiles <i>profile-name</i> ]
<b>Description</b>	Define drop probability percentage.
<b>Options</b>	<i>percentage</i> —Probability that a packet will be dropped, expressed as a percentage. A value of 0 means that a packet will never be dropped, and a value of 100 means that all packets will be dropped. <b>Range:</b> 0 through 100 percent
<b>Usage Guidelines</b>	See “Configuring RED Drop Profiles” on page 853.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## drop-profile

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<b>Syntax</b>	drop-profile <i>profile-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> drop-profile-map loss-priority (any   high   low) protocol (any   non-tcp   tcp)]
<b>Description</b>	Define drop profiles for RED. When a packet arrives, RED checks the queue fill level. If the fill level corresponds to a nonzero drop probability, the RED algorithm determines whether to drop the arriving packet.
<b>Options</b>	<i>profile-name</i> —Name of the drop profile.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## drop-profile-map

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<b>Syntax</b>	drop-profile-map loss-priority (any   high   low) protocol (any   non-tcp   tcp) drop-profile <i>profile-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> ]
<b>Description</b>	Define loss priority value for drop profile.  The statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## drop-profiles

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<b>Syntax</b>	<pre>drop-profiles {     profile-name {         fill-level <i>percentage</i> drop-probability <i>percentage</i>;         interpolate {             fill-level [ <i>values</i> ]             drop-probability [ <i>values</i> ];         }     } }</pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	<p>Define drop profiles for RED.</p> <p>For a packet to be dropped, it must match the drop profile. When a packet arrives, RED checks the queue fill level. If the fill level corresponds to a nonzero drop probability, the RED algorithm determines whether to drop the arriving packet.</p>
<b>Options</b>	<p><i>profile-name</i>—Name of the drop profile.</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See “Configuring RED Drop Profiles” on page 853.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## dscp

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<b>Syntax</b>	dscp ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	For IPv4 traffic, apply a Differentiated Services (DiffServ) code point (DSCP) rewrite rule.
<b>Options</b>	<p><i>rewrite-name</i>—Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules dscp] hierarchy level.</p> <p>default—The default mapping.</p>
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>See Also</b>	dscp-ipv6 on page 890, exp on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, ieee-802.1 on page 900, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## dscp-ipv6

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<b>Syntax</b>	dscp-ipv6 ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	For IPv6 traffic, apply a DSCP rewrite rule.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules dscp-ipv6] hierarchy level.  default—The default mapping.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, exp on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, ieee-802.1 on page 900, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## exp

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<b>Syntax</b>	exp ( <i>rewrite-name</i>   default) protocol <i>protocol-types</i> ;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	Apply an MPLS experimental (EXP) rewrite rule.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules exp] hierarchy level.  default—The default mapping.  The remaining statement is explained separately.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, ieee-802.1 on page 900, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## exp-push-push-push

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<b>Syntax</b>	exp-push-push-push default;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	For M-series routing platforms, rewrite the EXP bits of all three labels of an outgoing packet, thereby maintaining CoS of an incoming non-MPLS packet.
<b>Options</b>	default—Apply the default MPLS EXP rewrite table.
<b>Usage Guidelines</b>	See “Rewriting the EXP Bits of All Three Labels of an Outgoing Packet” on page 859.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp on page 890, exp-swap-push-push on page 891, ieee-802.1 on page 900, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## exp-swap-push-push

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<b>Syntax</b>	exp-swap-push-push default;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	For M-series routing platforms, rewrite the EXP bits of all three labels of an outgoing packet, thereby maintaining CoS of an incoming MPLS packet.
<b>Options</b>	default—Apply the default MPLS EXP rewrite table.
<b>Usage Guidelines</b>	See “Rewriting the EXP Bits of All Three Labels of an Outgoing Packet” on page 859.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp on page 890, exp-push-push-push on page 891, ieee-802.1 on page 900, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## fabric

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<b>Syntax</b>	<pre>fabric {     scheduler-map {         priority (high   low) scheduler <i>scheduler-name</i>;     } }</pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	For T-series and M320 platforms only, associate a scheduler with a fabric priority. The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Associating a Scheduler with a Fabric Priority” on page 851.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## fill-level

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See the following sections:

fill-level (Interpolated Value) on page 892

fill-level (Percentage) on page 893

### ***fill-level (Interpolated Value)***

<b>Syntax</b>	fill-level [ <i>values</i> ];
<b>Hierarchy Level</b>	[edit class-of-service drop-profiles <i>profile-name</i> interpolate]
<b>Description</b>	Define up to 64 values for interpolating queue fill level.
<b>Options</b>	[ <i>values</i> ]—Data points for mapping queue fill percentage. <b>Range:</b> 0 through 100
<b>Usage Guidelines</b>	See “Configuring RED Drop Profiles” on page 853.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**fill-level (Percentage)**

<b>Syntax</b>	fill-level <i>percentage</i> ;
<b>Hierarchy Level</b>	[edit class-of-service drop-profiles <i>profile-name</i> ]
<b>Description</b>	When configuring RED, map the fullness of a queue to a drop probability.
<b>Options</b>	<i>percentage</i> —How full the queue is, expressed as a percentage. You configure the fill-level and drop-probability statements in pairs. To specify multiple fill levels, include multiple fill-level and drop-probability statements. The values you assign to each statement pair must increase relative to the previous pair's values. This is shown in the “Segmented” graph on page 853. <b>Range:</b> 0 through 100 percent
<b>Usage Guidelines</b>	See “Configuring RED Drop Profiles” on page 853.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	drop-probability on page 887

