Troubleshoot Audio Call Transfer Problem at the Time of SRVCC Handover in VoLTE

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Introduction

This document describes how to troubleshoot the problem that occurs when an audio call in VoLTE does not seamlessly transfer at the time of the SRVCC handover.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Hardware knowledge of 5000/5500
- StarOS

Components Used

This document is not restricted to specific software and hardware versions.

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

VoLTE	Voice over Long Term Evolution
SRVCC	Single Radio Voice Call Continuity
CCR	Credit Control Request
CCA	Credit Control Answer
AVP	Attribute Value Pair
PCRF	Policy and Charging Rule Function
PCEF	Policy and Charging Enforcement Function

SGW	Serving Gateway
PGW	Packet Data Network Gateway
MME	Mobility Management Entity

Problem

The Service provider reported that even though SRVCC handover was successful at MME, the VoLTE call was not seamlessly transferred to the legacy 2G/3G network. After SRVCC handover was completed, MME sent **DELETE_BEARER_COMMAND** message to SGW with voice bearer flag as true and the bearer release at PGW was successful.
But, on further communication from PGW to PCRF, it was observed that PGW does not notify PCRF as PS_to_CS_Handover even though SRVCC was successful at MME end.

Troubleshoot

This section provides information in order to troubleshoot the problem of audio call handling when it is transferred from VoLTE to legacy 2G/3G network through SRVCC handover.

Collected "mon sub" traces with the SRVCC handover. Here is the sequence of messages exchanged between MME, SGW, PGW, and PCRF.

DELETE_BEARER_COMMAND message from MME to SGW as voice bearer flag true:

```
INBOUND>>>>>  12:17:24:406 Eventid:141004(3)
[SGW-S11/S4]GTPv2C Rx PDU, from 10.206.33.X:30464 to 10.206.31.Y:2123 (57)
TEID: 0x81E0418E, Message type: EGTP_DELETE_BEARER_COMMAND (0x42)
Sequence Number: 0xD2101D (13766685)
GTP HEADER
       Version number: 2
       TEID flag: Present
       Piggybacking flag: Not present
       Message Priority flag: Not present
       Message Priority: NA
       Message Length: 0x0035 (53)

INFORMATION ELEMENTS
       BEARER CONTEXT:
           Type: 93  Length: 10  Inst: 0
           Value:
               EPS BEARER ID:
                   Type: 73  Length: 1  Inst: 0
                   Value: 7
               BEARER FLAGS:
                   Type: 97  Length: 1  Inst: 0
                   Value:
                        VB : 1                                  >> voice bearer as true
       ULI TIMESTAMP:
           Type: 170  Length: 4  Inst: 0
           Value:
               Seconds: 3766718840

       USER LOCATION INFO:
           Type: 86  Length: 13  Inst: 0
           Value:
```

```
                Location type: TAI
                MCC: XYZ
                MNC: AB
                TAC: 0x7D5
                Location type: ECGI
                MCC: XYZ
                MNC: AB
                ECI: 0xE02F902

        UE TIME ZONE:
            Type: 114  Length: 2  Inst: 0
            Value:
                TZ: +5:30
                DST: +0 hour
```

Further, SGW sends **EGTP_DELETE_BEARER_COMMAND** message to PGW:

```
INBOUND>>>>>  12:17:24:407 Eventid:141004(3)
[PGW-S5/S2a/S2b]GTPv2C Rx PDU, from 223.224.X.Y:36368 to 223.224.A.B:2123 (57)
TEID: 0x80F0E1DB, Message type: EGTP_DELETE_BEARER_COMMAND (0x42)
Sequence Number: 0xAD818E (11370894)
GTP HEADER
        Version number: 2
        TEID flag: Present
        Piggybacking flag: Not present
        Message Priority flag: Not present
        Message Priority: NA
        Message Length: 0x0035 (53)

INFORMATION ELEMENTS
        BEARER CONTEXT:
            Type: 93  Length: 10  Inst: 0
            Value:
                EPS BEARER ID:
                    Type: 73  Length: 1  Inst: 0
                    Value: 7
                BEARER FLAGS:
                    Type: 97  Length: 1  Inst: 0
                    Value:
                        VB : 1                                  >> voice bearer as true
        ULI TIMESTAMP:
            Type: 170  Length: 4  Inst: 0
            Value:
                Seconds: 3766718840
        USER LOCATION INFO:
            Type: 86  Length: 13  Inst: 0
            Value:
                Location type: TAI
                MCC: XYZ
                MNC: AB
                TAC: 0x7D5
                Location type: ECGI
                MCC: XYZ
                MNC: AB
                ECI: 0xE02F902
        UE TIME ZONE:
            Type: 114  Length: 2  Inst: 0
            Value:
                TZ: +5:30
                DST: +0 hour
```

