Technical Specification Group Services and System Aspects **TSGS#23(04)0016**

Meeting #23, Phoenix, USA, 15 - 18 March 2004

Doc# OMA-POC-2004-0053R01
Originated by POC Group
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LIAISON STATEMENT

Title:	Reply LS to 3GPP on principles for overlapping issues with OMA regarding PoC ☒ Public ☐ OMA Confidential
To:	3GPP TSG-SA, TSG-SA WG2, 3GPP2 TSG-S, TSG-X
Copy:	3GPP TSG-SA WG1, TSG-CN WG1
Response to:	TSGS#22(03)0787
Source:	OMA POC WG
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Attachments:	OMA-AD_PoC-V1_0-20040205-D Draft Version 1.0 PoC AD OMA-POC-2004-0019

1 Overview

OMA POC WG thanks 3GPP for the Reply to the LS to 3GPP on principles for overlapping issues with OMA regarding PoC.

OMA POC WG would like to provide the following response to the point highlighted in the 3GPP LS:

- "TSG SA asks OMA group to provide information on the expectations in terms of performance of the underlying network responsible to deliver the PoC services. This information can be analysed by TSG SA WG 1 (S1) and TSG SA WG 2 (S2). so that it can be made sure that the 3GPP system is capable of supporting the OMA enabler. "

  OMA POC WG has not yet determined specific performance requirements for the underlying network. When such performance requirements are identified OMA will communicate those to 3GPP and 3GPP2.

OMA POC attaches the latest draft version of the OMA PoC Architecture Document for the information of 3GPP and 3GPP2 and request to be provided with any comments.

OMA POC has defined its specification structure for the PoC stage 3. It is the assumption of OMA POC that any profiling of Access Network or Radio Network parameters for PoC should be performed by 3GPP and 3GPP2.

In addition OMA POC would like to ask the following questions:

1. The assumption of OMA POC is that PoC will require release 6 of 3GPP IMS or equivalent in 3GPP2 MMD. OMA POC would like to know what the expected availability dates for release 6 of 3GPP IMS or equivalent in 3GPP2 MMD are?
2. The assumption of OMA POC is that PoC will not require use of the Reliability of Provisional Responses in SIP and preconditions SIP extensions. Will release 6 of 3GPP IMS and the equivalent of 3GPP2 MMD support the establishment of media sessions without use of these SIP extensions?
3. OMA POC have determined that a PoC client in the mobile terminal may pre-establish sessions with the PoC server without active media streams ahead of a PoC communication (e.g. immediately after SIP registration) and these inactive sessions may stay established for a very long time. Is there an impact on IMS/MMD for extremely long lived Sessions? Is there an impact on IMS/MMD for sessions that are established without active media?
4. OMA POC has the working assumption that the SIP SUBSCRIBE and NOTIFY methods will be used to inform PoC clients about PoC related events. Some of these subscriptions may have a long lifetime and exist outside of and much longer than an active PoC talk session. Is there any issue with IMS/MMD in supporting long lived subscriptions?
5. OMA POC understands that IMS/MMD supports the use of Service Based Local Policy (SBLP) and authorisation of IP media bearers. Since the assumption of OMA POC is that PoC will not require use of the Reliability of Provisional Responses in SIP and preconditions SIP extensions, what is the impact on the use of SBLP with PoC?
6. The signalling flows that OMA POC have defined assume that media bearers will be available at the time that the initial SIP signalling request is sent to the network. Are there any issues with IMS or MMD with this assumption?
7. There are proposals under discussion in OMA POC to use RTP or RTCP for transport of floor control signaling. Are there any issues in IMS or MMD or the underlying radio access networks with RTP header stripping, compression and generation and/or RTCP discarding or errors due to interference (BER) that would prevent these mechanisms being used for PoC floor control signaling.
8. Can the IMS/MMD SIP proxy infrastructure differentiate between a terminal that is only IMS registered and one that is both IMS registered and registered for a particular service such as POC so that the IMS SIP proxies will reject PoC requests when the terminal is IMS registered but not registered for the PoC service?

Please Note that the dates and locations of the next OMA POC meetings are as follows:

08th -11th March 2004	Kansas City, USA
26th -30th April 2004	Munich, Germany

2 Proposal

N/A

3 Requested Action(s)

OMA POC request 3GPP TSG-SA WG 2 to kindly provide answers to the questions 1 – 8 above.

OMA POC request 3GPP2 TSG-S to kindly provide answers to the questions 1 – 8 above.

Push to Talk over Cellular Requirements

Version 1.0 – 05~~0~~ February 2004

Open Mobile Alliance
OMA-RD_PoC-V1_0-2004020~~5~~0-A

Contents

1. Scope (Informative)

This Requirement Document (RD) defines the requirements for the Push to Talk over Cellular. This document captures the overall service description, primarily from the service subscriber's and user's points of view, but its scope does not include the details of the human interface itself. The information contained in this RD is applicable to network operators, service providers and terminal and infrastructure manufacturers.

This RD contains the core requirements for the Push to Talk over Cellular enabler as specified by OMA. By means of this enabler, together with other OMA service enablers, a service provider SHALL be able to provide a complete service.

The term PoC in this document refers to the Push to Talk over Cellular enabler offered via an OMA compatible environment.

2. References

2.1 Normative References

[Privacy] OMA Privacy Requirements for Mobile Services: OMA-RD-Privacy-V1_0-20031001-D
http://www.openmobilealliance.org/ftp/PD/OMA-Privacy-V1_0_0-20031001-D.zip

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels". S. Bradner. March 1997.
URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

None.

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

BER	Is the measured raw bit error rate for voice on the radio link.
Charging Data Record (CDR)	Record generated by a network element for the purpose of billing a subscriber for the provided service. It includes fields identifying the user, the session and the network elements as well as information on the network resources and services used to support a subscriber session. In the traditional circuit domain, CDR has been used to denote "Call Detail Record", which is subsumed by "Charging Data Record" as a generic term applicable to both circuit and packet switched networks.
Floor Control	Mechanism for the arbitration of the sequence of PoC participants to speak.
Full Duplex	Media flow in both directions at the same time. Hence a user can speak and hear at the same time.
Half Duplex	Media flow in both directions between the network and the terminal, but only in one direction at a time. Media cannot flow in both directions at the same time. Hence a user cannot speak and hear at the same time.
PoC Administrator	A person(s) or an entity that creates and maintains relevant aspects of PoC service for a specific PoC subscriber or group of subscribers. The PoC service provider is the default PoC administrator. PoC administrative rights may be assigned to a representative of a group of subscribers (e.g. IT department of a corporation, or a VAS provider) for the sole purpose of administering PoC service within that subscriber group
PoC Group	A defined set of PoC participants amongst whom a PoC session may take place or who may participate in a chat PoC group session.
PoC Group Administrator	A person(s) or entity who has the authority to define, delete or modify PoC group memberships (i.e. administrative rights for group membership management are exercised in an “off-line” fashion). The PoC service provider has group administrative rights by default. PoC Group administrative rights may be assigned by the service provider to a PoC subscriber or his representative (e.g. IT department in a corporation) as part of the service provisioning, or assigned by the PoC Host to a group session participant temporarily. The PoC Group administrator may be a participant in all, some or none of the PoC group sessions. PoC Group Administrator is a special case of PoC Administrator.
PoC Host	A PoC participant who has authority to initiate and administrate an active group session (i.e. group administrative rights in a PoC session are exercised in an “on-line” fashion). The service provider has PoC Host administrative rights by default, subject to applicable privacy rules. **Note:** Open PoC chat groups can be joined by any PoC subscribers and may not require any PoC hosts.
PoC group member	PoC subscriber who has been added to a PoC group through an administrative action.
PoC Participant	A PoC subscriber who is participating in a PoC session.
PoC Client	An entity that realises capabilities to support the PoC Service Enabler from a client perspective.
PoC session	This is an established connection between PoC subscribers where PoC participants can communicate using voice one at a time. Note: PoC Session has technical implications related to connectivity resources in the mobile network, design of the PoC service entity and PoC client etc.. This term is used throughout the Normative chapters in this document. ‘PoC session’ corresponds to ‘PoC call’ which is used in an ordinary sense.
PoC call	This is a term more suited for ordinary use which describes the PoC service experience from an

	end user perspective. This term is only used in the Informative chapters in this document.
PoC Service Enabler	Allows Push-to-Talk application by a half-duplex form of communication whereby one participant communicates with other(s). The PoC Service Enabler utilise UMTS and CDMA packet switched networks.
PoC Service Entity	Realize capabilities to support the PoC Service Enabler.
PoC subscriber	A subscriber whose service subscription includes the PoC service.
Service provider	A Service Provider is either a network operator or an other entity that provides services to a subscriber (e.g. a MVNO).
Subscriber	A network operator subscriber who may be the candidate to be a PoC service participant.
Talk-Burst	Communication transmitted when a participant invokes a PoC session and speaks after being granted permission and until he releases the PoC session function.

3.3 Abbreviations

PoC/POC	Push to Talk over Cellular
PTT	Push to Talk
MOS	Mean Opinion Score
BER	Bit Error Ratio
UE	User Equipment

4. Introduction (Informative)

Push To Talk over Cellular (PoC) service is a *two-way form* of communications that allows users to engage in immediate communication with one or more users. POC service is similar to a “walkie-talkie” application where a user presses a button to talk with an individual user or broadcast to a group of participants. The receiving participants hear the sender’s voice either without any action on their part, for example, without having to answer the call or may be notified and has to accept the call before he can hear the sender's voice. Other participants can respond to this message once this initial speech is complete. The communication is half-duplex, that is to say, at most one person can talk at a time and all other participants hear the speech. This contrasts with voice calls, which are full duplex, where more than one person can talk at a time.

The PoC service enabler has an inherent data orientation beyond simple voice. With its strong coupling to data capabilities, other key features similar to data messaging services are also supported, such as: Group lists creation & management, Group sessions emulating conferencing on demand and, possibly, other features enabled by user Presence & Availability information.

A number of Push to Talk services and their supporting equipment have already been seen in the market. However, to date, these services and the products are all proprietary in nature. In order to avoid market fragmentation and enable wide industry interoperability, a common standard defining service in sufficient detail to allow inter-working among different vendors equipment is needed.

OMA has undertaken this challenge to define a set of specifications that enable the service providers to offer this service to their subscribers, starting from the service requirements. Hence, this document contains the requirements of the Push to Talk over Cellular (PoC) service enabler.

The PoC service enabler may support a 1-to-1 communication feature, a 1-to-many communication feature and a personal alert feature.

- The 1-to-1-communication feature is the basic capability for setting up voice communication between two users. The voice communication attempt may either be accepted automatically or manually answered by the invited subscriber.
- The 1-to-many communication feature enables a subscriber to set-up a voice communication with a multiple number of other subscribers, where the participant speaks one at a time.
- The personal alert feature enables a subscriber to alert another subscriber. The alert expresses the calling subscriber’s wish to communicate and to request the invited subscriber to “call back”.

The document first captures the use cases describing the service requirements from the point of view of the end users and other actors, and then states the service enabler requirements, in the subsequent chapter, which are derived from these use cases.

4.1 User Experience

In the following figure 1, an end user with a PoC enabled device is illustrated interacting with a PoC service provider in order to participate in 1-to-1 and 1-to-many PoC calls.

The participation in PoC sessions is only permitted once the user has applied for and been granted a subscription to access PoC services. The user can then participate in PoC sessions, either with another PoC user or with-a PoC group. As a PoC participant, the user can participate as a member of more than one group at a time

The PoC service enabler supports advanced Group Lists creation & management capabilities and PoC group session. The user should be able to create and manage PoC group lists either using a terminal or a web page. Additionally, a participant in a PoC session is called a PoC Host when he has the ability to execute capabilities such as the following: remove & block subscribers as a result misusing - for example - a PoC session, granting administrative rights to another PoC Participant; and creating a chat group into which subscribers can register themselves.

The user is able to receive notifications of PoC groups available to participate in and hence request to join those groups, or he may receive invitations to participate in other PoC groups. he is able to identify which group he is participating in and

retrieve a list of PoC group members participating in each group. Changes to group status are propagated to the PoC participants, such as when a new user joins a group or when an existing user leaves a group.

As PoC subscribers can be subjected to potentially intrusive communications, mechanisms are provided to allow the Called Party to either accept or reject incoming PoC call alerts requesting a PoC session by another user or group.

In addition, Reject lists can be set up by the user to block potential spamming situations, including:

- Repetitive unwanted incoming requests for PoC sessions.

Similarly, Accept lists can be set up by the PoC subscriber to always accept incoming calls from specific PoC subscribers or PoC groups with:

- Automatic Answer (voice reception is instantaneous, no recipient action required), or
- Manual Answer mode (requiring recipient action).

Subject to privacy settings of the other participants, the PoC participant can also be notified of the status of on-going PoC sessions, such as the arrival of new PoC participants.

Once the PoC participant requests to speak and is granted the right to speak, the other PoC participant(s) in the PoC session can listen without further action.

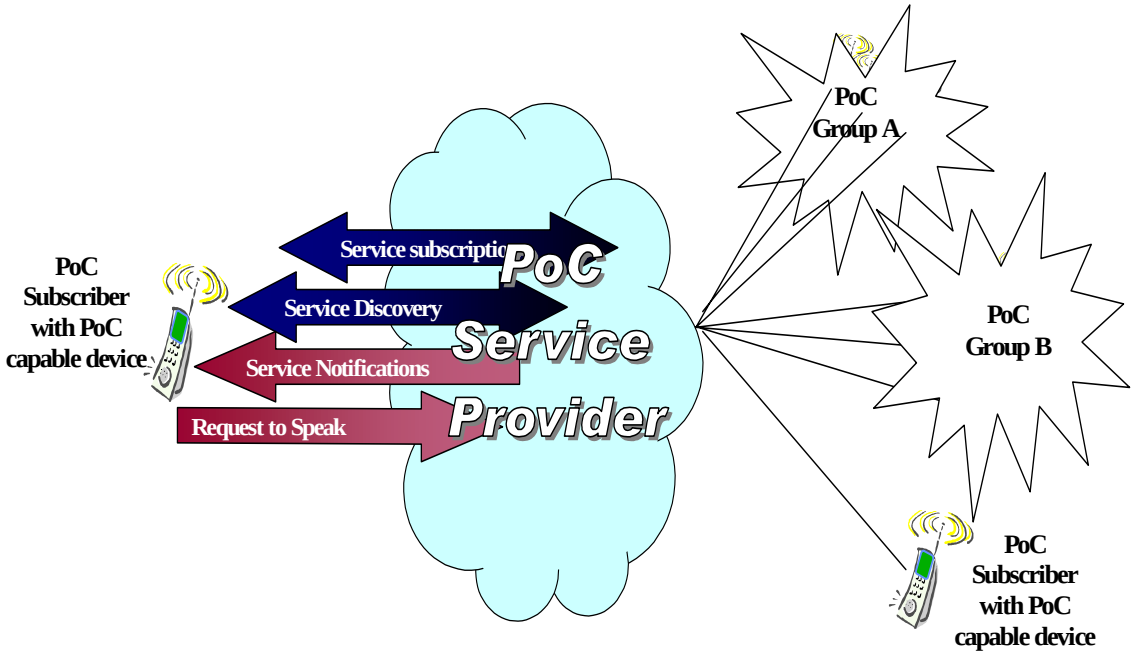


Figure 1: Basic User Experience

Note: the “PoC service provider” cloud may include multiple PoC service providers.

5. Use Cases (Informative)

The following are a collection of PoC use cases that are considered to represent a good basis for requirements derivation.

5.1 Use Case A, "*SHOPPING LIKE CRAZY"*

5.1.1 Short Description

This subclause provides the prose description of the basic PoC service from the beginning to the end.

- A group of people shopping together decided to keep in touch with each other using a PoC service to inform on the most challenging bargains. Therefore, one of them, Mary, requests the PoC service provider to set-up the PoC service for them.
- As soon as the PoC service provider has set up the service, all the invited people get an indication on their terminal, asking whether they would accept the service. This service invitation contains the name of the inviting host (Mary) as well as the name of the group: "*SHOPPING LIKE CRAZY*". In addition, the PoC service provider has relayed the right to accept additional participants to Mary.
- Most of the invited people accept the service offer, becoming participants in the PoC group. However some do not accept, since they have other preferences.
- In the department store they meet another friend who would like to join. Being given the name of the group he sends a request to Mary to join the group. Mary allows him to join.
- Susie suddenly discovers an extremely cheap shoe shop, which she simply has to tell her friends of. So she pushes the talk button.
- As someone is speaking right now and Manfred had pushed the button before, Susie's request to speak is queued.
- Hearing Manfred talk, Susie realizes that Manfred is already talking about this shoe shop. So she cancels her request to speak. Alternatively, after Manfred had finished speaking, Susie would have received an indication, that she is now "*on air*".
- The voice is immediately distributed to the other participants. For the listeners, when they are ready to listen, their terminals receive the voice of the speaker without prior indication.
- One of the participants receives an incoming phone call. As determined by the preferences of the owner, the phone switches to "*not ready to listen*" mode of the PoC service. In this mode the PoC service silently continues in the background, after the end of the phone call the participant decides to return to listening to the PoC service.
- After a while Manfred gets bored with all this gossip and decides to leave the PoC group. He simply sends the unregister-request indication to the PoC service. The rest of the participants get an indication that Manfred has left the PoC group.

5.1.2 Actors

- PoC Participants: Susie, Manfred and others are acting as participants.
- PoC Host: Mary is acting as the host:
- PoC Group Member: PoC Subscriber who has been added to the group, may or may not be PoC Participant
- Service provider

5.1.2.1 Actor Specific Issues

PoC Participants

- Want to be able to communicate quickly using voice
- Want easy to use handsets
- Want good voice quality

PoC Host:

- Want to be able to control the PoC group

Service Provider

- Wants to attract corporate customers to new infrastructure
- Wants to maximise potential for VoIP services

5.1.2.2 Actor Specific Benefits

PoC Participants:

- Increased productivity
- Ease and speed of placing voice calls

PoC Host

- Takes authority to control and administer the PoC group

Service Provider

- Takes revenue from PoC voice calls

5.1.3 Pre-conditions

All PoC group participants are enabled to use the PoC service and using PoC compatible terminals with PoC client.

All PoC group participants have connectivity to PoC Service Provider.

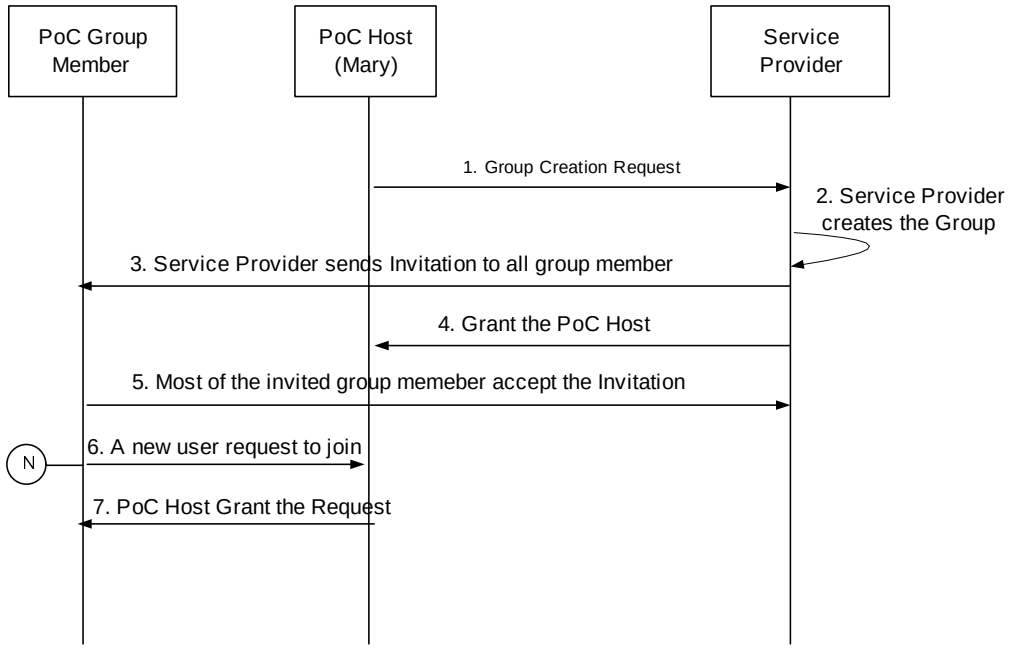
5.1.4 Post-conditions

When the group came to an end, the administrator may unregister all the participants and stop the service for this group. For another group, there is their PoC service running, but, as all the participants have left the service, the administrator may decide to terminate the service. In the both cases, the administrators give back their authority to the PoC service provider.

5.1.5 Normal Flow

The following flow provides the prose description of the PoC group creation by a PoC subscriber.

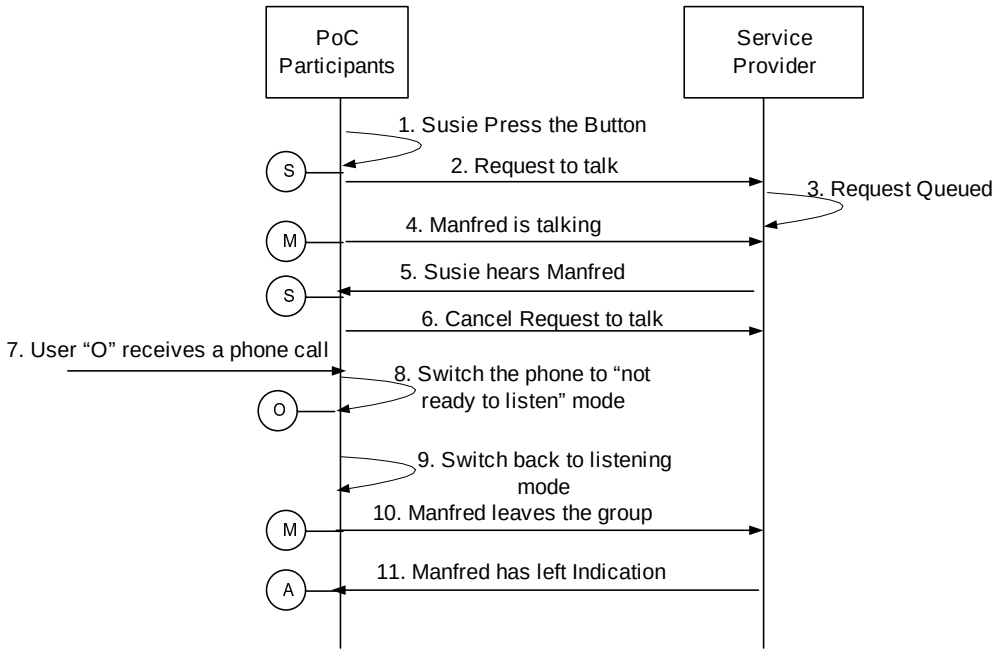
1. A PoC subscriber (Mary) sends a request to create a PoC Group to the Service Provider.
2. Service Provider creates the group according to the request.
3. Service Provider advertises the PoC group to all the invited group members with the group name and the PoC Host for the group.
4. The Service Provider grants part of the administrative authority to requestor (Mary), so that the requestor becomes PoC Host.
5. Most of the invited group members accept the invitation and become PoC Participant of the group.
6. A new user send a request to PoC Host to join the group
7. PoC Host grants the request to join.



PoC Group Creation

The following flow provides the prose description of the basic PoC service when the subscriber starts speaking and listening.

1. A participant pushes the talk button to request that she would like to speak.
2. The request to talk indication is sent to the service provider.
3. The network recognises the request by the user and puts the request in a queue since another participant in the group is talking.
4. The other participant speaks.
5. The speaking is delivered to other PoC participants in the same group.
6. The requestor hears the other participant's speech and decides to cancel her request.
7. Another participant in the group receives a circuit-switched phone call.
8. The participant set his PoC configuration to "not ready to listen" mode.
9. After finishing the CS call, the participant switches his PoC configuration back to listening mode.
10. Another participant decides to leave the group.
11. All the other participants in the group receive an indication that this participant has left the group.



PoC Group talk

5.1.6 Alternative Flow

<Alternative flows are needed to make the description complete, if a single flow of events does not cover the use case completely. However, avoid going into detail and do not describe all the exception handling as alternative flows. Exception handling shall be described only, if it leads to specific requirements for the overall system. (optional)>

5.1.7 Operational and Quality of Experience Requirements

The request-response time by the network and the distribution of the voice message shall be short enough so as not to irritate the users when the users take action to speak and to listen.

5.2 Use Case B, easy launch PoC service

5.2.1 Short Description

The PoC application can be launched by a user from his terminal in a very efficient and simple way.

5.2.2 Actors

- Participants: Cindy is acting as participants.
- Host: Tom is acting as the host:.
- Network operator. A network operator is the organisation, which provides the facility of the telecommunication to the users (subscribers). The network operator is going to provide the users with the Push to Talk service making use of the facility.
- Service provider. A PoC service may, according to the configuration of the network operator, provided by the service provider whose body is different from the network operator. The service is offered through the network operator. Note

that, in this sub clause, the distinction between the network operator and the service provider may not be well considered.

5.2.2.1 Actor Specific Issues

Participants

- Want easy to use PoC set up procedure
- Want to add additional information to the active PoC participants, if available

5.2.2.2 Actor Specific Benefits

Host Tom

- Gets additional presence information regarding other Takes authority to control and administer the PoC group

5.2.3 Pre-conditions

In the optional case presence information is used, it is assumed that Tom has rights to view Cindy's presence information and Cindy has presence information available.

Tom's terminal is enabled with additional PoC starting facilities for very easy PoC use.

All PoC group participants are enabled to use the PoC service and using PoC compatible terminals.

5.2.4 Post-conditions

Tom stays up to date with Cindy's presence information.

5.2.5 Normal Flow

- Tom selects his address book, and from the list of his contacts, he may launch immediately a PoC session via an appropriate menu item in the address book. Tom may be also given the opportunity to add further recipients after having selected Cindy as the first one.
- Optionally, the address book could have been updated automatically with presence information from Cindy; if this information is granted to Tom

5.2.6 Alternative Flow

- An alternative way for Tom to launch a PoC application is by doing it via a dedicated menu entry on the mobile phone's GUI. After launching the application, the user gets his list of participants (buddy list). If feasible, this list could be identical with the address book, with extra presence information where applicable.
- The user should be given the option to launch the application automatically after switching on the terminal. In this case, an IMS registration will be done in the background, ensuring more rapid access to the service.
- It must also be possible for the network to launch the PoC application, in case e.g. of an incoming PoC message or PoC session invitation and in case the PoC application is not yet running. Launching the application must work both in the case of an existing or a non-existing bearer session with the user. In case a bearer session has not yet been activated, the user shall be asked to approve the bearer session activation.

5.3 Use Case C: basic user interactions with a PoC terminal

5.3.1 Short Description

In this scenario a PoC user initiates a PoC call to his colleague by pressing a button on his PoC terminal. A system tone informs the user that system resources have been established for his call. The called party (his colleague) can hear the caller's voice on their terminals without a need to answer.

5.3.2 Actors

Participants: Company employees, Alan and Bill

Network Operator

5.3.2.1 Actor Specific Issues

Company employees

- Want to be able to communicate quickly using voice
- Want easy to use handsets
- Want good voice quality

Network Operator

- Wants to attract corporate customers to new infrastructure
- Wants to maximise potential for VoIP services

5.3.2.2 Actor Specific Benefits

Company employees

- Increased productivity
- Ease and speed of placing calls

Network Operator

- Takes revenue from PoC calls

5.3.3 Pre-conditions

Alan and Bill have PoC capable terminals and PoC service subscriptions.

5.3.4 Post-conditions

Alan and Bill complete their PoC voice communication and end their PoC session

5.3.5 Normal Flow

Alan and Bill are employees of the same company – a furniture warehouse. Alan works on the warehouse floor and needs to contact his product manager, Bill who works in a different location in the warehouse, to check when the next shipment of a range of chairs will arrive.

1. Alan first chooses the target PoC user that the voice communication will be directed to by scrolling through the list of supported PoC groups and other PoC users that Alan has defined. He finds "Bill – Product Manager".

2. Alan presses the "Push To Talk" button in order to talk to Bill. An indication on Alan's device (in this example, a confirmation tone) informs Alan that the connection to the PoC system has been set-up; it does NOT necessarily imply that the target user is receiving the voice communication.
3. Alan speaks into his handset and then releases the "Push To Talk" button, and listens for a response from Bill
4. Bill picks up Alan's voice from his handset speakerphone. He presses the "Push To Talk", button on his handset and awaits an indication (in this example a confirmation tone) prior to speaking.
5. This exchange goes on until Alan confirms with Bill the shipment delivery schedule he was after.
6. Alan returns to his PC and updates his records according to Bill's information
7. After a timeout period of inactivity, Alan and Bill's handsets indicate the end of the session (in this example by generating a short tone and displaying the message "*BYE*").
8. Bill notices that he forgot to mention to Alan about the quantity of the next shipment and he presses the "Push To Talk" button on his handset. Alan's name, being the last PoC group or other PoC user that Bill had a PoC session with stays as the default on the display.

5.3.6 Alternative Flow

As an alternative to step 2 and 4 above, Alan/Bill starts talking immediately after pressing the "Push-to-Talk" button, (i.e. without waiting for an indication to talk).

5.3.7 Operational and Quality of Experience Requirements

- PoC terminals shall be expected to support a physical button that causes an event both when pressed and a separate event when released. This button may be shared with other applications, i.e. it does not have to be a dedicated button exclusively used for PoC.
- PoC terminals should support the capability to scroll through a list displayed on the screen, allow the user to select displayed entities, and shall be able to interoperate with the physical button designated as the PoC button.
- A PoC capable terminals should support the capability to produce audio tones, e.g., to indicate a new PoC call has arrived or an error has occurred
- In-call messages, e.g., tones, system's greetings and other messages, shall be possible during a PoC session.
- Each PoC user should be identified by an alphanumeric string on the handset.
- The last PoC group or other PoC user with which the PoC user had a PoC session should remain as the default on the display of the PoC terminal after the session has ended.
- The PoC capable terminal should have a speaker in addition to the earpiece and provide a button for the user to toggle between the two.
- PoC voice calls shall be encrypted
- The request-response time when first establishing a PoC call may be longer than the time taken between listening and talking during an active PoC voice session

5.4 Use Case D, Basic Use Case, "Where to eat"

This is a basic use case, which describes the PoC group call feature. In the example one group member (Julie) initiates a group call by selecting the appropriate group from her PoC terminal and starts talking to other group members. Other members can hear the speech from their terminals without a need to answer. Other group members can take part in the conversation by pressing the POC button and waiting for a permission to speak

5.4.1 Short Description

- Julie wants to have lunch with her workmates and she makes a call to them using PoC.

- She queries whether they would like to go to city, as she is not very fond of the menu at the nearby restaurant where they usually eat.
- Julie first selects the group of people she wants to talk to and presses the Push to talk button.
- After a short while the PoC server will send her a permission to speak notification and she can start talking to the group and all the people in the group will hear her.
- Everybody in the group agrees that the menu at the local restaurant is not very attractive and they reply one-by-one to the group that they agree and would like to go to the city with Julie.

5.4.2 Actors

Primary actors:

Participant: Julie and her workmates from the same company.

5.4.3 Pre-conditions

All parties have PoC capable terminals and PoC service subscriptions.

5.4.4 Post-conditions

Julie has conveyed her message to all parties and they have replied to Julie. All parties have heard all the replies. The group session is still open for further group communications.

5.4.5 Normal Flow

Julie selects the Push to talk application and opens it. There is no group currently active and Julie creates one by selecting the people she wants to talk to from the phonebook in her terminal. She presses POC button and a PoC request is sent to all parties. Julie is given the permission to speak when the first party accepts the request. After that all parties that accept the request are automatically joined to the PoC group session and everybody can just push and talk, and no further notifications are sent. Other members can request a reply turn by pressing the POC button. After Julie releases the POC button the first requester is given the permission to speak, others will hear the voice of the first requester.

5.4.6 Alternative Flows

Outward ad hoc group

There is no group currently active and Julie creates one by selecting the people she wants to talk to from the phonebook in her terminal. She presses POC button and a PoC request is sent to all parties. All parties need to answer the request before Julie is given the permission to speak. After the initial PoC call creation everybody can just push and talk, and no further notifications are sent.

Inward ad hoc group

There is no group currently active and Julie creates one by creating a name to the group and selecting the people she wants to talk to from the phonebook in her terminal. She sends an invitation to the selected people and joins the group she created. Julie is given the permission to speak right after the group is created. When the selected people receive the group information, they can join the group and start using the service immediately. No notifications or alarms are sent after the invitation to join.

Inward permanent group

There is a previously defined “workmates” group and Julie joins it. She is given the permission to speak right after she has joined the group. All people that are active in the group will hear her speak without any notification.

5.5 Use Case E, Private Call - One-to-One

5.5.1 Short Description

Private call is a half-duplex dispatch audio communications between two subscribers. Allows two users to communicate via Push to Talk (POC) dispatch voice service. A user initiates a private call by selecting/specifying a target mobile subscriber and pushing the Push To Talk (POC) button on the phone. Only one user may speak at a time, arbitrated by the network. The POC Private Calls are typically of much shorter duration than a typical telephony call, and is characterized as having rapid set-up (compared to telephony) and short duration.

5.5.2 Actors

- Participants: Alice and Bob. Alice wishes to call Bob in a one-to-one private call, asking Bob if he set-up a technical review meeting.
- Host: In this case, Alice is the invoker of the Private Call.
- Network operator
- Service provider.

5.5.2.1 Actor Specific Issues

Participants

- Want to be able to quickly communicate using voice.
- Want easy to use handsets, with fast methods of selecting users and initiating a call.
- Want to know apriori that the user is reachable before the call.
- Want reasonably good voice quality.

Network Operator:

- Wants to attract customers to new service.
- Wants to reduce subscriber churn to other network Operator.
- Wants to maximise potential for VoIP services, offering new revenue generating service.

5.5.2.2 Actor Specific Benefits

Participants

- Better productivity – PoC calls are of quick duration, and gets users back to more productive tasks (vs. waiting for calls, or participating in calls that typically last longer than PoC calls).
- Ease and speed of placing PoC voice calls.

Network Operator

- Takes revenue from PoC voice calls.

5.5.3 Pre-conditions

Alice and Bob have PoC capable terminals and service subscriptions, and have powered-on their phones. Their PoC phones have registered with the network for PoC service. The handsets have provided presence information about Alice and Bob to the network (either automatically, or upon Alice or Bob's interaction with the handset).

The mechanisms for synchronizing the contact lists between the handset and the server are outside the scope of this use case.

5.5.4 Post-conditions

Alice and Bob have finished their Private Call voice call and ended their session.

5.5.5 Normal Flow

To begin a POC session, the Alice selects Bob's name from her contact list. Alice notices in her contact list that Bob's presence status is "online", which indicates with high probability that Bob is reachable. Once the number has been selected by Alice (or keyed into the handset), she presses and holds the "POC" button/key, indicating to the network that she would like to speak. Alice hears a talk-proceed-tone, to indicate that she can now begin to speak. Alice now speaks and the person being called, Bob, hears a tone to announce the incoming private call, and then hears Alice talking from his handset. When Alice is done speaking, her "POC" button is released, and Bob hears a "floor open" tone to indicate that he may now reply. Bob is now able to press and hold the "POC" button/key, hears the talk-proceed-tone, and begins to speak. The conversation would continue in this back and forth manner.

If the listening party presses the "POC" button while the talking party has their "POC" button depressed, the listening party hears a rejection or waiting tone to indicate that it is not yet their turn to speak.

The flow of a call is as follows:

Alice: Presses and holds the "POC" button, hears the "talk-proceed" tone and speaks,

Bob: Hears the "incoming call" tone and hears Alice speaking

Alice: Releases the "POC" button

Bob: Hears the "floor is available" tone, presses and holds the "POC" button, hears the "talk-proceed" tone and speaks

Alice: Hears Bob speaking

The conversation would continue in this back and forth manner. When the parties conclude their discussion, they stop talking, and stop pressing their respective "POC" buttons. After a period of time of inactivity, the network will determine there is no activity, and automatically hang-up the session.

5.5.6 Alternative Flow

A number of alternative flows or methods exist for this private call;

- Method to select the called party - Alice may select Bob from the contact list as in the normal flow above, or may directly enter a number or handle through the handset keypad. Also, Alice may choose to select Bob from a recent call list, either received calls or dialled calls.
- Quick Key – Upon selecting the party to be called, Alice may quickly press and release the POC button. This has the effect of setting up the call with the target users, but immediately releases the floor once the call is established. Once the call is established, either Alice or Bob may request the floor. This method provides a "polite" technique of notifying the target, in this case Bob, that Alice would like to communicate, without having speech play out on Bob's handset.
- Call Termination – When Alice is finished with the call; she may press a key on the handset that ends the call. Bob would receive a notification on his handset that the call is terminated. This would end the call and release the session more quickly than the session being timed-out by the network.
- Invite Based Call Treatment - Bob may have his handset configured for an invitation mode, in order to prevent speech from immediately coming out of his handset. This would cause Bob's handset to be notified that there is an incoming call, and he could choose to accept it or not (similar fashion to a telephony call). When Alice presses the POC button, instead of immediately receiving a talk-proceed-tone, she would get a notice that the system is waiting for Bob to accept the call. When Bob finally accepts the call, Alice will receive a talk-proceed-tone. If Bob does not accept the call, she would get a call-rejected notification.

- Do not disturb – If Bob does not want to be bothered for POC calls, Bob may configure his phone into a "do not disturb" mode. This would cause calls from anyone (Alice) to be automatically rejected.

- Presence Status Override - If on Alice's contact list, presence status for Bob is "unknown" (as opposed to "off-line", which means he is unreachable), Alice may attempt a call even though Bob's status is unsure. This is a possible situation under the condition that only a subset of contacts in Alice's contact list have been tagged to request presence updates. This tagging for updates may be done to reduce the network load required for presence updates. In this example, if Alice has 200 contacts in her list, perhaps only 10 people would be tagged to request presence updates. The other 190 people would have presence listed as "unknown" in her contact list, but Alice could still attempt calls to those people in spite of their unknown status.

- In call status – Alice can get a "User Busy" or "Unavailable" if a target user is already in engaged in a Private or Group Call. Alice may also get directed to leave a POC voice message, which will be enquired by the network for later playback for Bob.

- Call attempt failure – If Alice attempts to make a POC call to someone who is not available, and a mechanism has not been activated which enables Alice to leave a message, then after an appropriate alerting period the call attempt should terminate. Alice should be made aware of the reason for the call attempt termination and a mechanism should exist so that it is possible not to charge Alice for making the call attempt.

-

5.5.7 Operational and Quality of Experience Requirements

PoC Terminals should support the following (as a minimum):

- The terminals should support functions to setup the call, request the floor, and release the floor. *This does not need to be a dedicated button, although this will improve the user perception if available. The terminal should have separate buttons to manually exit the call.*

- The terminals should support distinct comfort tones to announce an incoming call, and to properly arbitrate the use of the half duplex service (talk-proceed, floor open, floor rejected).

- A "High Audio" speakerphone should be supported, *allowing for a walkie-talkie form of experience.*

- A contact list allowing for easy selection of the target users should be supported, as well as recent call lists.

- *Presence information should be available for all or a subset of users in the contact list.*

- Caller ID information must be provided to both parties of the private call.

- Visual indicators (in addition to the audio tones) should be provided, indicating if a user is in a call, if the user has the floor, or if the other participant has the floor.

- The initial call setup (first "POC") exchange can take longer than subsequent POC setups in the same session.

5.6 Use Case F, Call Alert – One-to-One

5.6.1 Short Description

The Call Alert function is one that allows a users to "ping" each other, indicating that one user wishes to communicate with another user. Call Alerts are often used in conjunction with Private Calls, and are used as a polite method of letting the target of the call know that the originator wishes to talk (instead of having speech immediately coming out of the handset as in a Private Call). It is also similar to a Quick Key method as described in the Private Call use case. The Call Alert provides a notification to the target of the calling party, and the target may immediately hit their POC key to Private Call back to the originator. The Call Alert may optionally carry text or other media to from the originator to the target.

5.6.2 Actors

- Participants: Alice and Bob. Alice wishes to Call Alert Bob, in order to invite Bob to Private Call.
- Host: In this case, Alice is the invoker of the Call Alert.
- Network operator.
- Service provider

5.6.2.1 Actor Specific Issues

Participants

- Want to politely or discretely notify a target user that the originator wishes to communicate.
- Users want to respond quickly communicate using voice.
- Want easy to use handsets, with fast methods of selecting users and initiating a call.
- Want to know apriori that the user is reachable before the call.
- Want reasonably good voice quality.

Network Provider

- Wants to attract customers to new service.
- Wants to reduce subscriber churn to other network providers.
- Wants to maximise potential for VoIP services, offering new revenue generating service.

5.6.2.2 Actor Specific Benefits

Participants

- Politeness or discrete calling capability. A “white collar” market feature. Call Alert leads to engaging in a Private Call.
- Better productivity – PoC calls are of quick duration, and gets users back to more productive tasks (vs. waiting for calls, or participating in calls that typically last longer than PoC calls).
- Ease and speed of placing PoC voice calls.

Network Provider

- Takes revenue from PoC Call Alerts, or expect that Call Alerts lead to Private Calls, which are charged.

5.6.3 Pre-conditions

Alice and Bob have PoC capable terminals and service subscriptions, and have powered-on their phones. Their PoC phones have registered with the network for PoC service. The handsets have provided presence information about Alice and Bob to the network (either automatically, or upon Alice or Bob’s interaction with the handset).

5.6.4 Post-conditions

Alice has Call Alerted (notified) Bob that she wishes to be contacted. Bob and Alice are active on their respective networks. Bob’s handset is configured to rapidly engage in a Private Call. This active configuration will persist for a period of time, after which Bob’s handset will restore itself back to a non-Alerted mode of operation.

5.6.5 Normal Flow

Alice may also choose to " Call Alert" Bob as opposed to using the "Private Call" technique illustrated previously. To Call Alert someone, Alice selects a contact from the contact list. Instead of immediately pressing the "POC" button as in the Private Call scenario, Alice selects the "Alert" option (a button on the handset User Interface). Instead of pressing and holding the "POC" button and speaking, Alice presses and releases the "Call Alert" soft key. This sends a signal to the handset of Bob. Bob hears the Call Alert tone (or vibration), and may respond by pressing and holding the "POC" button to initiate a Private Call conversation with Alice. Alice's name or PoC number/URI is displayed on Bob's handset via Caller ID format.

A Call Alert allows Bob to choose his action based on his environment, and his ability to respond and engage Alice in voice communication. Bob may need to exit a meeting, or restaurant in order to participate in the POC session. Call Alert allows Bob the flexibility engage the POC call at an acceptable time, especially if the Private Calls use the speakerphone, which can be disruptive.

5.6.6 Alternative Flow

- Method to select the called party - Alice may select Bob from the contact list as in the normal flow above, or may directly enter a number or handle through the handset keypad. Also, Alice may choose to select Bob from a recent call list, either received calls or dialled calls.
- Method of Invoking an Alert – In the example above, Alice selected the Alert option which immediately sent the call alert to Bob. Other methods may be considered, such highlighting a user in the contact list, selecting the Call Alert option, and then toggle the "POC" key to actually send the Call Alert. This would be similar to a Quick Key method described in the Private Call section, except that the alert notification would be persistent for a period of time on the Bob's handset.
- Call Alert Rejection Options - Upon receiving a Call Alert, Bob has multiple options. Examples…
  - Bob can immediately push the POC button, and enter a Private Call back to Alice. After a period of time, this Call Alert notify may go away, putting the handset back into a nominal non-Alerted mode of operation.
  - He can ignore the Call Alert. The notification could stay persistent on the handset for a period of time, allowing for a later callback if Bob was away from his handset.
  - Select an option that will have the handset automatically invoke Instant Messaging Application back to Alice, allowing Bob to send Alice canned messages such as "Can't Talk Now" or allowing Bob to craft a custom message back to Alice. Or,
  - Hit a button to ignore the call.
- In call status – Alice can get a "User Busy" or "Unavailable" if a target user is already in engaged in a Private or Group Call.
- Call attempt failure – In the case where the Call Alert is ignored or rejected by Bob, then Alice should be made aware that call attempt has been terminated and a mechanism should exist so that it is possible not to charge Alice for making the call attempt. This assumes a mechanism has not been activated which enables Alice to leave a message.

5.6.7 Operational and Quality of Experience Requirements

PoC Terminals should support the following (as a minimum) :

- Upon receipt of a Call Alert, the pressing the POC button should immediately setup a Private Call to the Call Alert originator.
- The terminals should support distinct comfort tones to announce an incoming call alert.

- A contact list allowing for easy selection of the target users should be supported, as well as recent call lists.
- Presence information should be available for all or a subset of users in the contact list.
- Originator Caller ID information must be provided to the recipient of a Call Alert.

5.7 Use Case G, User Defined Group Call – One-to-Many

5.7.1 Short Description

Group Call is a half-duplex dispatch audio communications between multiple subscribers. In the case of User Defined Group Call, a user invokes a Group Call to a group list that user previously created via a network provisioning action. A user creates and provisions a group which creates a persistent group identifier (which is held in the network and the handset) that the group owner can reference from his/her contact list. The subscriber that creates the group member list is the group owner for that group, and other members can not change that member list, unless modification permissions are given to those members.

The user can define the group member list via web mechanisms in the network, or via handset GUI operations, which allow the user to pick people from their contact list, and add those people to a group list definition. The group is given an name or handle, which can then be then referenced in the owners contact list.

If group members are in a automatic accept mode of call acceptance, typically associated with having high audio /speaker phone operation, the called parties are automatically joined to the group call. Otherwise, if they are in an invited mode of call acceptance , the called parties have the option of accepting or rejecting the group call invitation.

5.7.2 Actors

- Participants: Alice, Bob, Charlie, and Dave. Alice has defined a group, “Workteam”, consisting of Alice, Bob, Charlie, and Dave. Alice wishes to call the “Workteam”, for a short conversation.
- Host: In this case, Alice is the owner of the group “Workteam”, and will initiate the group call.
- Network operator.
- Service provider

5.7.2.1 Actor Specific Issues

Participants

- Users want to respond quickly communicate using voice to a broad number of people, and have all those people participate in a discussion.
- Want easy to use handsets, with fast methods of selecting users and initiating a call.
- Want reasonably good voice quality.

Network Provider

- Wants to attract customers to new service.
- Wants to reduce subscriber churn to other network providers.
- Wants to maximise potential for VoIP services, offering new revenue generating service.

5.7.2.2 Actor Specific Benefits

Participants

- Better productivity – PoC calls are of quick duration, and gets users back to more productive tasks (vs. waiting for calls, or participating in calls that typically last longer than PoC calls).
- Ease and speed of placing PoC group voice calls. Group Calls far easier to coordinate that establishing conventional conference bridges.

Network Provider

- Takes revenue from PoC voice calls. Group Calls can generate large aggregate minutes of use, as many people can be pulled into a call.

5.7.3 Pre-conditions

Alice, Bob, Charlie, and Dave have PoC capable terminals and service subscriptions, and Alice, Bob, and Charlie have powered-on their phones. Dave has not powered on his phone. Alice's, Bob's, and Charlie's PoC phones have registered with the network for PoC service. The handsets have provided presence information about Alice, Bob, and Charlie to the network (either automatically, or upon their interaction with the handset).

Alice, via a previous provisioning action, created a group called "Workteam" consisting of Alice, Bob, Charlie, and Dave. This group definition exists on both the handset and in the network. The mechanisms for synchronizing the group definitions and the contact lists are outside the scope of this use case.

5.7.4 Post-conditions

Alice, Bob, and Charlie have finished their User Defined Group Call and ended their session. Dave did not participate in the session.

