

QCI - QoS Mapping Configuration Mode Commands

The QoS Class Index (QCI) to QoS Mapping Configuration Mode is used to map QoS Class Indexes to enforceable QoS parameters. Mapping can occur between the RAN and the Serving Gateway (S-GW), the Mobility Management Entity (MME), and/or the PDN Gateway (P-GW) in an LTE network or between the RAN and the eHRPD Serving Gateway (HSGW) in an eHRPD network.

Command Modes

Exec > Global Configuration > QCI-QoS Mapping Configuration

configure > qci-qos-mapping *name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-qci-qos-mapping)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

Important For information on common commands available in this configuration mode, refer to the Common Commands chapter.

- operator-defined-qci, on page 1
- qci, on page 4

operator-defined-qci

Creates and maps non-standard QCI values to enforceable QoS parameters.

Product

P-GW

SAEGW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > QCI-QoS Mapping Configuration

configure > qci-qos-mapping *name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-qci-qos-mapping)#
```

Syntax Description

operator-defined-qci *num* **{ gbr | non-gbr } [{ downlink | uplkink } [encaps-header { copy-inner | copy-outer | dscp-marking** *dscp-marking-value* **} [internal-qos priority** *priority* **] | internal-qos priority** *priority* **| user-datagram dscp-marking** *dscp-marking-value* **[encaps-header { copy-inner | copy-outer | dscp-marking** *dscp-marking-value* **} [internal-qos priority** *priority* **]] | pre-rel8-qos-mapping** *num* **]**
no operator-defined-qci *num*

no

Disables the selected non-standard QCI value.

num

Specifies the non-standard, operator-defined QCI value to be enabled. *num* must be an integer from 128 through 254.

Important Standards-based QCI values 1 through 9 are configured through the **qci** command.

gbr

Specifies that this QCI type is Guaranteed Bit Rate (GBR).

non-gbr

Specifies that this QCI type is non-Guaranteed Bit Rate (non-GBR).

downlink

Configures parameters for downlink traffic.

uplink

Configures parameters for uplink traffic.

encaps-header { copy-inner | copy-outer | dscp-marking *dscp-marking-value* }

Specifies that the DSCP marking must be set on the encapsulation header for IP-in-IP, GRE, or GTP encapsulation.

- **copy-inner**: Specifies that the DSCP marking is to be acquired from the UDP headers within the encapsulation.

- **copy-outer** used to copy the DSCP value coming in the data packet from S1u interface to the data packet sent on the S5 interface and vice-versa.
- **dscp-marking** *dscp-marking-value*: Specifies that the DSCP marking is to be defined by this keyword.

  dscp-marking-value is expressed as a hexadecimal number from 0x00 through 0x3F.

internal-qos priority *priority*

Sets the internal QoS. These get resolved in L2 values.

priority is an integer value from 0 through 7.

user-datagram dscp-marking *dscp-marking-value*

Specifies that the IP DSCP marking is to be defined by this keyword.

dscp-marking-value is expressed as a hexadecimal number from 0x00 through 0x3F.

pre-rel8-qos-mapping *num*

Maps non-standard QCI to a standard QCI that has the characteristics (TC, THP, SI, TD, SSD) similar to desired pre-rel8 standard QoS values during 3G call or GnGp handover.

num must be an integer from:

- 1 through 4 for GBR
- 5 through 9 for non-GBR

Important If the wrong value is chosen, one of the following configuration errors will appear: "Failure: Only QCI range 1 - 4 are allowed for GBR QCI" or "Failure: Only QCI range 5 - 9 are allowed for Non-GBR QCI".

QCI values 1 through 9 are defined in *3GPP Specification TS 23.203 "Policy and charging control architecture"*.

Usage Guidelines

Use this command to create and map non-standard QCI values to enforceable QoS parameters in P-GW so that calls can be accepted when non-standard QCI values are received from UE or PCRF.

Important Use of non-standard QCIs require that a valid license key be installed. Contact your Cisco Account or Support representative for information on how to obtain a license.

3G GGSN Call

If the **pre-rel8-qos-mapping** field is not configured for the non-standard QCI under P-GW which is associated with a GGSN, then the 3G call would be rejected.

GnGp Handoff

1. If the **pre-rel8-qos-mapping** field is not configured for the non-standard QCI for default bearer, then the handoff would be rejected.
2. If the **pre-rel8-qos-mapping** field is not configured for the non-standard QCI for dedicated bearer, then only that bearer would be rejected during handoff.

3. In the following scenario:
   - default bearer with standard QCI or non-standard QCI (with **pre-rel8-qos-mapping** configured)
   - more than one dedicated bearer (some with standard QCI, some with non-standard QCI with **pre-rel8-qos-mapping** configured, and some with non-standard QCI with no mapping)

   During LTE-to-GnGp handoff:
   - UPC Request for all the dedicated bearers with non-standard QCI with no mapping would be rejected
   - handoff will be successful for the remaining bearers

Example

The following command creates an operator-defined GBR QCI value of *129* and maps it to a pre-rel8 standard QoS value of *2*:

```
operator-defined-qci 129 gbr pre-rel8-qos-mapping 2
```

qci

Creates and maps standard QCI values to enforceable QoS parameters.

Product

HSGW

P-GW

SAEGW

S-GW

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > QCI-QoS Mapping Configuration

configure > qci-qos-mapping *name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-qci-qos-mapping)#
```

Syntax Description

Syntax for StarOS releases 16 and forward

qci *num* **[arp-priority-level** *arp_value* **] [downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]**

qci *num* **[delay-class** *delay-class-value* **precedence-class** *precedence-class-value* **reliability-class** *reliability-class-value* **[downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [uplink [**

downlink] [encaps-header { copy-inner | dscp-marking *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]]**

qci *num* **[downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]**

qci *num* **[gbr [delay-class** *delay-class-value* **precedence-class** *precedence-class-value* **reliability-class** *reliability-class-value* **] [downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [max-packet-delay** *max-packet-delay-value* **max-error-rate** *max-error-rate* **] [traffic-policing interval** *value* **] [uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]]**

qci *num* **[max-packet-delay** *max-packet-delay-value* **max-error-rate** *max-error-rate* **[downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]]**

qci *num* **[non-gbr [delay-class** *delay-class-value* **precedence-class** *precedence-class-value* **reliability-class** *reliability-class-value* **] [downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [max-packet-delay** *max-packet-delay-value* **max-error-rate** *max-error-rate* **] [traffic-policing interval** *value* **] [uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]]**

qci *num* **[pre-rel8-qos-mapping** *num* **]**

qci *num* **[traffic-policing interval** *interval* **[delay-class** *delay-class-value* **precedence-class** *precedence-class-value* **reliability-class** *reliability-class-value* **] [downlink [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]] [max-packet-delay** *max-packet-delay-value* **max-error-rate** *max-error-rate* **] [uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]]**

qci *num* **[uplink [downlink] [encaps-header { copy-inner | dscp-marking** *dscp-marking-value* **}] [internal-qos priority** *priority* **] [user-datagram dscp-marking** *dscp-marking-value* **]]**

[default | no] qci *num* **[arp-priority-level** *arp_value* **]**



Important The optional keywords associated with each of the initial optional keywords are abbreviated in the syntax examples above for clarity. Refer to the definitions below for the full keyword paths and associated descriptions for each keyword string in this command.

default

Resets the default values for the select QCI value.

no

Disables the selected QCI value.

num

Specifies the QCI value to be enabled; must be an integer between 1-9, or 128-254, or 65, 66, 69, 70, 80, 82, 83.

QCI values 1 through 9 are defined in *3GPP Specification TS 23.203 "Policy and charging control architecture"*.

In release 21 and forward, QCI options 65 and 66 are available for guaranteed bit rate (GBR) network initiated QCI values only.

In release 21 and forward, QCI options 69 and 70 are available for non-GBR network initiated QCI values only.

arp-priority-level *arp_value*

Specifies the address retention priority (ARP) priority level.

arp_value must be an integer from 1 through 15.

delay-class *delay-class-value* precedenced-class *precedence-class-value* reliability-class *reliability-class-value*

delay-class: Specifies the pre-release 8 value for configuring packet delay.

delay-class-value must be an integer from 1 through 9.

precedence-class: Specifies the pre-release 8 value for configuring packet precedence.

precedence-class-value must be an integer from 1 through 32.

reliability-class: Specifies the pre-release 8 value for configuring packet reliability.

reliability-class-value must be an integer from 1 through 32.

downlink

Configures parameters for downlink traffic.

encaps-header { copy-inner | dscp-marking *dscp-marking-value* }

encaps-header: Specifies that the DSCP marking must be set on the encapsulation header for IP-in-IP, GRE, or GTP encapsulation.

