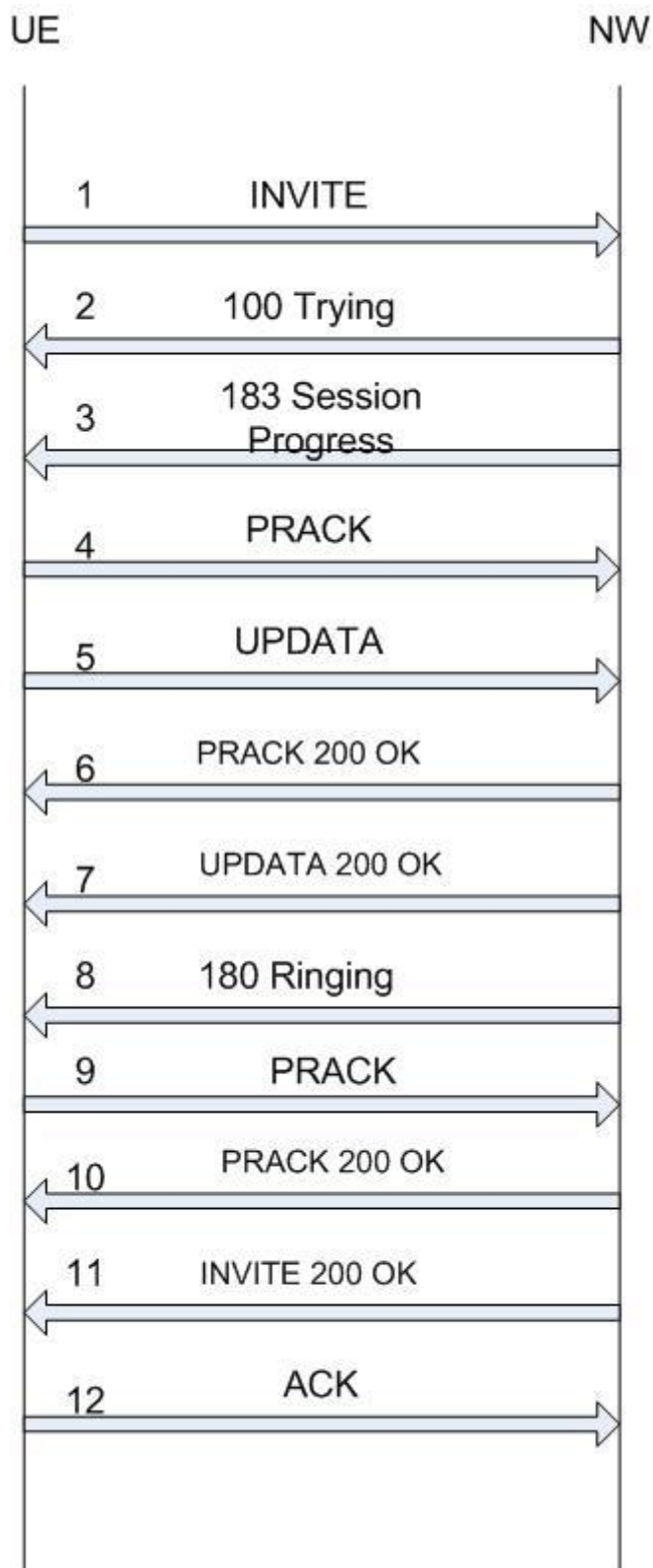# VoLTE呼叫SIP信令分析

VoLTE主叫与网络侧交互流程

1 1 INVITE

/**UE 向网侧发起 INVITE 请求，

sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org 是 IMPU

18801200325 是被叫的号码，SIP/2.0 是协议版本号*/

INVITE sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=phone

SIP/2.0

/**电话是 18813050064 呼出的,*/

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

/**被叫电话是 18801200325*/

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>

P-Preferred-Identity: <sip:+8618813050064@ims.huawei.com>

Contact:

<sip:460602013050064@192.168.57.10:5060>;+sip.instance="<urn:gsma:ime

i:86527602-000237-4>";+g.3gpp.icsi-ref="urn%%3Aurn-7%%3A3gpp-service.

ims.icsi.mmtel";+g.3gpp.mid-call;+g.3gpp.srvcc-alerting;video

Accept-Contact:

