



## Implementing SBC QoS (Marking)

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SBC supports quality of service (QoS) profiles that the integrator configures for IP packet marking on the data path. IP packet marking is used in the SBC in the following contexts:

- Configuring media packet real-time transport protocol (RTP) and real-time control protocol (RTCP) marking based on a per call scope.
- Supporting Differentiated Services Code Point (DSCP) marking as well as IP precedence/Type of Service (ToS) marking for voice service.
- Providing the ability to mark media packet differently depending on which branch of the call (either the caller or the callee) they are sent on.
- Supporting signaling and media packet marking based on Session Initiation Packet (SIP) resource priority header.



### Note

For a complete description of commands used in this chapter, refer to the *Cisco IOS XR Session Border Controller Command Reference*. To locate documentation for other commands that appear in this chapter, use the command reference master index, or search online.

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### Feature History for Implementing SBC QoS

Release	Modification
Release 3.3.0	This feature was introduced on the Cisco XR 12000 Series Router.
Release 3.4.0	No modification.
Release 3.4.1	The SIP marking feature was introduced on the Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.

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## Prerequisites for Implementing QoS

The following prerequisites are required to implement QoS on the SBC:

- You must be in a user group associated with a task group that includes the proper task IDs for SBC commands being used. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.
- You must install and activate the package installation envelope (PIE) for the SBC software.  
For detailed information about PIE installation, refer to the *Upgrading and Managing Cisco IOS XR Software* module in the *Cisco IOS XR Getting Started Guide*.
- Before implementing interworking DTMF, the SBC must already be created. See the procedures described in the “[SBC Configuration Prerequisites](#)” module.

## Information About Implementing QoS

To implement QoS marking on the SBC, the user configures the SBC with a number of QoS profiles, which are given unique names to identify them. These QoS profiles are used exclusively for marking packets.

Each QoS profile contains the following mutually exclusive parameters.

- A 6-bit DiffServ Code Point (DSCP) value to mark packets that match the QoS.
- A 3-bit IP precedence value and a 4-bit TOS value to mark packets that match the QoS.

**Note**

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A default QoS profile that cannot be modified or deleted is preconfigured on the SBC. If the user does not define a QoS profile, the default QoS profile is used for marking packets.

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## How to Implement QoS

To implement QoS marking on the SBC, follow the procedures in the following sections:

- [Configuring QoS Profiles](#)
- [Choosing a QoS Profile Using CAC](#)

## Configuring QoS Profiles

This task configures a signaling QoS profile to use an IP precedence value of 1 and a ToS value of 12 to mark packets that match the QoS.

## SUMMARY STEPS

1. **configure**
2. **sbc** *service-name*
3. **sbe**
4. **qos sig** *name*
5. **marking** *type*
6. **ip precedence** *value*
7. **ip tos** *value*
8. **commit**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure</b>  <b>Example:</b> RP/0/0/CPU0:router# configure	Enables global configuration mode.
Step 2	<b>sbc</b> <i>service-name</i>  <b>Example:</b> RP/0/0/CPU0:router(config)# sbc mysbc RP/0/0/CPU0:router(config-sbc)#	Enters the mode of an SBC service. <ul style="list-style-type: none"><li>• Use the <i>service-name</i> argument to define the name of the SBC.</li></ul>
Step 3	<b>sbe</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc)# sbe RP/0/0/CPU0:router(config-sbc-sbe)#	Enters the mode of an SBE entity within a SBC service.
Step 4	<b>qos sig</b> <i>name</i>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe)# qos sig residential RP/0/0/CPU0:router(config-sbc-sbe-qos-sig)#	Enters the mode of configuring a QoS profile. The <i>name</i> parameter must be the name of an existing QoS profile. The string “default” is reserved.
Step 5	<b>marking</b> <i>type</i>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-qos-sig)# marking ip-precedence	Configures whether the QoS profile marks packets with a DSCP value or an IP precedence and TOS value. The <i>type</i> must be either: <ul style="list-style-type: none"><li>• dscp</li><li>• ip-precedence</li></ul> The <b>no</b> version of this command configures the QoS profile to not mark packets.