- **copy-inner**: Specifies that the DSCP marking is to be acquired from the UDP headers within the encapsulation.
- **dscp-marking** *dscp-marking-value*: Specifies that the DSCP marking is to be defined by this keyword.

  dscp-marking-value is expressed as a hexadecimal number from 0x00 through 0x3F.

gbr

Specifies that this QCI type is Guaranteed Bit Rate (GBR).

internal-qos priority *priority*

Sets the internal QoS. These get resolved in L2 values.

priority is an integer value from 0 through 7.

max-packet-delay *max-packet-delay-value* max-error-rate *max-error-rate*

max-packet-delay *num*: Specifies the maximum packet delay (in milliseconds) that can be applied to the data with the QCI.

max-packet-delay-value must be an integer from 10 through 1000.

max-error-rate *num*: Specifies the maximum error loss rate of non-congestion related packet loss.

max-error-rate must be an integer from 1 through 6, specifying 10-1 through 10-6.



Important Defaults for standards-based QCI values are defined in *3GPP Specification TS 23.203 "Policy and charging control architecture"*.

non-gbr

Specifies that this QCI type is non-Guaranteed Bit Rate (non-GBR).

pre-rel8-qos-mapping

Specifies the standard QCI to be mapped. Must be an integer from 1 to 9. Values 1 through 4 correspond to GBR QCIs and values 5 through 9 corresponds to non-GBR QCIs.

traffic-policing interval *interval*

Specifies the traffic policing interval associated with the this QCI.

interval must be an integer from 1 through 100.

uplink

Configures parameters for uplink traffic.

user-datagram dscp-marking *dscp-marking-value*

user-datagram dscp-marking: Specifies that the IP DSCP marking is to be defined by this keyword.

dscp-marking-value is expressed as a hexadecimal number from 0x00 through 0x3F.

Syntax Description

Syntax for StarOS releases 15 and earlier

```
qci num [ delay-class num precedence-class num reliability-class num [
downlink | uplink ] ]

qci num [ downlink [ 802.1p-value priority | encaps-header { copy-inner [
802.1p-value priority ] | dscp-marking hex [ 802.1p-value priority ] } |
user-datagram dscp-marking hex [ 802.1p-value priority ] | encaps-header {
copy-inner [ 802.1p-value priority ] | dscp-marking hex | copy-outer [
802.1p-value priority ] } ] ]

qci num [ gbr [ delay-class | downlink | max-packet-delay | traffic-policing
 | uplink ] ]

qci num [ max-packet-delay num max-error-rate num [ downlink | uplink ] ]

qci num [ non-gbr [ delay-class | downlink | max-packet-delay |
traffic-policing | uplink ] ]

qci num  [ traffic-policing interval interval [ delay-class | downlink |
max-packet-delay | uplink ] ]

qci num [ uplink [ 802.1p-value priority | encaps-header { copy-inner [
802.1p-value priority ] | dscp-marking hex | copy-outer[ 802.1p-value priority
 ] } | mpls-exp-value value [ downlink { 802.1p-value priority | encaps-header
 { copy-inner [ 802.1p-value priority ] | dscp-marking  hex| copy-outer }
| user-datagram dscp-marking hex [ 802.1p-value priority | encaps-header {
 copy-inner [ 802.1p-value priority ] | dscp-marking hex [ 802.1p-value
priority ] } ] ] ]| user-datagram dscp-marking hex [ 802.1p-value priority ]
 | encaps-header { copy-inner [ 802.1p-value priority ] | dscp-marking |
copy-outer hex [ 802.1p-value priority ] } ] ]

[ default | no ] qci num
```

Important The optional keywords associated with each of the initial optional keywords are abbreviated in the syntax examples above for clarity. Refer to the definitions below for the full keyword paths and associated descriptions for each keyword string in this command.

default

Resets the default values for the select standards-based QCI value.

no

Disables the selected standards-based QCI value.

num

Specifies the standards-based QCI value to be enabled.

num must be an integer from 1 through 256.

Important Only standards-based QCI values of 1 through 9 are supported.