Further, **DELETE_BEARER** is accepted by PGW and initiates delete of the bearer:

```
<<<<OUTBOUND  12:17:24:408 Eventid:141005(3)
[PGW-S5/S2a/S2b]GTPv2C Tx PDU, from 223.224.A.B:2123 to 223.224.X.Y:36368 (17)
TEID: 0x80F3C18E, Message type: EGTP_DELETE_BEARER_REQUEST (0x63)
Sequence Number: 0xAD818E (11370894)
GTP HEADER
        Version number: 2
        TEID flag: Present
        Piggybacking flag: Not present
        Message Priority flag: Not present
        Message Priority: NA
        Message Length: 0x000D (13)

INFORMATION ELEMENTS
        EPS BEARER ID:
            Type: 73  Length: 1  Inst: 1
            Value: 7
```

Further, PGW initiates CCR update message towards PCRF. Here, in Charging-Rule-Report AVP, PGW informs PCRF about Charging-Rule-Name, PCC-Rule-Status, and Rule-Failure-Code.

Here it is found that PGW sends the wrong Rule-Failure-Code to PCRF. As MME indicated the release of Voice bearer(as the flag was true), PGW should inform to PCRF as PS_to_CS handover. Instead of this, there is a Resource_Allocation_failure that is reported to PCRF.

As a result, PCRF was considering failure in 4G network and informing the same to IMS. Hence IMS was initiating VoLTE call termination. So, Although SRVCC was successful, the call was not seamlessly transferred to the legacy 2G/3G network.

```
In 3GPP TS 29.212 V13.5.0 (2016-03)
As mentioned in section 3.6, Request of IP-CAN Bearer Termination
If the IP-CAN bearer termination is caused by the PS to CS handover, the PCEF shall report
related PCC rules for this IP-CAN bearer by including the Rule-Failure-Code AVP
set to the value PS_TO_CS_HANDOVER.

In 3GPP TS 29.212 V14.3.0 (2017-03)
As mentioned in section 4.5.6 Indication of IP-CAN Bearer Termination Implications
When the PCEF detects that a dedicated IP-CAN bearer could not be activated or has been
terminated it shall remove the affected PCC rules and send a CCR command to the PCRF
with CC-Request-Type AVP set to the value "UPDATE_REQUEST", including the Charging-Rule-Report
AVP specifying the affected PCC rules with the PCC-Rule-Status set to inactive
and including the Rule-Failure-Code AVP assigned to the value RESOURCE_ALLOCATION_FAILURE.

SRVCC PS-to-CS Handover Indication Support in starOS
This feature helps in notifying the PCRF about the exact reason for PCC rule deactivation on
Voice bearer deletion.
This exact cause will help PCRF to then take further action appropriately.
This feature ensures complete compliance for SRVCC, including support for PS-to-CS handover
indication when voicebearers are released.
If the IP-CAN bearer termination is caused by the PS to CS handover, the PCEF may report related
PCC rules for thisIP-CAN bearer by including the Rule-Failure-Code AVP set to the value
PS_TO_CS_HANDOVER.
```

