

MTAS 17A Technical Product Description NW AS Communication Interworking Communication IWF

TECHN PRODUCT DESCR



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1 Introduction

1.1 Scope

This document is part of MTAS TPD document series and describes the Communication Interworking in Network Application Server (hence forth called NW AS), which provides the communication Interworking Functions.

Current version only support Originating Precondition Interworking Function as communication Interworking Functionality.

1.2 Change History

Table 1 - Revision History

| Revision | Date | Comments/Changes |
|----------|------------|----------------------------|
| A | 2016-09-06 | Final Version for 17A |
| B | 2017-08-23 | Update for vMTAS Licensing |

2 Network AS Communication IWF Features

2.1 NW AS Communication IWF Overview

There are cases in VoLTE network when some connected SIP entities missing some standard SIP capability (e.g Precondition negotiation for QoS). This missing capability can result in the communication failure.

The Ericsson NW AS Communication Interworking Function works as B2BUA and fulfills missing SIP signaling between two SIP entities of network so that communication can be successful.

NW AS sits in the originating network.

NW AS can be deployed on MTAS as standalone node or collocated with MMTEL AS.

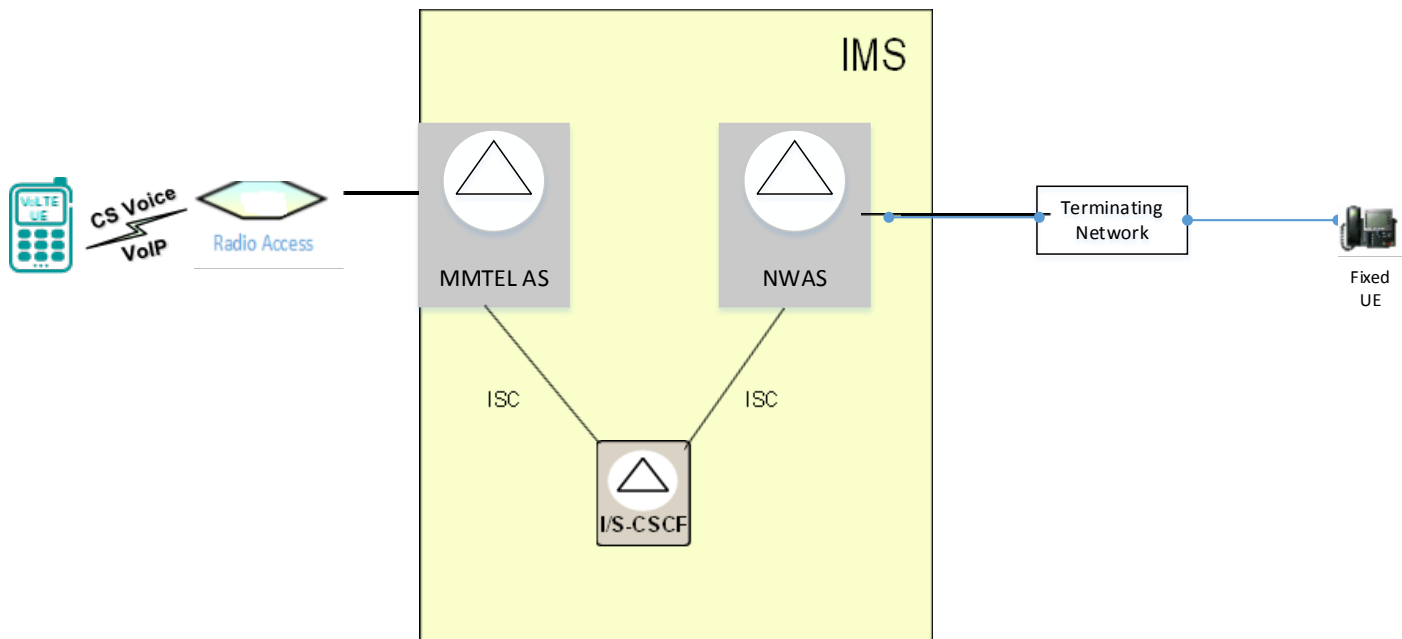


Figure 1 NWAS in solution

2.2 QoS Precondition

When the VoLTE device is calling a SIP end point which does not support QoS precondition negotiation, multiple issues may arise:

Ghost ringing: As the terminating SIP end point lacking in the QoS precondition negotiation support, the caller will not have the network resources reserved and which will result in “Ghost Ringing”.