5.7.5 Normal Flow

Alice would follow the same procedure for placing a User Defined Group Call as placing a Private Call, however instead of selecting a specific user on the contact list, a specific group would be selected, and in this case, it would be called "Workteam". In this case, no presence information is provided for a group, as it consists of multiple members with obviously difference presence states (Bob and Charlie are "online", Dave is "offline").

When Alice selects the "Workteam", she then presses and holds the "POC" button/key, indicating to the network that she would like to speak. The network attempts to reach all the group members. Alice hears a talk-proceed-tone as soon as the first group member handset joins the call, indicating that she can now begin to speak. As members are added to the call, Alice is notified as member join the call. For example, if Bob's handset automatically joins the call first, and Charlie's handset joins a few seconds later, Alice would be informed that Bob joined the group, and then a bit later Charlie joined the group. This way, members can be apprised as to who is on the call.

All of the active target members of the "Workteam", Bob and Charlie, will hear a tone to announce the incoming group call. A visual indicator (along with Caller ID of the originator) will be provided to Bob and Charlie to indicate that this is a Group Call verses a Private Call. Each member of the talk group will be able to respond and participate in the call using the previously outlined method for Private Call. PoC subscribers will not be able to participate in more than one group call at a time. The group call will continue with the "Workteam" as long as two or more members are engaged in the call. As soon as only one member exists on the call, or no group activity is detected, the "Workteam" group call session is terminated.

5.7.6 Alternative Flow

A number of alternative flows or methods exist for this User Defined Group Call;

- Call Start Criteria – The talk-proceed could be held off until all active members join. However, if invite methods are required at the target, this could significantly hold up the call start. Therefore, it is recommended that call start occur on the first join of any the group members.
- Call Tear Down Criteria – Based on the billing models, it might be desirable to terminate the group call as soon as the originator leaves the call, especially if the group call is paid for by the calling party. This should be a PoC system configuration capability.

- Missed Call Notifies - Members of the group who are on another POC call and not available for the User Defined Group Call will receive an indication on their handset that a Group Call from the call originator was missed.
- Invite Based Call Treatment - Invitation based call treatment at the target should be supported as in the Private Call.
- Callbacks – Even though Bob and Charlie don't own this group definition, the Group ID will show up in their recent call list. Since Bob and Charlie participated in the "Workteam" call, they can call that group back through their recent call list.
- Call Re-Join – In similar fashion to callbacks, if the one of the "Workteam" members drop off the call (tunnel, took another call, etc.), the members may re-join a group call in progress through initiating a POC call to the Group ID in their recent call list.

5.7.7 Operational and Quality of Experience Requirements

PoC Terminals should support the following (as a minimum) :

- The same ergonomic elements called out for the Private Call support (POC buttons, comfort tones, contact lists, speaker phones, recent calls lists, active group member lists, visual indicators of floor control).
- Caller ID of the group originator should be provided to all parties of the group call. Additionally, the friendly group name, "Workteam" should also be provided.
- Current talker ID for the group should be provided.
- A list of active group member participants should be provided by the handset to the user.
- The initial call setup (first "POC") exchange can take longer than subsequent POC setups in the same session.

5.8 Use Case H, Selective Dynamic Group Call – One-to-Many

5.8.1 Short Description

As noted in the previous use case, Group Call is a half-duplex dispatch audio communications between multiple subscribers. In the case of Selective Dynamic Group Call (SDGC), a user invokes a Group Call to a set of members that were selected (dynamically) on the handset, instead of the group members being a static user provisioning action on the network. The user selects the group members from his/her dispatch client contact list, initiates a group call, and the group membership is communicated to the network in near real time. Target members of the group call will be notified at setup time that this is a selective dynamic (e.g., adhoc or temporary) group call. This capability will greatly increase the attractiveness of using group call to reach multiple people, since the provisioning action is removed from the process. It will a natural user process, similar to adding multiple users to an email, Instant Message, or SMS.

5.8.2 Actors

- Participants: Alice, Bob, Charlie, Dave, and Edward. Alice has defined a group, "Workteam", consisting of Alice, Bob, Charlie, and Dave. Edward is not part of the "Workteam" group. Alice wishes to call Bob, Charlie, and Edward for a quick conversation, but does not need Dave as part of the discussion.
- Host: In this case, Alice is the owner of the selective dynamic group including Bob, Charlie, and Edward. Alice will initiate the group call.
- Network operator.
- Service provider..

5.8.2.1 Actor Specific Issues

Participants

- Group call initiator does not want to spend the time provisioning a group that the user may only want for a temporary amount of time. User want to quickly make a group call without provisioning actions.
- Users want to respond quickly communicate using voice to a broad number of people, and have all those people participate in a discussion.
- Want easy to use handsets, with fast methods of selecting users and initiating a call.
- Want reasonably good voice quality.

Network Provider

- Wants to attract customers to new service.
- Wants to reduce subscriber churn to other network providers.
- Wants to maximise potential for VoIP services, offering new revenue generating service.

5.8.2.2 Actor Specific Benefits

Participants

- Speed of reaching multiple people is now very high. No fixed group provisioning is required. Very rapid interaction to potentially large numbers of people.
- Better productivity – PoC calls are of quick duration, and gets users back to more productive tasks (vs. waiting for calls, or participating in calls that typically last longer than PoC calls).
- Ease and speed of placing PoC group voice calls. Group Calls far easier to coordinate that establishing conventional conference bridges.

Network Provider

- Takes revenue from PoC voice calls. Group Calls can generate large aggregate minutes of use, as many people can be pulled into a call.

5.8.3 Pre-conditions

Alice, Bob, Charlie, and Edward have PoC capable terminals and service subscriptions, and Alice, Bob, and Charlie have powered-on their phones. Alice's, Bob's, Charlie's, and Edward's PoC phones have registered with the network for PoC service. The handsets have provided presence information about Alice, Bob, Charlie, Edward to the network (either automatically, or upon their interaction with the handset).

Alice has Bob, Charlie, and Edward in her contact list. However, Edward is not provisioned as a member of the "Workteam" group previously used.

5.8.4 Post-conditions

Alice, Bob, Charlie, and Edward have finished their Selective Dynamic Group Call and ended their session. Dave did not participate in the session.

5.8.5 Normal Flow

Alice would follow the same procedure for placing a Selective Dynamic Group Call (SDGC) as placing a Private Call, however instead of selecting a specific user on the contact list, multiple users are selected via the contact list user interface. As in User Defined Group Call, no presence information is provided for a group, but in this case, Alice can see individual presence on each member as she selects them to join the call. This way, she can use presence to influence who she should invite to the temporary group call.

When Alice finishes selecting the SDGC members, she then presses and holds the "POC" button/key, indicating to the network that she would like to speak. The network attempts to reach all the group members. Alice hears a talk-proceed-tone as soon as the first group member handset joins the call, indicating that she can now begin to speak. As members are added to the call, Alice is notified as member join the call. For example, if Bob's handset automatically joins the call first, and Charlie's handset joins a few seconds later, Alice would be informed that Bob joined the group, and then a bit later Charlie joined the group. This way, all members can be apprised as to who is on the call.

All of the active target members of the SDGC, Bob, Charlie and Edward, will hear a tone to announce the incoming group call. A visual indicator (along with Caller ID of the originator) will be provided to Bob, Charlie, and Edward to indicate that this is a Group Call verses a Private Call. Each member of the talk group will be able to respond and participate in the call using the previously outlined method for Private Call. PoC subscribers will not be able to participate in more than one group call at a time. The group call will be continued with the SDGC as long as two or more members are engaged in the call. As soon as only one member exists on the call, or no group activity is detected, the group call session is terminated.

5.8.6 Alternative Flow

A number of alternative flows or methods exist for this User Defined Group Call;

- Embedding Defined Groups in a SDGC – In addition to selecting users for a SDGC, Alice could have also selected the "Workteam" as a member for the SDGC. This function will allow the user to use the SDGC capability to temporarily merge multiple groups for a group call. So in the previous case, she could have selected "Workteam" and Edward and gotten the same effect vs. selecting all members individually.

- Call Start Criteria – The talk-proceed could be held off until all active members join. However, if invite methods are required at the target, this could significantly hold up the call start. Therefore, it is recommended that call start occur on the first join of any the group members.

- Call Tear Down Criteria – Based on the billing models, it might be desirable to terminate the group call as soon as the originator leaves the call, especially if the group call is paid for by the calling party. This should be a PoC system configuration capability.

- Missed Call Notifies - Members of the group who are on another POC call and not available for the User Defined Group Call will receive an indication on their handset that a Group Call from the call originator was missed.

- Invite Based Call Treatment - Invitation based call treatment at the target should be supported as in the Private Call.

- Callbacks – Even though Bob and Charlie don't own this group definition, a temporary SDGC Group ID will show up in their recent call list. Since the SDGC is a temporary group, this definition may only last for a period of time (for example, 1 hour), and then will then become an invalid group ID.

- Call Re-Join – In similar fashion to callbacks, if the one of the SDGC members drop off the call (tunnel, took another call, etc.), the members may re-join a group call in progress through initiating a POC call to the temporary SDGC Group ID in their recent call list.

5.8.7 Operational and Quality of Experience Requirements

PoC Terminals should support the following (as a minimum) :

- The same ergonomic elements called out for the Private Call support (POC buttons, comfort tones, contact lists, speaker phones, recent calls lists, active group member lists, visual indicators of floor control).

- Caller ID of the group originator should be provided to all parties of the group call. Additionally, an indicator should be provided that indicates that this is a temporary SDGC group. This is to differentiate SDGC group definitions from User Defined Group definitions, since SDGC group definitions are removed from the network after a period of time.

- Current talker ID for the group should be provided.

- A list of active group member participants should be provided by the handset to the user.

- The initial call setup (first "POC") exchange can take longer than subsequent POC setups in the same session.

5.9 Use Case I, Private Chat Group Support – One-to-Many

5.9.1 Short Description

Chat groups in PoC have similar operational behaviours as conventional group calls, with the following main differences;

- When a user builds/defines a Chat Group, it is a private group, and specific members are invited to the chat group. The Chat Group ID is provided by the PoC service to all selected members of the group.
- Users may join the Chat Group via selecting the Chat Group ID from their contact list (or other chat group lists) and pushing POC. However, joining a chat group does not result in inviting all the members of the group, as in group call. Members join the group of their own volition.
- Once users join, they stay attached or bound to that group in a static fashion, whether there are discussions in the Chat Group or not.
- If no one is speaking in the Chat Group, the radio resources may be released by the network after a period of time. Upon activity in the group, the audio will be transmitted to the users attached to the group, which may result in activating the RF channels for those users.
- Users participate in the Chat Group in a half-duplex fashion as in the Group Calls.
- When a user wishes to unattach from the group, this will require a user action on the device to signal to the network to remove him from that Chat Group session.

Chat Groups really differ from a group call in the sense that people join and leave as they wish, and members are not actively pulled into a call as people join. It is "permanently" created by an owner, and has properties similar of a conference bridge.

Concerns exist on the feasibility of public POC Chat Groups that would be created by a PoC service provider. Issues of privacy, name hiding, group moderation and supervision, control / overloading, and the basic utility must be explored more fully.

5.9.2 Actors

- Participants: Alice, Bob, Charlie, Dave. Alice has defined a chat group, "Sales Chat Room", consisting of Alice, Bob, Charlie, and Dave. Alice wishes to have a quick "conference call" at 9 am with Bob, Charlie, and Edward for a fast sales status review.
- Host: In this case, Alice is the creator of the "Sales Chat Room", including Bob, Charlie, and Edward. After she creates the Chat Group, the notification of the "Sales Chat Room" is sent to Bob, Charlie and Edward.
- Network operator.
- Service provider..

5.9.2.1 Actor Specific Issues

Participants

- Chat Group creator wants to create a fast access "conference bridge" that is persistent, and can be used at any time. The group is closed, but readily accessible for all approved members.
- Want easy to use handsets, with fast methods of selecting users and initiating a call.
- Want reasonably good voice quality.

Network Provider

- Wants to attract customers to new service.
- Wants to reduce subscriber churn to other network providers.

- Wants to maximise potential for VoIP services, offering new revenue generating service.

5.9.2.2 Actor Specific Benefits

Participants

- Chat Group provides very fast access "conference bridge service". Very likely more cost effective than paying for conventional bridging service. Also, Chat Group ergonomics will likely shorten meeting times compared to normal conference bridge sessions.
- Chat Group allows people to participate in "Group Call" like sessions, without being bothered with an invitation to join the group call. People join the group on as their schedule allows, vs. being immediately pulled into a group call.
- Ease and speed of placing PoC chat group calls. Group Chat calls far easier to coordinate that establishing conventional conference bridges, and are permanent.
- Better productivity – PoC calls are of quick duration, and gets users back to more productive tasks (vs. waiting for calls, or participating in calls that typically last longer than PoC calls).

Network Provider

- Takes revenue from PoC chat groups. Like Group Calls, Chat Groups can generate large aggregate minutes of use, as many people can join the call.

5.9.3 Pre-conditions

Alice has previously defined a chat group, "Sales Chat Room", consisting of Alice, Bob, Charlie, and Dave, and this Chat Group ID / name has been sent and stored in their devices. Alice wishes to have a quick "conference call" at 9 am with Bob, Charlie, and Edward for a fast sales status review, so Alice sends an SMS message to Bob, Charlie, and Dave requesting them to join the "Sales Chat Room" at that time.

5.9.4 Post-conditions

The "Sales Chat Room" call is over, and all members have exited (un-attached) from the "Sales Chat Room".

5.9.5 Normal Flow

Alice, Bob, Charlie and Dave would follow a similar procedure for joining a Chat Group as placing a Private Call, however instead of selecting a specific user on the contact list, a specific Chat Group would be selected, and in this case, it would be called "Sales Chat Room". In this case, no presence information is provided for a chat group, as it may consist of multiple members with obviously difference presence states (Bob and Charlie are "online", Dave is "offline").

When Alice finishes selecting the "Sales Chat Room", she may press and release ("Quick key") the "POC" button/key, indicating to the network that she would like join the group. The push and release method is suggested so that she can use the POC button as the method to join the chat group, which will cause her to join and be put into a listen mode. This way, if group members have already joined, they may already be speaking and have the floor. She will begin to hear dialog on the next talkspurt after joining. If Alice does not hear anyone speak, she may request the floor via pushing the "POC" button again.

Alternatively, she may press and hold the button after selecting the "Sales Chat Room", and if provided the talk proceed tone, she may immediately begin speaking. However there is a chance that she will rejected if someone else in the Chat Group is already speaking. Therefore, the press release method is suggested as the preferred behaviour to join a Chat Group.

As members join, the handset devices display the Caller ID's of the joining parties in the Chat Group. Additionally, an 'entry' audio tone is played on the handsets, indicating that a person joined the group.

Alice was the first person to join the Chat Group, Bob joined a few minutes later, and then Charlie and Dave joined the Group near the same time. Once Alice has determined that all the group members are on the call (confirmed through her handset display), she has a discussion with each of the team members on their sales contacts status, in a back and forth half duplex manner as in Group Call. When Alice has all of her status from the team members, she says goodbye and leaves the

Chat Group. Bob and Charlie stay in the Chat Group for a while longer to talk about some sports related topics, and Dave is not interested and leave the chat group. When the members want to leave the chat group, each of the participants detach from the Chat Group via an option on the handset GUI. It should be emphasized that there is no session timer for Chat Groups, and if there is a large amount of time between talk spurts, the chat session is not terminated by the PoC service. Exiting the Chat Group requires a manual action from the member.

5.9.6 Alternative Flows

- Handset Automatically Logs Off Chat Group if Idle - A handset client may have additional functionality to provide an automatic logoff from a chat group if there has been no activity on the group for a period of time, configured by the PoC user.
- Creator Privacy Control – The creator of the Chat Group should have the ability to specify if only the provisioned users may join the group, or if the chat group is open to other non-provisioned members if they are given the Chat Group name/ID.

5.9.7 Operational and Quality of Experience Requirements

PoC Terminals should support the following (as a minimum) :

- The same ergonomic elements called out for the Private Call support (POC buttons, comfort tones, contact lists, speaker phones, recent calls lists, active group member lists, visual indicators of floor control).
- Caller ID of all chat group participants should be provided to all parties of the group call. As users join and leave, the handset devices should display the participant lists to reflect the current membership status. Also, join and leave tones should be played at the handset as member join / leave.
- Users must explicitly join and leave the chat group through actions on the handset. No automatic joins, or automatic session teardowns occur for chat groups.
- Current talker ID in the chat group must be provided.

5.10 Use Case J, Mobile Fixed Inter-working

5.10.1 Short Description

Benjamin, Jake and Alexandra are part of the White Knights death match team that participates in Doom death matches on an online gaming service. The White Knights have been challenged by the Dark Lords to a Doom death match. Benjamin has agreed with the head of the Dark Lords to death match at 7:00 PM tonight. Come 7:00 PM Benjamin and Jake have connected to the online gaming service from their game consoles and are chatting using the game services push-to-talk feature. There is no sign of Alexandra and they have to start the Doom death match against the Dark Lords without her. The Dark Lords start beating up the White Knights. It is looking ominous and Benjamin realizes that they desperately need Alexandra. Benjamin uses the online gaming service live talk feature to initiate a PoC session with Alexandra on her PoC enabled terminal.

5.10.2 Actors

- Participants: Jake, a member of the White Knights death match team and the Dark Lords death match team all with PoC enabled Internet terminals
- Participant: Alexandra, a member of the White Knights death match team and a mobile subscriber with a PoC enabled mobile terminal
- Host: Benjamin is the head of the White Knights death match team
- Network Operator: Network operator with PoC service
- Service Provider: Online gaming service

5.10.2.1 Actor Specific Issues

Participants

- Want to quickly contact team members anywhere, anytime, from anyplace, using any device
- Want to use nearest PoC enabled device

Network Provider

- Wants to expand the potential for revenue generation
- Wants to create opportunities for service inter-working.

Service Provider

- Wants to expand the potential for revenue generation
- Wants to increase community reach.

5.10.2.2 Actor Specific Benefits

Host

- Can quickly contact team members anywhere, anytime, from anyplace, using any device.

Network Provider

- Expands the PoC revenue stream.

Service Provider

- Gains additional revenue
- Adds functionality to the service that increases community reach.

5.10.3 Pre-conditions

The online gaming service live talk feature connects with Alexandra's network provider's PoC service

The gaming consoles of all participants include a two-way voice interface such as a speakerphone or headset

Alexandra's online gaming service profile includes her PoC URI

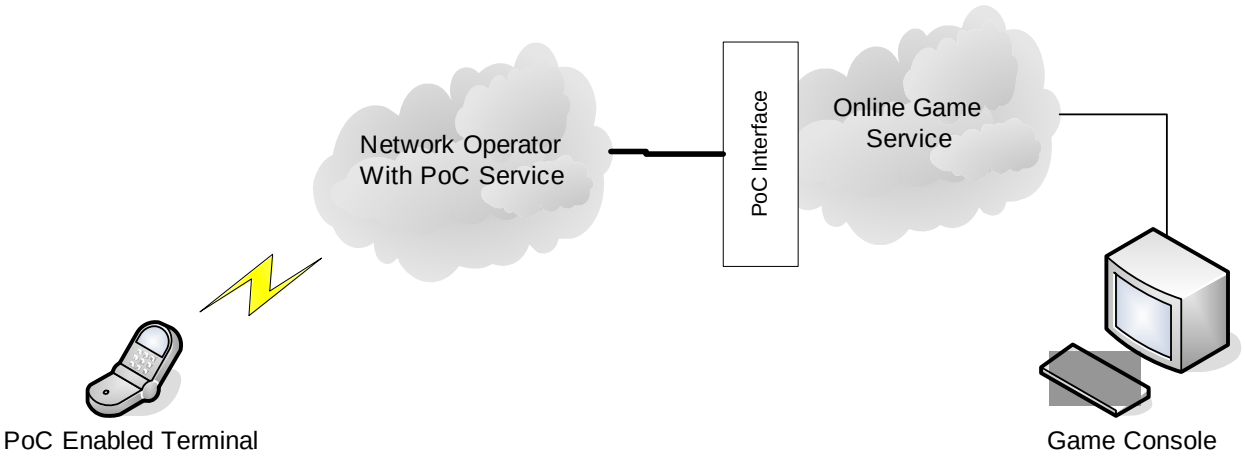
Benjamin's online gaming service account is enabled to use the PoC connection

5.10.4 Post-conditions

Benjamin contacted Alexandra on her PoC enabled mobile terminal. Alexandra joined the Doom death match in time for the White Knights to beat the Dark Lords

5.10.5 Normal Flow

Come 7:00 PM Benjamin and Jake have connected to the online gaming service from their game consoles and are chatting using the game services "live talk" feature. There is no sign of Alexandra and they have to start the Doom death match against the Dark Lords without her. The Dark Lords start beating up the White Knights. It is looking ominous and Benjamin realizes that they desperately need Alexandra.



1) Benjamin selects Alexandra from the list of team members and presses the "Talk" button on his headset.
2) The online gaming service live talk feature initiates the session to Alexandra's PoC enabled terminal via the connection with Alexandra´s network provider's PoC service.
3) Benjamin hears a tone in his headset indicating that he is connected to Alexandra.
4) Benjamin speaks into his headset microphone and releases the "Talk" button and waits for Alexandra's response.
5) The online gaming service sends Benjamin's message to Alexandra's PoC enabled terminal via the connection with her network operator's PoC service.
6) Alexandra hears Benjamin's message. She presses the "Talk" button on her mobile.
7) Alexandra immediately hears a tone on her mobile indicating that she is connected to Benjamin's game console.
8) Alexandra speaks into her mobile, telling Benjamin that she will be online in a couple of minutes, and releases the "Talk button.
9) The network operator's PoC service sends Alexandra's message to Benjamin's game console via the connection with his online gaming service.
10) Benjamin hears Alexandra's message. Benjamin returns to the Doom death match knowing that reinforcements will arrive soon.

5.10.6 Alternative Flow

5.10.6.1 Incoming PoC with session acceptance

As in the normal flow, except…

2.5) Alexandra receives an indication of an incoming PoC session and accepts the PoC session.

5.10.6.2 5.X.6.2 Incoming PoC with session rejection

As in the normal flow, except…

2.5) Alexandra receives an indication of an incoming PoC session and rejects the PoC session.

3) Benjamin receives an error indication and the PoC session is not established.

5.10.7 Operational and Quality of Experience Requirements

1) The online gaming service live talk feature is capable of connecting with a PoC network.
2) The network operator should be able to exchange charging information for a PoC session with the online gaming service.

5.11 Use Case K, Use of multiple group operation

In this use case, Julie is a cleaner in a hotel, and her work also includes responsibility to coordinate workflow with the hotel laundry.

5.11.1 Short Description

- Julie participates both in the group “cleaners” and in the group “laundry”. The group “cleaners” is used whenever the cleaners need any kind of assistance of each other, and when any other related person has something to communicate to or request from the cleaners. In this example, the groups are chat rooms that are joined by the persons involved at the beginning of their work shift, but the use case can be applied to other types of groups as well.
- Julie is hearing voice from the group “laundry”.
- Now the hotel receptionist selects the group “cleaners” on his/her PoC user equipment. Presses the talk button and starts to talk to ask if there is any vacant, single room already cleaned up.
- Because the group “cleaners” is related to Julie’s primary duties, the transmission of the receptionist will override her reception of the group “laundry” and she will hear the voice of the receptionist.
- Note that the communication in the laundry group is not disturbed in any way. In addition, if Julie is talking in the “laundry” group, she is not interrupted.
- Julie sees on the PoC user equipment display that the “cleaner” group communication is received and receptionist is talking.
- Julie presses the talk button, when she sees on her display that the receptionist talk burst is over and tells that she has a room # 274 available.
- The receptionist thanks Julie and gives the room to the customer.
- After a certain period, if there is no subsequent traffic in the group “cleaners”, Julie starts to hear the group “laundry” again (if there is traffic).

5.11.2 Actors

Participants

- Hotel receptionist, who needs to be able make requests to cleaners.
- Julie, a cleaner, who needs to keep informed of the situation in the hotel laundry.
- Other cleaners.

- Laundry personnel.

Host

- Hotel management

Network operator.

Service provider.

5.11.2.1 Actor specific issues

Participants

- want to be able to receive "handsfree" information related to their work
- want to be able to reach people related to their own work quickly and easily
- want to keep informed of the activities of groups related to their own work, by monitoring traffic in such groups
- want to give priority to the particular group

Hotel management

- wants to optimize the efficiency of their operations
- wants to minimize the communication cost to support the workflow

Network provider

- wants to minimize the resources used for a given revenue

5.11.2.2 Actor specific benefits

Participants

- Each participant hears only the traffic that is relevant to her work

Network provider

- A more efficient solution, because it allows using two small groups instead of one large one, so that less resources are used

5.11.3 Pre-conditions

All parties have PoC capable terminals and PoC service subscriptions. Receptionist and all cleaners on working duty are beforehand joined in the same group "Cleaners". Julie, one of the cleaners, has joined the group "cleaners" as her primary group and additionally the group "laundry".

5.11.4 Post-conditions

Receptionist has found a cleaned room.

5.11.5 Normal Flow

Julie activates group "cleaners" as her primary group and the group "laundry" as an additional group.

Julie hears traffic from the group "laundry" if there is no traffic in the group "cleaners".

Receptionist selects the group "cleaners" to talk to, presses the talk button and asks if any single room is already cleaned.

All group members see that receptionist is talking and hear that she/he is asking a cleaned room. Those group members, who have "cleaners" as their primary group, hear the receptionist even if they were just hearing another group.

One of the group members has a room ready made and she presses the talk button, when the previous talk burst is over and talks to receptionist, that she has a room. All other group members hear also, that room was found and there is no need anymore to talk with receptionist.

5.11.6 Operational and Quality of Experience Requirements

A PoC user shall be able to be joined-in to more than one group at a time for group communication. There can be two levels of groups for a user: one of the joined-in groups may be his primary group and the rest of the groups are secondary.

In case a user only has secondary groups, the main requirements are:

- If there is traffic in more than one group at the same time, there shall be a means to filter the traffic so that the user hears a single conversation
- The user shall start to hear traffic from any group that starts first
- The user shall continue hearing the same discussion (i.e. traffic from the same group) rather than hopping from group to group, unless there is a period of silence to indicate that the discussion has ended
- Because the user will be receiving voice from multiple groups in sequence, there shall be a means to identify which group is being received
- There may also be means to allow user to hears multiple groups at the same time
- When the user wants to talk into a group, she shall be able to select to which group to talk. The selection may also be implicit, e.g. the transmission is to the group that was most recently heard

In case the user has a primary group and secondary group(s), the following additional requirements are

- If there is no traffic in the primary group, the user shall receive traffic from secondary groups according to the requirements described above
- Voice in the primary group shall be received immediately, even if the user was receiving voice in secondary group
- As long as there is traffic in the primary group, the user shall continue hearing it, until there is a period of silence to indicate that the discussion has ended.
- When the user wants to talk into a group, it shall be possible to have the primary group as the default target
- The user shall be able to change her primary group
- When the user is talking, her transmission should not be interrupted because of traffic in another group
- The user shall be able to lock herself temporarily into one group and thus, suspends the listening of the other groups.

5.12 Use Case L, "Whispering" during an active session

5.12.1 Short Description

- Alice, Bob, Charlie, Dave, and a couple of others participate in a chat room or a group call in order to decide which action to take in new and urgent situation. Alice is leading the discussion, but so far no solution has been identified
- Bob has a new idea, but does not want to disclose it yet to everybody, before he has checked some details with Charlie. Bob selects Charlie and presses the talk button to talk to him privately while the communication in the group is continuing.
- Charlie hears Bob's idea and answers quickly to the question that Bob had raised. After a short discussion of 15 seconds Bob and Charlie are back in the group again.
- Bob is now convinced that the idea is workable, and wants to present it to Alice. At the moment, Dave is discussing something with some other participants of the group. Bob selects Alice to talk to her directly.
- Alice hears Bob's idea and agrees that it is worth to consider. After 10 seconds, both are back in the group again.
- When the floor in the group is free, Alice informs that there is a new proposal. Bob starts to present his idea.

5.12.2 Actors

Participants

Alice, Bob, Charlie, Dave, and other group participants.

Network operator

Service provider

5.12.3 Actor specific issues

Participants

- want to be able to conduct short "whispering" discussions person-to-person while taking part in a group communication, without losing more of the group communication that is absolutely necessary

5.12.4 Actor specific benefits

Participants

- Can conduct short private discussions on sensitive issues that they do not want to disclose to the whole group
- Can conduct short private discussions without disturbing the whole group
- Can conduct the active discussion without being disturbed by people having private discussions

5.12.5 Pre-conditions

All parties have PoC capable terminals and PoC service subscriptions. Participants have joined a chatroom, or alternatively there is group call in progress between the participants.

5.12.6 Post-conditions

The participants may either continue the group communication or to conclude it.

5.12.7 Normal Flow

Bob selects Charlie and presses the talk button to talk to him privately while the communication in the group is continuing.

Charlie starts hearing Bob's voice instead of the group traffic.

Charlie listens to Bob's idea and answers quickly to the question that Bob had raised.

Bob selects Alice and presses the talk button to talk to her directly.

Alice hears Bob's idea.

When the floor in the group is free, Alice informs that there is a new proposal

5.12.8 Alternative Flows

Bob selects Charlie and presses the talk button to talk to him privately while the communication in the group is continuing.

Charlie notices that Bob is trying to talk to him, and presses a button to accept.

Bob gets an indication, starts to speak and Charlie starts now hearing Bob's voice instead of the group traffic.

Charlie listens to Bob's idea and answers quickly to the question that Bob had raised.

Bob selects Alice to talk to her directly.

Alice accepts Bob's call, hears Bob's idea.

When the floor in the group is free, Alice informs that there is a new proposal.

5.12.9 Operational and Quality of Experience Requirements

A user, who participates in a group communication, shall be able to initiate and conduct a short person-to-person discussion with another group participant, without losing more of the group communication than absolutely necessary.

A user, who participates in a group communication, should be able to initiate and conduct a short person-to-person discussion with any PoC user, without losing more of the group communication than absolutely necessary.

A person-to-person conversation by a group participant shall not affect in any way the other group participants.

Users shall be able to receive person-to-person whispering calls while taking part in a group communication, either through automatic or manual answer. Users shall be able to control the automatic acceptance of person-to-person whispering calls while in a group, at least in the following ways:

- Calls from participants in the same group accepted.
- Calls from any user accepted.
- Calls require manual acceptance.

5.13 Use Case M – Ad-hoc Chat Group Support – One-to-Many

5.13.1 Short Description

PoC Host creates an ad-hoc PoC Group a week before an important meeting. The PoC Group ID is circulated on a company's internal mailing list. The PoC Host's colleagues, who plan to attend the meeting, register with the ad-hoc PoC Group individually using the PoC Group ID. (A colleague gives the Group ID to his friend; this friend is not part of the group who plans to attend the meeting.) A corresponding buddy list is automatically created; any of the PoC participants in the PoC Group can see who is online/offline

5.13.2 Actors

- Participants (10): Paul, George, Ringo, John, Yoko, Billy, Bob, Eric, Elton and Michael. Paul has defined an ad hoc PoC group called "Meeting Chat Room". (The chat room consists of no members yet. Later on, other people will register themselves to the chat room in a simple manner described later in this paper.)
- PoC Host: Paul is the PoC Host. He creates the "Meeting Chat Room", which now includes no members. After he creates the ad hoc PoC group, a PoC Group ID (numerical or alphanumerical) is displayed on his screen. Paul sends this information to the appropriate members via his email account
- Network operator (or PoC service provider): at registration the network operator provides the facility to check if the entered PoC IDs (PoC user identities) belong to the PoC participant. For this ad hoc PoC service, PoC IDs are of the nature of MSISDNs or SIP URIs so other PoC participants can identify who is in their PoC group. However, in case of public PoC chat rooms, nicknames can be supplemented for PoC IDs.

5.13.2.1 Actor Specific Issues

Participants

- PoC Host wants to create an ad hoc PoC Group on the fly, but he does not want to be bothered with the administrative actions[1]; he wants to have each member register him/herself. Therefore, all members have some administrative rights.
- To maintain some level of security/privacy when a PoC participant registers himself using his Group ID the corresponding MSISDNs or SIP URIs are checked by the network operator and are shown on each PoC Group participant's screen. Any PoC participant can see the list on his/her terminal.
- In some cases, a malicious PoC subscriber, who is an outsider, could steal the PoC Group ID by eavesdropping, and secretly join the PoC Group. A PoC Host has the right to remove any PoC members from the ad hoc PoC Group and to block him/her from future registration.
    - Additionally the PoC Host can also grant rights to any participant to remove/block PoC members.

Network Operator (or PoC service provider)

- The network operator (PoC service provider) checks the registrants' PoC IDs (PoC user identities) at registration. All PoC Group participants are visible to each participant. A cooperated operation between the network operator and the PoC service provider is necessary to archive a certain level of security. Additionally, cooperation of participants (including the Host) can be a measure of fraud avoidance.

  Three levels are provided for PoC group communications
    - *Prearranged already defined*
    - *Ad Hoc (already Defined)*
    - *Chat Mode*
        - *Member-only*—Anybody can join the group if he/she has membership via a PoC Group ID.
            - *His (MSISDN/URI) information is displayed*
        - *Public*—Anybody can join the group if he/she has membership via a PoC Group ID.

[1] Ad hoc PoC Group communications are intended for casual ad hoc communications mimicking the legacy walkie-talkie operations. Degraded security/privacy might be a trade-off.

- *His nickname may be displayed*

5.13.2.2 Actor Specific Benefits

Participants

- **Simplicity and quickness for ad-hoc PoC grouping** -- for the PoC Host, administrative actions are limited to the request of the PoC Group ID and the creation of the chat room. This is requested to either a network operator or to a PoC service provider. The PoC host can also define the expiration time (optional) for 1, talk sessions and 2, termination of the group itself (for, say, 2 days after the meeting).
- **Openness** -- anybody who knows the PoC Group ID can join the PoC Group. This is, in a sense, similar to a typical IM chat room.

Network Provider

- **More PTT usage expected—**PoC usage will increase by providing more open access levels; *members-only* access and *public* access.

5.13.3 Pre-conditions

Paul registers and obtains a PoC group ID via the PoC user interface on his terminal. Paul then sends the ID to his colleagues via his company's internal mailing list. His colleagues, who plan to attend the meeting see Paul's message. They get the ID and store it (on paper or via some device). Paul set the PoC Group to terminate 24 hours after the last day of the meeting.

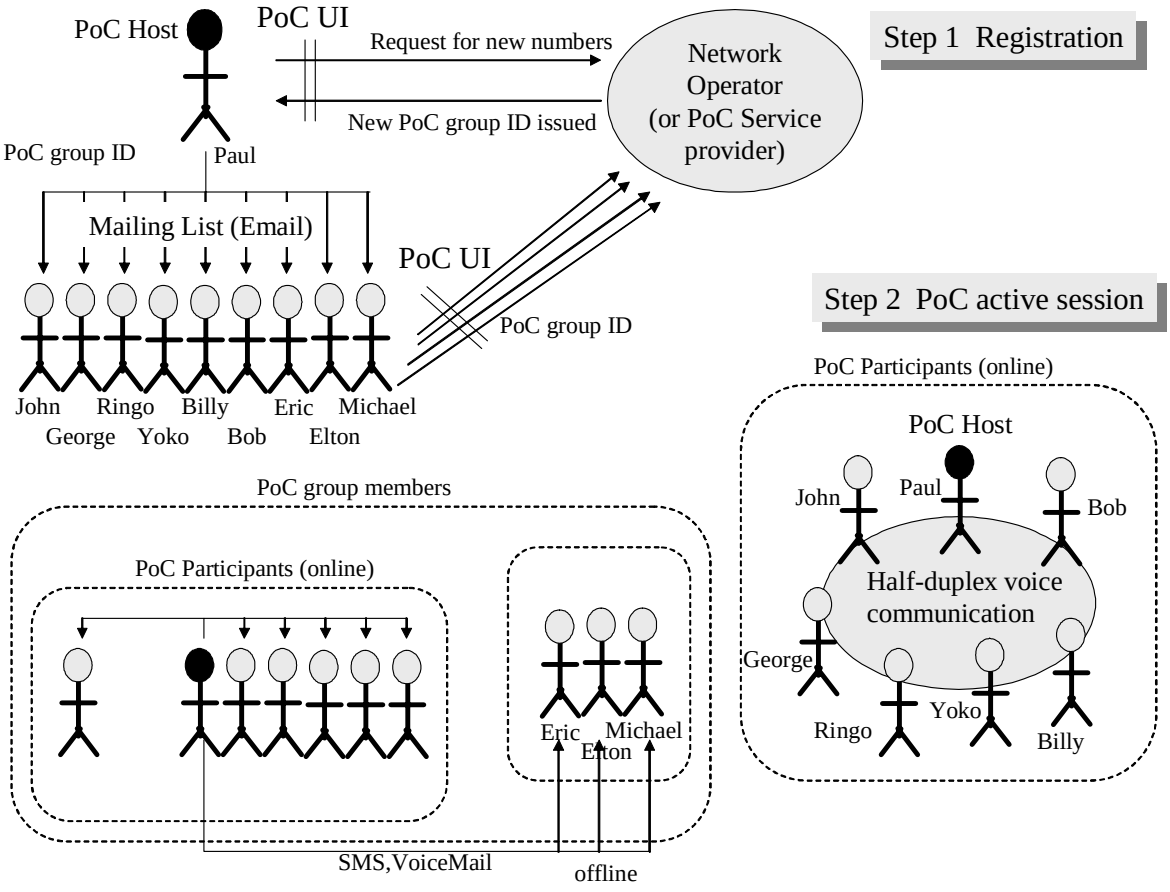
5.13.4 Post-conditions

The meeting is over, and all the members have no use for this PoC Group Chat Room. In 24 hours from the last meeting day (designated by the Host), the PoC Group is terminated.

5.13.5 Normal Flow

The figure below explains the service steps schematically.

Step 1 is divided into two sub-steps; Sub-step 1, the Host requests a PoC group ID, and Sub-step 2, Participants register to the group by entering the PoC group ID via the PoC user interface (PoC UI).



Step 1 Registration

- A week before the meeting, John, George and six other colleagues receive an email form Paul (making 9 total members), which says, "Let's create an ad hoc PoC Group for our upcoming meeting. Please join the PoC Group with this PoC group ID". Some of the members register to the PoC Group at once. But some others do not.
- The morning of the first meeting day, Ringo meets Elton. Elton says to Ringo, "Have you already registered with the PoC Group?" Ringo says, "Darn, I forgot! I lost the ID". Elton jots down the ID on a sheet of paper and says, "You are so forgetful. Here you are", and gives the paper to Ringo. Ringo registers with the PoC Group.
- Yoko comes across Michael in the main venue just near finishing time. Although Michael is not one of the original 9 members, he is one of Yoko's buddies and Yoko wants Michael to join his PoC Group as they will soon go out for beers. Yoko hands Michael the ID.

Step 2 PoC active session

- John, who has already registered to the PoC Group, finds a guy named Michael is suddenly on the list. He is disgruntled and makes a PoC Private Call (one-to-one), "Who on earth are you?" Michael says, "I used to sing with Yoko's husband. Yoko invited me but perhaps she has not notified the group yet. I will log off so that nobody else is surprised. Hope you don't mind me coming with you tonight for drinks and dinner. "
- Around half past 6pm, the group is ready to drink and eat. Paul makes a PoC Alert Call to all the PoC Group participants. Seven participants are logged-in (PoC Participants – online, active), but three other participants (Eric,

Elton and Michael) are offline. After waiting for a few minutes, Paul makes a PoC Group Call by pressing Talk Button, "Guten Abend! I used to live in this area when I was in college. The beer was great. Are we all ready?"

- John replies, "I want to have Eisbein mit Sauerkraut! And beer, of course! My favourite is Berliner Kindle".
- Ringo asks the group, "Say, where shall we dine? I happen to be walking in Europe Centre, a popular shopping mall in West Berlin. I see a German restaurant called Alt-Nuernberg. It looks good. I can even go through the menu while I am talking to you. Group agreed to discuss the menu over the PoC session
- Paul, "After our call I'll send an SMS or voice mail to those offline (Eric, Elton and Michael) with a message, **Eating out, Alt-Nürnberg in Europe Centre, 7PM, Tel:030 2614397".**

5.13.6 Operational and Quality of Experience Requirements

PoC Terminals support the following:

- Chat Mode PoC Group user interface is provided. A user requests and obtains a PoC Group ID that is issued by a network operator/PoC service provider via the user interface. The user enters via the UI, the PoC Group ID to become one of the PoC Group participants. The registered participant is automatically and dynamically added to the buddy list belonging to the PoC Group ID.
- The PoC IDs are tied into either MSISDNs or SIP URIs of all registered participants to the PoC Group and are visible on the PoC Group list. Optionally user names, for example, "John Doe" in this SIP From header field [From: John Doe <sip: Jdoe@necam.com>], are displayed.

A network operator (and PoC service provider) supports the following:

- Chat Mode PoC group services are provided with the following access levels – *members-only* and *public* .
- For *members-only* and *public* access levels, a network operator has to give part of the administrative rights to every PoC group member to let him manage his own PoC group registration.
- For *members-only* and *public* access levels, a network operator has to grant the PoC Host with administrative rights. For example, PoC Host may remove any PoC group member (and block him/her from future participation) in the PoC Group.
  - ✧ Additionally a PoC Host may grant a participant with the same rights
- For *members-only* and *public* access levels, a network operator has to perform some form of authentication for PoC Group member registrations.
- Anonymous access or nicknames may be allowed and are at the discretion of the PoC Host or network operator (PoC service provider).
- For *members-only* access level a 'buddylist' is created when the PoC Group ID is issued or when the first PoC subscriber logs into the 'chat room' of the PoC Group.
- For *public* access level a 'buddylist' may not be created when the PoC Group ID is issued or when the first PoC subscriber logs in the 'chat room' of the PoC Group. However, a network operator must create a 'buddylist' when the PoC subscriber requests a certain level of security/privacy.

5.14 Use Case N, Fleet Dispatch – One-to-Many-to-One

5.14.1 Short Description

A fleet delivery service or taxi service using PoC for dispatching has similar operational behaviour to group calls, with the following main differences:

- Fleet members and dispatcher use a dedicated PoC group for dispatch management.
- The dispatcher is a distinguished actor with capabilities that are quite distinct from those of the fleet members:
    - All fleet members hear the dispatcher, or,
    - In a more sophisticated version where PoC and Locationing services are both available, only fleet members meeting a given criterion selected by the dispatcher, such as being within 5 km of a given location, might hear the dispatcher in a given instance.
    - Only the dispatcher hears an individual fleet member. This is different from all other use cases.
    - Optionally, the dispatcher can preempt the channel from the fleet member.

5.14.2 Actors

- Participants: there are two classes of participant:
    - The dispatcher, who can interact with all the fleet members or any subset of them
    - The individual fleet members, who can only interact with the dispatcher.
- Host: The dispatch channel is typically administered independently of the participants. The administrator assigns dispatch and fleet roles to the participants.
- Network operator: Provides the network and radio resources used for the communications.
- Service provider: may be the network operator, the fleet operator, or some third party provider supporting dispatch as a value-added service.

5.14.2.1 Actor Specific Issues

Participants

- The dispatch channel should be permanently available and easily accessible.
- Access to the dispatch channel should be limited to the dispatcher and the fleet members.
- All fleet members need to be able to hear the dispatcher.
- Only the dispatcher needs to hear the fleet members.
- Voice quality only needs to be intelligible.

Host

- Needs to be able to add and remove fleet members from the group
- Needs to be able to assign different employees dispatcher authority
- Needs standard terminals for fleet members, specialized dispatch terminal for dispatcher.

- Wants to reduce communications costs
- Wants to be able to integrate dispatch with other services, e.g. locationing, emergency systems, text messaging

Network operator

- Wants to replace traditional dispatch channels
- Needs to provide wide coverage
- Opportunity to integrate PoC with other services

Service Provider

- Requires the ability to provide new types of service.

5.14.2.2 Actor Specific Benefits

Participants

- Replaces existing capabilities with equivalent services on standard equipment and with upgrades to integration with additional services.

Host

- Lowers costs through use of non-specialised terminals and shared radio resources.
- Integration with other facilities allows improvements in efficiency of fleet management.

Network operator

- Creates additional revenue stream.

Service Provider

- Provides a new type of service.
- Creates additional revenue stream.

5.14.3 Pre-conditions

The host has previously created the dispatch group, and has identified one member as the dispatcher.

5.14.4 Post-conditions

The dispatcher may convert the one-to-many-to-one call to a one-to-one call with the fleet member who answers.

After interacting with the fleet members, the dispatcher moves to the next action.

5.14.5 Normal Flow

A fleet member may initiate a call to the dispatcher by pressing a Talk button. The dispatcher's response is heard by all fleet members. However the fleet member's side of the conversation is not relayed to the other fleet members. While this conversation is in progress other fleet members may not access the channel.

The dispatcher initiates a dispatch call by broadcasting to all fleet members, or to a filtered subset meeting certain criteria. The return channel is open until one of the fleet members responds.

The dispatcher is notified of the identity of the fleet member. Other fleet members may not be notified of the identity of a fleet member that the dispatcher is in discussion with.

5.14.6 Alternative Flows

If necessary, the dispatcher can cut off a fleet member and open the floor to other fleet members.

5.14.7 Operational and Quality of Experience Requirements

The fleet members' PoC terminals should support speakerphone, Talk button, comfort tones, visual indicators of floor control. Certain common features, such as a visual user interface, may not be required in low-end dedicated terminals.

The dispatch terminal should support speakerphone, Talk button, comfort tones, visual indicators of floor control, tracking of active fleet members, display of speaker identity, history logs etc. It may have wired or wireless access to the network. It is likely to offer other specialized fleet management capabilities integrated with a PoC user interface.

5.15 Use Case O, Corporate Chat

Many situations exist where a quick and efficient communication method is needed but the need for confidentiality is very high and closed user groups are demanded.

5.15.1 Short Description

In this example a small workgroup needs to communicate quickly and privately. They work within the same company and the company has provided them with the PoC enabled terminals from the same service provider.

- A collection of stock traders from company X is considering a major move in the stock price of a stock that they are involved with.
- By mid-day the stock price continues to move and they consider what actions should be taken with the shares.
- The most senior member of the workgroup, Mike, knows his fellow traders from company X all have terminals capable of a private and secure PoC conversation.
- Mike, acting as host, sends an invitation to his co-workers to start the PoC conversation.
- Tom, one of the invitees is caught in another panic trading situation and can't join immediately. He ignores the first invitation and joins a couple of minutes later.
- The conversation proceeds and the stocks are traded within a few minutes after the call has started.

5.15.2 Actors

- PoC Participants: Tom, Peter, Paul and Mary
- PoC Host: Mike is acting as the host.

- PoC Company: Company X has made it possible for this workgroup to have a PoC conversation and is paying the bill for the PoC service.
- Service provider

5.15.2.1 Actor Specific Issues

PoC Participants

- Want to be able to communicate quickly as stocks are volatile and can have significant financial impact.
- Want easy to use handsets with headsets for hands-free use to allow private conversations.
- Want PoC terminals with good voice quality so trading instructions are understood.

Service Provider

- Provides corporate customers a service for business critical applications

Company X

- Company X must have closed confidential user groups to ensure that conversations cannot be overheard and that eavesdroppers are excluded.
- Unauthorised disclosure of the actual names of Group members to third parties must be prevented.
- Secure media link so that conversations cannot be intercepted.

5.15.2.2 Actor Specific Benefits

PoC Participants:

- Trusted and secure system that enables large value stock trades.

