3GPP TSG CN Plenary Meeting #16 **NP-020226**
5th - 7th June 2002. Marco Island, USA.

Source: **TSG CN WG 1**

Title: **CRs to Rel-5 on Work Item IMS-CCR towards 23.218**

Agenda item: **8.1**

Document for: **APPROVAL**

Introduction:

This document contains **10** CRs on **Rel-5 on** Work Item **"IMS-CCR"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
23.218	002	3	Rel-5	HSS providing to the S-CSCF the subset of the relevant end user profile	F	5.0.0	5.1.0	N1-23	N1-020972
23.218	003	10	Rel-5	Clarification on SPI related text	F	5.0.0	5.1.0	N1-24	N1-021405
23.218	004	4	Rel-5	Passing charging correlation information	F	5.0.0	5.1.0	N1-24	N1-021423
23.218	006	1	Rel-5	Correction of terminology in 23.218 regarding Offer-counter offer answer	F	5.0.0	5.1.0	N1-23	N1-020951
23.218	012	5	Rel-5	Update of the S-CSCF AS relationship, for REGISTER	F	5.0.0	5.1.0	N1-24	N1-021425
23.218	014	1	Rel-5	User profile filter criteria updates	F	5.0.0	5.1.0	N1-24	N1-021384
23.218	015	1	Rel-5	Add references for Sh and Si interfaces	F	5.0.0	5.1.0	N1-24	N1-021385
23.218	016	1	Rel-5	SIP Application Server acting as a Gatewas to an external Application Server; and OSA API usage.	F	5.0.0	5.1.0	N1-24	N1-021404
23.218	017	1	Rel-5	Clarification to Handling of IP multimedia registration for barred public user identities	F	5.0.0	5.1.0	N1-24	N1-021424
23.218	019		Rel-5	Correction of COMET to UPDATE in 23.218	F	5.0.0	5.1.0	N1-24	N1-021252

3GPP TSG-CN1 Meeting #23 ~~***Tdoc N1-020954***~~
Fort Lauderdale, Florida, USA 08. - 12. April 2002 ***Tdoc N1-020972***

CR-Form-v5

CHANGE REQUEST

⌘ **TS 23.218 CR 002** ⌘ **rev 3** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	HSS providing to the S-CSCF the relevant end user profile
Source:	⌘	Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	2002/04/12
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Reading 23.218, one can understand that the HSS can only request downloading of the full set of IMPU's iFC (i.e., registered and unregistered). CN4 Ft Lauderdale agreed to use as working assumption that the S-CSCF can request download of: 1) registered; 2) unregistered; or 3) both profiles. See N4-020364 & 020388. This CR implements this agreement.
Summary of change:	⌘	Clarify that the S-CSCF can request the HSS to download either the IMPU's registered, unregistered, or both iFCs to the S-CSCF.
Consequences if not approved:	⌘	Mis alignment with CN4 work, resulting in confusion & potentially higher Cx traffic, S-CSCF storage and processing complexity.

Clauses affected:	⌘	5.2, 6.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Change

5.2 Service interaction with IP multimedia subsystem

Service Points of Interest (SPIs) are those points in the SIP signalling on which Filter Criteria can be set. The following SPIs are defined:

- any initial known or unknown SIP method (e.g. REGISTER, INVITE, SUBSCRIBE, MESSAGE);
- presence or absence of any header;
- content of any header;
- direction of the request – either mobile originated (MO) or mobile terminated (MT) to registered user; or mobile terminated to unregistered user;
- session description information.

A Filter Criteria triggers one or more SPIs in order to send the related request to one specific application server. The set of Filter Criteria that is stored for a service profile of a specific user is called "Application Server Subscription Information". In order to allow the S-CSCF to handle the different Filter Criteria in the right sequence, a priority shall be assigned to each of them. Additionally Filter Criteria may indicate that a dialog shall be released if the indicated Application Server cannot be reached. Therefore a Filter Criteria shall contain the following information:

- address of the Application Server to be contacted;
- priority of the Filter Criteria providing the sequence in which the criteria shall be applied;
- registered, unregistered, or both (i.e., registered and unregistered) trigger Points, which indicated the Service Points of Interest (SPIs) triggered by this Filter Criteria. The SPIs may be linked by means of logical expressions (AND, OR, NOT, etc.);
- default Handling, i.e. indication if the dialog shall be released if the AS cannot be reached;
- optional Service Information that shall be added to the message body before it is sent to the AS (as an example this may include the IMSI for the IM-SSF).

The same priority shall not be assigned to more than one AS.

The S-CSCF shall request from the HSS the relevant set of iFCs that applies to the end user (i.e., registered, unregistered, or both). If the S-CSCF has a set of iFCs that is deemed valid (e.g., from a previous request), the S-CSCF need not request a new set.

In the case that multiple Filter Criteria are sent from the HSS to the S-CSCF when the S-CSCF receives a message via the Mw interface, the S-CSCF shall check the filter criteria one by one according to their indicated priority, i.e. the S-CSCF shall:

1. set up the list of filter criteria for that request according to their priority – the sequence of the filter criteria shall not be changed until the request finally leaves the S-CSCF via the Mw interface again;
2. parse the received request in order to find out the Service Points of Interest (SPIs) that are included in it;
3. check whether the trigger points of the filter criteria with the next highest priority are matched by the SPIs of the request and
   a) if it does not match the S-CSCF shall immediately proceed with step 6;
   b) if it matches the S-CSCF shall:
      i) add an indication to the request which will allow the S-CSCF to identify the message on the incoming side, even if its dialog identification has been changed e.g. due to the AS performing third party call control;

ii) forward the request via the ISC interface to the AS indicated in the current filter criteria. The AS then performs the service logic, may modify the request and may send the request back to the S-CSCF via the ISC interface;

iii) proceed with step 6 if the request was received again from the AS via the ISC interface;

6. repeat the above steps 2 to 5 for every filter criteria which was initially set up (in step 1) until the last filter criteria has been checked;

7. route the request based on normal SIP routing behaviour.

If an Application Server decides to locally terminate a request and sends back a final response for that request via the ISC interface to the S-CSCF, the S-CSCF shall discard the remaining list of filter criteria for that request. The final response shall include the indicator defined in step 3 b) i) above, so that the S-CSCF can correlate the messages.

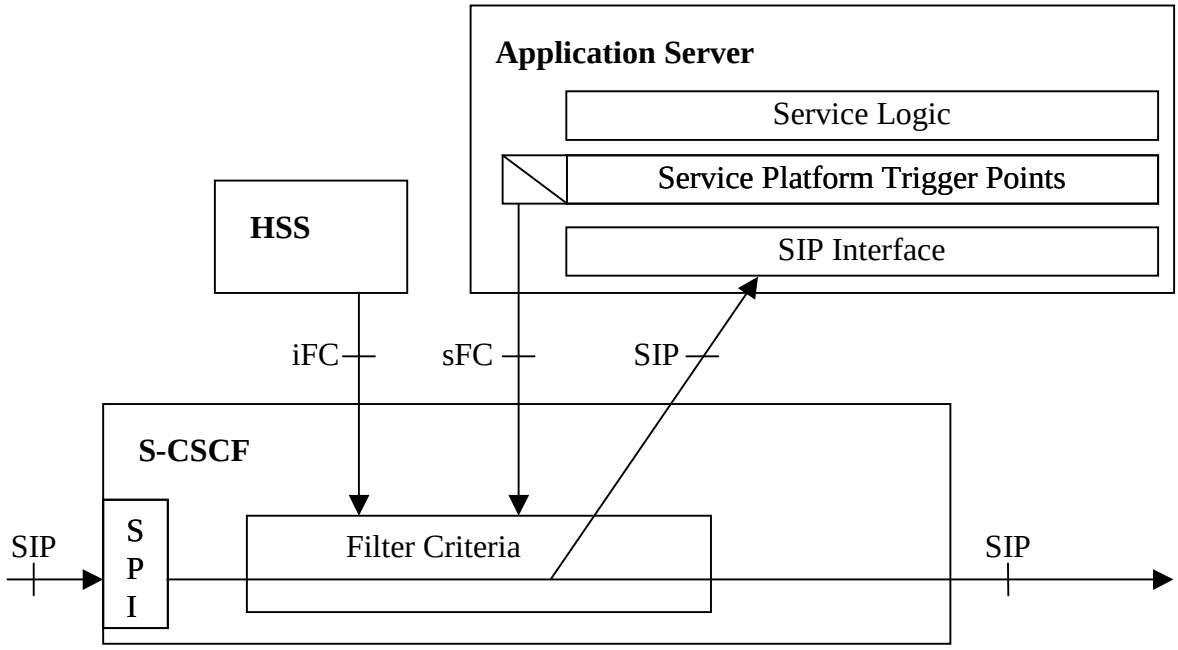

Figure 5.2.1: Application triggering architecture

Each invoked Application Server/service logic may decide not to be engaged with the invoked session by indicating that during the very first SIP transaction when the Record-Route/Route is generated for subsequent SIP requests. The denial shall mean that subsequent requests shall not be routed to such Application Servers/service logic any more during the lifetime of that session. Any Application Server, which has determined that it will not receive subsequent requests for a session cannot revoke this determination by means of Initial Filter Criteria (iFC).

Change

6.3 Handling of IP multimedia registration

Upon receiving the initial registration request from the user, the S-CSCF shall authenticate the user and upon receiving a subsequent registration request containing valid authentication credentials, request the HSS to send the relevant profile of the user~~download the user profile from the HSS~~. For further detailed information on registration and authentication procedures see 3GPP TS 24.229 [5] and 3GPP TS 33.203 [11].

After a successfully authenticated registration, the S-CSCF shall download from the HSS all the implicitly registered public user identities associated with the registered public user identity and the S-CSCF shall then determine based on the filter criteria information downloaded from HSS which application servers to inform about the registration event of the public user identity(s). If the registration request matches the filter criteria of some application servers, the S-CSCF needs to inform the application servers by performing a third party registration to the those application servers which are interested to be informed about the user registration event of these public user identities.

The important information carried in the third party REGISTER request is the public user identity, the S-CSCF address and the expiration time. Additional application server specific data, which is associated with the Filter Criteria and obtained from the HSS, is added to the REGISTER request body. This data should include the IMSI for an Application Server that supports CAMEL services or the private user identity for other Application Servers as received from the HSS.

This third party registration will include an expiration time that is equal to the expiration time sent to the UE by the S-CSCF in the 200 OK response to the incoming REGISTER request

On receiving a failure response to one of the REGISTER requests, the S-CSCF may initiate network-initiated deregistration procedure based on the information in the initial Filter Criteria. If the filter criteria does not contain an instruction to the S-CSCF regarding the failure to contact the Application Server, the S-CSCF shall not initiate network-initiated deregistration procedure.

See figure 6.3.1:

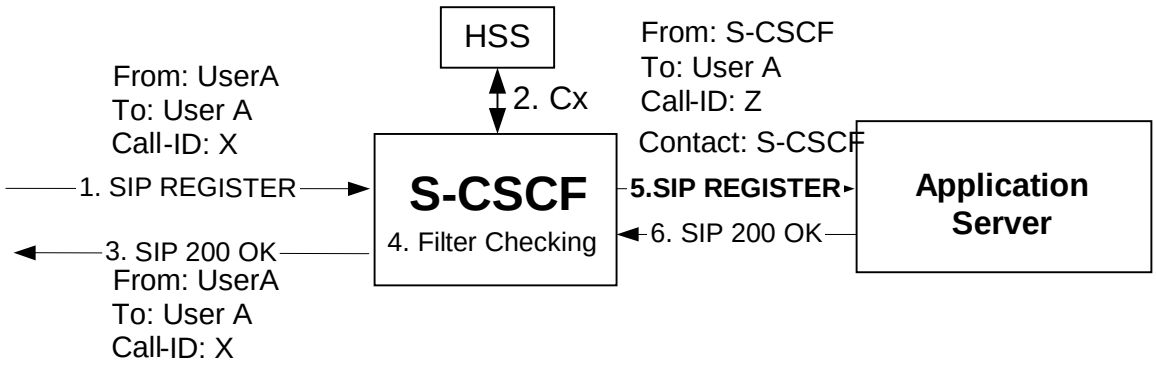

Figure 6.3.1: S-CSCF handling registration

Application Servers can in addition subscribe to the S-CSCF Registration Event Package. This provides a mechanism for the Application Server to discover all the implicitly registered public user identities without requiring multiple Register requests to be sent to the Application Server. The S-CSCF will send NOTIFY requests to the Application Server that has subscribed to the registration event package for the registered public user identity.

More information on these procedures is contained in 3GPP TS 24.229 [5]

3GPP TSG-CN1 Meeting #24 ***Tdoc N1-021405***

Budapest, Hungary, 13. – 17. May 2002 ~~***Tdoc N1-021317, N1-021122, N1-021250***~~

CR-Form-v5

CHANGE REQUEST

⌘ **TS 23.218 CR 003** ⌘ **rev 10** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Clarification on SPI related text
Source:	⌘	dynamicsoft, Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	2002/05/13
Category:	⌘	**F**
Release:	⌘	REL-5

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R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘
1) In the current text, default handling procedure is initiated when AS is failed. However, there is no description about the treatment of remaining filter criteria list.
2) Clarify that the S-CSCF downloads and stores the filter criteria (profile subset) from the HSS.
3) Clarify precedence in handling of "barring" versus triggers
4) Delete reference to "refreshing dialogue".

Summary of change: ⌘ **Previous T-doc no at CN1#23: N1-020953; then #23 SIP Ad Hoc 021102**
1) In section 5.2, it is proposed to describe that the default handling procedure will abandon the remaining filter criteria list
2) Confirm that triggers apply solely to dialogue initiation

Consequences if not approved: ⌘
1) Default handling procedure will be implemented wrongly.
2) Possible confusion that triggers apply not only to dialogue initiation

Clauses affected: ⌘ 5.2, 6.4, 6.5, 6.9, 7.2.1, B.3.1

Other specs affected: ⌘
☐ Other core specifications ⌘
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘ Changes done on this CR version:
1) note2 (5.2)
2) barring verification, iFC download, minor edit 1st para. (6.4)
3) deletion of refreshing (6.4, 6.5.1, 6.5.2)
4) verification of barred user (6.5.1, 6.5.2)

	5) reference to XML (6.9.2) 6) Default handling & AS being FFS (6.9.2.2)

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Change

5.2 Service interaction with IP multimedia subsystem

Service Points of Interest (SPIs) are those points in the SIP signalling on which Filter Criteria can be set. The following SPIs are defined:

- any initial known or unknown SIP method (e.g. REGISTER, INVITE, SUBSCRIBE, MESSAGE);
- presence or absence of any header;
- content of any header;
- direction of the request is with respect to the served user – either mobile originated (MO) or mobile terminated (MT) or mobile terminated to unregistered user;

  NOTE 1: REGISTER is considered part of the Mobile Origination.

  NOTE 2: The S-CSCF shall verify if the end user is barred before checking if any trigger applies for that end user.
- session description information.

A Filter Criteria triggers one or more SPIs in order to send the related request to one specific application server. The set of Filter Criteria that is stored for a service profile of a specific user is called "Application Server Subscription Information". In order to allow the S-CSCF to handle the different Filter Criteria in the right sequence, a priority shall be assigned to each of them. ~~Additionally Filter Criteria may indicate that a dialog shall be released~~ and abandon ~~the servicing of the remaining list of filter criteria be terminated if the indicated Application Server cannot be reached or the AS requests to perform the default handling procedure.~~ If the S-CSCF can not reach the AS, the S-CSCF shall apply the default handling associated with the trigger. This default handling shall be :

- To continue verifying ~~of~~ if the triggers of lower priority in the list match; or
- To abandon verification of matching of the triggers of lower priority in the list; and to release the dialogue.

Therefore a Filter Criteria shall contain the following information:

- address of the Application Server to be contacted;
- priority of the Filter Criteria providing the sequence in which the criteria shall be applied;
- trigger Points, which indicated the Service Points of Interest (SPIs) triggered by this Filter Criteria. The SPIs may be linked by means of logical expressions (AND, OR, NOT, etc.);
- default ~~H~~handling (as described above). ~~, i.e. indication if the dialog shall be released and abandon the servicing of the remaining list of filter criteria be terminated if the AS cannot be reached or the AS requests to perform the default handling procedure.;~~
- optional Service Information that shall be added to the message body before it is sent to the AS (as an example this may include the IMSI for the IM-SSF).

The same priority shall not be assigned to more than one initial Filter Criteria~~to more than one AS~~) for a given end user. .

In the case that multiple Filter Criteria are sent from the HSS to the S-CSCF when the S-CSCF receives a message via the Mw interface, the S-CSCF shall check the filter criteria one by one according to their indicated priority, i.e. the S-CSCF shall:

1. set up the list of filter criteria for that request according to their priority – the sequence of the filter criteria shall not be changed until the request finally leaves the S-CSCF via the Mw interface again;
2. parse the received request in order to find out the Service Points of Interest (SPIs) that are included in it;
3. check whether the trigger points of the filter criteria with the next highest priority are matched by the SPIs of the request and

a) if it does not match the S-CSCF shall immediately proceed with step ~~6~~ 4;

b) if it matches the S-CSCF shall:

i) add an indication to the request which will allow the S-CSCF to identify the message on the incoming side, even if its dialog identification has been changed e.g. due to the AS performing third party call control;

ii) forward the request via the ISC interface to the AS indicated in the current filter criteria. The AS then performs the service logic, may modify the request and may send the request back to the S-CSCF via the ISC interface;

iii) proceed with step ~~6~~ 4 if the request was received again from the AS via the ISC interface;

4~~6~~. repeat the above steps 2 ~~to 5~~ and 3 for every filter criteria which was initially set up (in step 1) until the last filter criteria has been checked;

5~~7~~. route the request based on normal SIP routing behaviour.

If an Application Server decides to locally terminate a request and ~~and~~ , sends back a final response for that request ~~and regests a default handling procedure~~ via the ISC interface to the S-CSCF, the S-CSCF shall abandon verification of the matching of the triggers of lower priority in the list~~perform the default handling treatment , i.e. discard the remaining list of filter criteria for that request~~. The final response shall include the indicator defined in step 3 b) i) above, so that the S-CSCF can correlate the messages.