Misrepresentation of call success: For the terminals not supporting the QoS precondition negotiation the rejection of resource reservation will be known only after receiving 200 OK, the call shall be released using BYE. This may be shown as a successful call which can have charging implications as well as incorrect performance counter results.

Media clipping: Even if the resources are available at the caller side, the bearer setup will be delayed relative to the answer as no QoS precondition negotiation is done, so the first media packets from the called party can be lost.

2.3 QoS Precondition procedures

2.3.1 Description

The QoS precondition negotiation is important for network resource reservation and bearer setup.

The NW AS supports Precondition Interworking by acting as B2BU between the Originating and terminating UE.



NW AS uses MRFP to generate the SDP Answer for the offer received in INVITE for QoS Preconditions.

NW AS identifies lack of Precondition Support by

- 1) Predefined List of terminating Number ranges in SIP domain.
- 2) On receipt of 18x Message from Termination UE without Support of precondition.

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2.3.2 Example Call Flow

2.3.2.1 Precondition Trigger based on 18x Response from UE-B.

Preconditions:

A valid license for Communication IWF NW AS is present.

NW AS Administrative State is UNLOCKED.

The CM attribute mtasPrlwAdministrativeState is UNLOCKED.

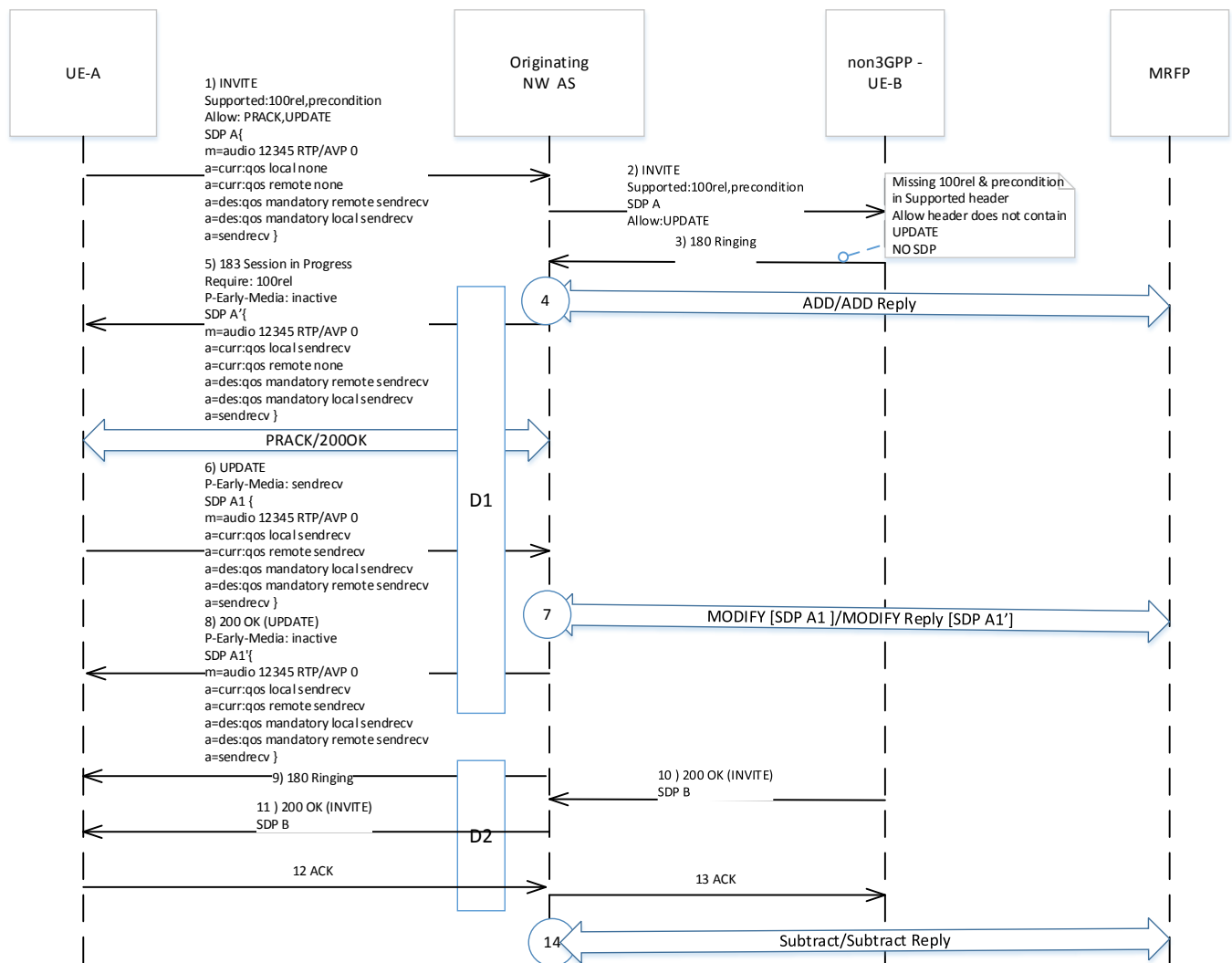


Figure 2 : Remote End does not support 100rel, precondition and UPDATE

1. UE-A sends an INVITE message in order to establish communication with UE-B. The INVITE contains header “Supported: precondition”, the SDP contains QoS preconditions where local preconditions haven’t been fulfilled and media direction line is sendrecv:

```
m=audio 12345 RTP/AVP 0
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv
```

2. NW AS sends INVITE message towards UE-B.
3. UE-B sends “180 Ringing” without SDP and Supported header do not contain precondition and 100rel and Allow Header do not contain UPDATE.



4. NW AS sends ADD request towards MRFP. MRFP Replies back with Add Reply. Reply Timer is stopped.
5. NW AS creates and sends a 183 Session in Progress to UE-A containing a SDP indicating that it has reserved. P-E-M is kept inactive.

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv
```

UE-A confirms the reception of “183 Session in Progress” with PRACK.

PRACK is answered with 200 OK.

6. UE-A has allocated the necessary resources and sends UPDATE message containing SDP indicating that preconditions are fulfilled:

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
```

7. NW AS sends MODIFY towards MRFP with SDP A1 and receives SDP A1' from MRFP in modify REPLY.
8. NW AS sends 200 OK (UPDATE) with SDP A1', with P-E-M as inactive:

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
```

9. NW AS sends 180 Ringing towards UE-A, received at step 3.
10. NW AS receives 200 OK of INVITE from UE-B with SDP.
11. NW AS sends 200 OK towards UE-A.
12. UE-A sends ACK towards NW AS.
13. NW AS sends ACK towards UE-B.
14. NW AS sends Subtract towards MRFP.



2.3.2.2 Precondition Trigger based on Pre-configured called party Numbers.

Preconditions:

A valid license for Communication IWF NW AS is present on the NW AS.

NW AS Administrative State is UNLOCKED.

The CM attribute `mtasPrlwAdministrativeState` is UNLOCKED.

The CM attribute `mtasPrlwBnumRangeWithoutPrecond` is configured with Number ranges in SIP Domain not supporting precondition. E.g "613*", "6174".

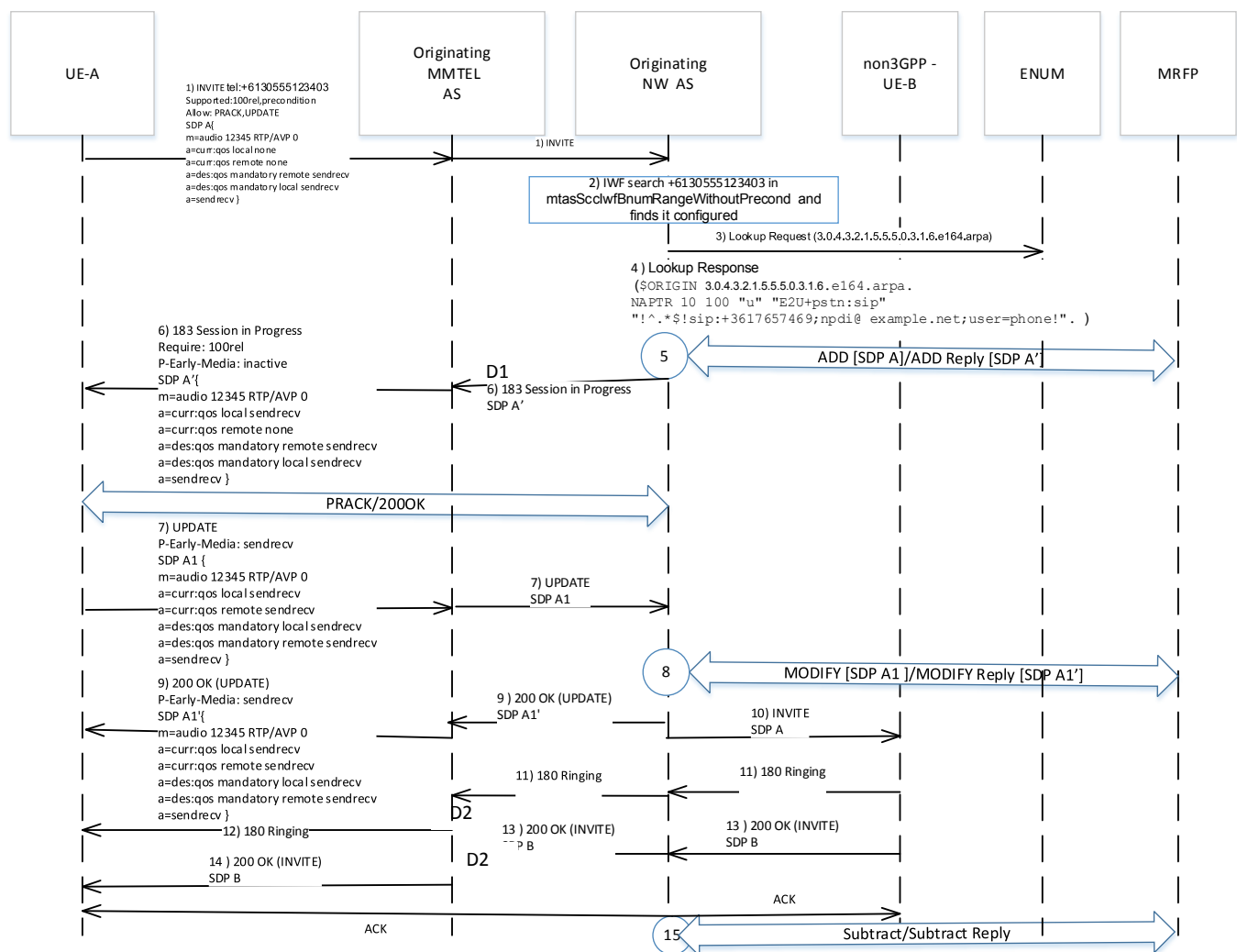


Figure 3 : Originating NW AS,Preconfigured Called Party Number.



NOTE: Number range must start in global format. Intl access prefix '+' not included in configured number range

1. UE-A sends an INVITE (+6130555123403) message in order to establish communication with UE-B. The INVITE contains header "Supported: precondition", the SDP contains QoS preconditions where local preconditions haven't been fulfilled and media direction line is sendrecv:

```
m=audio 12345 RTP/AVP 0
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv
```

2. NW AS checks it is telephone subscriber and fetch the called party Number +6130555123403 (normalised). NW AS searches the dialled number in configured MtasPrIwBnumRangeWithoutPrecond.parameter and finds it configured (matches against configured 613).