	Command or Action	Purpose
Step 6	<p><code>ip precedence value</code></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-qos-sig)#  ip precedence 1</p>	<p>Configures an IP precedence with which to mark IP packets belonging to the given QoS profile. The range of IP precedence values is 0 to 7.</p> <p>The <b>no</b> version of this command sets the default IP precedence value to 0.</p> <p><b>Note</b> If the QoS profile is configured to mark packets DSCP value takes precedence.</p>
Step 7	<p><code>ip tos value</code></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-qos-sig)#  ip tos 12</p>	<p>Configures an IP type of service (ToS) with which to mark IP packets belonging to the given QoS profile. The <i>value</i> parameter is a bit field consisting of one or more of the following bits OR'd together:</p> <ul style="list-style-type: none"> <li>• 8—Minimize delay</li> <li>• 4—Maximize throughput</li> <li>• 2—Maximize reliability</li> <li>• 1—Minimize monetary cost</li> </ul>
Step 8	<p><code>commit</code></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-qos-sig)#  commit</p>	<p>Saves configuration changes. Use the <b>commit</b> command to save the configuration changes to the running configuration file and remain within the configuration session.</p>

## Analyzing the SIP Resource-Priority Header

Users can configure the SBC to map SIP packets with Resource-Priority Header strings to the following SBC priority values:

- Routine
- Priority
- Immediate
- Flash
- Flash override
- Critical

The CAC uses the assigned priority value to choose the QoS profile.

The following task configures the SBC to assign priority value “flash” to a SIP packet with Resource-Priority Header string “dsn.flash”

### SUMMARY STEPS

1. **configure**
2. **sbc service name**
3. **sbe**
4. **resource-priority-set name**
5. **resource-priority string value**

6. `priority priority value`
7. `commit`

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure</b>  <b>Example:</b> RP/0/0/CPU0:router# configure	Enables global configuration mode.
Step 2	<b>sbc service-name</b>  <b>Example:</b> RP/0/0/CPU0:router(config)# sbc mysbc	Enters the mode of an SBC service. <ul style="list-style-type: none"> <li>• Use the <i>service-name</i> argument to define the name of the SBC.</li> </ul>
Step 3	<b>sbe</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc)# sbe	Enters the mode of an SBE entity within a SBC service.
Step 4	<b>resource-priority-set name</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe)# resource-priority-set dsn	Enters the mode to map SIP Resource-Priority header string to SBC priority values.
Step 5	<b>resource-priority string value</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-rsrc-pri-set)# resource-priority dsn.flash	Enters the mode to configure the priority of the Resource-Priority header string.
Step 6	<b>priority priority value</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-rsrc-pri)# priority flash	Sets the SBC priority value of the Resource-Priority header string. <p>The SBC priority value must be one of the following:</p> <ul style="list-style-type: none"> <li>• routine</li> <li>• priority</li> <li>• immediate</li> <li>• flash</li> <li>• flash-override</li> <li>• critical</li> </ul>
Step 7	<b>commit</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-rsrc-pri)# commit	Saves the configuration changes to the running configuration file.

## Configuring a Resource Priority Set on a SIP Adjacency

The following task configures the SIP adjacency “SipToIsp42” to use resource-priority-set “dsn.”

### SUMMARY STEPS

1. **configure**
2. **sbc** *service name*
3. **sbe**
4. **adjacency sip** *adjacency name*
5. **resource-priority-set** *name*
6. **commit**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure</b>  <b>Example:</b> RP/0/0/CPU0:router# configure	Enables global configuration mode.
Step 2	<b>sbc</b> <i>service-name</i>  <b>Example:</b> RP/0/0/CPU0:router(config)# sbc mysbc	Enters the mode of an SBC service. <ul style="list-style-type: none"> <li>• Use the <i>service-name</i> argument to define the name of the SBC.</li> </ul>
Step 3	<b>sbe</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc)# sbe	Enters the mode of an SBE entity within a SBC service.
Step 4	<b>adjacency sip</b> <i>adjacency name</i>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe)# adjacency sip SipToIsp42	Configures the SIP adjacency to use with the specified resource priority set.
Step 5	<b>resource-priority-set</b> <i>name</i>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-adj-sip)# resource-priority-set dsn	Sets the SIP adjacency to use with the specified resource priority set.
Step 6	<b>commit</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-adj-sip)# commit	Saves the configuration changes to the running configuration file.

## Choosing a QoS Profile Using CAC

This task configures calls from the account “acme” to use the voice QoS profile “enterprise” for packets sent from the SBC to the original caller.



### Note

This command can only be executed at the per-call scope. The CAC policy does not activate if this command is configured at any other scope.

