AMBR value [QOS] Missed in RAR for the Sy Trigger to Change the Policy Counter

Contents

Introduction

This document describes how to troubleshoot the issue of AMBR value [QOS] miss in RAR for the Sy trigger to change the policy counter.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- PCRF/CPS
- Diameter Protocol

Components Used

The information in this document is based on Cisco Policy Suit for PCRF solution.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Abbreviations

PCRF	Policy and Charging Rules Function

OCS	Online charging system
PGW	Packet Data Network Gateway
PB	Policy builder

Problem

When you apply throttle (new Policy-Counter-Status) after a new session is created the AMBR values are not applied in RAR sent to PGW, only the QCI value was being sent.

```
QoS-Information: Default-EPS-Bearer-QoS: QoS-Class-Identifier: 8 Revalidation-Time: -486962116
```

Issue Analysis

When you look at the PCRF trace, it is seen that the OCS sends an SNR immediately after the SLR/SLA exchange.

This SNR has the same Policy-Counter-Status (**NoThrottle**) value as the SLA.

As the SNR is processed, you can see the PCRF loads the Unlimited_AMBR table properly, until this everything works fine.

A few minutes later, a new SNR is sent to the PCRF with a Policy-Counter-Status change (apply **Throttle1**). When you process this, PCRF does not load the **Unlimited_AMBR table**, so the AMBR values for **Throttle1** are not attained, so are not passed to the PGW in the RAR.

These are some snips from the debug log to understand the above behavior in detail.

CRD Table Loaded during CCR-I Properly

```
-------- Debugging Messages ------------------------------- INFO core Tagging message with ID:
GX_TGPP INFO diameter Adding extracted AVP to policy: DiameterMessageAvp [code=QoS-Class-
Identifier, value=8] INFO core Start session triggered INFO TGPP [Rel9] features supported on
session 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org;405022273;510802;5f4efc9a-5202 INFO gx Creating new
diameter session 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org;405022273;510802;5f4efc9a-5202 INFO custrefdata Adding AVP
[APN_TABLE/LOGICAL_APN], value: DATA INFO custrefdata Adding AVP [LOCATION_TABLE/LOCATION_REF],
value: HOME INFO custrefdata Adding AVP [PROFILE_TABLE/PROFILE_ID], value: PROFILE_DATA INFO
custrefdata Adding AVP [QCIREF/QCI], value: 8 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle3_AMBR_DOWN], value: 20000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle2_AMBR_UP], value: 5000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle6_AMBR_UP], value: 600000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle3_AMBR_UP], value: 20000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle4_AMBR_DOWN], value: 50000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle1_AMBR_DOWN], value: 1200000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle2_AMBR_DOWN], value: 5000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle5_AMBR_UP], value: 100000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle6_AMBR_DOWN], value: 600000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle1_AMBR_UP], value: 1200000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle5_AMBR_DOWN], value: 100000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle4_AMBR_UP], value: 50000000 INFO auth Success ALLOW_ALL authorization
```

```
INFO core Switching credential id to 53099204XXXXXX for session INFO core domain: mobile INFO sy
Created new Sy diameter session INFO sy Triggering synchronous SLR Message on sessioniMOD-
PCRF01-qns01-1.cluster-MOD1.-Model;1597873954;1029;6862816375560209413 INFO debug-code The Sy
Policy Counter Status is : NoThrottle
```