PoC Host

- Efficient workgroup communication, which can be leveraged to increase revenue for the company with a solid coordinated effort in selling or buying stocks.

Service Provider

- Increased revenue from corporate customers.

5.15.3 Pre-conditions

All PoC group participants are enabled to use the PoC service and have PoC compatible terminals. All PoC group participants have connectivity to PoC Service Provider through their company subscription.

The group has been authorized and made available for designed employees using company-approved methods for confidentiality,

5.15.4 Post-conditions

When the call comes to an end, the host terminates the call knowing that all will execute the trade instructions.

5.15.5 Normal Flow

- Mike knows that there is a problem in the morning and might even warn his co-workers via e-mail, Instant Message or PoC that they should be prepared for this afternoon trade discussion.

- In the Afternoon the value of some stock continues to move and Mike decides to initiate a conversation with the team using a predefined group name.
- Various people accept the PoC conversation and get their instructions at that time. Any concerns are voiced and a consensus is reached.
- The trade is agreed to and the stock is traded.

5.15.6 Alternative Flow

- An alternative situation Mike forgets to warn his co-workers of what he is planning.
- His attempt to schedule a meeting finds only a small subset of the team available.
- Those that are left and have successfully connected to the PoC service, discuss the situation.
- They have the discussion; Mike decides to call off the trade. He then sends an e-mail, or Instant Message to the team to inform them what has happened.

5.15.7 Operational and Quality of Experience Requirements

- The PoC service entity should allow the subscribers company to affect and authorize the groups that can be used by the user.
- The PoC capable terminal should have a headset in addition to the speaker.
- The PoC service entity should allow corporate PoC calls to have integrity and confidentiality.
- The PoC service entity should allow the company to manage naming identities that are commonly used within the company
- The PoC service entity should allow the company to use a name space within the company that is independent from the addressing used within the PoC network.

5.16 Open Issues

No open issues identified.

6. Requirements (Normative)

6.1 High-Level Functional Requirements

This section contains the high level requirements for PoC.

PoC allows users to satisfy real time, half-duplex speech communication in a simple and easy way. A PoC subscriber MAY either join an existing PoC session or MAY create a PoC session spontaneously. A PoC participant who wants to speak, typically initiates a PoC session on its terminal and starts to speak. Other participants of the PoC group session simultaneously listen to the speaker's voice.

The basic characteristics of a PoC service enabler are as below:

- It allows a user to communicate with other users simultaneously in a half-duplex, arbitrated, walkie-talkie style speech communication. That is, one PoC participant at a time SHALL be granted the right to transmit their speech communication (i.e., to speak), while the others on the PoC session MAY receive the speech communication (i.e. listen only).
- PoC subscribers MAY communicate in a one-to-one or one-to-many fashion, and/or send Instant Personal Alerts.
- A PoC subscriber MAY create a PoC group. PoC subscribers MAY join a PoC group and become members of the PoC group.
- A PoC group MAY either be created by administrative means (e.g. a pre-arranged PoC group), or by inviting and adding PoC subscribers to a PoC group session in an ad-hoc manner (i.e. creating an ad-hoc PoC group). An ad-hoc PoC group exists only for the duration of an ad-hoc PoC group session.
- In a PoC chat group, PoC subscribers SHALL be able to join and leave the chat group themselves. If the chat group is restricted, then only members can join.
- A PoC chat group is pre-defined by the PoC group administrator.

  Note: A concise (informative) overview for pre-arranged, ad-hoc and chat PoC groups is available in Appendix B.
- When a PoC participant wishes to speak to the other PoC participant, he SHALL request the “right to speak”.
- The right to speak SHALL be granted by the PoC service entity. However, the ‘right-to-speak’ granted SHOULD timeout if not utilised after a certain threshold (to be configured by the PoC service provider). As an option, subsequent requests to speak in the same PoC session MAY be queued.
- In case more than one request is queued, the PoC service entity MAY prioritise requests in the queue.
- The voice SHALL be immediately delivered to other PoC participants who are permitted to receive it.
- Current talker identities SHALL be provided to current PoC group session particpants during the ongoing PoC session, unless the caller identity is restricted.
- The PoC Host SHALL be able to terminate a PoC group session at any time.
- The PoC service provider SHALL be able to terminate PoC sessions based on its policy.
- The PoC service entity SHALL be able to provide the inviting PoC subscriber with an early indication to start to speak even before invited PoC participants accept the PoC session request. The inviting PoC participant SHALL receive a notification if no PoC participants received the talk burst.

***Note**: Unless otherwise indicated, for reading consistency the male gender is used to denote both genders as part of the discussions on normative requirements and procedures in this portion of the document.*

- It SHOULD be possible for a PoC service entity to inter-work with Internet services that have similar voice capabilities (e.g. online gaming service, instant messaging service with audio functionality).
- It SHALL be possible to address PoC enabled terminals using an MSISDN.
- It SHALL be possible to address POC enabled terminals using an URI.

6.1.1 The 1-to-1 PoC communication feature

The 1-to-1 PoC communication feature enables a PoC subscriber to set-up a voice communication with another PoC subscriber. When the 1-to-1 PoC session is established, the PoC participants SHALL talk one at a time.

The invited PoC subscriber either accepts the PoC session automatically or reacts manually on the incoming PoC session invitation.

In the automatic answer mode, the inviting PoC subscriber's voice is audible at the invited PoC subscriber's terminal without any action by the invited PoC subscriber.

In the manual answer mode, the invited PoC subscriber confirms the incoming invitation by an appropriate action to accept the invitation to the PoC session.

In order to talk, a participant in a PoC session uses floor control for starting and ending of the talk-burst.

6.1.2 Three modes of 1-to-many PoC communication features

For the 1-to-many PoC communication mode, three modes SHALL be supported; namely, the pre-arranged mode, the ad hoc mode and the chat mode.

Attributes applicable to pre-arranged PoC groups:

- A PoC session between pre-arranged PoC group members SHALL be established when any individual member of the same pre-arranged PoC group invites the group.
- The voice communication SHALL be able to start after the first PoC group member accepts the invitation and receives the right-to-speak indication.
- The participation in a pre-arranged PoC group session SHALL be restricted to the members of the PoC group.
- Members of the PoC pre-arranged group SHALL either be invited when the PoC group session is established or SHALL be able to join in an ongoing session.
- Additionally, any PoC participant in the pre-arranged PoC group session MAY be allowed to invite additional PoC subscribers who are currently members of that pre-arranged group to participate in the ongoing PoC group session.

Attributes applicable to ad-hoc PoC groups:

- An ad hoc PoC group session SHALL be established when a PoC subscriber selects more than one other PoC subscriber and invites them.
- The voice communication SHALL be able to start after the first PoC subscriber accepts the invitation to participate in the ad-hoc group session and receives the right-to-speak indication.
- ~~The participation in an ad-hoc PoC group session MAY either be restricted (e.g. due to limited resources, not being invited), or unrestricted.~~
- To participate in an existing ad-hoc PoC group session, an invitation from an ad-hoc PoC group session participant SHALL be needed.
- As an exception, PoC subscribers SHALL be able to join in a PoC ad-hoc group session in case they were participants in the same group session before, left the session and join in again later.

Attributes applicable to chat PoC groups:

- A chat PoC group session SHALL be established as soon as the first PoC subscriber joins in.
- The voice communication between chat group participants – in principle – SHALL be possible at the time the PoC chat group session is established.
- A PoC subscriber SHALL be able to establish a chat PoC group session or join into an ongoing chat PoC group session.
- A PoC subscriber MAY be invited to the chat PoC session.
- The participation in a PoC Chat group sessions MAY be restricted, or unrestricted.

6.1.3 Instant personal alert

Instant personal alert is a PoC communication feature that allows a PoC subscriber to request another PoC subscriber to initiate a 1-to-1 communication back to the originator. The invitedPoC subscriber SHALL be able to recognize the Instant Personal Alert request, together with the inviting PoC subscriber's identity, subject to the inviting PoC subscriber's privacy rules. The alerted PoC subscriber SHALL be able to initiate a PoC session with the alerting subscriber in response to receiving the alert, possibly at some later time.

Since Instant Personal Alert does not create a PoC session, PoC subscriber's Presence (Ref: Chapter 6.2.4 Presence conditions do not apply to Instant Personal Alerts.

According to the description in [6.1.9.6] (PoC accept / reject list), a PoC subscriber MAY maintain the identities of other PoC subscribers from whom he does not wish to receive PoC talk requests. The same rejection conditions MAY apply to Instant Personal Alerts, subject to PoC service provider policy.

The Do-not-Disturb Presence feature SHALL not apply to Instant personal alerts. (Ref: Chapters 6.2.4 and 6.2.4.2 Presence)

A PoC subscriber who is participating in a PoC session SHALL be able to receive and send Instant personal alerts.

6.1.4 PoC Session Set-up Methods

This chapter describes PoC session set-up procedures. A distinction between 1-to-1 PoC session and 1-to-many PoC session applies.

6.1.4.1 Initiation of 1-to-1 PoC session

This section describes the PoC session set-up steps for a 1-to-1 PoC session.

- The inviting PoC subscriber SHALL invite another PoC subscriber to participate in the 1-to-1 PoC session.
- The PoC service entity MAY provide an early start to speak indication before the invited PoC subscriber answers the invitation.
- If the invited party accepts the invitation, the inviting PoC subscriber SHALL receive an indication that the invited PoC subscriber has accepted the invitation.
    - The inviting PoC subscriber MAY keep or discontinue the PoC session (e.g. reject the invited party's accept if he took too long to answer).
    - If the inviting PoC subscriber keeps the PoC session and receives the ready-to-speak indication, then inviting party MAY start to talk, otherwise speaking is not permitted.
- The speech of the inviting PoC subscriber SHALL be delivered as soon as the invited PoC subscriber accepts the PoC session invitation.

6.1.4.2 Initiation of 1-to-many PoC session

This subsections contained herein describe the PoC session set-up procedures for the three types of 1-to-many PoC session features.

6.1.4.2.1 Pre-arranged PoC group session set-up.

A pre-arranged PoC group list already exists and contains some PoC group members. One of the PoC group members wants to speak to other PoC group members.

- A member of a prearranged PoC group SHALL be able to request the establishment of a PoC session to all members of the prearranged PoC group by using a single group identity and waits for establishment indication.
- Optionally, the PoC service entity MAY check if at least one of the PoC group members is able to participate.
- The PoC service entity SHALL be able to allow only the PoC group administrator to originate the pre-arranged PoC group session.
- The PoC service entity SHALL invite all reachable PoC group members to participate in the PoC session.
- Optionally, the PoC service entity MAY select a set of PoC group members based on a pre-determined criteria (e.g. based on their availability or presence information), and only invite this selected subset to participate in the PoC session.
- The PoC service entity MAY provide an “early start to talk” inidcation.
- The PoC service entity SHALL be able to receive a “confirmation” indication from each invited PoC group member.
- The inviting PoC subscriber SHALL receive a notification if none of the invited PoC subscribers accept the invitation.
- The inviting PoC subscriber MAY receive indications that the invited PoC susbcriber have accepted the invitation.
- The PoC communication SHALL be possible to start as soon as at least one of the invited members accepted the invitation.
- The speech of the inviting PoC group member SHALL be delivered as soon as at least one of the invited PoC group members accepts the Poc session invitation.
- A PoC group member of the group SHALL be able to join the ongoing PoC session. This SHALL NOT cause any invitations to the members currently not participating in the PoC session.
- It SHALL be possible for the service provider to configure a maximum number PoC participants in a pre-arranged PoC group session.
- A PoC participant that has been disconnected from the pre-arranged PoC group session SHALL be able to re-join the same PoC group session, if it is still ongoing and the maximum number of PoC participants is not exceeded. Otherwise the re-join procedure SHALL be rejected.

6.1.4.2.2 Ad-hoc PoC group session set-up

A PoC group does not exist yet and a PoC subscriber wants to establish PoC session with several PoC subscribers

- A PoC subscriber SHALL be able to invite selected PoC subscribers to the Ad-hoc PoC group session.
- The inviting PoC subscriber SHOULD receive notification of the result of the invitation as per the invited PoC subscriber.
- When at least one PoC subscriber has accepted the invitation the inviting PoC subscriber and the accepting PoC subscriber SHALL be able to start the PoC session.

- The inviting PoC subscriber SHALL receive a notification if none of the invited PoC subscribers accept the invitation.
- It SHALL be possible for the PoC service provider to configure a maximum number maximum number of PoC participants in a ad-hoc group session.
- A PoC participant who has been disconnected from the ad-hoc PoC group session SHALL be able to re-join the same PoC session if it is still ongoing and the maximum number of PoC participants is not exceeded. Otherwise, the re-join procedure SHALL be rejected.

6.1.4.3 Reception of PoC Session Invitation

This chapter specifies requirements for reception of PoC session invitations of any type. The invitation applies to either to 1-to-1 or 1-to-many PoC sessions.

- The invited PoC subscriber SHALL get an identity of the inviting PoC subscriber and the identity of the pre-arranged group being invited, if such an identity exists, subject to privacy rules.
- If the invited PoC subscriber has activated the auto-answer setting, he SHALL hear the speech from other PoC participants without any action by the invited PoC subscriber (e.g. without manually answering the PoC session invitation).
- As an option, if the invited PoC subscriber has activated the manual-answer setting, he SHALL be alerted of an incoming PoC session invitation. The invited PoC subscriber SHALL be able to accept, ignore or reject the invitation manually.

6.1.4.4 Joining a chat PoC group session

- A PoC subscriber SHALL be able to join a chat PoC group session (e.g. restricted or unrestricted chat group) depending on the access rules.
- It SHALL be possible for the PoC service provider to configure a maximum number of participants in a PoC chat group.
- The PoC service entity SHALL be able to reject the joining subscriber because of the following reasons:
    - The PoC subscriber is not a member of the restricted group.
    - The maximum number of participants has already joined the group session.
    - The requested group does not exist.

    In this case, the PoC service entity SHALL provide reject indication and a cause.
- The joining PoC subscriber SHALL be able to start communicating with other PoC participants in chat PoC group.
- A PoC subscriber SHALL NOT be forced to reveal his identity to other participants in an open PoC chat group.

6.1.5 Communication Phase

6.1.5.1 Floor Control requirements

Floor Control is the mechanism for the arbitration of the sequence of PoC participants to speak.

The following list SHALL be the least set of requirements on Floor Control:

- To indicate that a PoC participant requests to speak.
- To indicate permission to a PoC participant to speak in response to a request.

- To indicate to a PoC participant that a request to speak has been denied.
- To indicate by a PoC participant that he has finished speaking.
- To indicate to a PoC participant that his speaking has been forced-released.
- To indicate to all PoC participants that the granted PoC participant has finished speaking and floor is idle.
- To indicate to all PoC participants that the PoC participant is about to speak (i.e. a PoC participant has been granted the right-to-speak).

The implementation of floor request queuing is optional for both the PoC Service Enabler and the PoC Client in the terminal device. If supported, Floor Control MAY provide the following capabilities as described below:

- To indicate to a PoC participant that a request to speak has been queued.
- To permit a PoC participant who has requested the floor to obtain his or her position in the floor request queue.
- To allow a PoC participant who has requested the floor to obtain the identity and position of other PoC participants in the floor request queue.
- To permit more than one level of priority in access to the floor, e.g. a higher priority PoC participant MAY be allowed to pre-empt a lower priority PoC participant.
- To allow the requester to cancel the request.

Performance requirements related to floor control SHOULD consider the constraints imposed by the underlying signalling transport, with particular emphasis on those associated with over-the-air transport.

6.1.5.2 Joining a PoC session

A PoC subscriber SHALL be able to join an ongoing PoC group session, if the maximum number of participants is not exceeded.

Joining a PoC session applies to members of pre-arranged or restricted chat PoC groups. For unrestricted PoC ~~ad-hoc~~ chat group sessions, any PoC subscriber MAY join in. For PoC ad-hoc group sessions, joining is only possible if the PoC subscriber was a PoC participant in the ad-hoc group session before, left it and re-joins it.

6.1.5.3 PoC Session Participant information

PoC session participant information SHALL be able to be delivered two ways if requested, and is not restricted. The mode SHALL be selectable by the PoC participant, depending on whether he wants to:

a) Request information on who is currently participating in the PoC group session at this time.

b) Request continuous information on who is participating in the PoC group session. In this case, there is an indication when:

- a PoC participant leaves or is removed from the PoC session.
- a PoC participant joins or is added to the PoC session.

The PoC participant MAY also choose not to request any PoC session participant information.

6.1.5.4 Leaving of PoC session

The PoC participants SHALL be able to leave the PoC session at any time.

6.1.5.5 Removing a PoC participant from PoC session

The PoC service entity SHALL be able to remove a PoC participant from the PoC session.

6.1.5.6 Adding ~~a~~ PoC subscriber(s) to a PoC group session

A participant of the PoC session SHALL be able to add new subscriber(s) into the Pre-arranged or Ad-hoc group sessions only, subject to service provider policy. The inviting PoC subscriber and the PoC Host SHALL receive notification of the result of the invitation as per the invited PoC subscriber. The notification can be for example:

- An invited PoC subscriber accepted invitation,
- An invited PoC subscriber rejected invitation or
- An invited PoC subscriber was unavailable. Reception of "unavailable" condition notifications by the inviting PoC subscriber or PoC Host SHALL be subject to his Presence service subscription, if one exists, or to PoC service provider policy, as applicable. (see Chapter 6.2.4.4).

After the PoC session is accepted the newly added PoC participant SHALL receive the status of the floor.

The added participant MAY be notified with the identities of all current participants whose identities are not restricted.

Addition of a PoC subscriber SHALL not affect the ongoing communication.

The added subscribers Identity SHALL be included in the list of participants (subject to restriction policy), which is distributed to those session's participants who have requested the participant information updates, subject of privacy rules.

It SHALL be possible to add subscribers to a PoC group as long as the maximum number of PoC group participants is not exceeded. The maximum number of PoC participants MAY be set by the PoC service provider and MAY vary for each PoC group.

6.1.6 PoC session termination by Service Provider

A PoC session SHALL terminate depending on the PoC service provider policy.

If there are still PoC participants left in the PoC session that is terminated by the PoC service provider, those PoC participants SHALL be removed from the PoC session and no PoC participant SHALL be able to rejoin.

6.1.7 Security

Prior to any PoC service interactions (e.g. PoC administration & configuration, PoC sessions) the PoC service entity and the PoC subscriber SHALL be mutually authenticated.

The speech communication and signalling in PoC sessions SHALL be transported in a secure manner.

The PoC service entity SHOULD be able to log the information about any PoC interactions.

PoC service enabler SHALL ensure integrity of PoC signalling.

6.1.8 Charging

The PoC service entity SHALL be able to collect sufficient information needed for charging, both types of PoC subscribers, (prepaid and post-paid subscribers).

The PoC service entity SHALL support sufficient mechanisms to allow various forms of charging. Information of relevance SHOULD include but not be limited to, the following items.

For Subscription based Charging

- PoC Subscriber status relative to PoC subscription, i.e. PoC subscribed, PoC unsubscribed, PoC subscription suspended or temporarily barred (by the service provider).
- Identity of each PoC group in which the PoC subscriber participates (as configured by the service provider).
- Maximum Size of each PoC group (i.e. maximum number of participants who joined the session, regardless of having spoken or not) in which the PoC subscriber has participated within a defined period (as configured by the service provider).

For Support Traffic based Charging (in addition to that for Subscription based Charging):

- Duration of a session, with start and finish time stamps.
- Duration of speaking time in a session (i.e. total time periods for all talk bursts by a subscriber).
- Number of PoC participants, including their identities.
- Number of "ready-to-speak" request granted.
- Number of sessions initiated, i.e. successful attempts.
- Number of failed session attempts, with time stamps of failed attempts.
- Volume of data (e.g. voice packets, bytes).
- Type of PoC session.
- PoC service interactions (e.g. join a PoC group, leave a PoC group, administer PoC groups, etc).
- Separate Charging Data Records (CDR) generated for originator and terminator of each PoC session.
- CDRs for the underlying packet connectivity resource SHALL indicate that the connectivity session is being used for PoC.

Latency should be a time-based value captured as part of the CDR; this would allow service providers to define their own thresholds for unacceptable latency (e.g. for operational performance measurements).

The PoC service entity SHALL provide records for failed delivery of talk bursts..

During a PoC group session, talk bursts can be generated by various PoC participants, CDRs for traffic generated by each active PoC group participant individually SHALL be available.

6.1.8.1 Charging requirements for roaming subscribers

PoC is intended to be used at home, when roaming and across networks. It SHALL be possible for Services Providers to ascertain the usage of the PoC service entity by PoC subscribers who are roaming. CDRs SHALL be made available both for usage of data connections and usage of the PoC service entity for roaming situations.

6.1.8.2 Charging requirements for inter-provider accounting

It SHALL be possible for Service Providers to ascertain the usage of the PoC service entity by PoC subscribers to an interconnected network. CDRs SHALL be made available both for usage of data connections and usage of the PoC service entity for interconnect situations.

6.1.9 Administration and configuration

PoC subscribers SHALL have the following minimum set of capabilities for all PoC sessions,

- Generate and manage PoC subscriber defined pre-arranged PoC group lists to be utilised by the PoC service entity.
- Generate and mange PoC subscriber defined chat groups.
- Manage PoC session treatment methods including Presence features - if supported, auto accept vs. manual accept and rejection based on identity of inviting PoC subscribers.
- Generate and manage a PoC subscriber's own contact list.

PoC service providers SHALL have the following minimum set of capabilities,

- Generate and Manage the PoC subscriptions
- Generate and manage pre-arranged PoC group list, accept/reject lists, answer mode setting.
- Generate and mange PoC subscriber defined chat groups.

- PoC client administration and configuration SHOULD be possible using existing OMA Device Management Enablers.

6.1.9.1 Visibilities of PoC groups

The PoC group SHALL be visible to the PoC Host. When a PoC subscriber searches for available PoC groups, a PoC group MAY be found or not found according to the following pre-defined conditions:

- The PoC group is visible to PoC group members only, or
- The PoC group is visible to all PoC subscribers, or
- PoC group is visible to the PoC Host only.

6.1.9.2 Membership to more than one PoC group

A PoC subscriber MAY be a member of more than one PoC groups at the same time.

6.1.9.3 PoC Session termination policies

The PoC service provider SHALL be able to cause the termination of the PoC session due to one or more reasons in the following list:

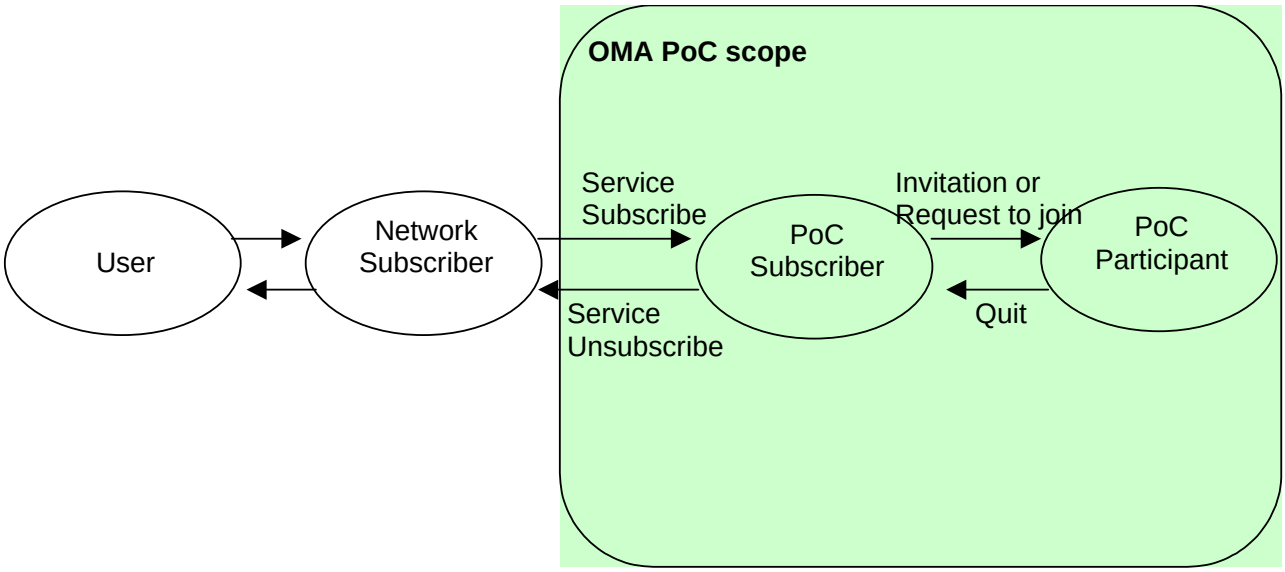
- Termination by PoC group administrator;
- Termination upon leaving of the last PoC participant in the PoC session;
- Termination upon leaving of the second last PoC participant in the PoC session;
- Termination upon leaving of the initiator of the PoC session;
- Termination after a pre-defined time period;
- Termination after a pre-defined time period without any talk-burst traffic in the PoC session..

A PoC Host MAY be able to trigger the termination of the PoC session as described below.

- Termination of session by date or date/time

6.1.9.4 State transition of the actors

- Before an individual user can use PoC service features, he SHALL have a network subscription with one or more (cellular) network operators.
- A subscriber MUST first subscribe to a PoC service offered by a PoC service provider. Once the subscription is completed, he becomes a PoC subscriber.
- Before a PoC subscriber can become a PoC Participant he SHALL either "be invited to the PoC session and accept the invitation" or "request to participate in the PoC session and have the request accepted. When he becomes a PoC participant, he is able to receive and transmit talk burst in the PoC session.



Note that the host is also an entity, but with the special attribute in the PoC participant. The host does not explicitly appear on the figure above.

6.1.9.5 PoC group and contact list management

The PoC subscriber uses a pre-arranged group as a means to establish PoC session where the PoC group attributes control the session type and who MAY participate in the PoC session. A pre-arranged group identity SHALL be used to address the group and initiate a PoC session

A PoC subscriber SHOULD have means to store the addresses of PoC subscribers and pre-arranged PoC groups in order to use that information to contact them using PoC features. For this purpose a PoC subscriber SHOULD have at least one contact list.

Following the creation of the contact list the PoC subscriber SHOULD be able to create PoC groups by associating individual entries on his contact list. Each individual contact can be associated with a single PoC group, several or all PoC groups.

A PoC subscriber SHOULD be able to create & manage PoC group lists from his handset or in a server in the service provider's intranet or the Internet.

It SHALL be possible to form PoC groups that include PoC subscribers from different PoC service providers.

The maximum number of members in a PoC group SHALL be configurable by the PoC service provider.

The maximum number of PoC groups that can be created and managed by a PoC subscriber SHALL be configurable by the PoC service provider.

PoC group list management SHOULD have safeguards (e.g. passwords) to prevent mis-use or unintended generation of traffic to the network.

PoC Group list combinations (Optional):

- Various PoC groups MAY be combined to create a new group.
- A PoC subscriber MAY have the capability to create and manage their own pre-arranged, ad-hoc or chat group lists, subject to service provider policy and accesss rules.
- A PoC subscriber may use groups to which they belong, defined by themselves or other PoC subscribers, to define new group combinations, subject to service provider policy and access rules.

6.1.9.6 PoC accept / reject list and answer mode management

On the reject list the PoC subscriber maintains the identities of PoC subscribers and/or PoC groups from whom the PoC subscriber does not wish to receive PoC session invitiations.

On the accept list, the PoC subscriber maintains the identities of PoC subscribers and/or PoC groups from whom the PoC subscriber agrees to receive PoC session invitations. In addition to the accept list, there is a single auto-answer mode flag which is applicable to PoC subscribers and/or PoC groups on the accept list. If the PoC subscriber sets the auto-answer mode flag ON, PoC session invitations from the accept list PoC subscribers and/or PoC groups SHALL be answered automatically. If the auto-answer mode flag is set to OFF, then the manual-answer mode is applied.

The PoC service entity SHALL maintain a list of sources per PoC subscriber that are to be rejected with no noticification to the PoC subscriber.

The PoC service entity SHALL reject PoC session invitations destined for a PoC subscriber when he has notificed the service provider that he wishes to reject all PoC session invitations from the specificed sources.

6.1.10 Usability

- The PoC service entity SHALL NOT prevent the PoC subscriber's operation of other OMA compatible services, for which the PoC subscriber is authorised and subscribed.
- The PoC service provider SHALL be able to decide the maximum number of PoC participants supported in a PoC group session.
- Administrative rights of an active PoC group session MAY be assigned to any of the participants by the session Host, or the PoC service provider.
- It SHALL be possible to queue more than one speaking request at the same time.
- The PoC application on the handset SHALL run concurrently with other service applications in the device. A specific mode of operation SHALL NOT be required of the handset, which could restrict other service operations.
- Concurrent service execution SHALL be supported by the PoC service enabler (e.g., take a telephony call, putting a PoC session on hold), but MAY be limited by capabilities of the supporting network or the ability of the handset device. The PoC service enabler SHALL NOT restrict concurrent service execution.

6.1.11 Privacy

A PoC service entity SHALL allow a PoC participant to hide his identity from all of the other PoC participants and SHOULD be able to hide his identity from some of the PoC participants. However, a PoC group administrator SHOULD NOT be compelled to accept unidentified participants into a PoC session.

A PoC participant SHALL be able to select the identity that is displayed to the other PoC participants, which MAY be in the nickname form, URI form or MSISDN form.

The PoC service entity SHALL NOT disclose PoC subscribers' personal data, e.g. identity or subscribed-to PoC groups, to any unwanted parties, in order to prevent undesired PoC session invitations.

The PoC service entity SHALL provide secure storage for PoC subscribers' personal data, e.g. identity or subscribed-to groups.

Privacy requirements SHALL be compliant with requirements stated in [Privacy].

6.1.12 Lawful Intercept

The PoC service enabler SHALL support capabilities to allow Lawful Interception.

6.1.13 Legacy Handset Support

The PoC Service enabler features are only accessible to PoC subscribers, subject to the scope of his PoC service subscription, and his terminal device capabilities.

If special means and/or updates of the PoC subsecriber's handset are necessary in order to access any part of the PoC service enabler, it SHOULD be possible for a PoC subscriber to "update" his mobile in an easy way (e.g. over-the-air download).

6.1.14 Service Provisioning by Service provider

Where device management is supported by the PoC service entity and the PoC subscriber's terminal and client, it SHALL be possible for the PoC service provider to set up and update PoC comunication feature configuration remotely in the terminal device. This SHOULD include:

- Setting up of the PoC key(s) and any icons and indications required on the terminal device, as applicable.

- Causing a new contact list or update of an existing contact list to be remotely installed on a PoC subscriber's client.

- Causing Accept/Reject lists or update of an existing accept/reject list to be remotely installed on a PoC subscriber's client.

It SHALL be possible for the PoC service provider to provide means (e.g. a user-interface from the PoC subscriber's terminal or via a web page) for the PoC subscriber to configure and update his PoC settings (e.g. manage group lists or accept/reject lists).

6.1.15 ~~6.1.16~~ Support of PoC Usage in Enterprise/Corporate Environment

The following requirements applicable to PoC usage in enterprise/corporate environment are in addition to other requirements covered throughout Chapter 6:

- The PoC Service Entity SHALL be able to interact with a corporate PoC systerm.
- When interacting with a corporate environment, the PoC service entity SHOULD ensure that private addresses used within the corporate environment are not exposed, shared or broadcast to PoC subscribers outside of the corporation.

6.2 Operational Requirements

6.2.1 High Level Requirements

- PoC subscriber SHALL be able to request the PoC service provider to create a PoC group on his behalf.
- PoC subscriber MAY download a list of chat PoC groups that he can join.
- PoC service provider SHALL be able to create a PoC group according to the request of a PoC subscriber.
- Service Provider SHOULD be able to advertise the PoC group information (e.g., PoC group identity, PoC group administrator of the PoC group) to all the PoC group members.
- PoC host SHOULD be able to advertise the PoC group (e.g. group identity) to all group members.
- The PoC host SHOULD also be able to allow any subscriber to advertise the unrestricted PoC group to any subscriber.
- PoC service provider MAY grant administrative rights to a PoC subscriber.
- A PoC subscriber MAY join a PoC group by sending the request to the PoC Host of the PoC group.
- A PoC Host SHALL be able to remove a PoC group member from the PoC group.
- A PoC Host MAY grant, or reject, requests from PoC subscribers to join the PoC group.
- A PoC service entity MAY be able to queue the request to talk.
- A PoC participant SHALL be able to cancel a request to talk.

- A PoC participant SHALL be able to receive notification of incoming requests for other services (e.g. an incoming simple voice call) while in a PoC session.
- A PoC participant SHALL be able to switch between listening mode and "not ready to listen" mode.

6.2.2 Requirements on identity

When a PoC subscriber receives the incoming PoC session invitation, he SHALL also receive the identity of the inviting PoC subscriber, in the form of user identity and, if provided, the display name. If the PoC subscriber's identity is restricted, it SHALL NOT be provided in this case. The display name MAY be provided either by the inviting PoC subscriber or by the PoC service entity. The PoC service entity MAY replace display name provided by the PoC subscriber. The PoC group identity SHALL also be given to the invited PoC subscriber.

The identity of the PoC participant who has been granted the floor, SHALL be distributed to all other PoC participants in the PoC session. If the PoC subscriber's identity is restricted, it SHALL NOT be provided in this case. The PoC participant with the grant floor SHALL be identified (when permitted) with his PoC subscriber identity and/or display name depending on the his setting.

Each PoC participant SHALL be identified (when permitted) by an alphanumeric indication (e.g. MSISDN or SIP URI). Additionally, he SHALL be able to use his display name during his participation in the PoC session.

Each PoC group SHALL have a unique alphanumeric identifier (e.g. SIP URI) and MAY have a screen name.

The PoC service entity SHOULD be able to support identifiers that use various alphabets (e.g. Arabic, Cyrillic, and Chinese).

6.2.3 Contact list

Each PoC subscriber SHOULD be able to create at least one list of other PoC PoC subscribers and PoC groups which MAY easily be used to address the PoC subscribers or the PoC groups to whom he would like to speak.

In order to recover from loss or to manage change of the PoC client, it SHOULD be possible to store the backup copy of a contact list off the client.

To support the requirements for contact list, capabilities common to other OMA service enablers SHALL be leveraged, where possible and appropriate.

To provide functionality to manage PoC group session participation history:

- The PoC service entity SHOULD be able to provide PoC subscriber off-line access to session history information based on relevant information collected for charging purposes (Ref: Chapter 6.1.8 Charging)
- Examples of PoC session histroy available may include: group sessions participated, time stamps & durations, identities of participants.

6.2.4 Presence Features

A PoC subscriber MAY have a set of Presence settings available to be used and customized on his behalf. These features allow the PoC subscriber to express his Presence status. The PoC subscriber SHALL be able to manipulate his presence settings in accordance with applicable and appropriate Presence Service standards.

Additionally, technical connection conditions may apply but are not considered herein (e.g. a PoC subscriber may be out of telecommunications coverage).

The Presence features considered herein are categorised with respect to their applicability to PoC subscriber interactions as follows. This PoC service enabler SHALL not prevent operations of other Presence features based on applicable and appropriate Presence Standards when they are used in combination with PoC.

- Reachable: The PoC subscriber is registered for PoC service and not engaged in any activity that prevents acceptance of a PoC session request.
- Busy: The PoC subscriber is registered and is engaged in another activity that may prevent acceptance of a PoC session request.
- Do Not Disturb: The PoC subscriber is registered but does not wish to accept PoC sessions at this time.
- Unavailable: The PoC subscriber is registered but temporarily unable to participate in PoC sessions at this time (e.g. out to lunch, or some other user defined conditions).
- Offline: The PoC subscriber is not registered for PoC service at this time.

A PoC subscriber that uses one or more of the Presence features, SHALL be able to interact with the PoC service as defined in the following subsections:

6.2.4.1 Reachable

If a PoC subscriber is invited to join a PoC session and is reachable for incoming PoC sessions, the PoC service enabler SHALL invite the subscriber to join the session initiated by the inviting subscriber.

If the invitation is accepted, the Presence status of the invited PoC subscriber SHALL be changed to “Busy” and the invited subscriber SHALL be able to participate in the on-going PoC session.

If the invitation is not accepted, a missed PoC session indication MAY be presented by the invited subscriber’s terminal.

6.2.4.2 Busy

If a PoC subscriber is invited to join a PoC session and is busy for incoming PoC sessions, the PoC service enabler MAY invite the subscriber to join the session initiated by the inviting subscriber.

If the invitation is accepted, the Presence status of the invited PoC subscriber stays “Busy”.

If the invitation is not accepted, the inviting subscriber SHALL be notified that the invited subscriber was busy. The invited subscriber SHALL not participate in the on-going PoC session

If the PoC subscriber ceases to be engaged in any PoC session, the Presence status is changed to “Reachable”.

6.2.4.3 Do-not-disturb

In case a PoC subscriber does not want to join a PoC session, the Poc subscriber SHALL be able to activate a setting to discard all incoming talk sessions. This action SHALL have no effect on the PoC subscriber’s ability to send or receive talk bursts in PoC sessions, which he is participating in at the time it is performed.

If a PoC subscriber tries to invite a PoC subscriber whose Do-not-disturb feature is active, the inviting PoC subscriber SHALL receive the busy indication.

Do-not-disturb feature SHALL apply to incoming talk sessions but SHALL not apply to instant personal alerts.

6.2.4.4 Unavailabale

A PoC subscriber SHALL be able to change his Presence status to unavailabale. This action SHALL have no effect on the PoC subscriber’s ability to send or receive talk bursts in PoC sessions, in which he is participating at the time he changes to “unavailable” condition. The indication of “unavailable” SHOULD be delivered to other participants in his current PoC session(s) who are entitled to receive them. Whether or not a PoC participant is entitled to receive “unavailable” condition indications is subject to his Presence service subscription profile, if one exists, which SHALL take precedence over the PoC service enabler notifications behaviour. “Unavailable” condition indications to PoC participants without any Presence service subscriptions SHALL be subject to PoC service provider policy.~~.~~ A detailed reason for the PoC subscriber’s “unavailable” condition MAY accompany the “unavailable” indications ~~be notified~~ to the other participants in his current PoC session(s), as applicable.

If a PoC subscriber is invited to join a PoC session and his Presence status is "unavailabale" for incoming PoC session invitations, the invitation is rejected. "Unavailable" condition indications and a detailed reason MAY be provided to the inviting PoC subscriber, subject to the qualificaations as above. ~~, indicating that the PoC subscriber is unavailable. A detailed reason for his "unavailable" Presence condition MAY accompany the response indication.~~

A PoC subscriber MAY be able to receive instant personal alerts when his Presence status is "unavailable".

6.2.4.5 Offline

If a PoC subscriber is invited to join a PoC session, and the PoC service enabler determines that a PoC subscriber is offline, the PoC service enabler SHALL reject the invitation on behalf of the invited PoC subscriber, indicating that the PoC subscriber is offline.

6.2.5 Deactivate incoming talk-bursts

A PoC subscriber SHALL be able to discard all incoming talk bursts of the ongoing PoC sessions.

6.2.6 Requirements on Service mobility

PoC subscriber SHALL be able to use the PoC service features with other PoC subscribers of the same PoC service provider.

PoC subscriber MAY be able to use the PoC service when roaming to another service provider's network.

6.2.7 Performance requirements

The first step for the service providers to offer a service with a satisfactory Quality of Experience (QoE) is to identify the underlying factors that impact QoE. QoE itself is highly subjective and very difficult to quantify and validate; whereas the factors impacting on QoE can be objectively measured and validated against pre-determined target values. For Push to Talk service enabler, the following service characteristics are identified as the factors impacting QoE:

QoE1, Right-to-speak (RTS) response times during PoC session establishment: The duration between the times a PoC subscriber initates a PoC session and when he receives a "right-to-speak" indication.

QoE2, Start-to-Speak (StS) response time after PoC session establishment: In a PoC session (1-to-1 or 1-to-many), the duration between the times a PoC participant initiates a floor request (i.e. permission to talk) and when he receives a "Start-to-speak" indication (or queuing indication or denial).

QoE3, End-to-end channel delay: The duration between the times one PoC participant, who has the right to speak, starts to speak and when another PoC participant starts to hear the speech (in case of 1-to-many sessions, each of the PoC participant's delay to another participant in the session must be measured).

QoE4, Voice quality: The following characteristics of the session directly impact the quality of the PoC speech:

- End-to-end channel delay
- Transmit and receive levels (loss plan as per telephony)
- Codec characteristics
- RF channel conditions
- Echo does not impact voice quality in PoC because of an absence of echo path in half-duplex operation.

These requirements in the following subsections in 6.2.7 refer to the case when a PoC session has been established among the PoC participants and is ready for voice communication.

6.2.7.1 Right-to-speak response times during PoC session establishment, QoE1

During PoC session establishment, the inviting subscriber receives 'right-to-speak' (RTS) indication after certain time depending on the answer mode setting of the invited PoC subscriber. If automatic answer is used, the right-to-speak indication can be given to the inviting PoC subscriber before the invited PoC subscriber is reached. If manual answer mode

is used, the invited PoC subscriber has to accept the PoC session invitation before the 'right-to-speak' indication is given to the inviting PoC subscriber. Therefore, the following characteristics requirements are applicable:

- The duration between the times the inviting PoC subscriber initiates the PoC session and when he receives a "right-to-speak" indication SHOULD typically be less than [2.0] seconds, in case PoC service entity provides early "right-to-speak" indication and the invited PoC subscriber is on automatic answer mode.
- If the invited PoC subscriber answers manually, then the inviting PoC subscriber SHOULD typically receive the 'right-to-speak' indication in less than [1.6] seconds after the invited PoC subscriber manually accepts the PoC session invitation.

6.2.7.2 Start-to-Speak response time in an established PoC session, QoE2

Start-to-speak (StS) refers to the response period between the times the PoC participant requests talk permission to when he receives permission to start speaking in an established PoC session.

When a PoC participant makes a request to talk in the PoC session and his request is not queued, the StS time SHOULD typically be less than [1.6] seconds. If the PoC participant's request to talk is queued due to other PoC participants speaking or having already requested to speak, he SHOULD typically receive an indication within [1.6] seconds that his request has been queued.

If the PoC participant's request is rejected for any reason, he SHOULD typically receive an indication within [1.6] seconds that his request has been rejected.

6.2.7.3 End-to-end channel delay, QoE3

The voice delay time (duration between when voice is spoken by a sending PoC participant until it is heard by the invitedPoC participant) SHOULD typically be no more than 1.6 seconds during the PoC session. This channel delay is a general requirement for the talk-bursts, however for the first talk-burst in a PoC session set-up the voice delay SHOULD typically be no more than 4 seconds, in case early indication is given.

6.2.7.4 Voice quality requirements, QoE4

The PoC session voice quality SHOULD typcially meet the following limit: `MOS >= 3 at BER <= 2%.`

6.2.7.5 Turnaround time (TaT)

TaT refers to the duration when a PoC participant stops talking and releases the floor to until he can hear another PoC participant begining to speak. TaT comprises of system delay times plus the response/reaction time from another PoC participant. To allow a fluent communication between PoC participants, TaT response time SHALL be acceptably short. In case another PoC participant replies immediately (i.e. within 1-2 s), the TaT SHOULD typically be no longer than 4 seconds.

6.2.8 Duration of speaking

The PoC service provider SHALL be able to configure the maximum duration of speaking by PoC participants in a PoC session. If a maximum speaking duration is configured and a PoC participant speaking reaches the time limit, the PoC participant's right-to-speak SHALL be automatically revoked.

In the case of PoC ad-hoc groups, the PoC Host MAY preset a maximum speaking duration.

If a maximum speaking duration is in effect, the speaking PoC participant SHALL be informed (e.g. by means of sound, flashing light or graphics) when the maximum speaking duration limit has been reached.

6.2.9 Multiple Group operation

Multiple group operation is an optional feature, the following requirements SHALL be met when this feature is implemented by the PoC service entity and PoC client. Also, service provider policy MAY apply before the PoC subscriber is authorised to use this feature:

- PoC subscriber SHALL be able to participate in more than one PoC group session at the same time.
- One of the PoC groups MAY be a primary PoC group and the rest secondary PoC groups.
- Primary PoC group communications SHALL have priority over secondary PoC group communication as defined in the following subsections.

6.2.9.1 Multiple group operation: no primary groups

- PoC subscriber SHALL be able to monitor multiple PoC group sessions.
- PoC subscriber SHALL start to hear traffic from any group where communication starts first.
- The PoC subscriber SHALL get an identification of the group session(s) in which traffic is being received.
- When the PoC subscriber wants to talk or listen into a group, he SHALL be able to select the group to which he wants to talk. Once a group has been selected, the PoC subscriber SHALL continue to hear traffic from that group until the discussion ends, or when he takes another action (e.g. deactivates talk-bursts or selects another group session for talking/listening). While talking or listening to the selected group session, he SHALL be able to continue monitoring the other group sessions.
- If there is traffic in more than one group session at the same time, there SHOULD be a means to filter the traffic so that the PoC subscriber only hears a single conversation at a time. Traffic from the selected group session SHALL have higher priority over traffic from the other groups being monitored. The affected participants whose talk-bursts are being filtered SHOULD not be notified.
- When the PoC subscriber is talking, his transmission SHOULD not be interrupted because of traffic arriving in another group session, i.e. transmission SHOULD have higher priority than reception.

6.2.9.2 Multiple group operation: one primary group and secondary group(s)

In case the PoC subscriber has a primary group and secondary group(s), the following requirements are applicable:

~~Secondary Group traffic behaviours:~~

- If there is no traffic in the primary group, the PoC subscriber SHALL receive traffic from secondary groups according to all the requirements described in Chapter 6.2.9.1.
- If there is traffic in the primary group, the following conditions apply:
    - Traffic in the primary group SHALL always have higher priority than traffic in any secondary group. As soon as speech from the primary group arrives, it SHALL be heard immediately, even if the PoC subscriber was receiving speech in a secondary group.
    - As long as there is traffic in the primary group, the PoC subscriber SHALL continue hearing it, until the discussion has ended, or when he takes another action (e.g. deactivates talk-bursts or selects another group session for talking/listening). While talking or listening to the primary group, he SHALL be able to continue monitoring the other group sessions.
- When the user wants to talk or listen into a group, it SHALL be possible to have the primary group as the default selected target.
- The user MAY be able to change his/her primary group.

~~Primary Group traffic behaviours:~~

- ~~Traffic in the primary group always has higher priority than traffic in any secondary groups. As soon as speech from the primary group arrives it SHALL be heard immediately, even if the PoC subscriber was receiving speech in a secondary group.~~

~~When the PoC subscriber wants to talk or listen into a group, it SHALL be possible to have the primary group as the default selected target.~~

~~The PoC subscriber MAY be able to change his primary group.~~

6.2.10 Separate 1-to-1 PoC session while having a PoC session

Separate 1-to-1 PoC session during other PoC sessions is an optional feature, the following requirements SHALL be met when this feature is implemented by the PoC service entity and PoC client. Also, service provider policy MAY apply before the PoC subscriber is authorised to use this feature:

- A PoC subscriber who participates in a PoC session (1-to-1 or 1-to-many) SHALL be able to initiate and conduct a separate 1-to-1 PoC session with any other PoC subscriber. In the case where the *invited* subscriber is in a 1-to-many session, the second session MAY be eastablished to a participant of the same or differernt group.
- A PoC subscriber of an ongoing PoC session (1-to-1 or 1-to-many) SHALL be able to receive separate 1-to-1 PoC session communications from any other PoC subscriber. In the case where the *inviting* subscriber is in a 1-to-many session, the second session MAY be received from a participant of the same or differernt group.
- The separate 1-to-1 PoC session by a PoC group participant SHALL NOT affect in any way the existing communications between other PoC group participants.
- The 1-to-1 PoC participants SHALL NOT receive speech from the previous session communication while sending or receiving speech from a separate 1-to-1 PoC PoC session.
- An implementation MAY prevent the 1-to-1 PoC participants from hearing the previous session communications during the entire 1-to-1 PoC session.
- The first PoC session SHALL be suspended (i.e. the PoC subscriber SHALL NOT be able to hear/transmit any talk bursts from/to the first PoC session) while the PoC subscriber is engaged in the second PoC session, and SHALL be automatically resumed when the second PoC session is terminated, provided that the other PoC session has not been terminated in the meantime.
- The PoC group participant information MAY be updated, when the first session is suspended and again when it is resumed.
- PoC participant SHALL be able to receive 1-to-1 PoC PoC sessions while taking part in a PoC session.
- PoC participant SHALL be able to control the automatic acceptance of 1-to-1 PoC sessions while in a PoC session.

