



## RADIUS in C-Plane

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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 C-Plane in CUPS uses the existing non-CUPS RADIUS framework without any impact on non-CUPS functionality. Mapping is done between existing non-CUPS data structures and CUPS-specific data structures like Packet Detection Rule (PDR), Usage Reporting Rule (URR), Forwarding Action Rule (FAR), and so on.

The P-GW supports accounting messages to report volume usage (bytes and packets) in each bearer to RADIUS. For RADIUS in CUPS C-Plane, it creates bearer level URR for calls enabled with RADIUS/Mediation accounting, and corresponding URR from U-Plane is communicated in AAA messages.

## How It Works

The RADIUS in C-Plane works as explained in the following sections.

## C-Plane Handling of RADIUS

### URR Creation during Session Setup

The Sx Session establishment request framework is used to create a new RADIUS bearer level URR. This is tagged to rule base PDR that is created. As a result, any data matching static rules is accounted in this URR by U-Plane. The same URR is associated to every PDR created on this bearer for Dynamic/Pre-defined rules, installed on the bearer from Gx.

### URR Processing in Detach Request

The URR information for RADIUS bearer is sent by P-GW U-Plane as part of Sx Session Delete Response. The P-GW CPlane does the mapping of these URRs to their corresponding non-CUPS RADIUS buckets in SessMgr, which is used by AAAMgr to encode and send RADIUS messages.

An API is created in SessMgr to be called by ACSMgr. The C-Plane, using this API, updates the non-CUPS buckets in SessMgr whenever U-Plane reports the URR.

### URR Processing in Detach Request

The P-GW U-Plane sends the Usage report for triggers like Volume/Time-Threshold and the C-Plane does the mapping of URRs to their corresponding charging buckets. The C-Plane takes the value of Volume/Time-Threshold from AAA Server Group (radius accounting interim volume/interval) CLI commands associated with the call. When interim is not configured under AAA Server Group, the Time-threshold reporting trigger is used for RADIUS bearer URR with a value of 0x7FFFFFFF.

### URR Handling for RADIUS

The RADIUS only has bearer level URR and whenever U-Plane reports the same, it updates the non-CUPS RADIUS buckets in SessMgr.

Currently, reporting of bytes from U-Plane is supported. Same framework is extended to support reporting of packets for RADIUS.

The C-Plane, when creating URR, requests to report packets usage to U-Plane and the information reported is used to populate non-CUPS buckets. New IE is created for this purpose, and encoding and decoding of these IEs over Sx interface is supported.

## U-Plane Handling of RADIUS

### URR Support in Session Establishment Request

U-Plane module supports the storage of a list of URRs received as part of Session Establishment Request. Each PDR can be associated with one or more URRs, and a particular URR can be linked to another URR.

Each URR contains the measurement method (time/volume), and reporting triggers that indicates the event on which the UPlane has to send usage report.

Separate support is added to store and report packets for RADIUS URR.

### Session Report Request Message

On encountering a time or volume threshold limit, U-Plane generates an Sx Session Report Request message and sends the same to C-Plane. This message contains the Usage report which indicates the reason for generating

the message, specified by Usage Report Trigger. In addition to this, the Usage report contains the time/volume/packets measurement.

If any other URRs are linked to the URR for which the session report request is being generated, then a session report request is generated for those linked URRs as well.

### Session Delete Response

This message, sent from the U-Plane, is in response to a Session Deletion Request from C-Plane. This results in termination of the Sx Session at U-Plane. Usage Report is included as part of Sx Delete Session Response.

### Session Report Response message

This message from the C-Plane indicates a successful delivery of the Session Report Request message with a cause code. Currently, no specific failure handling is done on receiving a failure cause.

## Information Elements for Packet Reporting

The following new IEs are supported to request packet usage information for U-Plane, and to report packet information from U-Plane:

- Extended Measurement Method - Indicates the method for measuring the usage of network resources.
- Figure Extended Measurement Method - This is not a mandatory IE for any Message. This IE can be present in following Messages between C-Plane and U-Plane: Sx Session Establishment over Sxa, Sxb, Sxc, Sxab. Similarly, Usage Report from U-Plane is enhanced to support packet information.
- Packet Measurement - The Packet Measurement IE contains the measured traffic volume in packets. This is not a mandatory IE for any Message. This IE can be present in following Messages between C-Plane and U-Plane:
  - Sx Session Modification over Sxa, Sxb, Sxc, Sxab
  - Sx Usage Report Session Deletion Response over Sxa, Sxb, Sxc, Sxab
  - Sx Usage Report Session Report Request over Sxa, Sxb, Sxc, Sxab

## Limitation and Restriction

Following is the known limitation and restriction of this feature:

- The **radius interim accounting now** CLI is not supported in CUPS architecture.
- Event based Usage reporting for RAT change is not supported.

## Configuring RADIUS in C-Plane



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**Note** The CLI commands available for non-CUPS RADIUS is applicable in CUPS environment and they can be used to configure RADIUS in C-Plane.

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# Monitoring and Troubleshooting



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**Note** The CLI commands available for non-CUPS RADIUS is applicable in CUPS environment and they can be used to monitor and troubleshoot the RADIUS in C-Plane.

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