CCR update message from PGW to PCRF with regards to Charging-Rule-Report AVP:

```
<<<<OUTBOUND  12:17:24:413 Eventid:81990(5)
Diameter message from 10.0.232.X:32933 to 10.5.40.Y:3869
  Base Header Information:
   Version:            0x01        (1)
   Message Length:     0x000260    (608)
```

```
 Command Flags:      0xc0        (192) REQ PXY
 Command Code:       0x000110    (272) Credit-Control-Request
 Application ID:     0x01000016  (16777238)   3GPP-Gx
 Hop2Hop-ID:         0xb7cf10ce  (3083800782)
 End2End-ID:         0x3b6b4886  (996886662)
AVP Information:
   [M]  Session-Id
      Code:      0x00000107 (263) Session-Id
      Flags:     0x40       (64)  [M]
      Length:    0x00004f   (79)
      Data: 0003-diamproxy.asr55k.gx;1385806608;584234203;5cd9037d-1db02

   [M]  Auth-Application-Id
      Code:      0x00000102 (258) Auth-Application-Id
      Flags:     0x40       (64)  [M]
      Length:    0x00000c   (12)
      Data: 16777238

   [M]  Origin-Host
      Code:      0x00000108 (264) Origin-Host
      Flags:     0x40       (64)  [M]
      Length:    0x00002b   (43)
      Data: 0003-diamproxy.asr55k.gx

   [M]  Origin-Realm
      Code:      0x00000128 (296) Origin-Realm
      Flags:     0x40       (64)  [M]
      Length:    0x00001a   (26)
      Data: cisco.com

  [M]  Destination-Realm
      Code:      0x0000011b (283) Destination-Realm
      Flags:     0x40       (64)  [M]
      Length:    0x00002a   (42)
      Data: PCRF.MNC0AB.MCCXYZ.3GPPNETWORK.ORG

   [M]  CC-Request-Type
      Code:      0x000001a0 (416) CC-Request-Type
      Flags:     0x40       (64)  [M]
      Length:    0x00000c   (12)
      Data: UPDATE_REQUEST (2)

   [M]  CC-Request-Number
      Code:      0x0000019f (415) CC-Request-Number
      Flags:     0x40       (64)  [M]
      Length:    0x00000c   (12)
      Data: 2

   [M]  Destination-Host
      Code:      0x00000125 (293) Destination-Host
      Flags:     0x40       (64)  [M]
      Length:    0x000037   (55)
      Data: PCRF01.PCRF.MNC0AB.MCCXYZ.3GPPNETWORK.ORG

   [M]  Origin-State-Id
      Code:      0x00000116 (278) Origin-State-Id
      Flags:     0x40       (64)  [M]
      Length:    0x00000c   (12)
      Data: 1552081338

   [M]  Subscription-Id
      Code:      0x000001bb (443) Subscription-Id
      Flags:     0x40       (64)  [M]
      Length:    0x000028   (40)
```

```
    [M]  Subscription-Id-Type
       Code:      0x000001c2 (450) Subscription-Id-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: END_USER_E164 (0)

    [M]  Subscription-Id-Data
       Code:      0x000001bc (444) Subscription-Id-Data
       Flags:     0x40       (64)  [M]
       Length:    0x000014   (20)
       Data: 121234567891

[M]  Subscription-Id
   Code:      0x000001bb (443) Subscription-Id
   Flags:     0x40       (64)  [M]
   Length:    0x00002c   (44)
    [M]  Subscription-Id-Type
       Code:      0x000001c2 (450) Subscription-Id-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: END_USER_IMSI (1)

    [M]  Subscription-Id-Data
       Code:      0x000001bc (444) Subscription-Id-Data
       Flags:     0x40       (64)  [M]
       Length:    0x000017   (23)
       Data: XYZAB1234567891

[M]  Framed-IPv6-Prefix
   Code:      0x00000061 (97) Framed-IPv6-Prefix
   Flags:     0x40       (64)  [M]
   Length:    0x000012   (18)
   Data: Reserved: 00 Prefixlen: 64 IPv6 prefix: 2401:4900:4097:f050::

[M]  User-Equipment-Info
   Code:      0x000001ca (458) User-Equipment-Info
   Flags:     0x40       (64)  [M]
   Length:    0x00002c   (44)
    [M]  User-Equipment-Info-Type
       Code:      0x000001cb (459) User-Equipment-Info-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: IMEISV (0)

    [M]  User-Equipment-Info-Value
       Code:      0x000001cc (460) User-Equipment-Info-Value
       Flags:     0x40       (64)  [M]
       Length:    0x000018   (24)
       Data: 9876543211234

[M]  Called-Station-Id
   Code:      0x0000001e (30) Called-Station-Id
   Flags:     0x40       (64)  [M]
   Length:    0x00000b   (11)
   Data: ims

[V] [M]  Charging-Rule-Report
   Code:      0x000003fa (1018) Charging-Rule-Report
   Flags:     0xc0       (192) [V]  [M]
   Length:    0x00006c   (108)
   Vendor-Id: 0x000028af (10415) 3GPP
    [V] [M]  Charging-Rule-Name
       Code:      0x000003ed (1005) Charging-Rule-Name
       Flags:     0xc0       (192) [V]  [M]
```

```
            Length:    0x00001e   (30)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: I_AD_VOLTE00F72513

         [V] [M]  Charging-Rule-Name
            Code:      0x000003ed (1005) Charging-Rule-Name
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x00001e   (30)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: I_AD_VOLTE00F72512

         [V] [M]  PCC-Rule-Status
            Code:      0x000003fb (1019) PCC-Rule-Status
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x000010   (16)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: INACTIVE (1)

         [V] [M]  Rule-Failure-Code
            Code:      0x00000407 (1031) Rule-Failure-Code
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x000010   (16)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: RESOURCE_ALLOCATION_FAILURE (10)                          >> failure code is
incorrect. It should be PS_CS_Handover

     [V] [M]  Access-Network-Charging-Address
        Code:      0x000001f5 (501) Access-Network-Charging-Address
        Flags:     0xc0       (192) [V]  [M]
        Length:    0x000012   (18)
        Vendor-Id: 0x000028af (10415) 3GPP
        Data: IPv4 223.224.X.Y
```

