RADIUS in C-Plane

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

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.

Monitoring and Troubleshooting

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.