Immediate SNR after the CCR

Here also the CRD table loading was proper and selected desired QOS based on the policy counter received from SNR.

```
-------- Debugging Messages ------------------------------- INFO core Tagging message with ID:
SY_V11 INFO core Successful load by key: diameterSessionKey:iMOD-PCRF01-qns01-1.cluster-MOD1.-
Model%3B1597873954%3B1029%3B6862816375560209413 INFO custrefdata Adding AVP
[APN_TABLE/LOGICAL_APN], value: DATA INFO custrefdata Adding AVP [LOCATION_TABLE/LOCATION_REF],
value: HOME INFO custrefdata Adding AVP [PROFILE_TABLE/PROFILE_ID], value: PROFILE_DATA INFO
custrefdata Adding AVP [QCIREF/QCI], value: 8 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle3_AMBR_DOWN], value: 20000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle2_AMBR_UP], value: 5000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle6_AMBR_UP], value: 600000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle3_AMBR_UP], value: 20000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle4_AMBR_DOWN], value: 50000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle1_AMBR_DOWN], value: 1200000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle2_AMBR_DOWN], value: 5000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle5_AMBR_UP], value: 100000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle6_AMBR_DOWN], value: 600000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle1_AMBR_UP], value: 1200000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle5_AMBR_DOWN], value: 100000000 INFO custrefdata Adding AVP
[Unlimited_AMBR/Throttle4_AMBR_UP], value: 50000000 INFO core domain: mobile INFO Sy client
Sending SNA Message on session iMOD-PCRF01-qns01-1.cluster-MOD1.-
Model;1597873954;1029;6862816375560209413 INFO debug-code The Sy Policy Counter Status is :
NoThrottle INFO debug-code The Sy Policy Counter Status is : NoThrottle
```

RAR sent to PGW with Proper QOS info

```
Message: com.broadhop.diameter2.messages.DiameterRequestMessage Application Id: Gx (16777238)
Command Code: Gx_RAR (258) Dest host: 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org Dest realm: epc.mnc099.mcc530.3gppnetwork.org Device
protocol: GX_TGPP End to end id: 0 (0x00000000) Hop by hop id: 0 (0x00000000) Origin state: 0
Stack name: null Session-Id: 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org;405022273;510802;5f4efc9a-5202 Auth-Application-Id:
16777238 Re-Auth-Request-Type: 0 QoS-Information: APN-Aggregate-Max-Bitrate-UL: 600000000 APN-
Aggregate-Max-Bitrate-DL: 600000000 Default-EPS-Bearer-QoS: QoS-Class-Identifier: 8
Revalidation-Time: -486962716 ============================================================
```

Consecutive SNR Received

Here the CRD table is **not loaded for Unlimited_AMBR**.

```
-------- Debugging Messages ------------------------------- INFO core Tagging message with ID:
SY_V11 INFO core Successful load by key: diameterSessionKey:iMOD-PCRF01-qns02-1.cluster-MOD1.-
Model%3B1597874000%3B1089%3B6862816573128705089 INFO custrefdata Adding AVP
[APN_TABLE/LOGICAL_APN], value: DATA INFO custrefdata Adding AVP [LOCATION_TABLE/LOCATION_REF],
value: HOME INFO custrefdata Adding AVP [PROFILE_TABLE/PROFILE_ID], value: PROFILE_DATA INFO
custrefdata Adding AVP [QCIREF/QCI], value: 8 INFO core domain: mobile INFO Sy client Sending
SNA Message on session iMOD-PCRF01-qns02-1.cluster-MOD1.Spark-
Model;1597874000;1089;6862816573128705089 INFO debug-code The Sy Policy Counter Status is :
```

```
Throttle1 INFO debug-code The Sy Policy Counter Status is : Throttle1 INFO debug-code ECGI :
530992xxxxxx INFO debug-code IMSI : 530992041xxxxxx INFO debug-code CGI : INFO debug-code Next
Eval Time: 2020-09-02T10:03:05Z INFO core domain: mobile INFO rt Added revalidation time Wed Sep
02 03:13:00 UTC 2020 INFO gx Sending RAR Message on session 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org;405022275;511314;5f4efd58-5202
```

RAR Sent without AMBR in QOS info

Expected to sent with reduced QOS value.

