

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Solution for REFER interworking problems



Reference

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1 Scope

The present documents purpose is to develop a solution for interworking problems of REFER based simulation services. This solution shall adjust REFER interworking problems of the Release 1 NGN services ECT and CONF, and shall also take into account Release 2 services.

NOTE: The results of the of the TR are included in ETSI TS 183 028 [5] "Common Basic Communication procedures".

2 References

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2.1 Informative references

- [1] IETF RFC 3515: "The Session Initiation Protocol (SIP) Refer Method".
- [2] IETF RFC 3725: "Best Current Practices for Third Party Call Control (3pcc) in the Session Initiation Protocol (SIP)".
- [3] ETSI TS 183 029: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services: Explicit Communication Transfer (ECT); Protocol specification".
- [4] ETSI TS 183 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Originating Identification Presentation (OIP) and Originating Identification Restriction (OIR); Protocol specification".
- [5] ETSI TS 183 028: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Common Basic Communication procedures".
- [6] ETSI TS 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".
- [7] ETSI ES 283 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Stage 3".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 181 002 [6] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AS	Application Server
CONF	CONFerence calling
HOLD	Communication Hold
IFC	Initial Filter Criteria
IP	Internet Protocol
ISDN	Integrated Service Data Network
MGCF	Media Gateway Control function
MPTY	MultiParTY
MPTY	Multi ParTY Service
NGN	Next Generation Network
OCB	Outgoing Communication Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
PSTN	Public Switch Telephone Network
SIP	Session Initiation Protocol
UE	User Equipment

4 REFER interworking

4.1 Introduction

4.1.1 Problem

The TISPAN NGN services ECT and CONF are based on the usage of SIP REFER requests. When the SIP REFER request is sent to a user who is located in the PSTN/ISDN, the invocation of the service fails, because there is no interworking from a SIP REFER request to a regarding PSTN/ISDN message.

For example at the invocation of the CONF service, a dial-in conference can be realized by sending a SIP REFER request to the participant, referring an SIP INVITE request to the conference focus. When the participant is located in the PSTN/ISDN, the SIP REFER request will be routed to the MGCF, where it will be answered with a SIP 403 Forbidden response.

In addition, there are many SIP terminals which lack the support to REFER because REFER is an optional extension to basic SIP. When the SIP REFER request is sent to such a terminal, the invocation of the service fails, too.

4.1.2 Possible solutions

Only one solution could be developed. It is proposed to use an Application Server, which can handle REFER requests by using 3rd party call control procedures.

NOTE: As there is no guarantee that 3rd party call control will result in an established communication, this solution works on a best-effort basis.

4.2 Description of the solutions

4.2.1 AS using 3rd party call control procedures

4.2.1.1 General description

The communication is established with the involvement of an Application Server that acts as a B2BUA, so the AS has knowledge about the existing partial dialogs he is involved in, especially of the media user for this communication.

The REFER request is routed via this AS. When the AS receives a 403 Forbidden or a 501 Not Implemented response to the REFER request, it uses 3rd party call control procedures to connect the REFER target and the Refer-to target. This is done by sending re-INVITE requests in existing partial dialogs and by sending INVITE requests to establish new partial dialogs.

Tables 1 and 2 give decision criteria when to start 3pcc procedures.

Table 1: Terminating party of a communication sends a REFER request

Content of the Allow header in the initial INVITE from A->B	Action AS-B on the REFER from B	Action that the AS-B does on the initial INVITE
INVITE with Allow header with no REFER token	Invoke the 3pcc procedure directly	AS-B adds the REFER token to the Allow header
INVITE with Allow header with a REFER token	Forward the REFER and if the 403 or 501 response is received, fall back to 3pcc procedure	No modification needed in the Allow header
INVITE without Allow header	Forward the REFER and if the 403 or 501 response is received, fall back to 3pcc procedure	No modification needed in the INVITE

