



DSCP Markings For Collapse Calls

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Feature Summary and 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

Currently QCI-based DSCP markings are applicable for Pure-S and Pure-P calls. The DSCP markings are based on QCI-QOS-Mapping associated with respective S-GW service or P-GW service. For collapse calls QCI-QOS-Mapping associated with PGW-service is applicable. This feature helps to apply the DSCP markings for collapse calls based on associated S-GW and P-GW services for uplink and downlink traffic. For uplink traffic DSCP markings associated with logical P-GW service is applicable. For downlink traffic DSCP markings associated with logical S-GW service is applicable. The DSCP markings are present in IP header of data traffic as a part of GTPU header and Inner IP. There's option to enabled or disable this functionality by CLI configuration. When you enable the feature, then only the new functionality is applicable otherwise existing functionality also works. By default, this feature is disabled so that there's no impact on customers who upgrades to this feature.

How It Works

Following are the steps that describes the DSCP markings for the collapse calls.

- In case of Collapse call:
 - for ACCESS side QCI-QOS mapping table associated with SGW-service is used.
 - For CORE side QCI-QOS mapping table associated with PGW-service is used.
- This is applicable once you enable the feature, otherwise QCI-QOS mapping table associated with PGW-service is used for both sides.
- APN associated QCI-QOS mapping table is preferred over the P-GW service QCI-QOS mapping table.
- APN-Profile associated QCI-QOS mapping table is preferred over SGW-Service QCI-QOS mapping table for ACCESS side DSCP markings.
- In case only P-GW service has QCI-QOS mapping table configuration then these DSCP markings is applicable on both ACCESS & CORE side for collapse call.
- In case only S-GW service has QCI-QOS mapping table configuration then these DSCP markings is applicable on ACCESS side for collapse call.
- There is a new configurable parameter inside the SAE-GW service which indicates whether the feature is enabled or disable.
- For Pure-P to Collapse HO and vice-versa, transport layer markings are updated in FAR as a part of Sx Modify request.
- Layer2 markings are also modified based on QCI-QOS mapping table picked for ACCESS & CORE side.
- DSCP markings continues to apply on existing bearers post session recovery.
- DSCP markings continues for the bearers on standby chassis once it switches to active mode.

Configuration

Configure the following command inside the SAE-GW service to enable/disable this feature.

```

configure
    context egress
        saegw_service saegw_service
        downlink-dscp-per-call-type enabled/disabled
    end
  
```



Note When you enable the feature, use the S-GW service QCI-QOS mapping DSCP markings for downlink, if call type collapses. By default, the downlink-DSCP-per-call-type is Disabled.

Monitoring and Troubleshooting

This section provides information on CLI commands that are available for monitoring and troubleshooting for DSCP markings for collapse calls.

Show Commands Outputs

This section provides information about show CLI commands that are available in support of DSCP markings for collapse calls.

show saegw-service all

This show command is to check if the feature is enabled or Disabled.

```
Service name : SAEGW11
Service-Id : 47
Context : EPC1
Status : STARTED
sgw-service : SGW11
pgw-service : PGW11
sx-service : SX11C
User Plane Tunnel GTPU Service : SAEGW11SXU
Newcall policy : n/a
downlink-dscp-per-call-type : enabled
CUPS Enabled : Yes
Service name : SAEGW21
Service-Id : 25
Context : EPC2
Status : STARTED
sgw-service : SGW21
pgw-service : PGW21
sx-service : SX21C
User Plane Tunnel GTPU Service : SAEGW21SXU
Newcall policy : n/a
downlink-dscp-per-call-type : disabled
CUPS Enabled : Yes
```

show sub user-plane-only callid <call_id> far full all

Use this User Plane CLIs to validate the Transport level marking options and inner packet markings for UPLINK/DOWNLINK FAR.

SMGR CP Changes

DSCP markings for Uplink/CORE and Downlink/ACCESS are present at bearer level inside `sessmgr_sub_session_t` → `sessmgr_qci_tab_t`.

User datagram DSCP markings are updated in IP header of inner packet, that is packet sent from UE to Internet and vice/versa.

Encaps header DSCP markings are updated in IP header of outer IP layer having GTPU-header (Outer header).

DSCP markings are sent from CP to UP inside FAR IE as follows:

- Transport Level Marking - The DSCP markings is configured in encaps header for ACCESS side and User-datagram on CORE side for collapse call.
- Transport Level Marking Options - Includes two options and are applicable only for outer header:
 - Copy-inner: Copy the inner packets markings to outer header
 - Copy-outer: Relay the DSCP markings for outer header

Inner Packet Marking - DSCP markings is configured in user datagram for ACCESS side. For CORE side it is N/A for collapse call.

