

在SRVCC移交时排除故障音频呼叫转移问题在VoLTE

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简介

本文描述如何排除故障发生的问题，当音频呼叫在VoLTE无缝地不在SRVCC移交时转接。

[先决条件](#)

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Cisco 建议您了解以下主题：

- 硬件知识5000/5500
- StarOS

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本文档不限于特定的软件和硬件版本。

本文档中的信息都是基于特定实验室环境中的设备编写的。

本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

简称

VoLTE
SRVCC
CCR
CCA
AVP
PCRF
PCEF
SGW

在长期演变的语音
单个无线电语音呼叫连续性
信贷管制请求
信贷管制答案
属性值对
策略和正在充电规则功能
策略和正在充电执行功能
服务的网关

问题

服务提供商报告，即使SRVCC移交是成功的在女士，VoLTE呼叫无缝地未转接对传统2G/3G网络。在SRVCC移交完成后，信息女士对SGW的传送的DELETE_BEARER_COMMAND用语音持票人标志作为真和在PGW的持票人版本是成功的。但是，在进一步通信从PGW到PCRF，注意到PGW不通知PCRF作为PS_to_CS_Handover，即使SRVCC是成功的在末端女士。

故障排除

当从VoLTE转接到传统2G/3G网络通过SRVCC移交时，此部分提供信息为了排除故障音频呼叫处理问题。

与SRVCC移交的收集的“星期一-sub”跟踪。这是消息顺序被交换在女士、SGW、PGW和PCRF之间。

DELETE_BEARER_COMMAND消息从女士到SGW作为语音真持票人的标志：

```
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

进一步，SGW传送EGTP_DELETE_BEARER_COMMAND信息对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

进一步，DELETE_BEARER由PGW接受并且启动持票人的删除：

<<<<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

进一步，PGW启动往PCRF的CCR更新消息。这里，在正在充电规则报告AVP，PGW通知关于正在充电规则NAME、PCC规则状态和规则失败代码的PCRF。

此处发现PGW发送错误的规则失败代码对PCRF。当女士指示语音持票人版本(因为标志是真的)，PGW应该通知到PCRF作为PS_to_CS移交。而不是此，有报告对PCRF的Resource_Allocation_failure。

结果，PCRF考虑4G网络的失败并且通知同样对IMS。因此IMS启动VoLTE呼叫终止。因此，虽然SRVCC是成功的，呼叫无缝地未转接对传统2G/3G网络。

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更新消息从PGW到关于正在充电规则报告AVP的PCRF：

<<<<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
```

解决方案

在客户网络rel-8直径字典使用了。是被找到的PS_CS_Handover rel-8不支持它。因此，您需要更新字典到3gpp-r10。在您更新字典对3gpp-r10后，原因适当地发送作为PS_CS_Handover。

在此以后，最终用户音频呼叫也许是能无缝地移交到从VoLTE的传统2G/3G网络。

```
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消息从SGW到PGW作为语音真持票人的标志：

```
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

进一步，它由PGW接受并且发起持票人的版本。

<<<<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从PGW到关于正在充电规则报告AVP的PCRF与作为PS_CS_Handover被看到的故障代码。

<<<<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

适当的直径字典在4G需要用于音频呼叫的无缝的移交从VoLTE的到传统2G/3G网络通过SRVCC移交。这，在直径字典更新对在IMS验证服务下后的3gpp-rel10支持。