**forwarding-class**

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See the following sections:

- forwarding-class (Classifiers) on page 894
- forwarding-class (Forwarding Policy) on page 894
- forwarding-class (Fragmentation) on page 895
- forwarding-class (Interfaces) on page 895
- forwarding-class (Restricted Queues) on page 896

***forwarding-class (Classifiers)***

**Syntax** forwarding-class *class-name* {  
     loss-priority *level* {  
         code-points [ *aliases* ] [ *6-bit-patterns* ];  
     }  
 }

**Hierarchy Level** [edit class-of-service classifiers *type classifier-name*]

**Description** Define forwarding class name and option values.

**Options** *class-name*—Name of the forwarding class.

The remaining statements are explained separately.

**Usage Guidelines** See “Classifying Packets by Behavior Aggregate” on page 830.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

***forwarding-class (Forwarding Policy)***

**Syntax** forwarding-class *class-name* {  
     next-hop [ *next-hop-name* ];  
     lsp-next-hop [ *lsp-regular-expression* ];  
 }

**Hierarchy Level** [edit class-of-service forwarding-policy next-hop-map *map-name*]

**Description** Define forwarding class name and associated next hops.

**Options** *class-name*—Name of the forwarding class.

The remaining statement is explained separately.

**Usage Guidelines** See “Configuring CoS-Based Forwarding” on page 863.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**forwarding-class (Fragmentation)**

<b>Syntax</b>	forwarding-class <i>class-name</i> { fragment-threshold <i>bytes</i> ; no-fragmentation; }
<b>Hierarchy Level</b>	[edit class-of-service fragmentation-maps]
<b>Description</b>	For AS PIC link services IQ interfaces (lsq) only, define a forwarding class name and associated fragmentation properties within a fragmentation map.  The fragment-threshold and no-fragmentation statements are mutually exclusive.
<b>Options</b>	<i>class-name</i> —Name of the forwarding class.
<b>Default</b>	If you do not include this statement, the traffic in forwarding class <i>class-name</i> is fragmented.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring Fragmentation by Forwarding Class” on page 453.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**forwarding-class (Interfaces)**

<b>Syntax</b>	forwarding-class <i>class-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	Associate a forwarding class configuration or default mapping with a specific interface.
<b>Options</b>	<i>class-name</i> —Name of the forwarding class.
<b>Usage Guidelines</b>	See “Assigning a Forwarding Class to an Interface” on page 823.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**forwarding-class (Restricted Queues)**

<b>Syntax</b>	<code>forwarding-class class-name queue queue-number;</code>
<b>Hierarchy Level</b>	[edit class-of-service restricted-queues]
<b>Description</b>	For T-series and M320 platforms only, map forwarding classes to restricted queues. You can map up to eight forwarding classes to restricted queues.
<b>Options</b>	<i>class-name</i> —Name of the forwarding class.  The remaining statement is explained separately.
<b>Usage Guidelines</b>	See “Configuring up to Eight Forwarding Classes” on page 824.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**forwarding-classes**

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<b>Syntax</b>	<code>forwarding-classes {     queue queue-number class-name priority (high   low); }</code>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	Associate forwarding class with queue name and number. For T-series and M320 platforms only, you can configure fabric priority queuing by including the priority statement at the [edit class-of-service forwarding-classes queue <i>queue-number class-name</i> ] hierarchy level.  The statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring Forwarding Classes” on page 821 and “Overriding Fabric Priority Queuing” on page 823.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## forwarding-policy

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**Syntax**

```
forwarding-policy {
  next-hop-map map-name {
    forwarding-class class-name {
      next-hop [ next-hop-name ];
      lsp-next-hop [ lsp-regular-expression ];
    }
  }
  class class-name {
    classification-override {
      forwarding-class class-name;
    }
  }
}
```

**Hierarchy Level** [edit class-of-service]

**Description** Define CoS-based forwarding policy options.  
The statements are explained separately.

**Usage Guidelines** See “Configuring CoS-Based Forwarding” on page 863.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## fragment-threshold

---

**Syntax** fragment-threshold *bytes*;

**Hierarchy Level** [edit class-of-service fragmentation-maps forwarding-class *class-name*]

**Description** For AS PIC link services IQ interfaces (lsq) only, set the fragmentation threshold for an individual forwarding class.

**Options** *bytes*—Maximum size, in bytes, for multilink packet fragments. Any nonzero value must be a multiple of 64 bytes.  
**Range:** 128 through 16,320 bytes

**Default** If you do not include this statement, the fragmentation threshold you set at the [edit interfaces *interface-name* unit *logical-unit-number*] or [edit interfaces *interface-name* mfr-uni-nni-bundle-options] hierarchy level is the default for all forwarding classes. If you do not set a maximum fragment size anywhere in the configuration, packets are fragmented if they exceed the smallest MTU of all the links in the bundle.