Table 2: Originating party of a communication sends a REFER request

Content of the Allow header in the 200 OK response on the initial INVITE (A->B dialog)	Action AS-A on the REFER from A	Action that the AS-A does on the 200 OK response on A-B dialog
200 (OK) with Allow header with no REFER token	Invoke the 3pcc procedure directly	AS-A adds the REFER token to the Allow header
200 (OK) with Allow header with a REFER token	Forward the REFER and if the 403 or 501 response is received, fall back to 3pcc procedure	No modification needed in the Allow header
200 (OK) response without Allow header	Forward the REFER and if the 403 or 501 response is received, fall back to 3pcc procedure	No modification needed in the 200 (OK) response

As a network option, the AS of the initiator of the REFER request may initiate 3rd party call control procedures without sending the REFER to the REFER target and waiting for an error response, which means tables 1 and 2 are not applicable in this case.

To avoid a longer re-negotiation of the media, the media information of the existing partial dialogs are used for the INVITE requests or the first re-INVITE requests during the 3pcc procedures.

4.2.1.2 Signalling requirements

Basic communication procedures according to ES 283 003 [7] can apply, with the following additions.

4.2.1.2.1 Actions at the S-CSCF of the initiator of the REFER request

Based on the Initial Filter Criteria (IFC) Rules a REFER request can be forwarded to the AS.

NOTE: An example of the use of IFC is shown in annex B.

4.2.1.2.2 Actions at the AS of the initiator of the REFER request

4.2.1.2.2.1 REFER is sent inside a dialog

4.2.1.2.2.1.1 Normal procedures

If the AS receives a 403 Forbidden or a 501 Not implemented response, it can send a 202 Accepted response followed by a NOTIFY request with a 100 Trying status line to the originator of the REFER request, according to the procedures of RFC 3515 [1].

The AS then can perform third party call control procedures according to Flow III or Flow IV of RFC 3725 [2], with the following additions and clarifications:

The AS should verify if it is involved in the dialogs between the originator of the REFER on the one side and the REFER target and the Refer-to target on the other side.

Then the AS can send an INVITE request to the Refer-to target if it **is not** involved in a dialog with the Refer-to target (e.g. Blind ECT), or the AS can send a re-INVITE request to the Refer-to target if it **is** involved in a dialogue with the Refer-to target (e.g. Consultative ECT). The INVITE request can contain if available a P-Asserted-ID header field with a valid identity of the REFER target and a Referred-by header field matching the P-Asserted-Identity of the REFER request.

When the partial dialog with the Refer-to target is acknowledged, the AS can send in the original partial dialog a NOTIFY request with a 100 Trying status line to the originator of the REFER request, according to the procedures of RFC 3515 [1]. After that the AS can send a re-INVITE request to the REFER target. The re-INVITE request shall contain if available a P-Asserted-ID header field with a valid identity of the REFER-to target and a Referred-by header field matching the P-Asserted-Identity of the REFER request.

When the partial dialog with the REFER target is acknowledged, the AS can send in the original partial dialog a NOTIFY request with a 200 OK status line to the originator of the REFER request, according to the procedures of RFC 3515 [1]. If a Replaces parameter is included in the Refer-To header field of the original REFER request and it refers to the original partial dialog between the referor and the refer-to target, the AS can send a BYE request in the original partial dialog to the referor.

When the 3rd party call control procedures were successful, continued processing procedures according to subclause 7 of RFC 3725 [2] can be applied.

As a network option, the AS could send a 202 Accepted response directly and initiate 3rd party call control procedures without trying to forward the REFER request to the REFER target.

NOTE: For example, when UE-A and UE-B establish a session, they will exchange their own capabilities for SIP methods by using "Allow" header. If the AS lies in the signalling path between UE-A and UE-B, it can know whether the two UEs support REFER or not, and can initiate 3rd party call control procedures. Another example is that a network operator doesn't want to send REFERs to a user because of security reasons.