*;+g.3gpp.icsi-ref="urn%%3Aurn-7%%3A3gpp-service.ims.icsi.mmtel"

Request-Disposition: fork

/** E-UTRAN 表示 4G

TDD 是 TDD 制式,现在支持 TDD 和 FDD 的 4G 通话*/

P-Access-Network-Info:

3GPP-E-UTRAN-TDD;utran-cell-id-3gpp="460600000000A06A"

/**打开了 precondition */

Supported: 100rel,join,norefersub,precondition,replaces,timer

Allow: INVITE,ACK,BYE,CANCEL,UPDATE,INFO,PRACK,SUBSCRIBE,NOTIFY,REFER

Session-Expires: 1800

Min-SE: 90

Call-ID: bbecbowMm@192.168.57.10

CSeq: 1 INVITE

/**VoLTE 呼叫经过的网络节点数最大值*/

Max-Forwards: 70

User-Agent: RCS-client/OMA1.0 HW-VxW/V1.0

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKddecbowMmawMmxhaaGL2;rport

Content-Type: application/sdp

Content-Length: 833

v=0

o=vue 3202 0 IN IP4 192.168.57.10

s=-

c=IN IP4 192.168.57.10

t=0 0

m=audio 31004 RTP/AVP 108 106 101 102

/**********************

AMB-WB 宽带，a 开头的字段是详细解释

有 4 种编码方式：

宽带 108

窄带 101

宽带 DTMF 描述 101

宽带 DTMF 描述 102

*/

a=rtpmap:108 AMR-WB/16000/1

a=fmtp:108 mode-change-capability=2;max-red=0

/*********************

AMR 就表示 AMR-NB（窄带）

*******************/

a=rtpmap:106 AMR/8000/1

a=fmtp:106 mode-change-capability=2;max-red=0

a=rtpmap:101 telephone-event/16000

a=fmtp:101 0-15

a=rtpmap:102 telephone-event/8000

a=fmtp:102 0-15

/*************

表示 1 帧/20ms

**************/

a=ptime:20

/*************

表示 1 帧/240 秒是个界限，网络侧不能低于这个速率

****************/

a=maxptime:240

/*************

SDP 协商

***************/

a=sendrecv

/*************

curr：当前状态

Precondition type：qos

status type: local

***************/

a=curr:qos local none

a=curr:qos remote none

/***************

des：期望

derection tag：sendrecv

级别：optional，级别从低到高是 none（资源没有），optional（资源可选），

mandatory（资源一定要有）

***************/

a=des:qos optional local sendrecv

a=des:qos optional remote sendrecv

/**************

m 开头的字段是多媒体信息描述

**************/

m=video 37050 RTP/AVP 118 123

a=rtpmap:118 H264/90000

a=fmtp:118 profile-level-id=64E00D; max-br=640

a=rtpmap:123 H264/90000

a=fmtp:123 profile-level-id=42E00D; max-br=640

a=sendrecv

a=curr:qos local none

a=curr:qos remote none

a=des:qos optional local sendrecv

a=des:qos optional remote sendrecv

2 2   100 Trying

/**网络侧回了 100 Trying 表示网络侧在尝试连接被叫

*/

SIP/2.0 100 Trying

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKddecbowMmawMmxhaaGL2;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>

CSeq: 1 INVITE

Content-Length: 0

3 3 183 Session Progress

/**********************

网络侧回 183 表示网络侧在做资源预留，建立 QCI5，QCI1 等承载

*/

SIP/2.0 183 Session Progress

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKddecbowMmawMmxhaaGL2;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