**Usage Guidelines** See “Configuring Fragmentation by Forwarding Class” on page 453.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## fragmentation-map

---

<b>Syntax</b>	<code>fragmentation-map <i>map-name</i>;</code>
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	For AS PIC link services IQ interfaces (Isq) only, associate a fragmentation map with a multilink PPP interface or MLFR FRF.16 DLCI.
<b>Options</b>	<i>map-name</i> —Name of the fragmentation map.
<b>Default</b>	If you do not include this statement, traffic in all forwarding classes is fragmented. The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring Fragmentation by Forwarding Class” on page 453.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## fragmentation-maps

---

<b>Syntax</b>	<pre> fragmentation-maps {     <i>map-name</i> {         forwarding-class <i>class-name</i> {             fragment-threshold <i>bytes</i>;             no-fragmentation;         }     } } </pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	For AS PIC link services IQ interfaces (Isq) only, define fragmentation properties for individual forwarding classes.
<b>Options</b>	<i>map-name</i> —Name of the fragmentation map.
<b>Default</b>	If you do not include this statement, traffic in all forwarding classes is fragmented. The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring Fragmentation by Forwarding Class” on page 453.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## frame-relay

---

<b>Syntax</b>	frame-relay ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	For J-series Services Routers only, apply a Frame Relay discard eligible (DE) rewrite rule. You can combine a Frame Relay rewrite rule with other rewrite rules on the same interface, to rewrite both the DE bit and the MPLS EXP or IP DSCP, for example.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules frame-relay] hierarchy level.  default—The default mapping. The default rewrite rule contains the following:  loss-priority low code-point 0; loss-priority medium-low code-point 0; loss-priority medium-high code-point 1; loss-priority high code-point 1;
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, ieee-802.1 on page 900

## frame-relay-de

---

<b>Syntax</b>	frame-relay-de <i>map-name</i> { loss-priority <i>level</i> code-points [ <i>values</i> ]; }
<b>Hierarchy Level</b>	[edit class-of-service loss-priority-maps]
<b>Description</b>	For J-series Services Routers only, define a Frame Relay discard-eligible bit loss-priority map.
<b>Options</b>	<i>map-name</i> —Name of the loss-priority map.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## ieee-802.1

---

<b>Syntax</b>	ieee-802.1 ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	Apply a IEEE-802.1 rewrite rule.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules ieee-802.1] hierarchy level.  default—The default mapping.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, inet-precedence on page 901, rewrite-rules (Definition) on page 913

## import

---

See the following sections:

import (Classifiers) on page 900

import (Rewrite Rules) on page 901

### ***import (Classifiers)***

<b>Syntax</b>	import ( <i>classifier-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service classifiers <i>type classifier-name</i> ]
<b>Description</b>	Specify a default or previously defined classifier.
<b>Options</b>	<i>classifier-name</i> —Name of the classifier mapping configured at the [edit class-of-service classifiers] hierarchy level.  default—The default classifier mapping.
<b>Usage Guidelines</b>	See “Classifying Packets by Behavior Aggregate” on page 830.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**import (Rewrite Rules)**

<b>Syntax</b>	import ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service rewrite-rules <i>type</i> <i>rewrite-name</i> ]
<b>Description</b>	Specify a default or previously defined rewrite-rules mapping to import.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules] hierarchy level.  default—The default rewrite-rules mapping.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**inet-precedence**


---

<b>Syntax</b>	inet-precedence ( <i>rewrite-name</i>   default);
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules]
<b>Description</b>	Apply a IPv4 precedence rewrite rule.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules inet-precedence] hierarchy level.  default—The default mapping.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	dscp on page 889, dscp-ipv6 on page 890, exp on page 890, exp-push-push-push on page 891, exp-swap-push-push on page 891, ieee-802.1 on page 900

## interfaces

---

**Syntax**

```

interfaces {
  interface-name {
    scheduler-map map-name;
    scheduler-map-chassis map-name;
    unit logical-unit-number {
      classifiers {
        type (classifier-name | default);
      }
      forwarding-class class-name;
      rewrite-rules {
        type (rewrite-name | default);
      }
    }
  }
}

```

**Hierarchy Level** [edit class-of-service]

**Description** Configure interface-specific CoS properties for incoming packets. Associate forwarding-class definition and RED mapping with an interface on the routing platform.

**Options** *interface-name*—Name of the interface.

The remaining statements are explained separately.

**Usage Guidelines** See “Classifying Packets by Behavior Aggregate” on page 830 and “Rewriting Packet Header Information” on page 854.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## interpolate

---

**Syntax**

```

interpolate {
  fill-level [ values ];
  drop-probability [ values ];
}

```

**Hierarchy Level** [edit class-of-service drop-profiles *profile-name*]

**Description** Specify values for interpolating relationship between queue fill level and drop probability.

The statements are explained separately.

**Usage Guidelines** See “Configuring RED Drop Profiles” on page 853.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## loss-priority

---

See the following sections:

loss-priority (Classifiers) on page 903

loss-priority (Frame Relay DE Bit Loss-Priority Map) on page 904

loss-priority (Rewrite Rules) on page 904

loss-priority (Scheduler Drop Profiles) on page 905

### ***loss-priority (Classifiers)***

**Syntax** loss-priority *level*;

**Hierarchy Level** [edit class-of-service classifiers *type classifier-name* forwarding-class *class-name*]

**Description** Specify packet loss priority value for a specific set of code-point aliases and bit patterns.

**Options** *level* can be one of the following:

high—Packet has high loss priority.

low—Packet has low loss priority.

medium-high—(For J-series Services Routers only) Packet has medium-high loss priority.

medium-low—(For J-series Services Routers only) Packet has medium-low loss priority.