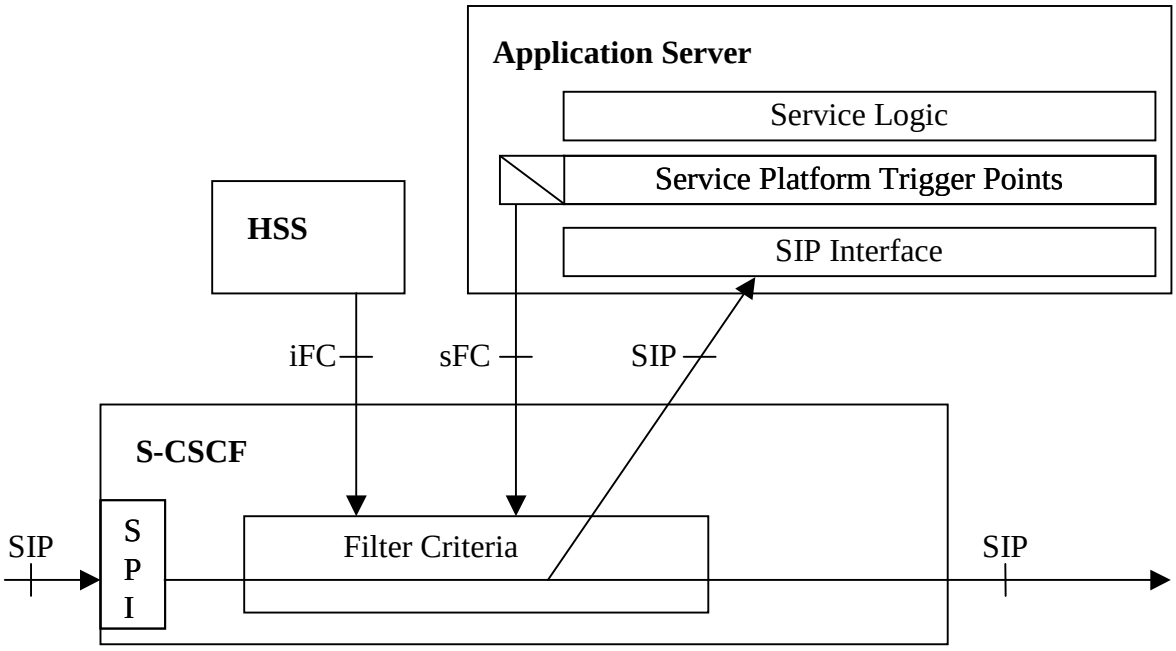

Figure 5.2.1: Application triggering architecture

Each invoked Application Server/service logic may decide not to be engaged with the invoked session by indicating that during the very first SIP transaction when the Record-Route/Route is generated for subsequent SIP requests. The denial shall mean that subsequent requests shall not be routed to such Application Servers/service logic any more during the lifetime of that session. Any Application Server, which has determined that it will not receive subsequent requests for a session cannot revoke this determination by means of Initial Filter Criteria (iFC).

Change

6.4 Handling of mobile originated IP multimedia sessions

The S-CSCF shall verify if the public user identity is barred. If so, it shall respond with a 4xx error code and stop further session processing.

The S-CSCF only looks for initial filter criteria when receiving an initial request ~~or refreshing request for a dialog.~~.

The initial filter criteria (subset of the profile) has already been downloaded from the HSS and is stored locally at the S-CSCF, as specified in 3GPP TS 24.228 [4], and 3GPP TS 24.229 [5].

When such a session request comes in, the S-CSCF shall first check its triggers ~~s~~ points (i.e., this is ~~an~~ a mobile originating request or a mobile terminating request). This clause describes the requirements for the S-CSCF when this request is ~~an~~ a mobile originating request. So ~~, if this request is an originating request,~~ the S-CSCF shall:

- check whether this request matches the initial filter criteria with the highest priority ~~of the application servers assigned~~ for that user by checking the service profile against the public user identity, which was used to place this request;

  if this request matches the initial filter criteria, the S-CSCF shall forward this request to that application server, then check for matching of the next following filter criteria of lower priority, and apply the filter criteria on the SIP method received from the previously contacted application server;

- if this request does not match the highest priority initial filter criteria, check for matching of the following filter criteria priorities until one applies;

- if no more (or none) of the initial filter criteria apply, ~~of any application server,~~ the S-CSCF shall forward this request downstream based on the route decision;

~~- if this request matches the initial filter criteria of only one application server and the S-CSCF has not interacted with that application server during this initial or refreshing transaction, the S-CSCF shall forward this request to that application server; if the S-CSCF has interacted with that application server in this transaction, the S-CSCF shall not forward this request to that application server but shall forward this request downstream based on the route decision;~~

~~- if this originating request matches the initial filter criteria of more than one application server, the S-CSCF shall forward this request to the one which has not been interacted with in this transaction and has the highest priority according the Priority List given by HSS among those matched application servers; if all of them have been interacted in this transaction, the S-CSCF shall forward this request downstream based on the route decision; if the first attempt fails, the S-CSCF shall try others one by one according to their priories until there is a successful contact;~~

- in any instance, if the contact of the application server fails, the S-CSCF shall use the "default handling ~~treatment~~" associated with the ~~SPI~~initial Filter Criteria to determine if it shall either terminate the call, or let the call continue based on the information in the filter criteria; if the filter criteria doesn't contain instruction to the S-CSCF regarding the failure of the contact to the application server, the S-CSCF shall let the call continue as the default behaviour.

6.5 Handling of mobile terminated IP multimedia sessions

6.5.1 Handling of mobile terminated IP multimedia sessions, registered user

The S-CSCF shall verify if the public user identity is barred. If so, it shall respond with a 4xx error code and stop further session processing.

The S-CSCF only looks for initial filter criteria when receiving an initial request ~~or refreshing request for a dialog~~.

When such a request comes in, the S-CSCF shall first check this is an originating request or a terminating request. This clause describes the requirements for the S-CSCF when this request is a terminating request. So, if this request is a terminating request, the S-CSCF shall:

- if unavailable, download the relevant subscriber profile including the initial filter criteria from the HSS.
- use the initial Filter Criteria for the Mobile Termination;
- ~~check whether this request matches the initial filter criteria of the application servers assigned for that user by checking the service profile against the public user identity, which this request was addressed to;~~
- the subsequent requirements for the S-CSCF are the same as those for handling originating sessions.

It may be possible that originating UE and terminating UE shares the same S-CSCF and AS, therefore the shared application server may interact with the S-CSCF twice in one transaction but in originating and terminating procedures respectively.

6.5.2 Handling of mobile terminated IP multimedia sessions, unregistered user

The S-CSCF shall verify if the public user identity is barred. If so, it shall respond with a 4xx error code and stop further session processing.

The S-CSCF only looks for initial filter criteria when receiving an initial request.

When such a request comes in, the S-CSCF shall first check this is an originating request or a terminating request. This clause describes the requirements for the S-CSCF when this request is a terminating request. So, if this request is a terminating request, the S-CSCF shall:

- if unavailable, download the relevant subscriber profile including the initial filter criteria from the HSS.
- use the initial Filter Criteria for the Mobile Termination for unregistered user;
- the subsequent requirements for the S-CSCF are the same as those for handling originating sessions.

It may be possible that originating UE and terminating UE shares the same S-CSCF and AS, therefore the shared application server may interact with the S-CSCF twice in one transaction but in originating and terminating procedures respectively.

Change

6.9 Description of subscriber data

6.9.1 Application Server subscription information

The Application Server Subscription Information is the set of all Filter Criteria that are stored within the HSS for service profile for a specific user. This information shall be sent by the HSS to the S-CSCF via the Cx Interface during registration.

6.9.2 Filter Criteria

This clause defines the contents of the Filter Criteria. This information is part of the Application Server Subscription Information. For further information about the XML modelling see 3GPP TS 29.228 [8].

Filtering is done for initial SIP request messages only.

The S-CSCF shall apply filter criteria to determine the need to forward SIP requests to Application Servers. These filter criteria will be downloaded from the HSS. ~~The HSS shall provide filter criteria in the prioritized list.~~

Initial Filter Criteria (iFC) are stored in the HSS as part of the user profile and are downloaded to the S-CSCF upon user registration, or upon a terminating initial request for an unregistered user if unavailable. They represent a provisioned subscription of a user to an application. After downloading the User Profile from the HSS, the S-CSCF assesses the filter criteria ~~activates for the indicated Application Server the Service Points of Interest that are correlated to the iFC in the User Profile~~. Initial Filter Criteria are valid throughout the registration lifetime of a user or until the User Profile is changed.

Subsequent Filter Criteria (sFC) are not used in this version of this specification.

6.9.2.1 Application Server address

Address to be used to access the Application Server for a particular subscriber.

6.9.2.2 Default ~~IP multimedia~~ handling ~~procedure~~

The Default ~~IP Multimedia H~~handling procedure indicates whether to abandon matching of lower priority triggers and to release the dialogue ~~IP Multimedia session shall be released~~; or to continue~~d~~ the dialogue and trigger matching. ~~as requested in case that AS requests to perform the default handling procedure during the dialogue between AS and S-CSCF or of loss of communications between the S-CSCF and Application Server is failed~~.

Use of the default handling procedure by the AS is not supported in this version of this specification.

6.9.2.3 Trigger point

Trigger Points are the information the S-CSCF receives from the HSS that defines the relevant SPIs for a particular application. They define the subset of initial SIP requests received by the S-CSCF that should be sent or proxied to a particular application. When the S-CSCF receives an initial SIP request, it evaluates the filter criteria one by one. If the initial SIP request matches the filter criteria, the S-CSCF proxies the SIP request to the corresponding SIP AS/IM-SSF/OSA SCS.

6.9.2.4 ~~Application Server priority list~~iFC Priority

If there are multiple ~~application servers~~initial Filter Criteria ~~are~~ assigned for one subscriber, ~~a~~ the priority shall ~~be assigned to application servers which~~ describe~~s~~ the order in which the S-CSCF shall assess them, and then contact the Application Servers ~~in case a~~when the SIP request matches the initial filter criteria ~~of more than one application server~~.

In this case, the S-CSCF shall interact with the application server~~s~~ associated with the initial matching filter criteria, starting from the ~~application server,~~filter criteria which has the highest priority.

6.9.2.5 Service Information

~~Service Information is an optional part of a Filter Criteria, which is a string of information~~. Service Information is transparent information, and is not processed by the HSS or the S-CSCF. Service Information is optionally part of an initial Filter Criteria. If it is available from the initial Filter Criteria the S-CSCF shall include it into the body of the SIP request which is sent from the S-CSCF to the AS to which the initial Filter Criteria is pointing to. ~~Service Information is not processed, analysed or evaluated by the S-CSCF.~~

6.9.3 Authentication data

This clause defines the Authentication Data. This data shall be sent by the HSS to the S-CSCF via the Cx Interface during registration.

For definition of authentication data see specification 3GPP TS 23.008 [10]. For the handling of authentication data, see 3GPP TS 33.203 [11].

Change

7.2 Interfaces defined for HSS

7.2.1 HSS – CSCF (Cx) interface

This interface is used to send subscriber data to the S-CSCF, including Filter Criteria (and their priority); ~~to the S-CSCF; including Filter criteria,~~ which indicates which SIP requests should be proxied to which Application Servers.

The protocol used between the HSS and CSCF (Cx Interface) is specified in 3GPP TS 29.228 [8].

Change

B.3 Example information flows for a voicemail service

B.3.1 User out of coverage message recording

Figure B.3.1.1 shows a possible scenario of an Application Server, which acting as a terminating UA performs the function of a Voicemail Server in order to terminate a call and record a message on behalf of a UE that is out of coverage or powered off.

A S-CSCF is forwarded the initial INVITE destined for a UE that is not currently IMS registered. The Default Filter Criteria in the S-CSCF indicates that for the case of an unregistered user the INVITE should be forwarded to the Voicemail and Announcement Server.

Upon receiving the INVITE request the Voicemail and Announcement Server determines that the destination UE has subscribed to the Voicemail Service (possibly by downloading some subscriber profile information via the Sh interface). The Voicemail and Announcement Server therefore in addition to playing an announcement to inform the caller that the called party is either powered off or out of coverage also informs the caller that he may leave a message for the called party.

The calling party leaves a message for the called party and then hangs up the call by sending a BYE.

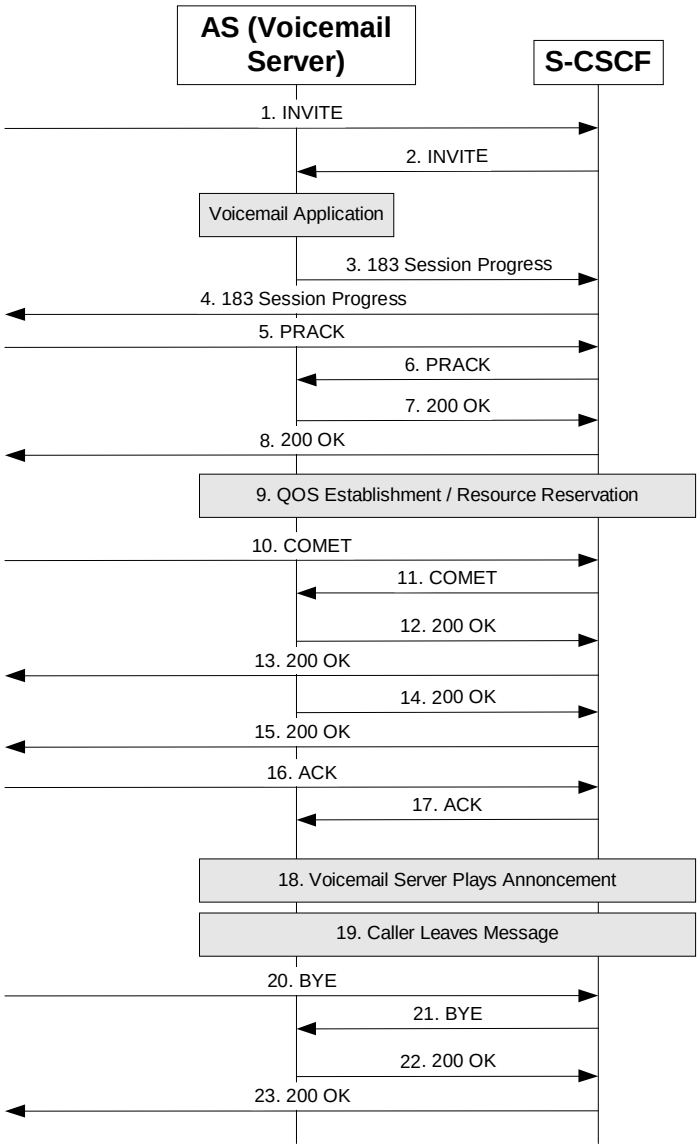

Figure B.3.1.1: Voicemail server records messages

Notes for figure B.3.1.1:

NOTE: For simplicity the 100 Trying response returned or received by the S-CSCF in reponse to requests is omitted from figure B.3.1.1.

1) INVITE request destined for an unregistered user is received at the S-CSCF ~~from caller~~.

2) Based on ~~Default~~ trigger point of the initial Filter Criteria S-CSCF proxies the INVITE request to the AS (Voicemail ~~and Announcement~~ Server) ~~(AS).~~

3-4) The AS starts the voicemail application and responds with a 183 Session Progress containing SDP which is proxied back to the caller by the S-CSCF.

5-8) The caller responds with a PRACK containing SDP, which the S-CSCF proxies to the AS and the AS responds with a 200 OK containing SDP which the S-CSCF proxies back to the caller.

QOS establishment and resource reservation takes place.

10-13) After completing resource reservation the caller sends a COMET containing SDP which is proxied by the S-CSCF to the AS which responds with a 200 OK containing SDP which is proxied back to the caller by the S-CSCF.

14-15) The AS then sends a 200 OK to the initial INVITE which the S-CSCF proxies to the caller.

16-17) The caller returns an ACK to the 200 OK.

18) The AS plays an announcement using the session established indicating that the caller is powered off but that the caller may leave a message.

19) The caller leaves a message using the session established.

20-21) The caller hangs up by sending a BYE which the S-CSCF proxies to the AS.

22-23) The AS responds with a 200 OK, which the S-CSCF proxies back to the caller.

3GPP TSG-CN1 Meeting #24 Adhoc
Budapest Hungary 13. - 17. May 2002

Tdoc N1-02112121423

CR-Form-v5

CHANGE REQUEST

⌘	23.218	CR	004	⌘ rev	~~3~~ 4	⌘	Current version:	5.0.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Passing charging correlation information
Source:	⌘	NEC Corporation
Work item code:	⌘	IMS-CCR
Date:	⌘	07.05.2002
Category:	⌘	F
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	**Previous T-Doc No at CN1#23: N1-020937** **Previous T-Doc No at CN1#23: N1-021033** Make passing of off-line and on-line charging function addresses, GCID, and registration ICID in 24.229 consistent with 32.200. Alignment with 32.200 regarding CCF addresses for P-CSCF in the visited network needs to be incorporated.
Summary of change:	⌘	Description of CCF Gateway addresses are deleted for P-CSCF, SGSN and GGSN in visited network and it is added that it is implementation dependent how P-CSCF in the visited network get the CCF addresses..
Consequences if not approved:	⌘	The AS network entities may not have access to the correct charging functions. This may prevent associating charging records from within the network. Not having the GPRS charging information or registration ICID may preclude some AS charging functions. Charging collection will not be working for P-CSCF in the visited network.

Clauses affected:	⌘	3.2, 6.8, 9.4.5			
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	24.228, 24.229	
Other comments:	⌘				

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of Modification

3.2 Abbreviations

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

API	Application Programming Interface
AS	Application Server
AS-ILCM	Application Server Incoming Leg Control Model
AS-OLCM	Application Server Outgoing Leg Control Model
B2BUA	Back-to-Back User Agent
CAMEL	Customized Applications for Mobile network Enhanced Logic
CAP	CAMEL Application Part
CCF	Charging Collection Function
~~CCF-G~~	~~Charging Collection Function Gateway~~
CDR	Charging Data Records
CF	Call Forwarding
CFonCLI	Call Forwarding on Calling Line Identification
CGI	Common Gateway Interface
CPL	Call Processing Language
CLI	Calling Line Identification
CSCF	Call Session Control Function
CSE	CAMEL Service Environment
FC	Filter Criteria
GPRS	General Packet Radio Service
GPRS CID	GPRS Charging IDentifiers
gsmSCF	gsm Service Control Function
HPLMN	Home PLMN
HSS	Home Subscriber Server
IETF	Internet Engineering Task Force
I-CSCF	Interrogating CSCF
ICID	IMS Charging ID
iFC	Initial Filter Criteria
ILCM	Incoming Leg Control Model
IM	IP Multimedia
IM-CSI	IP Multimedia CAMEL Subscription Information
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IM-SSF	IP Multimedia Service Switching Function
IOI	Inter Operator Identifier
IP	Internet Protocol
ISC	IP multimedia Service Control
MAP	Mobile Application Part
MGCF	Media Gateway Control Function
MO	Mobile Originating
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
MT	Mobile Terminating
O-IM-CSI	Originating IP Multimedia CAMEL Subscription Information
OLCM	Outgoing Leg Control Model
OSA	Open Service Access
PLMN	Public Land Mobile Network
P-CSCF	Proxy CSCF
RFC	Request For Comments
SCIM	Service Capability Interaction Manager
SCS	Service Capability Server
SDP	Session Description Protocol
sFC	Subsequent Filter Criteria
SIP	Session Initiation Protocol
S-CSCF	Serving CSCF

SPI	Service Points of Interest
STP	Service platform Trigger Points
T-IM-CSI	Terminating IP Multimedia CAMEL Subscription Information
UA	User Agent
UE	User Equipment
URL	Uniform Resource Locator

End of Modification

Start of first change

6.8 S-CSCF handling IMS charging

In registration processing, a S-CSCF may send a third party REGISTER to an application server, where the ICID, IOI and charging function addresses are included in the message.