Solution

In the customer network rel-8 diameter dictionary was used. It is found PS_CS_Handover was not supported in rel-8.
So, you need to update the dictionary to 3gpp-r10. After you have updated the dictionary to 3gpp-r10, the cause is properly sent as PS_CS_Handover.
After this, the end-users audio calls might be able to seamlessly handover to legacy 2G/3G network from VoLTE.

```
ims-auth-service DRA_Gx_SPG
   policy-control
     diameter dictionary r8-gx-standard
     diameter update-dictionary-avps 3gpp-r10    << diameter dictionary updated to 3gpp-r10
```

DELETE_BEARER_COMMAND message from SGW to PGW as voice bearer flag true:

```
INBOUND>>>>>  From sessmgr:205 tpc_interface.c:1338 (Callid 3cda3ef4) 13:28:21:659
Eventid:141004(3)
[PGW-S5/S2a/S2b]GTPv2C Rx PDU, from 223.224.M.N:39632 to 223.224.P.Q:2123 (57)
TEID: 0x845800CD, Message type: EGTP_DELETE_BEARER_COMMAND (0x42)
Sequence Number: 0xE9625A (15295066)
GTP HEADER
        Version number: 2
        TEID flag: Present
        Piggybacking flag: Not present
        Message Priority flag: Not present
        Message Priority: NA
```

```
        Message Length: 0x0035 (53)

INFORMATION ELEMENTS
        BEARER CONTEXT:
            Type: 93  Length: 10  Inst: 0
            Value:
                EPS BEARER ID:
                    Type: 73  Length: 1  Inst: 0
                    Value: 7

                BEARER FLAGS:
                    Type: 97  Length: 1  Inst: 0
                    Value:
                        VB : 1                                  >> voice bearer as true

        ULI TIMESTAMP:
            Type: 170  Length: 4  Inst: 0
            Value:
                Seconds: 3769747091
        USER LOCATION INFO:
            Type: 86  Length: 13  Inst: 0
            Value:
                Location type: TAI
                MCC: XYZ
                MNC: AB
                TAC: 0x844
                Location type: ECGI
                MCC: XYZ
                MNC: AB
                ECI: 0xDCF8C02

        UE TIME ZONE:
            Type: 114  Length: 2  Inst: 0
            Value:
                TZ: +5:30
                DST: +0 hour
```

