

Revised Marking for Subscriber Traffic

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Feature Summary and Revision History

Summary Data

Applicable Product(s) or Functional Area	P-GW
Applicable Platform(s)	• ASR 5500 • VPC-DI • VPC-SI
Feature Default	• Disabled - Configuration Required
Related Changes in This Release	Not applicable
Related Documentation	• *Command Line Interface Reference* • *P-GW Administration Guide*

Revision History

Revision Details	Release
P-GW supports configuration of 802.1p and MPLS Experimental (EXP) bits marking for user data traffic. This feature is fully qualified in this release.	21.20.2

Revision Details	Release
In this release P-GW supports configuration of 802.1p and MPLS Experimental (EXP) bits marking for user data traffic. **Important** This feature is not fully qualified in this release, and is available only for testing purposes. For more information, contact your Cisco Account Representative.	21.20

Feature Description

802.1p/MPLS EXP marking helps in providing QoS treatment by prioritizing traffic at L2 level.

Currently, data traffic for different access types, such as GGSN, eHRPD, P-GW, and S-GW, refer to the QCI-QoS table and configure the appropriate 802.1p or MPLS-EXP (L2 QoS) markings based on the internal-qos value associated with particular row. However, the usage of internal-qos from the QCI-QoS table is not configurable and uses the default values. In addition, L2 QoS (802.1p/MPLS EXP) marking is not supported in GGSN, SAEGW, and GTPv1/eHRPD calls on P-GW.

With this feature, you can:

- Configure internal priority in QCI-mapping table for the GGSN, GTPv1 P-GW, and SAEGW calls.
- Mark subscriber traffic with either 802.1p or MPLS-EXP to enable or disable L2 marking. A new CLI command has been introduced to support service specific configuration to mark subscriber traffic. This L2 marking can be decided based on QCI and DSCP marking together or solely based on DSCP marking.

Limitations

- This feature does not control the behavior of the control packets. The control packets (GTP-C) continue to get L2 marked based on DSCP derived L2 marking.
- This feature is not supported on standalone GGSN. It is supported on GnGp-GGSN node.

How It Works

You can configure internal priority in QCI-mapping table for the GGSN, GTPv1 P-GW, and SAEGW calls. You can also mark subscriber traffic with either 802.1p or MPLS-EXP to enable or disable L2 marking. To do this, use the CLI command to configure service specific configuration to mark subscriber traffic. This L2 marking can be decided based on QCI and DSCP marking together or solely based on DSCP marking.

Behavior Changes for Different Services

This section describes behavior of this feature for different services. Please see the *Command Changes* section for more information on the CLI command options and its behavior:

GGSN/P-GW GTPv1 Calls:

Previous Behavior: Earlier, the traffic was not marked for data path. This was default behavior for GGSN.

New Behavior: A new CLI command has been introduced to mark the traffic based on:

- QCI-Derived
- DSCP-Derived
- None

If the no or default option of the CLI command is used, then the traffic is not marked. When the feature is not enabled, traffic is not marked.

P-GW GTPv2, S-GW, SAEGW Calls:

Previous Behavior: The QCI-QoS mapping feature used internal-QoS for L2 marking, which in turn uses QCI-Derived marking for data traffic. This was the default behavior for P-GW, S-GW, and SAEGW calls.

New Behavior: With this feature, the traffic is marked based on:

- QCI-Derived
- DSCP-Derived
- None

If the no or default option of the CLI command is used, then the traffic is not marked and the default behavior is executed. When the feature is not enabled, traffic is not marked.

Configuring Revised Marking for Subscriber Traffic

By default, the traffic data path is supported with GGSN.. The internal priority can be configured in QCI-mapping table for the GGSN, GTPv1 P-GW, and SAEGW calls. Subscriber traffic can also be marked with either 802.1p or MPLS-EXP to enable or disable L2 marking. To do this, use the CLI command to configure service specific configuration to mark subscriber traffic. This L2 marking can be decided based on QCI and DSCP marking together or solely based on DSCP marking.

Configuring Internal Priority

To configure internal priority in the QCI-mapping table for the GGSN, GTPv1 P-GW, and SAEGW calls, use the following service specific configuration. This command in the GGSN service configuration overrides the behavior of QCI-QOS-mapping for data packets only.

```
configure
     context context_name
        ggsn-service service_name
           internal-qos data { dscp-derived | none | qci-derived }
           { no | default } internal-qos data { dscp-derived | none |
qci-derived }
           end
```

Notes:

- **no:** Disables the specified functionality.
- **default:** Disables the functionality.

- **dscp-derived:** Data packets are marked at Layer 2 based on DSCP configured in qci-qos mapping table, then if DSCP is not configured in the qci-qos mapping table then data packets are not marked.
- **none:** Data packets are not marked with Layer 2 (MPLS EXP/802.1P) marking.
- **qci-derived:** Data packets are marked at Layer 2 based on internal-qos-priority configured in qci-qos mapping table. If internal-qos priority is not configured in the qci-qos mapping table, then the data packets are not marked.

Verifying the Configuration

The configuration of this feature can be verified using the following commands from the `exec` mode:

- **show configuration**
- **show** *service-type* **{ all | name** *service_name* **}**

Please see the *Monitoring and Troubleshooting Revised Marking for Subscriber Traffic* section for the command output.

