

Gx Support for eMPS

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Feature Summary and Revision History

Summary Data

Applicable Product(s) or Functional Area	• P-GW • SAEGW
Applicable Platform(s)	ASR 5500
Feature Default	• For GTP and Gx Prioritization for eMPS sessions: Disabled - Configuration Required • For Parsing of DRMP AVP: Enabled - Always-on
Related Changes in This Release	Not Applicable
Related Documentation	• *Command Line Interface Reference* • *P-GW Administration Guide* • *SAEGW Administration Guide*

Revision History

Revision Details	Release
First introduced.	21.3

Feature Description

The National Security/Emergency Preparedness (NS/EP) Next Generation Network (NGN) Priority Services (NGN-PS) (formerly called NGN Government Emergency Telecommunications Service (GETS)) is a set of voice, video and data services that are based on services available from public packet-switched Service Providers, and that provide priority treatment in support of National Security and Emergency Preparedness (NS/EP) communications. A Service Provider is a public telecommunications service provider authorized by the NCS to provide GETS (including Legacy GETS), Wireless Priority Service (WPS), and/or NS/EP NGN Priority Services (NS/EP NGN-PS). The NS/EP NGN-PS provides priority treatment for a Service User's NS/EP communications and is required when the Service Providers' networks are impaired due to congestion and/or damaged from natural disasters (such as floods, earthquakes, and hurricanes) and man-made disasters (such as physical, cyber, or other forms of terrorist attacks).

With this feature, support is added for NS/EP NGN priority service over the network which eventually requires the P-GW node to first identify an eMPS bearer/session (based on configured Enhanced Multimedia Priority Service (eMPS) evolved Allocation and Retention Priority (eARP)), and then prioritize their GTP and Gx signaling over the network.



Important For supplemental information related to eMPS profile configuration (configuring the eMPS ARPs, which are used to identify a bearer/session as an eMPs bearer/session), and eMPS statistics, refer to the *Expanded Prioritization for VoLTE/Emergency Calls* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*.

Prioritization of GTP and Gx Signaling

1. Prioritizing the GTP signaling for eMPS sessions implies:
   - Excluding the eMPS session's GTP control traffic from throttling due to Load Overload Control (For supplemental information about Load Overload Control, refer to the *3GPP R12 GTP-C Load and Overload Control Support on the P-GW, SAEGW, and S-GW* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*).
2. Prioritizing the Gx signaling for eMPS sessions implies:
   - Excluding the eMPS session's Gx traffic from outgoing RLF throttling (RLF throttling is only applicable for Gx outgoing messages).
   - Excluding the eMPS session's Gx traffic from max-outstanding queue decisions.

Parsing the DRMP AVP from RAR Messages

Support is also extended for parsing the DRMP AVP from RAR messages on the Gx interface. And, if the DRMP value is received as 0, the corresponding response (RAA) message is prioritized, that is to say, excluded from Gx RLF throttling and max-outstanding queue decisions.

Relationships to Other Features

This feature is related to eMPS profile, Load Overload Control, Gx RLF throttling, and Max-outstanding configuration features, and one or more among these features may require additional license key to be installed.

How It Works

The following is a high-level overview of how this feature works:

- The newly introduced CLI command, **diameter session-prioritization**, is used to enable or disable Gx signaling prioritization for eMPS sessions. This CLI command is at policy-control configuration in IMS-authorization service, and it is required to:
  - Exclude the eMPS session's Gx traffic from RLF throttling.
  - Exclude the eMPS session's Gx traffic from max-outstanding queue decisions.

  The following Gx signaling is excluded from RLF throttling and max-outstanding queue decisions:
  - All Gx signaling for an eMPS session.
  - Gx signaling related to eMPS upgrade/downgrade toggling which also includes inter-access technology handovers.
  - Gx signaling which is initiated as part of eMPS upgrade failure (UBRsp/CBRsp failures from access side).
- Support is added for parsing DRMP AVP from RAR and prioritizing corresponding RAA if the DRMP value is received as 0. This behavior is enabled by default and applicable to both eMPS and non-eMPS sessions, and independent of the diameter session-prioritization CLI command.
- **GTP Load Overload Throttling behavior**: The Cisco P-GW supports GTP Load Overload Throttling for both self-overload and peer-overload scenarios. However, GTP signaling for eMPS sessions should be excluded from throttling even under these conditions. For this prioritization to work, all the eARP values configured under eMPS profile must be configured under Load Overload profile configuration (for both self-overload and peer-overload). For additional eARP values configured under Load Overload profile configuration (self-overload and peer-overload), the legacy behavior of self-overload and peer-overload continues.

  If there is any change in the eARP values configured under eMPS profile configuration:

  1. For existing sessions:
     a. The new configuration is considered for eMPS upgrade/downgrade toggling, when there is any change in eARP value of existing bearer(s) of that session or at the time of bearer creation for that session.
     b. Till the session is marked eMPS, the legacy behavior of self-overload and peer-overload continues for the newly configured eARP values.
  2. For new sessions:
     a. New configuration takes effect seamlessly.

