Technical Specification of the SIP (Gm) interface between the User Equipment (UE) and the NGN platform of Deutsche Telekom

1 TR 114

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Amendment 3 (Implementation Guideline for use of preconditions)

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1 Scope

This Amendment is an addition to 1 TR 114 V3.0.0 and replaces section 4.2.1 of the main document.

2 References

See 1TR114 and 1TR114 Annex B_V020000_TS24229-b60.pdf

3 Modifications to 1 TR 114 preconditions

Replace Section 4.2.1 with the following text:

§4.2.1 SIP capabilities

The support of Preconditions is OPTIONAL. i.e Deutsche Telekom does not use preconditions in the IMS.

If the end device vendor decide to implement preconditions then the procedures as described under section 4 of this document shall apply.

The request of Preconditions (indication of SUPPORT/REQUIRED) within an initial INVITE) with the initial INVITE SHALL NOT be done.

SIP INVITE Messages requesting preconditions may be supported with a proper precondition handling. Further information pleases see Section 4 (Bullet point $5.1.4.1) of this document.

SIP URIs shall be supported in SIP header fields.

The use of the P-Early-Media header is mandatory i.e. each INVITE has to contain a P-Early-Media Header set to supported.

For SIP UE supporting SIP-Analogue and SIP-ISDN interworking (e.g. IAD) the subscription of the "ua-profile" is **implicit.** This overrules the procedures stated within 1TR126 ANNEX A Section “A 5.3.1.2 Subscription for profile delivery” and 1TR127 ANNEX B Section “A 5.3.1.2 Subscription for profile delivery”

The sending of the SUBSCRIBE Method for the “ua-profile” and “MWI package” shall not apply.

The support of Reliable Provisional Responses as defined in RFC3262 [27] and within 1TR114 (including Annex B) are mandatory. The following description shows the most important settings of the option tag 100rel and the procedures for sending PRACK/200 OK (PRACK):

1. RFC3262 [27] describes the procedures for the 100rel option tag :

   ```
   This option tag is for reliability of provisional responses.  When
   present in a Supported header, it indicates that the UA can send or
   receive reliable provisional responses. When present in a Require header
   in a request, it indicates that the UAS MUST send all provisional
   responses reliably. When present in a Require header in a reliable
   provisional response, it indicates that the response is to be sent
   reliably.
   ```

2. The originating UE (UAC) shall include the 100rel option tag into the SIP supported header field of the INVITE as defined in RFC3262 [27].

3. Each INVITE received by an terminating UE (UAS) with a 100rel option tag in the SIP supported header indicates that the originating UE (UAC) is able to handle 100rel. In case the terminating UE (UAS) wants to have the provisional response reliable then it has to set the option tag 100rel in the require header as defined in RFC3262 [27]. This is only allowed when the SDP answer contains the SDP to be used for the session.

4. Each Response received by the originating UE (UAC) with a 100rel in the required header shall be correctly answered regarding the procedures of 1TR114 and RFC3262 [27]. (i.e. sending PRACK)