**Usage Guidelines** See “Classifying Packets by Behavior Aggregate” on page 830.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

***loss-priority (Frame Relay DE Bit Loss-Priority Map)***

<b>Syntax</b>	<code>loss-priority level code-points [ values ];</code>
<b>Hierarchy Level</b>	[edit class-of-service loss-priority-maps frame-relay-de <i>map-name</i> ]
<b>Description</b>	For J-series Services Routers only, map code points to a loss priority.
<b>Options</b>	<p><i>level</i> can be one of the following:</p> <p>high—Packet has high loss priority.</p> <p>low—Packet has low loss priority.</p> <p>medium-high—Packet has medium-high loss priority.</p> <p>medium-low—Packet has medium-low loss priority.</p> <p>The remaining statement is explained separately.</p>
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

***loss-priority (Rewrite Rules)***

<b>Syntax</b>	<code>loss-priority level;</code>
<b>Hierarchy Level</b>	[edit class-of-service rewrite-rules <i>type rewrite-name forwarding-class class-name</i> ]
<b>Description</b>	Specify a loss priority to which to apply a rewrite rule. The rewrite rule sets the code-point aliases and bit patterns for a specific forwarding class and packet loss priority (PLP). The inputs for the map are the forwarding class and the PLP. The output of the map is the code-point alias or bit pattern.
<b>Options</b>	<p><i>level</i> can be one of the following:</p> <p>high—The rewrite rule applies to packets with high PLP.</p> <p>low—The rewrite rule applies to packets with low PLP.</p> <p>medium-high—(For J-series Services Routers only) The rewrite rule applies to packets with medium-high PLP.</p> <p>medium-low—(For J-series Services Routers only) The rewrite rule applies to packets with medium-low PLP.</p>
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

***loss-priority (Scheduler Drop Profiles)***

<b>Syntax</b>	loss-priority (any   high   low);
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> drop-profile-map]
<b>Description</b>	Specify a loss priority to which to apply a drop profile. The drop profile map sets the drop profile for a specific PLP and protocol type. The inputs for the map are the PLP designation and the protocol type. The output is the drop profile.
<b>Options</b>	any—The drop profile applies to packets with any PLP. high—The drop profile applies to packets with high PLP. low—The drop profile applies to packets with low PLP.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	protocol (Schedulers) on page 911

**loss-priority-maps**

---

See the following sections:

loss-priority-maps (Assigning to an Interface) on page 906

loss-priority-maps (Defining) on page 906

***loss-priority-maps (Assigning to an Interface)***

<b>Syntax</b>	<pre> loss-priority-maps {   default;   map-name; } </pre>
<b>Hierarchy Level</b>	[edit class-of-service interfaces interface-name unit <i>logical-unit-number</i> ]
<b>Description</b>	For J-series Services Routers only, assign the loss priority map to a logical interface.
<b>Options</b>	<p>default—Apply default loss priority map. The default map contains the following:</p> <pre> loss-priority low code-point 0; loss-priority high code-point 1; </pre> <p><i>map-name</i>—Name of loss priority map to be applied.</p>
<b>Default</b>	If you do not include this statement, the default logical interface bandwidth is the average of unused bandwidth for the number of logical interfaces that require default bandwidth treatment.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

***loss-priority-maps (Defining)***

<b>Syntax</b>	<pre> loss-priority-maps {   frame-relay-de <i>map-name</i> {     loss-priority <i>level</i> code-points [ <i>values</i> ];   } } </pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	<p>For J-series Services Routers only, map the loss priority of incoming packets based on code point values.</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## lsp-next-hop

---

<b>Syntax</b>	<code>lsp-next-hop [ <i>lsp-regular-expression</i> ];</code>
<b>Hierarchy Level</b>	[edit class-of-service forwarding-policy next-hop-map <i>map-name</i> forwarding-class <i>class-name</i> ]
<b>Description</b>	Specify the LSP regular expression to which to map forwarded traffic.
<b>Options</b>	<i>lsp-regular-expression</i> —Next-hop LSP label.
<b>Usage Guidelines</b>	See “Configuring CoS-Based Forwarding” on page 863.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## next-hop

---

<b>Syntax</b>	<code>next-hop [ <i>next-hop-name</i> ];</code>
<b>Hierarchy Level</b>	[edit class-of-service forwarding-policy next-hop-map <i>map-name</i> forwarding-class <i>class-name</i> ]
<b>Description</b>	Specify the next-hop name or address to which to map forwarded traffic.
<b>Options</b>	<i>next-hop-name</i> —Next-hop alias or IP address.
<b>Usage Guidelines</b>	See “Configuring CoS-Based Forwarding” on page 863.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## next-hop-map

---

<b>Syntax</b>	<pre>next-hop-map <i>map-name</i> {     forwarding-class <i>class-name</i> {         next-hop <i>next-hop-name</i>;         lsp-next-hop [ <i>lsp-regular-expression</i> ];     } }</pre>
<b>Hierarchy Level</b>	[edit class-of-service forwarding-policy]
<b>Description</b>	Specify the map for CoS forwarding routes.
<b>Options</b>	<i>map-name</i> —Map that defines next-hop routes.
<b>Usage Guidelines</b>	See “Configuring CoS-Based Forwarding” on page 863.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## no-fragmentation