6.2.11 Manual Answer Override

Manual Answer Override is an optional feature, the following requirements SHALL be met when this feature is implemented by the PoC service entity and PoC client. Also, service provider policy MAY apply before the PoC subscriber is authorised to use this feature:

The manual answer override feature supports a means for a inviting PoC subscriber to override a invited PoC subscribers manual answer settings. By using this feature, an authorised PoC Subscriber MAY be able to request the overriding of another PoC subscriber's manual answer preference, i.e. the inviting PoC subscriber's speech is immediately audible at the invited PoC subscriber's terminal without any action by the invited PoC subscriber.

A PoC Service enabler that supports this feature SHALL:

- Provide means to ensure that any PoC subscriber using this feature has previously been authorised to do so on be half of the invited PoC subscriber.
- Authorisation to use the manual override service SHALL be verified each time the service is invoked.
- If use of the feature is authorised then the Inviting subscsriber's speech SHALL be immediately audible at the invited PoC subscribers terminal, except in the following circumstances:
    - The network operator has blocked access.
    - The invited PoC subscriber is not connected.

  - In emergency situations, the service provider SHALL be able to administratively allow one of more PoC subscribers to the override the PoC sessions.

- If use of the feature is authorised but the initiation of the session cannot be completed for any of the reasons listed above, the inviting PoC subscriber SHALL be notified accordingly, possibly with the reason for failure.
- If use of the feature is not authorised, the inviting PoC subscriber SHALL be notified accordingly.
- A PoC subscriber who is authorised to use this feature MAY be able to select it on a session-by-session basis.

6.3 Overall System Requirements

The general network attributes & behaviours specified in this chapter are supported in the PoC architecture design:

6.3.1 Open Interfaces

Interfaces to the PoC service entities SHALL make use of open standards. Specifically, it SHALL be possible to make use of relevant network interface standards from 3GPP and 3GPP2.

6.3.2 Interoperability between PoC Service Providers & Service Entities

- It SHALL be possible for PoC participants to seamlessly interact with each other within a PoC session (i.e. 1-to-1 and group sessions) regardless of their PoC service providers.
- PoC subscribers SHALL be able to seamlessly utilise PoC features involving other PoC subscribers regardless of their PoC service provider. For example, a PoC group session served by one service provider's PoC service entity MAY include PoC participants who are subscribers of another PoC service provider.
- An appropriate interface SHOULD be provided between the PoC service entities of different PoC service providers that are interconnected to allow the service providers to manage the set-up, monitoring, maintenance and termination of PoC sessions and PoC groups regardless of the PoC participant's PoC service provider.

6.3.3 Inter-working with fixed connections

PoC service entity MAY inter-work with the fixed IP network Instant Messaging services with enhanced streaming audio funtionality. This may enable a substantial extension to PoC coverage for both PoC and IM users. However, PoC inter-working with traditional voice services (whether implemented on circuit switched or packet seitched technology is out-of-scope). Protocols to support such inter-working are not part of the PoC features.

6.3.4 Cross Services Interoperability

PoC service entity MAY inter-work with other standalone and/or integrated messaging services, but is currently out-of-scope. For example, protocols to support such inter-working are not part of the PoC feature, although messaging services may create such inter-working by adding the necessary PoC protocols and interfaces.

6.3.5 Interaction with Circuit Switched Call Mode residing on the terminal

In the near term, it is highly probable that a PoC service will be added to a mobile terminal capable of Circuit Switched (CS) voice communications. In this case, both the PoC service and CS voice service modes are collocated in the terminal, but inter-working between these services is not supported. However, to maintain usability of these services when collocated on a terminal, some means for the user to change between these service modes SHALL be possible, which may involve both the PoC service entity and/or the client.

- If a CS call is ongoing, any incoming PoC session SHOULD be indicated.
- If a PoC session is ongoing, any incoming CS call SHOULD initiate alerting.
- The PoC subscriber SHOULD be able to switch between CS and PoC sessions if needed maintaining session context for the non-active call/session.

6.3.6 Roaming Service Support

- A PoC subscriber while roaming SHALL be able to access the PoC service (e.g. initiate or respond to a PoC session request) either as an individual or a PoC group session participant.
- The visited network SHALL be "transparent" and provide unrestricted PoC subscriber access to his home network PoC service. The PoC subscriber SHOULD be able to access all the features of his normal home based PoC service.
- It SHALL be possible to limit some PoC capabilities, while a PoC subscriber is roaming, by the PoC subscriber's preferences or through PoC service provider provisioning (e.g. 1-to-separate PoC session or multiple group operation may be restricted).

6.3.7 Presence Feature Settings

If Presence features are supported by the PoC service entity, a PoC subscriber SHALL be able to indicate his Presence conditions (e.g. Do-Not-Disturb or Unavailable). Consistent with Chapter 6.3.3, interworking between Presence services (as part of PoC service features) and traditional vocie servcies is out-of-scope. Protocols to support such inter-working are not part of the PoC features.

6.4 System Elements

This section contains high-level requirements on the basic functionality required by each of the identified system elements supporting PoC. The PoC client interacts with the PoC application service infrastructure to establish PoC sessions. The PoC application service infrastructure SHALL coordinate a reliable half-duplex PoC session initiated by the PoC session originator and other PoC participant(s).

Note that the requirements in this section do not assume any PoC architecture in particular. The intention is to capture requirements on the functionality related to the PoC client and service infrastructure. Actual system elements are not specified.

6.4.1 User Equipment

- The PoC enabled user equipment (UE) SHALL support functions to set up the PoC session, and request the floor and release the floor.
- The PoC UE SHALL support a function to manually exit the PoC session.
- PoC UE SHALL support functions (e.g. tones) to announce an incoming PoC session, and to properly arbitrate the use of the half duplex PoC session (e.g. talk-proceed, floor open, floor rejected).

6.4.2 PoC Client

The PoC Client SHALL be able to:

- Allow PoC session initiation, (e.g. codec negotiation), participation (e.g., talk or listen), and termination.
- Perform registration with the PoC Application Service Infrastructure.
- Participate in authentication with the PoC Application Service Infrastructure.
- Provide access to different PoC group lists in the PoC Application Service Infrastructure (e.g. contact lists, group lists).
- Generate talk bursts for transmission when the PoC function is invoked and reproduce received talk bursts when the PoC function is not invoked.
- Support floor control procedures (e.g. make requests and respond to commands).

- Incorporate PoC configuration data downloaded by the PoC Application Service Infrastructure (e.g. over-the-air activation).

The PoC Client MAY:

- Provide access to PoC subcriber for managing PoC group lists.
- Provide access to PoC service entity on Presence conditions of the PoC subscriber.

6.4.3 PoC Application Service Infrastructure

The PoC Application Service Infrastructure SHALL be able to:

- Support session initiation requests from PoC Clients.
- Allow participation in and termination of PoC sessions.
- Service registration requests from PoC Clients.
- Participate in authentication with PoC Clients.
- Negotiate the capabilities of the PoC client to be used in the PoC session.
- Allow PoC Clients to access different PoC group lists (e.g. contact lists or group lists).
- Forward talk bursts from the speaker towards designated PoC Clients.
- Support floor control.
- Dynamically add and remove PoC group members during an active PoC session.
- Generate CDRs.
- Control access to the PoC session.
- Support Lawful Interception.
- Perform authorization of PoC clients.
- Provision PoC service parameters (and user profiles, etc.) for PoC subscribers; and
- Store and access PoC group membership information.

The PoC Application Service Infrastructure MAY be able to:

- Allow the PoC Client to manage lists.
- Provide a means to inform PoC subscribers of the presence and availability of group members; and
- Interact with other service enabling platforms.

6.4.4 Network interfaces

6.4.4.1 Interface Between PoC Client and PoC Application Service Infrastructure

Interfaces between the PoC Client and PoC Application Service Infrastructure MUST:

- Be supported by Mobile Packet Switched Data Networks (e.g. those defined by 3GPP and 3GPP2).
- Support secure transportation of PoC talk-bursts.
- Support secure signaling and communication connections.
- Support the requirements of performance related signaling protocols (e.g. floor control).

- Support functions related to PoC session initiation, registration, participation and termination.
- Support authentication of PoC Clients/PoC Application Service Infrastructure.
- Support authorization of PoC Clients.
- Support an administration interface to allow PoC subscribers to update PoC group lists and contacts lists.
- Support secure provisioning of PoC service parameters and features.

6.4.4.2 Interface Between PoC Application Service Infrastructure and Presence Enabler

An interface between the PoC application service infrastructure and a Presence service enabler MAY be provided to inform PoC participants of the presence and availability of PoC group members.

To support the requirements for Presence features, capabilities common to other OMA service enablers SHALL be leveraged, where possible and appropriate to provide a unified experience to the PoC subscriber.

6.4.4.3 Interface Between PoC Application Service Infrastructure and OAM&P

The PoC application service infrastructure SHOULD be able to utilize standards based interface capabilities that allow integration with the service provider's Operations, Administraion, Management and Provisioning (OAM&P) systems.

6.4.4.4 Interface Between PoC Application Service Infrastructures in Different Service Provider Domains

The PoC application service infrastructure SHALL be able to connect to PoC application service infrastructures in different service provider domains.

6.4.4.5 Interface Between PoC Application Service Infrastructure and Law Enforcement Agency

Access to intercepted PoC communications SHALL be possible, as required by law enforcement agencies.

6.4.4.6 Interface Between PoC Application Service Infrastructure and PoC Group/List Management

To support the requirements for PoC Group/List Management, capabilities common to other OMA service enablers SHALL be leveraged, where possible and appropriate to provide a unified experience to the PoC subscriber.

Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-RD_PoC-V1_0-20031013-D	13 Oct 2003	Apply new approved templet version to the requirements document. Same content as in the version from 8th of October 2003.
OMA-RD_PoC-V1_0-20031015-D	15 Oct 2003	Chapter 6.1.2.1 on Floor Control ; OMA-REQ-2003-0539R02 Chapter 6.1.6.8 on globa settings; OMA-REQ-2003-0667 Chapter 6.2.5 on bar incoming talk burst; common agreement
OMA-RD_PoC-V1_0-20031029-D	29 Oct 2003	"many chapters"
OMA-RD_PoC-V1_0-20031102-D	02 Nov 2003	Chapter 6.1.4 on Instant Personal Alert, OMA-2003-0668R03 Chapter 6.2.1 on incoming requests, OMA-2003-0684R01 Chapter 6.2.4 on Presence features, OMA-REQ-2003-0631R02 Chapter 6.2.7 on voice delay, OMA-2003-0693 Chapter 6.2.11 on Whisper; OMA-REQ-2003-0700 Chapter 6.2.13 on Manual Answer Override, OMA-REQ-2003-0698R02 "many chapters", OMA-REQ-2003-0697R01
OMA-RD_PoC-V1_0-20031110-D	10 Nov 2003	Chapter 5.10 (new use case) and 6.1 additional high level requirenments, OMA-2003-066R02. Chapter 3, 4.1, 6.1. and 6.2.: clarifications of editors notes as proposed by the editor. Chapter 6.1.1 and 6.1.7.7 editorial changes proposed by the editor.
OMA-RD_PoC-V1_0-20031111-D	11 Nov 2003	Outcome of the REQ POC face-2-face meeting
OMA-RD_PoC-V1_0-20031124-D	24 Nov 2003	Based on changes proposed in input contribution OMA-REQ-2003-0798-PoC
OMA-RD_PoC-V1_0-20031128-D	28 Nov 2003	Chapter 6.1.3. Instant Personal Alert, OMA-REQ-2003-0800 Chapter 6.1.2, 6.1.5.2, 6.1.5.3, OMA-REQ-2003-0801 Chapter 6.2.7.3. e-2-e delay, OMA-REQ-2003-0802 Plus changes agreed at the OMA REQ PoC Conf call, 2003-11-24 (chapter 4.1 and 6.1.8) Remove 6.4.1.1 and corrections in the numbering in chapter 6.4.4
OMA-RD_PoC-V1_0-20031203-D	03 Dec 2003	OMA-REQ-2003-0710R03, use case only OMA-REQ-2003-0810, OMA-REQ-2003-0812, OMA-REQ-2003-0813, OMA-REQ-2003-0814, OMA-REQ-2003-0815, most but not everything OMA-REQ-2003-0816, OMA-REQ-2003-0820R01
OMA-RD_PoC-V1_0-20031204-D	03 Dec 2003	Clean version of OMA-RD_PoC-V1_0-20031203-D
OMA-RD_PoC-V1_0-20040125-D	25 Jan 2004~~3~~	General update of OMA-RD_PoC-V1_0-20031204-D based on comments resolution as documented in the RD Review Report OMA-REQ-2003-0840R05 (25 Jan 2004). Porposed texts and modifications from the following input contributions were discussed, agreed and edited for inclusion as part of the RDRR resolution: OMA-REQ-2003-0848 OMA-REQ-2003-0849 OMA-REQ-2003-0850 OMA-REQ-2003-0852 OMA-REQ-2003-0854 R02 OMA-REQ-2003-0855 OMA-REQ-2003-0856 OMA-REQ-2003-0861 OMA-REQ-2003-0870

Reference	Date	Description
		OMA-REQ-2004-0019 OMA-REQ-2004-0020 OMA-REQ-2004-0025 OMA-REQ-2004-0029 OMA-REQ-2004-0051 OMA-REQ-2004-0053R02 OMA-REQ-2004-0054R02 OMA-REQ-2004-0056 OMA-REQ-2004-0062 OMA-REQ-2004-0071 Appendix re Undeveloped Use Cases removed.
OMA-RD_PoC-V1_0-200401230-D	25 Jan 2004~~3~~	Incorporation of review comments: RDRR #016 RDRR #038 RDRR #095 RDRR #149 RDRR #173 Constency changes for unrestricted and restricted group terminology, Constancy changes for PoC administrator and group administrator.
OMA-RD_PoC-V1_0-200401231-D	31 Jan 2004	Chaper 6.2.9.2 re-edited as per agreed changes in RDRR version 6 (dated 29 Jan 2004) Comment #190. Chapter 6.1.5.2 corrected to reflect RDRR Comment #106. OMA-REQ-2004-0111: Chapter 6.2.4.4 qualifications for "Unavailable" presence indications added. OMA-REQ-2004-0112: Chapter 6.1.2 Attributes for Ad-hoc groups, 3rd bullet deleted. Chapter 6.1.5.2 clarified as for unrestricted chat group sessions. Chapter 6.1.5.6 was clarified as applicable to pre-arranged and ad-hoc group sessoins only. "Unavailable" indications qualifications added

A.2 Draft/Candidate Version <current version> History

<<This section is available in pre-approved versions – it should be removed in the actual approved versions>>

Document Identifier	Date	Sections	Description

Appendix B – Overview of Pre-arranged, Ad-hoc and Chat PoC Gruoups (Informative)

The table below provides a concise overview of the differences between PoC Group (either pre-arranged or as-hoc) sessions and Chat PoC Group session:

Characteristic	PoC Group Session	Chat PoC Group Session
Setup	Setup is initiated by a PoC group member. The group of PoC subscribers identified by the initiating PoC subscriber may be a pre-arranged group, or an ad hoc group.	Setup is initiated by a PoC group member or the service provider. The initiating PoC subscriber may specify that the Chat PoC Group Chat is limited to members of a specific administrated group or groups. The initiating PoC subscriber may also specify that the Chat PoC Group is open to all PoC subscribers.
Session Name	The PoC System will apply the name of the group to the new group session, unless one is supplied by the initiating PoC subscriber.	The initiating PoC subscriber must specify a name for the Chat PoC Group.
Alerts to PoC group members	Alerts are automatically sent to all PoC group members except those having successfully applied a Do-Not-Disturb presence status	Alerts are not automatically sent. PoC subscribers must query the list of available Chat PoC Groups and manually select to join the Chat Group. PoC subscribers may notify other PoC subscribers of available Chat PoC Groups.
Floor Control	Standard PoC floor control procedures apply, i.e., half-duplex walkie-talkie style communication.	Standard PoC floor control procedures apply, i.e., half-duplex walkie-talkie style communication.
Termination	The Group session is terminated explicitly by one of the PoC participants who has PoC Host status for the group session. It may also be terminated implicitly as the second last participant leaves the PoC session. Finally, it may be administratively terminated by a PoC group administrator or by the service provider.	A Chat PoC Group may be administratively terminated by a PoC group administrator or by the service provider. A Chat PoC Group may have a termination time assigned to it. The Chat PoC Group may also be configured to terminate when the initiating PoC participant leaves the session.

Appendix C - Terminal User Interface (Informative)

The following requirments pertaining to PoC terminal and user–interface arequirements are considered out-of-scope of the PoC service enabler. This informative requirements are captured herein as issues for terminal design and development considerations in support of the PoC subscriber services.

- Some activator mechanism (e.g. a dedicated button) may be required on the terminal for activating the PoC function. In the absence of such an activator, there should be an alternative method defined to activate the PoC function (e.g. using certain terminal keypad sequence, soft keys or touch screen action). As an option, more one PoC activator may be defined for multiple group operations.
- Loud Speaker capability should be provided on the terminal. If present, it should be possible to switch the loud speaker on/off and to regulate its audio volume.
- Where applicable, the name, display name, number or public user identities of the invited PoC subscriber or active PoC groups should be indicated in the display. The user should be able to define what identity is displayed on the terminal.
- While in PoC mode, the user should have easy access to persons and groups he wishes to communicate with. Both keypad and contact list display may be used for person/group selection.
- To support Priority sessions, a dedicated activator (e.g. a button or some other mechanism) on the terminal may be configured as "priority" PoC session function. The destination of the priority session may be pre-programmed and should be password protected, or may be chosen from the contact list.
- The owner of a PoC device should be able to prohibit the use of PoC chats for the decvice.
- Buffering of voice packets for the PoC session may be supported at the terminal.

Push to talk over Cellular (PoC) - Architecture

Draft Version 1.0 – 04~~20~~ February~~January~~ 2004

Open Mobile Alliance
OMA-AD_PoC-V1_0-2004020412~~0~~-D

Contents

Figures

Tables

1. Scope

Editor's note: This text is preliminary.

The scope of the Push to talk over Cellular (PoC) architecture document is to define the architecture for the PoC service enabler. This architecture is based on the requirements listed for the system in the PoC Requirements document [PoC RD V1.0].

2. References

2.1 Normative References

[CREQ] "Specification of WAP Conformance Requirements". Open Mobile Alliance™. WAP-221-CREQ. URL:http//www.wapforum.org/ <*to be replaced by an OMA ref when available*>

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels". S. Bradner. March 1997. URL:http://www.ietf.org/rfc/rfc2119.txt

[RFC2234] "Augmented BNF for Syntax Specifications: ABNF". D. Crocker, Ed., P. Overell. November 1997. URL:http://www.ietf.org/rfc/rfc2234.txt

[RFC2806] "URLs for Telephone Calls", A. Vähä-Sipilä, April 2000. URL: http://www.ietf.org/rfc/rfc2806.txt?number=2806

[RFC3261] "SIP: Session Initiation Protocol", J. Rosenberg et al, June 2002. URL:http://www.ietf.org/rfc/rfc3261.txt

[3GPP TS 23.228] 3GPP TS 23.228, IP Multimedia Subsystem (IMS); Stage 2

URL:http://www.3gpp.org/

[3GPP2 X.P0013.2] 3GPP2 X.P0013.2 IP Multimedia Subsystem (IMS); Stage-2

URL:http://www.3gpp2.org/

[PoC RD V1.0] Push to Talk over Cellular Requirements, OMA-RD_PoC-V1_0-20031015-D, October 2003. URL:http://www.openmobilealliance.com/

[ITU-T E.164] "The international public telecommunication numbering plan", ITU-T Recommendation E.164. URL: http://www.itu.int/rec/recommendation.asp?type=folders&lang=e&parent=T-REC-E.164

2.2 Informative References

[WAPARCH] "WAP Architecture". Open Mobile Alliance™. WAP-210-WAPArch. URL:http//www.wapforum.org/

<<add/remove entries as needed OR state that there are>>

None.

<<If there are no references of a particular type, state that there are none>>

3. Terminology and Conventions

3.1 Conventions

<<if doc includes normative material keep the next two paragraphs>>

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

<<OR if doc is informative just keep the next line>>

This is an informative document, which is not intended to provide testable requirements to implementations.

<<If needed, describe or declare using appropriate normative references the additional conventions that are used.>>

3.2 Definitions

For the purposes of the PoC specifications, the following terms and definitions apply.

Editor’s note: In particular the following definitions were questioned and are subject to further discussion: access lists, contact list, maxptime, media capabilities list, media capabilities, media parameters, mode sets, user accept list, user reject list.

Access control	Each PoC user can define rules that describe who is allowed to contact him/her using the PoC service. The PoC Server implements the access control policy according to these defined rules
Access list	Each PoC user has two access lists: a user accept list and user reject list. Access lists are used for controlling whether the PoC server is allowed or not to send talk session requests to the user when requested by other user
Ad-hoc instant group talk	A feature providing a user to ad-hoc establishes a PoC session with other PoC users
Chat group	A persistent group created for chat group talk. Each group member joins the talk session individually
Chat group talk	A feature providing users with the capability to join a pre-defined chat group. The chat group may be open or restricted
Chat talk session	A talk session established by a chat group talk
Confirmed indication	The PoC server confirms readiness to receive media only after it has received confirmation from downstream elements of readiness to receive media
Contact list	A list available to the end user containing the addresses of other users or groups
Contact	A contact is an identity of a user, or a group. A contact includes the SIP URI or a TEL URI of the entity, type of the entity (user or group) and optionally the display name
Floor control	A control mechanism that arbitrates requests, from the PoC clients, for the right to speak
Group Talk	An instant group talk, ad-hoc instant group talk or chat group talk
Group	Group is predefined set of users together with its attributes. The group is used for easy session establishment and/or for defining session access policy. Each group is identified by its SIP URI
Instant group	A persistent group created for instant group talk. The users PoC server invites all the other group members to a talk session
Instant group talk	A feature providing a user to establish a PoC session with other members in a pre-defined instant group. The instant group is always a restricted group

Instant personal Alert	A feature providing a user with the capability to send a callback request to another user
Instant personal talk	A feature to establish a PoC session with another user
Instant talk session	A talk session established by **instant personal talk**, ad-hoc group talk or **instant group talk**
Invited user	This is the PoC user who has been invited to a **talk session**
Inviting user	This is the PoC user inviting other PoC user(s) to the to a **talk session**
Maxptime	The maximum amount of media which can be encapsulated in a RTP payload packet, expressed as time in milliseconds. The time is calculated as the sum of the time the media present in the packet represents. The time should be a multiple of the frame size. In PoC the allowed values are N*20; where N>0 and N<21
Media capabilities list	In this list, the PoC Server shall store the downlink media capabilities of all PoC clients that are active in sessions served by the PoC Server
Media capabilities	A set of parameters that should describe the performance of the PoC user equipment (PoC client), the speech coder used and the performance of the radio bearer that carries the PoC service (the quality of service parameters agreed upon etc)
Media parameters	The PoC Server uses the media capabilities list to determine the settings the user equipments should use in the talk session. The information transmitted from the PoC Server to the PoC client in order to alter the settings of the PoC client, is in this document referred to as media parameters. Media parameters are transmitted by SIP/SDP messages
mode-set	Restricts the active codec mode set to a subset of all modes. Possible values are a comma separated list of modes from the set: 0,…,7. If the decoder specifies such mode set, the encoder MUST abide by the request and MUST NOT use modes outside of the subset. If not present, all codec modes are allowed for the session
On-demand session	
Open group	A group that can be joined by any user
Participant	A PoC user in **talk session**
Pre-established session	
Ptime	Number of frames per RTP-packet the PoC client needs to be able to receive the media stream on its downlink. Ptime is given as the length of time in milliseconds represented by the media that needs to be in a RTP packet
Restricted group	A group that can be joined only by predefined user(s)
Session	A session is considered as an exchange of data between associations of participants
Talk session	This is an established connection between PoC users where the users can communicate one at a time in a half duplex manner
Talk spurt	A part of the speech signal that starts with a speech onset and ends when the speech coder goes down in DTX-mode. Hence a talk burst can consists of several talk spurts
~~**Talk burst**~~	~~The media recording, transport and playback that occur from when the user has the floor~~
Talk burst	The media recording, transport and playback that occurs from the point the PoC Client has got the permission to send a talk burst until the permission is released.
Talk burst control	Talk burst control is the means for the PoC client and the PoC Server to control the talk burst sent during a PoC session and to ensure the quality of the sent talk burst.
Unconfirmed indication	The PoC server confirms readiness to receive media before it has received confirmation from downstream elements of readiness to receive media
User	A human using the described features through a terminal device
User accept list	User accept list is a list of items each identified by its SIP URI
User equipment	User equipment is a hardware device (e.g. phone) with Push-to-Talk software used by users
User reject list	User reject list is a list of items each identified by its SIP URI

3.3 Abbreviations

For the purposes of the PoC specifications, the following abbreviations apply:

AMR	Adaptive Multi Rate
DNS	Domain Name System
DTD	Document Type Definition
FQDN	Fully Qualified Domain Name
GERAN	GSM/EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GLMS	Group and List Management Server
HTTP	Hypertext Transfer Protocol
IMS	IP multimedia subsystem
IPCP	Internet Protocol Control Protocol
ISC	IMS service control interface
MD5	Message Digest no. 5
NAI	Network Access Identifier
NAPTR	Naming Authority Pointer
OMA	Open Mobile Alliance
PCO	Protocol Configuration Options
P-CSCF	Proxy-CSCF
PDP	Packet Data Protocol
PoC	Push to talk over Cellular
PTT	Push to talk
RTCP	RTP Control Protocol
RTP	Real-time Transport Protocol
SIP	Session Initiation Protocol
SRV	DNS resource record for the location of services
UCS	Universal Character Set
UE	User Equipment
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UTF-8	UCS Transformation Format 8
UTRAN	Universal Terrestrial Radio Access Network
XML	Extensible Mark-up Language

4. Introduction

Push to talk over Cellular (PoC) is intended to provide rapid communications for business and consumer customers of mobile networks. PoC will allow user voice and data communications shared with a single recipient, (1-to-1) or between groups of recipients as in a group chat session, (1-to-many) such as in figure 1 below.

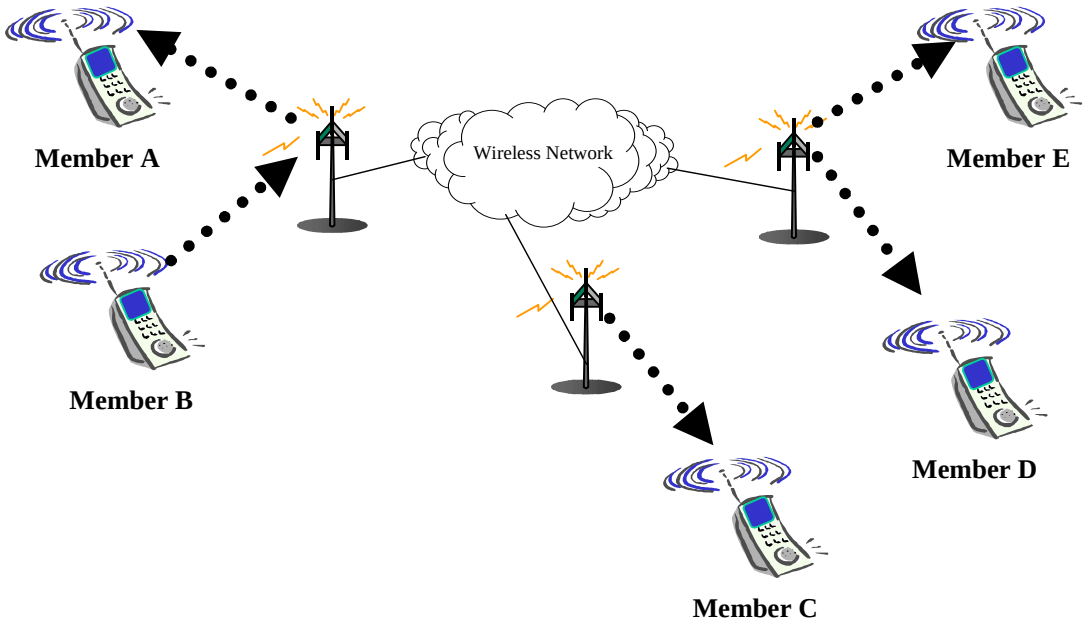
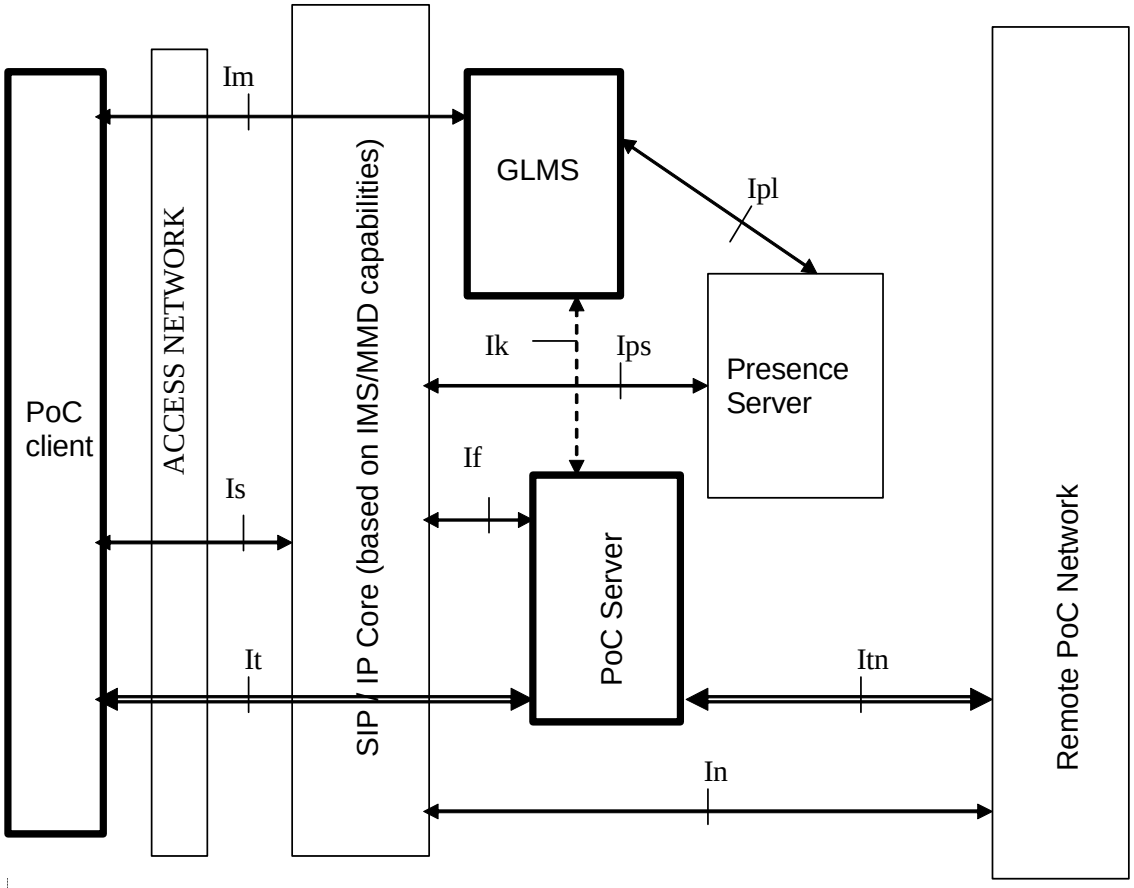


Figure 1: Example of a PoC 1-to-many group session (voice transmission)

Existing solutions that offer walkie-talkie like services typically consist of mobile terminals with dedicated talk buttons, supported by networks that support the exchange of signalling messages to establish and maintain a push to talk call, report the presence of users, etc. Such implementations use proprietary messaging protocol among the various entities, such as the mobile terminal and the network.
OMA-PoC seeks interoperability among the network entities to avoid market fragmentation, by realising the push to talk over cellular service in a widely-acceptable and standardised manner.

5. Architecture

Editor's note: Dashed lines indicate interfaces that are FFS



It: Floor Control and media
Itn: Floor Control and media
Is: PoC Client to Proxies Session Signaling
If: Proxy to PoC Server Session Signaling
In: Proxy to Proxy Session Signaling
Im: Group Mgmt to PoC Client
Ik:Group Mgmt to PoC Server

Bold box identifies PoC functional entities

Remote PoC Network contains the same network elements and reference points as the home PoC network

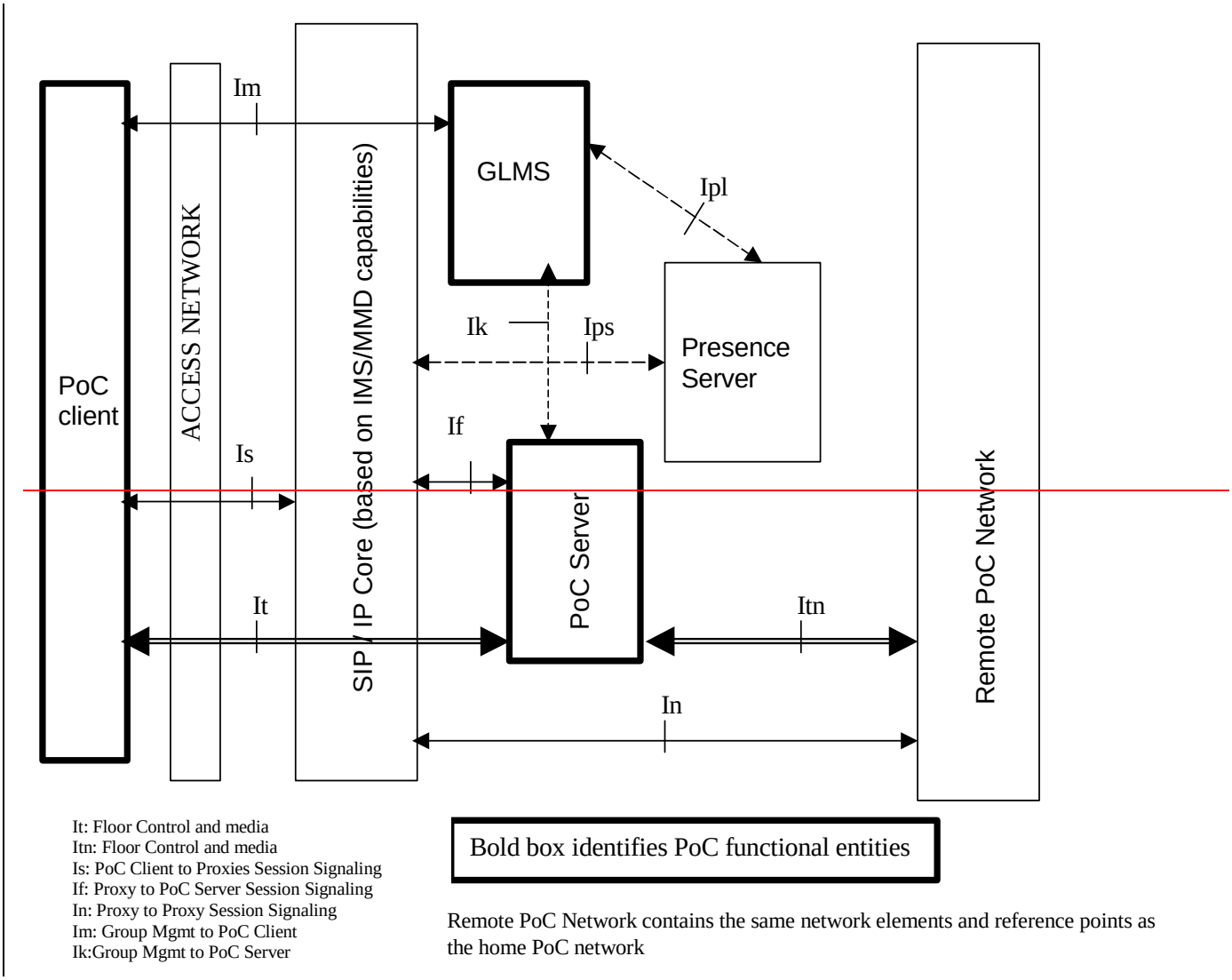


Figure 2: PoC architecture

Editor's note: There may be other interface in addition to those shown on the figure. These interfaces are FFS.

The access network used by the PoC architecture includes both the radio access as well as the other nodes required to gain IP connectivity and IP mobility.

The access network used by the PoC architecture includes both the radio access as well as the other nodes required to gain IP connectivity and IP mobility.

PoC SHALL utilize SIP/IP Core based on capabilities from IMS as specified in 3GPP ([3GPP TS 23.228]) and 3GPP2 ([3GPP2 X.P0013.2]).

6. Description of functional entities

6.1 PoC Functional Entities

6.1.1 PoC Client

The PoC Client resides on the mobile terminal and is used to access PoC service.

Editor's note: need to add the material from the RD section 6.3/4 work

6.1.2 PoC Server

The PoC Server implements the application level network functionality for the PoC service

The PoC server MAY perform a Controlling PoC Function or Participating PoC Function. The Controlling PoC Function and Participating PoC Function are different roles of the PoC server and Figure 2 shows the distribution of the functionality during a 1-1 PoC Session in a single Network.. A PoC server MAY perform both a Controlling PoC function and a Participating PoC function at the same time.

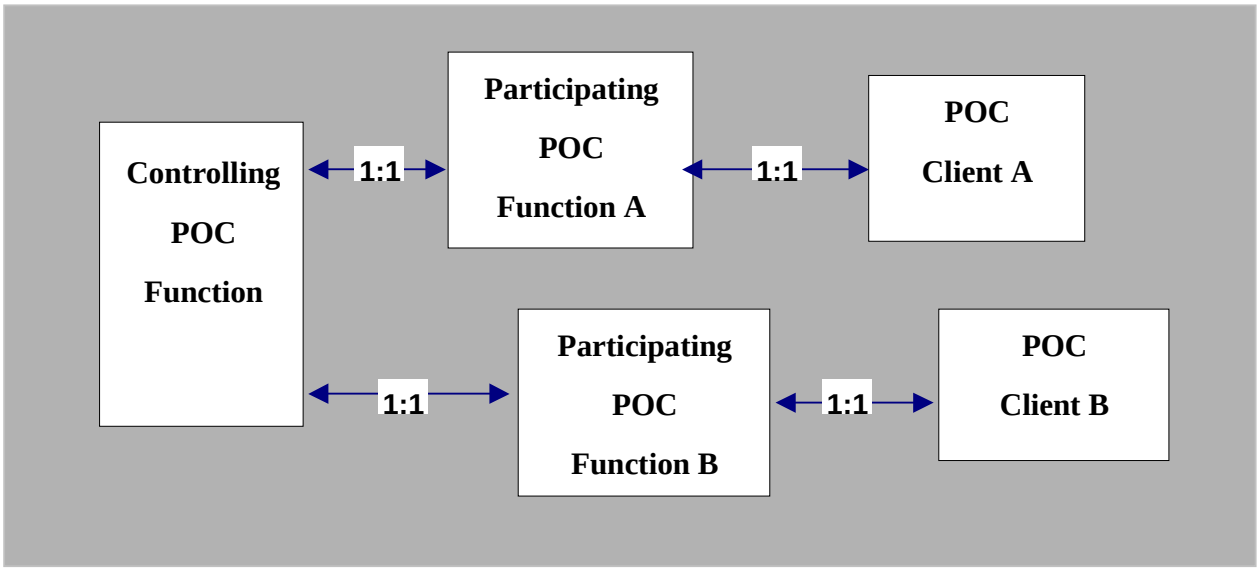


Figure 3: Relationship between Controlling PoC Function, Participating PoC Functions and the PoC Clients

The determination of the PoC Server role (Controlling PoC Function and Participating PoC Function) takes place during the PoC session setup and lasts for the duration of the whole PoC session. In case of 1-1 PoC Session and Ad-hoc PoC group session the PoC server of the inviting user shall perform the Controlling PoC Function. In case of the Chat group talk and pre-arranged group talk the PoC server owning/hosting the group identity shall perform the Controlling PoC Function.

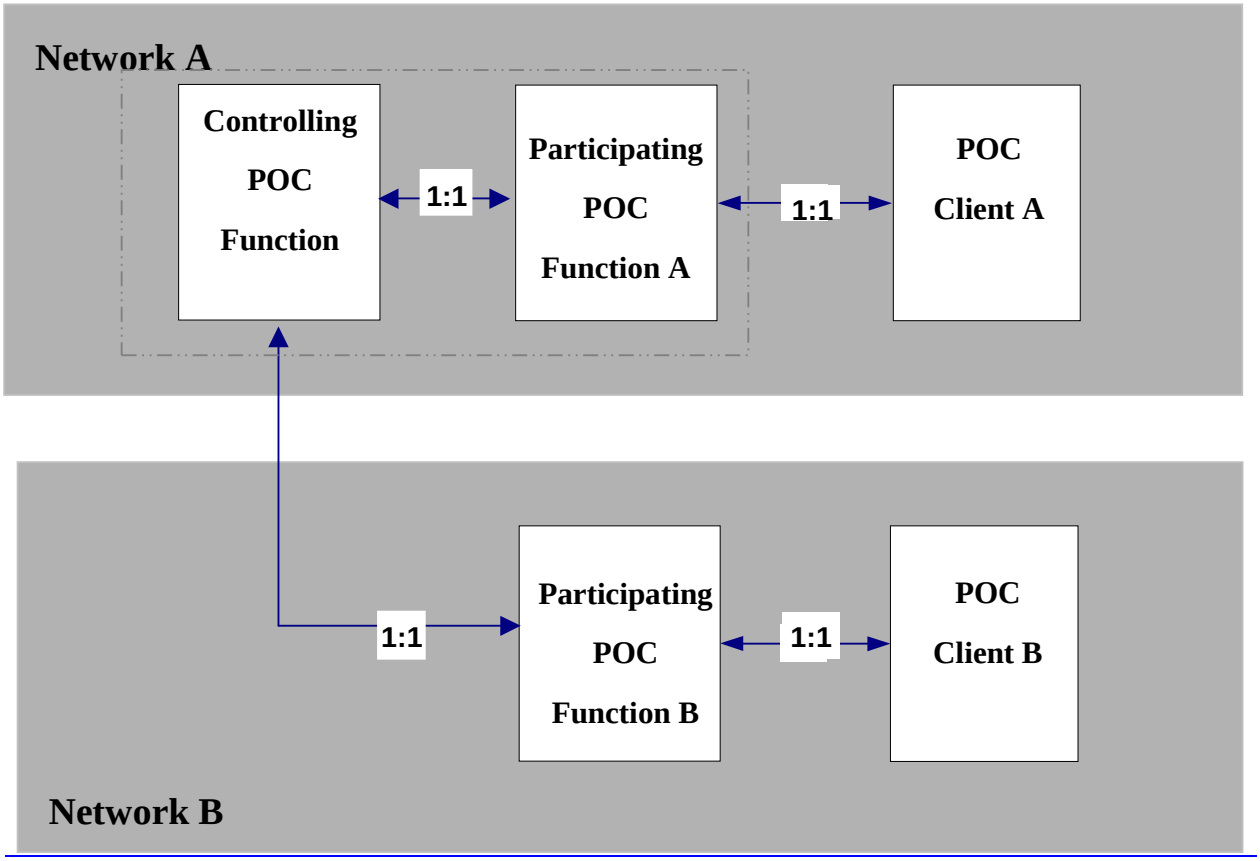


Figure 4: Relationship between the Controlling PoC function, Participating PoC function and PoC Clients for 1-1 PoC Session

In a PoC session there shall be only one PoC server performing the Controlling PoC Function. There can be one or more PoC servers performing the Participating PoC Function in the PoC session. Figure 3 shows the distribution of the functionality during a 1-1 PoC Session in a multiple network environment.

The PoC Server performing the Controlling PoC Function has *N* number of SIP sessions and media and floor control communication paths in one PoC session, where *N* is number of participants in the PoC session. The PoC server performing the PoC Controlling Function will have no direct communication to the PoC Client for talk session signaling. The PoC server performing the Controlling PoC Function may have a direct communication path for media to each PoC client based local policy in the PoC servers performing the Participationg PoC Function. A PoC server performing the Participating PoC Function has always a direct communication path with a PoC Client and a direct communication path with the PoC server performing the Controlling PoC Function. Figure 4 depicts the relation between the Controlling PoC Function, Participating PoC Function and the PoC Client in multiple network environment for a PoC Group session.

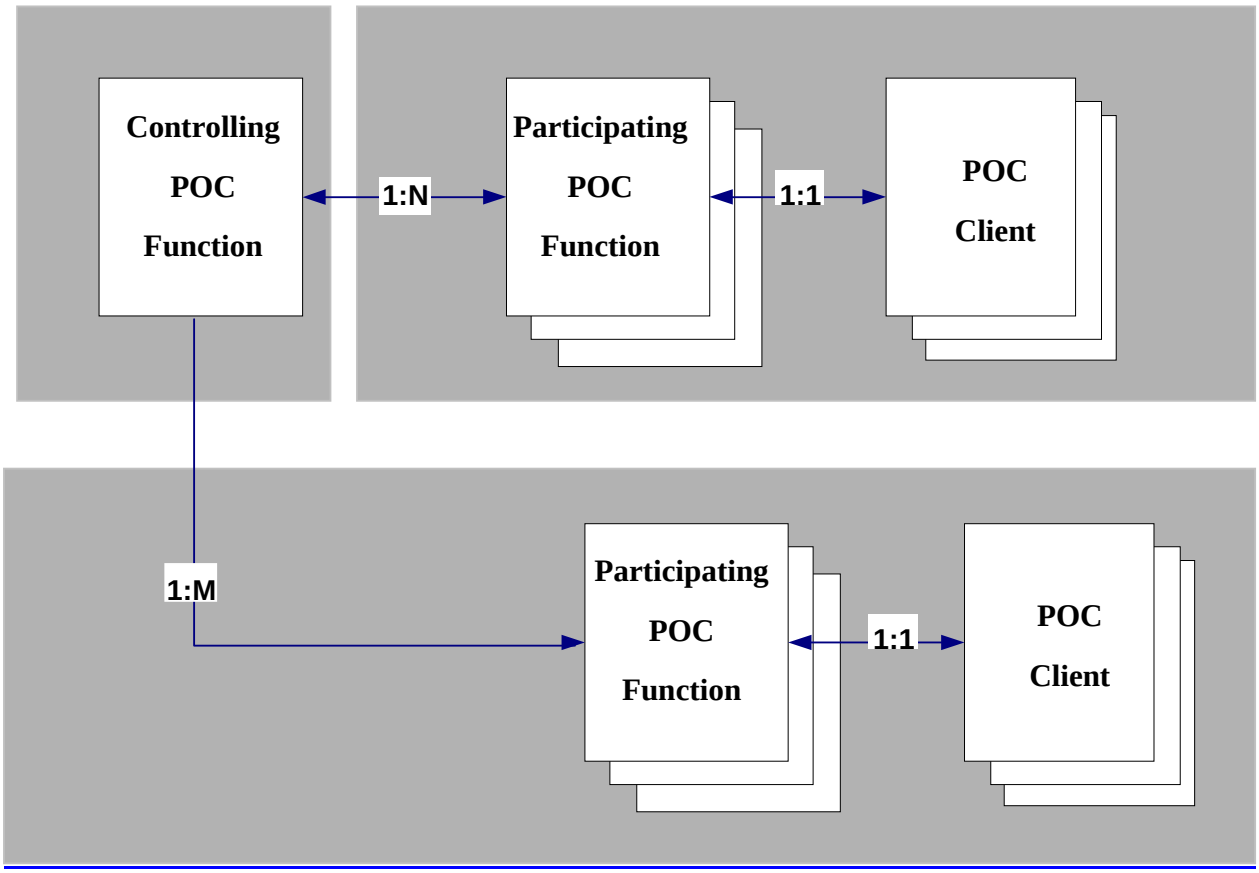


Figure 5: Relationship between the Controlling PoC Function, Participating PoC Function and PoC Clients for PoC Group Session

The Controlling PoC Function can be assigned to a PoC Server in the Home Network of the inviting user or the Home Network of one of the invited users.