4. Correct Use and handling of preconditions

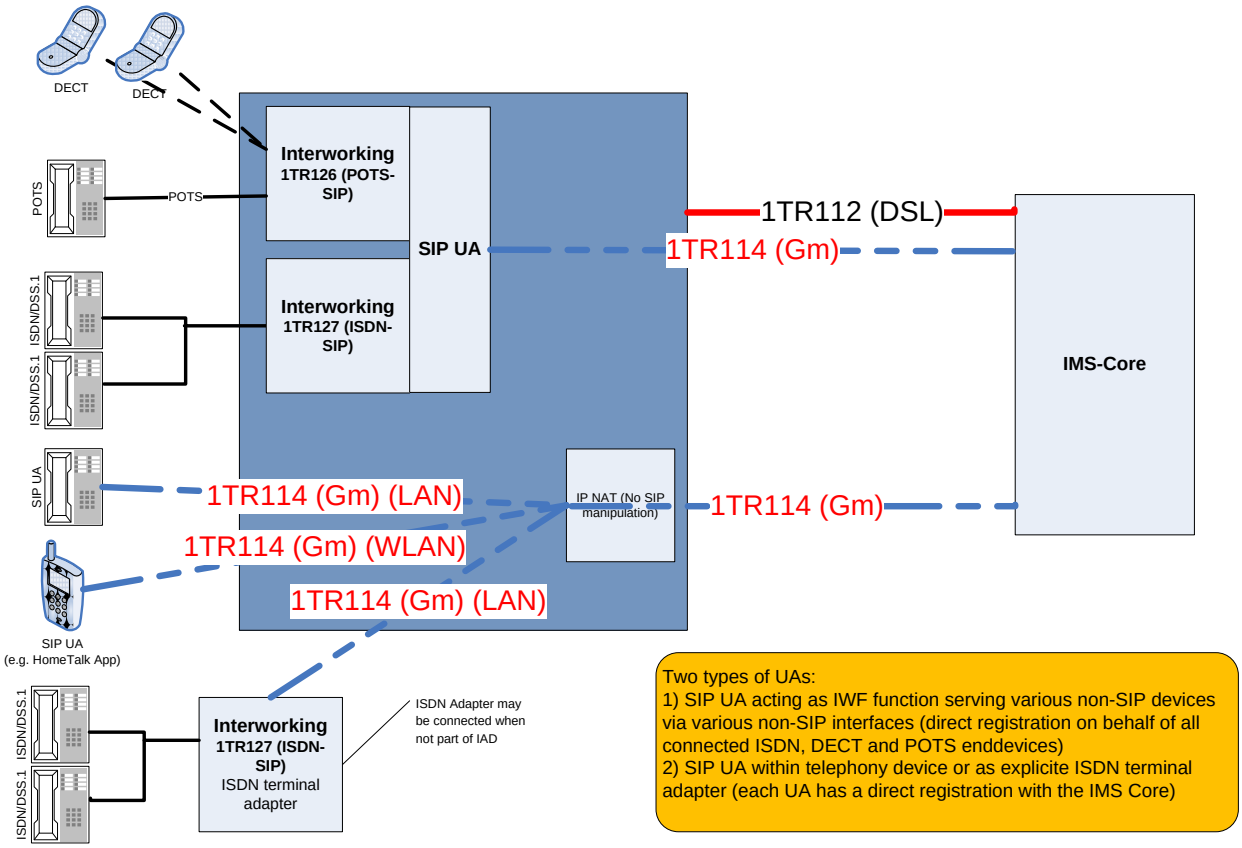

Figure 1 Possible architecture of an IAD

In case the IAD/SIP UE supports preconditions then the following procedures shall apply:

Depended on the IAD/ SIP UE implementation there could be different SDP profiles to be answered for different connected devices as shown in Figure 1. I.e. the direct connected end devices to the IAD and internal SIP UA will be presented with their possible SDP profile.

The connected UA's/Phones may use different codecs. i.e. DECT phones may be compliant with G.711 and G.722 and analogue Phones only with G.711. Also SIP UA's directly connected over the Ethernet may have a spread of codecs to be supported. The main document (1TR114) describes which codecs are supported within Deutsche Telekoms IMS network.

When different connected end devices (DECT , POTS, ISDN) have different SDP profiles to be supported a differentiation has to be done when sending provisional responses with SDP.

The IAD has to sent for each SDP profile representing the codecs used by one or more end devices a provisional Response containing the valid SDP.

The SIP procedures apply as follows:

In addition to the procedures defined in Section §5.1.3.1 and §5.1.4.1 and RFC 3312 [30] the following shall apply:

1. Sending provisional responses shall only indicate the SDP supported by the end device (or group of end devices with the same characteristics) to be connected. In cases where an IAD connect two different end devices with different codec profile then for each a provisional response shall be generated.

2. The procedures for answering the initial INVITE set the correct from/to tag and call ID due to RFC 3261 procedures which are then different for each provisional response when answering with multiples provisional response for each end device or end device group.

The following section is a copy out of 1TR114 Annex B_V020000_TS24229-b60.pdf and replaces the regarding text in 1TR114 Annex B_V020000_TS24229-b60.pdf

$5.1.3.1 Initial INVITE request

If a UE for non mobile access supports the precondition mechanism then the UE shall set neither the supported nor the required header for preconditions when sending a initial INVITE.
The support of preconditions (if implemented) is "passive" and if initial INVITE received by the UE and indicates the precondition mechanism as supported or required the UE shall reserve the local resources and indicate the preconditions as required within the response to the initial INVITE. Further detail is described within the following section.