During a session, the S-CSCF shall generate the CDR for charging purposes.

In a session originating case, when receiving an incoming initial request, this request will carry the ICID generated by the upstream P-CSCF, which is serving the originating user; the S-CSCF shall store the ICID for this session and handle this request based on filter criteria. After processing this request the S-CSCF shall include the ICID and the charging function addresses received from the HSS in the outgoing message. The charging function addresses identify on-line, and ~~and~~ off-line ~~and off-line gateway~~ charging entities in the home network. It is implementation dependent how IMS related entities such as P-CSCF~~, GGSN or SGSN~~ in the visited network get the local CCF addresses ~~in the visited network~~ in the case that the P-CSCF is located in the visited network. ~~Off-line gateway charging entities (CCF/G) are used for P-CSCF, GGSN and SGSN in the visited network~~, If this message is sent outside the mobile network, S-CSCF shall include Inter Operator Identifier (IOI) that identifies the home network into the message. IOI is globally unique identifier for using inter operator accounting purposes~~ and also is included in the initial request/response to AS~~. The response to the outgoing message may contain a separate IOI that identifies the home network of the called party. The S-CSCF shall retain either IOI in the message when contacting the Application Servers. The S-CSCF will receive GPRS charging information ~~PRS CIDs~~ from subsequent requests and responses, the S-CSCF shall store these parameters and shall remove them from the outgoing message if this message is sent to the terminating UE's home network or the originating UE's visited network. The GPRS charging information~~GCIDs~~ may be sent to application servers.

In a session terminating case, when receiving an incoming initial request, this request will carry the ICID generated by the originating UE's P-CSCF; the S-CSCF shall store the ICID for this session and handle this request based on filter criteria. After processing this request the S-CSCF shall include the ICID and the charging function addresses received from the HSS in the outgoing message. The charging function addresses identify on-line ~~,and~~ and off-line ~~and off-line gateway~~ charging entities in the home network. IOI may be received from another network or is inserted by the MGCF to identify the originating PSTN/PLMN. If ~~this~~IOI is received at the S-CSCF ~~message was received from outside the mobile network~~, the S-CSCF shall store the IOI value for the network that sent the request. The response to the incoming message may contain a separate IOI that identifies the home network of the S-CSCF. The S-CSCF shall retain either IOI in the message when contacting the Application Servers. Afterward~~,~~ the S-CSCF shall remove the IOI of the requesting network from the message before sending the message further within the network. The S-CSCF will receive GPRS~~PRS CIDs~~ charging information from subsequent requests and responses, the S-CSCF shall store these parameters and removes them from the outgoing message if this message is sent to the terminating UE's visited network or the originating UE's home network. The ~~GCIDs~~ GPRS charging information may be sent to application servers.

For detailed information on transporting charging parameters between IMS entities using SIP, see 3GPP TS 24.229 [5].

End of first change

Start of second change

9.4.5 Application server handling of IP multimedia session charging

If an application server receives a third party REGISTER from the S-CSCF carrying the ICID, IOI and charging function addresses, the application server may store these parameters for charging purposes.

In a session originating case, when processing an incoming initial request carrying the ICID, IOI, GPRS charging information~~GCIDs~~ and charging function addresses for this session, the application server shall pass ~~this~~ these parameters in the outgoing message and may store the parameters for charging purposes.

In a session terminating case, when processing an incoming initial request carrying the ICID, IOI, GPRS charging information~~GCIDs~~ and charging function addresses for this session, the application server shall pass ~~this~~ these parameters in the outgoing message and may store the parameters for charging purposes.

When the application server is acting as an originating user agent as described in clause 9.1.1.2 and initiates a session or a stand-alone transaction, it shall generate ICID itself.

For detailed information on transporting charging parameters between IMS entities using SIP, see 3GPP TS 24.229 [5].

End of second change

3GPP TSG-CN1 Meeting #23
Ft Lauderdale, Florida, 8th – 12th April 2002

Tdoc N1-020951

CR-Form-v5

CHANGE REQUEST

⌘ **23.218** **CR** **006** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of terminology in 23.218 regarding Offer/counter offer/answer
Source:	⌘	dynamicsoft
Work item code:	⌘	IMS-CCR
Date:	⌘	10.04.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The Offer/Counter-offer/Answer model with SIP is no longer a working assumption for SIP within IETF.
Summary of change:	⌘	References to Offer/Counter-offer/Answer have been replaced with Offer/Answer with Preconditions.
Consequences if not approved:	⌘	The text in 23.218 will not align with IETF SIP.

Clauses affected:	⌘	2, 8.1.2, 8.1.3, 8.1.4, B.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

FIRST MODIFICATION

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] Void.

[2] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[3] 3GPP TS 23.228: " IP multimedia subsystem; Stage 2".

[4] 3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP; stage 3".

[5] 3GPP TS 24.229: "IP multimedia call control protocol based on SIP and SDP; stage 3".

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

[7] 3GPP TR 29.998-4-4: "Open Service Access (OSA); Application Programming Interface (API) Mapping for Open Service Access (OSA); Part 4: Call Control Service Mapping; Subpart 4: Multiparty Call Control SIP".

[8] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".

[9] 3GPP TS 23.278: "Customised Applications for Mobile network Enhanced Logic (CAMEL); IP Multimedia System (IMS) interworking; Stage 2".

[10] 3GPP TS 23.008: "Organisation of subscriber data".

[11] 3GPP TS 33.203: "Access security for IP based services".

[12] 3GPP TS 29.198: "Open Service Access (OSA); Application programming Interface (API)".

[13] IETF RFC 3265: "Session Initiation Protocol (SIP) Event Notification".

[14] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) specification".

[15] IETF RFC 3264: "An Offer/Answer Model with Session Description Protocol".

NEXT MODIFICATION

8.1.2 Tones and announcements

An Application Server is in control of the tone/announcement selection and is aware of MRFC capabilities.

The MRFC accepts INVITE requests sent from an Application Server, via the S-CSCF, for the purpose of applying tones and announcements. The INVITE sent to the MRFC will contain sufficient information to play the appropriate tone or announcement.

The MRFC shall support both the offer/answer as defined in IETF RFC 3264 [15] and the offer/answer with preconditions ~~and offer/counter-offer/answer~~ models for SDP negotiation with the AS. However, the offer/answer model for SDP negotiation between the AS/S-CSCF and the MRFC is sufficient for applying tones and announcements. The MRFC should always grant the requests from the AS (unless there is a resource problem). The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.

The tone or announcement should end when a BYE is received. Alternatively, an expiration time may have been specified from the AS within the SDP of the INVITE request. In this case, the MRFC may terminate the media on its own and generate and BYE request towards the AS. A tone or announcement may also have a pre-determined play time (e.g., confirmation tone), and so there may not be a need for the AS to send a request to stop it or to include the play time in the request.

See annex B for a call flow example of playing an announcement for a mobile originated call.

8.1.3 Ad hoc conferences (multiparty calls)

An Application Server can control an Ad Hoc conference (multiparty call) and is aware of MRFC capabilities.

The MRFC accepts INVITE requests sent from an Application Server, via the S-CSCF, for the purpose of managing ad hoc conferences. The INVITE sent to the MRFC shall contain sufficient information to initiate, add and remove parties from the conference. Re-INVITE requests can also be sent for managing floor control and for parties to leave and rejoin the media path.

The MRFC shall support both the offer/answer as defined in IETF RFC 3264 [15] and the offer/answer with preconditions~~and offer/counter-offer/answer~~ models for SDP negotiation with the AS. However, the offer/answer model for SDP negotiation between the AS/S-CSCF and the MRFC is sufficient for managing ad hoc conferences. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC will reserve the requested local resources and return the appropriate resource identifiers in the 200 response.

See annex B for a call flow example of an Ad Hoc Conference (Multiparty Call).

8.1.4 Transcoding

An Application Server can control a transcoding session and is aware of MRFC capabilities.

The MRFC accepts INVITE requests sent from an Application Server, via the S-CSCF, for the purpose of transcoding. The INVITE sent to the MRFC shall contain sufficient information to associate the two sessions that require transcoding.

The MRFC shall support both the offer/answer as defined in IETF RFC 3264 [15] and the offer/answer with preconditions~~and offer/counter-offer/answer~~ models for SDP negotiation with the AS. Either may be necessary for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem).

For the offer/answer model, the MRFC responds to the INVITE request with a 200 response indicating the selected media in the SDP. The MRFC will also reserve the requested local resources at that time and return the appropriate resource identifiers in the 200 response.

For the offer/answer with preconditions~~offer/counter-offer/answer~~ model, the MRFC responds to the INVITE request with a 183 response indicating the list of codecs supported by the MRFC. When the PRACK is received indicating the selected media in the SDP, the MRFC will reserve the requested local resources at that time and return the appropriate resource identifiers in the 200 response.

See annex B for call flow examples of providing transcoding.

NEXT MODIFICATION

B.2 Announcement, conferencing and transcoding examples using MRFC

B.2.1 Example information flow for a mobile originated IP multimedia session that results in playing an announcement

The following diagram shows an example of playing an announcement for a mobile originated IP multimedia session. An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog. The B2BUA AS manages the interactions between the two dialogs.

The offer/answer model as defined in IETF RFC 3264 [15] is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.

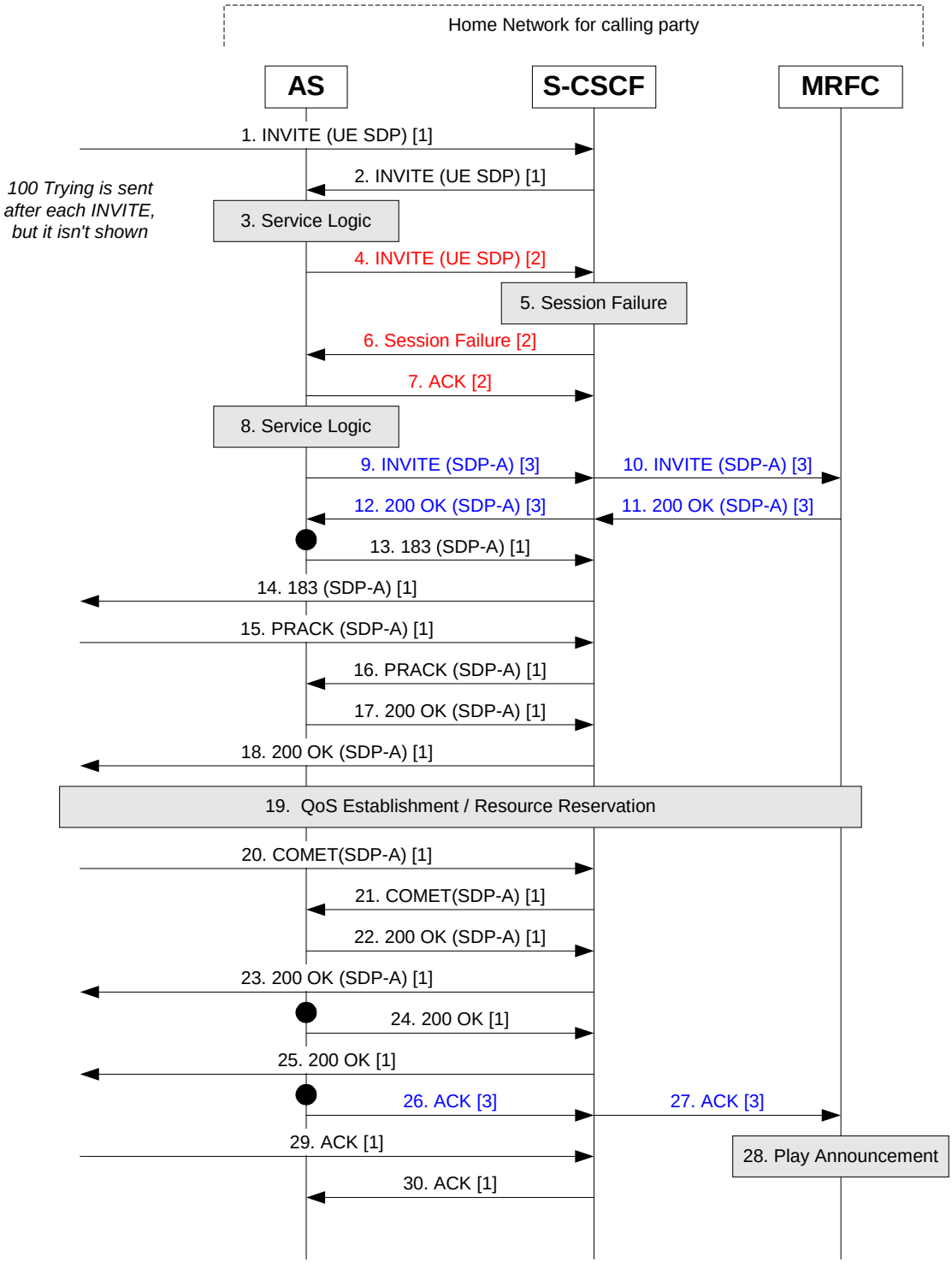

Figure B.2.1.1: Tones and announcements call flow

Notes for figure B.2.1.1:

INVITE request is received at the S-CSCF [Call-ID 1].

INVITE request is forwarded to an AS, based on the filter criteria.

The AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF experiences a failure, such as not being able to determine the next hop for the SIP URL.

Session failure returned to the AS.

ACK returned to complete this dialog [Call-ID 2].

The AS service logic determines to play an announcement to the calling party.

New INVITE request is sent to the MRFC, via the S-CSCF, to establish a new dialog for playing an announcement [Call-ID 3]. Sufficient information is included to specify the details for the announcement.

S-CSCF relays INVITE to the MRFC.

The MRFC allocates the requested resource and returns 200 OK, with SDP-A indicating selected media.

S-CSCF relays 200 OK to the AS.

- 30) The B2BUA AS manages the dialog for Call-ID 1 as normal, with the SDP-A supplied from the MRFC. The MRFC is instructed to play the announcement using the ACK request at flow 26 for Call-ID 3.

B.2.2 Example information flow for a mobile originated IP multimedia ad hoc conferencing session (multiparty call)

The following diagram shows an example of an ad hoc conference (multiparty call). An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The Application Server is in control of the ad hoc conference, is aware of the MRFC capabilities and is also operating as a B2BUA performing third party call control.

An INVITE request is generated from UE-1 indicating a desire to start a multiparty call (ad hoc conference) by taking the existing sessions, between UE-1 to UE-2 and UE-1 to UE-3, and bringing them together. The AS uses third party call control to request the conference facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the three parties (UE-1, UE-2, UE-3). New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the conferencing resource at the MRFP. The first INVITE request to the MRFC should receive a response that includes the conference identifier. The same conference identifier will be used for subsequent INVITE requests to add or drop parties to the conference.

The offer/answer model as defined in IETF RFC 3264 [15] is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected media in the SDP. The MRFC will also reserve the requested local resources at that time and return the appropriate resource identifiers in the 200 response.

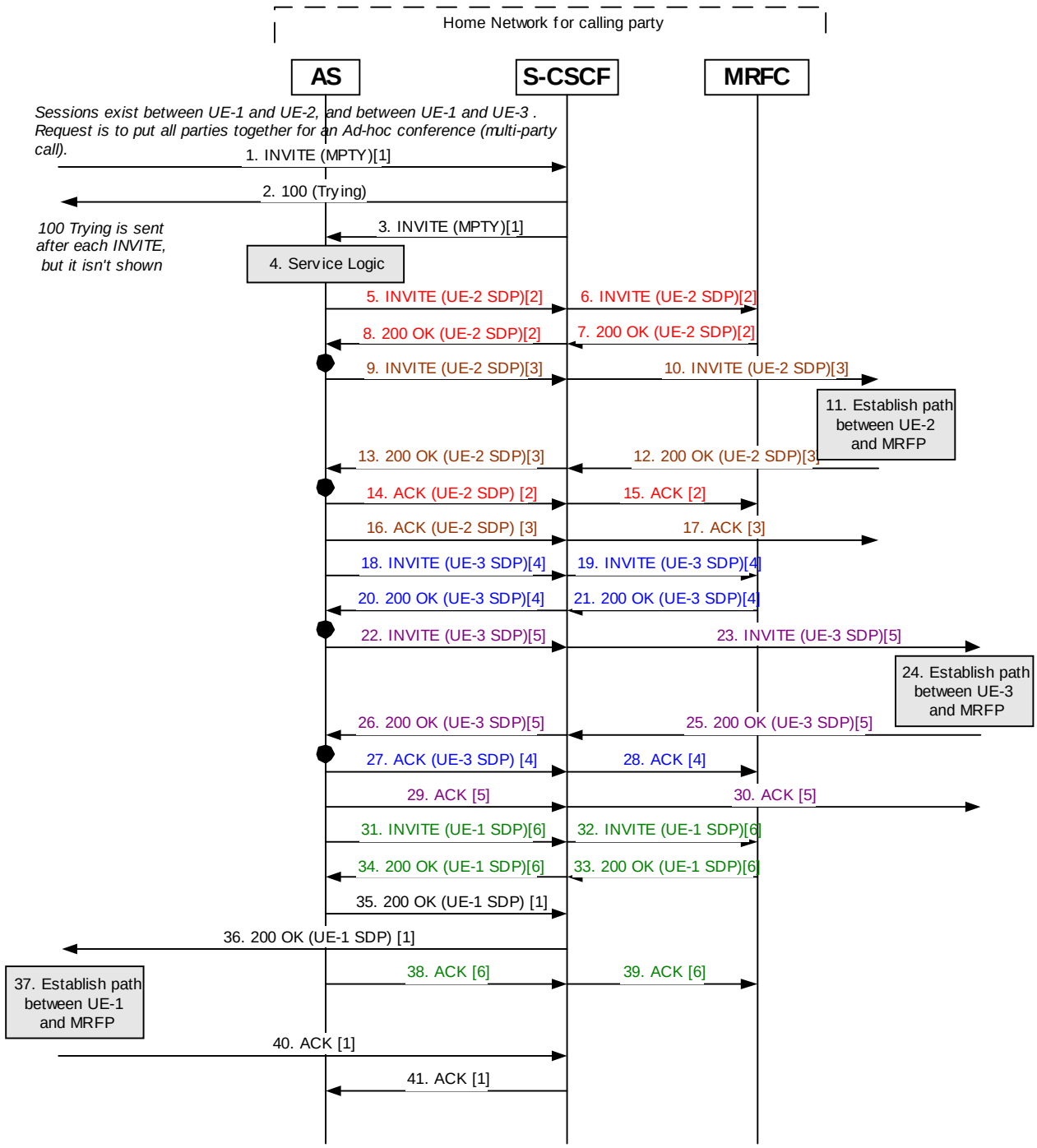

Figure B.2.2.1: Ad hoc conference call flow

Notes for figure B.2.2.1:

INVITE request received at S-CSCF from UE-1 indicating desire to start ad hoc conference (multiparty call) for the existing sessions between UE-1 to UE-2 and UE-1 to UE-3.