### SUMMARY STEPS

1. **configure**
2. **sbc** *service-name*
3. **sbe**
4. **cac-policy-set** *policy-set-id*
5. **first-cac-scope** *scope-name*
6. **first-cac-table** *table-name*
7. **cac-table** *table-name*
8. **match-type** *table-type*
9. **entry** *entry-id*
10. **match-value** *key*
11. **caller-voice-qos-profile** *profile-name*
12. **caller-video-qos-profile** *profile-name*
13. **caller-sig-qos-profile** *profile name*
14. **commit**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure</b>  <b>Example:</b> RP/0/0/CPU0:router# configure	Enables global configuration mode.
Step 2	<b>sbc</b> <i>service-name</i>  <b>Example:</b> RP/0/0/CPU0:router(config)# sbc mysbc	Enters the mode of an SBC service. <ul style="list-style-type: none"> <li>Use the <i>service-name</i> argument to define the name of the service.</li> </ul>
Step 3	<b>sbe</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc)# sbe	Enters the mode of an SBE entity within an SBC service.

	Command or Action	Purpose
Step 4	<p><b>cac-policy-set</b> <i>policy-set-id</i></p> <p><b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe)# cac-policy-set 1</p>	Enters the mode of Call Admission Control (CAC) policy set configuration within an SBE entity, creating a new policy set, if necessary.
Step 5	<p><b>first-cac-scope</b> <i>scope-name</i></p> <p><b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy)# first-cac-scope call</p>	<p>Configures the scope at which to begin defining limits when performing the admission control stage of policy.</p> <p>The <i>scope-name</i> argument configures the scope at which limits should be initially defined. Possible values are:</p> <ul style="list-style-type: none"> <li>• global</li> <li>• call</li> </ul> <p>Also, one or more of the following scopes can be defined in a comma-separated list:</p> <ul style="list-style-type: none"> <li>• src-adjacency</li> <li>• dst-adjacency</li> <li>• src-number</li> <li>• dst-number</li> <li>• src-account</li> <li>• dst-account</li> </ul>
Step 6	<p><b>first-cac-table</b> <i>table-name</i></p> <p><b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy)# first-cac-table MyCacTable</p>	Configures the name of the first policy table to process when performing the admission control stage of policy.
Step 7	<p><b>cac-table</b> <i>table-name</i></p> <p><b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy)# cac-table MyCacTable</p>	Enters the mode for configuration of an admission control table (creating one, if necessary) within the context of an SBE policy set.

	Command or Action	Purpose
Step 8	<p><b>match-type</b> <i>table-type</i></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cactable)# match-type src-account</p>	<p>Configures the match-type of an admission control table within the context of an SBE policy set.</p> <p>The <i>table-type</i> argument controls the syntax of the match-value fields of the entries in the table. Possible table-types available are:</p> <ul style="list-style-type: none"> <li>• policy-set</li> <li>• dst-prefix</li> <li>• src-prefix</li> <li>• src-adjacency</li> <li>• src-account</li> <li>• dst-adjacency</li> <li>• dst-account</li> <li>• category</li> <li>• event-type</li> <li>• all</li> </ul>
Step 9	<p><b>entry</b> <i>entry-id</i></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cactable)# entry 1</p>	<p>Enters the mode for configuring an entry in an admission control table, creating the entry, if necessary.</p>
Step 10	<p><b>match-value</b> <i>key</i></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cac-table-ent)# match-value acme</p>	<p>Configures the match value of an entry in an admission control table.</p>
Step 11	<p><b>caller-voice-qos-profile</b> <i>profile-name</i></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cac-table-ent)# caller-voice-qos-profile enterprise</p>	<p>Configures the QoS profile to use for voice media packets sent to the original caller.</p>
Step 12	<p><b>caller-video-qos-profile</b> <i>profile-name</i></p> <p><b>Example:</b>  RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cac-table-ent)# caller-video-qos-profile enterprise</p>	<p>Configures the QoS profile to use for packets sent to the original caller.</p>

	Command or Action	Purpose
Step 13	<b>caller-sig-qos-profile</b> <i>profile-name</i>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cac-table-ent)# caller-sig-qos-profile enterprise	Configures the QoS profile to use for signaling packets sent to the original caller.
Step 14	<b>commit</b>  <b>Example:</b> RP/0/0/CPU0:router(config-sbc-sbe-cacpolicy-cac-table-ent)# commit	Saves configuration changes. Use the <b>commit</b> command to save the configuration changes to the running configuration file and remain within the configuration session.