4.2.1.2.2.1.2 Exceptional procedures

If the 3rd party call control procedures fail because a media negotiation between REFER target and Refer-to target is not possible (e. g. the codes cannot be negotiated or the offered ports have changed in a subsequent SDP offer), or REFER target or Refer-to target answer the INVITE request with an error response, error handling procedures according to subclause 6 of RFC 3725 [2] can be applied.

4.2.1.2.2.2 REFER is sent outside a dialog

4.2.1.2.2.2.1 Normal procedures

If the AS receives a 403 Forbidden or a 501 Not implemented response, it can send a 202 Accepted response followed by a NOTIFY request with a 100 Trying status line to the originator of the REFER request, according to the procedures of RFC 3515 [1].

The AS then can perform third party call control procedures according to Flow III or Flow IV of RFC 3725 [2], with the following additions and clarifications:

The AS can send an INVITE request to the Refer-to target. The INVITE request can contain if available a P-Asserted-ID header field with a valid identity of the REFER target and a Referred-by header field matching the P-Asserted-Identity of the REFER request.

When the dialog with the Refer-to target is acknowledged, the AS can send in the REFER dialog a NOTIFY request with a 100 Trying status line to the originator of the REFER request, according to the procedures of RFC 3515 [1]. After that the AS can send an INVITE request to the REFER target. The INVITE request can contain if available a P-Asserted-ID header field with a valid identity of the Refer-to target and a Referred-by header field matching the P-Asserted-Identity of the REFER request.

When the dialog with the REFER target is acknowledged, the AS can send in the REFER dialog a NOTIFY request with a 200 OK status line to the originator of the REFER request, according to the procedures of RFC 3515 [1].

When the 3rd party call control procedures were successful, continued processing procedures according to subclause 7 of RFC 3725 [2] can be applied.

As a network option, the AS could send a 202 Accepted response directly and initiate 3rd party call control procedures without trying to forward the REFER request to the REFER target.

NOTE: For example, when UE-A and UE-B establish a session, they will exchange their own capabilities for SIP methods by using "Allow" header. If the AS lies in the signalling path between UE-A and UE-B, it can know whether the two UEs support REFER or not, and can initiate 3rd party call control procedures. Another example is that a network operator doesn't want to send REFERs to a user because of security reasons.

4.2.1.2.2.2 Exceptional procedures

If the 3rd party call control procedures fail because a media negotiation between REFER target and Refer-to target is not possible, or REFER target or Refer-to target answer the INVITE request with an error response, error handling procedures according to subclause 6 of RFC 3725 [2] can be applied.

4.2.1.3 Charging

The AS could generate charging events for the generated INVITE requests, correlated to the initiator of the REFER request.

4.2.1.4 Service impact

The following clauses describe the impact services have on the REFER interworking.

4.2.1.4.1 Origination Identification Restriction (OIR)

The AS can enforce OIR privacy settings on OIR relevant headers carried in the generated INVITE and/or re-INVITE requests, as specified TS 183 007 [4] for regular INVITE requests originated by the served user.

4.2.1.4.2 Anonymous Communication Rejection and Communication Barring (ACR/CB)

Not applicable.

NOTE: Transfer requests with a transfer Target that is barred by the served users Outgoing Communication Barring (OCB) rules should not be accepted according to the procedures described in TS 183 029 [3].

4.2.1.5 Parameter values (timers)

Not applicable.

4.3 Conclusion

It is proposed to select the AS using 3rd party call control procedures as solution for the REFER interworking problems.