100 Trying returned.

INVITE forwarded to AS.

AS performs service logic and allows attempt to start ad hoc conference.

5-8) New INVITE request sent to MRFC to initiate multiparty call, get conference identifier and prepare dialog for UE-2 [Call-ID 2].

9-13) Re-INVITE sent to UE-2 to establish dialog between AS and UE-2 [Call-ID 3].

14-17) ACK sent for Call-ID 2 and Call-ID 3.

18-21) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-3 [Call-ID 4].

22-26) Re-INVITE sent to UE-3 to establish dialog between AS and UE-3 [Call-ID 5].

27-30) ACK sent for Call-ID 4 and Call-ID 5.

31-34) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-1 [Call-ID 6].

35-36) 200 OK returned to UE-1 with SDP.

37) The session is established.

38-41) ACK sent for Call-ID 1 and Call-ID 6.

B.2.3 Example information flows for a mobile originated IP multimedia session that requires transcoding

The two figures B.2.3.1 and B.2.3.2 that follow illustrate the MRFC providing transcoding for a mobile originated session, where the MRFC is receiving directions from the AS operating as a B2BUA.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the originating UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog with the called party after receiving the initial failure indication. The B2BUA AS manages the interactions between the two dialogs.

An INVITE request is generated from a UE. A 606 "Not Acceptable" response is received from the called party. The AS uses third party call control to request transcoding facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the two parties. New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the transcoding resource at the MRFP.

In the first figure B.2.3.1 below, the called party returns an indication of an acceptable codec. For this case, the request to the MRFC will include the appropriate codec for the called party and the offer/answer model as defined in IETF RFC 3264 [15] with the MRFC is used. In figure B.2.3.2 below, the called party does not indicate any SDP, which means that more steps will be required on the subsequent INVITE request to set up transcoding with the MRFC. An INVITE without SDP is sent to the MRFC to get the list of codecs it supports. The AS then sends that list of codecs in the new INVITE that it sends to the called party. The B2BUA function of the AS matches up the responses.

The offer/answer model is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.

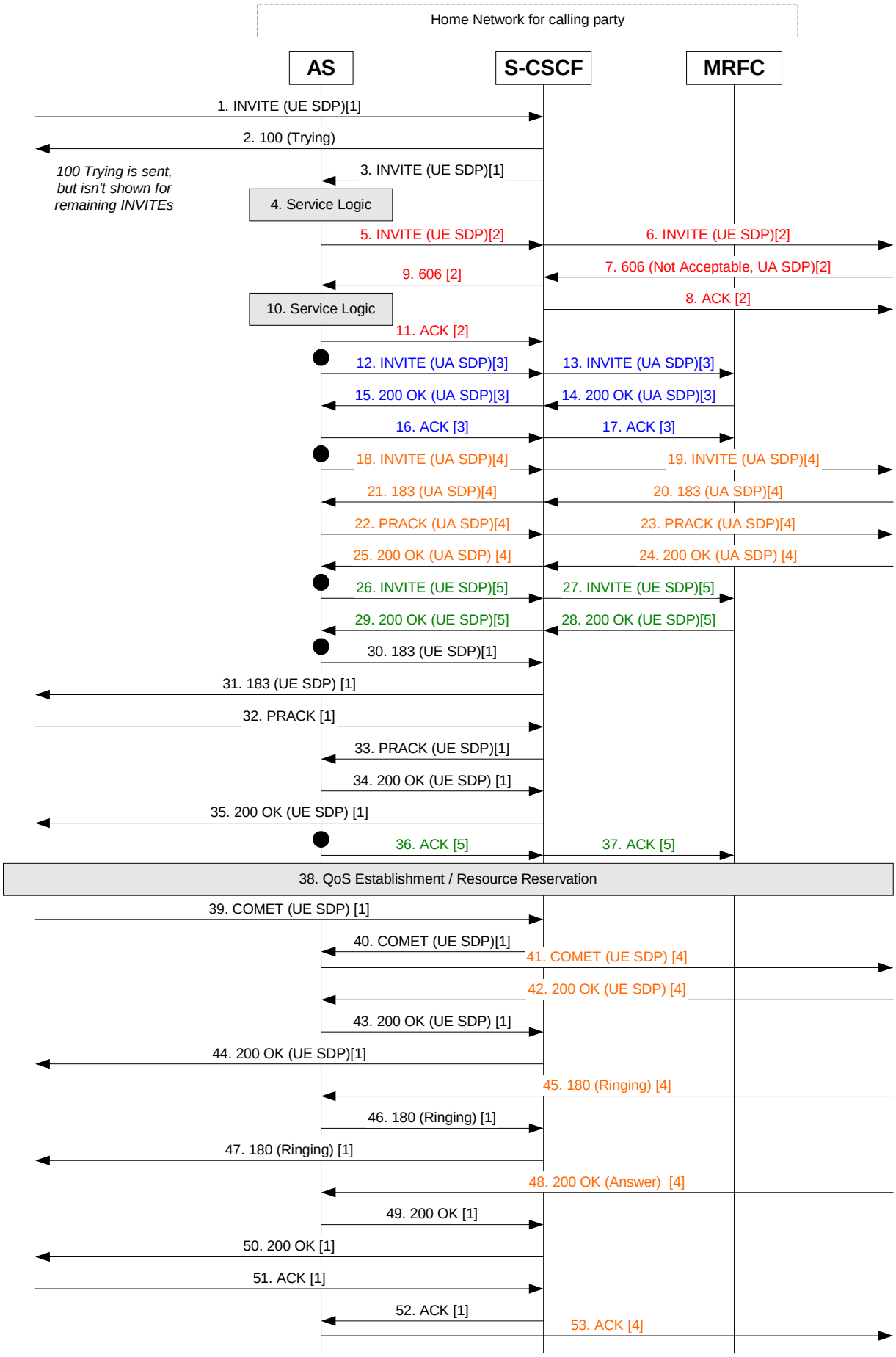

Figure B.2.3.1: Transcoding call flow (called party indicates codec)

Notes for figure B.2.3.1:

INVITE request received at S-CSCF from UE [Call-ID 1].

100 Trying returned.

INVITE forwarded to an AS, based on filter criteria.

AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF forwards the INVITE.

Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable plus information on what codec would be acceptable.

An ACK is sent to the called UA to complete the dialog for Call-ID 2.

606 response is forwarded to the AS.

AS service logic determines that there is an MRFC that can perform the transcoding.

ACK sent to S-CSCF to complete the dialog for Call-ID 2.

12-17) New INVITE request sent to MRFC to establish transcoding for called UA [Call-ID 3].

18-25) New INVITE request sent to called UA to establish session between UA and MRF [Call-ID 4].

26-29) New INVITE request sent to MRFC to establish transcoding for calling UE [Call-ID 5].

30-53) Normal call establishment procedures from here on, with B2BUA AS performing the appropriate signalling translations between the associated dialogs.

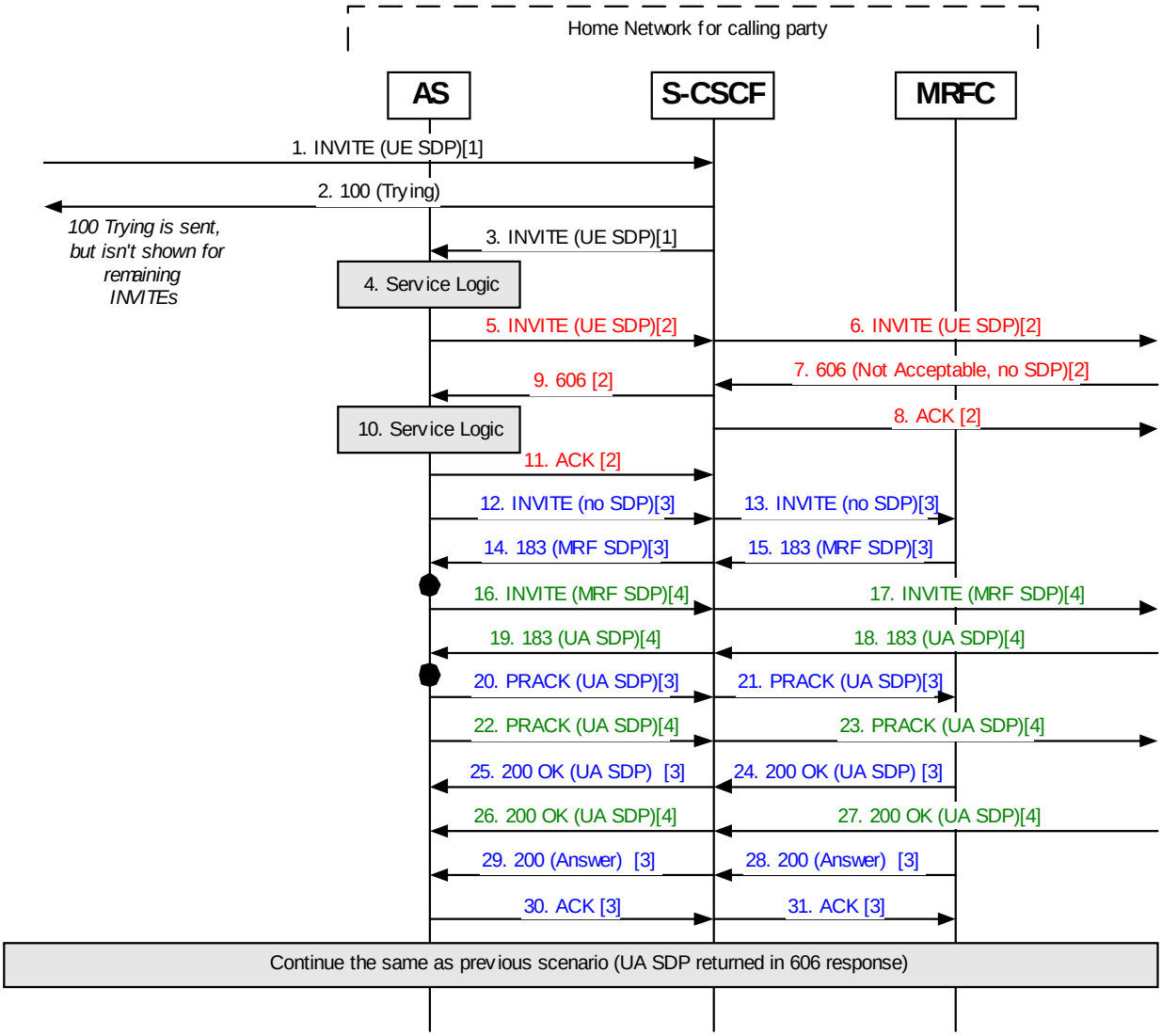

Figure B.2.3.2: Transcoding call flow (called party codec negotiated)

Notes for figure B.2.3.2:

INVITE request received at S-CSCF from UE [Call-ID 1].

100 Trying returned.

INVITE forwarded to an AS, based on filter criteria.

AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF forwards the INVITE.

Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable but there is no information on what codec would be acceptable (no SDP).

ACK sent to called UA to complete the dialog for Call-ID 2.

606 response is forwarded to the AS.

AS service logic determines that there is an MRFC that can perform the transcoding.

ACK sent to S-CSCF to complete the dialog for Call-ID 2.

12-15) New INVITE request sent to MRFC to establish transcoding for called UA and to get the list codecs supported by the MRF [Call-ID 3].

16-19) New INVITE request sent to called UA with SDP for all codecs supported by the MRF to establish session between UA and MRF [Call-ID 4]. UA returns SDP with acceptable codecs.

20-23) A new offer with the codecs provided by the UA is sent in PRACK and the 200 OK response indicates the selected codec.

24-31) Acknowledgements sent to complete Call-ID 3.

Call establishment procedures from here on are common with the previous transcoding call flow.

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CR-Form-v5

CHANGE REQUEST

⌘	23.218	CR	012	⌘ rev	~~4~~ 5	⌘	Current version:	5.0.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Update of the S-CSCF- AS relationship, for REGISTER.
Source:	⌘	NEC Corporation Nokia, dynamicsoft, Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	07/05/2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Previous T-doc no: N1-021102 at the CN1#SIPadhoc There is discrepancy between the current CR and 5.4.1 in 24.229 In 24.229, there is no description about procedure about S-CSCF triggering services upon REGISTER. Another point is that default handling procedure was clarified at the last SIPadhoc meeting. Current CR has discrepancy with this results.
Summary of change:	⌘	Clarifications on: REGISTER triggering, default handling.
Consequences if not approved:	⌘	Inconsistencies within 23.218 and 24.229.

Clauses affected:	⌘	6.3		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

********** start of change **********

6.3 Handling of IP multimedia registration

Upon receiving the initial registration request from the user, the S-CSCF shall authenticate the user and upon receiving a subsequent registration request containing valid authentication credentials, download the user profile from the HSS. For further detailed information on registration, profile download and authentication procedures see 3GPP TS 24.229 [5] and 3GPP TS 33.203 [11].

The initial filter criteria (subset of the profile) is stored locally at the S-CSCF, as specified in 3GPP TS 24.229 [5].

The S-CSCF shall verify if the triggers match, from the highest to the lowest priority (see subclause 5.2).

After a successfully authenticated registration, the S-CSCF shall download from the HSS ~~service profile for the user including all filter criterias associated with the public user and~~ all the implicitly registered public user identities associated with the registered public user identity~~., etc. and the~~ The S-CSCF shall then verify, in their order of priority, if the triggers ~~determine based on the filter criteria information~~ downloaded from the HSS match. ~~which application servers to inform about the registration event of the public user identity(s)~~. If the registration request from the ~~UE~~ user matches ~~the filter~~ a trigger~~criteria of some application servers~~, the S-CSCF ~~needs to inform either~~ performs ~~a the application servers by performing~~ a third party registration to the those application servers which are interested to be informed about the user registration event of these public user identities. This may trigger services to be executed by an AS.~~; or the S-CSCF triggers service(s) on REGISTER. The service profile is stored locally during the registration period for the purpose of subsequent session requests or mobile origination, etc.~~

The important information carried in the third party REGISTER request is the public user identity, the S-CSCF address and the expiration time. Additional application server specific data, which is associated with the Filter Criteria and obtained from the HSS, is added to the REGISTER request body. This data should include the IMSI for an Application Server that supports CAMEL services or the private user identity for other Application Servers as received from the HSS.

This third party registration will include an expiration time that is equal to the expiration time sent to the UE by the S-CSCF in the 200 OK response to the incoming REGISTER request

On receiving a failure response to one of the REGISTER requests ~~or on a service triggered by a REGISTER~~, the S-CSCF shall apply the "default handling" related with the ~~may initiate network initiated deregistration procedure based on the information in the~~ initial Filter Criteria's trigger used (see subclauses 5.2, 6.9.2.2). ~~If the filter criteria does not contain an instruction to the S-CSCF regarding the failure to contact the Application Server, the S-CSCF shall not initiate network initiated deregistration procedure.~~

~~The S-CSCF shall ababdon verifying if the REGISTER dependent triggers matching, fromfor the highest to the lowestlower priority.~~

********** end of change **********

********** start of change **********

9.4.3 Application Server handling of IP multimedia registration

When the user is registered with the network and has been assigned a S-CSCF, the application servers, which are interested to know about the user registration events, should get a third party registration request generated by the S-CSCF. When the application server receives the request, the AS may perform a service triggered by a REGISTER. If the application server doesn't support this mechanism, it shall send back an error response to the S-CSCF. If the application server supports this mechanism, it shall treat this request as a notification from the network about the user's registration event and extract the important information from this request.

The application server will also expect to receive REGISTER requests indicating reregistration or deregistration events from the S-CSCF, so that the application server can update or release user's registration information.

The important information carried in the third party registration request are, the public user identity, the S-CSCF address, and the expiration time. The third party registration request may also carry the user' implicitly registered public identities.

The application server can also extract user specific data from the REGISTER request, e.g. the IMSI for an Application Server that supports CAMEL services.

Application Servers can also subscribe to the S-CSCF Registration Event Package after receiving the third party registration request. After subscribing to the event package with the S-CSCF, the application will expect to receive the notifications from the S-CSCF, which may carry the user's implicitly registered public user identities and user's registration event information.

The application server can also obtain the user's implicitly registered public identities by accessing the HSS via Sh or Si interface.

An application server will require knowledge of a user's IMS subscription information if they are to correctly apply services. This information can be provided to the application server in two ways, either:

a) Manually by provisioning. This is outside of the scope of this specification.

b) Automatically from the HSS via the Sh and Si interfaces.

More information on these procedures is contained in 3GPP TS 24.229 [5].

********** **end of change** **********

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Tdoc N1-021384
was Tdoc N1-021186

6.9 Description of subscriber data

Start of first change

6.9.1 Application Server subscription information

The Application Server Subscription Information is the set of all Filter Criteria that are stored within the HSS for service profile for a specific user. This information shall be sent by the HSS to the S-CSCF via the Cx Interface during registration. ~~The information~~Filter Criteria shall also be sent after registration via the Cx interface when requested, as specified in 3GPP TS 29.228 [8] ~~if it is changed at the HSS for a specific user with an active registration~~.

End of first change

6.9.2 Filter Criteria

This clause defines the contents of the Filter Criteria. This information is part of the Application Server Subscription Information.

Filtering is done for initial SIP request messages only.

The S-CSCF shall apply filter criteria to determine the need to forward SIP requests to Application Servers. These filter criteria will be downloaded from the HSS. The HSS shall provide filter criteria in the prioritized list.

Initial Filter Criteria (iFC) are stored in the HSS as part of the user profile and are downloaded to the S-CSCF upon user registration. They represent a provisioned subscription of a user to an application. After downloading the User Profile from the HSS, the S-CSCF activates for the indicated Application Server the Service Points of Interest that are correlated to the iFC in the User Profile. Initial Filter Criteria are valid throughout the registration lifetime of a user or until the User Profile is changed.

Subsequent Filter Criteria (sFC) are not used in this version of this specification.

6.9.2.1 Application Server address

Address to be used to access the Application Server for a particular subscriber.

6.9.2.2 Default IP multimedia handling

The Default IP Multimedia Handling indicates whether the IP Multimedia session shall be released or continued as requested in case of loss of communications between the S-CSCF and Application Server.

