Type of Service/Traffic Class Configuration for Predefined Rules

Feature Summary and Revision History

Summary Data

Applicable Product(s) and Functional Area	• GGSN • P-GW • SAEGW
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* • *GGSN Administration Guide* • *P-GW Administration Guide* • *SAEGW Administration Guide*

Revision History

Revision Details	Release
First Introduced	21.3

Feature Description

A traffic flow template (TFT) is an information element that specifies parameters and operations for a Packet Data Protocol (PDP) context. This information element may be used to transfer extra parameters to the network (for example, the Authorization Token; see 3GPP TS 24.229 [95]). The TFT may contain packet filters for the downlink direction, uplink direction, or for both directions.

The packet filters determine the traffic mapping to PDP contexts. Ideally, the network uses the downlink packet filters while the mobile stations use the uplink packet filters. This behavior is also seen for a packet filter that applies to both the directions.

The TFT is a type 4 information element with a minimum length of 3 octets. The maximum length for the IE is 257 octets.

Currently, there is a requirement for an Operator to identify and filter data traffic based on the “Type of Service (TOS)/Traffic class” information. This information needs to be configured as part of the Predefined or Dynamic rules (or both). Also, the Operator wants to send “Type of Service (TOS)/Traffic Class" information as part of TFT in the Create Bearer Request (CBR) and Update Bearer Request (UBR) messages, which can be triggered via the Local Policy or PCRF.

For Dynamic rules, the P-GW already supports "Type of Service (TOS)/Traffic class" information that is used to identify specific data traffic. However, for Predefined rules, there is no option available to configure "Type of Service(TOS)/Traffic class" information as part of packet filter configuration.

This feature introduces the **ip tos-traffic-class** CLI to configure Type of Service (TOS)/Traffic class information in the packet filter configured under charging action to address the Operator requirements.

How It Works

The new CLI configures the packet filter associated with the Predefined rules, with the "Type of Service (TOS)/Traffic Class" configuration. These Predefined rules can be triggered via Local Policy or as part of PCRF communication.

The CLI syntax to configure "Type of Service (TOS)/Traffic Class" information under Predefined rules is in-line with "Type of Service (TOS)/Traffic Class" AVP information that is received as part of the Dynamic rules from PCRF.

According to 3GPPP 24.008 - Section 10.5.6.12, “For "Type of service/Traffic class type", the packet filter component value field shall be encoded as a sequence of a one octet Type-of-Service/Traffic Class field and a one octet Type-of-Service/Traffic Class mask field. The Type-of-Service/Traffic Class field shall be transmitted first.”

For example:

```
toS/traffic class: 0x20 0xff
```

Also, now the P-GW includes both the "Type of Service (TOS)/Traffic class" information under TFT IE, as part of the Create Bearer Request (CBR) and Update Bearer Request (UBR) messages (which is in line with 3GPP 29.212 Section 5.3.14).

Important

- The CLI is added in “packet-filter” configuration mode to configure TOS/Traffic class information.
- While triggering the Create or Update Bearer Request towards a peer, P-GW populates the "Type of Service (TOS)/Traffic class" information under TFT IE if the Predefined rule associated with that bearer is configured with "Type of Service (TOS)/Traffic class" information.
- There is no impact of Session Manager Recovery or ICSR on existing bearer packet filter information.

Limitations

Following are the limitations of this feature:

- Operator should configure TOS along with mask and there are no default values for TOS value and mask.
- For any change of "Type of Service (TOS)/Traffic class" configuration under packet filter, the behavior is in line with the other packet filter parameter configuration change.
- Current PGW/GGSN/SAEGW behavior is that if the Predefined rules installed on the different bearers have ToS/Traffic class configured for uplink traffic on one bearer and downlink traffic on another bearer, then uplink and downlink packets for the same flow go through different bearers accordingly. However, if these Predefined rules with configured ToS/Traffic class are removed on the fly, still uplink and downlink packets for the same flow will go through different bearers.
- Consider the scenario where there are two dedicated bearers installed with Predefined rules such that the uplink traffic with a particular ToS/Traffic class say t1, matches first dedicated bearer and the downlink traffic with another ToS/Traffic class say t2, matches downlink traffic. If the IP ToS/Traffic class CLI is disabled in the corresponding Predefined rules followed by SESSMGR restart, the downlink packets with ToS/Traffic class "t2" will go through the first dedicated bearer instead of second if there is an uplink packet with the same flow (source IP, source port, destination IP, destination port) received before this downlink packet.

Configuring the TOS/Traffic Class for Predefined Rules

The following section provides the configuration command to enable or disable the feature.

Enabling or Disabling the ip tos-traffic-class Command

The modified command, **ip tos-traffic-class**, is used to configure ToS/Traffic class under charging action in the Packet filter mode.

This CLI is disabled by default.

To enable or disable the feature, enter the following commands:

```
configure
   active-charging service service_name
      packet-filter packet_filter
         [ no ] ip tos-traffic-class { type_of_service | traffic class } mask
{ mask_value }
         end
```

Notes:

- **no** : If previously configured, deletes the ToS/Traffic class under charging action.
- **tos-traffic-class** = { *type_of_service* | *traffic class* }: Specifies the Type of Service (TOS)/Traffic Class" value that is used to filter the traffic. Enter an integer, ranging from 0 to 255.
- **mask** { *mask_value* }: Validates the dynamic rules for automatic recovery after a switchover. Enter an integer, ranging from 0 to 255.

Monitoring and Troubleshooting

This section provides information regarding show commands and/or their outputs in support of this feature.

Show Commands

This section lists all the show commands available to monitor this feature.

show configuration

This command has been modified to display the following output:

```
show configuration
configure
   active-charging service acs
    packet-filter PF226
      ip protocol = 6
      ip remote-port = 226
      ip  tos-traffic-class = 32 mask = 255
      exit
```

show active-charging packet-filter

This command has been modified to display the following output:

When ToS/Traffic class is enabled/configured:

```
show active-charging packet-filter { all | name }
Service Name: acs

   Packet Filter Name: abcd
      IP Proto: 6
     Local Port: Not configured
     Remote Port: 226
     Remote IP Address: Not configured
     Direction: Bi-Directional
     Priority: None
```

```
    Tos-traffic-class: 32
    Tos-traffic-class-mask: 255
```

When ToS/Traffic class is disabled/not configured:

```
show active-charging packet-filter { all | name }

Service Name: acs

   Packet Filter Name: abcd
      IP Proto: 6
     Local Port: Not configured
     Remote Port: 226
     Remote IP Address: Not configured
     Direction: Bi-Directional
     Priority: None
    Tos-traffic-class: Not configured
    Tos-traffic-class-mask: Not configured
```

show configuration verbose

This command has been modified to display the following output:

When ToS/Traffic class is enabled/configured:

```
show configuration verbose
configure
   active-charging service acs
    packet-filter PF226
      ip protocol = 6
      ip remote-port = 226
      ip  tos-traffic-class = 32 mask = 255
      ---
      exit
```

When ToS/Traffic class is disabled/not configured:

```
show configuration verbose
configure
   active-charging service acs
    packet-filter PF226
      ip protocol = 6
      ip remote-port = 226
      no ip   tos-traffic-class
      ---
     exit
```

show configuration verbose