---

<b>Syntax</b>	no-fragmentation;
<b>Hierarchy Level</b>	[edit class-of-service fragmentation-maps forwarding-class <i>class-name</i> ]
<b>Description</b>	<p>For AS PIC link services IQ interfaces (Isq) only, set traffic on a queue to be interleaved, rather than fragmented. This statement specifies that no extra fragmentation header is prepended to the packets received on this queue and that static-link load balancing is used to ensure in-order packet delivery.</p> <p>Static-link load balancing is done based on packet payload. For IPv4 and IPv6 traffic, the link is chosen based on a hash computed from the source address, destination address, and protocol. If the IP payload is TCP or UDP traffic, the hash also includes the source port and destination port. For MPLS traffic, the hash includes all MPLS labels and fields in the payload, if the MPLS payload is IPv4 or IPv6.</p>
<b>Default</b>	If you do not include this statement, the traffic in forwarding class <i>class-name</i> is fragmented.
<b>Usage Guidelines</b>	See “Configuring Fragmentation by Forwarding Class” on page 453.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## priority

---

See the following sections:

priority (Fabric Queues, Schedulers) on page 909

priority (Fabric Priority) on page 909

priority (Schedulers) on page 910

**priority (Fabric Queues, Schedulers)**

<b>Syntax</b>	priority (high   low) scheduler <i>scheduler-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service fabric scheduler-map]
<b>Description</b>	For T-series and M320 platforms only, specify the fabric priority with which a scheduler is associated.  For a scheduler that you associate with a fabric priority, you cannot include the buffer-size, transmit-rate, or priority statements at the [edit class-of-service schedulers <i>scheduler-name</i> ] hierarchy level.
<b>Options</b>	low—Scheduler has low priority.  high—Scheduler has high priority.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Associating a Scheduler with a Fabric Priority” on page 851.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**priority (Fabric Priority)**

<b>Syntax</b>	priority (high   low);
<b>Hierarchy Level</b>	[edit class-of-service forwarding-classes queue <i>queue-number class-name</i> ]
<b>Description</b>	For T-series and M320 platforms only, specify packet priority value.
<b>Options</b>	low—Forwarding class's fabric queuing has low priority.  high—Forwarding class's fabric queuing has high priority.
<b>Usage Guidelines</b>	See “Overriding Fabric Priority Queuing” on page 823.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**priority (Schedulers)**

<b>Syntax</b>	<code>priority priority-level;</code>
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> ]
<b>Description</b>	Specify packet-scheduling priority value.
<b>Options</b>	<p><i>priority-level</i> can be one of the following:</p> <p>low—Scheduler has low priority.</p> <p>medium-low—Scheduler has medium-low priority.</p> <p>medium-high—Scheduler has medium-high priority.</p> <p>high—Scheduler has high priority. Assigning high priority to a queue prevents the queue from being underserved.</p> <p>strict-high—Scheduler has strictly high priority. Configure a high priority queue with unlimited transmission bandwidth available to it. As long as it has traffic to send, the strict-high priority queue receives precedence over low, medium-low, and medium-high priority queues, but not high priority queues. You can configure strict-high priority on only one queue per interface.</p>
<b>Usage Guidelines</b>	See “Configuring Priority Scheduling” on page 838.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

**protocol**


---

See the following sections:

protocol (Rewrite Rules) on page 911

protocol (Schedulers) on page 911

**protocol (Rewrite Rules)**

<b>Syntax</b>	<code>protocol protocol-types;</code>
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> rewrite-rules exp <i>rewrite-name</i> ]
<b>Description</b>	Apply a rewrite rule to MPLS packets only, and write the code point value to MPLS headers only; or apply a rewrite rule to MPLS and IPv4 packets, and write the code point value to MPLS and IPv4 headers.
<b>Options</b>	<p><i>protocol-types</i> can be one of the following:</p> <p><code>mpls-any</code>—Apply a rewrite rule to MPLS packets and writes the code point value to MPLS headers.</p> <p><code>mpls-inet-both</code>—Apply a rewrite rule to VPN MPLS packets with IPv4 payloads. On T-series and M320 platforms, write the code point value to the MPLS and IPv4 headers. On M-series routing platforms, initialize all ingress MPLS LSP packets with IPv4 payloads with 000 code points for IP precedence and MPLS EXP values.</p> <p><code>mpls-inet-both-non-vpn</code>—Apply a rewrite rule to non-VPN MPLS packets with IPv4 payloads. On T-series and M320 platforms, write the code point value to the MPLS and IPv4 headers. On M-series routing platforms, initialize all ingress MPLS LSP packets with IPv4 payloads with 000 code points for IP precedence and MPLS EXP values.</p>
<b>Usage Guidelines</b>	See “Rewriting MPLS and IPv4 Packet Headers” on page 857.
<b>Required Privilege Level</b>	<p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>

**protocol (Schedulers)**

<b>Syntax</b>	<code>protocol (any   non-tcp   tcp);</code>
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> drop-profile-map]
<b>Description</b>	Specify the protocol type for the specified scheduler.
<b>Options</b>	<p><code>any</code>—Accept any protocol type.</p> <p><code>non-tcp</code>—Accept any protocol type other than TCP-IP.</p> <p><code>tcp</code>—Accept only TCP/IP protocol.</p>
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	<p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>

## queue

---

See the following sections:

queue (Global Queues) on page 912

queue (Restricted Queues) on page 912

### **queue (Global Queues)**

**Syntax** `queue queue-number class-name;`

**Hierarchy Level** [edit class-of-service forwarding classes]

**Description** Specify the output transmission queue to which to map all input from an associated forwarding class.

**Options** *class-name*—Name of forwarding class.

*queue-number*—Output queue number.