Annex A (informative): Signalling flows

A.1 AS using 3rd party call control procedures

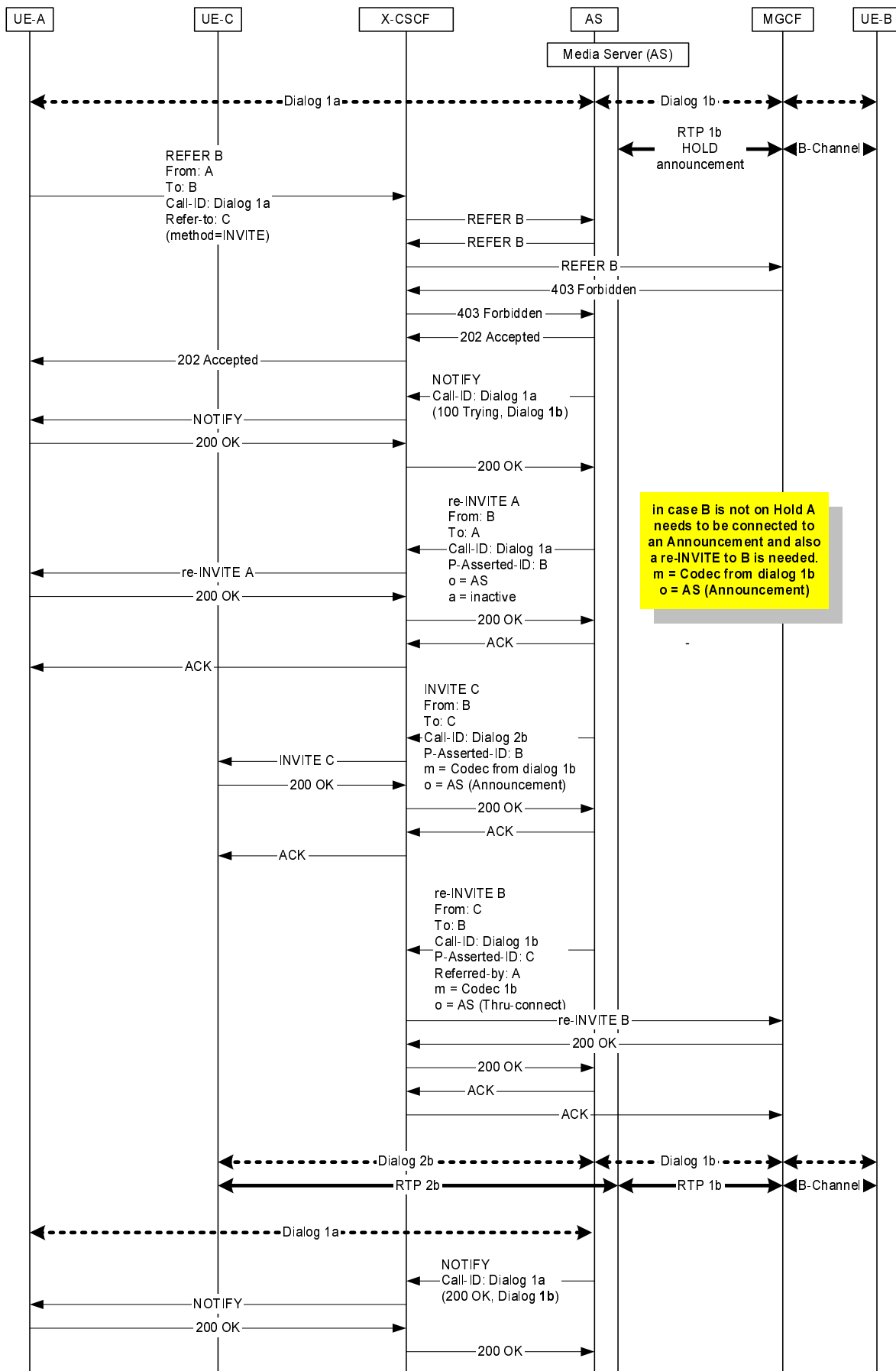


Figure A.1.1: Example flow for REFER interworking with REFER sent inside a dialog with usage of a media server