6.9.2.3 Trigger point

Trigger Points are the information the S-CSCF receives from the HSS that defines the relevant SPIs for a particular application. They define the subset of initial SIP requests received by the S-CSCF that should be sent or proxied to a particular application. When the S-CSCF receives an initial SIP request, it evaluates the filter criteria one by one. If the initial SIP request matches the filter criteria, the S-CSCF proxies the SIP request to the corresponding SIP AS/IM-SSF/OSA SCS.

6.9.2.4 Application Server priority list

If there are multiple application servers are assigned for one subscriber, a priority shall be assigned to application servers which describes the order in which the S-CSCF shall contact the Application Servers in case a SIP request matches the initial filter criteria of more than one application server. In this case, the S-CSCF shall interact with the application servers associated with the initial filter criteria starting from the application server, which has the highest priority.

6.9.2.5 Service Information

Service Information is an optional part of a Filter Criteria, which is a string of information. If it is available from the Filter Criteria the S-CSCF shall include it into the body of the SIP request which is sent from the S-CSCF to the AS to which the Filter Criteria is pointing to. Service Information is not processed, analysed or evaluated by the S-CSCF.

6.9.3 Authentication data

This clause defines the Authentication Data. This data shall be sent by the HSS to the S-CSCF via the Cx Interface during registration.

For definition of authentication data see specification 3GPP TS 23.008 [10]. For the handling of authentication data, see 3GPP TS 33.203 [11].

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Tdoc N1-021385
was Tdoc N1-021187

Start of first change

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] Void.

[2] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[3] 3GPP TS 23.228: " IP multimedia subsystem; Stage 2".

[4] 3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP; stage 3".

[5] 3GPP TS 24.229: "IP multimedia call control protocol based on SIP and SDP; stage 3".

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

[7] 3GPP TR 29.998-4-4: "Open Service Access (OSA); Application Programming Interface (API) Mapping for Open Service Access (OSA); Part 4: Call Control Service Mapping; Subpart 4: Multiparty Call Control SIP".

[8] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".

[9] 3GPP TS 23.278: "Customised Applications for Mobile network Enhanced Logic (CAMEL); IP Multimedia System (IMS) interworking; Stage 2".

[10] 3GPP TS 23.008: "Organisation of subscriber data".

[11] 3GPP TS 33.203: "Access security for IP based services".

[12] 3GPP TS 29.198: "Open Service Access (OSA); Application programming Interface (API)".

[13] IETF RFC 3265: "Session Initiation Protocol (SIP) Event Notification".

[14] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) specification".

[15] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[16] 3GPP TS 29.229: "Cx Interface based on the Diameter protocol".

[17] 3GPP TS 29.328: "IP Multimedia Subsystem (IMS) Sh Interface; Signalling flows and message contents".

[18] 3GPP TS 29.329: "Sh Interface based on the Diameter protocol".

End of first change

Start of second change

7 Functional requirements of HSS

7.1 Subscriber data related storage requirements for HSS

HSS stores information required by:

- S-CSCFs (downloaded via Cx interface). Data model and abstract syntax notation are described in TS 29.228 [8];
- IM-SSF Application Servers (downloaded via Si interface);
- Application Servers (downloaded via Sh interface).

The service related data shall be transparent to HSS, this requires the HSS has some means to differentiate the source of the request for the data, therefore, the HSS can respond with the data the request asks for.

7.2 Interfaces defined for HSS

7.2.1 HSS – CSCF (Cx) interface

This interface is used to send subscriber data to the S-CSCF; including Filter criteria, which indicates which SIP requests should be proxied to which Application Servers.

The protocol used between the HSS and CSCF (Cx Interface) is specified in 3GPP TS 29.228 [8] and 3GPP TS 29.229 [16].

7.2.2 HSS - Application Server (Sh) interface

The Sh interface is between the HSS and the SIP Application Servers and the OSA SCS and may be used for transferring User Profile information.

The protocol used between the HSS and AS (Sh Interface) is specified in 3GPP TS 29.328 [17] and 3GPP TS 29.329 [18].

7.2.3 HSS – CSE interface

The protocol used on the interface between the HSS and the CAMEL Service Environment (CSE) is the MAP protocol [15].

7.2.4 HSS – IM-SSF Application Server (Si) interface

The Si interface is between the HSS and the IM-SSF Application Server and is used for transferring IMS CAMEL specific information.

The protocol used between the HSS and IM-SSF (Si Interface) is specified in 3GPP TS 23.278 [9] and 3GPP TS 29.002 [15].

7.3 Procedures during IP multimedia registration

These procedures are described in TS 29.228 [8].

7.4 Procedures during IP multimedia sessions

These procedures are described in TS 29.228 [8].

End of second change

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Budapest, Hungary, 13. – 17. May 2002 ***~~N1-021123~~ ~~N1-021198~~***

CR-Form-v5

CHANGE REQUEST

⌘ **TS 23.218 CR 016** ⌘ **rev 1** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	SIP Application Server acting as a Gatewas to an external Application Server; and OSA API usage.
Source:	⌘	Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	2002/05/15
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	1) At the Madrid meeting, SA2 (3GPP architecture authority) confirmed that there is no requirement to have the SIP AS acting as a gateway for 3rd parties SIP ASs. This described as a requirement in 23.218 though, resulting in a misalignment between TS 23.228 and TS 23.218. In order not to lose this possible deployment, we propose to move that text in an informative annex. 2) Clarifiy 23.218 to support the 23.228 clause (4.2.1.2Support of OSA): "It shall be possible for an operator to offer access to services based on OSA for its IM CN subsystem subscribers. This shall be supported by an OSA API between the Application Server (AS) and the network."
Summary of change:	⌘	1) Move the capability description "SIP AS acting as a gateway to access external AS" to an informative annex. 2) Clarify that OSA API can be used between the network & external AS.
Consequences if not approved:	⌘	1) Misalignment between TS 23.218 and TS 23.228.

Clauses affected:	⌘	5.1, Annex A
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	SA2 references: S2-021056, SA2 chair's MOM

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Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5 Functional requirements of network entities

5.1 Architecture for service provision for IP multimedia subsystem

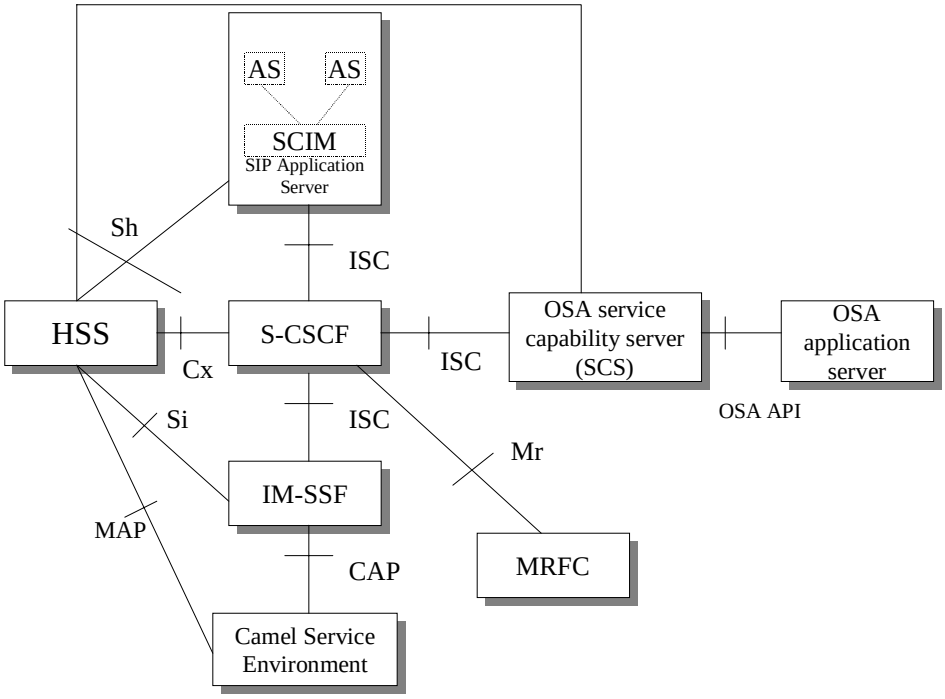

Figure 5.1.1: Functional architecture for support of service provision for IP multimedia subsystem

Figure 5.1.1 illustrates the architecture with the S-CSCF communicating to Application Servers via the IP multimedia service control (ISC) interface. The Application Servers can be:

- SIP Application Servers - which may host and execute services. It is intended to allow the SIP Application Server to influence and impact the SIP session on behalf of the services. ~~SIP Application Servers may act as gateway functions for other application servers (external) in the case that the other application servers are located externally to the home network and they communicate via a gateway at the end of the ISC interface. The interface between the SIP Application Server acting as a gateway, and other application servers (external) is outside the scope of the present document;~~

- the IM-SSF - which is a particular type of application server the purpose of which is to host the CAMEL network features (i.e. trigger detection points, CAMEL Service Switching Finite State Machine, etc) and to interface to CAP as specified in 3GPP TS 29.078 [14];

- the OSA service capability server (OSA SCS) which interfaces to the OSA framework Application Server and which provides a standardized way for third party secure access to the IM subsystem. The OSA reference architecture defines an OSA Application Server as an entity that provides the service logic execution environment for client applications using the OSA API as specified in 3GPP TS 29.198 [12]. This definition of Application Server differs from the definition of Application Server in the context of service provisioning for the IM subsystem, i.e. the entity communicating to the S-CSCF via the ISC interface;

- in addition a specialized type of SIP Application Server, the service capability interaction manager (SCIM) which performs the role of interaction management between other application servers.

All the Application Servers, (including the IM-SSF and the OSA SCS) behave as SIP application servers on the ISC interface.

In addition the Application Servers can also interact with the MRFC via the S-CSCF (ISC and Mr interfaces) in order to control Multimedia Resource Function processing.

Annex A (informative): Scalability and deployment considerations for IP multimedia service provision

This Annex is intended to guide the reader in deployment and real life issues.

This specification has provided a set of tools for the application developer and the application integrator to utilize in order to develop and deploy applications and provide services for the IP multimedia core network subsystem. However, practical deployments will need to consider certain scalability issues with the use or misuse of some of the tools specified in this specification.

The architecture allows for any number of Application Servers to be connected to any number of S-CSCFs and any number of Application Servers to be involved in the initiation of a multimedia session. A scalability issue may arise if there are a large number of S-CSCF and AS in a network.

Consideration should be given to the signalling propagation delays introduced when many Application Servers add themselves to the route to provide originating and terminating services for the calling and called parties.

A SIP Application Server may act as gateway function by forwarding an incoming request to external ASs beyond the IM CN subsytem. An external ASs will also send responses to IM CN subsytem via a SIP AS gateway. These other Application Servers can be located externally to the home network, and use the SIP Application Server as a gateway to the ISC interface. The interface between the SIP Application Server acting as a gateway, and other Application Servers is outside the scope of the present document.

There is another case where the external AS is connected with S-CSCF (or I-CSCF) via public ISP networks depending on the operators desire for network configuration hiding. S-CSCF or entities outside the S-CSCF may perform the interworking function.

Care must also be taken to the priority and order of contact of multiple Application Servers during a session in order to account for feature interaction issues.

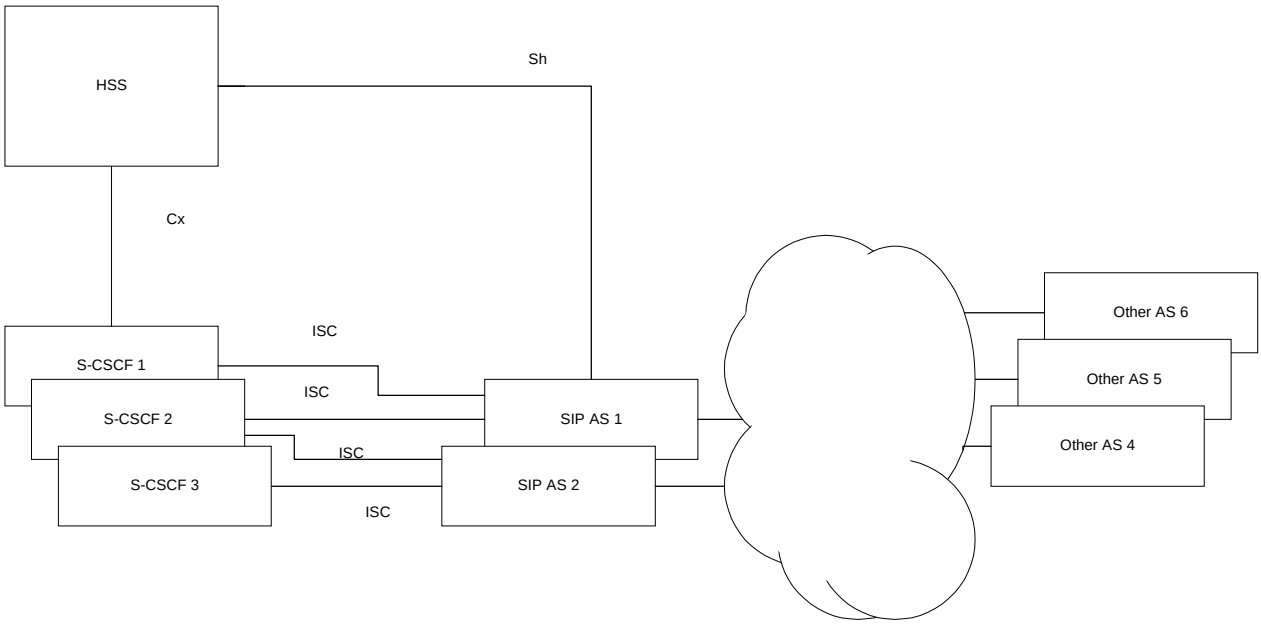

Figure A.1: Example hierarchical architecture for Application Servers

Figure A.1 depicts a possible solution that shows how a S-CSCF (S-CSCF1 S-CSCF3) could be connected to a single AS (SIP AS1), while another (S-CSCF2) could be connected to more than one, in this case it is two (SIP AS1, SIP AS2). All S-CSCF will be connected to the HSS via Cx. A SIP AS may be connected to the HSS via Sh. SIP ASs may be connected to the IP network, which could allow them to contact Application Servers (e.g., either SIP ASs, or Other ASs).

Care should be taken to the transaction delays resulting of a high number of S-CSCF and ASs on the session signalling path.

A possible application of this architecture is described below (see figure A.2).

While some applications need to discover the registration of a user on an event driven basis, many applications do not. For many applications an access to the HSS or other database to obtain the address of the S-CSCF that serves a user is sufficient to contact and initiate a session to that user, and others (such as basic call feature servers) do not require to be informed of the registration state or necessarily even need to know the identity of the user. It is therefore possible that the filter criteria are set in such a way that S-CSCF3 does not forward or notify SIP AS 3 of REGISTER requests. SIP AS3 would then need to determine registration status via other means (i.e. via IP network) not specified.

The number of Application Servers receiving REGISTER requests (i.e., SIP AS3) from an individual S-CSCF should be minimized.

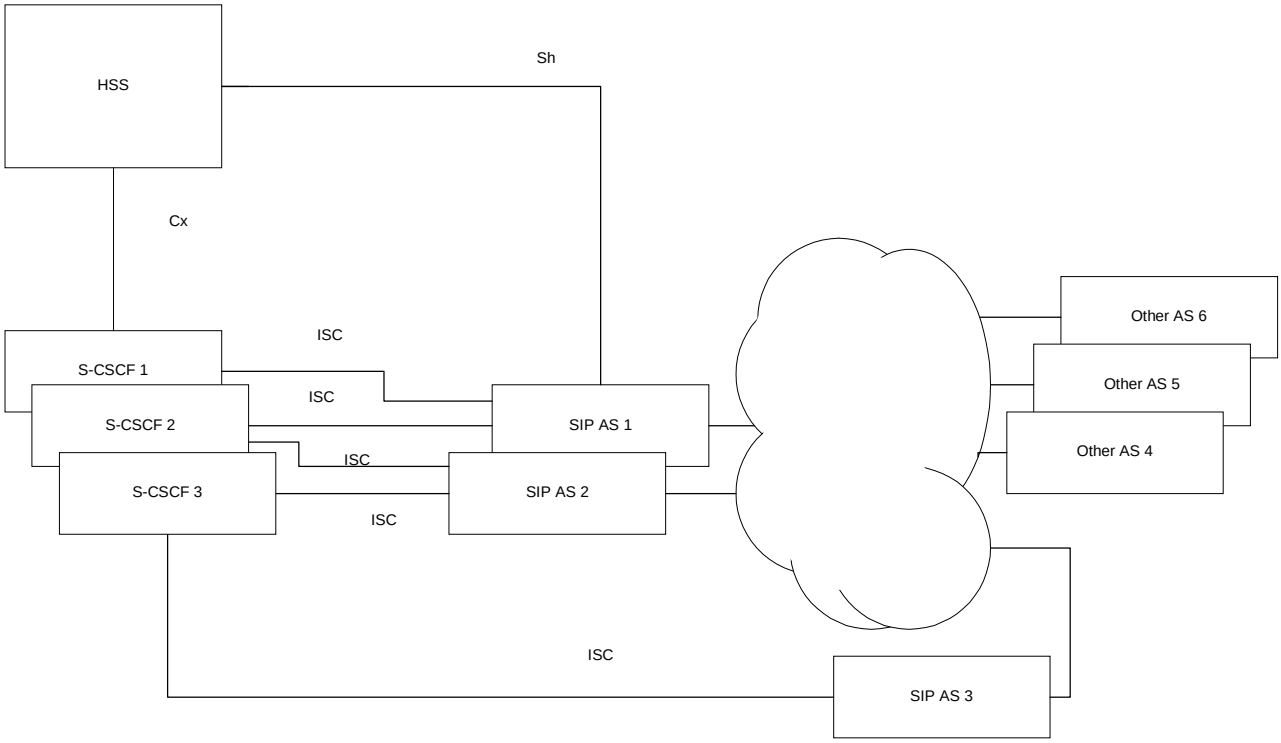

Figure A.2: Use of a hierarchy in a practical architecture for Application Servers

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Budapest, Hungary, 13th – 17th May 2002

Tdoc N1-021424

CR-Form-v5

CHANGE REQUEST

⌘ **23.218** **CR** **017** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Clarification to Handling of IP multimedia registration for barred public user identities
Source:	⌘	dynamicsoft
Work item code:	⌘	IMS-CCR
Date:	⌘	04.05.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	SA2 agreed that public user identities may be barred including temporary public user identities derived from a USIM.
Summary of change:	⌘	Clarification that the contents of the To header in the third party register request sent to an AS should be based on the public user identity in the filter criteria trigger.
Consequences if not approved:	⌘	Ambiguity in the specification regarding S-CSCF behaviour at registration regarding handling of Filter Criteria and barred public user identities.