**Range:** For M-series routing platforms, 0 through 3. For T-series and M320 platforms, 0 through 7. Some T-series PICs are restricted to 0 through 3.

**Usage Guidelines** See “Configuring Forwarding Classes” on page 821.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

### **queue (Restricted Queues)**

**Syntax** `queue queue-number;`

**Hierarchy Level** [edit class-of-service restricted-queues forwarding-class *class-name*]

**Description** For T-series and M320 platforms only, map forwarding classes to restricted queues.

**Options** *queue-number*—Output queue number.

**Range:** 0 through 3.

**Usage Guidelines** See “Configuring up to Eight Forwarding Classes” on page 824.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

## restricted-queues

---

<b>Syntax</b>	restricted-queues { forwarding-class <i>class-name</i> queue <i>queue-number</i> ; }
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	For T-series and M320 platforms only, map forwarding classes to restricted queues.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Configuring up to Eight Forwarding Classes” on page 824.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## rewrite-rules

---

See the following sections:

rewrite-rules (Definition) on page 913

rewrite-rules (Interfaces) on page 914

### ***rewrite-rules (Definition)***

<b>Syntax</b>	rewrite-rules { <i>type</i> <i>rewrite-name</i> { import ( <i>rewrite-name</i>   default); forwarding-class <i>class-name</i> { loss-priority <i>level</i> code-point [ <i>aliases</i> ] [ <i>6-bit-patterns</i> ]; } } }
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	Specify a rewrite-rules mapping for the traffic that passes through all queues on the interface.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping.  <i>type</i> —Traffic type. <b>Values:</b> dscp, dscp-ipv6, exp, frame-relay (J-series only), ieee-802.1, inet-precedence
	The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**rewrite-rules (Interfaces)**

<b>Syntax</b>	rewrite-rules { dscp ( <i>rewrite-name</i>   default); dscp-ipv6 ( <i>rewrite-name</i>   default); exp ( <i>rewrite-name</i>   default) protocol <i>protocol-types</i> ; exp-push-push-push default; exp-swap-push-push default; frame-relay ( <i>rewrite-name</i>   default); ieee-802.1 ( <i>rewrite-name</i>   default); inet-precedence ( <i>rewrite-name</i>   default); }
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	Associate a rewrite-rules configuration or default mapping with a specific interface.
<b>Options</b>	<i>rewrite-name</i> —Name of a rewrite-rules mapping configured at the [edit class-of-service rewrite-rules] hierarchy level.  default—The default mapping.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	rewrite-rules (Definition) on page 913

**scheduler**

See the following sections:

    scheduler (Fabric Queues) on page 914

    scheduler (Scheduler Map) on page 915

**scheduler (Fabric Queues)**

<b>Syntax</b>	scheduler <i>scheduler-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service fabric scheduler-map priority (high   low)]
<b>Description</b>	For T-series and M320 platforms only, specify a scheduler to associate with a fabric queue. For fabric CoS configuration, schedulers are restricted to transmit rates and drop profiles.
<b>Options</b>	<i>scheduler-name</i> —Name of the scheduler configuration block.
<b>Usage Guidelines</b>	See “Associating a Scheduler with a Fabric Priority” on page 851.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

***scheduler (Scheduler Map)***

<b>Syntax</b>	<code>scheduler scheduler-name;</code>
<b>Hierarchy Level</b>	[edit class-of-service scheduler-maps <i>map-name</i> ]
<b>Description</b>	Associate a scheduler with a scheduler map.
<b>Options</b>	<i>scheduler-name</i> —Name of the scheduler configuration block.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

***scheduler-map***

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See the following sections:

scheduler-map (Fabric Queues) on page 915

scheduler-map (Interfaces) on page 916

scheduler-map (Virtual Channels) on page 916

***scheduler-map (Fabric Queues)***

<b>Syntax</b>	<code>scheduler-map priority (high   low) scheduler scheduler-name;</code>
<b>Hierarchy Level</b>	[edit class-of-service fabric]
<b>Description</b>	For T-series and M320 platforms only, associate a scheduler with a fabric priority.  The statements are explained separately.
<b>Usage Guidelines</b>	See “Associating a Scheduler with a Fabric Priority” on page 851.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

***scheduler-map (Interfaces)***

<b>Syntax</b>	<code>scheduler-map map-name;</code>
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> ], [edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	Associate a scheduler map name with an interface.  For channelized OC12 intelligent queuing (IQ), channelized T3 IQ, channelized E1 IQ, and Gigabit Ethernet IQ interfaces only, you can associate a scheduler map name with a logical interface.
<b>Options</b>	<i>map-name</i> —Name of the scheduler map.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

***scheduler-map (Virtual Channels)***

<b>Syntax</b>	<code>scheduler-map map-name;</code>
<b>Hierarchy Level</b>	[edit class-of-service virtual-channel-groups <i>group-name virtual-channel-name</i> ]
<b>Description</b>	For J-series Services Routers only, apply a scheduler map to this virtual channel.
<b>Options</b>	<i>map-name</i> —Name of the scheduler map.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	default-channel on page 886, shaping-rate (Virtual Channels) on page 921, virtual-channel-group on page 924, virtual-channel-groups on page 925, virtual-channels on page 925