QCI values 1 through 9 are defined in *3GPP Specification TS 23.203 "Policy and charging control architecture"*.

delay-class *num* precedence-class *num* reliability-class *num*

delay-class *num*: Specifies the pre-release 8 value for configuring packet delay.

num must be an integer from 1 through 32.

precedence-class *num*: Specifies the pre-release 8 value for configuring packet precedence.

num must be an integer from 1 through 32.

reliability-class *num*: Specifies the pre-release 8 value for configuring packet reliability.

num must be an integer from 1 through 32.

downlink [802.1p-value *priority* | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex* [802.1p-value *priority*] } | user-datagram dscp-marking *hex* [802.1p-value *priority*] | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex* | copy-outer[802.1p-value *priority*] }]]

Configures parameters for downlink traffic.

802.1p-value *priority*: Maps the qci value to the priority value set in the Ethernet frame header.

priority is an integer value from 0 through 7.

encaps-header: Specifies that the DSCP marking must be set on the encapsulation header for IP-in-IP, GRE, or GTP encapsulation.

user-datagram dscp-marking *hex*: Specifies that the IP DSCP marking is to be defined by this keyword.

hex is expressed as a hexadecimal number from 0x00 through 0x3F.

{ copy-inner | dscp-marking *hex* **| copy-outer }**

- **copy-inner**: Specifies that the DSCP marking is to be acquired from the UDP headers within the encapsulation.
- **dscp-marking** *hex*: Specifies that the DSCP marking is to be defined by this keyword.

  hex ia expressed as a hexadecimal number from 0x00 through 0x3F.
- **copy-outer** used to copy the DSCP value coming in the data packet from S1u interface to the data packet sent on the S5 interface and vice-versa.

gbr

Specifies that this QCI type is Guaranteed Bit Rate (GBR).

max-packet-delay *num* max-error-rate *num*

max-packet-delay *num*: Specifies the maximum packet delay (in milliseconds) that can be applied to the data with the QCI.

num must be an integer from 10 through 1000.

max-error-rate *num*: Specifies the maximum error loss rate of non-congestion related packet loss.

num must be an integer from 1 through 6, specifying 10-1 through 10-6.



Important Defaults for standards-based QCI values are defined in *3GPP Specification TS 23.203 "Policy and charging control architecture"*.

non-gbr

Specifies that this QCI type is non-Guaranteed Bit Rate (non-GBR).

traffic-policing interval *interval*

Specifies the traffic policing interval associated with the this QCI.

interval must be an integer from 1 through 100.

uplink [802.1p-value *priority* | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex* [802.1p-value *priority*] } | mpls-exp-value *value* [downlink { 802.1p-value *priority* | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex* } | user-datagram dscp-marking *hex* [802.1p-value *priority* | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex*| copy-outer [802.1p-value *priority*] }]]] | user-datagram dscp-marking *hex* [802.1p-value *priority*] | encaps-header { copy-inner [802.1p-value *priority*] | dscp-marking *hex* [802.1p-value *priority*] }]]

Configures parameters for uplink traffic.

802.1p-value *priority*: Maps the qci value to the priority value set in the Ethernet frame header.

priority is an integer value from 0 through 7.

encaps-header: Specifies that the DSCP marking must be set on the encapsulation header for IP-in-IP, GRE, or GTP encapsulation.

mpls-exp-value *value*: Sets EXP bits for MPLS for mobile to egress side traffic.

value is an integer value from 0 through 7.

user-datagram dscp-marking *hex*: Specifies that the IP DSCP marking is to be defined by this keyword.

hex is expressed as a hexadecimal number from 0x00 through 0x3F.

{ copy-inner | dscp-marking *hex*| **copy-outer }**

- **copy-inner**: Specifies that the DSCP marking is to be acquired from the UDP headers within the encapsulation.
- **dscp-marking** *hex*: Specifies that the DSCP marking is to be defined by this keyword.

  hex is expressed as a hexadecimal number from 0x00 through 0x3F.
- **copy-outer** used to copy the DSCP value coming in the data packet from S1u interface to the data packet sent on the S5 interface and vice-versa.

Usage Guidelines

Use this command to create and map QCI values to enforceable QoS parameters.



Important Non-standard QCI values are only supported with the license-enabled **operator-defined-qci** command.

Example

The following command creates a QCI value of *8* and defines the uplink encapsulation header as using the DSCP marking from the encapsulated UDP header:

```
qci 8 uplink encaps-header copy-inner
```