CSeq: 1 INVITE

Allow: INVITE,ACK,BYE,CANCEL,UPDATE,INFO,PRACK,SUBSCRIBE,NOTIFY,REFER

Contact: <sip:72.10.10.51:5060>

Require: 100rel,precondition

Server: RCS-client/OMA1.0 HW-VxW/V1.0

RSeq: 1

Feature-Caps: *;+g.3gpp.srvcc;+g.3gpp.srvcc-alerting

Content-Length: 689

Content-Type: application/sdp

v=0

o=- 21401 21401 IN IP4 72.10.10.60

s=SBC call

c=IN IP4 72.10.10.60

t=0 0

m=audio 48150 RTP/AVP 108 101

a=rtpmap:108 AMR-WB/16000/1

a=fmtp:108 mode-change-capability=2;max-red=0

a=rtpmap:101 telephone-event/16000

a=fmtp:101 0-15

a=ptime:20

a=maxptime:240

/**SDP

*/

a=sendrecv

a=curr:qos local none

a=curr:qos remote none

a=des:qos mandatory local sendrecv

a=des:qos mandatory remote sendrecv

a=conf:qos remote sendrecv

m=video 48152 RTP/AVP 118

a=rtpmap:118 H264/90000

a=fmtp:118 profile-level-id=64E00D;max-br=640

a=sendrecv

a=curr:qos local none

a=curr:qos remote none

a=des:qos mandatory local sendrecv

a=des:qos mandatory remote sendrecv

a=conf:qos remote sendrecv

4 4　PRACK

```
/****************
```
PRACK UE 等待网络预留资源分配
```
****************/
PRACK sip:72.10.10.51:5060 SIP/2.0
From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow
To:
"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=
phone>;tag=sbc080479mp79ee
Call-ID: bbecbowMm@192.168.57.10
CSeq: 2 PRACK
Max-Forwards: 70
User-Agent: RCS-client/OMA1.0 HW-VxW/V1.0
Via: SIP/2.0/UDP
192.168.57.10:5060;branch=z9hG4bKaeecbowMmawMmxhaaqJ2;rport
RAck: 1 1 INVITE
Content-Length: 0
```

5 5 UPDATE

```
/********************
UE收到QCI=1 等承载建立后就发UPDATE
UE发UPDATE和UE收到PRACK 200 OK的顺序在不同场景下前后顺序会互换
********************/
UPDATE sip:72.10.10.51:5060 SIP/2.0
From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow
To:
"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=
phone>;tag=sbc080479mp79ee
Contact: <sip:460602013050064@192.168.57.10:5060>
P-Access-Network-Info:
3GPP-E-UTRAN-TDD;utran-cell-id-3gpp="460600000000A06A"
Supported: 100rel,join,norefersub,precondition,replaces,timer
Allow: INVITE,ACK,BYE,CANCEL,UPDATE,INFO,PRACK,SUBSCRIBE,NOTIFY,REFER
Session-Expires: 1800
Min-SE: 90
Call-ID: bbecbowMm@192.168.57.10
CSeq: 3 UPDATE
Max-Forwards: 70
User-Agent: RCS-client/OMA1.0 HW-VxW/V1.0
Via: SIP/2.0/UDP
192.168.57.10:5060;branch=z9hG4bKbfecbowMmawMmxhaayba;rport
Content-Type: application/sdp
Content-Length: 639
v=0
o=vue 3202 3202 IN IP4 192.168.57.10
s=-
c=IN IP4 192.168.57.10
t=0 0
m=audio 31004 RTP/AVP 108 101
a=rtpmap:108 AMR-WB/16000/1
a=fmtp:108 mode-change-capability=2;max-red=0
a=rtpmap:101 telephone-event/16000
a=fmtp:101 0-15
a=ptime:20
a=maxptime:240
a=sendrecv
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
```

```
m=video 37050 RTP/AVP 118
a=rtpmap:118 H264/90000
a=fmtp:118 profile-level-id=64E00D; max-br=640
a=sendrecv
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
```

6 6　PRACK 200 OK

SIP/2.0 200 OK

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKaeecbowMmawMmxhaaqJ2;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=phone>;tag=sbc080479mp79ee

CSeq: 2 PRACK

Server: RCS-client/OMA1.0 HW-VxW/V1.0

Content-Length: 0

7 7   200 OK

SIP/2.0 200 OK

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKbfecbowMmawMmxhaayba;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