Clauses affected:	⌘	6.3		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	24.229, 23.218 (CR XX), 23.228 (CR XX)
Other comments:	⌘			

6.3 Handling of IP multimedia registration

Upon receiving the initial registration request from the user, the S-CSCF shall authenticate the user and upon receiving a subsequent registration request containing valid authentication credentials, download the user profile from the HSS. For further detailed information on registration and authentication procedures see 3GPP TS 24.229 [5] and 3GPP TS 33.203 [11].

After a successfully authenticated registration, the S-CSCF shall download from the HSS all the implicitly registered public user identities associated with the registered public user identity and the S-CSCF shall then determine based on the filter criteria information downloaded from HSS which application servers to inform about the registration event of the public user identity(s). If the registration request matches the filter criteria of some application servers, the S-CSCF needs to inform the application servers by performing a third party registration to the those application servers which are interested to be informed about the user registration event of these public user identities.

The important information carried in the third party REGISTER request is the public user identity, the S-CSCF address and the expiration time. It shall be possible based on operator configuration to use one of the implicitly registered public user identities as the public user identity in the To: header of the third party REGISTER request sent to the Application Server. Additional application server specific data, which is associated with the Filter Criteria and obtained from the HSS, is added to the REGISTER request body. This data should include the IMSI for an Application Server that supports CAMEL services or the private user identity for other Application Servers as received from the HSS.

This third party registration will include an expiration time that is equal to the expiration time sent to the UE by the S-CSCF in the 200 OK response to the incoming REGISTER request

On receiving a failure response to one of the REGISTER requests, the S-CSCF may initiate network-initiated deregistration procedure based on the information in the initial Filter Criteria. If the filter criteria does not contain an instruction to the S-CSCF regarding the failure to contact the Application Server, the S-CSCF shall not initiate network-initiated deregistration procedure.

See figure 6.3.1:

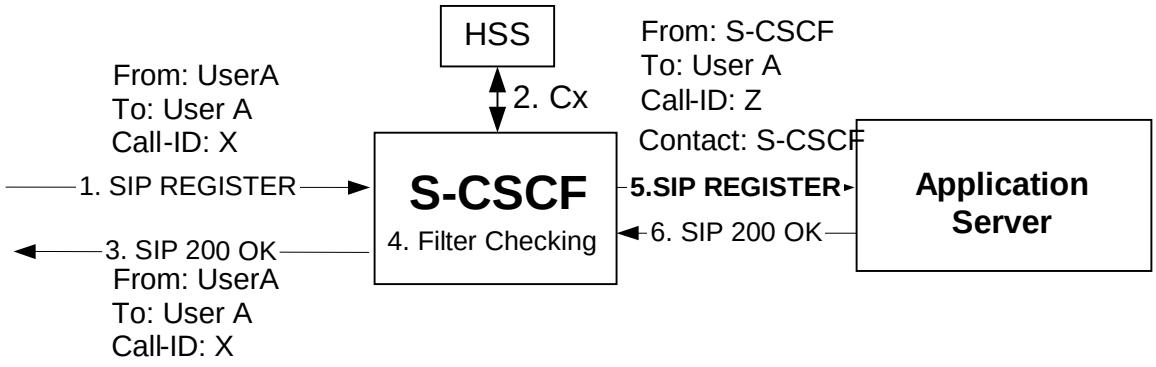


Figure 6.3.1: S-CSCF handling registration

Application Servers can in addition subscribe to the S-CSCF Registration Event Package. This provides a mechanism for the Application Server to discover all the implicitly registered public user identities without requiring multiple Register requests to be sent to the Application Server. The S-CSCF will send NOTIFY requests to the Application Server that has subscribed to the registration event package for the registered public user identity.

More information on these procedures is contained in 3GPP TS 24.229 [5].

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13th – 17th May 2002

Tdoc N1-021252

CR-Form-v5

CHANGE REQUEST

⌘ **23.218** **CR** **019** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of COMET to UPDATE in 23.218
Source:	⌘	dynamicsoft
Work item code:	⌘	IMS-CCR
Date:	⌘	04.05.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The COMET method is no longer a working assumption for SIP within IETF and has been replaced with the UPDATE method.
Summary of change:	⌘	References to COMET have been replaced with UPDATE.
Consequences if not approved:	⌘	The text in 23.218 will not align with IETF SIP.

Clauses affected:	⌘	B.2.1, B.2.3, B.3.1, B.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

B.2 Announcement, conferencing and transcoding examples using MRFC

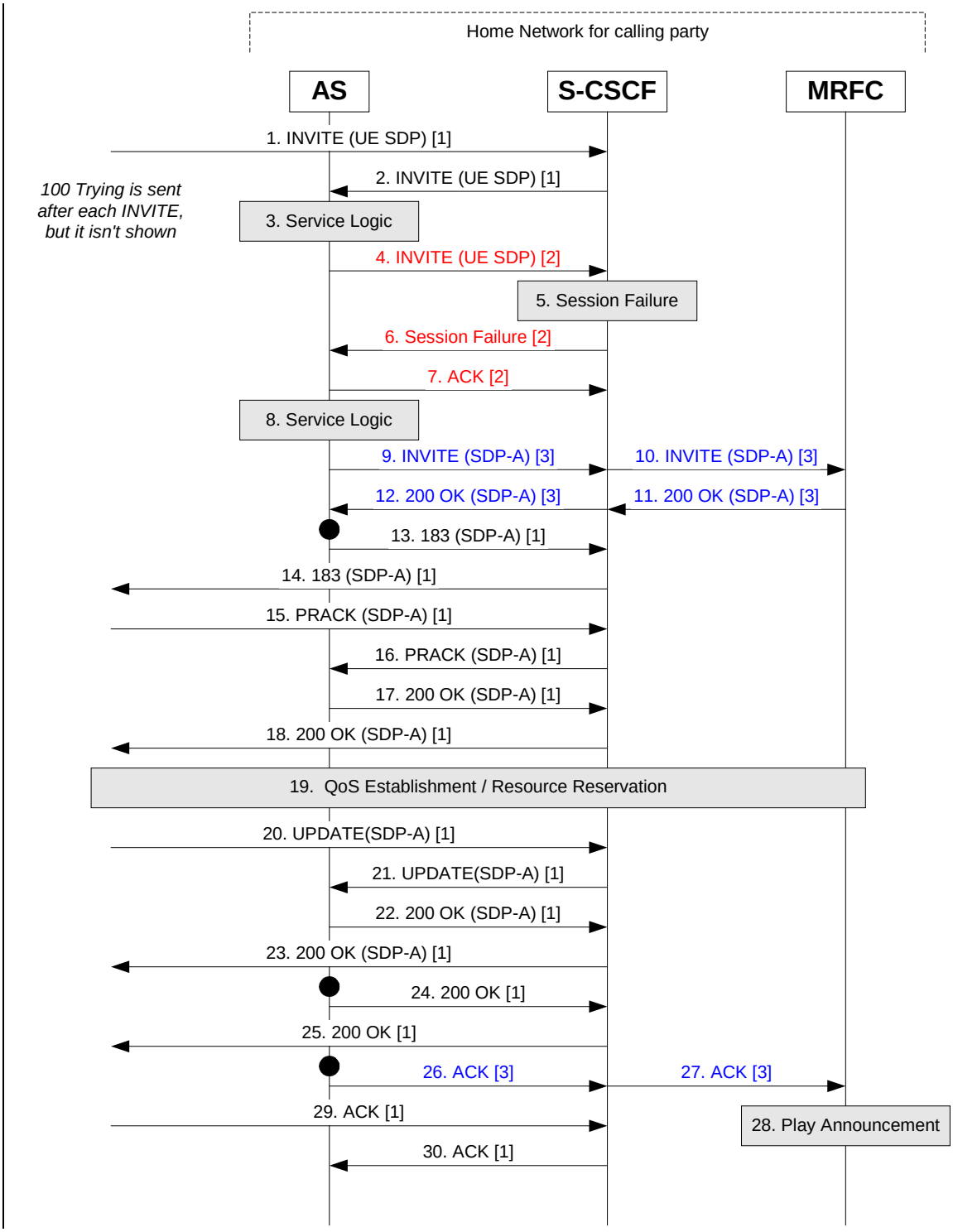
B.2.1 Example information flow for a mobile originated IP multimedia session that results in playing an announcement

The following diagram shows an example of playing an announcement for a mobile originated IP multimedia session. An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog. The B2BUA AS manages the interactions between the two dialogs.

The offer/answer model is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.


Home Network for calling party
AS
S-CSCF
MRFC
1. INVITE (UE SDP) [1]
2. INVITE (UE SDP) [1]
100 Trying is sent after each INVITE, but it isn't shown
3. Service Logic
4. INVITE (UE SDP) [2]
5. Session Failure
6. Session Failure [2]
7. ACK [2]
8. Service Logic
9. INVITE (SDP-A) [3]
10. INVITE (SDP-A) [3]
12. 200 OK (SDP-A) [3]
11. 200 OK (SDP-A) [3]
13. 183 (SDP-A) [1]
14. 183 (SDP-A) [1]
15. PRACK (SDP-A) [1]
16. PRACK (SDP-A) [1]
17. 200 OK (SDP-A) [1]
18. 200 OK (SDP-A) [1]
19. QoS Establishment / Resource Reservation
20. UPDATE(SDP-A) [1]
21. UPDATE(SDP-A) [1]
22. 200 OK (SDP-A) [1]
23. 200 OK (SDP-A) [1]
24. 200 OK [1]
25. 200 OK [1]
26. ACK [3]
27. ACK [3]
29. ACK [1]
28. Play Announcement
30. ACK [1]

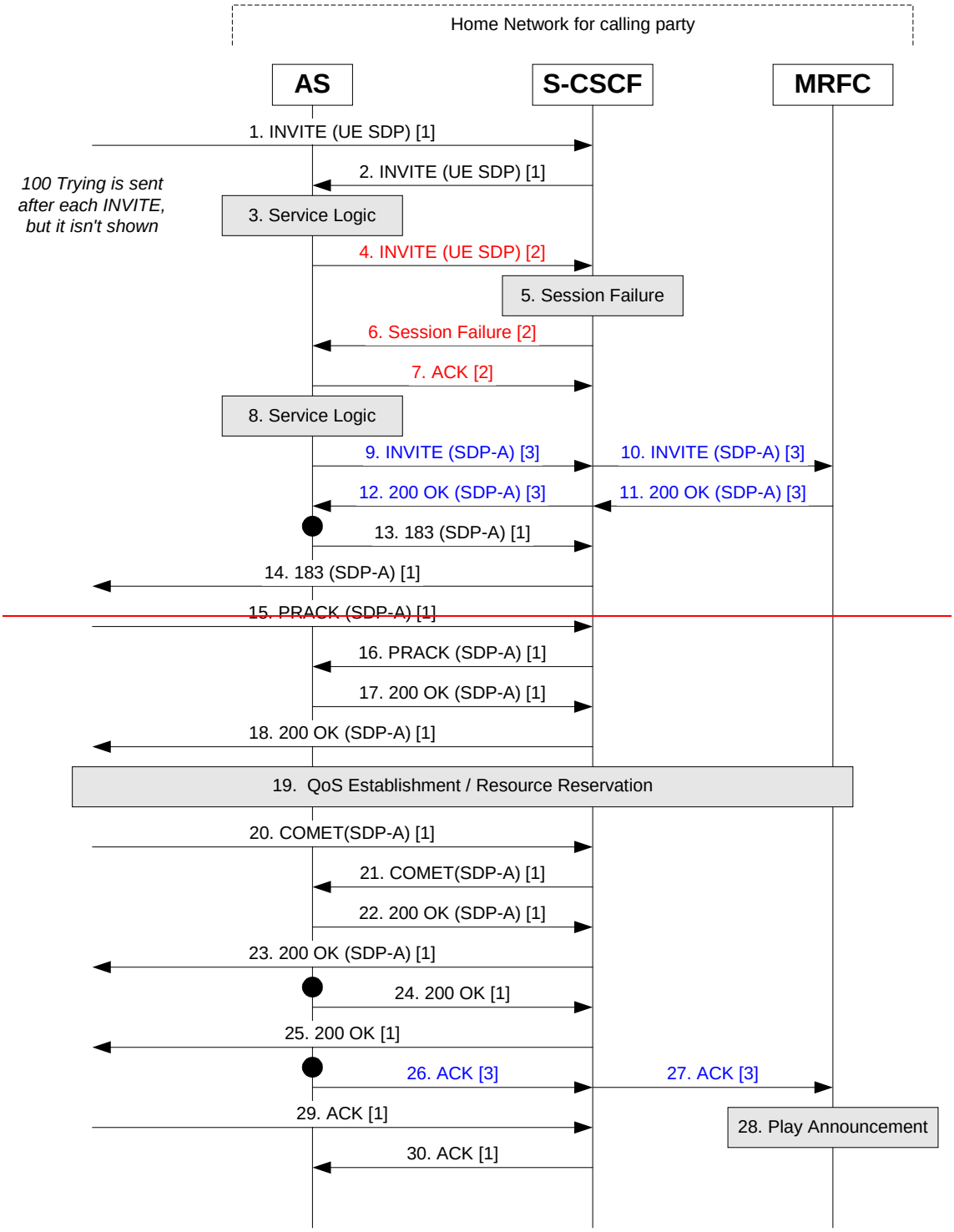


Figure B.2.1.1: Tones and announcements call flow

Notes for figure B.2.1.1:

INVITE request is received at the S-CSCF [Call-ID 1].

INVITE request is forwarded to an AS, based on the filter criteria.

The AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF experiences a failure, such as not being able to determine the next hop for the SIP URL.

Session failure returned to the AS.

ACK returned to complete this dialog [Call-ID 2].

The AS service logic determines to play an announcement to the calling party.

New INVITE request is sent to the MRFC, via the S-CSCF, to establish a new dialog for playing an announcement [Call-ID 3]. Sufficient information is included to specify the details for the announcement.

S-CSCF relays INVITE to the MRFC.

The MRFC allocates the requested resource and returns 200 OK, with SDP-A indicating selected media.

S-CSCF relays 200 OK to the AS.

- 30) The B2BUA AS manages the dialog for Call-ID 1 as normal, with the SDP-A supplied from the MRFC. The MRFC is instructed to play the announcement using the ACK request at flow 26 for Call-ID 3.

B.2.2 Example information flow for a mobile originated IP multimedia ad hoc conferencing session (multiparty call)

The following diagram shows an example of an ad hoc conference (multiparty call). An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The Application Server is in control of the ad hoc conference, is aware of the MRFC capabilities and is also operating as a B2BUA performing third party call control.

An INVITE request is generated from UE-1 indicating a desire to start a multiparty call (ad hoc conference) by taking the existing sessions, between UE-1 to UE-2 and UE-1 to UE-3, and bringing them together. The AS uses third party call control to request the conference facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the three parties (UE-1, UE-2, UE-3). New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the conferencing resource at the MRFP. The first INVITE request to the MRFC should receive a response that includes the conference identifier. The same conference identifier will be used for subsequent INVITE requests to add or drop parties to the conference.

The offer/answer model is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected media in the SDP. The MRFC will also reserve the requested local resources at that time and return the appropriate resource identifiers in the 200 response.

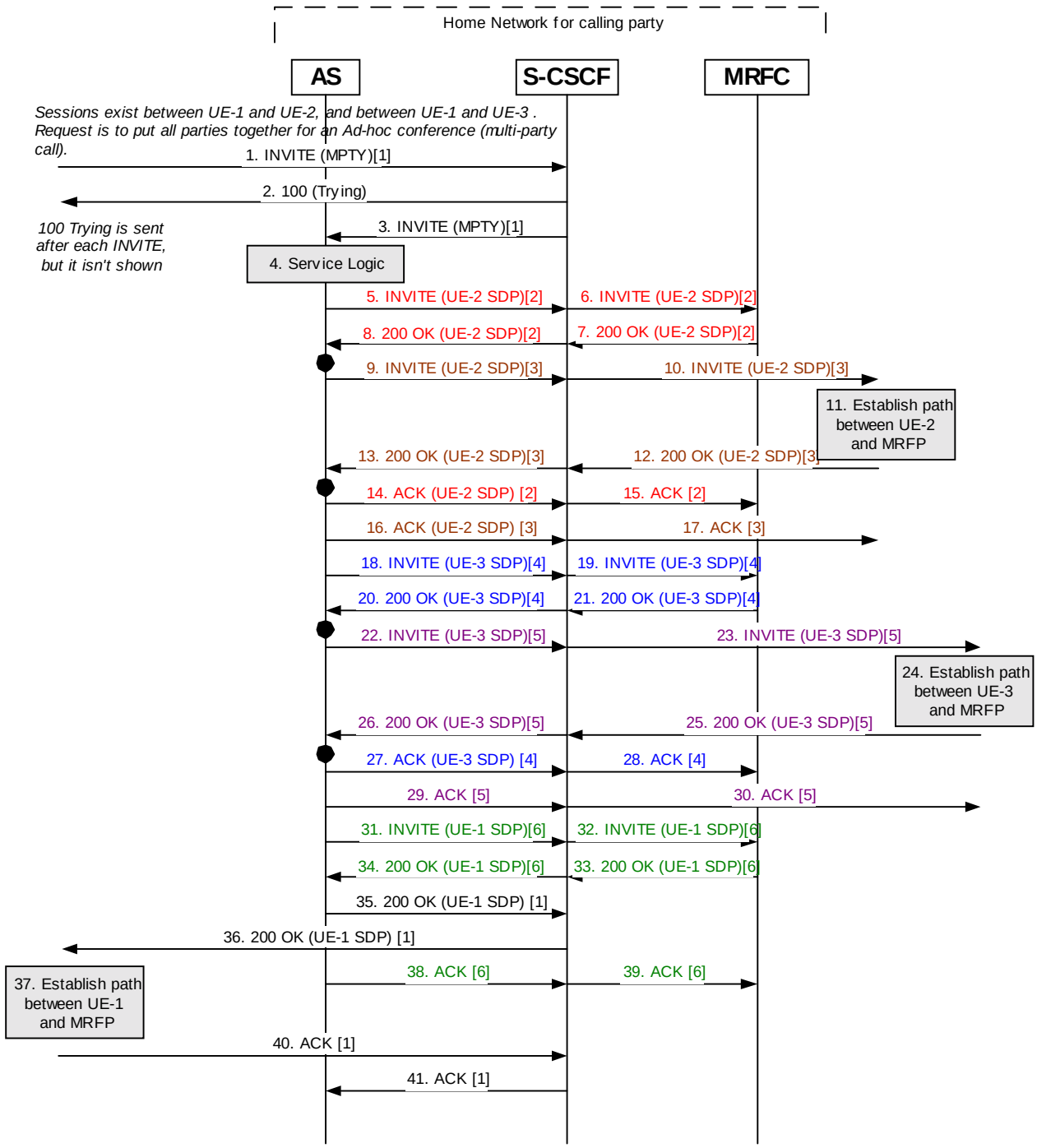


Figure B.2.2.1: Ad hoc conference call flow

Notes for figure B.2.2.1:

INVITE request received at S-CSCF from UE-1 indicating desire to start ad hoc conference (multiparty call) for the existing sessions between UE-1 to UE-2 and UE-1 to UE-3.