3. NW AS sends ENUM query using the dialled number +6130555123403 towards ENUM server.
4. ENUM server replies back with response. NW AS finds the result URI in SIP domain (looking at returned URI sip prefix).
5. NW AS sends ADD request towards MRFP. MRFP Replies back with Add Reply. Reply Timer is stopped.
6. NW AS creates and sends a 183 Session in Progress to UE-A containing a SDP indicating that it has reserved

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv
```

UE-A confirms the reception of "183 Session in Progress" with PRACK.

PRACK is answered with 200 OK.

7. UE-A has allocated the necessary resources and sends UPDATE message containing SDP indicating that preconditions are fulfilled:

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
```

8. NW AS sends MODIFY towards MRFP with SDP A1 and receives SDP A1' from MRFP in modify REPLY.



9. NW AS sends 200 OK (UPDATE) with SDP A1':

```
m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
```

10. NW AS sends INVITE message towards UE-B.

11. UE-B sends "180 Ringing" towards NW AS

12. NW AS sends 180 Ringing towards UE-A.

13. NW AS receives 200 OK of INVITE from UE-B with SDP.

14. NW AS sends 200 OK towards UE-A.

NW AS sends ACK towards UE-A.

NW AS sends ACK towards UE-B.

15. NW AS sends Subtract towards MRFP.

2.3.2.3 Precondition fulfillment from SRVCC Handover based.

Preconditions:

A valid license for Communication IWF NW AS is present on the NW AS.

NW AS Administrative State is UNLOCKED.

The CM attribute `mtasPrlwAdministrativeState` is UNLOCKED.