CSeq: 3 UPDATE

Allow: INVITE, ACK, BYE, CANCEL, UPDATE, INFO, PRACK, SUBSCRIBE, NOTIFY, REFER

Contact: <sip:72.10.10.51:5060>

Server: RCS-client/OMA1.0 HW-VxW/V1.0

Supported: 100rel, join, norefersub, precondition, replaces

Content-Length: 649

Content-Type: application/sdp

v=0

o=- 21401 21402 IN IP4 72.10.10.60

s=SBC call

c=IN IP4 72.10.10.60

t=0 0

m=audio 48150 RTP/AVP 108 101

/****************

最后使用的是宽带还是窄带要看整个流程的最后的 SDP，这里看出协商后是宽带

*****************/

a=rtpmap:108 AMR-WB/16000/1

a=fmtp:108 mode-change-capability=2;max-red=0

a=rtpmap:101 telephone-event/16000

a=fmtp:101 0-15

a=ptime:20

a=maxptime:240

a=sendrecv

a=curr:qos local sendrecv

a=curr:qos remote sendrecv

a=des:qos mandatory local sendrecv

a=des:qos mandatory remote sendrecv

m=video 48152 RTP/AVP 118

a=rtpmap:118 H264/90000

a=mtp:118 profile-level-id=64E00D;max-br=640

a=sendrecv

a=curr:qos local sendrecv

a=curr:qos remote sendrecv

a=des:qos mandatory local sendrecv

a=des:qos mandatory remote sendrecv

8 8   180 Ringing

/********************

被叫响铃后，网络侧给主叫发 180Ringing

**********************/

SIP/2.0 180 Ringing

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKddecbowMmawMmxhaaGL2;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

CSeq: 1 INVITE

Allow: INVITE,ACK,BYE,CANCEL,UPDATE,INFO,PRACK,SUBSCRIBE,NOTIFY,REFER

Contact: <sip:72.10.10.51:5060>

Require: 100rel,precondition

Server: RCS-client/OMA1.0 HW-VxW/V1.0

RSeq: 2

Feature-Caps: *;+g.3gpp.srvcc;+g.3gpp.srvcc-alerting

Content-Length: 0

9 9 PRACK

/*****************

UE 侧收到 183 或 180 的信令后都会回 PRACK

*****************/

PRACK sip:72.10.10.51:5060 SIP/2.0

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

Call-ID: bbecbowMm@192.168.57.10

CSeq: 4 PRACK

Max-Forwards: 70

User-Agent: RCS-client/OMA1.0 HW-VxW/V1.0

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKcgecbowMmawMmxhaaOda;rport

RAck: 2 1 INVITE

Content-Length: 0

10 10 PRACK 200 OK

/********************

由于 UPDATA 已经协商完了，这里 200 OK 就没有 SDP 了

*******************/

SIP/2.0 200 OK

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKcgecbowMmawMmxhaaOda;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

CSeq: 4 PRACK

Server: RCS-client/OMA1.0 HW-VxW/V1.0

Content-Length: 0

11 11 INVITE 200 OK

SIP/2.0 200 OK

Via: SIP/2.0/UDP

192.168.57.10:5060;branch=z9hG4bKddecbowMmawMmxhaaGL2;rport=5060

Call-ID: bbecbowMm@192.168.57.10

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:

"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=

phone>;tag=sbc080479mp79ee

CSeq: 1 INVITE

Allow: INVITE,ACK,BYE,CANCEL,UPDATE,INFO,PRACK,SUBSCRIBE,NOTIFY,REFER

Contact: <sip:72.10.10.51:5060>;+g.3gpp.mid-call

Require: timer

Server: RCS-client/OMA1.0 HW-VxW/V1.0

Supported: tdialog,100rel,join,norefersub,precondition,replaces

Session-Expires: 1800;refresher=uac

Feature-Caps: *;+g.3gpp.srvcc;+g.3gpp.srvcc-alerting

Content-Length: 0

12 12   ACK

/***************

给网络侧下发的最后的 200 OK 回 ACK

***************/

ACK sip:72.10.10.51:5060 SIP/2.0

From: <sip:+8618813050064@ims.huawei.com>;tag=ccecbow

To:
"18801200325"<sip:18801200325@ims.mnc060.mcc460.3gppnetwork.org;user=phone>;tag=sbc080479mp79ee

Contact: <sip:460602013050064@192.168.57.10:5060>

Call-ID: bbecbowMm@192.168.57.10

CSeq: 1 ACK

Max-Forwards: 70

User-Agent: RCS-client/OMA1.0 HW-VxW/V1.0

Via: SIP/2.0/UDP
192.168.57.10:5060;branch=z9hG4bKdhecbo0SWa0SWOhaa4cw;rport

Content-Length: 0