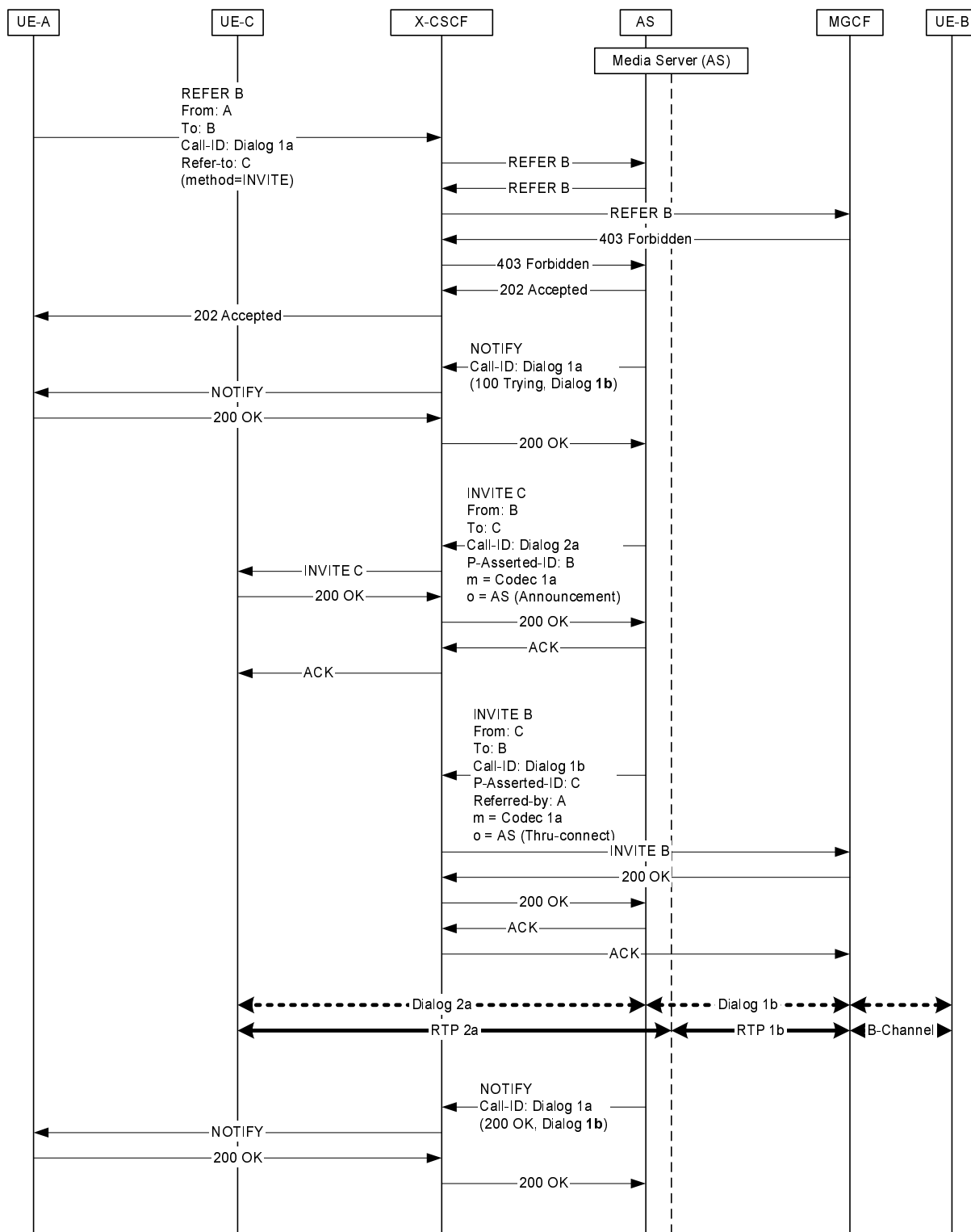


Figure A.1.2: Example flow for REFER interworking with REFER sent outside a dialog with usage of a media server