Upon generating an initial INVITE request, the UE shall include the Accept header field with "application/sdp", the MIME type associated with the 3GPP IM CN subsystem XML body (see subclause 7.6.1) and any other MIME type the UE is willing and capable to accept.

The "integration of resource management and SIP" extension is hereafter in this subclause referred to as "the precondition mechanism" and is defined in RFC 3312 [30] as updated by RFC 4032 [64].

The preconditions mechanism should be supported by the originating UE.

The UE ~~*may*~~ *shall* initiate a session without the precondition mechanism if the originating UE does not require local resource reservation.

~~*NOTE 1: The originating UE can decide if local resource reservation is required based on e.g. application requirements, current access network capabilities, local configuration, etc.*~~

In order to allow the peer entity to reserve its required resources, an originating UE supporting the precondition mechanism *shall not indicate the support* ~~*should make use*~~ of the precondition mechanism, ~~*even if*~~ *when* it does not require local resource reservation.

~~*Upon generating an initial INVITE request using the precondition mechanism, the UE shall:*~~

- ~~*indicate the support for reliable provisional responses and specify it using the Supported header field mechanism;and*~~

- ~~*indicate the support for the preconditions mechanism and specify it using the Supported header field mechanism.*~~

~~*Upon generating an initial INVITE request using the precondition mechanism, the UE should not indicate the requirement for the precondition mechanism by using the Require header field mechanism.*~~

~~*NOTE 2: If an UE chooses to require the precondition mechanism, i.e. if it indicates the "precondition" option tag within the Require header field, the interworking with a remote UE, that does not support the precondition mechanism, is not described in this specification.*~~

NOTE 3: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26]. The UE *shall* ~~*can*~~ accept ~~*or reject*~~ any of the forked responses*(minimum 10 provisional responses from a forked INVITE)*, for example, if the UE is capable of supporting a limited number of simultaneous transactions or early dialogs.

Upon successful reservation of local resources the UE shall confirm the successful resource reservation (see subclause 6.1.2) within the next SIP request.

When supporting reliability of provisional responses (100rel) as defined in RFC 3262 [27] then the procedures in receiving multiples provisional responses for each UE or group of UE has to apply with answering PRACK for each provisional response received.

NOTE 4: In case of the precondition mechanism being used on both sides, this confirmation will be sent in either a PRACK request or an UPDATE request. In case of the precondition mechanism not being supported on one or both sides, alternatively a reINVITE request can be used for this confirmation after a 200 (OK) response has been received for the initial INVITE request, in case the terminating UE does not support the PRACK request (as described in RFC 3262 [27]) and does not support the UPDATE request (as described in RFC 3311 [29]).

NOTE 5: If the UE supports the P-Early-Media header field, upon receiving a 18x provisional response with a P-Early-Media header field indicating authorized early media, as described in RFC 5009 [109], if the preconditions are met, the UE should, based on local configuration, present received early media to the user.

NOTE 6: If the UE supports the P-Early-Media header field, upon receiving a 180 (Ringing) provisional response with a P-Early-Media header field indicating authorized early media, as described in RFC 5009 [109], if the preconditions are met, and the UE presents the received early media to the user based on local configuration, the UE will not provide an indication that the invited user is being alerted.

NOTE 7: If the UE supports the P-Early-Media header field and if the most recently received P-Early-Media header field within the dialog includes a parameter applicable to media stream with value "inactive", then based on local configuration, the UE will provide an indication that the invited user is being alerted and stop presenting received early media to the user if requested by any previous receipt of P-Early-Media header field within the dialog.

If the UE wishes to receive early media authorization indications, as described in RFC 5009 [109], the UE shall add the P-Early-Media header field with the "supported" parameter to the INVITE request.

To request end to access edge media security either on a session or media level, the UE shall send an SDP Offer for an SRTP stream containing one or more SDES crypto attributes, each with a key and other security context parameters required according to RFC 4568 [168], together with the attribute "a=3ge2ae".

