

# L2 Marking Support


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## Revision History

**Note** Revision history details are not provided for features introduced before release 21.24.

| Revision Details | Release |
|---|---|
| First introduced | Pre 21.24 |

## Feature Description

The L2 Marking Support for CUPS enables marking of QoS Class Identifier (QCI) and Differentiated Services Code Point (DSCP) derived L2 marking for CUPS. The QoS marking support is similar to the QoS marking support that is supported on the non-CUPS platform, which ensures that the QoS treatment is maintained when the packets traverse via the L2 routers.

## How it Works

This section briefly describes how L2 marking works.

### Basic Functionality

- The type of the L2 marking is decided at the Control Plane (CP) as per the Service-Configuration. The types of L2 marking supported are DSCP-based, QCI-based, and None.

- When the User Plane (UP) comes up with a QCI value, the lookup is performed on the associated QCI-table for the service. Based on the lookup, the priority is selected or decided for the corresponding QCI value.
- The selected Layer 2 marking type and priority is communicated to the UP in an Sx message.
- To support the passing of new information to the UP, a new custom IE is added to the FAR IE.
  - LAYER2 MARKING:
    - TYPE PRIORITY: <type> <priority-value>

      The new custom IE is defined with the type-number : 228

- When the L2 marking changes – type or priority, the same is communicated to the UP, when the bearer update occurs.

## Sx Interfaces Changes

### Layer 2 Marking IE in FAR

To pass the L2 Marking information to the UP for the bearer, a new custom-IE is defined and the FAR is modified to include it as follows:

***Table 1: Layer 2 Marking Information Element***

| Information Elements | Condition / Comment | Application | | | | IE ID |
|---|---|---|---|---|---|---|
| | | Sxa | Sxb | Sxc | N4 | |
| Layer2 Marking | This IE shall indicate the type of the Layer2 Marking if present. | X | X | | | |

The Layer 2 Marking IE is encoded as follows:

***Table 2: Layer 2 Marking IE Within PFCP FAR***

| Octet 1 and 2 | | Layer2 Marking IE Type = 228 (decimal) | | | |
|---|---|---|---|---|---|
| Octets 3 and 4 | | Length = n | | | |
| Information elements | Condition / Comment | Application | | | |
| | | Sxa | Sxb | Sxc | N4 |

| **Octet 1 and 2** | | **Layer2 Marking IE Type = 228 (decimal)** | | | |
|---|---|---|---|---|---|
| **Octets 3 and 4** | | **Length = n** | | | |
| Layer 2 Marking | This IE identifies the Layer 2 Marking to be applied for the packets matching this FAR.<br>The length of the IE could be either 0 or 1. The 1 byte contains the following information.<br>• TYPE PRIORITY: <type> <priority-value><br>• Type : (1-DSCP, 2-QCI, 3-None) - beginning 2 Bits<br>Priority-Value: the last 6 bits<br>• Internal-Priority in case of QCI/None type<br>• DCSP value in case of DSCP type | X | X | Sxc | N4 |

## Limitations

The following is the limitation for this feature in this release.

The change in the QCI table is not applied immediately to the subscriber. The change is applied only after the bearer update.

# Configuring L2 Marking Support

The following section provides information about the CLI commands available to enable or disable the feature.

## 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.

# Associating QCI-QoS Mapping Table

Use the following commands to associate a QCI-QoS mapping table at the CP.

```
configure
  context context_name
    associate qci-qos-mapping { map_table_name map_table_name }
    exit
```

**NOTES**:

- **map_table_name** *map_table_name*: Specifies the name of an internal table from which to map the QoS to L2 values.

  *map_table_name* must be a string of 0 through 80 characters.

- This command is disabled by default.

# Configuring QCI Derived L2 Marking

Use the following commands to:

- Create or modify a Layer 2 mapping table.
- Enter the QoS L2 Mapping Configuration Mode to map internal QoS priority to Layer 2 QoS values on the User Plane (UP).

```
configure
  qos l2-mapping-table { name map_table_name| system-default }
  exit
```

**NOTES**:

- **name** *map_table_name*: Specifies the name of QoS mapping table from which to map QoS to L2 values. It enables internal mapping to L2 values like 802.1p, mpls, and so on.

  *map_table_name* must be an alphanumeric string of 0 through 80 characters.

- **system-default** : Configures the system default mapping. The system default is always associated as the default for every VRF or Context.
- This command is enabled by default.

# Associating L2 Mapping Table

Use the following commands to associate the configured L2 mapping table to a given VRF or Context.

```
configure
   context context_name
      associate l2-mapping-table name table_name
      exit
```

**NOTES**:

- **l2-mapping-table name** *table_name*: Specifies the name of an internal table from which to map QoS to L2 values.

  *map_table_name* must be an alphanumeric string of 0 through 80 characters.

- This command is enabled by default.

# Configuring DSCP Derived L2 Marking

Use the following commands to modify the Differentiated Services Code Point (DSCP) to Class of Service (CoS) mapping on the User Plane (UP).

```
configure
   qos ip-dscp-iphb-mapping dscp dscp_value internal-priority cos
class_of_service_value
   exit
```

**NOTES**:

- **ip-dscp-iphb-mapping**: Manages mapping of the DSCP information in a packet to the internal QoS marking.

  “ip-dscp-iphb-mapping” is a global table per UP.

- **dscp** *dscp_value*: Maps the IP DSCP values to the internal QoS.

  *dscp_value* must be a hexadecimal number between 0x0 and 0x3F.

- **internal-priority cos** *class_of_service_value*: Maps to the internal QoS priority or CoS.

  *class_of_service_value* must be a Hexadecimal number between 0x0 and 0x7.

- This command is enabled by default.