6.1.2.1 Controlling PoC Function

The PoC Server performs the following functions when it fulfills the Controlling PoC Function:

- Provides centralized PoC session handling
- Provides the centralized Media distribution
- Provides the centralized floor control functionality including talker identification
- Provides SIP session handling, such as SIP session origination, termination, etc.
- Provides policy enforcement for participation in group sessions
- Provides the participants information
- Collects and provides centralized media quality information
- Provides centralized charging reports

6.1.2.2 Participating PoC Function

The PoC Server performs the following functions when it fulfills the Participating PoC Function:

- Provides PoC session handling
- May provide the Media relay function between PoC Client and Controlling PoC server

- May provide user media adaptation procedures
- May provide the floor control message relay function between PoC Client and Controlling PoC server
- Provides SIP session handling, such as SIP session origination, termination, etc, on behalf of the represented PoC Client..
- Provides policy enforcement for incoming PoC session (e.g. access control, availability status, etc)
- May collect and provide media quality information
- Provides the participant charging reports

The listed optional functions of the Participating PoC Function are not used whenever the media is bypassing the PoC Server performing the Participating PoC Function.

Editor's Note: Participating PoC functions related to PoC Presence and support of Multiple Sessions are FFS.

~~The PoC Server implements the application level network functionality for the PoC service. The PoC Server performs the following functions:~~

~~Editor's note: need to collect the items from the 6.3/4 material~~

- ~~Provides PoC session handling~~
- ~~Provides the Media distribution~~
- ~~Provides the floor control functionality including talker identification~~
- ~~Provides SIP session handling, such as SIP session origination, termination, etc.~~
- ~~Provides policy enforcement for participation in group sessions~~
- ~~Provides policy handling for incoming PoC session (e.g. access control, availability status, etc)~~
- ~~Provides the participants information (such as user nicknames)~~
- ~~Collects and provides media quality information~~
- ~~Provides the charging reports~~

6.1.3 Group and List Management Server (GLMS)

PoC users use the GLMS to manage groups and lists (e.g. contact and access lists) that are needed for the PoC service. The GLMS performs the following functions:

- Provides list management operations to create, modify, retrieve and delete groups and lists
- Provides storage for groups and lists

6.2 External Entities Providing Services to POC System

6.2.1 SIP/IP Core

The SIP/IP core includes a number of SIP proxies and SIP registrars. The SIP/IP Core performs the following functions that are needed in support of the PoC Service:

- Routes the SIP signaling between the PoC Client and the PoC Server
- Provides discovery and address resolution services
- Supports SIP compression
- Performs authentication and authorization of PoC Client based on user's service profile
- Maintains the registration state
- Provides charging information

6.3 Presence Server

The Presence Server performs the following functions that are needed in support of the PoC Service:

~~Provides availability information~~

- Maintains the Presence Status of PoC clients (e.g. “Reachable”, “Do Not Disturb”, “Unavailable”, “Offline”)

Editor’s Note: Whether “Busy” is Maintained by the Presence Server is FFS.

- Supports the publication of Presence Information on PoC Clients from PoC clients Supports the watching and fetching of Presence Information on PoC clients by PoC clients.

Editor’s Note: The following functions are FFS

Supports the publication of Presence Information from the PoC Server on behalf of the PoC Client.

Supports the watching and fetching of Presence Information on PoC clients by the PoC Server.

- Supports the authorization of watchers of PoC clients Presence Information and authorizes the watching and fetching of Presence Information
- Supports the authorization of presence list subscriptions
- Supports back-end subscriptions of Presence Lists containing members in other domains
- Supports the watching and fetching Presence Information from other presence servers (presence list)

Editor’s Note: The address of the Presentity for PoC Presence Information needs to be the same as the PoC Address.

~~Note: More information is needed to address the role of the Presence Server~~

7. Description of the reference points

7.1 Reference point Is: PoC Client – SIP/IP Core

The Is reference point supports the communication between the PoC client and the IMS Core. The protocol for the Is reference point is SIP.

This reference point SHALL support the following:

- PoC session signalling between the PoC client and the PoC server
- Provides discovery and address resolution services
- Provides SIP compression
- Performs authentication and authorization of PoC Client based on user's service profile
- Provides PoC client registration
- Publishing presence information
- Subscribing to presence information
- Receiving presence notifications

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, the Is reference point SHALL conform with the Gm reference point [3GPP TS 23.002, 3GPP2 X.P0013.0].

7.2 Reference point If: SIP/IP Core – PoC Server

The protocols over If reference point support the communication between the SIP/IP core and the PoC Server for session control. The If reference point is based on SIP.

The If reference point SHALL support the following:

- PoC session signalling between the PoC client and the PoC server
- Provides address resolution services
- Provides charging information

Editor's Note: The following is FFS

Publication of Presence Information from the PoC server to the Presence Server

Subscription to Presence Information by the PoC Server to the Presence Server

Notification of Presence Information by the Presence Server to the PoC Server

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, the If reference point SHALL conform to the ISC reference point [3GPP TS 23.002, 3GPP2 X.P0013.0].

~~Editor's note: The presence related actions are FFS.~~

7.3 Reference point Im: PoC Client-GLMS

The Im reference point is between the PoC Client and the Group List and Management Server. The Im reference point SHALL provide the following functions:

- Create groups and lists
- Modify existing groups and lists (e.g. add and remove users of the group)
- Retrieve groups and lists
- Delete groups and lists

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, then the Im reference point SHALL conform to the Ut reference point [3GPP TS 23.002].

7.4 Reference point It: PoC Client-PoC Server

The It reference point SHALL support:

- media transport
- floor control procedures.

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS, then the It reference point SHALL use the services of the Mb reference point [3GPP TS 23.002, 3GPP2 X.P0013.0].

7.5 Reference point Itn: PoC Server – PoC Server

The Itn reference point supports the user plane communication between the PoC servers.

The Itn reference point SHALL support the following:

- media transport
- floor control procedures

Editor's Note: media transport not clearly restricted to Itn - FFS

7.6 Reference point In: SIP/IP Core – SIP/IP Core

The In reference point supports the communication between the SIP/IP Cores. The In reference point is based on SIP.

The In reference point SHALL support the following:

- communication and forwarding of SIP signalling messaging between SIP/IP Cores

7.7 Reference point Ips: SIP/IP Core – Presence Server

The Ips reference point supports the communication between the SIP/IP Core and the Presence Server. The Ips reference point is based on SIP.

The Ips reference point SHALL support the following:

- Publication of Presence Information from the PoC client to the Presence Server

- Subscription to Presence Information by the PoC Client to the Presence Server
- Notification of Presence Information by the Presence Server to the PoC Client
- Publication of Presence Information from the PoC Server to the Presence Server
- Subscription to Presence Information by the PoC Server to the Presence Server

Notification of Presence Information by the Presence Server to the PoC Server

7.8 Reference point Ipl: GLMS – Presence Server

The Ipl reference point supports the communication between the GLMS and the Presence Server.

The Ipl reference point SHALL support the following:

- Transfer of Presence Lists to the Presence Server
- Transfer of Group Lists to the Presence Server

Transfer of Subscription Authorisation Policies to the Presence Server

7.9 Reference point Ik: PoC Server - GLMS

The Ik reference point supports the communication between the PoC server and GLMS. The Ik reference point SHALL provide the following functions:

- Retrieval of access control and group member lists

Editor's note: It is an open issue how the data in GLMS and PoC server will be synchronized.

8. System concepts

8.1 Identification

8.1.1 PoC Address

Each user SHALL have one or more PoC Addresses. A PoC Address SHALL be used by any PoC user to request communication with other PoC users. A PoC Address is in the format of either a SIP URI or a TEL URI. At least one PoC Address SHALL be in the format of a SIP URI. The PoC Address SHALL comply either with the specification of a SIP URI in [RFC 3261], or with the specification of a TEL URI in [RFC2806bis]. Note that the SIP/IP Core will translate a TEL URI to a SIP URI for routing.

A PoC Address SHALL be registered with the SIP/IP core as described in section 8.3. Registration of one PoC Address associated with a PoC User MAY imply registration of other PoC Addresses associated with the same user.

The PoC Address is used for PoC and other SIP based service.

Examples of PoC Addresses are:

- sip:joe.doe@operator.net;
- sip:buss2.city@operator.net;
- sip:buss2.city@poc.operator.net.;
- tel:+16195551212;
- tel:5551212; phone-context = pbx.net.

8.1.2 Private user identity

When the SIP/IP Core corresponds with 3GPP/3GPP2 IMS, the private user identity shall be used as described in [3GPP TS 24.229, 3GPP2 X.P0013.4].

8.1.3 Group identities

A group is identified with a group identity. The PoC Client uses group identities for addressing Group Talk sessions. The group identity is associated with individual identities of all the group members. The group identity SHALL take the form of SIP URI as defined in RFC 3261 and RFC 2396. It SHALL be possible to create a group identity statically and dynamically.

- An operator shall be able to create a static group identity which is stored in the GLMS for use in PoC Group sessions.
- It SHALL be possible for the PoC client to request the PoC server to generate a group identity at establishment of the Ad-hoc group session. This identity is valid until PoC session termination.
- The user SHALL be able to request the GLMS to generate and store a group identity via the Im reference point.

8.2 Addressing

8.2.1 Phone numbers

Phone numbers may be used as a user public identity. A PoC user may address another user by a phone number. The PoC client shall send the phone number to the SIP core in a TEL URL [RFC2806].

The phone number may use the international E.164 [ITU-T E.164] format (prefixed with a '+' sign), or a local format using a local dialing plan and prefix. The SIP Core shall interpret the phone number with a leading '+' to be an E.164 number.

Addressing by TEL URL for a PoC session requires that the PoC Server can resolve the TEL URL to a SIP URI, for instance by using DNS/ENUM or other local data base. A phone number in a local format shall be converted to the E.164 format before DNS/ENUM is used.

8.2.2 SIP URI

A PoC user may address another user by a SIP URI.

8.3 Registration

8.3.1 General

Prior to using the PoC service the UE running the PoC Client SHALL perform SIP registration to the SIP/IP Core according to [RFC3261], which indicates the support of PoC Service in the REGISTER request. The registration function is provided in the SIP/IP Core and the registration MAY be visible to the PoC Server via the If reference point. After a successful registration a user is able to use a registered Public User Identity:

- to originate PoC communication including session and session unrelated procedures;
- to receive PoC communication including session and session unrelated procedures.

When the SIP/IP Core corresponds with 3GPP/3GPP2 IMS then it is possible for the network on behalf of PoC UE to register additional PoC Addresses during a SIP registration of a single PoC Address. Registering multiple PoC Addresses at once is called implicit registration. The PoC Address that is used in the registration SHALL be SIP URI according to [RFC3261] while the PoC Addresses to be registered implicitly MAY be SIP URIs or TEL URLs.

The PoC Client is responsible for maintaining its registration active by using a re-registration procedure. If the PoC Client fails to perform a successful re-registration before a registration timer expires the registration is terminated.

The PoC Client SHALL be able to terminate its registration at any point of time by using a deregistration procedure. The SIP/IP Core MAY terminate user's registration at any point of time by using a network initiated deregistration procedure.

When the SIP/IP Core corresponds with 3GPP/3GPP2 IMS, The PoC Client SHALL use 3GPP/3GPP2 IMS registration mechanisms as defined in [3GPP TS 24.229]/ [3GPP2 X.P0013.4].

8.4 Session establishment

8.4.1 General

The mobile originated procedures describe how requests are transported from the originating user to the PoC Server serving the originating user.

The mobile terminated procedures describe how requests are transported from the PoC Server serving the originating user to the terminating user.

The PoC client, SIP/IP Core, PoC server SHOULD be able use 3GPP/3GPP2 IMS routing mechanisms as defined in [3GPP TS 24.229][3GPP2 X.P0013.4].

8.4.1.1 Mobile originated procedures

The PoC Client SHALL send all requests to the SIP/IP Core. The PoC Client SHALL indicate in the request that this is a PoC communication so that it is possible for the SIP/IP Core to route the request to the PoC Server.

8.4.1.2 Mobile terminated procedures

The PoC Server SHALL send all requests to the same SIP/IP Core that it received the Originating Request from. The PoC Server SHALL indicate in the request that this is a PoC communication.

When the PoC Server in the terminating network receives the request it performs the necessary terminating service control. If the service control determines that the session establishment SHOULD continue then the terminating PoC Server routes the request to the terminating user via the terminating SIP/IP Core.

NOTE: Routing of requests between domains is a function of the SIP/IP core and is out of the scope of this specification.

8.5 Security

Editor's note: Contribution expected.

8.6 ~~Floor control~~Talk Burst ARbitration

~~Editor's note: Contribution expected.~~

The ½ duplex mode implies that before a PoC Client can send a talk burst the PoC Client SHALL negotiate with other PoC Client(s) in the talk session on the permission to send a talk burst.

The PoC Server SHALL act as the arbitrator between PoC Clients as follows:

- The PoC Client SHALL request for the permission to send a talk burst from the PoC Server.
- The PoC Server SHOULD confirm the request to send a talk burst if no other PoC Client has the permission to send a talk burst. The PoC Server MAY reject a request to send a talk burst due to policy decision by the PoC Server.
- The PoC Server SHOULD reject the request to send a talk burst if another PoC Client has the permission to send a talk burst. The PoC Server MAY queue a request to send a talk burst if queuing is supported by the PoC Client. The PoC Server MAY place a request in the queue depending on the priority of the participant at the PoC Client. The PoC Server MAY limit the number of positions in a talk burst queue.
- The PoC Server SHALL supervise the length of a talk burst and SHALL revoke the permission to talk if the length exceeds a configurable maximum talk burst duration.

The PoC Client and the PoC Server SHALL support the following requests/responses/indications:

- Talk Burst request:
  The request is sent by the PoC client to the PoC Server in order to request permission to send a talk burst. The request includes:
  - Queuing supported indicator if queuing is supported by the PoC Client; and,
  - A PoC Session identifier.
- Talk Burst Confirm response:
  The response is sent by the PoC Server to the PoC Client in order confirm that the PoC Client has obtained permission to send one talk burst. The response includes:
  - A PoC Session identifier.
- Talk Burst Reject response:
  The response is sent by the PoC Server to the PoC Client to reject a request to send a talk burst. The Talk Burst Reject includes:

- A reject reason. The reject reason may be:
  - Another PoC Client already has been given permission to send a talk burst and no queuing of the request is allowed;
  - Another PoC Client already has been given permission to send a talk burst and the queue full.
  - The PoC Client is not allowed to request permission to send a talk burst at the moment; and,
  - Only one participant in the PoC session. For example if only one participant is left in a PoC Session
- A PoC Session identifier.

- Talk Burst Completed indication:
  The indication is sent by the PoC Client to the PoC Server in order to indicate that the sending of the talk burst is completed. The Talk Burst Completed indication includes:
  - A PoC Session identifier.
- No Talk Burst indication:
  The indication is sent by the PoC Server to all PoC Clients in order to inform the PoC clients that none has the permission to send a talk burst at the moment. The No Talk Burst indication includes:
  - A PoC Session identifier.
- Receiving Talk Burst indication:
  The indication is sent by the PoC Server to all PoC Clients (with the exception of the PoC Client with the permission to send a talk burst) in a PoC session in order to inform them that another PoC Client has the permission to send a talk burst and that the PoC Client(s) shall prepare for receiving a talk burst. The Receiving Talk Burst indication includes:
  - The identity of the PoC participant at the PoC Client sending the talk burst, that is:
    - The PoC Address in the case the sender don't want to be anonymous; and,
    - The display name of the PoC participant at the PoC Client sending a talk burst.
  - A PoC Session identifier.
- Stop Talk Burst indication:
  The indication is sent by the PoC Server to the PoC Client who has the permission to send a talk burst in order to revoke the permission to talk. The Stop Talk Burst indication MAY include:
  - Reason code:
    - Only one user in the PoC session. For example if only one participant is left in a PoC Session; and,
    - Talk burst too long indicating that the talk burst has exceeded the maximum duration.

- A retry-after time value indicating how long the PoC Client has to wait before a request to send a talk burst will be confirmed. The parameter is only present in the case the permission to send a talk burst is revoked due to “Talk burst is to long”.
- A PoC Session identifier.

If the PoC Server and the PoC Client support queuing of the Talk Burst Request the following requests/responses/indications SHALL be supported:

- Talk Burst Request Queued response:
  The response is sent by the PoC Server to the PoC Client to indicate that the Talk Burst Request is queued. The indication includes:
  - Queue position.
  - A PoC Session identifier.
- Talk Burst Queue Position request:
  The request is sent by the PoC Client to read the position in the queue. The request includes:
  - A PoC Session identifier.
- Talk Burst Queue Position response:
  The response is sent by the PoC Server to the PoC Client in response to the Talk Burst Queue Position request. The response includes:
  - Queue position.
  - A PoC Session identifier.
- Talk Burst Queue Identity request:
  The request is sent by the PoC Client to the PoC Server in order to obtain the identity and position of other participants in the talk burst request queue.
  - A PoC Session identifier.
- Talk Burst Queue Identity response.
  The response is sent by the PoC Client in response to the Talk Burst Queue Identity request. The response includes:
  - List of PoC Address and Queue position pairs.
  - A PoC Session identifier.

Editor’s note: The need and use of the PoC Session identifier is for further study.

8.7 Quality Feedback

The PoC Client and the PoC Server MAY send quality feed back reports to each other during a PoC session.

Quality feedback includes the following quality feedback reports:

- Sender Report:
  The sender of a talk burst sends the Sender Report. The Sender Report includes:

- Accumulated number of sent media packets since the start of the PoC Session.
- A PoC Session identifier.

- Receiver Report:
  The receiver of a talk burst sends the Receiver Report. The Receiver Report includes:
  - Accumulated number of received media packets since the start of the PoC Session.
  - A PoC Session identifier.

Editor's note: The use of the PoC Session identifier is for further study.

~~8.7~~8.8 Codecs

Editor's note: Contribution expected.

~~8.8~~8.9 Signaling compression

Editor's note: Contribution expected.

~~8.9~~8.10 Charging

8.9.1 Charging of PoC sessions

In a PoC session there can be number of PoC participants being PoC subscribers of several different PoC operators. Each of the PoC operators shall be able to charge PoC participants independently on the other PoC operators policy based on their charging policies.

The charging of the PoC participant can be based on the following:

- PoC session time: Time spent by the PoC participant in a PoC session.
- Sent talk-bursts: Amount of talk-bursts sent by the PoC participant. Amount of talk-bursts shall be measured as a number of talk-bursts and/or as a length of talk-bursts.
- Received talk-bursts: Amount of talk-bursts received by the PoC participant. Amount of talk-bursts shall be measured as a number of talk-bursts and/or as a length of talk-bursts.
- Actions initiated by the PoC participant in a PoC session. Following actions shall be able to charge
  - Adding a new PoC participant into the session
  - Subscription to the participant information in a PoC session
  - Amount of Participant information sent to the PoC participant

In the PoC architecture the Participating PoC server measures and sends charging reports to the charging system for the charging of the PoC participant.

In a PoC session there needs to be a PoC session owner. The PoC session owner in the case of 1-1 PoC session and Ad-hoc PoC group session is the initiator of the PoC session. In the case of a Chat group session and a Pre-arranged PoC session, the PoC session owner is the owner of the PoC group.

- Total PoC session time: Total time PoC session is up, i.e. the time that there is at least one PoC participant in a PoC session.
- Amount of PoC participants as function of time: In order to do this following need to be measured, times when PoC participants join and leave the PoC session.
- Talk-bursts distributed to the PoC participants: When one of the PoC participants sends talk-burst in a session, then this talk-burst needs to be distributed to all PoC participants in a PoC session. The amount of distributed talk-bursts shall be measured as a number of talk-bursts and/or as a length of talk-bursts.
- Number of participant information subscriptions.
- Number of participant information sent to the PoC participants.

In the PoC architecture the Controlling PoC server measures and sends charging reports to the charging system for the charging of the PoC session owner.

8.9.2 Charging of other PoC services

A PoC operator shall be able to charge PoC subscriber of the following other actions:

- Number of sent PoC alerts
- Activation/deactivation of Do not disturb setting
- List management operations

~~Editor's note: Contribution expected.~~

Editor's note: The charging section is not completed.

~~8.10~~8.11 Roaming

The PoC client SHALL be able to use the home PoC service when roaming.

When roaming, interconnection between operator's networks and communication between the PoC server and the PoC client MAY be achieved either

a) through interconnection of the IP Access Networks; or

b) when a SIP/IP core exists in the visited network through interconnection of the visited and home SIP/IP core networks.

The exact mechanisms for interconnection in the roaming scenario are outside the scope of this document. For 3GPP IMS the roaming scenarios are specified in [3GPP TS 23.228] and for 3GPP2 MMD in [3GPP2 X.P00132].

~~8.11~~8.12 Presence

~~Editor's note: Contribution expected.~~

The PoC client MAY utilize presence service enabler(s) to determine the PoC Presence status of other PoC clients.

The PoC client MAY publish presence information ("Reachable", "Unavailable" and "Do Not Disturb") to the Presence Server via the SIP/IP core.

The PoC client supplied presence information is routed to the Presence Server via the Is and Ips reference points.

Editor's Note: It is FFS whether:

The PoC server SHOULD/MAY publish presence information ("Reachable", "Busy") to the Presence Server based on the state of the PoC client within the PoC session.

The PoC server SHOULD/MAY obtain any Presence Information it requires on PoC clients (e.g. "Reachable", "Busy", "Do Not Disturb", "Unreachable", "Offline") by subscribing to their Presence Status using the functionalities of the Presence Service enabler.

It is FFS if the PoC Server publishes presence information to the Presence Server if the PoC client has not authorized the watching of this information.

The signaling between the Presence Server and the PoC Clients SHALL be routed via the SIP/IP core and the Ips Reference Point.

The signaling between the Presence Server and the PoC Server SHALL be routed via the SIP/IP core and the Ips Reference Point.

The Group and contact Lists for the PoC Service and the Group and Presence Lists for the Presence Service enabler SHALL be stored in and accessed from the GLMS using the Ipl reference point.

The Subscription Authorization Policy for the Presence Server SHALL be stored in and accessed from the GLMS using the Ipl reference point.

The creation and modification of Group and contact Lists for the PoC Service and the Group and Presence Lists, and Subscription Authorization Policy for the Presence Service enabler SHALL utilize common mechanisms using the Im reference point.NOTE: The architecture and functions of the Presence Service enabler are out of scope of this specification.

Editor's Note: How Offline is published is FFS

8.13 Access Control

8.13.1 Usage of access control lists

An access control list can be used by the end user as a means of controlling the incoming PoC session requests from other users or groups. On the accept list the user can maintain users and/or groups from whom he is willing to accept to receive PoC session requests. On the reject list the PoC user can maintain PoC users and/or groups from whom he is not willing to receive PoC session requests. The access control lists can be applied also on the delivery of the instant personal alerts.

The access control lists are superseded by Do-not-Disturb state.

8.13.2 Access control list management

Access control list management includes operations that allow the PoC Client to reliably manipulate the access control lists and the related attributes located in the GLMS.

A PoC subscriber shall be able to add and remove user(s)/group(s) to the access control list and get the access control list when queried. Additionally the PoC client can activate and deactive access control lists. Only activated access control lists shall be checked by the system.

Editor's note: The discussion about answering mode setting is not finalised:

8.x.3 Answering mode setting

In addition to the accept control lists the PoC system has an auto answer mode flag, which can be set on a user and/or group basis. The auto answer is stored in the GLMS. A user shall have the ability to configure the terminal to either automatically accept the incoming session request or to be prompted before accepting the request. These settings may be defined per inviting user and/or group. If the user sets auto answer mode on, auto answer mode is applied to the incoming PoC sessions. If the auto answer mode is off, then the manual answer mode shall be applied. A user shall have the ability to either accept or reject requests from unlisted i.e. users not listed in the access control lists. Manual answer mode shall be applied for unlisted users.

9. High level procedures

The flow charts in the following sub-clauses describe the logical flow of information between the PoC architectural functional elements but do not necessarily fully conform to all the details of the protocols that will be used.

9.1 Pre-established Session

9.1.1 Introduction

The pre-established session provides a mechanism to negotiate media parameters such as IP address, ports and codecs, which are used for sending the media and floor control packets between the PoC Client and the home PoC Server. The mechanism allows the PoC Client to invite other PoC clients or receive PoC sessions without negotiating again the media parameters. The pre-established session may be established after the initial registration. The Figure 6 presents the high level description of the pre-established session procedure.

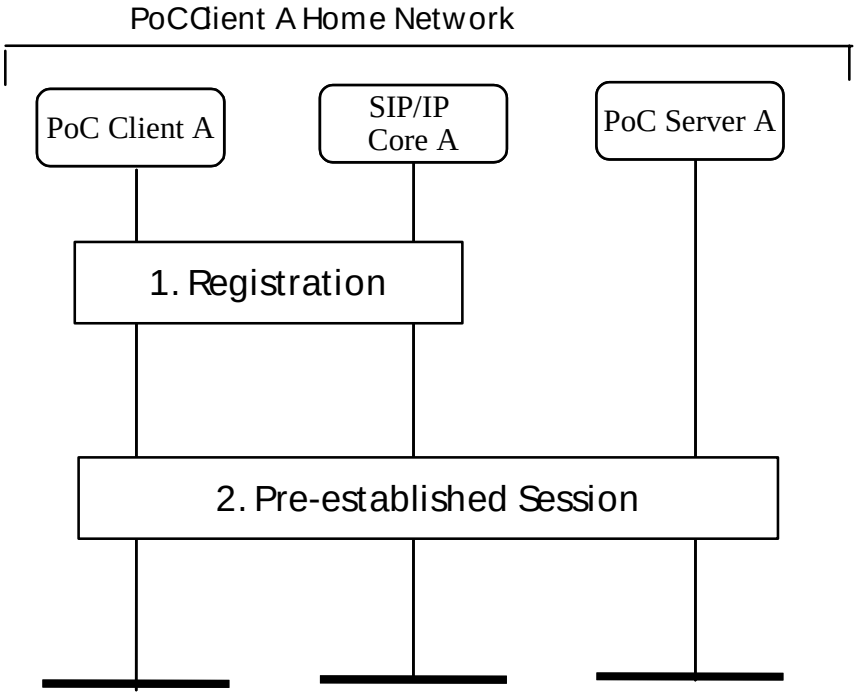


Figure 6: Pre-established Session

1. The PoC Client registers to the SIP/IP Core. The registration is described in the subclause 8.3.

2. The pre-established session is a session establishment procedure between the PoC Client and the PoC Server to exchange necessary media parameters needed for setting up the media bearer. After the pre-established session the PoC Client is able to activate media bearer whenever needed:

   - immediately after the early session procedure or;
   - when the actual SIP signaling for the PoC Session is initiated.

9.1.2 Pre-established Session Flow

The pre-established session is a session between the PoC client and the PoC server in the home PoC network. The Figure 7 presents the pre-established session flow.

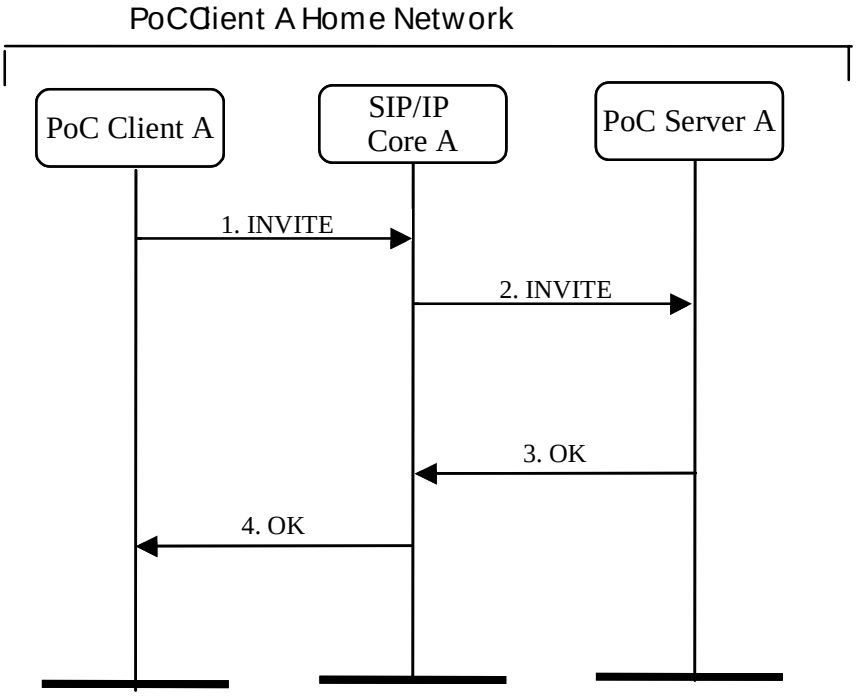


Figure 7: Pre-established Session

1. The PoC Client sends an INVITE request to the SIP/IP Core containing a PoC indication. The request SHALL contain SDP including necessary media parameters (e.g. PoC Client IP address, port number(s), supported codecs)

Editors note: The key information elements shall be clarified later.

2. The SIP/IP Core forwards the request to the PoC Server based on the PoC indication and the PoC Address of the PoC client in the request.

3. The PoC Server performs necessary service control and sends OK to the SIP/IP Core.

4. The SIP/IP Core forwards the OK the PoC Client.

The procedure for establishing a PoC session with other users within the pre-established session is described in the section 9.2.

9.2 Ad-hoc PoC group session and 1-1 PoC session setup

In the Ad-hoc PoC group session setup one PoC subscriber selects several other PoC subscribers to be invited to an ad-hoc PoC group session.

1-1 PoC session setup is similar case with ad-hoc PoC group session except only one PoC subscriber is invited by the inviting PoC subscriber.

9.2.1 Ad-hoc PoC group session invitation from PoC client

In the following subchapters different setup scenarios are described from the inviting PoC client point of view.

Chapter 9.2.1.1 ‘Confirmed indication using on-demand session’ describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers has accepted the invitation using on-demand session establishment.

Chapter 9.2.1.2 ‘Unconfirmed indication using on-demand session’ describes a case where right-to-speak indication is given to the inviting PoC subscriber when the invited PoC subscribers is registered and uses automatic answer.

Chapter 9.2.1.3 ‘Confirmed indication using pre-established session’ describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers has accepted the invitation and the inviting PoC client has pre-established session.

Chapter 9.2.1.4 ‘Unconfirmed indication using pre-established session' describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers is registered and uses automatic answer and the inviting PoC client has a pre-estabblished session.

9.2.1.1 Confirmed indication using on-demand session

This subchapter describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers has accepted the invitation. Figure 8 shows the signalling flow for this scenario.

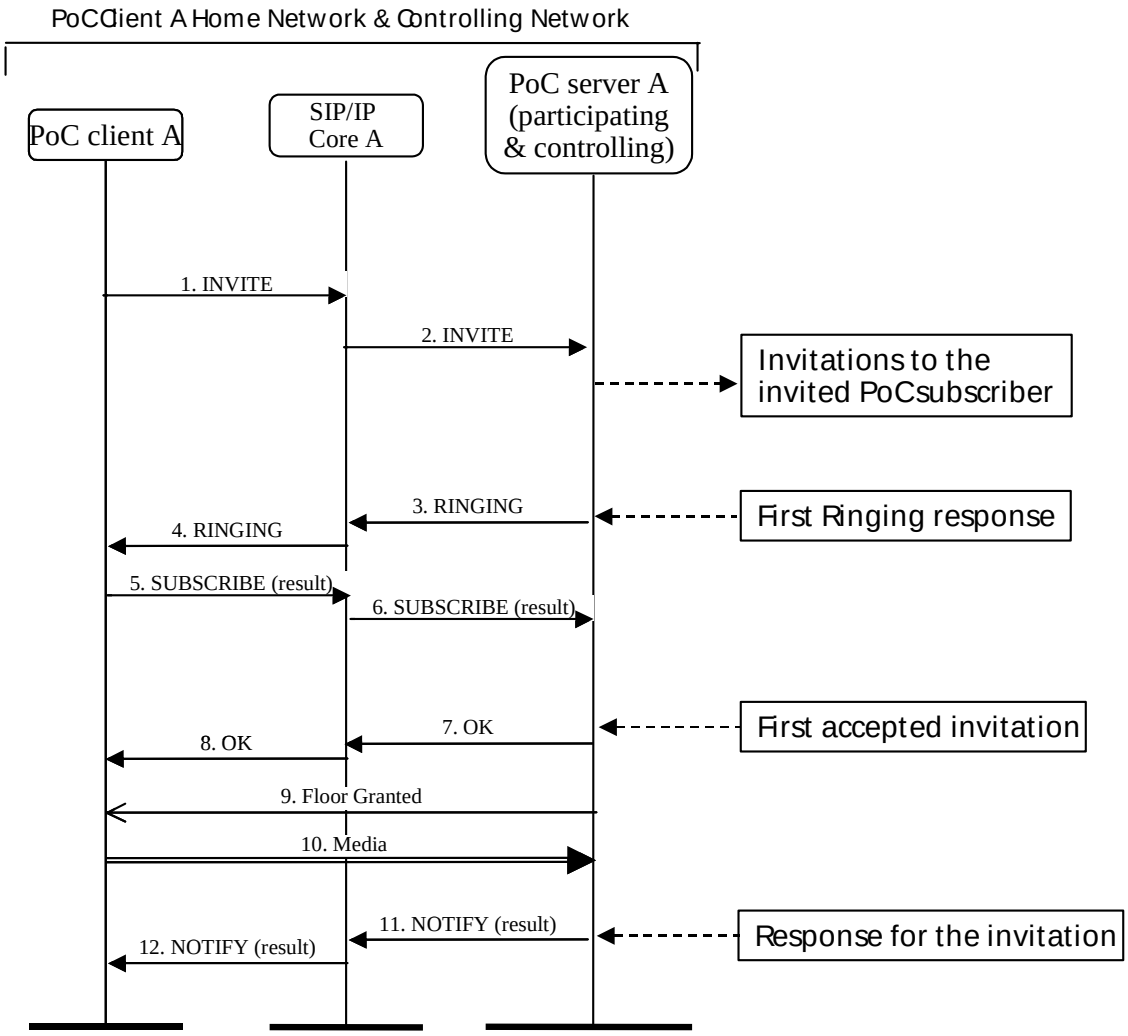


Figure 8: Confirmed indication using on-demand session

Editor's note: Figures will be modified slightly by the separate contribution providing power point slides.

1. PoC Client A initiates an ad-hoc PoC group session or 1-1 PoC session by sending an INVITE request to the home PoC network.

   Information elements contained in INVITE request:

   a. A list of PoC Addresses of invited PoC subscribers;

   b. Media parameters of PoC client A

   c. PoC service indication

   d. PoC Address of the PoC client A

2. SIP/IP core A routes the INVITE request to the PoC server A (participating & controlling) based on PoC Address of inviting PoC subscriber and PoC service indication.

   Information elements contained in INVITE request:

   a. Information elements contained in INVITE request:A list of PoC Addresses of invited PoC subscribers;

b. Media parameters of PoC client A

c. PoC service indication

d. PoC Address of the PoC client A

3. Since this is an ad-hoc PoC group session setup or 1-1 PoC session setup the PoC server A (participating & controlling) takes the roles of the PoC controlling function and PoC participating function. The PoC server A (participating & controlling) sends invitations to the PoC clients of the invited PoC subscribers as described in the chapter 9.2.2. When the first Ringing response is received the PoC server A (participating & controlling) sends ringing response towards the PoC Client A.

4. SIP/IP core A forwards the Ringing response to the PoC client A.

The steps 5 and 6 are optional depending on the configuration of the PoC client A.

5. The PoC client A sends SUBSCRIBE request in order to receive information about the result of the invitations. Information elements contained in SUBSCRIBE request:

   a. subscription to invitation results event

6. SIP/IP core A forwards SUBSCRIBE request to the PoC server A (participating & controlling)

   Information elements contained in SUBSCRIBE request:

   a. subscription to invitation results event

7. When the first PoC client accepts the PoC session request, the PoC server A (participating & controlling) sends OK response towards the PoC Client A. The OK response includes the following information:

   Information elements contained in OK response:

   a. Media parameters of PoC server A (participating & controlling)

8. SIP/IP core A forwards the OK response to the PoC client A.

   Information elements contained in OK response:

   a. Media parameters of PoC server A (participating & controlling)

9. Since one PoC participant is connected, the PoC server A (participating & controlling) sends the floor control message Floor Granted to the PoC Client A.

10. The PoC client A sends media to the PoC server A (participating & controlling).

For each invited PoC subscriber the following signalling is repeated if requested by the PoC client A in the steps 5 and 6:

Note: Throttling and aggregating of notifications is a subject to stage 3 specification.

11. When final response is received from an invited PoC subscriber, the PoC server A (participating & controlling) sends NOTIFY request to the PoC Client A with information of the final result. A final result can be

    a. The invited PoC subscriber accepted the invitation;

    b. The invited PoC subscriber rejected the invitation;

    c. The invited PoC subscriber is not reachable;

    d. The invited PoC subscriber is busy or

    e. The invited PoC subscriber did not answer

12. SIP/IP core A forwards the NOTIFY to the PoC client A.

If none of the invited PoC subscribers accepts the invitation, the PoC server A (participating & controlling) rejects the PoC session.

9.2.1.2 Unconfirmed indication using on-demand session

This subchapter describes a case where right-to-speak indication is given to the inviting PoC subscriber when the invited PoC subscriber is registered and uses automatic answer. Figure 9 shows the signalling flow for this scenario.

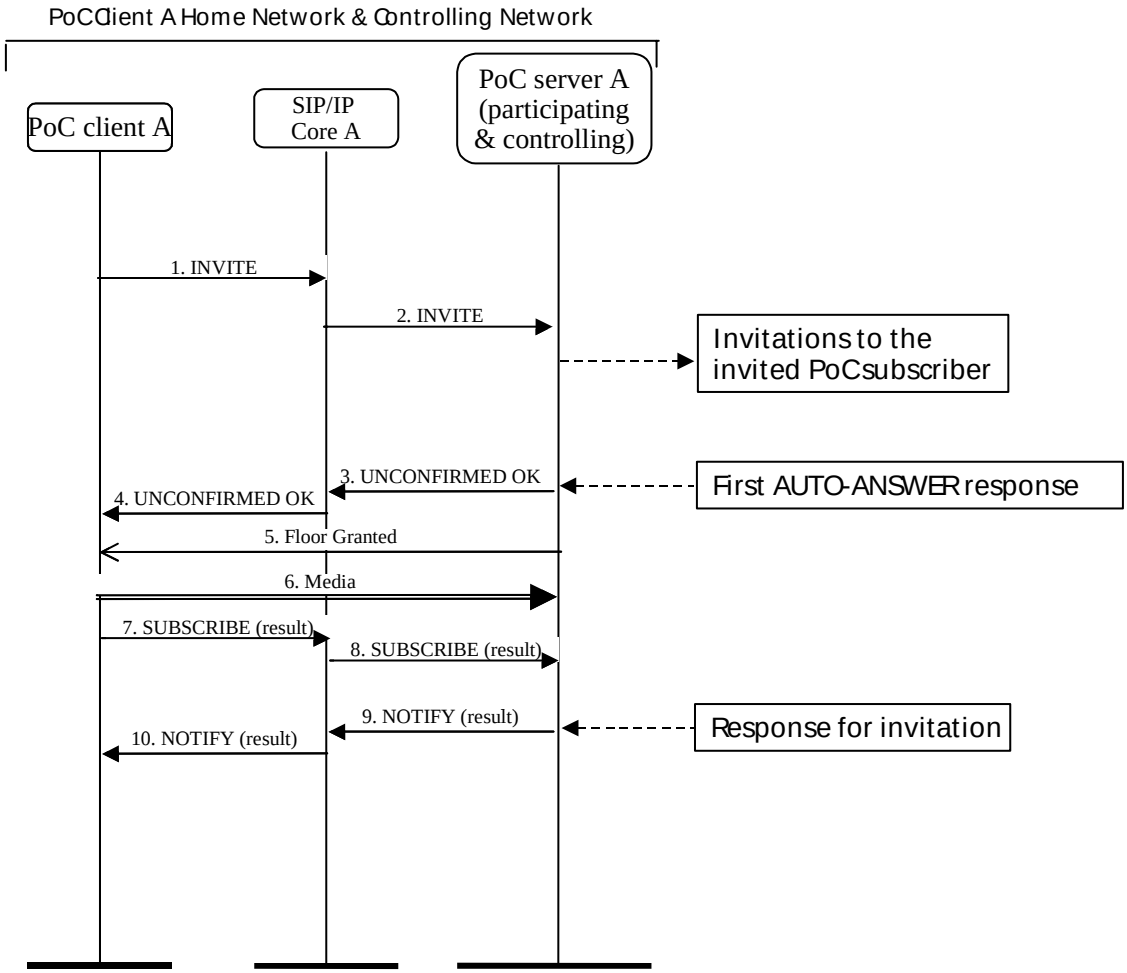


Figure 9: Unconfirmed indication using on-demand session

1. PoC Client A initiates an ad-hoc PoC group session or 1-1 PoC session by sending an INVITE request to the home PoC network.

   Information elements contained in INVITE request:

   a. A list of PoC Addresses of invited PoC subscribers;

   b. Media parameters of PoC client A

   c. PoC service indication

   d. PoC Address of the PoC client A

2. SIP/IP core A routes the INVITE request to the PoC server A (participating & controlling) based on PoC Address of inviting PoC client and PoC service indication.

   Information elements contained in INVITE request:

   a. A list of PoC Addresses of invited PoC subscribers;

   b. Media parameters of PoC client A

   c. PoC service indication

   d. PoC Address of the PoC client A

3. Since this is an ad-hoc PoC group session setup the PoC server A (participating & controlling) takes the roles of the PoC controlling function and PoC partipating function. The PoC server A (participating and controlling) sends invitations to the PoC clients of the invited PoC subscribers as described in the chapter 9.2.2. When the first Auto-answer response from the terminating side is received the PoC server A (participating & controlling) sends UNCONFIRMED OK response towards the PoC Client A indicating that none of the invited PoC subscribes are necessarily connected in the PoC session.

   Information elements contained in UNCONFIRMED OK response:

   a. Media parameters of PoC server A (participating & controlling)

4. SIP/IP core A forwards the UNCONFIRMED OK response to the PoC client A.

   Information elements contained in UNCONFIRMED OK response:

   a. Media parameters of PoC server A (participating & controlling)

5. The PoC server A (participating & controlling) sends the floor control message Floor Granted to the PoC client A.

6. The PoC client A sends media to the PoC server A (participating & controlling). The PoC server A (participating & controlling) buffers the media to be sent to the invited PoC clients when they are connected.

The steps 7 and 8 are optional depending on the configuration of the PoC client A.

7. PoC client A sends SUBSCRIBE request in order to receive information about the result of the invitations.

   Information elements contained in SUBSCRIBE request:

   a. subscription to invitation results event

8. SIP/IP core A forwards SUBSCRIBE request to the PoC server A (participating & controlling)

   Information elements contained in SUBSCRIBE request:

   a. subscription to invitation results event

For each invited PoC subscriber the following signalling is repeated if requested by PoC client A in the step 7 and 8:

9. When final response is received from an invited PoC subscriber, thePoC server A (participating & controlling) sends NOTIFY request towards the PoC Client A with information of the final result. A final result can be

   a. The invited PoC subscriber accepted the invitation;

   b. The invited PoC subscriber rejected the invitation;

   c. The invited PoC subscriber is not reachable;

d. The invited PoC subscriber is busy or

e. The invited PoC subscriber did not answer

10. SIP/IP core forward the NOTIFY to the PoC client A.

If none of the invited PoC subscribers accepts the invitation, the PoC server A (participating & controlling) rejects the PoC session.

9.2.1.3 Confirmed indication using pre-established session

This subchapter describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers has accepted the invitation and the inviting PoC client has pre-established session. Figure 10 shows the signalling flow for this scenario.

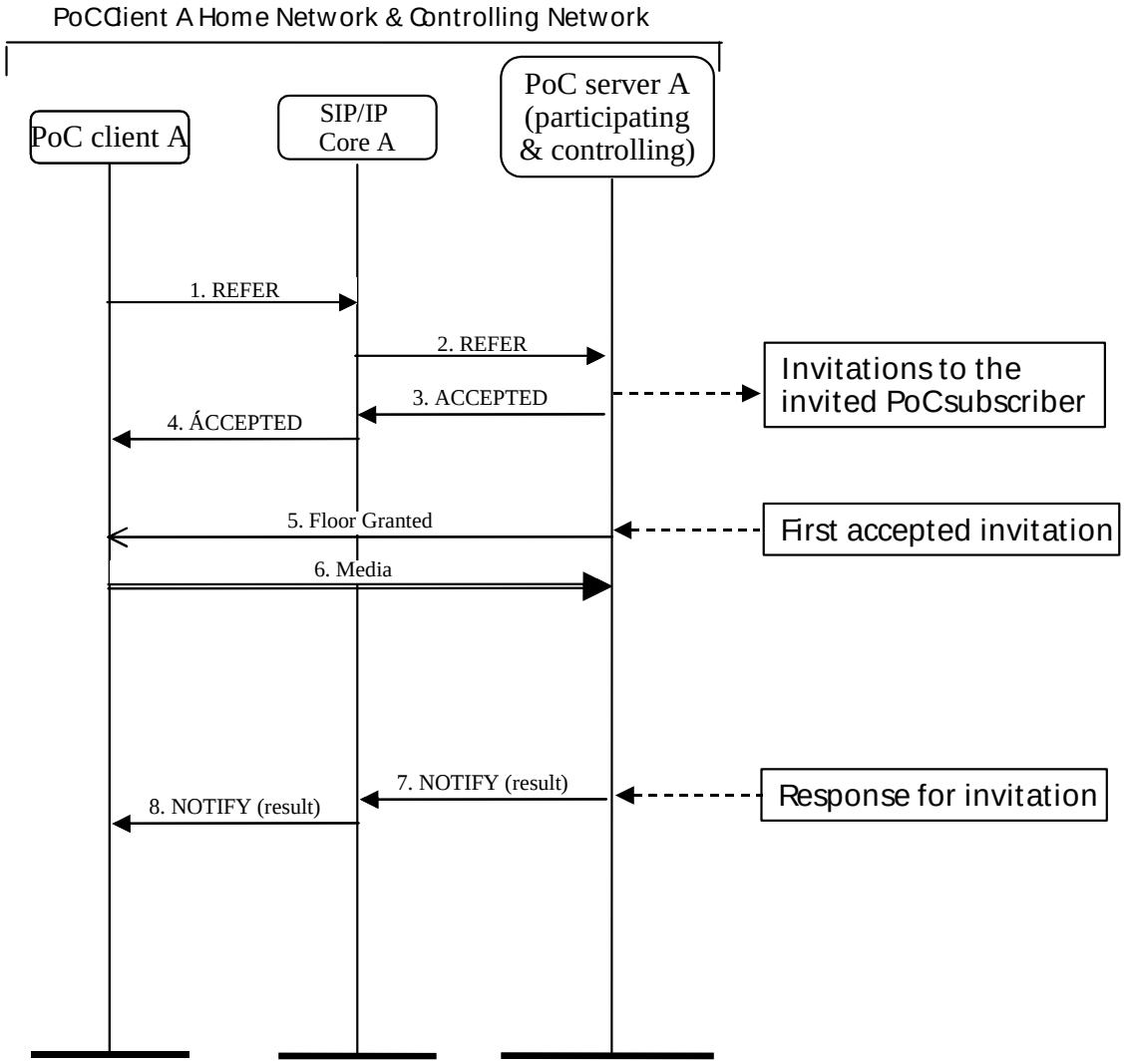


Figure 10: Confirmed indication using pre-established session

1. In this case PoC client A has a pre-established session with the PoC Server A (participating & controlling). PoC Client A initiates an ad-hoc PoC group session or 1-1 PoC session by sending REFER request to the home PoC network.