100 Trying returned.

INVITE forwarded to AS.

AS performs service logic and allows attempt to start ad hoc conference.

5-8) New INVITE request sent to MRFC to initiate multiparty call, get conference identifier and prepare dialog for UE-2 [Call-ID 2].

9-13) Re-INVITE sent to UE-2 to establish dialog between AS and UE-2 [Call-ID 3].

14-17) ACK sent for Call-ID 2 and Call-ID 3.

18-21) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-3 [Call-ID 4].

22-26) Re-INVITE sent to UE-3 to establish dialog between AS and UE-3 [Call-ID 5].

27-30) ACK sent for Call-ID 4 and Call-ID 5.

31-34) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-1 [Call-ID 6].

35-36) 200 OK returned to UE-1 with SDP.

37) The session is established.

38-41) ACK sent for Call-ID 1 and Call-ID 6.

B.2.3 Example information flows for a mobile originated IP multimedia session that requires transcoding

The two figures B.2.3.1 and B.2.3.2 that follow illustrate the MRFC providing transcoding for a mobile originated session, where the MRFC is receiving directions from the AS operating as a B2BUA.

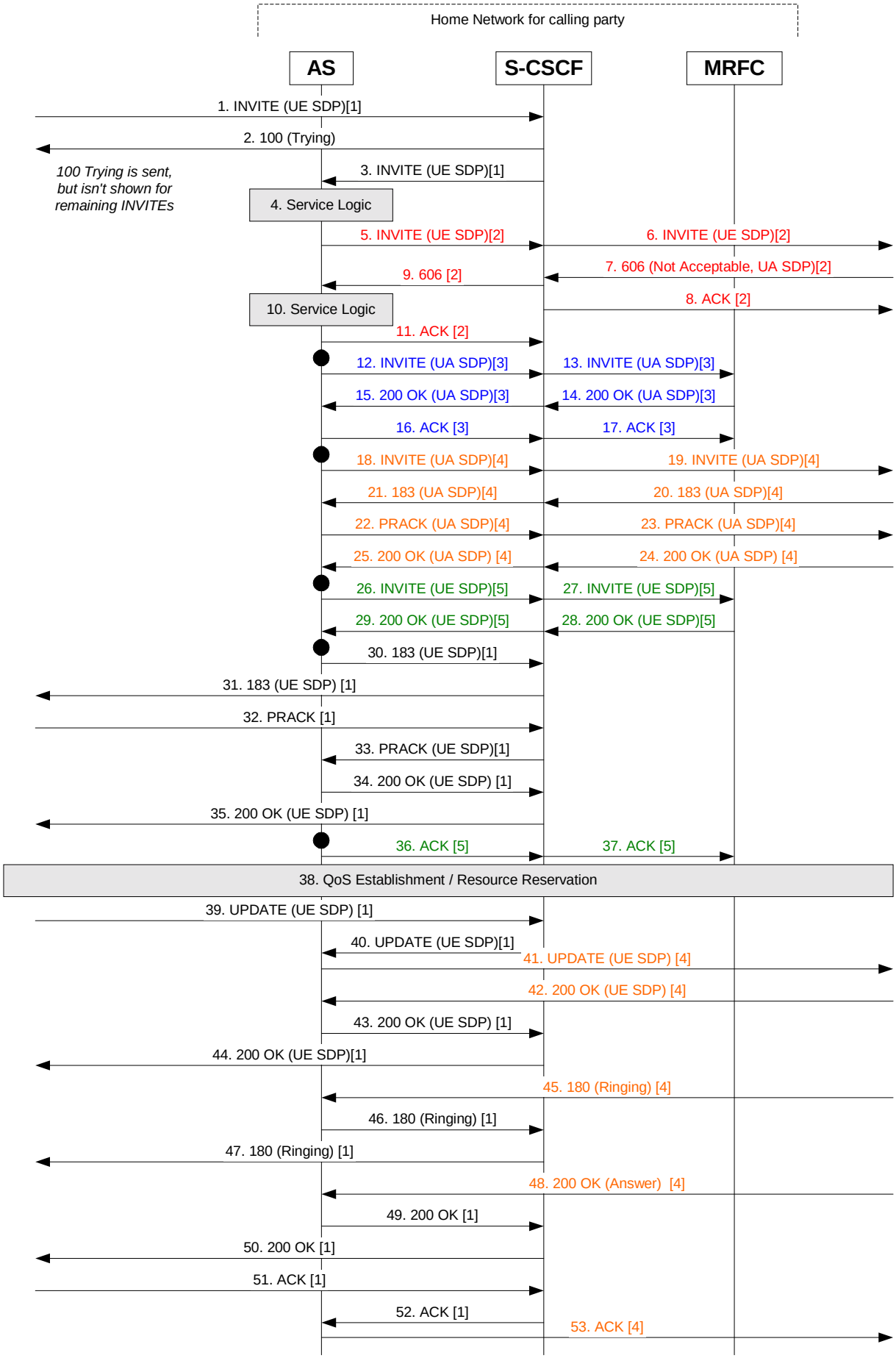
The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the originating UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog with the called party after receiving the initial failure indication. The B2BUA AS manages the interactions between the two dialogs.

An INVITE request is generated from a UE. A 606 "Not Acceptable" response is received from the called party. The AS uses third party call control to request transcoding facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the two parties. New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the transcoding resource at the MRFP.

In the first figure B.2.3.1 below, the called party returns an indication of an acceptable codec. For this case, the request to the MRFC will include the appropriate codec for the called party and the offer/answer model with the MRFC is used. In figure B.2.3.2 below, the called party does not indicate any SDP, which means that more steps will be required on the subsequent INVITE request to set up transcoding with the MRFC. An INVITE without SDP is sent to the MRFC to get the list of codecs it supports. The AS then sends that list of codecs in the new INVITE that it sends to the called party. The B2BUA function of the AS matches up the responses.

The offer/answer model is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.


Home Network for calling party
AS
S-CSCF
MRFC
1. INVITE (UE SDP)[1]
2. 100 (Trying)
100 Trying is sent, but isn't shown for remaining INVITEs
3. INVITE (UE SDP)[1]
4. Service Logic
5. INVITE (UE SDP)[2]
6. INVITE (UE SDP)[2]
7. 606 (Not Acceptable, UA SDP)[2]
9. 606 [2]
8. ACK [2]
10. Service Logic
11. ACK [2]
12. INVITE (UA SDP)[3]
13. INVITE (UA SDP)[3]
15. 200 OK (UA SDP)[3]
14. 200 OK (UA SDP)[3]
16. ACK [3]
17. ACK [3]
18. INVITE (UA SDP)[4]
19. INVITE (UA SDP)[4]
21. 183 (UA SDP)[4]
20. 183 (UA SDP)[4]
22. PRACK (UA SDP)[4]
23. PRACK (UA SDP)[4]
25. 200 OK (UA SDP) [4]
24. 200 OK (UA SDP) [4]
26. INVITE (UE SDP)[5]
27. INVITE (UE SDP)[5]
29. 200 OK (UE SDP)[5]
28. 200 OK (UE SDP)[5]
30. 183 (UE SDP)[1]
31. 183 (UE SDP) [1]
32. PRACK [1]
33. PRACK (UE SDP)[1]
34. 200 OK (UE SDP) [1]
35. 200 OK (UE SDP) [1]
36. ACK [5]
37. ACK [5]
38. QoS Establishment / Resource Reservation
39. UPDATE (UE SDP) [1]
40. UPDATE (UE SDP)[1]
41. UPDATE (UE SDP) [4]
42. 200 OK (UE SDP) [4]
43. 200 OK (UE SDP) [1]
44. 200 OK (UE SDP)[1]
45. 180 (Ringing) [4]
46. 180 (Ringing) [1]
47. 180 (Ringing) [1]
48. 200 OK (Answer) [4]
49. 200 OK [1]
50. 200 OK [1]
51. ACK [1]
52. ACK [1]
53. ACK [4]

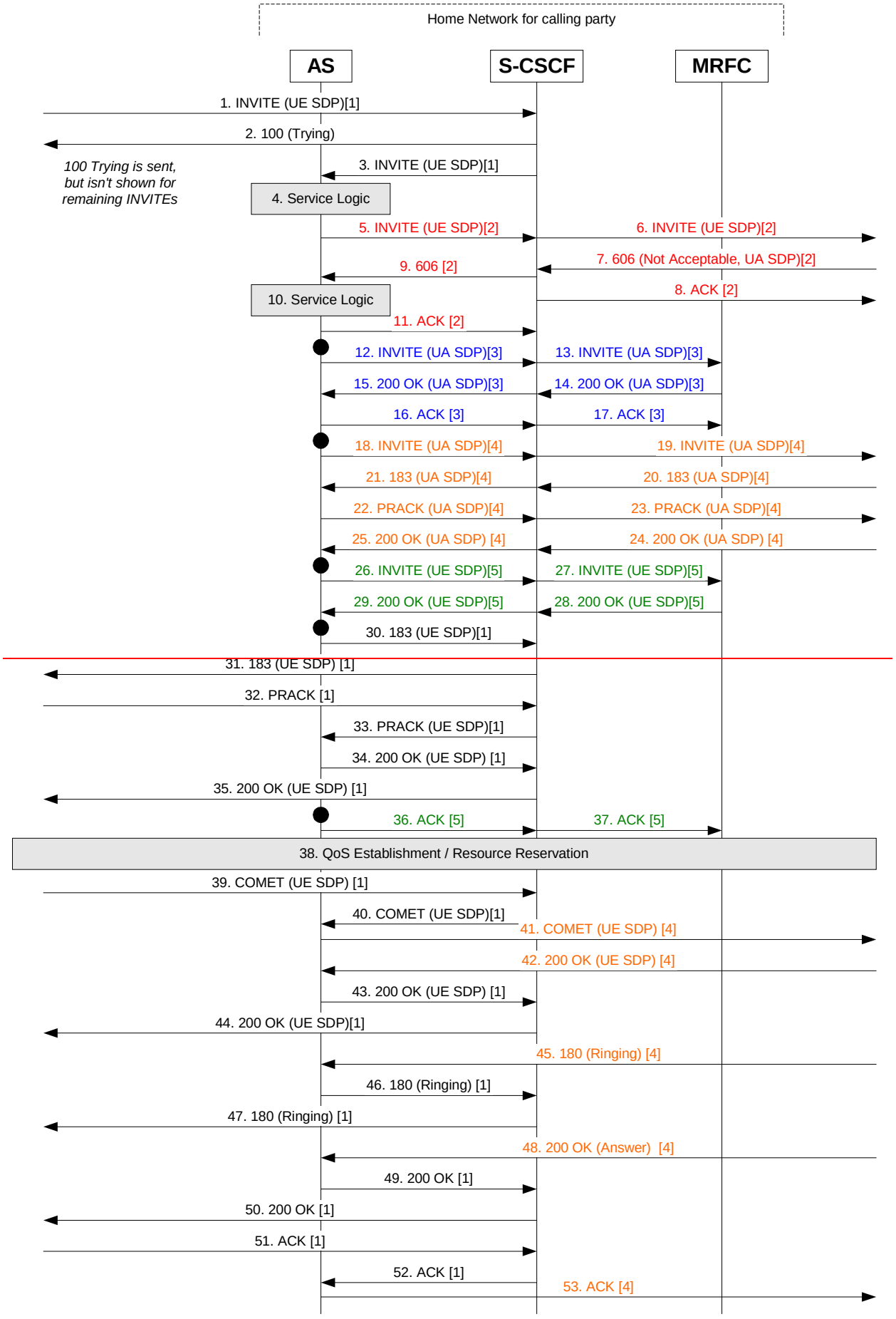


Figure B.2.3.1: Transcoding call flow (called party indicates codec)

Notes for figure B.2.3.1:

INVITE request received at S-CSCF from UE [Call-ID 1].

100 Trying returned.

INVITE forwarded to an AS, based on filter criteria.

AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF forwards the INVITE.

Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable plus information on what codec would be acceptable.

An ACK is sent to the called UA to complete the dialog for Call-ID 2.

606 response is forwarded to the AS.

AS service logic determines that there is an MRFC that can perform the transcoding.

ACK sent to S-CSCF to complete the dialog for Call-ID 2.

12-17) New INVITE request sent to MRFC to establish transcoding for called UA [Call-ID 3].

18-25) New INVITE request sent to called UA to establish session between UA and MRF [Call-ID 4].

26-29) New INVITE request sent to MRFC to establish transcoding for calling UE [Call-ID 5].

30-53) Normal call establishment procedures from here on, with B2BUA AS performing the appropriate signalling translations between the associated dialogs.

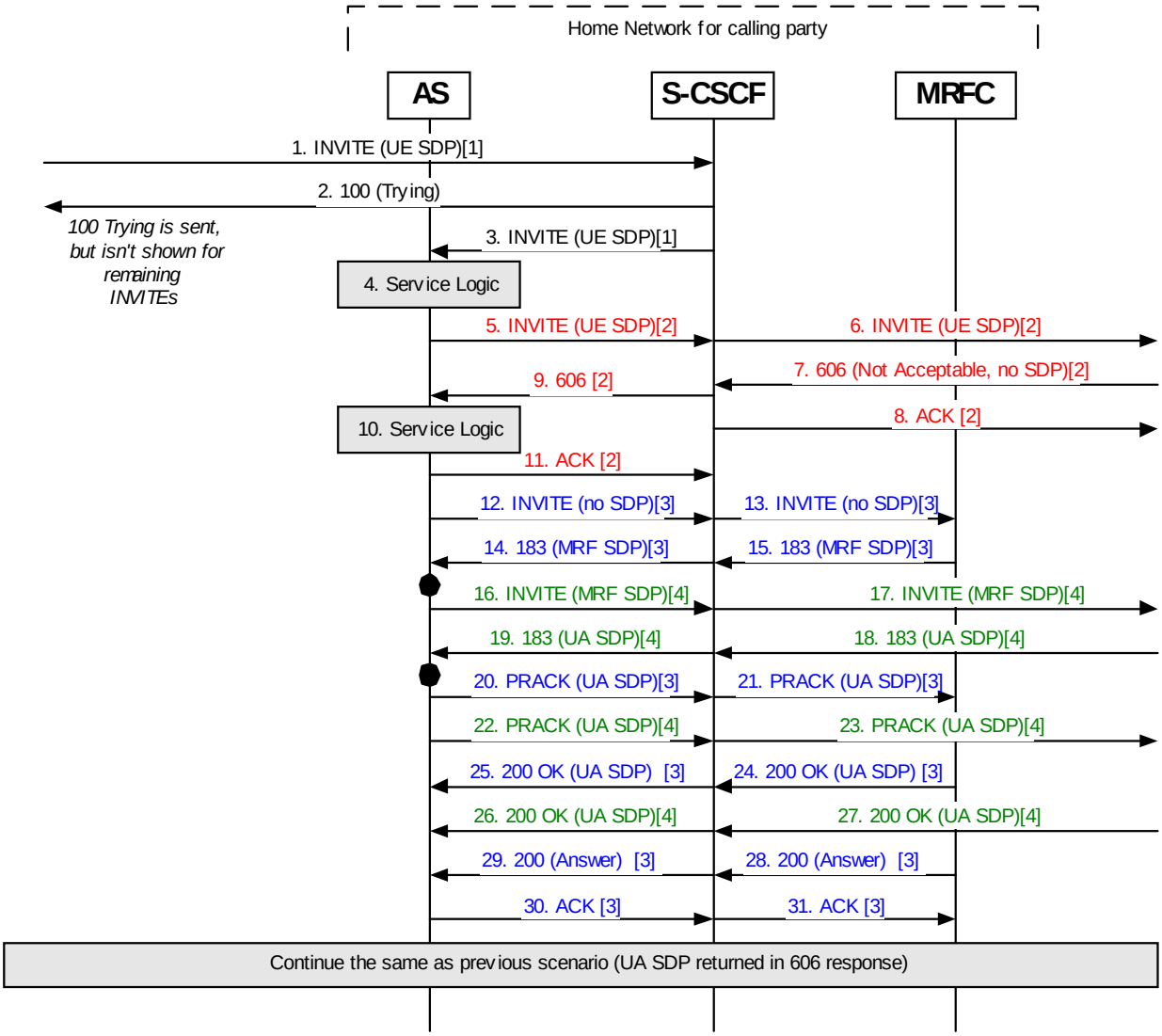


Figure B.2.3.2: Transcoding call flow (called party codec negotiated)

Notes for figure B.2.3.2:

INVITE request received at S-CSCF from UE [Call-ID 1].

100 Trying returned.

INVITE forwarded to an AS, based on filter criteria.

AS service logic determines to proceed with the call.

New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].

S-CSCF forwards the INVITE.

Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable but there is no information on what codec would be acceptable (no SDP).

ACK sent to called UA to complete the dialog for Call-ID 2.

606 response is forwarded to the AS.

AS service logic determines that there is an MRFC that can perform the transcoding.

ACK sent to S-CSCF to complete the dialog for Call-ID 2.

12-15) New INVITE request sent to MRFC to establish transcoding for called UA and to get the list codecs supported by the MRF [Call-ID 3].

16-19) New INVITE request sent to called UA with SDP for all codecs supported by the MRF to establish session between UA and MRF [Call-ID 4]. UA returns SDP with acceptable codecs.

20-23) A new offer with the codecs provided by the UA is sent in PRACK and the 200 OK response indicates the selected codec.

24-31) Acknowledgements sent to complete Call-ID 3.

Call establishment procedures from here on are common with the previous transcoding call flow.