```

m=audio 12345 RTP/AVP 0
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv

```

2. SCC AS sends INVITE message towards NW AS, NW AS forwards INVITE towards UE-B.
3. UE-B sends “180 Ringing” without SDP and Allow Header do not contain UPDATE.
4. NW AS sends ADD request towards MRFP. MRFP Replies back with Add Reply.
5. NW AS creates and sends a 183 Session in Progress to SCC AS and SCC AS forwards it to UE-A containing a SDP indicating that it has completed the reservation:

```

m=audio 12345 RTP/AVP 0
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory remote sendrecv
a=des:qos mandatory local sendrecv
a=sendrecv

```

UE-A confirms the reception of “183” with PRACK.

PRACK is answered with 200 OK.

6. UE-A sends UPDATE confirming the resource reservation.
 - 6-a NW AS Sends MODIFY towards MRFP with SDP A1 received in UPDATE and receives A1' in the MODIFY RESPONSE.
7. NW AS replies back with 200 OK for UPDATE with QoS reservation confirmation.
8. NW AS sends 180 Ringing received in step 3, towards UE-A.
9. UE-A moves to CS access and MSC sends INVITE STN-SR, PAI:C-MSISDN, Contact:g.3gpp.srvcc-alerting, SDP towards SCC AS.
10. SCC AS SRVCC service generated UPDATE message which is handled by NW AS.
11. NW AS sends MODIFY with SDP A2 towards MRFP and receives SDP A2' from MRFP in MODIFY REPLY.
12. NW AS sends 200 OK for UPDATE to SCC-AS SRVCC service.
13. SCC-AS sends 183 Session in Progress towards UE-A.



14. UE-B sends 200 OK for INVITE towards NW AS. NW AS forwards it towards SCC AS.

MSC responds with a PRACK.

200 OK on PRACK sent from SCC AS.

15. For the first received PRACK, SCC AS sends a SIP INFO request to MSC in the dialog created by the SIP INVITE request due to static STN with application/vnd.3gpp.state-and-event-info content that the call is in alerting state.

16. MSC acknowledges with 200 OK and enters Call delivered state.

17. SCC AS sends 200 OK for INVITE received in step 14 from UE-B.

18. MSC sends ACK towards SCC AS.

19. SCC AS sends ACK towards NW AS. NW AS sends ACK towards UE-B.

20. NW AS sends REINVITE without SDP towards B.

21. UE-B sends 200 OK for REINVITE with SDP offer B1.

22. NW AS sends REINVITE towards MSC with SDP B1.

23. MSC replies with SDP A3 in 200 OK for REINVITE.

24. NW AS sends ACK towards MSC.

25. NW AS appends the SDP A3 in ACK and sends towards UE-B.

26. NW AS sends Subtract towards MRFP.

3 Network AS Known Limitation

- 1) Current release supports only QoS preconditions fulfillment on behalf of terminating UE.
- 2) Media direction sendrecv is only supported in Initial INVITE with QoS precondition negotiation request.

3.1 Geographical Redundancy

3.1.1 Description

NW AS supports geographical redundancy meaning that the IMS system can be configured with two NW ASs. If the primary NW AS is restarting or unavailable, the secondary NW AS can be used in the system.



4 Acronyms and Abbreviations

| | |
|-------------------|-------------------------------------|
| NW AS | Network Application Server |
| B2BUA | Back to Back User Agent |
| Communication IWF | Communication Interworking Function |
| AS | Application Server |
| QoS | Quality of Service |
| MMTel | Multi-Media Telephony |
| QoS | Quality of Service |
| S-CSCF | Serving-CSCF |
| SR-VCC | Single Radio Voice Call Continuity |
| UA | User Agent |
| UE | User Equipment |
| VoLTE | Voice over LTE |
| MRFP | Media Resource Function Point |



5 Reference Documents

- [1] MTAS Technical Product Description Common Features 1/221 02-FGC 101 2990
- [2] MTAS Technical Product Description MMTel AS 2/221 02-FGC 101 2990