Logic to fetch the DSCP marking changed for collapse call:

- Fetch the DSCP markings based on qci & qrp_pl for session from the associated SGW-Service for ACCESS/downlink side.
- Fetch the DSCP markings based on qci & qrp_pl for session from the associated PGW-Service for CORE/uplink side.
- For ACCESS/downlink side qci-qos mapping table associated with APN-profile takes preference over SGW-Service qci-qos-mapping table.
- For CORE/uplink side qci-qos mapping table associated with APN config takes preference over PGW-Service qci-qos-mapping table.
- In case SGW-service qci-qos mapping table is not configured, then PGW-service qci-qos-mapping table is applied on both ACCESS/CORE side.
- In case PGW-service qci-qos mapping table is not configured, then SGW-service qci-qos mapping table is applied on ACCESS side and no DSCP markings applied on CORE side.
- DSCP markings are updated on UP in create/update FAR sent as a part of SX Establishment/Modification request from CP to UP.
- Update the TLM, IPM & TLMO in case of HO from Pure-P to Collapse and vice-versa in Sx Modification request as a part of Update FAR IE.
- Update the layer2 markings in case of HO from Pure-P to Collapse and vice-versa in Sx Modification request as a part of Update FAR IE.

Following table depicts the various possible config combinations and outcome for DSCP markings to be applied on ACCESS and CORE side for COLLAPSE call:

S. No.	Feature Enable/Disable	PGW Service QOS-QCI table configured(Q1)	SGW Service QOS-QCI table configured(Q2)	APN QOS-QCI table configured(Q3)	APN-Profile QOS-QCI table configured(Q4)	ACCESS/Downlink DSCP Markings for Collapse Call	CORE/Uplink DSCP Markings for Collapse Call
1	ENABLE	YES	YES	YES	YES	Q4 (APN-Profile)	Q3(APN)
2	ENABLE	YES	YES	YES	NO	Q2 (SGW-Service)	Q3(APN)
3	ENABLE	YES	YES	NO	YES	Q4 (APN-Profile)	Q1(PGW-service)
4	ENABLE	YES	YES	NO	NO	Q2 (SGW-Service)	Q1(PGW-service)

S. No.	Feature Enable/Disable	PGW Service QOS-QCI table configured(Q1)	SGW Service QOS-QCI table configured(Q2)	APN QOS-QCI table configured(Q3)	APN-Profile QOS-QCI table configured(Q4)	ACCESS/Downlink DSCP Markings for Collapse Call	CORE/Uplink DSCP Markings for Collapse Call
5	ENABLE	YES	NO	YES	YES	Q4 (APN-Profile)	Q3(APN)
6	ENABLE	YES	NO	YES	NO	Q3(APN)	Q3(APN)
7	ENABLE	YES	NO	NO	YES	Q4 (APN-Profile)	Q1(PGW-service)
8	ENABLE	YES	NO	NO	NO	Q1(PGW-service)	Q1(PGW-service)
9	ENABLE	NO	YES	YES	YES	Q4 (APN-Profile)	Q3(APN)
10	ENABLE	NO	YES	YES	NO	Q2 (SGW-Service)	Q3(APN)
11	ENABLE	NO	YES	NO	YES	Q4 (APN-Profile)	N/A (NO DSCP)
12	ENABLE	NO	YES	NO	NO	Q2 (SGW-Service)	N/A (NO DSCP)
13	ENABLE	NO	NO	YES	YES	Q4 (APN-Profile)	Q3(APN)
14	ENABLE	NO	NO	YES	NO	Q3(APN)	Q3(APN)
15	ENABLE	NO	NO	NO	YES	Q4 (APN-Profile)	N/A (NO DSCP)
16	ENABLE	NO	NO	NO	NO	N/A (NO DSCP)	N/A (NO DSCP)
17	DISABLE	YES	YES	YES	YES	Q3(APN)	Q3(APN)
18	DISABLE	YES	YES	YES	NO	Q3(APN)	Q3(APN)
19	DISABLE	YES	YES	NO	YES	Q1(PGW-service)	Q1(PGW-service)
20	DISABLE	YES	YES	NO	NO	Q1(PGW-service)	Q1(PGW-service)
21	DISABLE	YES	NO	YES	YES	Q3(APN)	Q3(APN)
22	DISABLE	YES	NO	YES	NO	Q3(APN)	Q3(APN)
23	DISABLE	YES	NO	NO	YES	Q1(PGW-service)	Q1(PGW-service)
24	DISABLE	YES	NO	NO	NO	Q1(PGW-service)	Q1(PGW-service)
25	DISABLE	NO	YES	YES	YES	Q3(APN)	Q3(APN)
26	DISABLE	NO	YES	YES	NO	Q3(APN)	Q3(APN)
27	DISABLE	NO	YES	NO	YES	N/A (NO DSCP)	N/A (NO DSCP)
28	DISABLE	NO	YES	NO	NO	N/A (NO DSCP)	N/A (NO DSCP)
29	DISABLE	NO	NO	YES	YES	Q3(APN)	Q3(APN)
30	DISABLE	NO	NO	YES	NO	Q3(APN)	Q3(APN)
31	DISABLE	NO	NO	NO	YES	N/A (NO DSCP)	N/A (NO DSCP)
32	DISABLE	NO	NO	NO	NO	N/A (NO DSCP)	N/A (NO DSCP)

Statistics

Use the following User Plane CLI to show the number of TOS marked packets for U/L and D/L.

show sub user-plane-only full all