## scheduler-map-chassis

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<b>Syntax</b>	<code>scheduler-map-chassis (derived   <i>map-name</i>);</code>
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>type-fpc/pic/*</i> ]
<b>Description</b>	For IQ interfaces, assign a custom scheduler to the packet forwarding component queues that control the aggregated traffic transmitted into the entire PIC.
<b>Options</b>	<p><code>derived</code>—Sets the chassis queues to derive their scheduling configuration from the associated logical interface scheduling configuration.</p> <p><code>map-name</code>—Name of the scheduler map configured at the [edit class-of-service scheduler-maps] hierarchy level.</p>
<b>Default</b>	If you do not include this statement, on IQ interfaces the aggregated traffic that is fed from the packet forwarding components into the PIC is automatically queued according to the scheduler configuration for each logical unit in the PIC.
<b>Usage Guidelines</b>	See “Scheduling Packet Forwarding Component Queues” on page 842.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>See Also</b>	per-unit-scheduler on page 721, scheduler-map on page 915

## scheduler-maps

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<b>Syntax</b>	<pre>scheduler-maps {   <i>map-name</i> {     forwarding-class <i>class-name</i> scheduler <i>scheduler-name</i>;   } }</pre>
<b>Hierarchy Level</b>	[edit class-of-service]
<b>Description</b>	Specify scheduler map name and associate it with the scheduler configuration and forwarding class.
<b>Options</b>	<p><code>map-name</code>—Name of the scheduler map.</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## schedulers

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**Syntax** schedulers {  
     *scheduler-name* {  
         buffer-size (*seconds* | percent *percentage* | remainder | temporal *microseconds*);  
         drop-profile-map loss-priority (any | high | low) protocol (any | non-tcp | tcp)  
             drop-profile *profile-name*;  
         priority *priority-level*;  
         shaping-rate (percent *percent* | *rate*);  
         transmit-rate (percent *percentage* | *rate* | remainder) <exact>;  
     }  
 }

**Hierarchy Level** [edit class-of-service]

**Description** Specify scheduler name and parameter values.

**Options** *scheduler-name*—Name of the scheduler to be configured.

The remaining statements are explained separately.

**Usage Guidelines** See “Configuring Scheduling Maps” on page 835.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

## shaping-rate

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See the following sections:

shaping-rate (Adaptive Shaping) on page 919

shaping-rate (Applying Packet Scheduling) on page 919

shaping-rate (Limiting Excess Bandwidth Usage) on page 920

shaping-rate (Virtual Channels) on page 921

**shaping-rate (Adaptive Shaping)**

<b>Syntax</b>	shaping-rate (percent <i>percent</i>   <i>rate</i> );
<b>Hierarchy Level</b>	[edit class-of-service adaptive-shapers <i>adaptive-shaper-name</i> trigger <i>type</i> ]
<b>Description</b>	For J-series Services Routers only, define the list of trigger types and associated rates.
<b>Options</b>	percent <i>percentage</i> —Shaping rate as a percentage of the available interface bandwidth. <b>Range:</b> 0 through 100 percent  <i>rate</i> —Peak rate, in bits per second (bps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000). <b>Range:</b> 3200 through 32,000,000,000 bps
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	trigger on page 922

**shaping-rate (Applying Packet Scheduling)**

<b>Syntax</b>	shaping-rate <i>rate</i> ;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	For logical interfaces on which you configure packet scheduling, configure traffic shaping by specifying the amount of bandwidth to be allocated to the logical interface.
<b>Options</b>	<i>rate</i> —Peak rate, in bits per second (bps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000). <b>Range:</b> 1000 through 32,000,000,000 bps
<b>Default</b>	If you do not include this statement, the default logical interface bandwidth is the average of unused bandwidth for the number of logical interfaces that require default bandwidth treatment.
<b>Usage Guidelines</b>	See “Associating a Scheduler Map with a DLCI or VLAN” on page 846.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**shaping-rate (Limiting Excess Bandwidth Usage)**

<b>Syntax</b>	shaping-rate (percent <i>percent</i>   <i>rate</i> );
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> ]
<b>Description</b>	<p>For J-series Services Routers only, define a limit on excess bandwidth usage.</p> <p>The transmit-rate statement at the [edit class-of-service schedulers <i>scheduler-name</i>] hierarchy level configures the minimum bandwidth allocated to a queue. The transmission bandwidth can be configured as an exact value or allowed to exceed the configured rate if additional bandwidth is available from other queues. For J-series Services Routers only, you limit the excess bandwidth usage with this statement.</p> <p>You should configure the shaping rate as an absolute maximum usage and not the additional usage beyond the configured transmit rate.</p>
<b>Options</b>	<p>percent <i>percentage</i>—Shaping rate as a percentage of the available interface bandwidth.  <b>Range:</b> 0 through 100 percent</p> <p><i>rate</i>—Peak rate, in bits per second (bps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000).  <b>Range:</b> 3200 through 32,000,000,000 bps</p>
<b>Default</b>	If you do not include this statement, the default shaping rate is 100 percent, which is the same as no shaping at all.
<b>Usage Guidelines</b>	See “Associating a Scheduler Map with a DLCI or VLAN” on page 846.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