   Information elements contained in REFER request:

   a. A list of PoC Addresses of PoC subscribers to be invited

   b. PoC service indication

   c. PoC Address of the PoC client A

2. SIP/IP core A forwards the REFER request to the PoC server A (participating & controlling).

   Information elements contained in REFER request:

   a. A list of PoC Addresses of PoC subscribers to be invited

   b. PoC service indication

   c. PoC Address of the PoC client A

3. Since this is an ad-hoc PoC group session setup the PoC server A (participating & controlling) takes the roles of the PoC controlling function and PoC participant function. The PoC server A (participating & controlling) sends invitations to the PoC clients of the invited PoC subscribers as described in the chapter 9.2.2. The PoC server A (participating & controlling) sends ACCEPTED response towards the PoC Client A.

4. SIP/IP core A forwards the ACCEPTED response to the PoC client A.

5. When the first invited subscriber has accepted the invitation thePoC server A (participating & controlling) sends the floor control message Floor Granted to the PoC Client A.
6. The PoC client A sends media to the PoC server A (participating & controlling).

For each invited PoC subscriber the following signalling is repeated:

7. When final response is received from an invited PoC subscriber, the PoC server A (participating & controlling) sends NOTIFY request to the PoC Client A with information about the final result. A final result can be:

   a. The invited PoC subscriber accepted the invitation;

   b. The invited PoC subscriber rejected the invitation;

   c. The invited PoC subscriber is not reachable;

   d. The invited PoC subscriber is busy or

   e. The invited PoC subscriber did not answer.

8. The SIP/IP core A forwards NOTIFY to the PoC client A.

If none of the invited PoC subscribers accepts the invitation, the PoC server A (participating & controlling) rejects the PoC session.

9.2.1.4 Unconfirmed right-to-speak using pre-established session

This subchapter describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers is reachable and uses automatic answer and the inviting PoC client has a pre-established session. Figure 11 shows the signalling flow for this scenario.

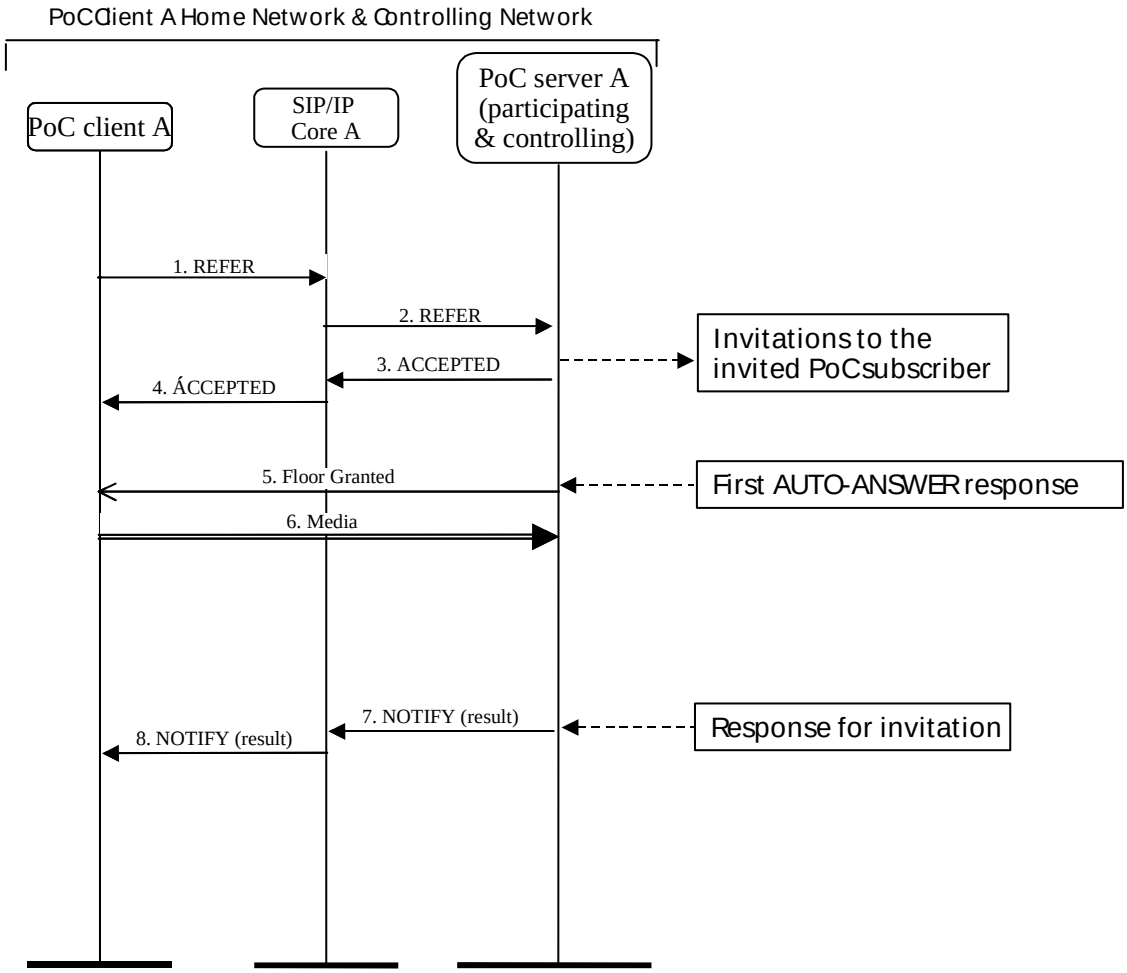


Figure 11: Unconfirmed indication using pre-established session

1. In this case PoC client A has a pre-established session with the PoC Server A (participating & controlling). PoC Client A initiates an ad-hoc PoC group session or 1-1 PoC session invitation request (SIP REFER) to the home PoC network.

   Information elements contained in REFER request:

   a. A list of PoC Addresses of PoC subscribers to be invited

   b. PoC service indication

   c. PoC Address of the PoC client A

2. SIP/IP core A forwards the REFER request to the PoC server A (participating & controlling).

   Information elements contained in REFER request:

   a. A list of PoC Addresses of PoC subscribers to be invited

   b. PoC service indication

   c. PoC Address of the PoC client A

3. Since this is an ad-hoc PoC group session setup the PoC server A (participating & controlling) takes the roles of the PoC controlling function and PoC participating function. The PoC server A (participating & controlling) sends invitations to the PoC clients of the invited PoC subscribers as described in the chapter 9.2.2. The Hosting PoC server sends ACCEPTED response towards the PoC Client A.

4. SIP/IP core A forwards the ACCEPTED response to the PoC client A.

5. When the first Auto-answer response is received from the terminating side, the PoC server A (participating & controlling) sends the floor control message Floor Granted to the PoC Client A.

6. The PoC client A sends media to the PoC server A (participating & controlling).

For each invited PoC subscriber the following signalling is repeated:

7. When final response is received from an invited PoC subscriber, the Hosting PoC server sends NOTIFY request towards the PoC Client A with information about the final result. A final result can be

    a. The invited PoC subscriber accepted the invitation;

    b. The invited PoC subscriber rejected the invitation;

    c. The invited PoC subscriber is not reachable;

    d. The invited PoC subscriber is busy or

    e. The invited PoC subscriber did not answer

8. SIP/IP core A forwards the NOTIFY to the PoC client A.

If none of the invited PoC subscribers accepts the invitation, the PoC server A (participating & controlling) rejects the PoC session.

9.2.2 Ad-hoc PoC group session invitation to the PoC Client

In the following subchapters different setup cases are described from the invited PoC client point of view.

Chapter 9.2.2.1 ‘Automatic answer case using on-demand session’ describes a scenario where the invited PoC subscriber has defined that the PoC session request from the inviting PoC subscriber is accepted automatically.

Chapter 9.2.2.2 ‘Automatic answer using pre-established session’ describes a scenario where the invited PoC subscriber has defined that the PoC session request from the inviting PoC subscriber is accepted automatically and the invited PoC client has a pre-established session connection with the PoC server.

Chapter 9.2.2.3 ‘Manual answer case using on-demand session’ describes a scenario where the invited PoC subscriber answers manually to the PoC session request.

9.2.2.1 Automatic answer using on-demand session

This subchapter describes a scenario where the invited PoC subscriber has defined that the PoC session request from the inviting PoC subscriber is accepted automatically and on-demand session establishment is used. Figure 12 shows signalling flow for this scenario.

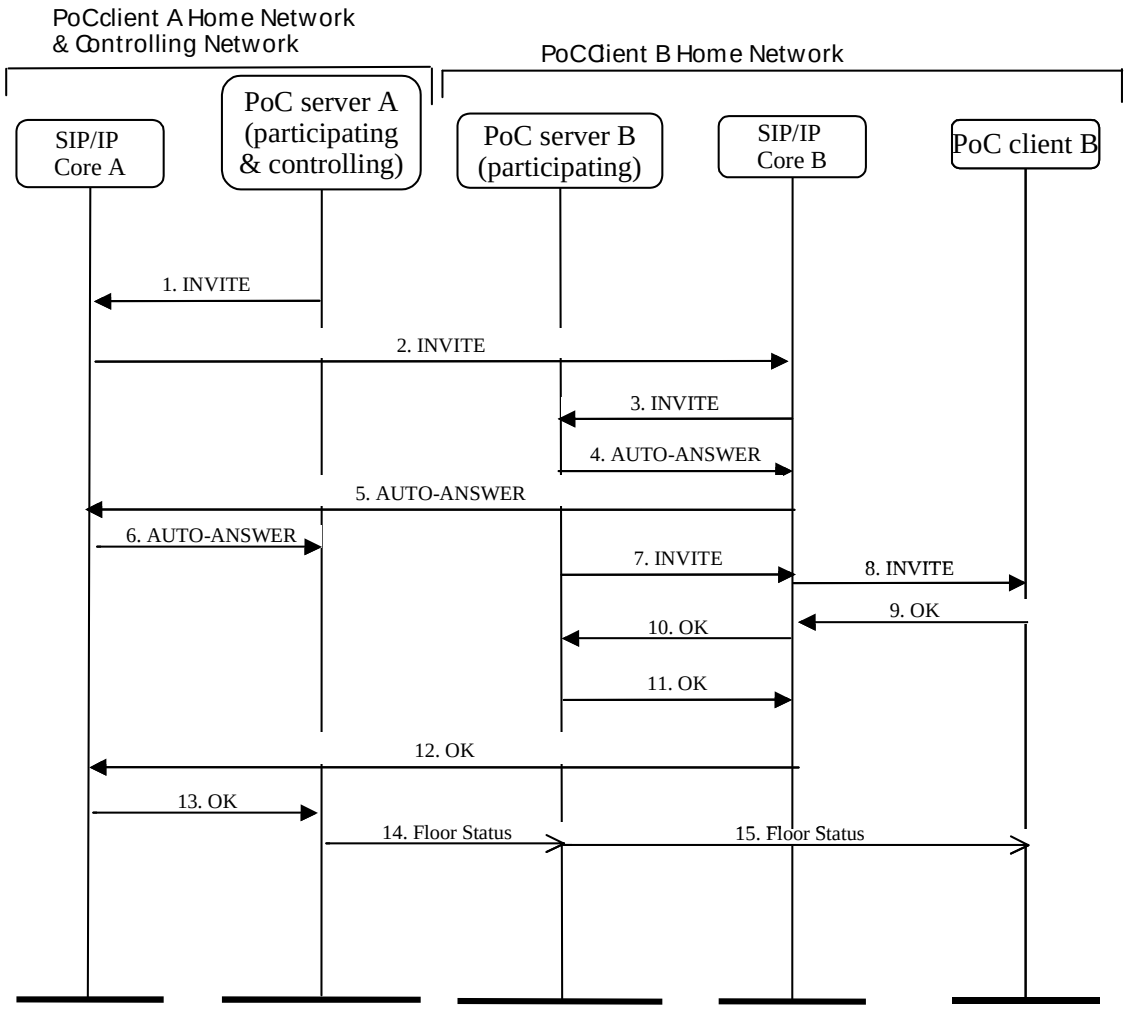


Figure 12: Automatic answer using on-demand session

1. PoC server A (participating & controlling) sends INVITE request to the SIP/IP core A.

   Information elements contained in INVITE request:

   a. PoC Address of invited PoC subscriber

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of the PoC client A

   e. Controlling PoC function assigned

2. SIP/IP core A routes the request to the PoC client B home network.

   Information elements contained in INVITE request:

   a. PoC Address of invited PoC subscriber

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

d. PoC Address of the PoC client A

e. Controlling PoC function assigned

3. SIP/IP core B routes the request to the PoC server B (participating) based on the PoC Address of invited PoC client and PoC service indication.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

4. Since in this case the PoC client B is accepting the session automatically, The PoC server B (participating) sends AUTO-ANSWER response back towards the controlling network. The AUTO-ANSWER response indicates that the automatic acceptance is used by the PoC client B.

5. SIP/IP core B forwards the AUTO-ANSWER response to the controlling network.

6. SIP/IP core A forwards the AUTO-ANSWER response to the PoC Server A (participating & controlling)

7. PoC Server B (participating) sends the PoC session setup request to the SIP/IP core B..

   Information elements contained in INVITE request:

   a. Media parameters of the PoC server B (participating), if PoC server B (participating) stays on the media and floor control path, otherwise media parameters received from the controlling network are included.

   b. PoC service indication

   c. Automatic acceptance indication

   d. PoC Address of PoC client B

   e. PoC Address of PoC client A

8. SIP/IP core B routes the INVITE request to the PoC client B.

   Information elements contained in INVITE request:

   a. Media parameters of the PoC server B (participating), if PoC server B (participating) stays on the media and floor control path, otherwise media parameters received from the controlling network are included.

   b. PoC service indication

   c. Automatic acceptance indication

   d. PoC Address of PoC client B

   e. PoC Address of PoC client A

9. When the PoC client B receives the INVITE request, the PoC Client B shall send OK response for the INVITE.

   Information elements contained in OK response:

   a. Media parameters of the PoC client B

10. SIP/IP core B forwards the OK response to the PoC server B (participating)

    Information elements contained in OK response:

    a. Media parameters of the PoC client B

11. When PoC Server B (participating) receives OK response it will forward it to towards controlling network. The OK response includes following information:

    Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parameters received from the PoC client B are included.

12. SIP/IP core B forwards the OK response to the controlling network

    Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parameters received from the PoC client B are included.

13. SIP/IP core A forwards the OK response to the PoC server A (participating & controlling)

    Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parametersreceived from the PoC client B are included.

14. ThePoC server A sends floor control message informing the PoC client B about the status of the floor (i.e. Floor Taken or Floor Idle message).

15. PoC server B (participating) relays the floor control message to the PoC client B.

9.2.2.2 Automatic answer using pre-established session

This subchapter describes a scenario where the invited PoC subscriber has defined that the PoC session request from the inviting PoC subscriber is accepted automatically and the invited PoC client has a pre-established session connection with the PoC server. Figure 13 shows signalling flow for this scenario.

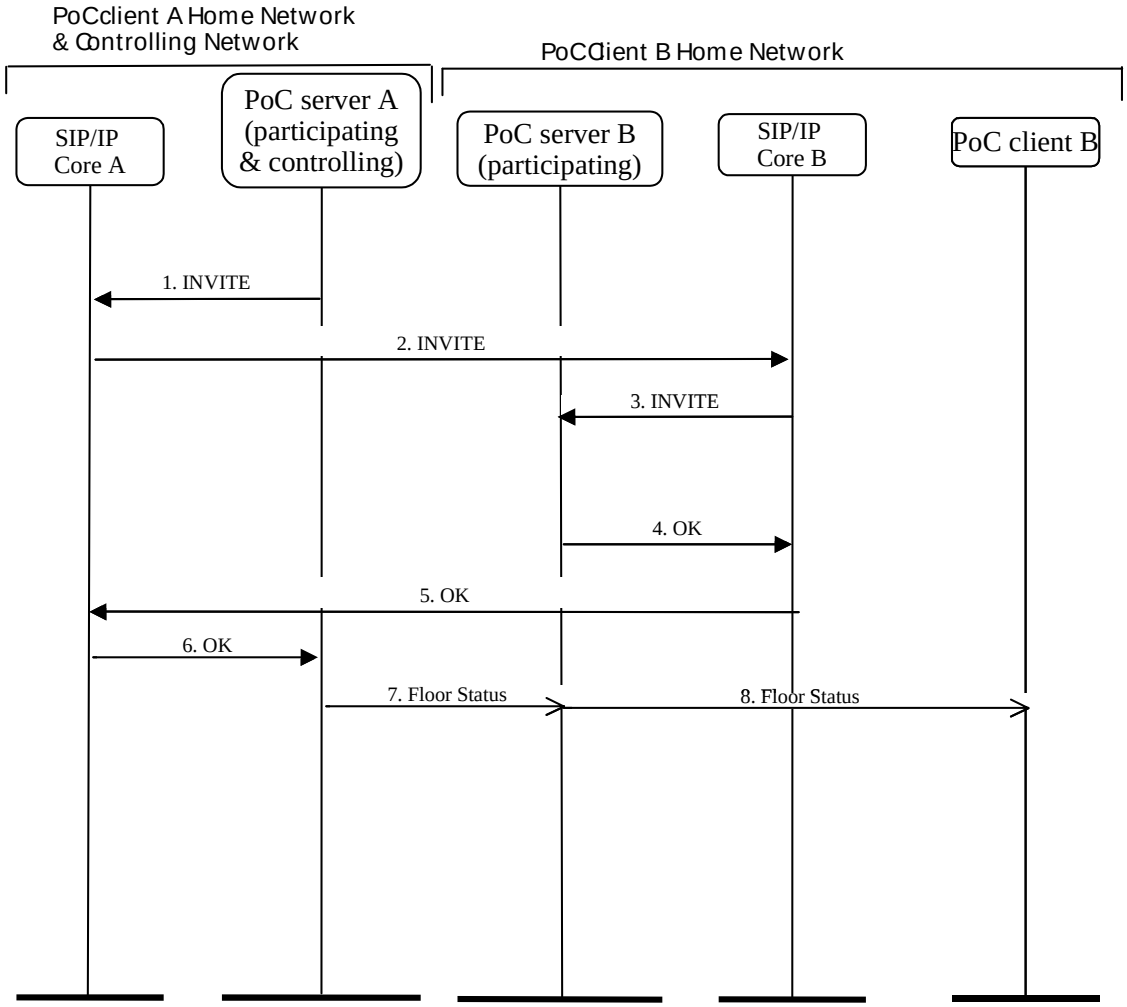


Figure 13: Automatic answer using pre-established session

1. PoC server A (participating & controlling) sends INVITE request to the SIP/IP core A.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

2. SIP/IP core A routes the request to the PoC client B home network.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

d. PoC Address of PoC client A

e. Controlling PoC function assigned indication

3. SIP/IP core B routes the request to the PoC server B (participating) based on PoC Address of PoC client and PoC service indication.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

4. Since in this case the PoC client B (participating) is accepting the session automatically and PoC client B has pre-established session with PoC server B, the PoC Server B sends OK response back towards the controlling network

   Information elements contained in OK response:

   a. Media parameters of PoC server B

5. SIP/IP core B forwards the OK response to the controlling network.

   Information elements contained in OK response:

   a. Media parameters of PoC server B

6. SIP/IP core A forwards the OK response to the PoC server A (participating & controlling)
   Information elements contained in OK response:

   a. Media parameters of PoC server B

7. The PoC server A (participating & controlling) sends floor control message informing PoC client B about the status of the floor (Floor Taken or Floor Idle).

8. The PoC server B (participating) relays the floor control message to the PoC client B.

9.2.2.3 Manual answer using on-demand session

This subchapter describes a scenario where the invited PoC subscriber answers manually to the PoC session request. Figure 14 shows signalling flow for this scenario.

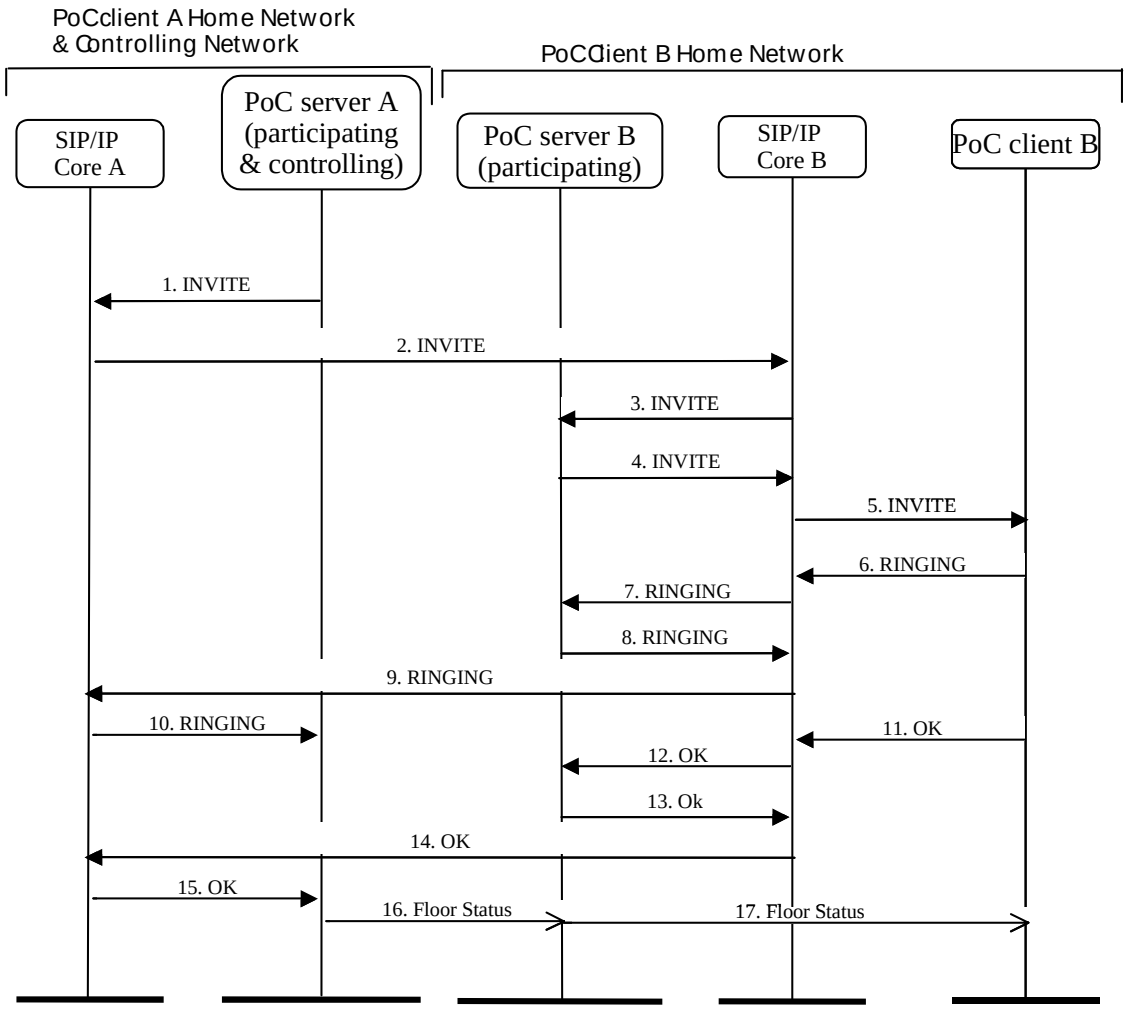


Figure 14: Manual answer using on-demand session

1. PoC server A (participating & controlling) sends INVITE request to the SIP/IP core A.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

2. SIP/IP core A routes the request to the PoC client B home network.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

d. PoC Address of PoC client A

e. Controlling PoC function assigned indication

3. SIP/IP core B routes the request to the PoC server B (participating) based on PoC Address of PoC client and PoC service indication.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server A (participating & controlling)

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

4. Since in this case the PoC client B is accepting the session manually the PoC server B (participating) sends INVITE request towards PoC client B.

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server B (participating) if PoC server B stays on the media and floor control path, otherwise media parameters received from the controlling network are included

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

5. SIP/IP core B routes the INVITE to the PoC client B

   Information elements contained in INVITE request:

   a. PoC Address of PoC client B

   b. Media parameters of PoC server B (participating) if PoC server B stays on the media and floor control path, otherwise media parameters received from the controlling network are included

   c. PoC service indication

   d. PoC Address of PoC client A

   e. Controlling PoC function assigned indication

6. When the PoC client B receives the INVITE request it prompts the PoC subscriber about the PoC session invitation and sends RINGING response.

7. SIP/IP core B forwards the RINGING response to the PoC server B (participating).

8. PoC Server B (participating) forwards RINGING response towards controlling network.

9. SIP/IP core B forwards the RINGING response to the controlling network.

10. SIP/IP core A forwards the RINGING response to the PoC server A (participating & controlling).

11. When the PoC subscriber B accepts the invitation, the PoC Client B sends OK response for the INVITE.

Information elements contained in OK response:

a. Media parameters of the PoC client B

12. SIP/IP core B forwards the OK response to the PoC server B (participating)

    Information elements contained in OK response:

    a. Media parameters of the PoC client B

13. When PoC Server B (participating) receives OK response it will forward it towards controlling network. Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parameters received from the PoC client B are included.

14. SIP/IP core B forwards the OK response to the controlling network

    Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parameters received from the PoC client B are included.

15. SIP/IP core A forwards the OK response to the PoC server A (participating & controlling)

    Information elements contained in OK response:

    a. Media parameters of PoC server B if PoC server B (participating) stays on the media and floor control path, media parameters received from the PoC client B are included.

16. When receiving OK response, the PoC server A (participating & controlling) sends floor control message informing the PoC Client B about the status of the floor.

17. PoC server B (participating) relays the floor control message to the PoC client B.

9.3 Pre-arranged PoC Group Session Setup

A pre-arranged PoC group is a group having pre-defined group identity and member list. A pre-arranged PoC group session is initiated by one of the members. When a pre-arranged PoC group session is initiated, all other group members are invited. The pre-arranged PoC group session is established by using the group identity ~~as an address~~ in the invitation message.

~~Originating part~~9.3.1 Pre-arranged PoC session invitation from PoC client

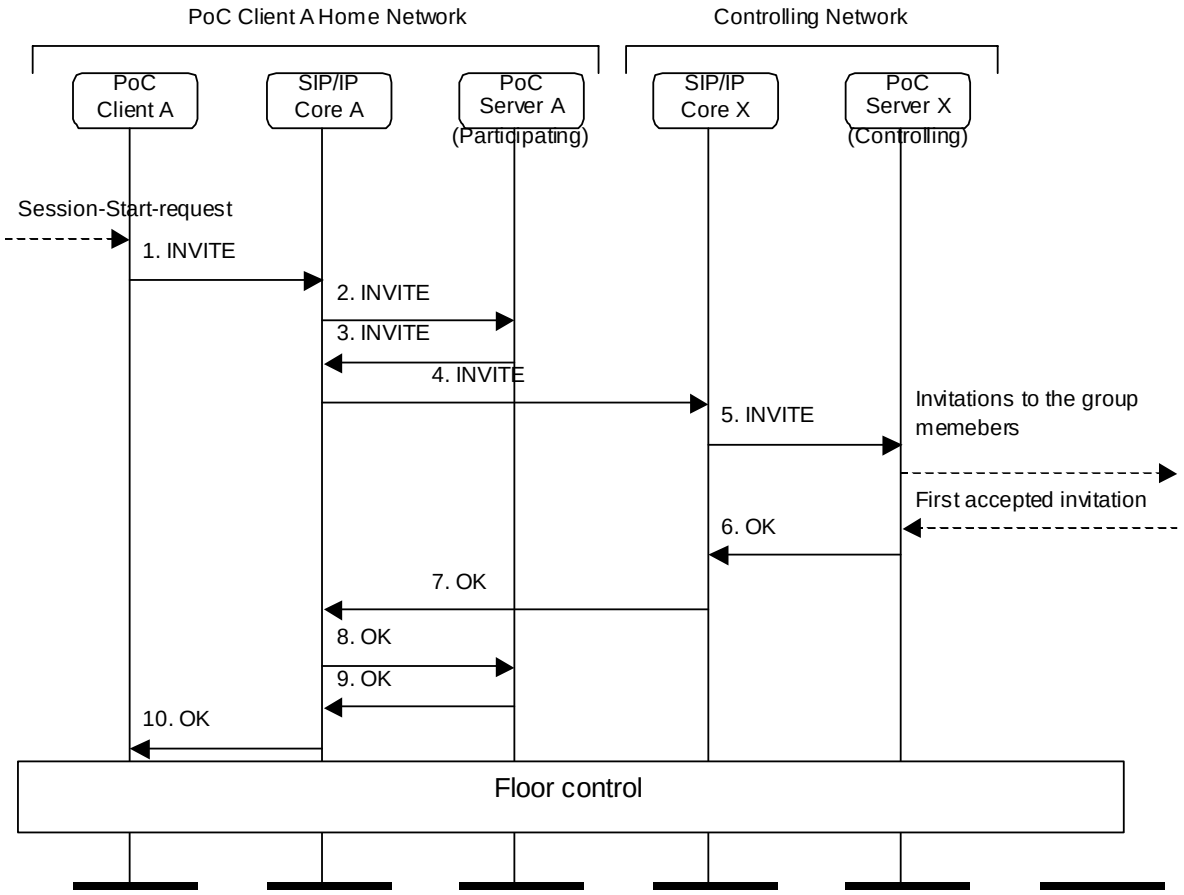
Chapter 9.3.1.1 'Confirmed indication using on-demand session' describes a case where right-to-speak indication is given to the inviting PoC subscriber when one of the invited PoC subscribers has accepted the invitation using on-demand session establishment.

Chapter 9.3.1.2 'Unconfirmed indication using on-demand session' describes a case where right-to-speak indication is given to the inviting PoC subscriber when the invited PoC subscribers is registered and uses automatic answer.

~~to be added (initiate the session) The signaling messages exchanged to establish a Pre-Arranged PoC Group session the initial INVITE with the already existing identifier into the group for the Request URI.~~

9.3.1.1 ~~Confirmed case~~ Confirmed indication using on-demand session

In this case, the originator shall confirm the event that at least one of the PoC group member has been connected before he starts speaking. In the figure 12, the right-to-speak indication in the floor control follows the confirmation from the PoC server X (controlling).~~to be added (initiate the session)~~



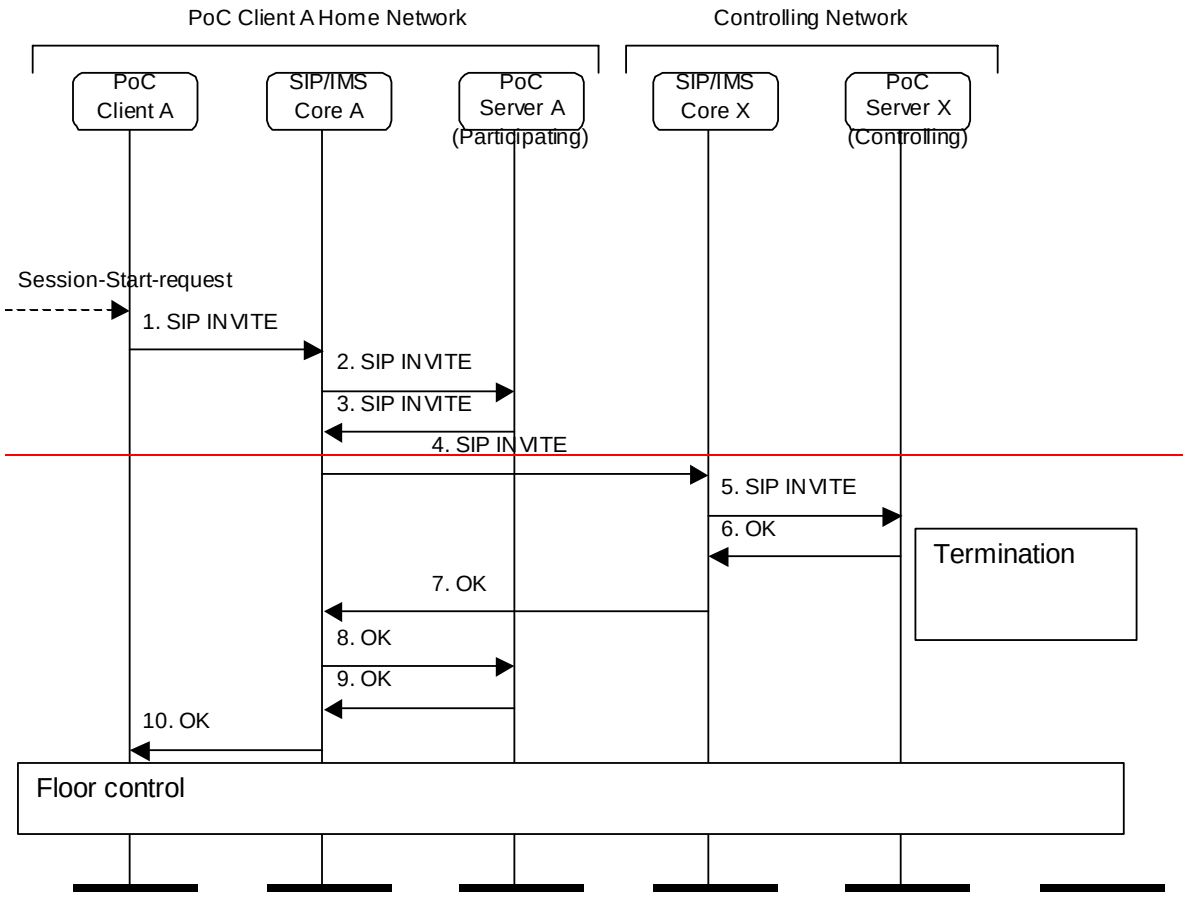


Figure 15: Pre-arranged Group Session Set-up, Originating part

~~Editor's note: Word "SIP" shall be removed from the message name at this stage.~~

Editor's note: For the confirmed mode, handling the ringing is missing. Contribution expected.

1. The PoC Client A sends an INVITE request to the address of the Pre-arranged PoC Group.

   Information Elements contained in the INVITE request:

   a. Pre-arranged Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. Media parameters of PoC client A.

2. The SIP/IP Core A routes the INVITE request to the participating PoC Server A trigged on the PoC service indication and PoC Address.

   Information Elements contained in the INVITE request:

   a. Pre-arranged Group Identity

   b. PoC Address of the user initiating this PoC Session

c. PoC service indication

d. Media parameters of PoC client A.

3. The participating PoC Server A identifies that the Pre-arranged PoC Group is not hosted in this PoC Server therefore it sends the request to the SIP/IP Core A.

   Information Elements contained in the INVITE request:

   a. Pre-arranged Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

4. The SIP/IP Core A routes the request according to the routing principles to SIP/IP Core X, according to the routing principles described in the chapter 8.4.

   Information Elements contained in the INVITE request:

   a. Pre-arranged Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

5. The SIP/IP Core X routes the request to the controlling PoC Server X based on Pre-arranged PoC Group identity. If the Pre-arranged PoC Group identity is used for other services (e.g. messaging) that are hosted on other application servers then the SIP/IP Core needs to use PoC service indication to route to the PoC server.

   The PoC Server X performs the necessary terminating service control (e.g. authorizes the PoC Client A) and if the PoC address of the user initiating the PoC session is authorized successfully, the PoC server X invites the other members to the pre-arranged PoC session as described in chapter 9.3.2.

   Information Elements contained in the INVITE request:

   a. Pre-arranged Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

6-8. ~~The PoC Server X performs the necessary terminating service control (e.g. authorizes the PoC Client A) and if the PoC Address of the user initiating the PoC session is authorized successfully.~~

~~Editor's note: Refer to the termination part: according to the member list. The poc server x sends invitation to the pre-arranged PoC group members as described in the chapter 9.3.2.~~

When the first PoC client accepts the pre-arranged PoC session invitation, the PoC Server X sends an OK response to the PoC Server A (participating) along the same signaling path.

Information Elements contained in the OK response:

a. PoC Server X (controlling) selected media parameters.

9-10. The PoC Server A sends an OK response to the PoC Client A along the same signaling path.

Information Elements contained in the OK response:

a. PoC Server A (participating) selected media parameters.

Note: This high level flow describes a case where a subscription to the invitation results is not used. The case where the subscription is used is similar to the subclause 9.2.1.1.

9.3.1.2 Unconfirmed indication using on-demand session ~~case~~

~~to be added (initiate the session)~~ In this case, the originator does not have to confirm that the PoC group members have been connected before he starts speaking: he can immediately speak after he receives the unconfirmed indication from the PoC server X (Controlling). The figure x shows the high level flow of this scenario.

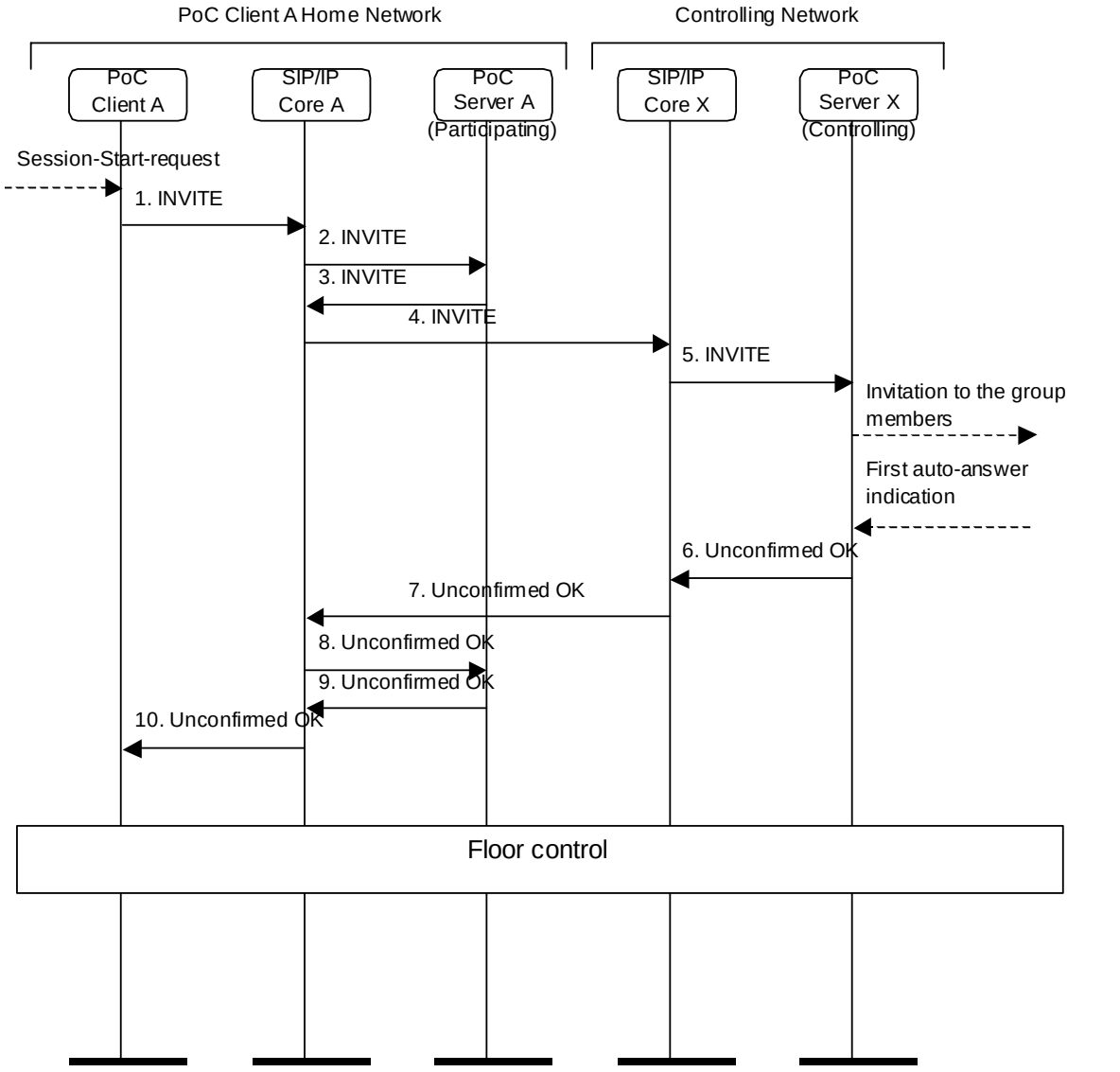


Figure 16. Unconfirmed indication using on-demand session.

1. The PoC Client A sends an INVITE request to the address of the Pre-arranged PoC Group.

Information Elements contained in the INVITE request:

a. Pre-arranged Group Identity

b. PoC Address of the PoC client A

c. PoC service indication

d. Media parameters of the PoC client A.

2. The SIP/IP Core A routes the INVITE request to the participating PoC Server A trigged on the PoC service indication and PoC address.

Information Elements contained in the INVITE request:

a. Pre-arranged Group Identity

b. PoC Address of the PoC client A

c. PoC service indication

d. Media parameters of the PoC client A.

3. The participating PoC Server A identifies that the Pre-arranged PoC Group is not hosted in this PoC Server therefore it sends the request to the SIP/IP Core A.

Information Elements contained in the INVITE request:

a. Pre-arranged Group Identity

b. PoC Address of the PoC client A

c. PoC service indication

d. PoC server A (participating) selected media parameters.

4. The SIP/IP Core A routes the request according to the routing principles to SIP/IP Core X, according to the routing principles described in the chapter 8.4.

Information Elements contained in the INVITE request:

a. Pre-arranged Group Identity

b. PoC Address of the PoC client A

c. PoC service indication

d. PoC server A (participating) selected media parameters.

5. The SIP/IP Core X routes the request to the controlling PoC Server X based on Pre-arranged PoC Group identity. If the Pre-arranged PoC Group identity is used for other services (e.g. messaging) that are hosted on other application servers then the SIP/IP Core needs to use PoC service indication to route to the PoC server.

The PoC Server X performs the necessary terminating service control (e.g. authorizes the PoC Client A) and if the PoC address of the user initiating the PoC session is authorized successfully, the PoC server X invites the other members to the pre-arranged PoC session as described in 9.3.2.

Information Elements contained in the INVITE request:

a. Pre-arranged Group Identity

b. PoC Address of the PoC client A

c. PoC service indication

d. PoC server A (participating) selected media parameters.

6-8. When the PoC Server X receives the first auto-answer indication, it sends the Unconfirmed OK to the PoC server A through the signaling path.

Information Elements contained in the Unconfirmed OK:

a. PoC server X (controlling) selected media parameters.

9-10. The PoC Server A sends an Unconfirmed OK response to the PoC Client A along the same signaling path.

Information Elements contained in the Unconfirmed OK response:

PoC Server A (participating) selected media parameters.

Note: This high level flow describes a case where a subscription to the invitation results is not used. The case where the subscription is used is similar to the subclause 9.2.1.2.

9.3.2 Terminating part

Depending on the PoC client's setting, two cases are possible, Auto-answer and manual-answer.

~~to be added (initiate the session)~~

9.3.2.1 Auto-answer case

In this case, the terminating PoC client automatically answers the connection request by the PoC server and the user is able to hear the voice. The figure x shows the high level flow of this scenario.

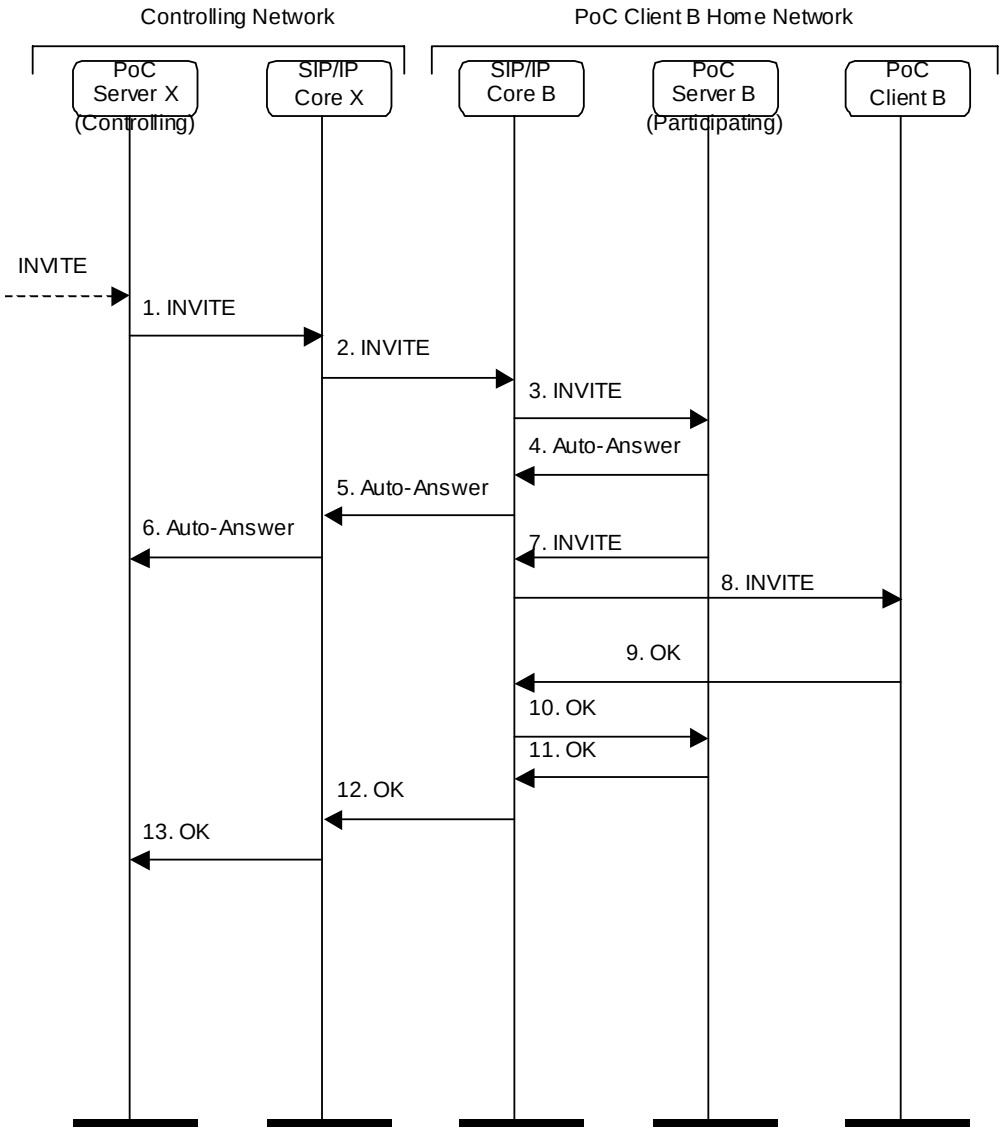


Figure 17. Terminating part, autonaswer case.