- Session recovery and ICSR recover the eMPS state of the session.
- As per Government Industry Requirements (GIR) document, eMPS marking is done only for P-GW EUTRAN and S4-SGSN PDNs.

Limitations

Following are the known limitations of the feature:

- When a session is marked eMPS, it will continue to be excluded from GTP throttling under GTP self-overload situation even after it has been downgraded to a non-eMPS session.
- If for a session, any Update Bearer Request or Create Bearer Request which can upgrade the session from non-eMPS to eMPS fails due to internal failure, the corresponding CCR-U may not be prioritized sometimes.

Configuring Gx Support for eMPS

This section provides information about the CLI commands available in support of the feature.

Configuring eMPS Profile

Use the following commands to configure eMPS profile, which is used to identify/mark a bearer/session as an eMPS bearer/session.

```
configure
  emps-profile emps_profile
    earp earp_value earp_value
    end
```



Important For supplemental information related to eMPS profile configuration (configuring the eMPS ARPs, which are used to identify a bearer/session as an eMPS bearer/session), and eMPS statistics, refer to the *Expanded Prioritization for VoLTE/Emergency Calls* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*.

Enabling Gx Prioritization for eMPS Sessions

Use the following commands under the Policy Control Configuration Mode to enable prioritization of Gx messages based on eMPS state of the session.

```
configure
  context context_name
    ims-auth-service service_name
      policy-control
        [ no ] diameter session-prioritization
        end
```

Notes:

- By default, the **diameter session-prioritization** CLI command is disabled and Gx messages will not be prioritized based on eMPS value.
- If previously configured, use the **no diameter session-prioritization** CLI command to set the default behavior.
- The **diameter session-prioritization** CLI takes affect when Gx, along with eMPS profile, is enabled in the configuration.

Enabling GTP Prioritization for eMPS Sessions under GTP Load Overload Throttling

Use the following configurations for prioritizing the eMPS sessions related to GTP signaling, in case the GTP Peer Overload Control and/or Self-Protection configuration is enabled in the system. These configurations provide option to exclude eMPS session's GTP traffic from throttling under Peer Overload/Self Protection conditions.

```
configure
  emps-profile emps_profile_name
    earp earp_value earp_value
    end
```

```
configure
  gtpc-overload-control-profile overload_profile
    throttling-behavior earp earp_value earp_value exclude
    self-protection-behavior earp earp_value earp_value exclude
    end
```

Notes:

- **emps-profile** *emps_profile_name*: Configures eMPS profile for defining attributes of an eMPS session. The *emps_profile_name* is a string of size from 1 to 63.
- **earp**: Configures a maximum of 3 eARP priority level (PL) values so that sessions with configured eARP priority values can be marked as eMPS sessions. Maximum of 3 eARP values can be configured under an eMPS profile.
- As per above configuration, sessions with any one bearer with either eARP value will be excluded from Load Overload GTP Throttling.



Important For supplemental information related to GTP-C overload control throttling/self-protection behavior and configurations details, refer to the *3GPP R12 GTP-C Load and Overload Control Support on the P-GW, SAEGW, and S-GW* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*.

For supplemental information related to eMPS profile configuration (configuring the eMPS ARPs, which are used to identify a bearer/session as an eMPs bearer/session), and eMPS statistics, refer to the *Expanded Prioritization for VoLTE/Emergency Calls* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*.

For information related to configuration of Gx RLF Throttling and Gx max-outstanding queue, refer the *CLI Configuration Guide*.

Verifying the Gx Support for eMPS Configuration

This section provides information to verify the Gx Support for eMPS configuration.

show configuration

The output of this CLI command has been enhanced to display the following new field:

- diameter session-prioritization

show configuration verbose

The output of this CLI command has been enhanced to display the following new field:

- diameter session-prioritization

Monitoring and Troubleshooting the Gx Support for eMPS

This section provides information about CLI commands available to monitor and troubleshoot the feature.

show ims-authorization policy-control statistics

Use this CLI command to view statistics related to the number of prioritized DRMP messages. Following is a partial sample output:

```
show ims-authorization policy-control statistics

Rule Installation Failure:
  Resource Limitation:           0            Unknown Bearer ID:             0
  Invalid QCI:                   0            Invalid ARP:                   0
  Bearer-Id in QoS:              0            Parse Error:                   0
  Invalid Redirect Address:      0            ADC Absent:                    0
  Incorrect Metering Method:     0            Incorrect Rating Group:        0
  Incorrect Online AVP:          0            Incorrect Offline AVP:         0
  Incorrect Flow Status:         0            Incorrect Usage Monitoring AVP:0
  Incorrect Required Access Info:0            Incorrect Flow Description:     0
  Incorrect Reporting Level:     0

DRMP Statistics:
  RAR with P0 priority:          0            RAR with other priority:      2
```