

Volume Reporting over Gx

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Revision History

Note Revision history details are not provided for features introduced before release 21.24.

Revision Details	Release
Trigger-based usage reporting for 3G is supported in CUPS.	21.25
First introduced	Pre 21.24

Feature Description

The Volume Reporting over Gx (VoGx) feature provides PCRF the capability to make real-time decisions based on the data usage by subscribers.

This feature is implemented using the existing non-CUPS architecture, for Control Plane. This implementation is done by mapping the existing VoGx framework and the CUPS data structures such as FAR, PDR, URR and so on.

Important Volume Reporting over Gx is applicable only for volume quota.

How it Works

The following steps explain how Volume Reporting over Gx works:

1. PCEF, after receiving the message from PCRF, parses the usage monitoring-related AVPs and sends the information to IMSA.
2. IMSA updates the information to ECS.
3. After the ECS is updated with the usage monitoring information from PCRF, the PCEF (ECS) starts tracking the data usage.
4. For session-level monitoring, the ECS maintains the amount of data usage.
5. For PCC rule monitoring, usage is monitored with the monitoring key as the unique identifier. Each node maintains the usage information per monitoring key. When the data traffic is passed, the usage is checked and reported against the usage threshold values.



Note In releases earlier than 21.22, the monitoring key value was in the range of 0-134217727.

In 21.22 and later releases, the monitoring key value is in the range of 1-4000000000.

During call establishment, if the PCRF sends more than 50 monitoring keys in CCA-I message, only the first 50 monitoring keys are considered and the remaining keys are ignored.

6. The PCEF continues to track data usage after the threshold is reached and before a new threshold is provided by the PCRF. If a new usage threshold is not provided by the PCRF in the acknowledgment of an IP-CAN Session modification where its usage was reported, then usage monitoring does not continue in the PCEF for that IP CAN session.

For additional information about this feature, refer the *SAEGW Administration Guide*.

Supported Standards

The Volume Reporting over Gx feature is based on the following standard: 3GPP TS 29.212 V9.5.0 (2010-06): 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Policy and Charging Control over Gx reference point (Release 9).

Control Plane Handling for VoGx

URR Creation during Session Setup

- Sx Session establishment request is used as per the GxSPI framework.
- The Control Plane function sends the list of URRs in the Sx Session Establishment request, along with their references in corresponding PDRs.

URR Processing in Detach Request

- The URR information will be sent by PGW-U as part of Sx Session Delete Response.

- PGW-C maps these URRs to the corresponding Monitoring-key Buckets and sends the CCR-T containing Usage Report.

Sx Session Report Request

PGW-U sends the Usage Report for Volume Threshold. PGW-C maps the URRs to corresponding Monitoring-key Buckets and generate the Gx CCR-U accordingly.

Handling of RAR With Usage Monitoring Related AVPs

When the Usage Monitoring information with the monitoring key associated with Gx alias rule comes in an RAR without any rule associated, the Create URR IE with usage monitoring information (volume or time) is sent towards UP.

User Plane Handling for VoGx

Volume Threshold Breach

When data packets match a particular PDR and the PDR has associated URRs that have the measurement method set as Volume, the uplink and downlink usage counters are incremented depending on the PDR source interface type. Once a volume threshold is breached for a particular URR, an Sx Session Report Request message is generated and sent with Usage Report Trigger set as Volume Threshold. All the usage counters of the URRs that are reported is cleared once the message is generated and sent to Control Plane. However, the existing threshold limit will be applicable for further transactions.

Limitations

The VoGx feature has the following limitations.

- Reporting of usage to PCRF during following event triggers are not supported in CUPS:
  - Trigger
    - PGW_TRACE_CONTROL (24)
    - QOS_CHANGE_EXCEEDING_AUTHORIZATION (11)
    - APN_AMBR_MODIFICATION_FAILURE (29)
    - CHARGING_CORRELATION_EXCHANGE (28)
    - OUT_OF_CREDIT (15)
    - REALLOCATION_OF_CREDIT (16)
    - UE_IP_ADDRESS_ALLOCATE (18)
    - UE_IP_ADDRESS_RELEASE (19)
    - APPLICATION_START (39)
    - APPLICATION_STOP (40)
    - REVALIDATION_TIMEOUT (17)

- Trigger-based usage reporting is not supported for 3G in CUPS.

Configuring VoGx Monitoring Key Range

From Release 21.22 onwards, it is mandatory to define the **monitoring-key urr-id-prefix** entries for all the monitoring keys configured locally in the PCEF as part static and predefined rules.

Use the following configurations to enable the monitoring key range.

```
configure
   active-charging service service_name
     mon-key-urr-list list_name
        monitoring-key value urr-id-prefix urr_id
        end
```

NOTES:

- **mon-key-urr-list** *list_name*: Specifies the name of monitoring key list. *list_name* must be a string of size 1-63.
- **monitoring-key** *value*: *value* must be an integer in the range of 1-4000000000.
- **urr-id-prefix** *urr_id*: *urr_id* must be an integer in the range of 1-8388607.
- Multiple monitoring key and URR ID combinations under the list name can be configured. The recommended limit is 2500 entries.
- This CLI command can be configured in both Control Plane and User Plane. After configuring the CLI command in Control Plane, it is mandatory to push the configuration to User Plane using PFD push mechanism. For RCM, it is mandatory to configure **require rcm-configmgr** on User Plane before configuring the CLIs. Both Control Plane and User Plane must be configured through CLI in RCM configuration.
- You should configure only unique monitoring key and URR-ID combinations. These URR-IDs configured through **mon-key-urr-list** should not coincide with the URR-IDs configured through **urr-list**. If such a configuration is attempted, the CLI throws an error.
- If there is a run-time addition of this CLI at Control Plane, it is necessary to push the CLIs using PFD push mechanism so that configurations can be updated at both ends. These configurations will apply next call onwards or at the time of next URR creation.

Monitoring and Troubleshooting VoGx

This section provides information about the CLI commands available for monitoring and troubleshooting VoGx in CUPS.

Show Commands and/or Outputs

show active-charging subsystem all debug-only

The output of this CLI command has been enhanced to include the following fields in support of VoGx feature in CUPS.

- Total Mon-Key Urr Entries in list
- Total Mon-Key lookup success
- Total Mon-Key lookup failure

show user-plane-service monitoring-key-urr-id-list all

Use this CLI command to view all the monitoring keys that were pushed from Control Plane to User Plane.