1 PoC server X (controlling) sends an INVITE request to the SIP/IP core X.

Information elements contained in the INVITE request:

PoC Address of the PoCclient A

Media parameters of PoC server X (controling)

PoC service indication

PoC address of the PoC client B

Controlling PoC function assigned

2 SIP/IP core X routes the request to the PoC client B home network.

Information elements contained in the INVITE request:

PoC Address of the PoC client A

Media parameters of PoC server X (controling)

PoC service indication

PoC address of the PoC client B

Controlling PoC function assigned

3 SIP/IP core B routes the request to the PoC server B based on the PoC address of invited PoC client and PoC service indication.

Information elements contained in the INVITE request:

PoC Address of the PoC client A

Media parameters of PoC server X (controling)

PoC service indication

PoC address of the PoC client B

Controlling PoC function assigned

4 - 6 The PoC server B sends Auto-Answer indication to the PoC Server X throught the signaling path.

7 The PoC Server B sends an INVITE request to the SIP/IP core B..

Information elements contained in the INVITE request:

PoC service indication

Automatic acceptance indication

PoC address of PoC client B

PoC address of PoC client A

Media parameters of PoC server B (participating)

8 SIP/IP core B routes the INVITE request to the PoC client B.

Information elements contained in the INVITE request:

PoC service indication

Automatic acceptance indication

PoC address of PoC client B

PoC address of PoC client A

Media parameters of PoC server B (participating)

9 - 13 When the PoC client B receives the INVITE request, the PoC Client B shall send OK response for the INVITE. The OK response is sent to the PoC server X through the signalling connection.

9.3.2.2 Manual answer case

In this case, the terminating PoC client indicates the incoming connection request and the user responds the request. The figure x shows the high level flow of this scenario.

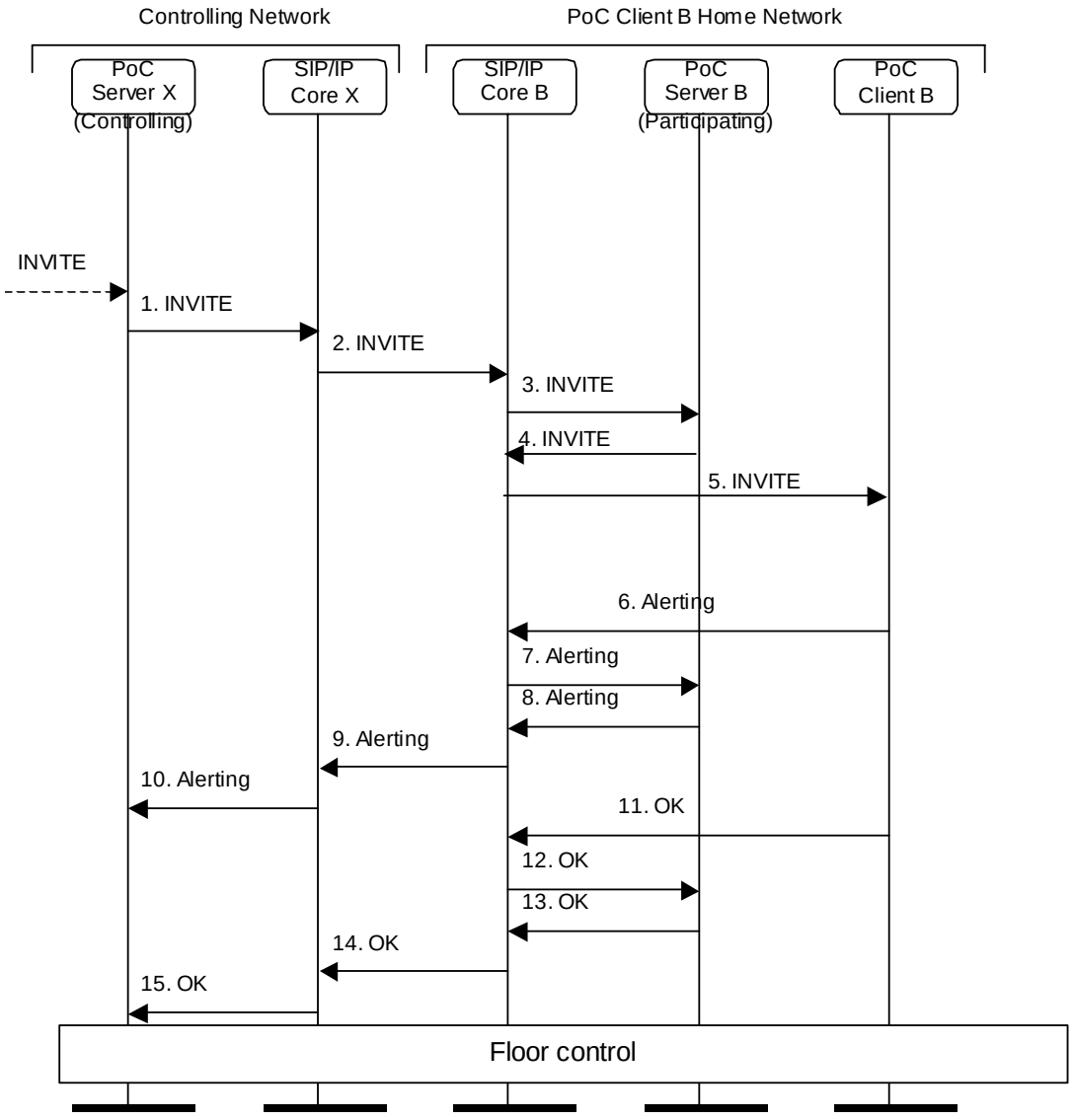


Figure 18. Terminating part, manual answer

1 PoC server X (controlling) sends an INVITE request to the SIP/IP core X.

Information elements contained in the INVITE request:

- PoC Address of the PoC client A
- Media parameters of PoC server X (controlling)
- PoC service indication
- PoC address of the PoC client B
- Controlling PoC function assigned

2 SIP/IP core X routes the request to the PoC client B home network.

Information elements contained in the INVITE request:

- PoC Address of the PoC client A
- Media parameters of PoC server X (controlling)
- PoC service indication
- PoC address of the PoC client B
- Controlling PoC function assigned

3 SIP/IP core B routes the request to the PoC server B based on the PoC address of invited PoC client and PoC service indication.

Information elements contained in the INVITE request:

- PoC Address of the PoC client A
- Media parameters of PoC server X (controlling)
- PoC service indication
- PoC address of the PoC client B
- Controlling PoC function assigned

4 The PoC Server B sends an INVITE request to the SIP/IP core B.

Information elements contained in the INVITE request:

- PoC service indication
- PoC address of PoC client B
- PoC address of PoC client A
- Media parameters of PoC server B (participating)

5 SIP/IP core B routes the INVITE request to the PoC client B.

Information elements contained in the INVITE request:

PoC service indication

PoC address of PoC client B

PoC address of PoC client A

Media parameters of PoC server B (participating)

The PoC client B indicates the PoC session is going to start.

6 - 10 When the PoC client B sends back the alerting indication to the PoC server X through the signalling connection.

11 - 15 When the PoC client B receives the indication that the user accept the PoC session, the PoC Client B sends OK response for the INVITE. The OK response is sent to the PoC server X through the signalling connection.

Editor's note: ~~Additional contributions expected.~~Manual answer override is not covered. Contribution expected.

9.4 Chat PoC Group Session Setup

To join a Chat PoC Group session, a PoC Client sends a request to join the pre-defined Chat Group. The Chat PoC Group MAY be hosted either in PoC subscriber's home PoC network or in a remote PoC network.

The PoC Server hosting the Chat PoC group SHALL accept any invitation request if the type of group is an open group. If the type of group is a restricted group then the invitation request SHALL only be accepted if the calling user is a member of the restricted group. In both cases the total number of group participants SHALL NOT exceed the group participant limit.

Figure 19 shows the high-level signaling procedure when a user joins a Chat PoC Group session existing in another network.

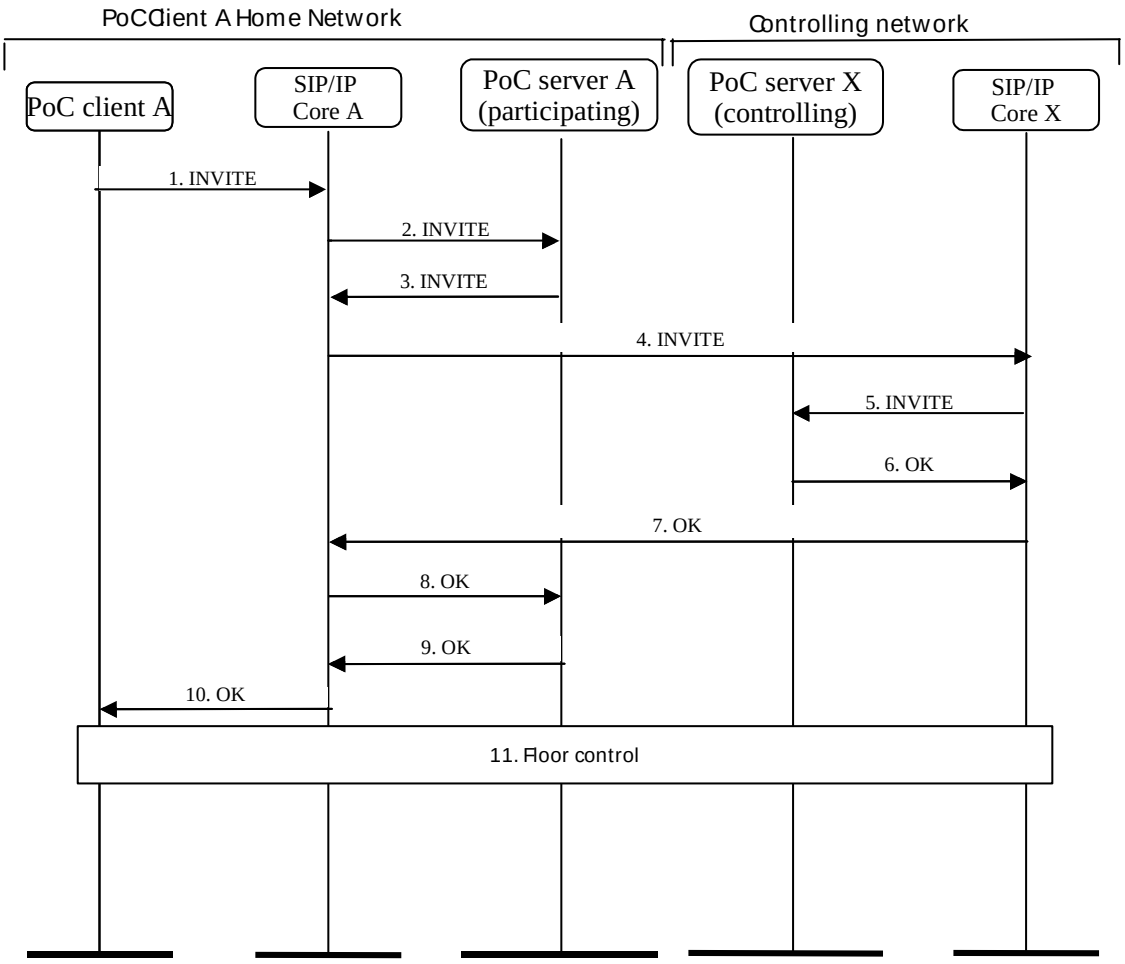


Figure 19: Joining the Chat PoC Group session

1. The PoC Client A sends an INVITE request to the address of the Chat PoC Group.

   Information Elements contained in INVITE request:

   a. Chat Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. Media parameters of PoC client A.

2. The SIP/IP Core A routes the INVITE request to the participating PoC Server A trigged on the PoC service indication and PoC Address.

   Information Elements contained in INVITE request:

   a. Chat Group Identity

b. PoC Address of the user initiating this PoC Session

c. PoC service indication

d. Media parameters of PoC client A.

3. The participating PoC Server A identifies that the Chat PoC Group is not hosted in this PoC Server therefore it sends the request to the SIP/IP Core A.

   Information Elements contained in INVITE request:

   a. Chat Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

4. The SIP/IP Core A routes the request according to the routing principles to SIP/IP Core X. The routing principles are described in the chapter 8.4.

   Information Elements contained in INVITE request:

   a. Chat Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

5. The SIP/IP Core X routes the request to the controlling PoC Server X based on Chat PoC Group identity. If the Chat PoC Group identity is used for other services (e.g. messaging) that are hosted on other application servers then the SIP/IP Core needs to use PoC service indication to route to the PoC server. OK ?

   Information Elements contained in INVITE request:

   a. Chat Group Identity

   b. PoC Address of the user initiating this PoC Session

   c. PoC service indication

   d. PoC server A (participating) selected media parameters.

6-8. The PoC Server X performs the necessary terminating service control (e.g. authorizes the PoC Client A) and if the PoC Address of the user initiating the PoC session is authorized successfully. The user is added to the Chat PoC Group session. The PoC Server X sends an OK response to the PoC Server A (participating) along the same signaling path.

   Information Elements contained in OK response:

   a. PoC Server X (controlling) selected media parameters.

9-10. The PoC Server A sends an OK response to the PoC Client A along the same signaling path.

   Information Elements contained in OK response:

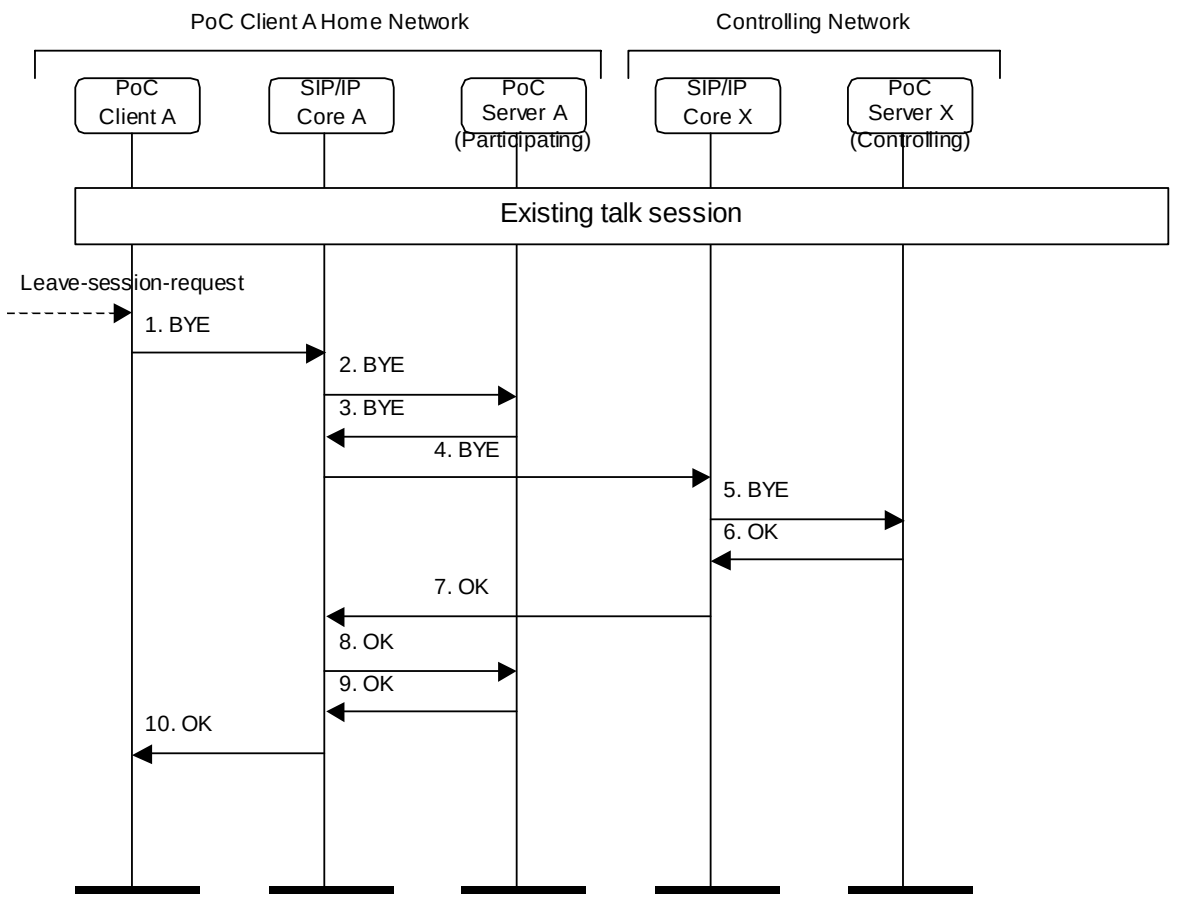
   a. PoC Server A (participating) selected media parameters.

11. Floor control is made and media transmitted as described in the chapter 9.x.

Editor's note: The reference shall be added, when available.

9.5 Leaving PoC Group Session

Any group participant may leave the group session~~, and later re-join the group session if the session still exists and if the number of participants is under the maximum limit.~~ When the PoC –group session initiator leaves the group session, whether the group session is ended or not depends on the group policy. Figure 20 shows the high-level signalling procedure for leaving the PoC group.



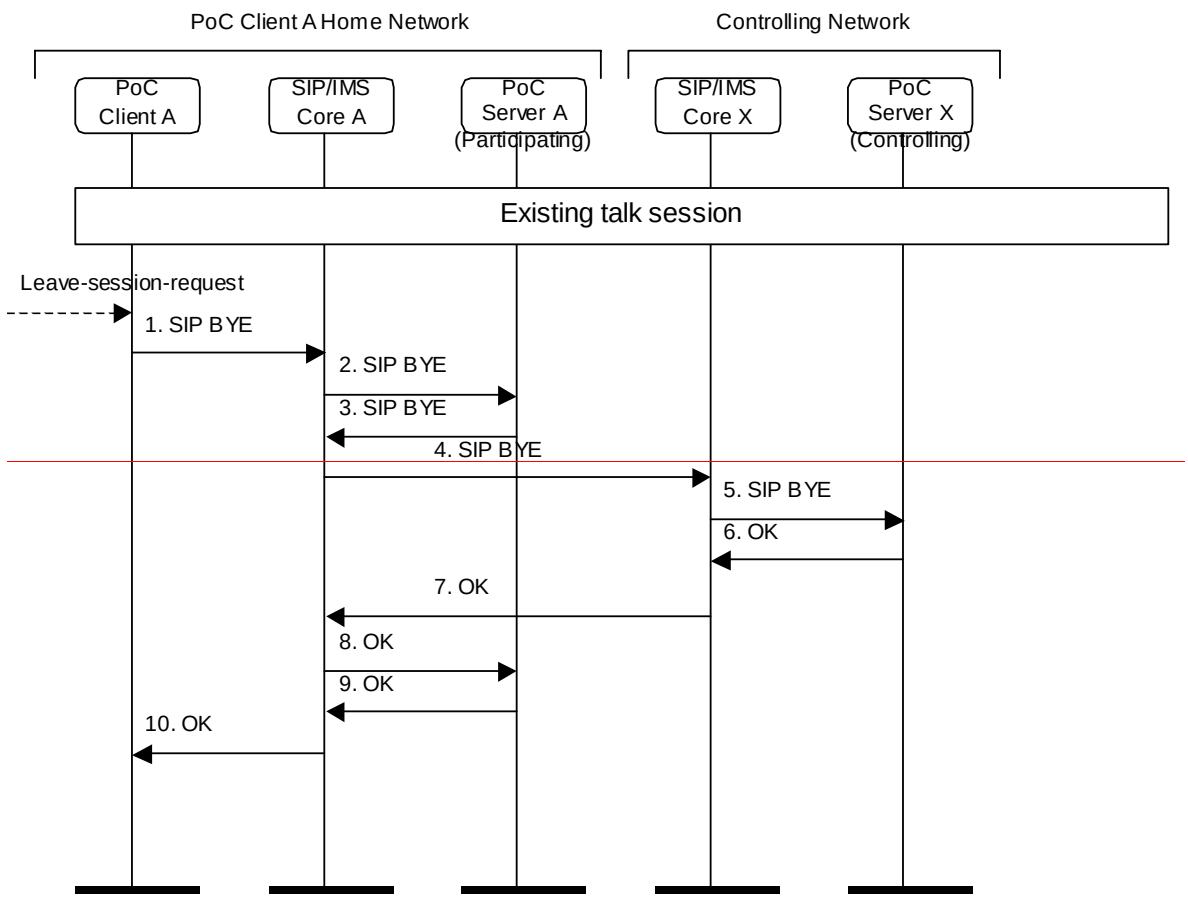


Figure 20: Leaving the PoC group session

~~Editor's note: Word "SIP" shall be removed from the message name at this stage.~~

Note: PoC client A can be any of the PoC~~poc~~ clients participating in the session.

1-5 The PoC Client A sends a BYE request through the signaling path to the PoC Server X.

Information Elements contained in the BYE request:

a. PoC Address of the user leaving this PoC Session

6 - 10 Upon receiving the request, the PoC Server X (Controlling) performs the necessary procedures to remove the PoC Client A. The PoC Server X (Controlling) sends an OK response to the PoC Client A through the signaling path which has routed the request. This event is informed to other PoC clients as described in the chapter 9.11.~~The PoC Client A stores the contact address of the PoC Server X (Controlling).~~

9.6 Re-joining PoC ~~a~~ Group Session

~~Editor's note: Contribution expected.~~

When the user wishes to rejoin the PoC group session, he issues INVITE request to the PoC server. The PoC server adds the user to the PoC group session if it is still ongoing, otherwise it is rejected.

Figure x shows the high-level signalling procedure of re-joining the PoC group session.

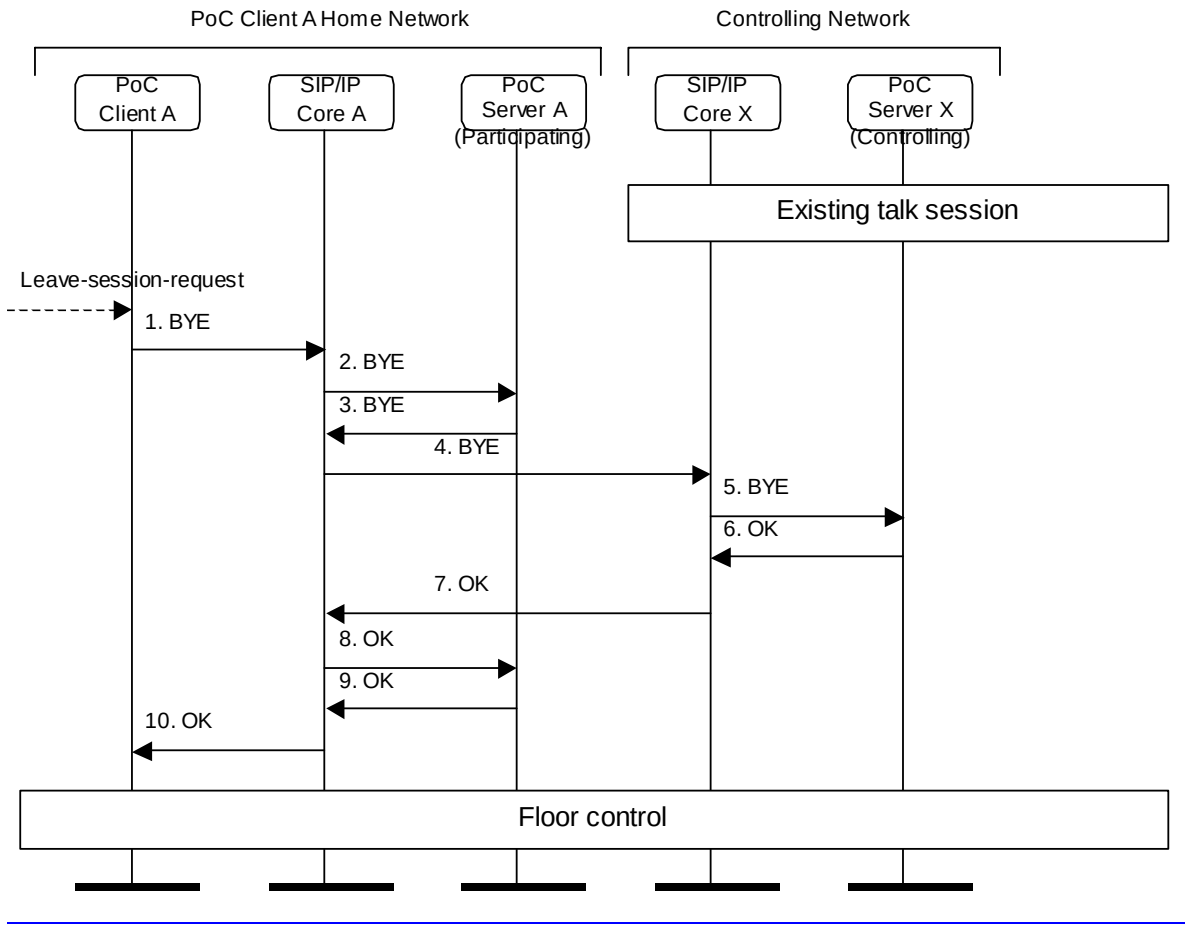


Figure 21. Rejoining the PoC group session

1. The PoC Client A sends an INVITE request to the address of the Pre-arranged PoC Group.

Information Elements contained in the INVITE request:

- Pre-arranged Group List
- PoC service indication

Editors note: The method of identifying the PoC group session is FFS.

2. The SIP/IP Core A routes the INVITE request to the participating PoC Server A trigged on the PoC service indication and PoC address.

Information Elements contained in the INVITE request:

- Pre-arranged Group List
- PoC service indication

3. The participating PoC Server A identifies that the Pre-arranged PoC Group is not hosted in this PoC Server therefore it sends the request to the SIP/IP Core A.

Information Elements contained in the INVITE request:

- Pre-arranged Group List
- PoC service indication

4. The SIP/IP Core A routes the request to SIP/IP Core X according to the routing principles described in the chapter 8.4.

Information Elements contained in the INVITE request:

- Pre-arranged Group List
- PoC service indication

5. The SIP/IP Core X routes the request to the controlling PoC Server X based on Pre-arranged PoC Group identity. If the Pre-arranged PoC Group identity is used for other services (e.g. messaging) that are hosted on other application servers then the SIP/IP Core needs to use PoC service indication to route to the PoC server.

Information Elements contained in the INVITE request:

- Pre-arranged Group List
- PoC service indication

6 - 10 Upon receiving the request, the PoC Server X performs the necessary procedures to add the PoC Client A to the session. The PoC Server X sends an OK response to the PoC Client A through the signaling path which has routed the request. The PoC Client A stores the contact address of the PoC Server X.

9.7 Adding a user to a PoC session

Any PoCparticipants may add any PoC subscribers to ongoing PoC session, as long as the maximum number of participant is not exceeded.

9.7.1 Procedure at inviting user

Figure x shows the high-level signalling procedure of adding a PoC subscriber to the PoC group session from the inviting user's point of view.

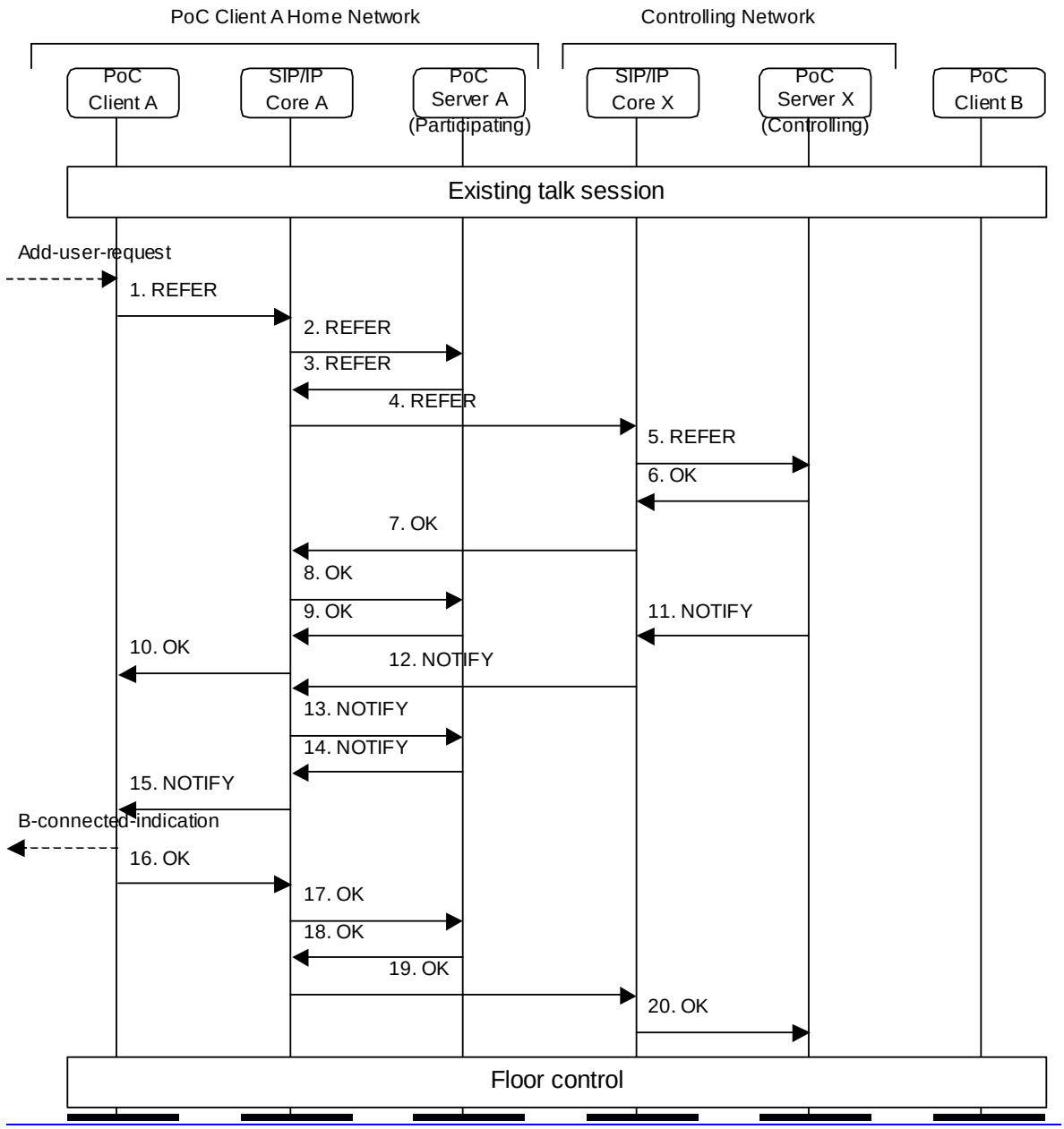


Figure 22. Adding a user (procedure at inviting user)

When the user (referred to as the "inviting user") wishes to add a user to the PoC group session, the PoC client issues a REFER request to the PoC server X. The REFER method is handled to add the user (referred to as the "invited user") to the PoC group session by the PoC Server X.

The PoC server may apply PoC group policies to the adding users to an ongoing group session.

The PoC server X (Controlling) issues a NOTIFY method according to the RFC 3515 to the inviting user upon receiving the accepted-response from the invited user.

1 - 5 The PoC Client A sends a REFER request with the intended invited user's address (PoC Client B) through the signaling path to the PoC Server X.

Information Elements contained in the REFER request:

PoC Address of the invited PoC client

6 - 10 Upon receiving the REFER request, the PoC Server X initiates the inviting procedure to the PoC client B side and sends an OK response to the PoC Client A through the signaling path which has routed the original request.

11 - 15 When the PoC Server X receives the indication from the PoC Client B that he/she has accepted the invitation, the PoC Server X sends a NOTIFY request to the PoC Client A.

15 - 20 Upon receiving the NOTIFY, the PoC Client A sends an OK response to the PoC Server X.

9.7.2 Procedure at invited user

When an invited user is indicated with incoming INVITE method by the PoC server, depending on the answering mode on the terminal, the invited user may manually answer or automatically accept which issues the final response back to the PoC server.

9.7.2.1 Invited user is in manual answer mode

In this case, the terminating PoC client indicate the incoming invitation request and the user responds the request. The figure x shows the high level flow of this scenario.

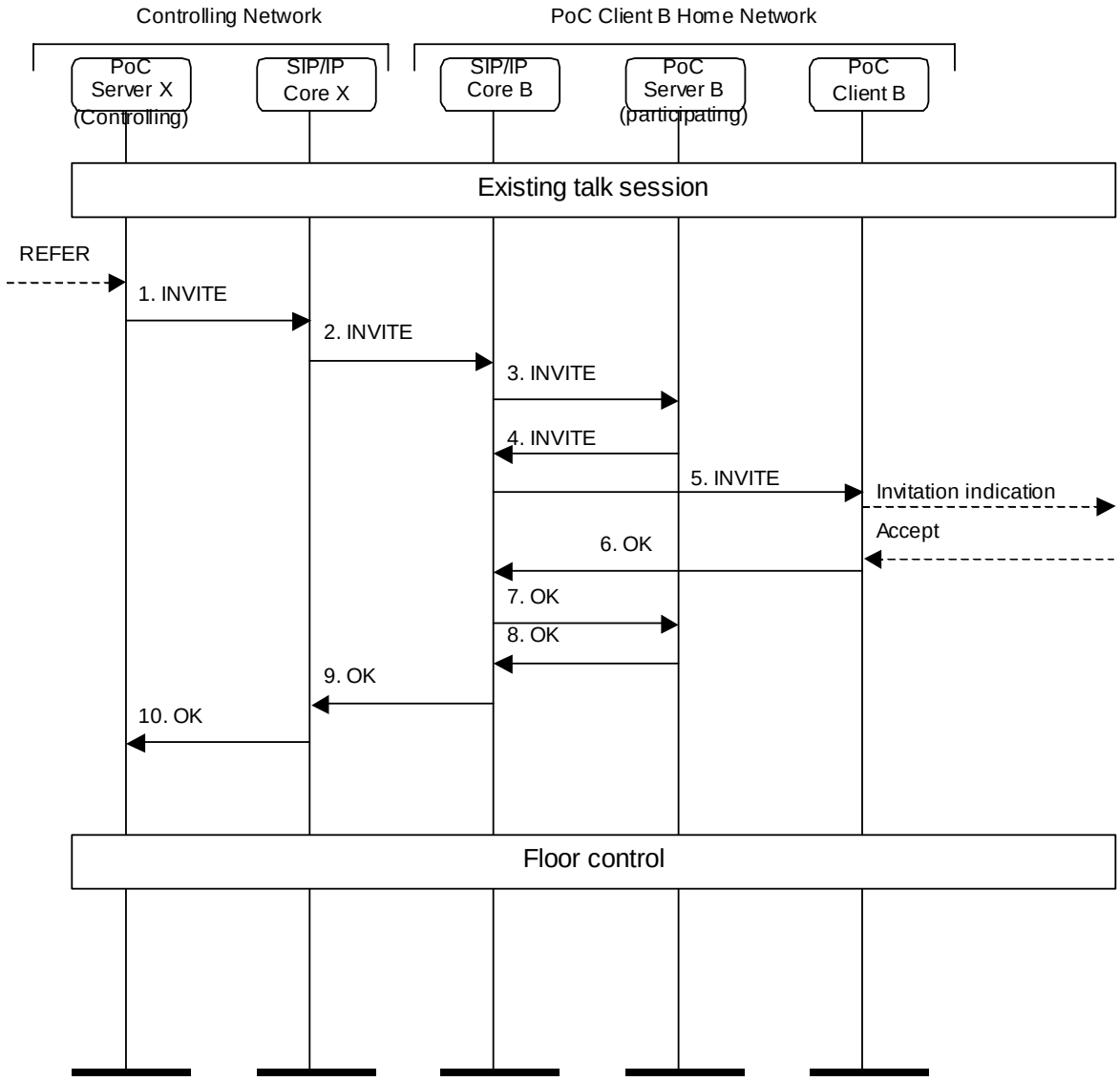


Figure 23. Adding a user (procedure at invited user)

1 Upon receiving the request to invite a PoC Client B, the PoC Server X sends an INVITE request to the PoC Client B. To reach the PoC Client B, the PoC Server X sends INVITE request to the SIP/IP core X.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of the PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned,

Media parameters of the PoC server X (controlling).

2 SIP/IP Core routes the request to the PoC Client B's home network.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of the PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned

Media parameters of the PoC server X (controlling).

3 SIP/IP Core B routes the request to the PoC Server B based on the PoC address of the invited PoC client and PoC Service Indication.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned.

Media parameters of the PoC server X (controlling).

4 The PoC Server B sends the PoC session setup request to the SIP/IP Core B.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Media parameters of the PoC server B (participating).

5 The SIP/IP Core forward the INVITE request to the PoC Client B.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Media parameters of the PoC server B (participating).

The PoC Client B indicate the invitation and wait for the accept indication by the user.

5 - 10 Upon receiving the invitation accept indication by the user, the PoC Client B responds with an OK to the PoC Server X through the signaling path which has routed the request. The PoC Server X notifies the inviting user that the invited user has accepted the invitation.

9.7.2.2 Invited user is in auto answer mode

In this case, the terminating PoC client automatically answers the invitation request by the PoC server and the user is able to hear the voice. The figure y shows the high level flow of this scenario.

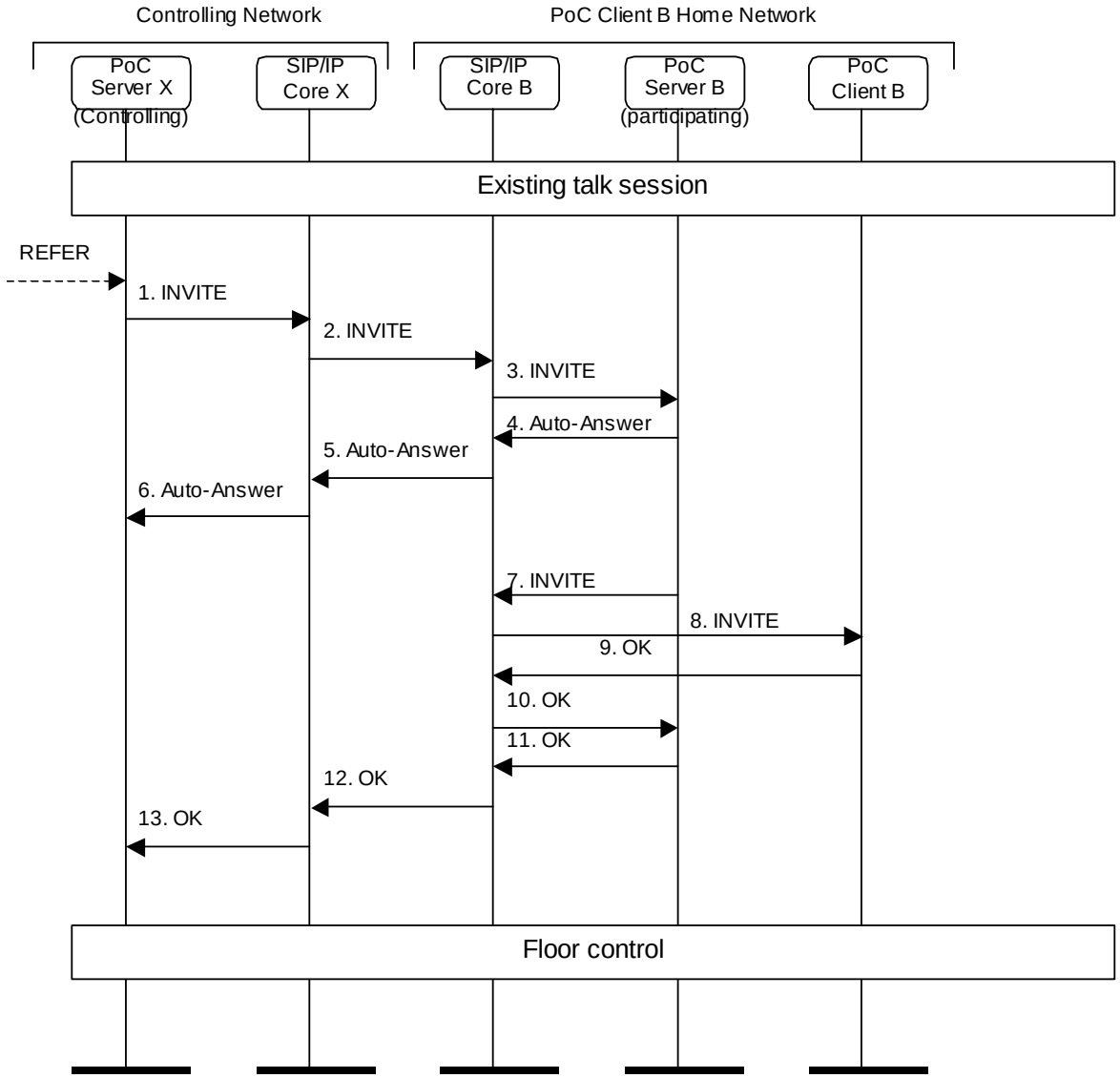


Figure 24. Adding a user (procedure at invited user)

1 Upon receiving the request to invite a PoC Client B, the PoC Server X sends INVITE request to the PoC Client B. To reach the PoC Client B, the PoC Server X sends INVITE request to the SIP/IP core X.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned.

Media parameters of the PoC server X (controlling).

2 SIP/IP Core routes the request to the PoC Client B's home network.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned.

Media parameters of the PoC server X (controlling).

3 SIP/IP Core B routes the request to the PoC Server B based on the PoC address of the invited PoC client and PoC Service Indication.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

Controlling PoC function assigned.

Media parameters of the PoC server X (controlling).

4 - 6 When the PoC Server B receives the request, it sends AUTO-ANSWER indication to the PoC Server X through the signaling path.

7 The PoC Server B sends the PoC session setup request to the SIP/IP Core B.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

AUTO-ANSWER indication.

Media parameters of the PoC server B (participating).

8 The SIP/IP Core B forwards the INVITE request to the PoC Client B.

Information elements contained in the INVITE request:

PoC Group Identity (optional)

PoC Address of PoC Client B,

PoC Service Indication,

PoC Address of the PoC Client A,

AUTO-ANSWER indication.

Media parameters of the PoC server B (participating).

9 - 13 The PoC Client B responds with an OK to the PoC Server X through the signaling path which has routed the request. The PoC Server X notifies the inviting user that the invited user has accepted the invitation.

~~9.7~~9.8 nstant Personal Alert

~~Editor's note: Contribution expected.~~

The Instant personal alert provides the capability for one PoC subscriber to alert another PoC subscriber, i.e. request the other PoC Subscriber to establish an 1-1 PoC session when convenient for the alerted PoC subscriber.

9.8.1 Originating side

This chapter describes the procedures in the home network of the PoC subscriber sending the instant personal alert. Figure 25 shows the high-level signaling flow for this scenario.

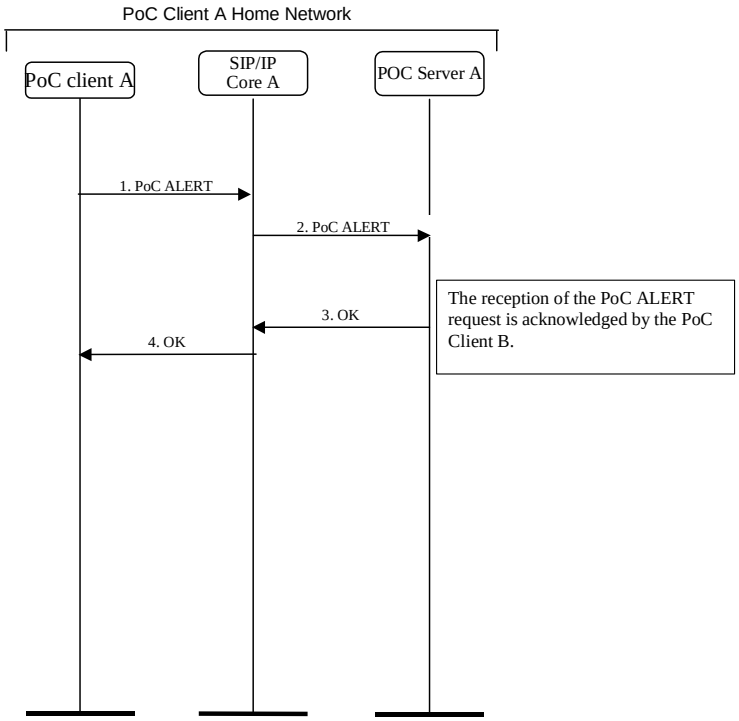


Figure 25: Sending an instant personal alert, originating side.

1. The PoC Client A sends a PoC ALERT to the SIP/IP Core A.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

2. The SIP/IP Core sends the PoC ALERT request to the PoC Server A based on the PoC Address of PoC Subscriber A PoC Service indication.

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

   The signaling flow on the terminating side is described in the chapter 9.x.2.

3-4 When the PoC Client B acknowledges the reception of the PoC ALERT request an OK response is received in the PoC Server A. The PoC Server A forwards the OK response via SIP/IP Core A to the PoC Client A.

9.8.2 Terminating side

This chapter describes the procedures in the home network of the PoC subscriber receiving the instant personal alert. Figure 26 shows the high level signaling for the scenario.

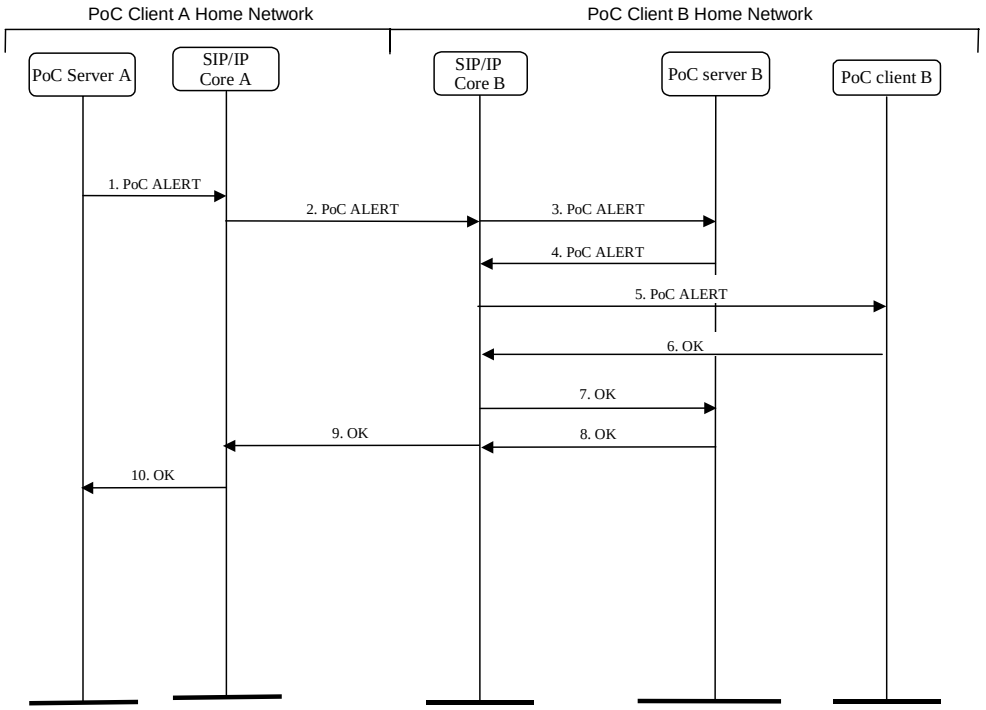


Figure 26: Sending an instant personal alert, terminating side.