Further, it is accepted by PGW and initiates the release of the bearer.

```
<<<<OUTBOUND  From sessmgr:205 sessmgr_egtp.c:2984 (Callid 3cda3ef4) 13:28:21:670
Eventid:141005(3)
[PGW-S5/S2a/S2b]GTPv2C Tx PDU, from 223.224.M.N:2123 to 223.224.P.Q:39632 (17)
TEID: 0x8064A25A, Message type: EGTP_DELETE_BEARER_REQUEST (0x63)
Sequence Number: 0xE9625A (15295066)
GTP HEADER
        Version number: 2
        TEID flag: Present
        Piggybacking flag: Not present
        Message Priority flag: Not present
        Message Priority: NA
        Message Length: 0x000D (13)

INFORMATION ELEMENTS
        EPS BEARER ID:
            Type: 73  Length: 1  Inst: 1
            Value: 7
```

CCR from PGW to PCRF with regards to the Charging-Rule-Report AVP with failure code seen as PS_CS_Handover.

```
<<<<OUTBOUND  From diamproxy:55 diamproxy_rlf.c:553 (Callid 3cda3ef4) 13:28:21:679
Eventid:81990(5)
```

```
Diameter message from 10.206.17.X:51119 to 10.5.40.Y:3007
  Base Header Information:
   Version:            0x01        (1)
   Message Length:     0x000260    (608)
   Command Flags:      0xc0        (192) REQ PXY
   Command Code:       0x000110    (272) Credit-Control-Request
   Application ID:     0x01000016  (16777238)   3GPP-Gx
   Hop2Hop-ID:         0xaebac4d3  (2931475667)
   End2End-ID:         0x19b8ec95  (431549589)
  AVP Information:
     [M]  Session-Id
        Code:      0x00000107 (263) Session-Id
        Flags:     0x40       (64)  [M]
        Length:    0x00004e   (78)
        Data: 0007-diamproxy.asr55k.dra.gx;1020935924;202167245;5d0747d1-cd02

     [M]  Auth-Application-Id
        Code:      0x00000102 (258) Auth-Application-Id
        Flags:     0x40       (64)  [M]
        Length:    0x00000c   (12)
        Data: 16777238

     [M]  Origin-Host
        Code:      0x00000108 (264) Origin-Host
        Flags:     0x40       (64)  [M]
        Length:    0x00002b   (43)
        Data: 0007-diamproxy.asr55k.dra.gx

     [M]  Origin-Realm
        Code:      0x00000128 (296) Origin-Realm
        Flags:     0x40       (64)  [M]
        Length:    0x00001a   (26)
        Data: cisco.com

     [M]  Destination-Realm
        Code:      0x0000011b (283) Destination-Realm
        Flags:     0x40       (64)  [M]
        Length:    0x00002a   (42)
        Data: PCRF.MNC0AB.MCCXYZ.3GPPNETWORK.ORG

     [M]  CC-Request-Type
        Code:      0x000001a0 (416) CC-Request-Type
        Flags:     0x40       (64)  [M]
        Length:    0x00000c   (12)
        Data: UPDATE_REQUEST (2)

     [M]  CC-Request-Number
        Code:      0x0000019f (415) CC-Request-Number
        Flags:     0x40       (64)  [M]
        Length:    0x00000c   (12)
        Data: 2

     [M]  Destination-Host
        Code:      0x00000125 (293) Destination-Host
        Flags:     0x40       (64)  [M]
        Length:    0x000037   (55)
        Data: PCRF01.NO.DC.PCRF.MNC0AB.MCCXYZ.3GPPNETWORK.ORG

     [M]  Origin-State-Id
        Code:      0x00000116 (278) Origin-State-Id
        Flags:     0x40       (64)  [M]
        Length:    0x00000c   (12)
        Data: 1559087623
```

```
[M]  Subscription-Id
   Code:      0x000001bb (443) Subscription-Id
   Flags:     0x40       (64)  [M]
   Length:    0x000028   (40)
    [M]  Subscription-Id-Type
       Code:      0x000001c2 (450) Subscription-Id-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: END_USER_E164 (0)