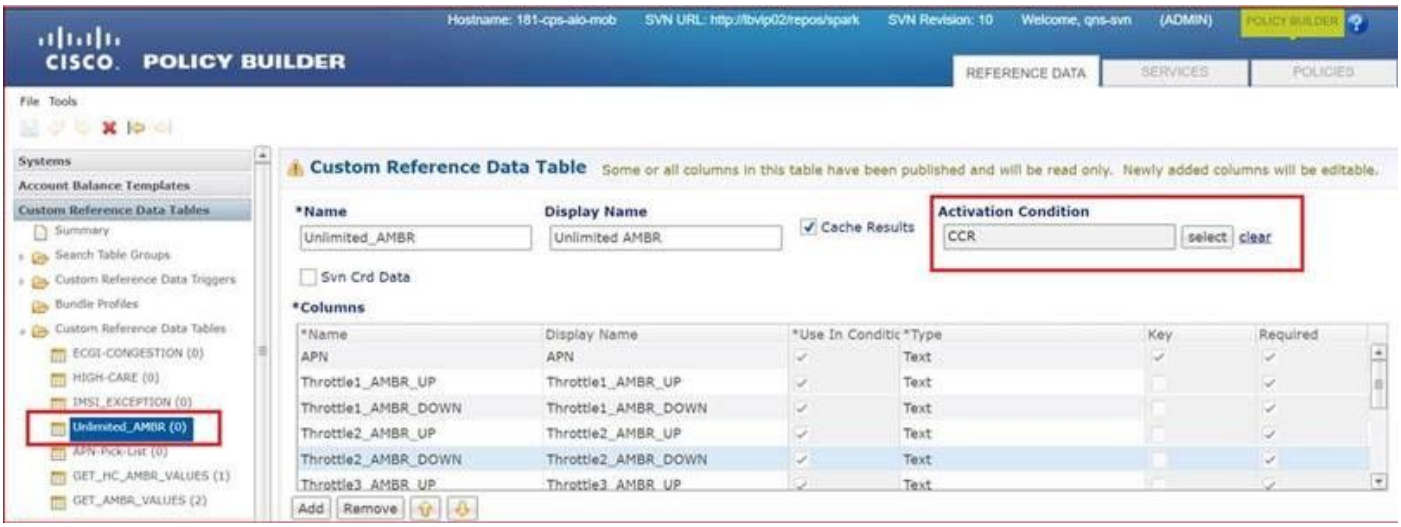
```
Message: com.broadhop.diameter2.messages.DiameterRequestMessage Application Id: Gx (16777238)
Command Code: Gx_RAR (258) Dest host: 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org Dest realm: epc.mnc099.mcc530.3gppnetwork.org Device
protocol: GX_TGPP End to end id: 0 (0x00000000) Hop by hop id: 0 (0x00000000) Origin state: 0
Stack name: null Session-Id: 0001-diamproxy.mod-ggsae01-
gx.epc.mnc099.mcc530.3gppnetwork.org;405022275;511314;5f4efd58-5202 Auth-Application-Id:
16777238 Re-Auth-Request-Type: 0 QoS-Information: Default-EPS-Bearer-QoS: QoS-Class-Identifier:
8 Revalidation-Time: -486962116 ============================================================
```

Further, the debug qns logs were looked into, and it was seen that the table was skipped due to **condition is false CCR**

```
MOD-PCRF01-qns02 MOD-PCRF01-qns02 2020-09-02 02:13:00,740 [pool-108-thread-1] DEBUG
c.b.policy.impl.RulesPolicyService - Policy event: Message:
com.broadhop.diameter2.messages.DiameterRequestMessage Application Id: Sy (16777302) Command
Code: Sy_SNR (8388636) Dest host: mod-pcrf01-lb Dest realm: epc.mnc099.mcc530.3gppnetwork.org
Device protocol: SY_V11 End to end id: 1874920025 (0x6fc10259) Hop by hop id: 30806209
(0x01d610c1) Origin state: 0 Stack name: null Origin host: sy01.mod02.bumblebee.co.nz Origin
realm: mod02.bumblebee.co.nz Session-Id: iMOD-PCRF01-qns01-1.cluster-MOD1.Spark-
Model;1597873954;1029;6862816375560209413 Auth-Application-Id: 16777238 Policy-Counter-Status-
Report: Policy-Counter-Identifier: THROTTLE Policy-Counter-Status: Throttle1 Route-Record:
sy01.mod02.bumblebee.co.nz QPS-Internal-Route-Record-Host: mod-
dsc02.epc.mnc099.mcc530.3gppnetwork.org QPS-Internal-Route-Record-Realm:
epc.mnc099.mcc530.3gppnetwork.org, no return address <SNIP> . . . . </SNIP> MOD-PCRF01-qns01
MOD-PCRF01-qns01 2020-09-02 02:13:00,742 [pool-109-thread-1] DEBUG
c.b.c.i.CustomerReferenceDataManager - Skipping table Unlimited_AMBR since condition is false
CCR
```

