

Probleemoplossing voor audiogespreksprobleem op het moment dat SRVCC-ontvanger in VoLTE

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Inleiding

Dit document beschrijft hoe u het probleem kunt oplossen dat zich voordoet wanneer een audiobericht in VoLTE niet naadloos overzet ten tijde van de SRVCC-overdracht.

Voorwaarden

Vereisten

Cisco raadt kennis van de volgende onderwerpen aan:

- Hardware kennis van 5000/5500
- StarOS

Gebruikte componenten

Dit document is niet beperkt tot specifieke software- en hardware-versies.

De informatie in dit document is gebaseerd op de apparaten in een specifieke laboratoriumomgeving.

Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als uw netwerk levend is, zorg er dan voor dat u de mogelijke impact van om het even welke opdracht begrijpt.

Afkortingen

VoLTE
SRVCC
CCR
CCA
AVP

Voice over Long Term Evolutie
Continuum van één radio-spraakoproepen
Crediteringsaanvraag
Antwoord op kredietcontrole
Waarde kenmerk

PCRF
PCEF
SGW
PGW
MEVROUW

Beleids- en heffingsfunctie
Handhavings- en handhavingsfunctie
Serving-gateway
PacketData Network Gateway
Mobiliteitsbeheerentiteit

Probleem

De serviceprovider meldde dat, ook al was de overdracht van SRVCC bij MME succesvol, de VoLTE-oproep niet naadloos was overgebracht naar het bestaande 2G/3G-netwerk. Nadat de SRVCC overdracht werd voltooid, stuurde ME **DELETE_BEARER_COMMAND** bericht naar SGW met een stem onder de vlag aan toonder als waar en de versie aan toonder bij PGW was succesvol.

Maar bij verdere communicatie van PGW naar PCRF werd opgemerkt dat PGW PCRF niet meldt als PS_to_CS_Handover, hoewel SRVCC succesvol was aan het eind van MME.

Problemen oplossen

Deze sectie verschaft informatie om een oplossing te vinden voor het probleem van de audio-gespreksverwerking wanneer deze via SRVCC-overdracht wordt overgebracht van VoLTE naar een legacy 2G/3G netwerk.

Verzamelde "mon sub" sporen met de SRVCC overdracht. Hier is de reeks berichten die worden uitgewisseld tussen MME, SGW, PGW en PCRF.

VERWIJDEERT_BEARER_COMMAND bericht van MME naar SGW als spraak-boorder vlag waar:

```
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

Verder stuurt SGW EGTP_DELETE_BEARER_COMMAND bericht naar 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

Verder wordt **DELETE_BEARER** door PGW geaccepteerd en initieert hij het verwijderen van de toonder:

<<<

[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

Verder initieert PGW CCR-update naar PCRF. Hier informeert PGW in een Charging-Rule-Report AVP PCRF over de Charging-Rule-Name, PCC-Rule-Status en Rule-fail-Code. Hier blijkt dat PGW de verkeerde regel-falen-code naar PCRF stuurt. Zoals de MME heeft aangegeven dat de Voice Beonder (zoals de vlag waar was) is vrijgegeven, moet PGW bij de PCRF inlichten als PS_to_CS-overdracht. In plaats hiervan is er een Resource_Allocation_fail die aan PCRF wordt gemeld. Daardoor heeft PCRF overwogen te falen in 4G-netwerk en hetzelfde aan IMS mee te delen. Daarom initieerde IMS de afhandeling van VoLTE-gesprekken. Dus hoewel SRVCC succesvol was, werd de oproep niet naadloos overgebracht naar het legacy 2G/3G netwerk.

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 this IP-CAN bearer by including the Rule-Failure-Code AVP set to the value PS_TO_CS_HANDOVER.

CCR-update-bericht van PGW naar PCRF met betrekking tot het kostenregel-rapport AVP:

<<<

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)

incorrect. It should be PS_CS_Handover

>> failure code is

[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

Oplossing In het netwerk van de klant werd rel-8 diameterwoordenboek gebruikt. Het blijkt dat PS_CS_Handover niet ondersteund werd in rel 8.

U moet het woordenboek dus aanpassen aan 3gpp-r10. Nadat u het woordenboek hebt bijgewerkt aan 3gpp-r10, wordt de oorzaak correct verzonden als PS_CS_Handover.

Hierna kunnen de audio-telefoontjes van de eindgebruiker moeiteloos overdragen van VoLTE naar een nationaal 2G/3G-netwerk.

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

VERWIJDERT_BEARER_COMMAND-bericht van SGW naar PGW als spraak-drager-vlag:

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

Voorts wordt het door PGW geaccepteerd en wordt het initiatief genomen tot de vrijgave van de houder.

<<<

[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 van PGW naar PCRF met betrekking tot de Charging-Rule-Report AVP met een mislukkingscode die gezien wordt als PS_CS_Handover.

<<<

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

Er moet een passend diameterwoordenboek worden gebruikt voor de naadloze overdracht van een audioboodschap van VoLTE in 4G naar het bestaande 2G/3G-netwerk via SRVCC-overdracht. Dit werd ondersteund nadat het diameterwoordenboek werd bijgewerkt tot 3gpp-rel10 onder ims-auth-service.