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall not progress any remaining early dialogues to established dialogs. Therefore, upon the reception of a subsequent final 200 (OK) response for an INVITE request (e.g., due to forking), the UE shall:

1) acknowledge the response with an ACK request; and

2) send a BYE request to this dialog in order to terminate it.

Upon receiving a 488 (Not Acceptable Here) response to an initial INVITE request, the originating UE should send a new INVITE request containing SDP according to the procedures defined in subclause 6.1.

NOTE 8: An example of where a new request would not be sent is where knowledge exists within the UE, or interaction occurs with the user, such that it is known that the resulting SDP would describe a session that did not meet the user requirements.

Upon receiving a 421 (Extension Required) response to an initial INVITE request in which the precondition mechanism was not used, including the "precondition" option-tag in the Require header field, the originating UE shall:

- send a new INVITE request using the precondition mechanism, if the originating UE supports the precondition mechanism; and

- send an UPDATE request as soon as the necessary resources are available and a 200 (OK) response for the first PRACK request has been received.

Upon receiving a 503 (Service Unavailable) response to an initial INVITE request containing a Retry-After header field, then the originating UE shall not automatically reattempt the request until after the period indicated by the Retry-After header field contents.

The UE may include a "cic" tel-URI parameter in a tel-URI, or in the userinfo part of a SIP URI with user=phone, in the Request-URI of an initial INVITE request if the UE wants to identify a user-dialed carrier, as described in RFC 4694 [112].

NOTE 9: The method whereby the UE determines when to include a "cic" tel-URI parameter and what value it should contain is outside the scope of this document (e.g. the UE could use a locally configured digit map to look for special prefix digits that indicate the user has dialled a carrier).

NOTE 10: The value of the "cic" tel-URI parameter reported by the UE is not dependent on UE location (e.g. the reported value is not affected by roaming scenarios).

In the event the UE receives a 380 (Alternative Service) response to an INVITE request the response containing a P-Asserted-Identity header field with a value equal to the value of the last entry of the Path header field value received during registration and the the response containing a 3GPP IM CN subsystem XML body that includes an <ims-3gpp> element, including a version attribute, with an <alternative-service> child element with the <type> child element set to "emergency" (see table 7.6.2), the UE shall attempt an emergency call as described in subclause 5.1.6.

NOTE 11: The last entry on the Path header field value received during registration is the value of the SIP URI of the P-CSCF. If there are multiple registration flows associated with the registration, then the UE has received from the P-CSCF during registration multiple sets of Path header field values. The last entry of the Path header field value corresponding to the flow on which the 380 (Alternative Service) response was received is checked.

Upon receiving a 199 (Early Dialog Terminated) provisional response to an established early dialog the UE shall release resources specifically related to that early dialog.

$5.1.4 Call initiation - UE-terminating case

$5.1.4.1 Initial INVITE request

In cases when the UE supports preconditions then the support of preconditions shall be "passive". I.e. when a initial INVITE is received by the UE and indicates the precondition mechanism as supported or required the UE shall reserve the local resources and indicate the preconditions as required within the response to the initial INVITE. Further detail is described within the following section.

The preconditions mechanism should be supported by the terminating UE.

The handling of incoming initial INVITE requests at the terminating UE is mainly dependent on the following conditions:

- the specific service requirements for "integration of resource management and SIP" extension (hereafter in this subclause known as the precondition mechanism and defined in RFC 3312 [30] as updated by RFC 4032 [64], and with the request for such a mechanism known as a precondition); and
- the UEs configuration for the case when the specific service does not require the precondition mechanism.

If an initial INVITE request is received the terminating UE shall check whether the terminating UE requires local resource reservation.

NOTE 1: The terminating UE can decide if local resource reservation is required based on e.g. application requirements, current access network capabilities, local configuration, etc.

If local resource reservation is required at the terminating UE and the terminating UE supports the precondition mechanism, and:

a) the received INVITE request includes the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall make use of the precondition mechanism and shall indicate a

Require header field with the "precondition" option-tag in any response or subsequent request it sends towards to the originating UE; or

b) the received INVITE request does not include the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall not make use of the precondition mechanism.