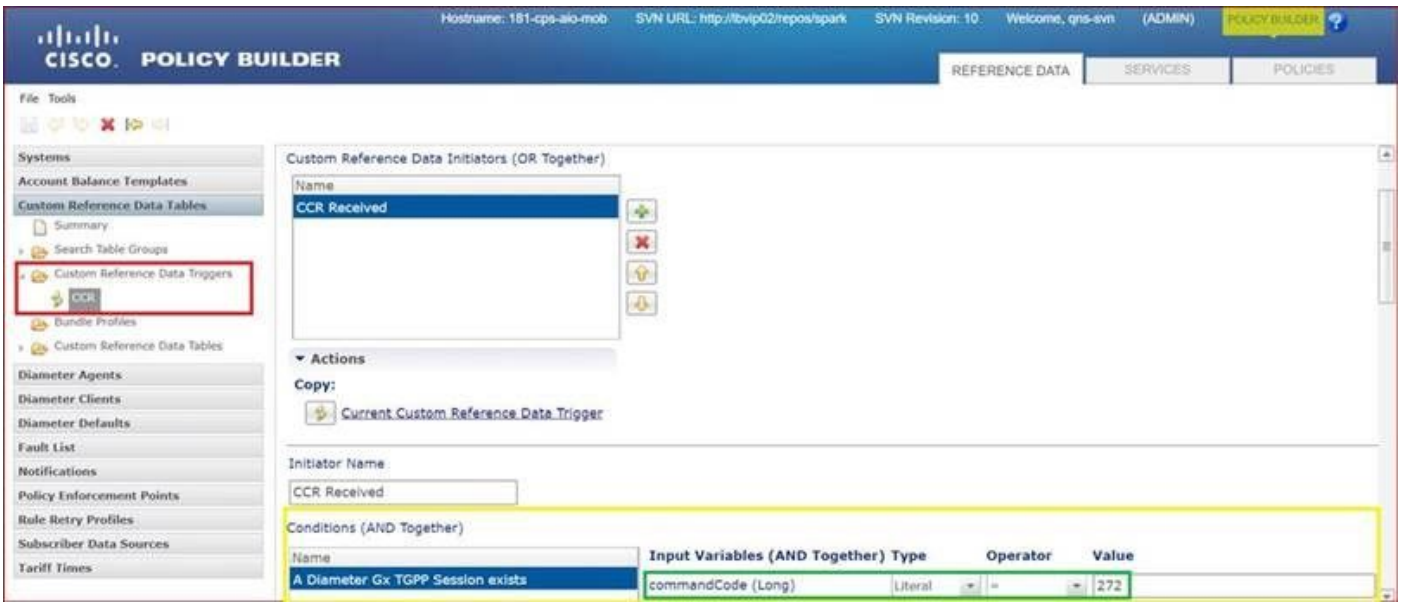
Further, the PB is investigated to understand the behavior of CRD table load.

Once you walk through the provided SVN dump, It is found for this configuration for this table: **Unlimited_AMBR**



The activation condition for this table is based on CCR Trigger.