Configuring 802.1p and MPLS EXP Marking for User Data Traffic

This section describes how to configure the 802.1p and MPLS Experimental (EXP) bits marking for user data traffic. Configuring the feature consists of the following tasks:

1. Configure ip-dscp-iphb-mapping.
2. Configure L2-mapping
3. Configure qci-qos-mapping.
4. Associate the l2-mapping in Egress context.
5. Associate the l2-mapping in Igress context.
6. Associate internal-qos data in P-GW and S-GW service

Configure ip-dscp-iphb-mapping

Use the following example to access *QOS Profile Configuration Mode* and configure ip-dscp-iphb-mapping.

```
configure
  qos ip-dscp-iphb-mapping dscp Value  internal-priority cos  value
  end
```

Notes:

- *qos ip-dscp-iphb-mapping dscp* : Creates a QOS profile.
- **dscp** : Specify dscp mapping with Hexadecimal value between 0x0 and 0x3F.
- **internal-priority cos** : Define the Class of Service (cos) value between 0x0 and 0x7.

Configure L2-mapping

Use the following example to access *QOS L2 Mapping Configuration Mode* and configure L2 mapping.

```
configure
  qos l2-mapping-table name  { name map_table_name | system-default }
    internal-priority cos class_of_service_value color color_value [ 802.1p-value
 802.1p_value ] [ mpls-tc mpls_tc_value ]
      end
```

Notes:

- **qos l2-mapping-table name** : Maps qos from internal qos to l2 values.
- **internal-priority cos** : Maps internal QoS priority with Class of Service (COS) values.
  - *class_of_service_value*: Specify a Hexadecimal number between 0x0 and 0x7.
  - **802.1p-value** : Maps to a 802.1p value and *.802.1p_value* must be a Hexadecimal number between 0x0 and 0xF.
  - **mpls-tc** *mpls_tc_value*: Maps to an MPLS traffic class. *mpls_tc_value* must be a Hexadecimal number between 0x0 and 0x7.

Configure qci-qos

Use the following commands to configure qci-qos mapping.

```
Configure
  qci-qos-mapping  name
    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  ] ]
     end
```

Notes:

- **qci-qos-mapping** : Maps internal QoS priority with Class of Service (CoS) value.
- **quci num**: Specifies the non-standard, operator-defined QCI value to be enabled.
- **arp-priority-level** : Specifies the address retention priority (ARP) priority level.
- **downlink**: Configures parameters for downlink traffic.
- **encaps-header { copy-inner | 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.
  - **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.

- **uplink**: Configures parameters for uplink traffic.
- **internal-qos priority** *priority* : Sets the internal QoS. These get resolved in L2 values.
- **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.

Associate L2-mapping table

Use the following commands to associate L2 mapping table in egress context and ingress context.

```
configure
   context egress context_name | ingress context_name
   associate l2-mapping-table { name table_name
   exit
   context ingress context_name
   associate l2-mapping-table { name table_name
   end
```

- **associate l2-mapping-table**: Maps qos from internal qos to l2 values.
- **{ name** *table_name* : Specifies the name of table to map qos from internal qos to l2 values. *table_name* must be a alphanumeric string of size 1 to 80.

Associate internal-qos-data in a P-GW and S-GW Service

Use the following commands to associate internal-qos-data in a P-GW and S-GW service.

```
configure
     context context_name
        pgw-service service_name
           internal-qos data { qci-derived | dscp-derived | none }
           { no | default } internal-qos data { dscp-derived | none |
qci-derived }
           exit
        sgw-service service_name
           internal-qos data { qci-derived | dscp-derived | none }
           { no | default } internal-qos data { dscp-derived | none |
qci-derived }
           end
```

Notes:

- **no:** : Disables the specified functionality.
- **default** : Disables the functionality.
- **dscp-derived:** Data packets are marked at Layer 2 based on DSCP configured in qci-qos mapping table, then if DSCP is not configured in the qci-qos mapping table then data packets are not marked.
- **none:** Data packets are not marked with Layer 2 (MPLS EXP/802.1P) marking.

- **qci-derived:** Data packets are marked at Layer 2 based on internal-qos-priority configured in qci-qos mapping table. If internal-qos priority is not configured in the qci-qos mapping table, then the data packets are not marked.

Monitoring and Troubleshooting Revised Marking for Subscriber Traffic

The following section describes commands available to monitor Revised Marking for Subscriber Traffic.

Internal Priority Show Commands

The following section describes commands available to monitor Internal Priority.

show configuration

This command displays the following output:

- When **internal-qos data** is configured as **none**:

```
internal-qos data none
```

- When **internal-qos data** is configured as **qci-derived**:

```
internal-qos data qci-derived
```

- When **internal-qos data** is configured as **dscp-derived**:

```
internal-qos data dscp-ds-derived
```

- When **internal-qos data** is **not configured**:

```
no internal-qos data
```

show *service-type* { all | name *service_name* }

This command displays the following output:

- When **internal-qos data** is configured as **none**:

```
Internal QOS Application:    Enabled
Internal QoS Policy:         None
```

- When **internal-qos data** is configured as **qci-derived**:

```
Internal QOS Application:   Enabled
Internal QOS Policy:        QCI Derived
```

- When **internal-qos data** is configured as **dscp-derived**:

```
 Internal QOS Application:    Enabled
 Internal QOS Policy:         DSCP Derived
```

- When **internal-qos data** is **not configured**:

```
        Internal QOS Application:     Backward-compatible
```