

# Gx-alias Enhancement


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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 Gx-alias enhancement feature is a method of installing multiple sets of predefined rules with a single Gx-alias rule name. This rule name comes from PCRF and is transparent to PCEF, where PCRF either activates or deactivates by naming each rule.

This feature is applicable for rules that are installed only on default bearer. To successfully install large number of rules, you must configure **no policy-control update-default-bearer** CLI command under the ACS configuration mode or the **no tft-notify-ue-def-bearer** CLI command under the ACS Rulebase configuration mode to implement it on a per-rulebase level. All the ruledefs, defined under the Gx-alias Group of Ruledef (GoR), must also be defined under the rulebase for it to get applied to the session.

## How it Works

The CP expands the GoR for Gx-alias, allocates the PDR IDs to these installed rules, and carries the information in a vendor-specific TLV. As part of this information, the Gx-alias name with Start and End of the PDR IDs are sent to the UP. The UP, after receiving this new TLV, expands the Gx-alias into ruledefs and maps the corresponding PDR IDs in a sequence which is governed by the configuration on UP.

The functionality/behavior of the Gx-alias Enhancement feature includes:

- Before and after the configuration updates, contents of the Gx-alias GoR are exactly the same, and in the same order, on both CP and UP.
- Addition of a new ruledef in a Gx-alias GoR is applied only to new sessions. Only deletion of a ruledef from a Gx-alias GoR is handled in existing session.
- Predefined rules functionality at UP has no impact when Gx-alias is mapped to the ruledefs. That is, URR-IDs/charging is transparent to Gx-alias being used.

**NOTE**:

- Maximum limit of GoRs that can be configured: 64
- Maximum number of rules allowed per GoR: 512
- Maximum rules allowed per default bearer: 2048

### IE Format of Gx-alias

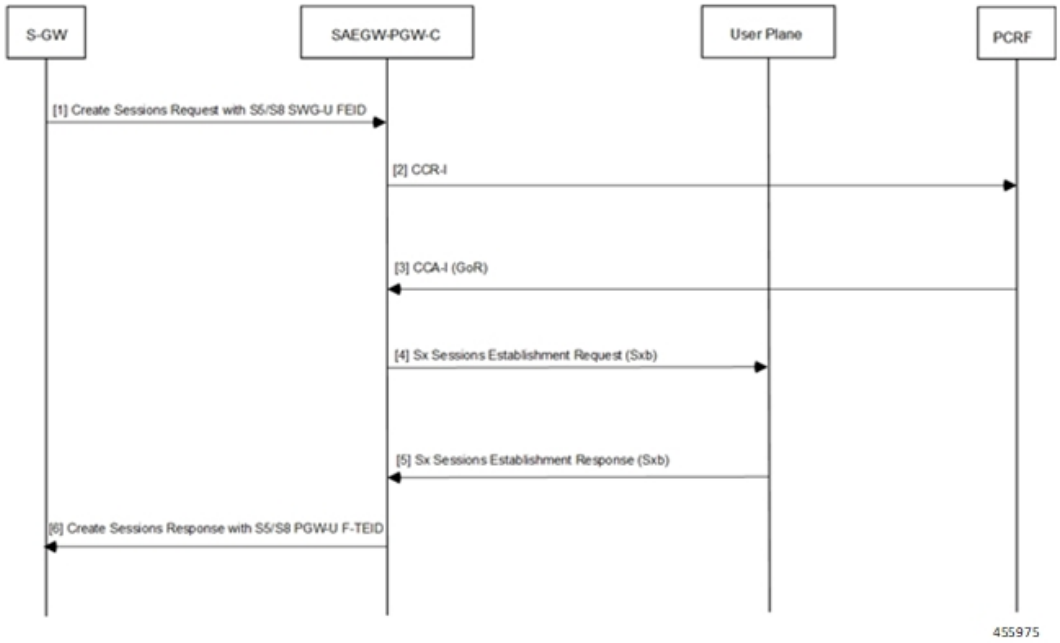
The following table provides the IE Format and encoding information of the Gx-alias feature.

| | Bits | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Octets | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
| 1 to 2 | Type = 246 (decimal) | | | | | | | | |
| 3 to 4 | Length n [Min=7, Max=69 {5+ACSCTRL_GRP_OF_RDEFS_NAMELEN (64)}] | | | | | | | | |
| 5 | Flags (Add/Delete GoR Rules)<br>For example: 1 for Add, 0 for Delete rules in GoR | | | | | | | | |
| 6 to 7 | Start PDR ID | | | | | | | | |
| 8 to 9 | End PDR ID | | | | | | | | |
| 10 to n+4 | Gx-alias GoR name (min size=2, max size=64) | | | | | | | | |

**PFCP_IE_GX_ALIAS**: IE to communicate a Gx-alias GoR name, Start and End PDR IDs, and also the operation to perform from Control Plane to User Plane during Sx Session Establishment/Modification Request message.

# Call Flow

This section describes the Gx-alias enhancement call flow.




| Step | Description |
|---|---|
| 1 | S-GW sends a Create Sessions Request with S5/S8 SGW-U FEID to SAEGW-PGW-C. |
| 2 | SAEGW performs Gx communication CCR-I with PCRF.<br>During a Pure-P call for CUPS SAEGW, the SAEGW-PGW-C does the following:<br>• After Gx interaction, performs Gx communication (CCR-I and CCA-I) with PCRF.<br>• Performs User Plane selection based on User Plane profile configured with IP pool (APN associated IP pool).<br>• Establishes GTP-U session required for RA/RS for IPv6/IPv4v6 PDN.<br>• Performs Sxb interaction with the selected User Plane. |
| 3 | PCRF performs Gx communication CCA-I with SAEGW.<br>Sx Establishment Request session contains the following information:<br>• GoR/GoR Action/FAR/URR information for uplinks and downlink data path: dynamic/predefined/static rules.<br>• Also, Control Plane requests User Plane to allocate F-TEID for P-GW ingress, PDR S5/S8 PGW-U F-TEID. In Gx-alias GoRs, ruledefs must be within the same order for Control Plane and User Plane that are part of Day-0 configuration. The newly configured rules apply only to new sessions that are Cisco-specific Control Plane and User Plane node pairs. |

| Step | Description |
|---|---|
| 4 | SAEGW establishes a Sx Sessions Establishment Request (Sxb) with the User Plane.<br>The new IE format for Gx-alias, PFCP_IE_GX_ALIAS does the following actions:<br>• Communicate a Gx-alias GoR (Group-of-Ruledef) name<br>• Start/End PDR IDs<br>• Perform operations from the Control Plane to the User Plane during the Sx Session Establishment/Modification Request message. |
| 5 | The User Plane provides "P-GW ingress PDR S5/S8-U PGW F-TIED" information as part of Sx Session Establishment Response and establishes a Sx Sessions Establishment Response (Sxb) with SAEGW-PGW-C. |
| 6 | On receipt of the Sx Session Establishment Response, SAEGW-PGW-C sends Create Session Response towards S-GW with "S5/S8-U PGW F-TEID". |

# Limitation

Following are the known limitations of the feature:

- IE-handling is applicable only between Cisco-supported Control Plane-User Plane nodes. All ruledefs configured in Gx-alias GoR are bound only to the default bearer.
- To avoid exceeding the recovery time, only eight GoRs are recovered during session recovery. The maximum recommended limit of GoRs to be configured is eight (8).
- With 2048 rules, you may see an impact on scaling of sessions. The maximum recommended rules per default bearer is 1000.