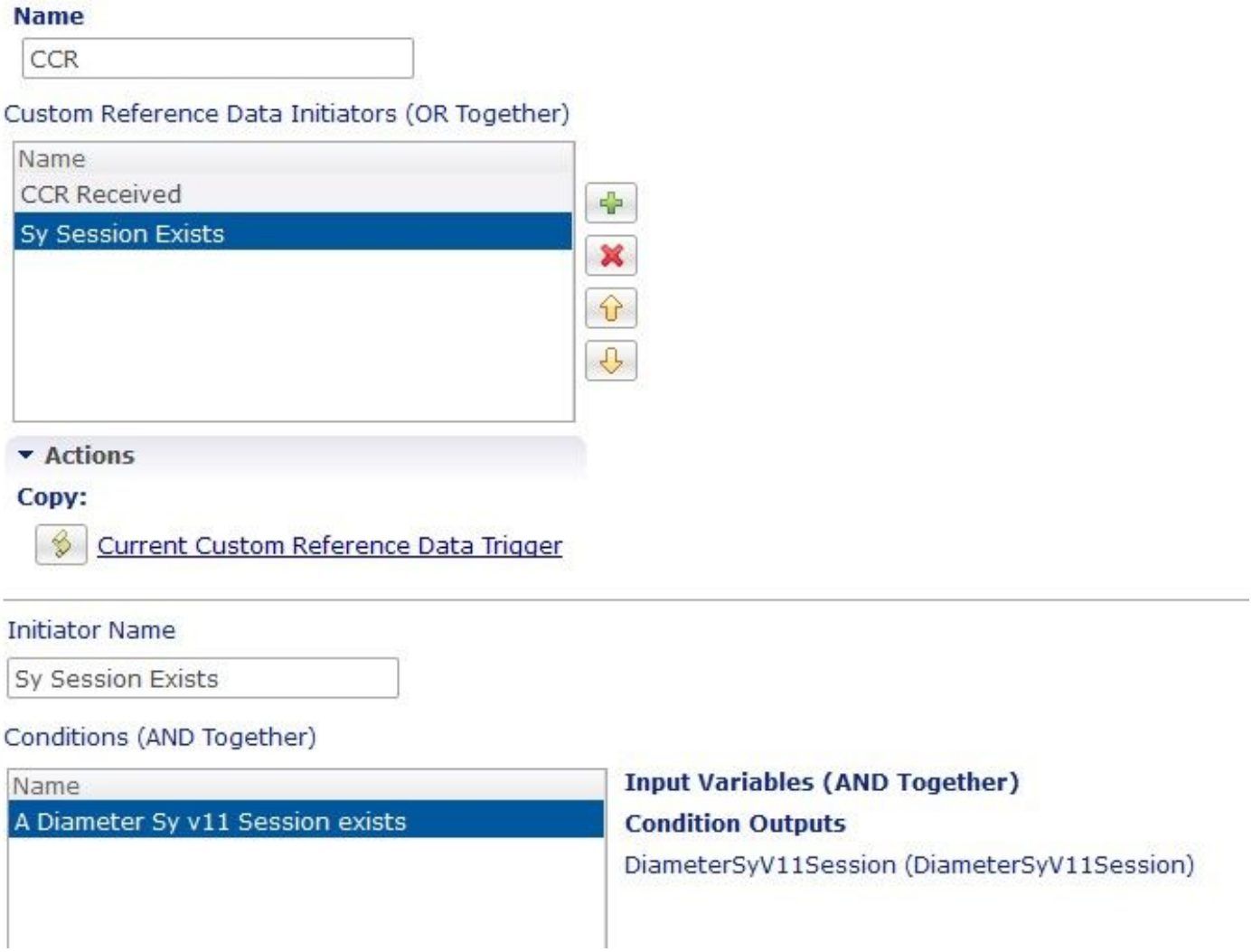
So, if you see the content of this CCR trigger, the condition is, a Gx diameter session exists with a Command code 272. Ie. CCRs.



Because of this, the tables do not load without a corresponding to CCR. Ie. SNR doesn't have a right to load CRD without an initial CCR [I or U]

Solution

Add the CRD activation trigger for SY session, and perform a publish of the new configuration.



Post publish of this new change, did multiple attempts of data calls, and all were successful. All the consecutive SNRs were able to load the CRD table and proper QOS being sent in RAR based on the incoming policy counter change from Sy.