B.3 Example information flows for a voicemail service

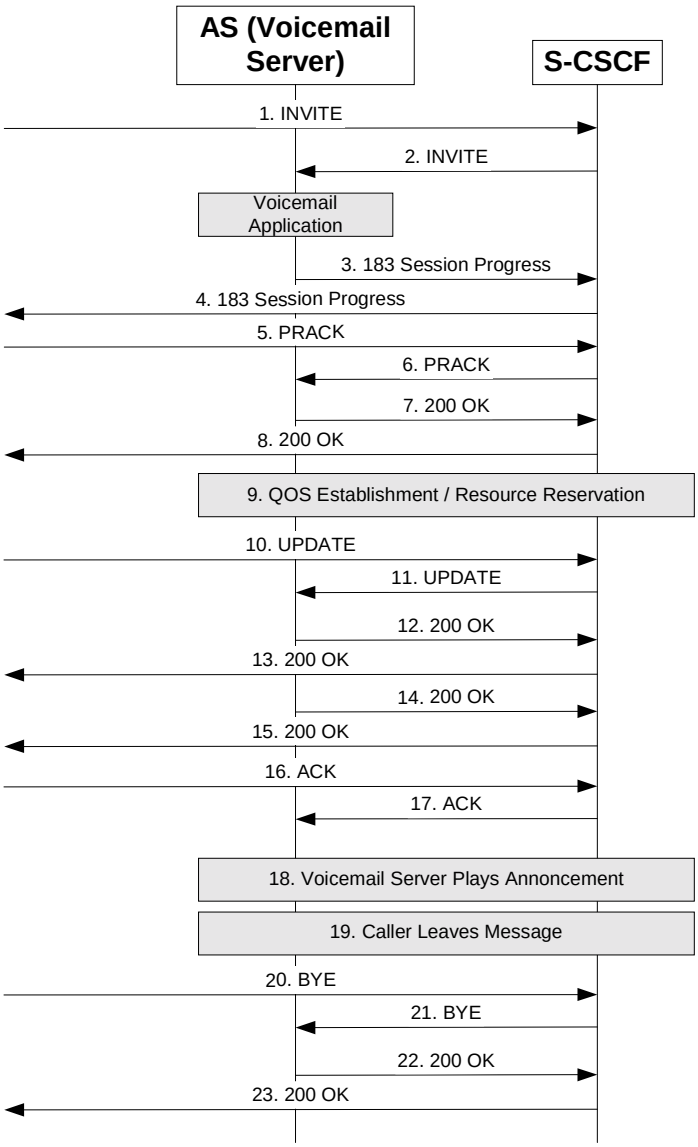
B.3.1 User out of coverage message recording

Figure B.3.1.1 shows a possible scenario of an Application Server, which acting as a terminating UA performs the function of a Voicemail Server in order to terminate a call and record a message on behalf of a UE that is out of coverage or powered off.

A S-CSCF is forwarded the initial INVITE destined for a UE that is not currently IMS registered. The Default Filter Criteria in the S-CSCF indicates that for the case of an unregistered user the INVITE should be forwarded to the Voicemail and Announcement Server.

Upon receiving the INVITE request the Voicemail and Announcement Server determines that the destination UE has subscribed to the Voicemail Service (possibly by downloading some subscriber profile information via the Sh interface). The Voicemail and Announcement Server therefore in addition to playing an announcement to inform the caller that the called party is either powered off or out of coverage also informs the caller that he may leave a message for the called party.

The calling party leaves a message for the called party and then hangs up the call by sending a BYE.


AS (Voicemail Server)
S-CSCF
1. INVITE
2. INVITE
Voicemail Application
3. 183 Session Progress
4. 183 Session Progress
5. PRACK
6. PRACK
7. 200 OK
8. 200 OK
9. QOS Establishment / Resource Reservation
10. UPDATE
11. UPDATE
12. 200 OK
13. 200 OK
14. 200 OK
15. 200 OK
16. ACK
17. ACK
18. Voicemail Server Plays Annoncement
19. Caller Leaves Message
20. BYE
21. BYE
22. 200 OK
23. 200 OK

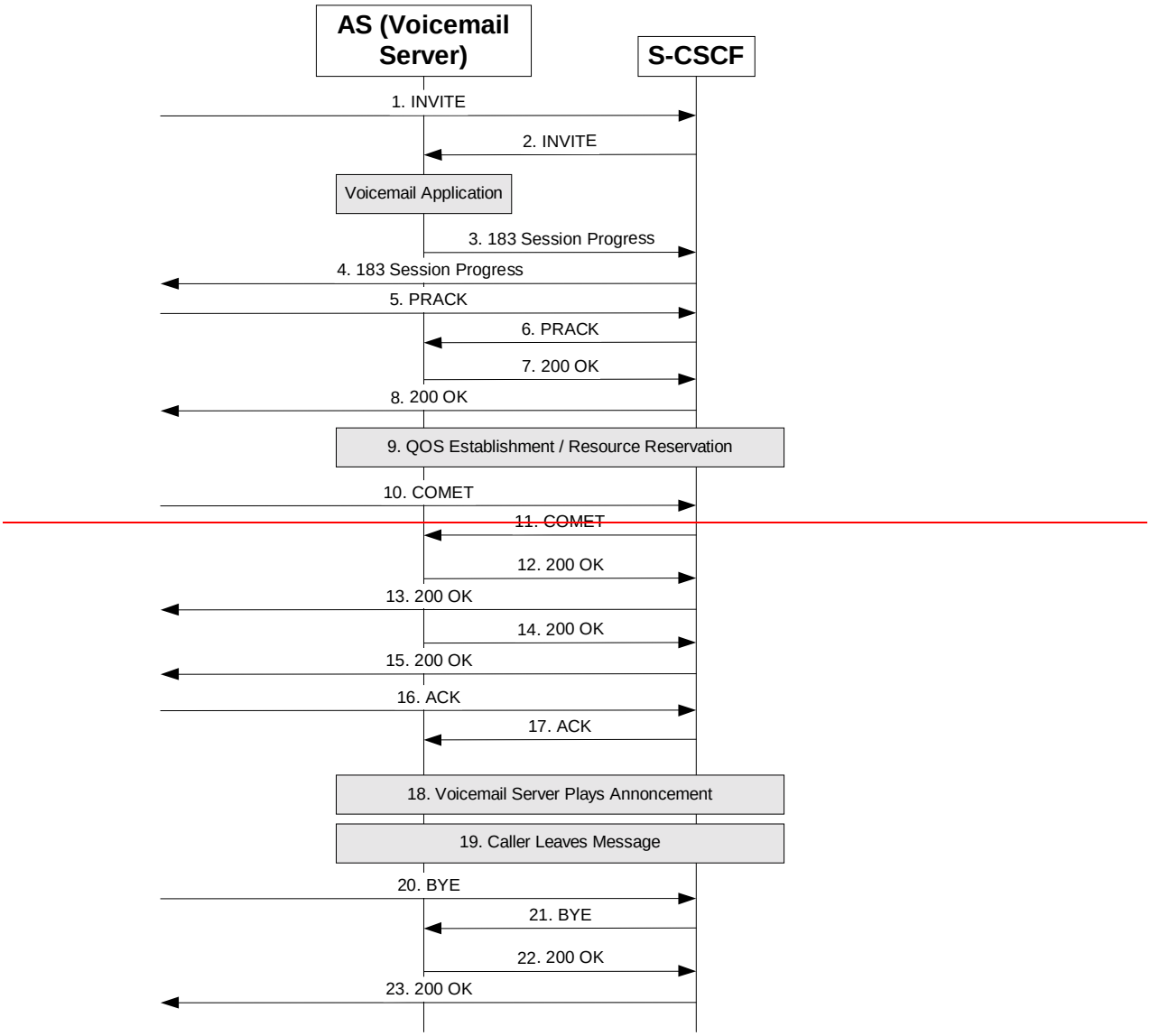


Figure B.3.1.1: Voicemail server records messages

Notes for figure B.3.1.1:

NOTE: For simplicity the 100 Trying response returned or received by the S-CSCF in reponse to requests is omitted from figure B.3.1.1.

INVITE request received at S-CSCF from caller.

Based on Default Filter Criteria S-CSCF proxies the INVITE request to the Voicemail and Announcement Server (AS).

3-4) The AS starts the voicemail application and responds with a 183 Session Progress containing SDP which is proxied back to the caller by the S-CSCF.

5-8) The caller responds with a PRACK containing SDP, which the S-CSCF proxies to the AS and the AS responds with a 200 OK containing SDP which the S-CSCF proxies back to the caller.

QOS establishment and resource reservation takes place.

10-13) After completing resource reservation the caller sends a ~~COMET~~UPDATE containing SDP which is proxied by the S-CSCF to the AS which responds with a 200 OK containing SDP which is proxied back to the caller by the S-CSCF.

14-15) The AS then sends a 200 OK to the initial INVITE which the S-CSCF proxies to the caller.

16-17) The caller returns an ACK to the 200 OK.

18) The AS plays an announcement using the session established indicating that the caller is powered off but that the caller may leave a message.

19) The caller leaves a message using the session established.

20-21) The caller hangs up by sending a BYE which the S-CSCF proxies to the AS.

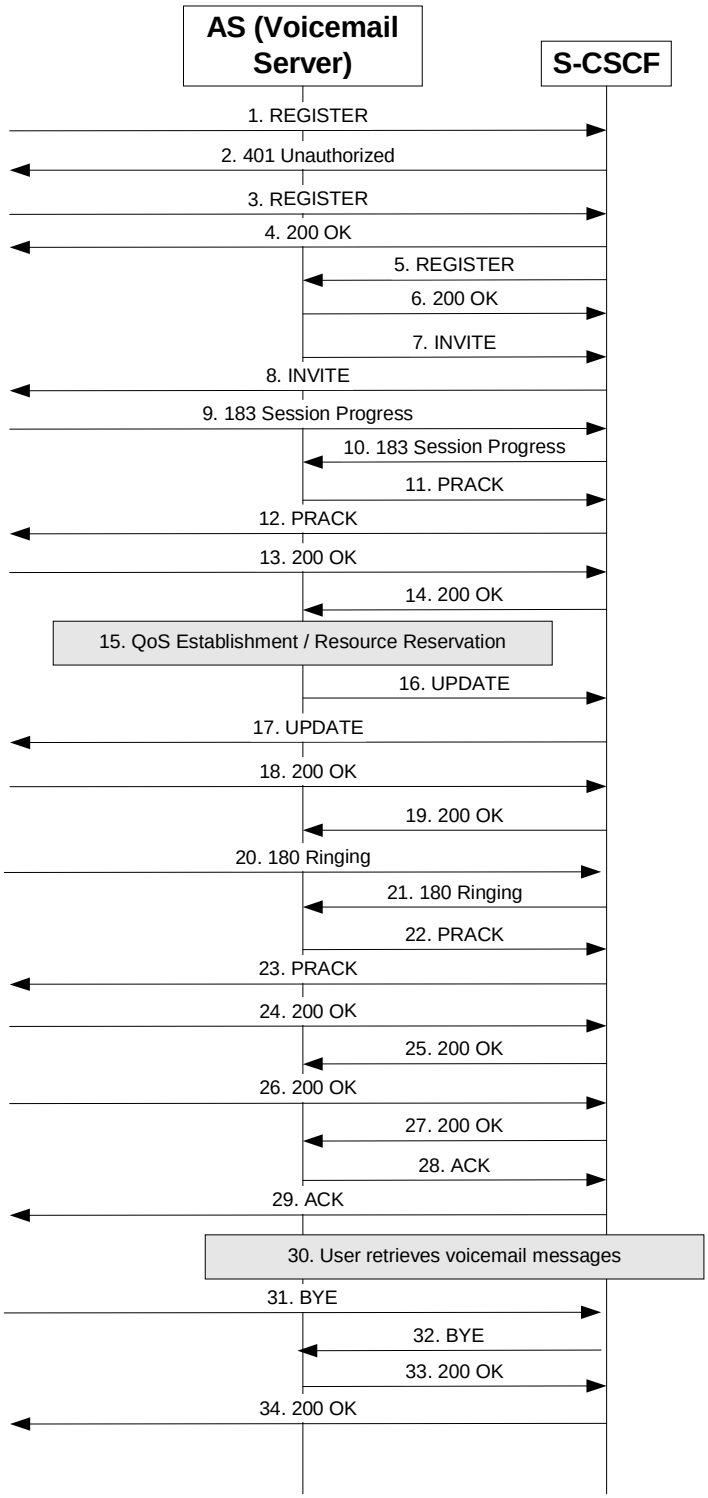
22-23) The AS responds with a 200 OK, which the S-CSCF proxies back to the caller.

B.3.2 User IMS registers voice mail service plays back messages

Figure B.3.2.1 shows the scenario when the UE that has subscribed to a voicemail service with a feature enabled that contacts the user upon registration informing him of any recorded messages.

The Filter Criteria downloaded by the S-CSCF indicates that a third party REGISTER request should be sent to the Voicemail Server. Upon receiving the third party registration of the UE, the Voicemail Server acting as an originating UA contacts the UE by sending an INVITE request to inform him that he has voicemail messages recorded while he was not registered.

The user listens to the messages played back by the voicemail server, (only streaming class QOS is required for this session) and then terminates the session with a BYE.


AS (Voicemail Server)
S-CSCF
1. REGISTER
2. 401 Unauthorized
3. REGISTER
4. 200 OK
5. REGISTER
6. 200 OK
7. INVITE
8. INVITE
9. 183 Session Progress
10. 183 Session Progress
11. PRACK
12. PRACK
13. 200 OK
14. 200 OK
15. QoS Establishment / Resource Reservation
16. UPDATE
17. UPDATE
18. 200 OK
19. 200 OK
20. 180 Ringing
21. 180 Ringing
22. PRACK
23. PRACK
24. 200 OK
25. 200 OK
26. 200 OK
27. 200 OK
28. ACK
29. ACK
30. User retrieves voicemail messages
31. BYE
32. BYE
33. 200 OK
34. 200 OK

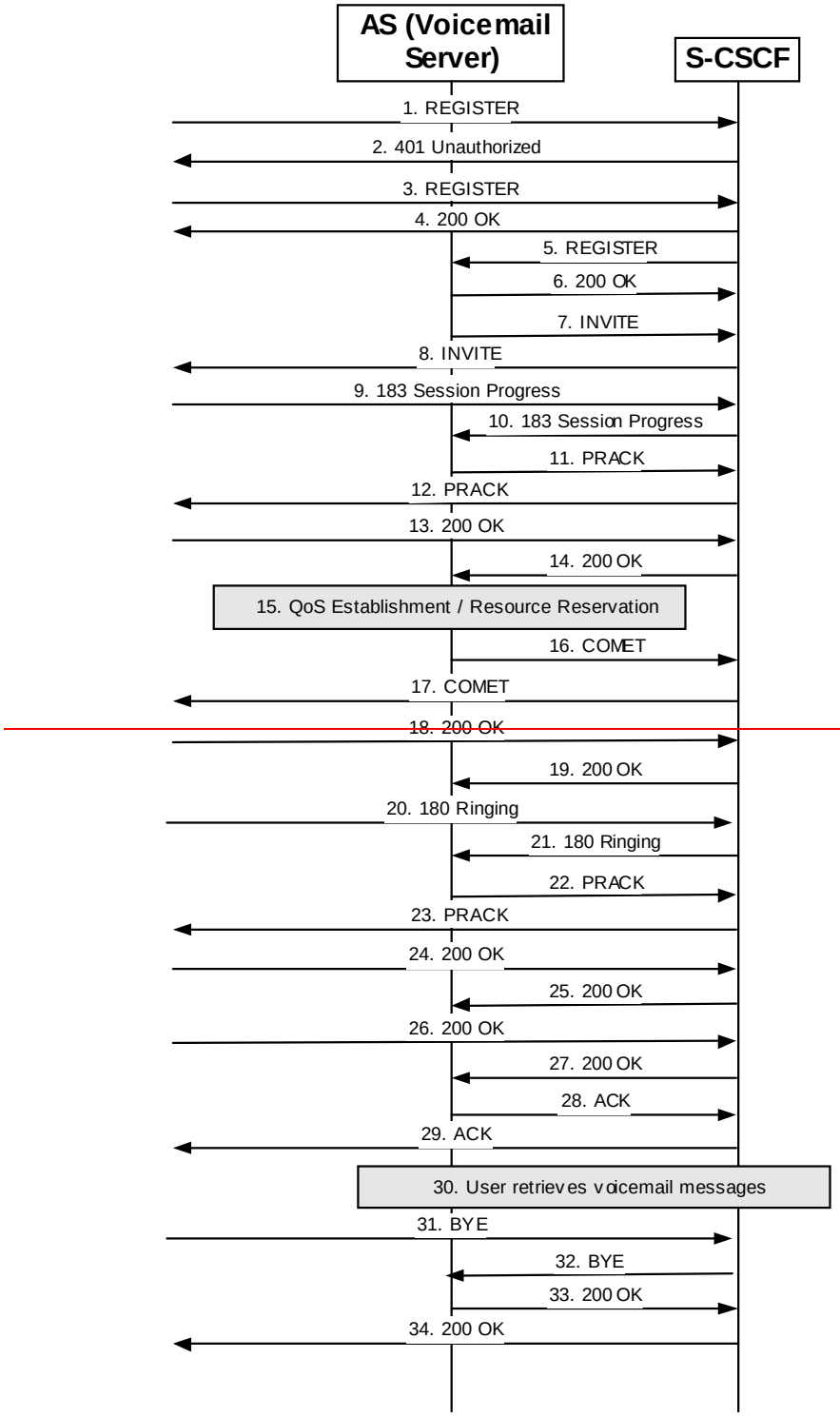


Figure B.3.2.1: Upon registration voicemail server replays messages

Notes for figure B.3.2.1:

NOTE: For simplicity the 100 Trying response returned or received by the S-CSCF in reponse to requests is omitted from figure B.3.2.1.

1-4) The UE sends a REGISTER request to the S-CSCF which authenticates with a 401 Unauthorized response challenge with the authentication response being supplied in a second REGISTER request. The registration completes with a 200 OK from the S-CSCF to the UE.

5-6) The S-CSCF downloads Filter Criteria for the UE from the HSS which indicates the S-CSCF should send a third party REGISTER request on behalf of the UE to an AS that performs a voicemail service. The AS responds to the REGISTER request with a 200 OK.

The AS downloads subscriber data for the subscriber (possibly from the HSS via the Sh interface) that indicates that the subscriber has enabled a feature that has the voicemail application contact the subscriber upon registration to deliver recorded messages. The AS sends an INVITE request containing SDP for the UE to the S-CSCF which proxies it to the UE.

The UE responds with 183 Session Progress containing SDP which the S-CSCF proxies to the AS.

The AS sends a PRACK, which the S-CSCF proxies to the UE and the UE respond with a 200 OK which the S-CSCF proxies to the AS.

15) QOS establishment and resource reservation takes place.

The AS sends a ~~COMET~~UPDATE, which the S-CSCF proxies to the UE and the UE responds with a 200 OK which the S-CSCF proxies to the AS.

20-21) The UE sends a 180 Ringing indicating that it is alerting the user which the S-CSCF proxies to the AS.

22-25) The AS to indicate receipt of the 180 response sends a PRACK which the S-CSCF proxies to the UE and the UE responds with a 200 OK which the S-CSCF proxies to the AS.

26-27) When the subscriber answers the UE sends a 200 OK to the initial INVITE which the S-CSCF proxies to the AS.

28-29) The AS acknowledges the 200 OK with an ACK which the S-CSCF proxies to the UE.

30) The AS plays an announcement indicating the number of messages stored and then plays back the messages to the UE using the session established.

31-32) The UE hangs up by sending a BYE, which the S-CSCF proxies to the AS.

33-34) The AS responds with a 200 OK, which the S-CSCF proxies back to the UE.