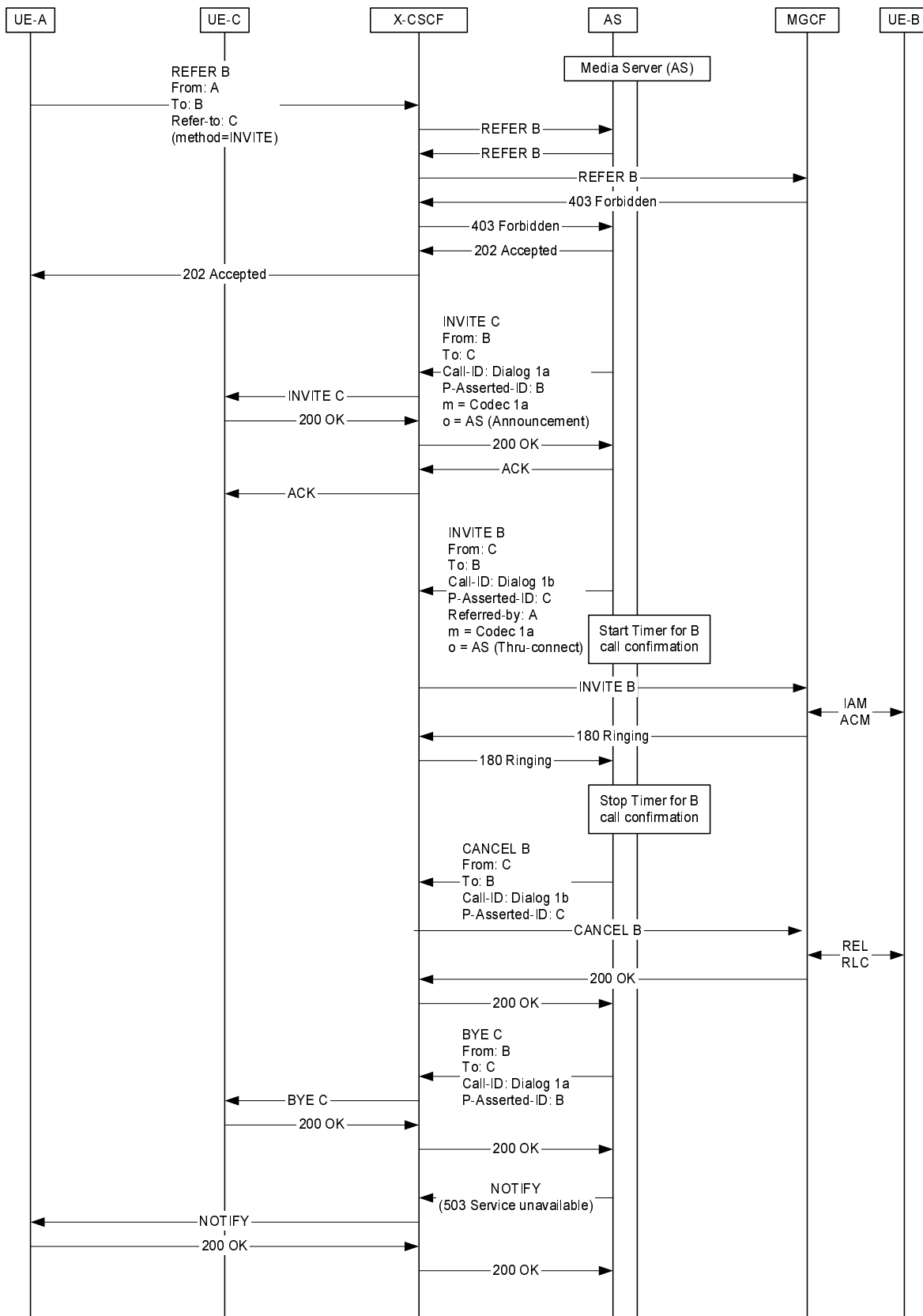


Figure A.1.3: Example flow for REFER interworking in case of No Reply with usage of a media server