## Configuration Examples of QoS Profiles

This section provides the following configuration examples:

- [Configuring a QoS Voice Profile Using IP Precedence Marking: Example](#)
- [Configuring a QoS Voice Profile Using DSCP Marking: Example](#)
- [Choosing a QoS Profile Using CAC: Example](#)
- [Configuration of a SIP Adjacency Using Resource- Priority-Set: Example](#)

### Configuring a QoS Voice Profile Using IP Precedence Marking: Example

This task configures a QoS voice profile to use an IP precedence value of 1 and a TOS value of 12 to mark packets that match the QoS.

```

configure
sbc mysbc
  sbe
    qos voice residential
      marking ip-precedence
      ip precedence 1
      ip tos 12
commit

sbc mysbc
  sbe
    qos voice residential
      ip tos 12
      marking ip-precedence
      ip precedence 1
!
```

### Configuring a QoS Voice Profile Using DSCP Marking: Example

This task configures a QoS voice profile to use an IP precedence value of 1 and a TOS value of 12 to mark packets that match the QoS.

```

configure
```

```
sbc mysbc
sbe
  qos voice residential
  marking dscp
  dscp 10
  commit
```

```
sbc mysbc
sbe
  qos voice residential
  marking dscp
  dscp 10
  !
  !
```

## Choosing a QoS Profile Using CAC: Example

This task configures calls from the account “acme” to use the voice QoS profile “enterprise” for packets sent from the SBC to the original caller.

```
configure
sbc mysbc
sbe
  cac-policy-set 1
  first-cac-scope call
  first-cac-table MyCacTable
  cac-table MyCacTable
  match-type src-account
  entry 1
  match-value acme
  caller-voice-qos-profile enterprise
  caller-video-qos-profile enterprise
  commit

sbc mysbc
sbe
  cac-policy-set 1
  first-cac-scope call
  first-cac-table MyCacTable
  cac-table MyCacTable
  match-type src-account
  entry 1
  match-value acme
  caller-video-qos-profile enterprise
  caller-voice-qos-profile enterprise
  !commit
  !
  !
```

## Configuration of a SIP Adjacency Using Resource- Priority-Set: Example

This section provides the following configuration example:

```
configure
sbc mysbc
sbe
  adjacency sip SipToIsp42
  resource-priority-set dsn
```

```
commit
```

## Additional References

The following sections provide references related to implementing SBC QoS.

## Related Documents

Related Topic	Document Title
Cisco IOS XR master command reference	Cisco IOS XR Master Commands List
Cisco IOS XR SBC interface configuration commands	<i>Cisco IOS XR Session Border Controller Command Reference</i>
Initial system bootup and configuration information for a router using the Cisco IOS XR Software	<i>Cisco IOS XR Getting Started Guide</i>
Cisco IOS XR command modes	<i>Cisco IOS XR Command Mode Reference</i>

## Standards

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

## MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: <a href="http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml">http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml</a>

## RFCs

RFCs	Title
RFC 2749	<i>COPS usage for RSVP</i>
RFC 2205	<i>Resource ReSerVation Protocol (RSVP) -- Version 1 Functional Specification</i>
RFC 3550	<i>RTP: A Transport Protocol for Real-Time Applications</i>

## Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

## Related Command Summary

This section provides an alphabetical list of the commands related to QoS configuration on the Cisco XR 12000 Series Router. For more information about the commands, see the *Cisco IOS XR Session Border Controller Command Reference*.

Command	Purpose
<b>callee-sig-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for signaling packets sent to the original callee.
<b>callee-video-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for media packets sent to the original callee.
<b>callee-voice-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for media packets sent to the original callee.
<b>caller-sig-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for signaling packets sent to the original caller.
<b>caller-video-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for media packets sent to the original caller.
<b>caller-voice-qos-profile</b> <i>profile-name</i>	Configures the QoS profile to use for media packets sent to the original caller.
<b>dscp</b>	Configures a DSCP with which to mark IP packets belonging to a given QoS profile.
<b>ip precedence</b> <i>value</i>	Configures an IP precedence with which to mark IP packets belonging to a QoS profile.

<b>Command</b>	<b>Purpose</b>
<b>ip TOS</b> <i>value</i>	Configures an IP TOS with which to mark IP packets belonging to a QoS profile.
<b>marking</b> <i>type</i>	Configures whether the QoS profile will mark packets with a DSCP value or an IP precedence and type of service (TOS) value.
<b>priority</b> <i>value</i>	Sets the SBC priority value of the Resource-Priority header string.
<b>qos video</b>	Enters the mode for QoS video configuration.
<b>qos voice</b>	Enters the mode for QoS voice configuration.
<b>resource-priority</b> <i>value</i>	Enters the mode to configure the priority of the Resource-Priority header string.
<b>resource-priority-set</b> <i>value</i>	Enters the mode to map SIP Resource-Priority header string to SBC priority values.