If local resource reservation is not required by the terminating UE and the terminating UE supports the precondition mechanism and:

a) the received INVITE request includes the "precondition" option-tag in the Supported header field and:

- the required resources at the originating UE are not reserved, the terminating UE shall use the precondition mechanism; or

- the required local resources at the originating UE and the terminating UE are available, the terminating UE may use the precondition mechanism;

b) the received INVITE request does not include the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall not make use of the precondition mechanism; or

c) the received INVITE request includes the "precondition" option-tag in the Require header field, the terminating UE shall use the precondition mechanism.

NOTE 2: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26].

NOTE 3: If the terminating UE does not support the precondition mechanism it will apply regular SIP session initiation procedures.

If the terminating UE requires a reliable alerting indication at the originating side, the UE shall send the 180 (Ringing) response reliably.

In case more than one UE or groups of UE's are connected to the IAD (See Figure) multiples provisional responses will be sent back from the IAD supporting the profile of the end device which are connected. e.G if analogue and DECT phones are connected each port (or group of ports) reflects an own UA which has to answer properly due to TS 24.229/RFC3261 procedures. This different provisional responses has to be sent with the popper SDP.

When supporting reliability of provisional responses (100rel) then the procedures in sending multiples provisional responses for each UE or group of UE has to apply. Each PRACK has to be answered properly with a 200 OK (PRACK).

If the received INVITE request indicated support for reliable provisionable responses, but did not require their use, the terminating UE shall send provisional responses reliably only if the provisional response carries SDP or for other application related purposes that requires its reliable transport.

NOTE 4: Certain applications *(i.e. DT IMS applications),* services and operator policies might mandate the terminating UE to send a 199 (Early Dialog Terminated) provisional response (see RFC 6228 [142]) prior to sending a non-2xx final response to the INVITE request.

If the terminating UE uses the precondition mechanism and if the originating side requested confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the terminating UE then upon successful reservation of local resources, the terminating UE shall confirm the successful resource reservation (see subclause 6.1.3) within an SIP UPDATE request.

NOTE 5: Originating side requests confirmation for the result of the resource reservation at the terminating UE e.g. when an application server performs 3rd party call control. The request for confirmation for the result of the resource reservation at the terminating UE can be included e.g. in the SDP answer in the PRACK request.

If the terminating UE included an SDP offer or an SDP answer in a reliable provisional response to the INVITE request and both the terminating UE and the originating UE support UPDATE method, then in order to remove one or more media streams negotiated in the session for which a final response to the INVITE request has not been sent yet, the terminating UE sends an UPDATE request with a new SDP offer and delays sending of 200 (OK) response to the INVITE request till after reception of 200 (OK) response to the UPDATE request.

Version	Published	Remarks
3.0.0		-locating P-CSCF and correct prioritization of P-CSCF in case of registration including maintenance procedures. -Preconditions support "passive" better described -Early-Media Header and indication of early media described to avoid misinterpretation. And allow handling of calls initiated by mobile devices. - use of from-change. No default setting - deletion of Annex A - Update of Annex B - Deletion of TS 124.503 - UPDATE to 3GPP Release 11 documents -Correction of *# Procedures using PIN (ECT, OCB, Kick Out, Black List, White List, ACR, CB, ICB) - CLIR 3 included in D.2.0 - Documentation Update TIP/TIR and OIP/OIR -MWI voided - Documentation Update of " 8.6 Support of NAT traversal by the UE" -MIME Type UPDATE Table 7-5 -UPDATE Table 7-4 SIP Headers - add references TR-069, TR-104 and TR-181 - add reference 3GPP TS 23.003 - C.2.8 allow implementations acting on "application/vnd.3gpp.cw+xml" All changes are backward compatible with the procedures described within 1TR114 Version 2.4.0
Amendment 1		Additions to 1 TR 114 for the SIP REQUEST Retry Mechanism in Failure Cases
Amendment 2		Addition of requirements for secure VoIP. TLS and SRTP added Replacement of text in Annex B of this document for sections 6.1.2 and 6.1.3.
Amendment 3	09.02.2015	Implementation Guideline for use of preconditions and 100rel