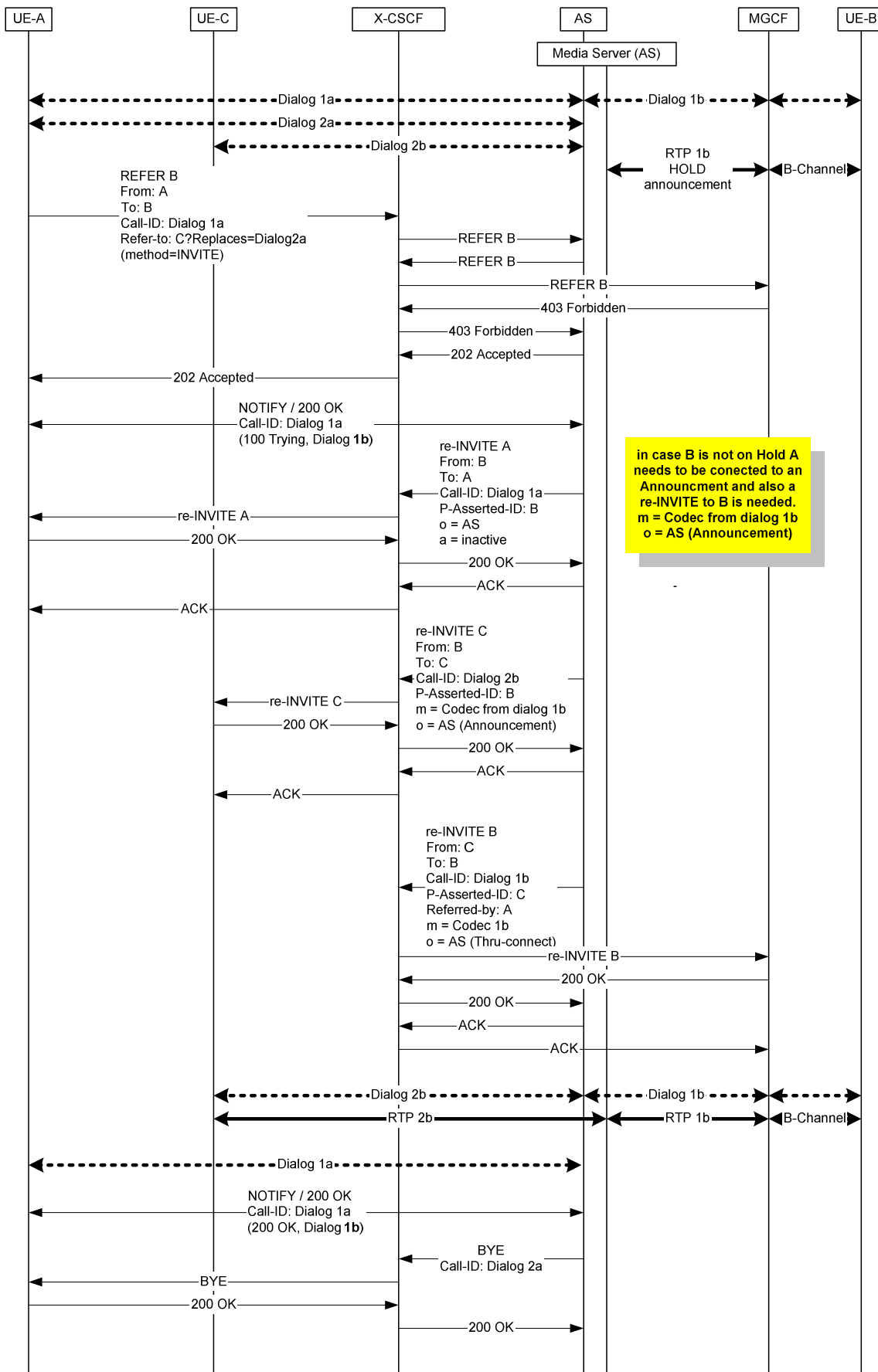


Figure A.1.4: Example flow for REFER interworking in case the Refer-to header field contains a replaces parameter with usage of a media server