**shaping-rate (Virtual Channels)**

<b>Syntax</b>	shaping-rate (percent <i>percent</i>   <i>rate</i> );
<b>Hierarchy Level</b>	[edit class-of-service virtual-channel-groups <i>group-name</i> <i>virtual-channel-name</i> ]
<b>Description</b>	For J-series Services Routers only, define the shaping rates to be associated with the virtual channel.
<b>Options</b>	percent <i>percentage</i> —Shaping rate as a percentage of the available interface bandwidth. <b>Range:</b> 0 through 100 percent  <i>rate</i> —Peak rate, in bits per second (bps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000). <b>Range:</b> 3200 through 32,000,000,000 bps
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	default-channel on page 886, scheduler-map (Virtual Channels) on page 916, virtual-channel-group on page 924, virtual-channel-groups on page 925, virtual-channels on page 925

## transmit-rate

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<b>Syntax</b>	transmit-rate ( <i>rate</i>   percent <i>percentage</i>   remainder) <exact>;
<b>Hierarchy Level</b>	[edit class-of-service schedulers <i>scheduler-name</i> ]
<b>Description</b>	Specify the transmit rate or percentage for a scheduler.
<b>Options</b>	<p>exact—Enforce the exact transmission rate. Under sustained congestion, a rate-controlled queue that goes into negative credit fills up and eventually drops packets.</p> <p><i>rate</i>—Transmission rate, in bps. You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000).  <b>Range:</b> 3200 through 32,000,000,000 bps</p> <p>remainder—Use remaining rate available.</p> <p>percent <i>percentage</i>—Percentage of transmission capacity.  <b>Range:</b> 0 through 100 percent</p>
<b>Default</b>	If you do not include this statement, the default transmit rates for queues 0 through 7 are 95, 0, 0, 5, 0, 0, 0, and 0 percent.
<b>Usage Guidelines</b>	See “Configuring Scheduling Maps” on page 835.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## trigger

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<b>Syntax</b>	trigger <i>type</i> shaping-rate (percent <i>percent</i>   <i>rate</i> );
<b>Hierarchy Level</b>	[edit class-of-service adaptive-shapers <i>adaptive-shaper-name</i> ]
<b>Description</b>	For J-series Services Routers only, specify a trigger type and its associated rate.
<b>Options</b>	<p><i>type</i>—The type of trigger.</p> <p>The remaining statement is explained separately.</p>
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	shaping-rate (Adaptive Shaping) on page 919

## unit

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<b>Syntax</b>	<pre> unit <i>logical-unit-number</i> {   adaptive-shaper <i>adaptive-shaper-name</i>;   classifiers {     type (<i>classifier-name</i>   default);   }   forwarding-class <i>class-name</i>;   loss-priority-maps   rewrite-rules {     type (<i>rewrite-name</i>   default);   }   scheduler-map <i>map-name</i>;   shaping-rate <i>rate</i>;   virtual-channel-group <i>group-name</i>; } </pre>
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> ]
<b>Description</b>	Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.
<b>Options</b>	<p><i>logical-unit-number</i>—Number of the logical unit.  <b>Range:</b> 0 through 16,384</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See “Classifying Packets by Behavior Aggregate” on page 830 and “Rewriting Packet Header Information” on page 854.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

## virtual-channel-group

---

<b>Syntax</b>	virtual-channel-group <i>group-name</i> ;
<b>Hierarchy Level</b>	[edit class-of-service interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]
<b>Description</b>	<p>For J-series Services Routers only, assign an virtual channel group to a logical interface.</p> <p>If you apply a virtual channel group to multiple logical interfaces then separate queues are created on each of the interfaces. The same virtual channel names are used on all the interfaces. You can specify the scheduler and shaping rates in the virtual channels in percentages so that you can apply the same virtual channel group to logical interfaces with different available bandwidths.</p>
<b>Options</b>	<i>group-name</i> —Name of the virtual channel group.
<b>Usage Guidelines</b>	See the <i>J-series Services Router User Guide</i> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>See Also</b>	default-channel on page 886, scheduler-map (Virtual Channels) on page 916, shaping-rate (Virtual Channels) on page 921, virtual-channel-groups on page 925, virtual-channels on page 925

## virtual-channel-groups

---

**Syntax** virtual-channel-groups {  
     group-name {  
         virtual-channel-name {  
             scheduler-map map-name;  
             shaping-rate rate;  
             default-channel;  
         }  
     }  
 }

**Hierarchy Level** [edit class-of-service]

**Description** For J-series Services Routers only, associate a virtual channel with a scheduler map and a shaping rate.

Virtual channels and virtual channel groups enable you to direct traffic into a virtual channel and apply bandwidth limits to the channel.

**Options** *group-name*—Name of the virtual channel group.

The remaining statements are explained separately.

**Usage Guidelines** See the *J-series Services Router User Guide* .

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**See Also** default-channel on page 886, scheduler-map (Virtual Channels) on page 916, shaping-rate (Virtual Channels) on page 921, virtual-channel-group on page 924, virtual-channels on page 925

## virtual-channels

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**Syntax** virtual-channels {  
     virtual-channel-name;  
 }

**Hierarchy Level** [edit class-of-service]

**Description** For J-series Services Routers only, specify a list of virtual channels.

Each virtual channel has eight transmission queues.

**Options** *virtual-channel-name*—Name of the virtual channel.

**Usage Guidelines** See the *J-series Services Router User Guide* .

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**See Also** default-channel on page 886, scheduler-map (Virtual Channels) on page 916, shaping-rate (Virtual Channels) on page 921, virtual-channel-group on page 924, virtual-channel-groups on page 925