   [M]  Subscription-Id-Data
       Code:      0x000001bc (444) Subscription-Id-Data
       Flags:     0x40       (64)  [M]
       Length:    0x000014   (20)
       Data: 121234567891

[M]  Subscription-Id
   Code:      0x000001bb (443) Subscription-Id
   Flags:     0x40       (64)  [M]
   Length:    0x00002c   (44)
    [M]  Subscription-Id-Type
       Code:      0x000001c2 (450) Subscription-Id-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: END_USER_IMSI (1)

    [M]  Subscription-Id-Data
       Code:      0x000001bc (444) Subscription-Id-Data
       Flags:     0x40       (64)  [M]
       Length:    0x000017   (23)
       Data: XYZAB1234567891

[M]  Framed-IPv6-Prefix
   Code:      0x00000061 (97) Framed-IPv6-Prefix
   Flags:     0x40       (64)  [M]
   Length:    0x000012   (18)
   Data: Reserved: 00 Prefixlen: 64 IPv6 prefix: 2401:4900:4071:32ec::

[M]  User-Equipment-Info
   Code:      0x000001ca (458) User-Equipment-Info
   Flags:     0x40       (64)  [M]
   Length:    0x00002c   (44)
    [M]  User-Equipment-Info-Type
       Code:      0x000001cb (459) User-Equipment-Info-Type
       Flags:     0x40       (64)  [M]
       Length:    0x00000c   (12)
       Data: IMEISV (0)

    [M]  User-Equipment-Info-Value
       Code:      0x000001cc (460) User-Equipment-Info-Value
       Flags:     0x40       (64)  [M]
       Length:    0x000018   (24)
       Data: 9876543211234

[M]  Called-Station-Id
   Code:      0x0000001e (30) Called-Station-Id
   Flags:     0x40       (64)  [M]
   Length:    0x00000b   (11)
   Data: ims

[V] [M]  Charging-Rule-Report
   Code:      0x000003fa (1018) Charging-Rule-Report
   Flags:     0xc0       (192) [V]  [M]
   Length:    0x00006c   (108)
```

```
        Vendor-Id: 0x000028af (10415) 3GPP
         [V] [M]  Charging-Rule-Name
            Code:      0x000003ed (1005) Charging-Rule-Name
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x00001e   (30)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: I_AD_VOLTE03D4E98A

         [V] [M]  Charging-Rule-Name
            Code:      0x000003ed (1005) Charging-Rule-Name
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x00001e   (30)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: I_AD_VOLTE03D4E989

         [V] [M]  PCC-Rule-Status
            Code:      0x000003fb (1019) PCC-Rule-Status
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x000010   (16)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: INACTIVE (1)

         [V] [M]  Rule-Failure-Code
            Code:      0x00000407 (1031) Rule-Failure-Code
            Flags:     0xc0       (192) [V]  [M]
            Length:    0x000010   (16)
            Vendor-Id: 0x000028af (10415) 3GPP
            Data: PS_TO_CS_HANDOVER (13)                        >> failure code seen as
PS_to_CS_Handover

      [V] [M]  Access-Network-Charging-Address
         Code:      0x000001f5 (501) Access-Network-Charging-Address
         Flags:     0xc0       (192) [V]  [M]
         Length:    0x000012   (18)
         Vendor-Id: 0x000028af (10415) 3GPP
         Data: IPv4 223.224.X.Y
```

Appropriate diameter dictionary needs to be used for seamless handover of an audio call from VoLTE in 4G to legacy 2G/3G network through SRVCC handover. This was supported after the diameter dictionary was updated to 3gpp-rel10 under ims-auth-service.