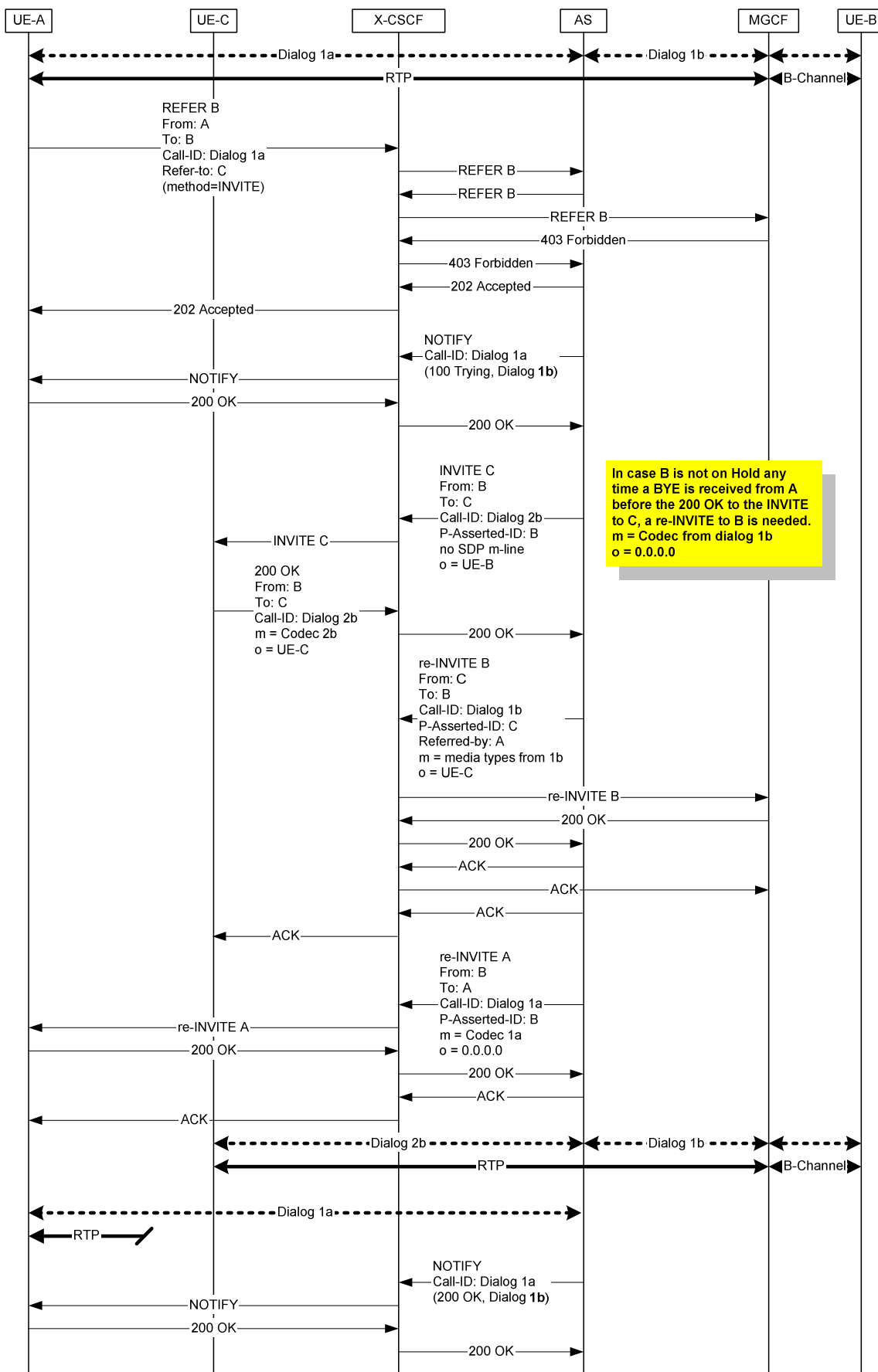


Figure A.1.5: Example flow for REFER interworking with REFER sent inside a dialog without usage of a media server

Annex B (informative): Example of filter criteria

This annex provides an example of a filter criterion that triggers SIP requests that are subject to initial filter criteria evaluation.

B.1 AS using 3rd party call control procedures

An example of an IFC when the REFER request is forwarded to the AS is:

- Method: REFER.

History

Document history		
V2.2.0	January 2008	Publication