APN AMBR Traffic Policing

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2021.01.0

Feature Description

The APN-AMBR is a subscription parameter that is stored per APN in the HSS. S-GW provides APN-AMBR during default bearer establishment procedure. APN-AMBR limits the aggregate bit rate that can be expected to be provided across all non-GBR bearers and across all PDN connections of the same APN. Each of those non-GBR bearers can potentially utilize the entire APN-AMBR, for example, when the other non-GBR bearers do not carry any traffic. The P-GW enforces the APN-AMBR in downlink and uplink direction.

Limitations

The **token-replenishment-interval** and **violate-action shape** CLI commands are not supported.

Configuring the APN AMBR Traffic Policing Feature

This section describes how to configure the APN-AMBR Traffic Policing feature.

```
configure
         context context_name
           apn apn_name
       apn-ambr rate-limit direction { downlink | uplink } [ burst-size
{ auto-readjust duration { milliseconds msecs | seconds } | violate-action
 { drop | lower-ip-precedence | transmit }
                end
```

NOTES:

- **rate-limit direction { downlink | uplink }**: Specifies that the rate limit is to be applied to either the downlink (network to subscriber) traffic or the uplink (subscriber to network) traffic.
- **burst-size { auto-readjust duration milliseconds msecs | seconds }**: This parameter is used by policing algorithms to permit short bursts of traffic not to exceed the allowed data rates. It's the maximum size of the token bucket.
  - **auto-readjust duration***seconds*: The duration (in seconds) used in this burst size calculation: burst size = peak data rate/8 * auto-readjust duration.
    - Seconds must be an integer value from 1-30. Default is 1 second.
  - **milliseconds**: *msecs* must be an integer value from 100-900, in increments of 100 milliseconds. For example, 100, 200, or 300, and so on.
- **violate-action { drop | lower-ip-precedence | transmit }**: The action that the P-GW takes when the data rate of the bearer context exceeds the AMBR.
  - **drop**: Drops violating packets.
  - **lower-ip-precedence**: Sets the DSCP value to zero ("best effort") for violating packets.
  - **transmit**: Transmits violating packets. This is the default behavior of the feature.
- Prior to this feature, the default behavior was to drop the violating packets.

Monitoring and Troubleshooting

This section provides information about the commands available to monitor and/or troubleshoot the APN-AMBR Traffic Policing feature.

Show Commands and/or Outputs

This section provides information about the show commands available for monitoring and/or troubleshooting the APN-AMBR Traffic Policing feature.

- **show user-plane-service pdn-instance name <apn_name>**

  Use this show command in UPF to see if the rate limit is enabled/disabled, burst size, and other such parameters for downlink/uplink traffic:

  - APN-AMBR
    - Downlink Apn Ambr: Indicates if the rate limit is enabled or disabled for downlink traffic.
      - Burst Size: Indicates the burst size of the downlink traffic.
      - Auto Readjust: Indicates if the auto-readjust is enabled or disabled for downlink burst size.
      - Auto Readjust Duration: Indicates the duration used in downlink burst size calculation.
      - Burst Size(bytes): Indicates the burst size in bytes.
      - Violate Action: Indicates the action that the P-GW takes when the data rate of the bearer context exceeds the AMBR for downlink traffic.
    - Uplink Apn Ambr: Indicates if the rate limit is enabled or disabled for uplink traffic.
      - Burst Size: Indicates the burst size of the uplink traffic.
      - Auto Readjust: Indicates if the auto-readjust is enabled or disabled for uplink burst size.
      - Auto Readjust Duration: Indicates the duration used in uplink burst size calculation.
      - Burst Size(bytes): Indicates the burst size in bytes.
      - Violate Action: Indicates the action that the P-GW takes when the data rate of the bearer context exceeds the AMBR for uplink traffic.
    - Token Replenishment Interval: Indicates the token replenishment interval duration.

- **show sub user-plane-only full all**

  Use this show command in UPF to see the count of packets that are dropped, and IP precedence lowered due to APN-AMBR policer. The following fields are introduced in support of this feature:

  - APN AMBR Uplink Pkts Drop: Indicates the number of APN-AMBR packets that are dropped for uplink traffic.

- APN AMBR Uplink Bytes Drop: Indicates the number of APN-AMBR bytes that are dropped for uplink traffic.
- APN AMBR Uplink Pkts IP pref lowered: Indicates the number of APN-AMBR uplink packets for which IP precedence is lowered.
- APN AMBR Uplink Bytes IP pref lowered: Indicates the number of APN-AMBR uplink bytes for which IP precedence is lowered.
- APN AMBR Downlink Pkts Drop: Indicates the number of APN-AMBR packets that are dropped for downlink traffic.
- APN AMBR Downlink Bytes Drop: Indicates the number of APN-AMBR bytes that are dropped for downlink traffic.
- APN AMBR Downlink Pkts IP pref lowered: Indicates the number of APN-AMBR downlink packets for which IP precedence is lowered.
- APN AMBR Downlink Bytes IP pref lowered: Indicates the number of APN-AMBR downlink bytes for which IP precedence is lowered.