1. The PoC Server A sends the PoC ALERT to the SIP/IP Core A.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

2. The SIP/IP Core A routes the PoC ALERT request to the SIP/IP Core B based on the PoC Address of the target PoC Subscriber B.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

3. The SIP/IP Core B sends the PoC ALERT request to the PoC server B based on the PoC Address of the target PoC Subscriber, the PoC Service indication and the PoC Alert indication.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

4. The PoC server B checks if the PoC subscriber sending the PoC ALERT request is authorized to send an instant personal alert to the target PoC subscriber using the target PoC subscriber's accept and reject list and if authorized the PoC server B sends the PoC ALERT to the SIP/IP Core B.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

5. The SIP/IP Core B routes the PoC ALERT request to the PoC Client B based on registration information.

   Information Elements contained in PoC ALERT request:

   a) The PoC Address of the PoC subscriber A;

   b) The PoC Address of the PoC Subscriber B;

   c) PoC Service indication; and,

   d) PoC Alert indication.

5-10. The PoC Client B sends the OK response in order to acknowledge the reception of the PoC ALERT request. The OK response is along the signaling path created by the PoC ALERT request. The sending of the OK response does not imply that the user has seen the alert.

9.9 Simultaneous Sessions

9.10 Deactivate incoming talk bursts

9.11 Partisipant Information

9.12 Group Advertising

9.13 Group and List Management

The PoC group host SHALL be able to create, modify, retrieve and delete groups in the home PoC network. On creation the group will get an identity, which is globally unique. Additionally restricted groups SHALL contain member lists. The groups are created and modified via Im reference point. Ad-hoc groups are temporary, they are not defined beforehand and they don't have stored member lists.

A PoC client SHALL be able to create, modify and delete lists that are used for various purposes in PoC service (accept lists, reject lists).

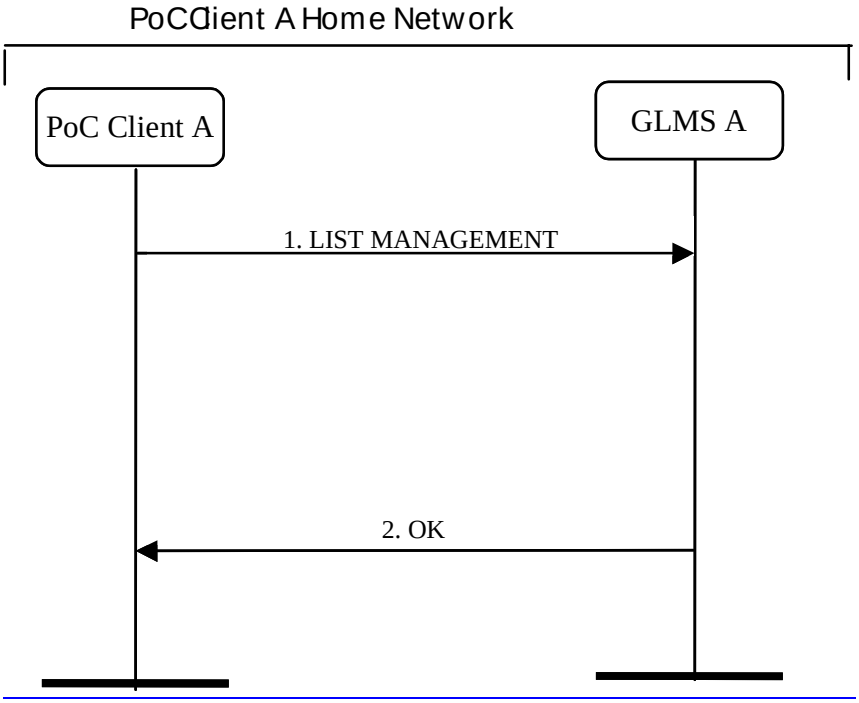


Figure 27. Group creation, modification, retrieval or deletion.

1. PoC Client A SHALL send the LIST MANAGEMENT request to GLMS A. The request SHALL include the information elements:
   a. Group identity
   b. Group objectives: display name, group type, member list
   c. Indication: Create, modify, retrieve or delete
2. GLMS A SHALL create, modify or delete group(s) according to the "Indication" in the request (if the PoC subscriber has rights to perform the action) and send the acknowledgement to the PoC Client A. The OK MAY include the information elements:
   a. Result of the request (e.g. Group list)

Appendix A Change History (Informative)

A.1 Approved Version History

Reference	Date	Description

A.2 Draft/Candidate Version 1.0 History

<<This section is available in pre-approved versions – it should be removed in the actual approved versions>>

Document Identifier	Date	Sections	Description
OMA-Architecture_PoC-V1_0-20030922-D	22.9.2003		First version, table of contents, baseline
OMA-Architecture_PoC-V1_0-20031002-D	02.10.2003		Definitions and abbreviations added.
OMA-Arctitecture PoC-V1_0-20031013-D	13.10.2003		In Tokyo meeting agreed architecture picture provided by RIM (Andrew Allen) added, text agreed in the meeting added into sections 4, 5, 6. References adjusted.
OMA-AD-PoC-V1_0-20031012-D	13.10.2003		Document name changed to the permanent document name.
OMA-AD-PoC-V1_0-20031017-D	17.10.2003	1, 7.1, 7.2	Text added to section 1, and sections 7.1 and 7.2 added to the document.
OMA-AD-PoC-V1_0-20031027-D	27.10.2003	7.3, 7.4, 8.1	Input contribution 0045 inplemented in 7.3, and 7.4. Sections 8.1, 8.1.1, 8.1.2 added based on on-line editing.
OMA-AD-PoC-V1_0-20031105-D	5.11.2003	8.1.3, 8.2	3.11.2003 Conference call result implemented to the AD. Related references added.
OMA-AD-PoC-V1_0-20031118-D	18.11.2003	6 - 9	The version 20031105 edition trace marks approved. The London meeting 10.-12.11.2003 changes added (seen as revision marked in this version).
OMA-AD-PoC-V1_0-20031124-D	24.11.2003		The version 20031118 edition trace marks approved. The given comments are taken account (seen as revision marked in this version).
OMA-AD-PoC-V1_0-20040109-D	09.01.2004	3,4,8,9	The PoC WG meeting Phoenix 6.-9.1.2004 accepted contributions are taken account.
OMA-AD-PoC-V1_0-20040120-D	20.01.2004	9, 3	Some minor editorials are corrected.
OMA-AD-PoC-V1_0-20040204	04.02.2004	8.10, 9.7	The PoV WG meeting Los Angeles 2.-4.2.2004 accepted contributions are included.

Appendix B Guidelines for Preparing Flow Charts (Informative)

The protocol issues are not yet agreed in the OMA PoC work on stage 2. And although it is clear that the Session Initiation Protocol (SIP) and Session Description Protocol (SDP) are used for call set up etc. purposes, it may stay open at this moment what are the exact SIP methods and headers used in the signaling flows.

Therefore it is recommended to use a high level description in the architecture document describing only e.g. INVITE and OK for a successful session setup and leaving open what is the exact message sequence in each session setup case. In some cases when the precise protocol method still needs to be determined it may be appropriate to use an abstract signaling naming, e.g. PoC session request and acknowledgement.

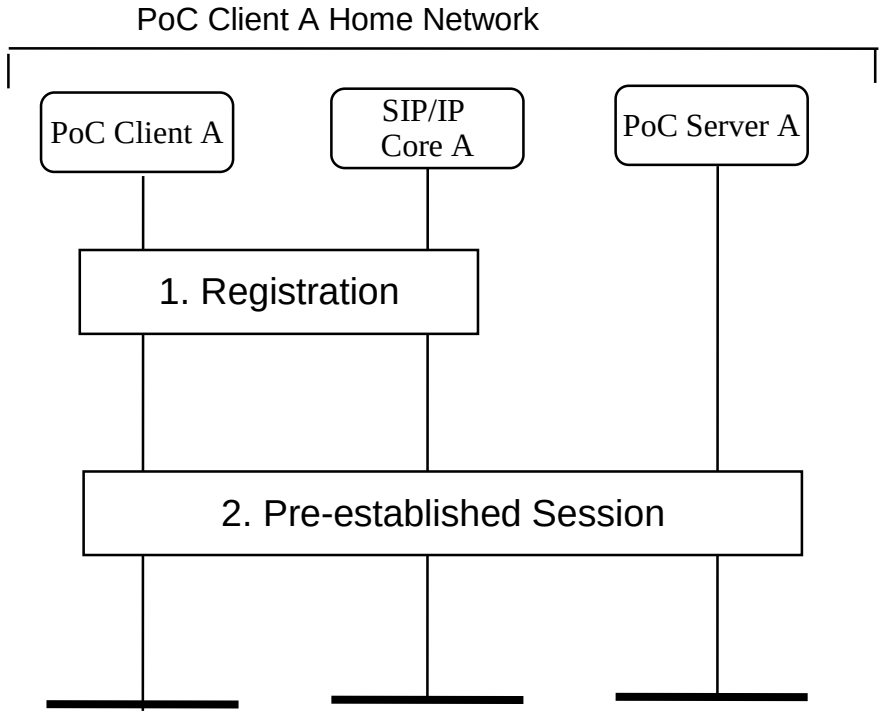
Additionally it is defined the network elements shown on the figure. It is recommended to show all network elements participating the signaling message transfer. Typically they are PoC client A and B, PoC server A, B and X and SIP/IP Core A, B and X. Where A is the originating party, B is the terminating party and X is the session controlling party. Additionally the network element naming shall clarify the PoC server role: participating, controlling or both.

The originating flow (from originating PoC client to the controlling PoC server) and terminating flow (from the controlling PoC server to the terminating PoC client) is described separately. The flows are numbered and textually described under the figure. The textual description includes the information elements that are necessary to be conveyed in each flow.

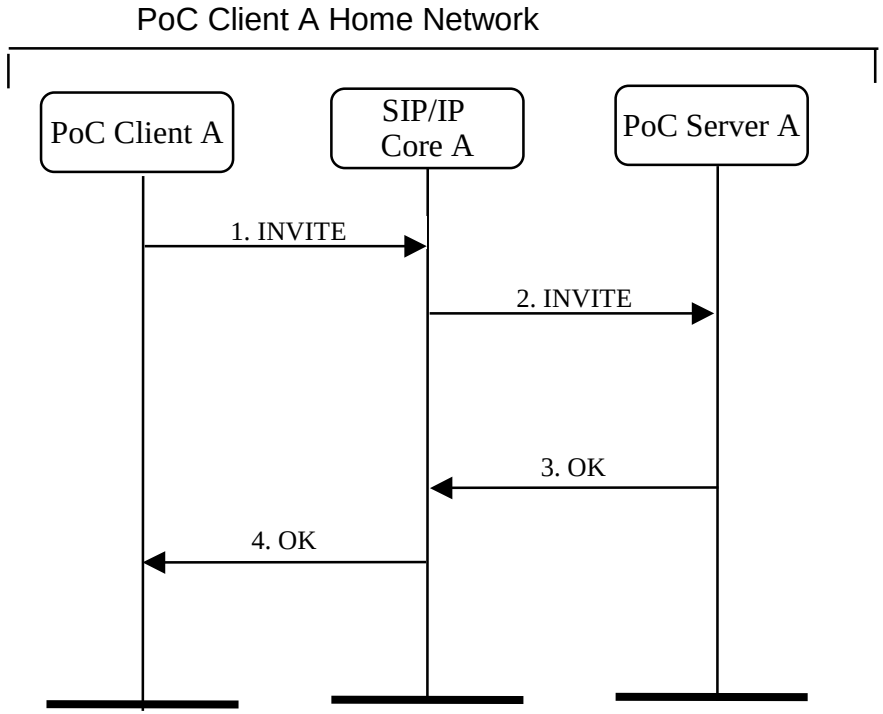
The flow charts are drawn in AD by using Power Point tool. The template for drawing the flow charts by Power Point is available as a permanent document.

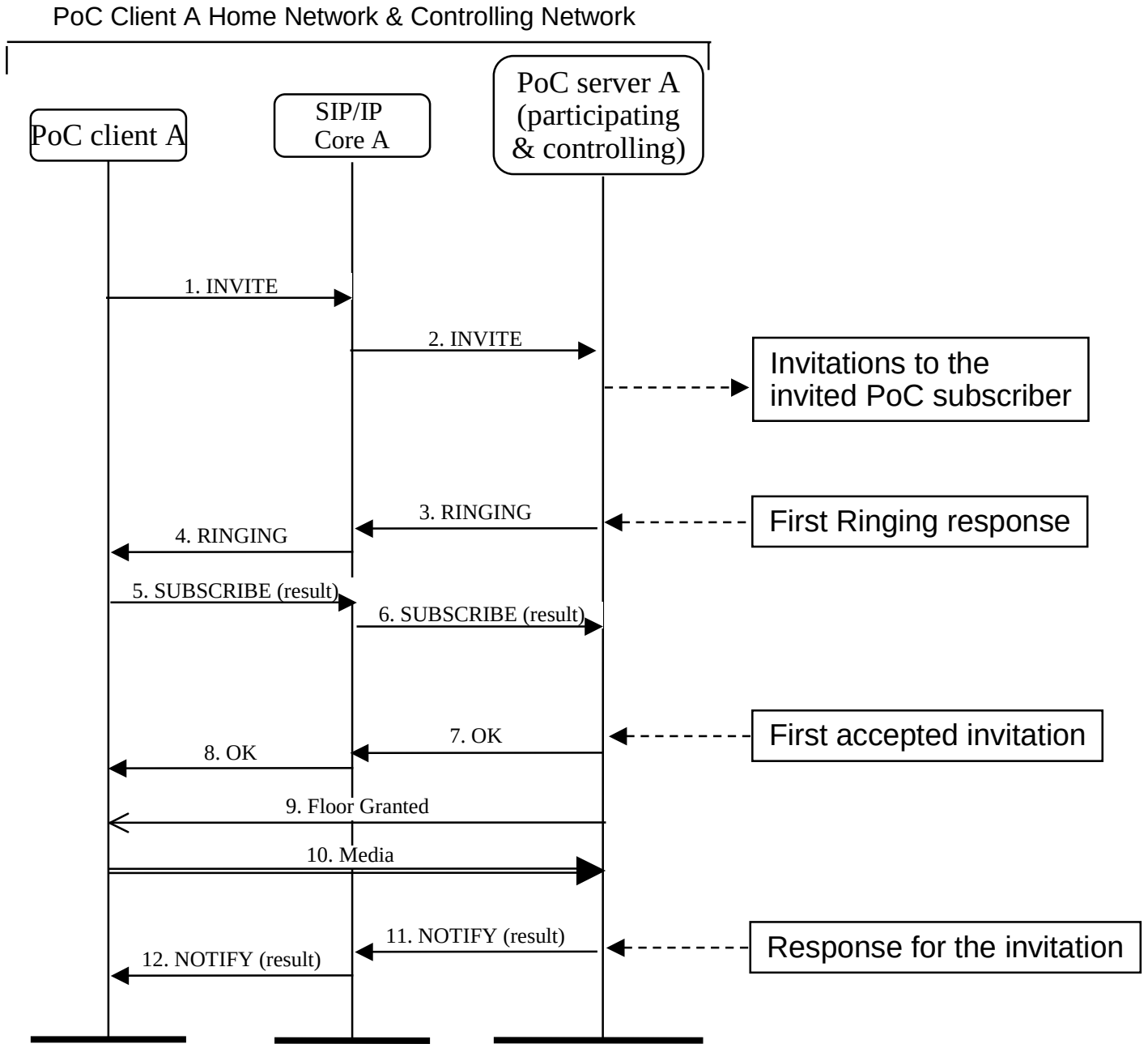
For an example see chapter 9.4 Chat PoC Group.

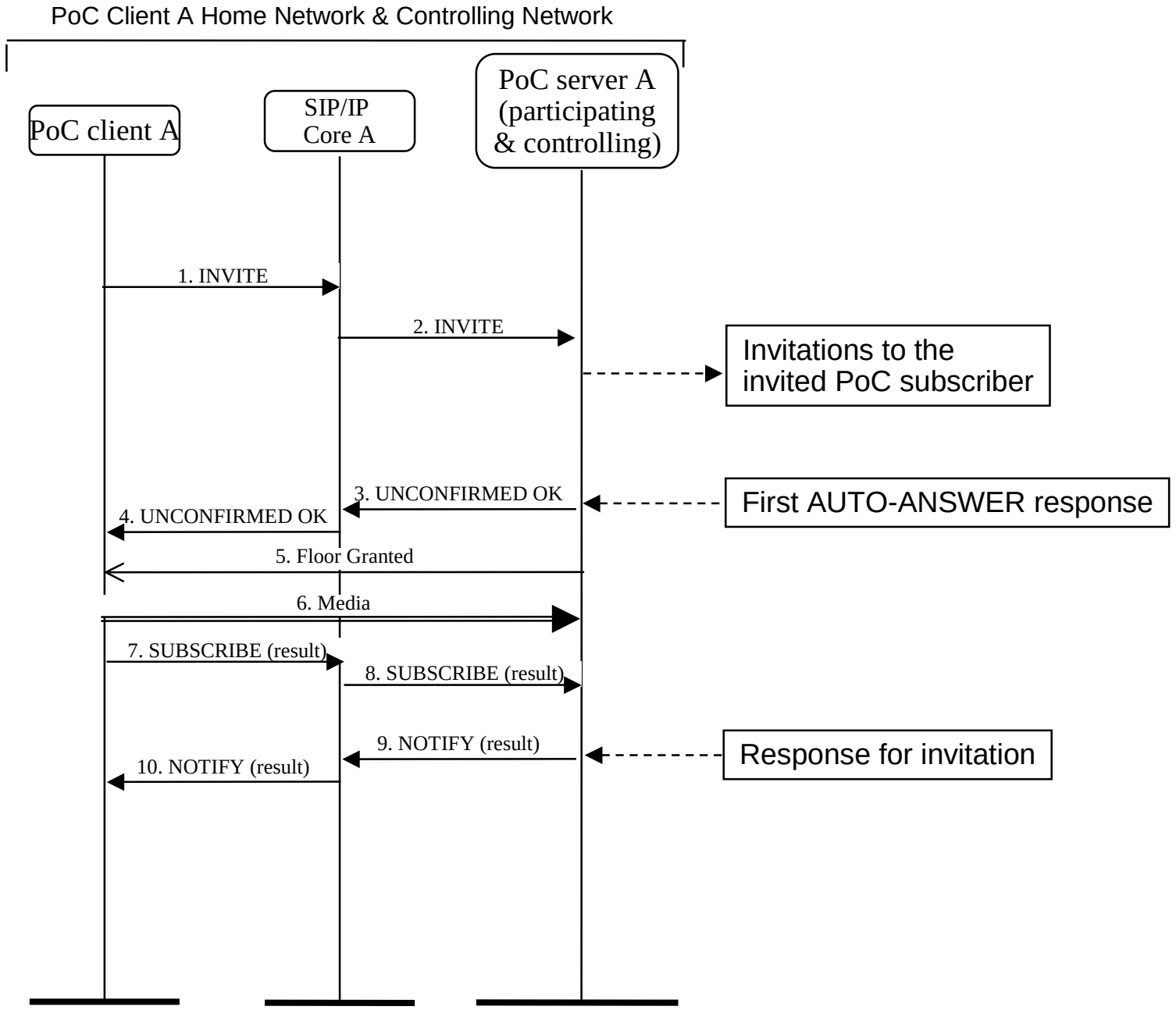
Originating part

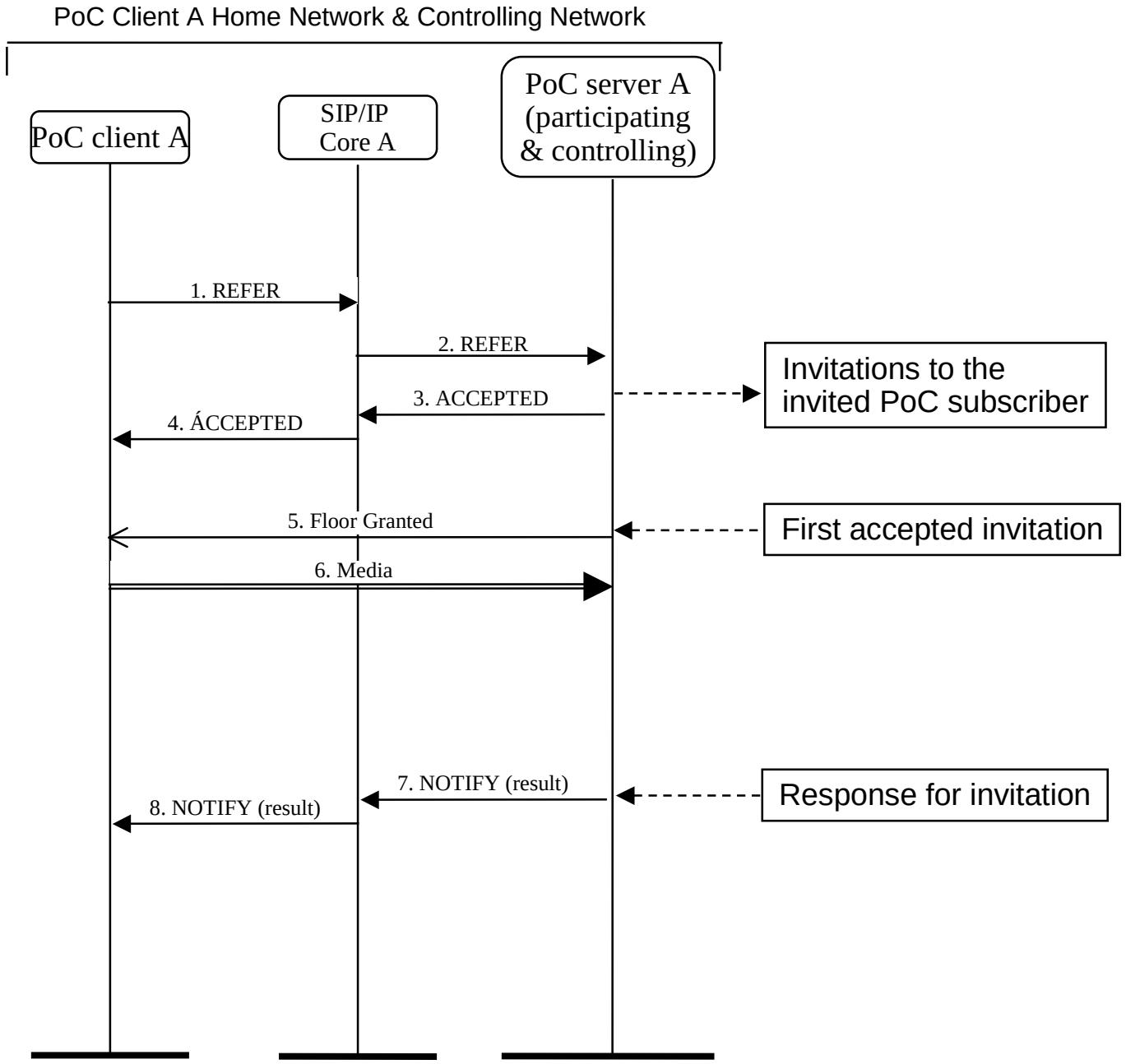


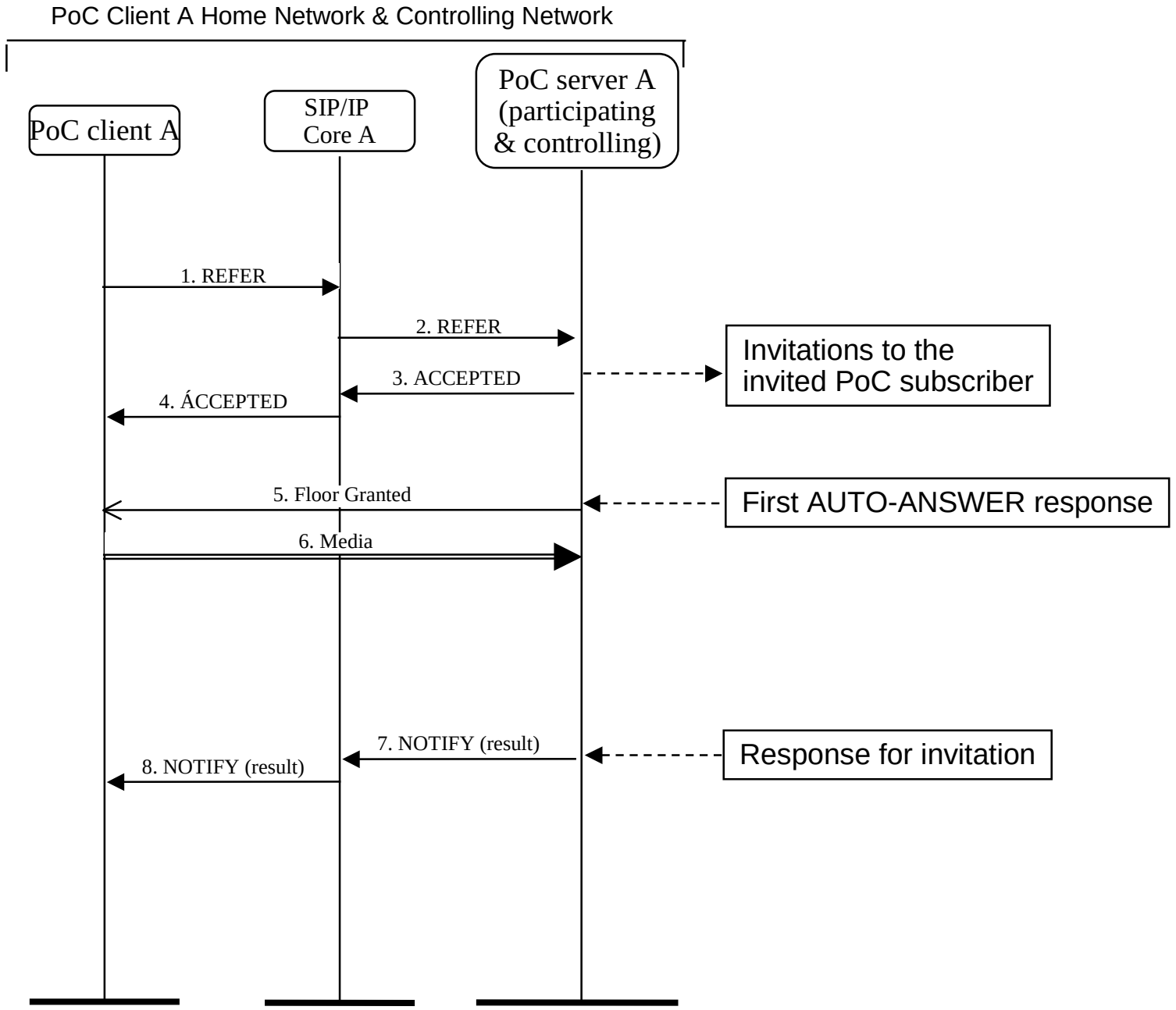
Originating part

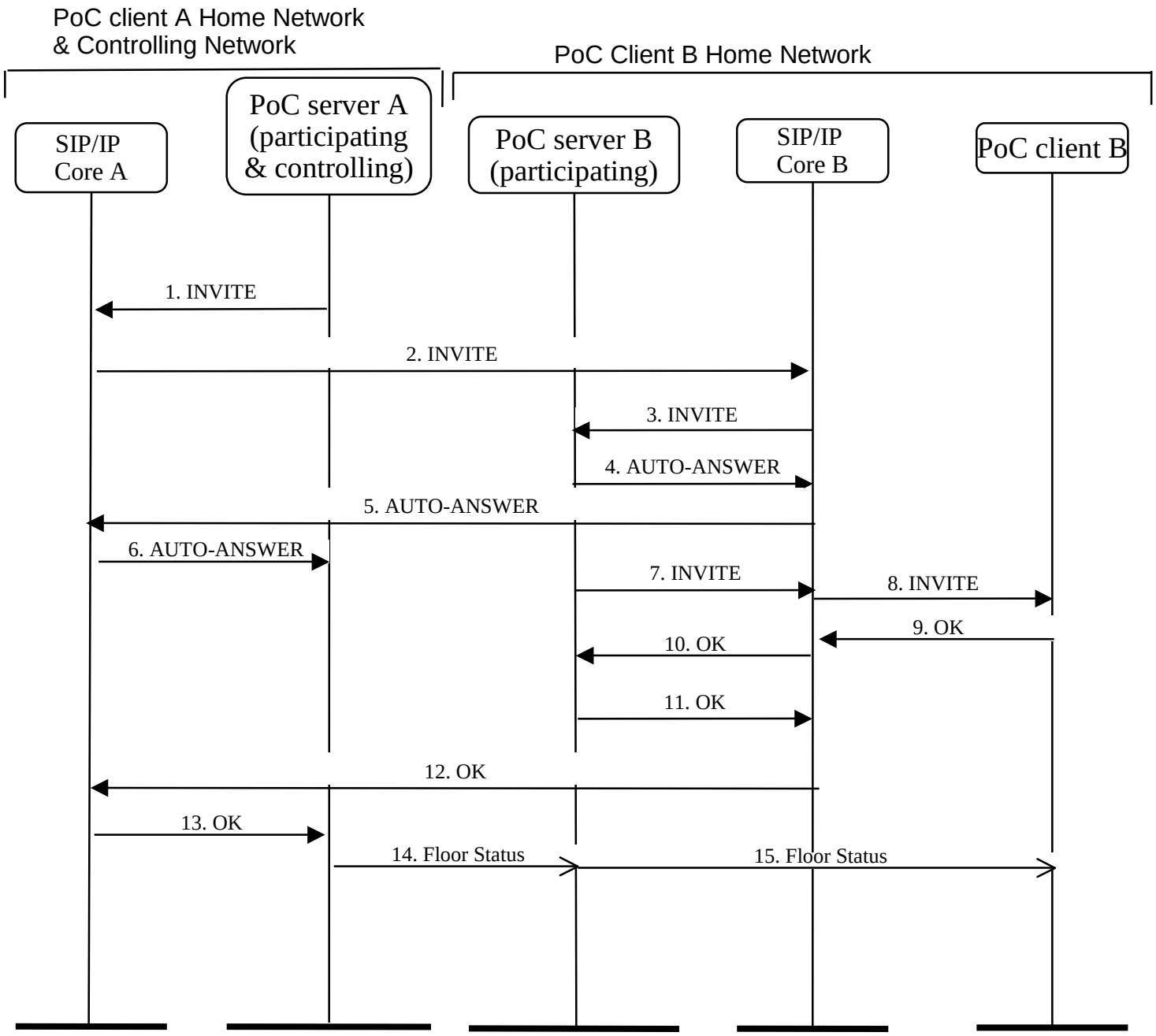


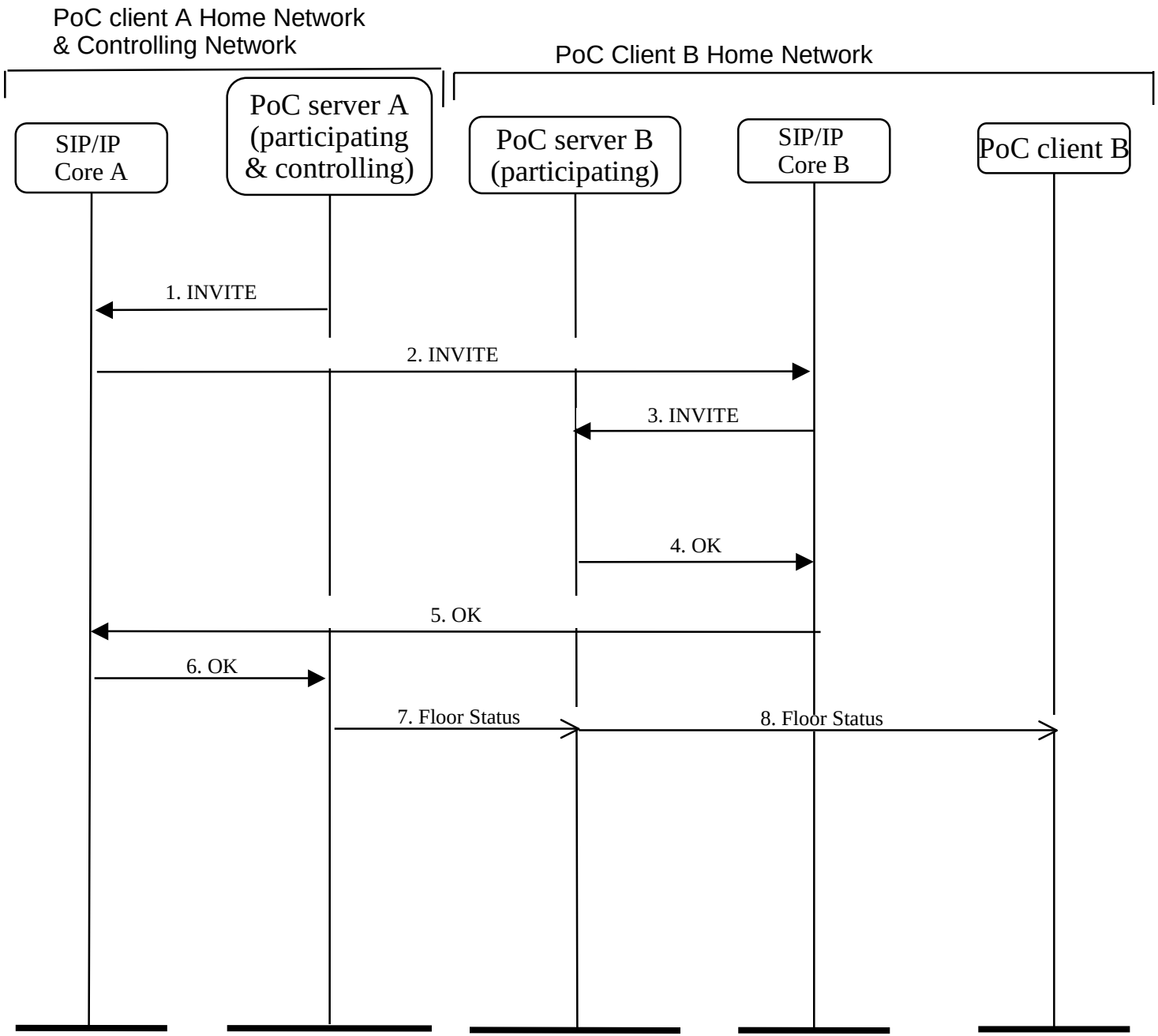

PoC Client A Home Network & Controlling Network
PoC client A
SIP/IP Core A
PoC server A (participating & controlling)
1. INVITE
2. INVITE
Invitations to the invited PoC subscriber
3. RINGING
First Ringing response
4. RINGING
5. SUBSCRIBE (result)
6. SUBSCRIBE (result)
7. OK
First accepted invitation
8. OK
9. Floor Granted
10. Media
11. NOTIFY (result)
Response for the invitation
12. NOTIFY (result)

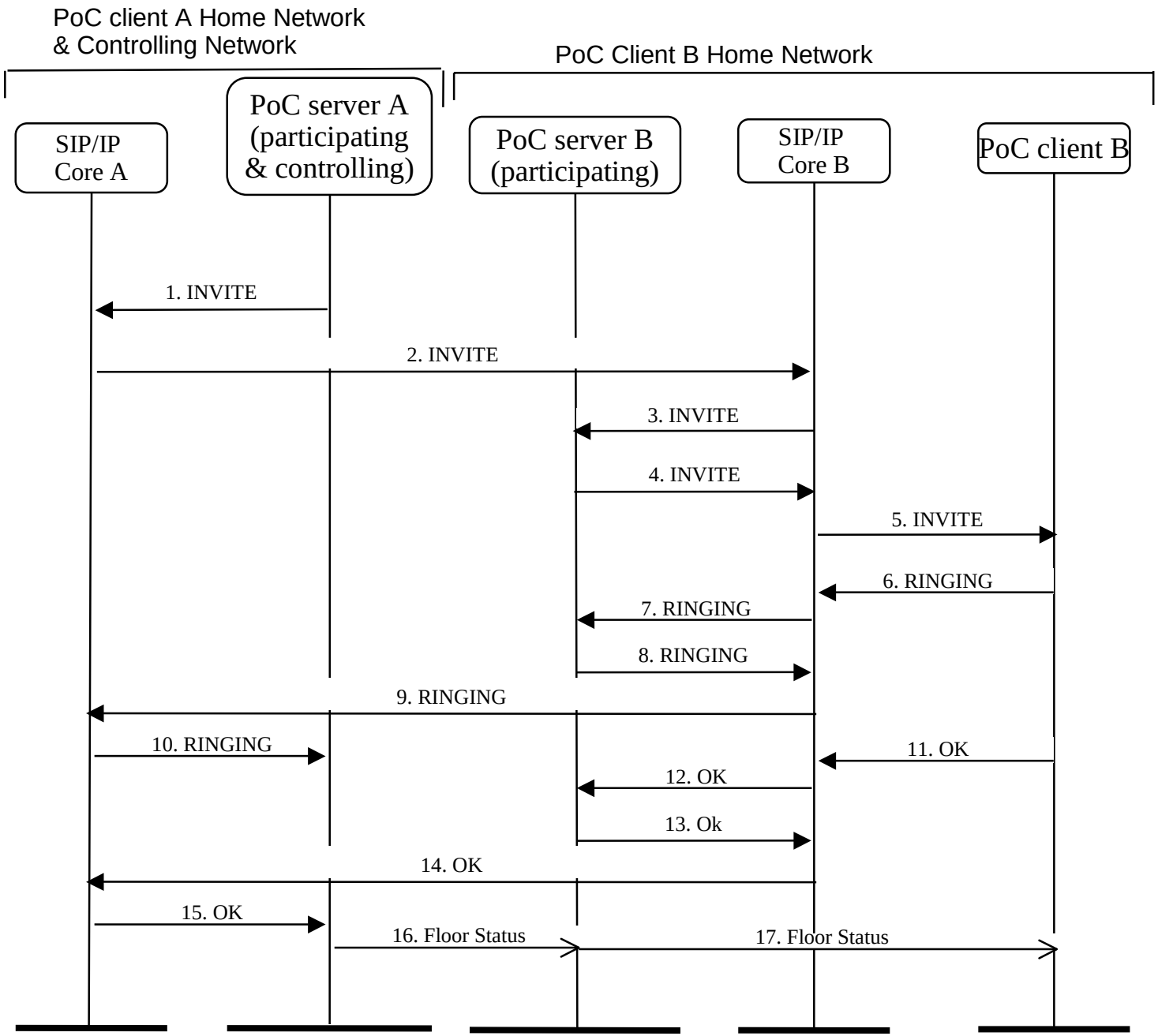

PoC Client A Home Network & Controlling Network
PoC client A
SIP/IP Core A
PoC server A (participating & controlling)
1. INVITE
2. INVITE
Invitations to the invited PoC subscriber
3. UNCONFIRMED OK
First AUTO-ANSWER response
4. UNCONFIRMED OK
5. Floor Granted
6. Media
7. SUBSCRIBE (result)
8. SUBSCRIBE (result)
9. NOTIFY (result)
Response for invitation
10. NOTIFY (result)


PoC Client A Home Network & Controlling Network
PoC client A
SIP/IP Core A
PoC server A (participating & controlling)
1. REFER
2. REFER
3. ACCEPTED
4. ÁCCEPTED
5. Floor Granted
6. Media
7. NOTIFY (result)
8. NOTIFY (result)
Invitations to the invited PoC subscriber
First accepted invitation
Response for invitation

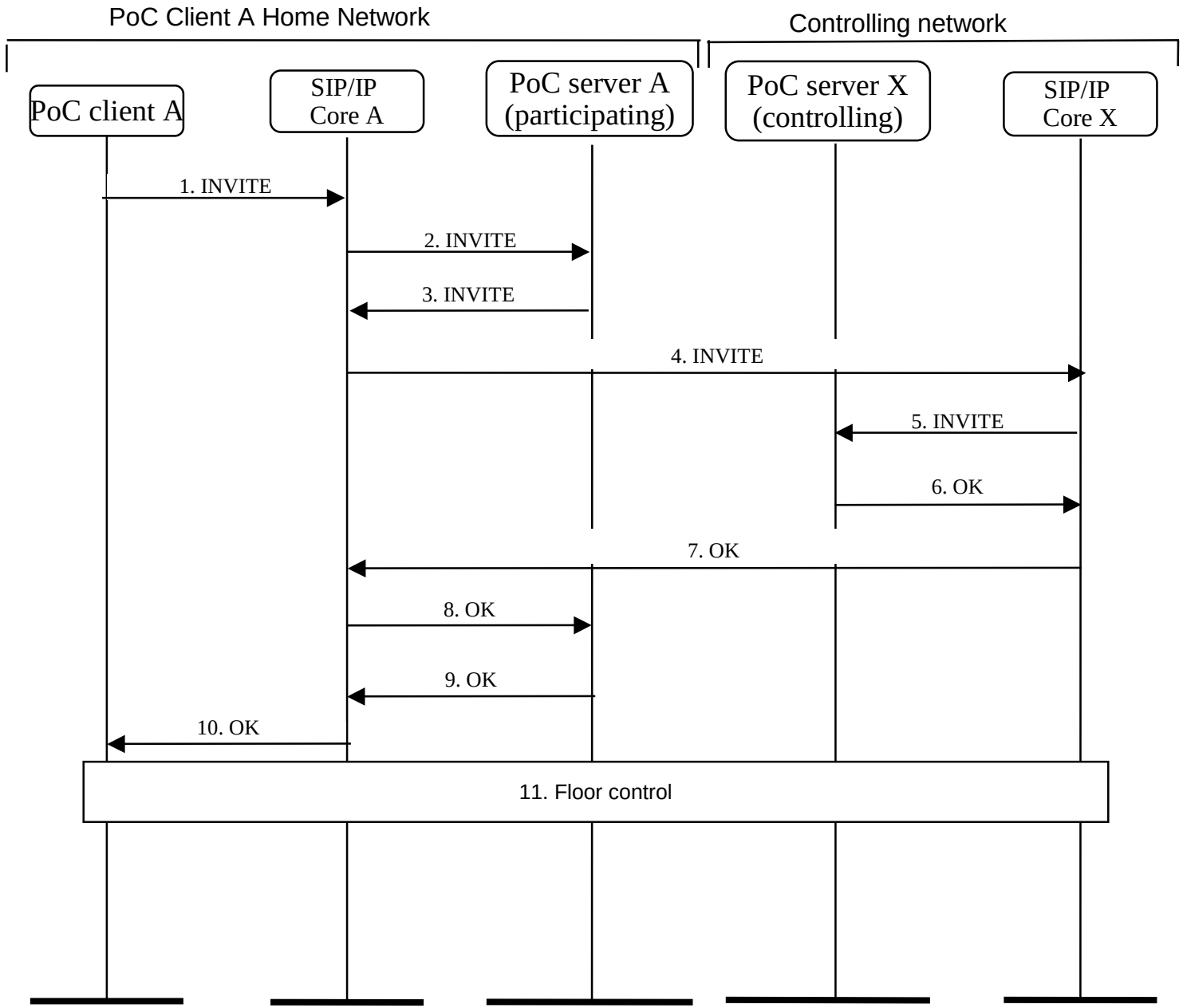

PoC Client A Home Network & Controlling Network
PoC client A
SIP/IP Core A
PoC server A (participating & controlling)
1. REFER
2. REFER
3. ACCEPTED
4. ÁCCEPTED
5. Floor Granted
6. Media
7. NOTIFY (result)
8. NOTIFY (result)
Invitations to the invited PoC subscriber
First AUTO-ANSWER response
Response for invitation

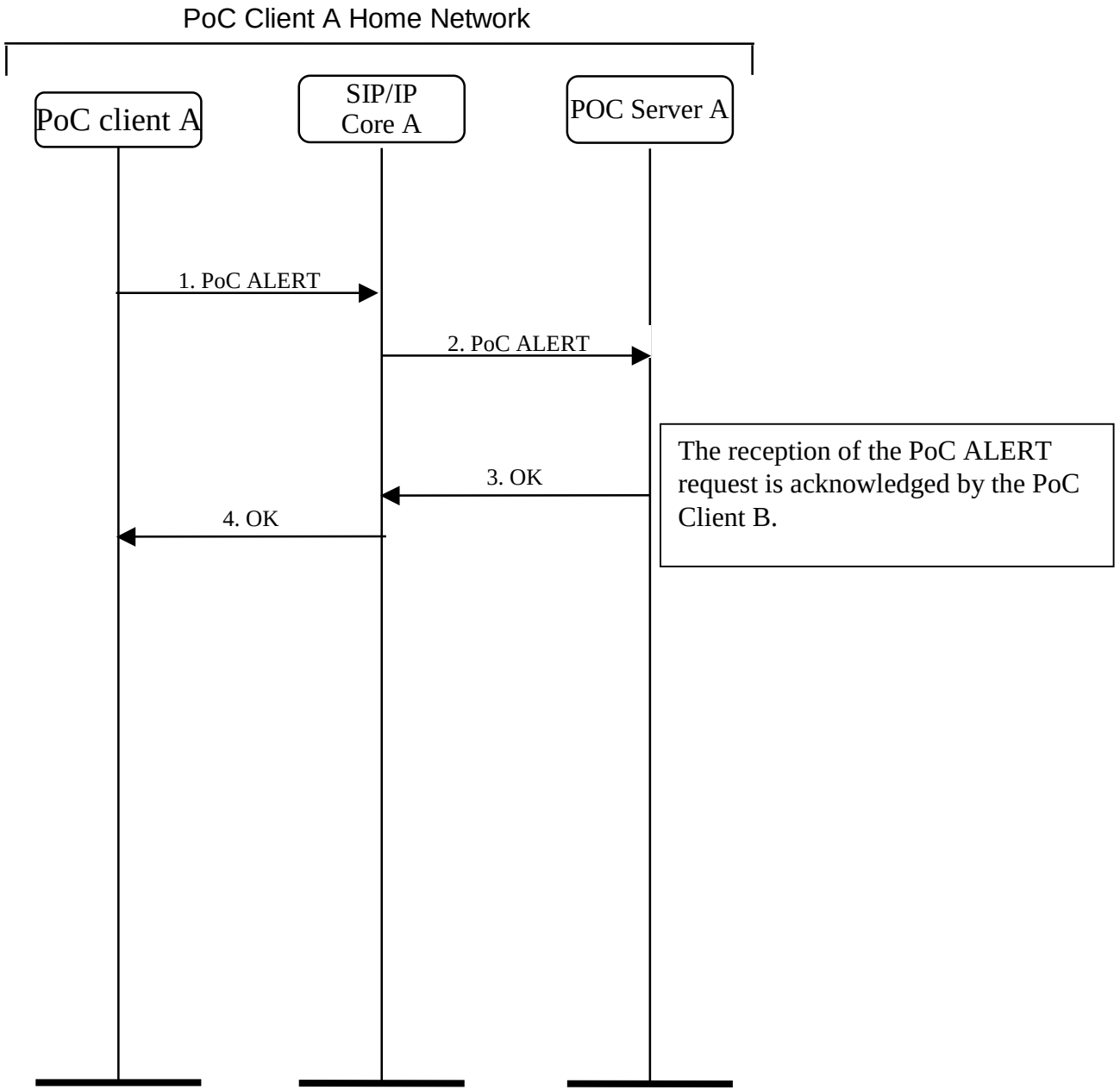

PoC client A Home Network
& Controlling Network
PoC Client B Home Network
SIP/IP
Core A
PoC server A
(participating
& controlling)
PoC server B
(participating)
SIP/IP
Core B
PoC client B
1. INVITE
2. INVITE
3. INVITE
4. AUTO-ANSWER
5. AUTO-ANSWER
6. AUTO-ANSWER
7. INVITE
8. INVITE
9. OK
10. OK
11. OK
12. OK
13. OK
14. Floor Status
15. Floor Status

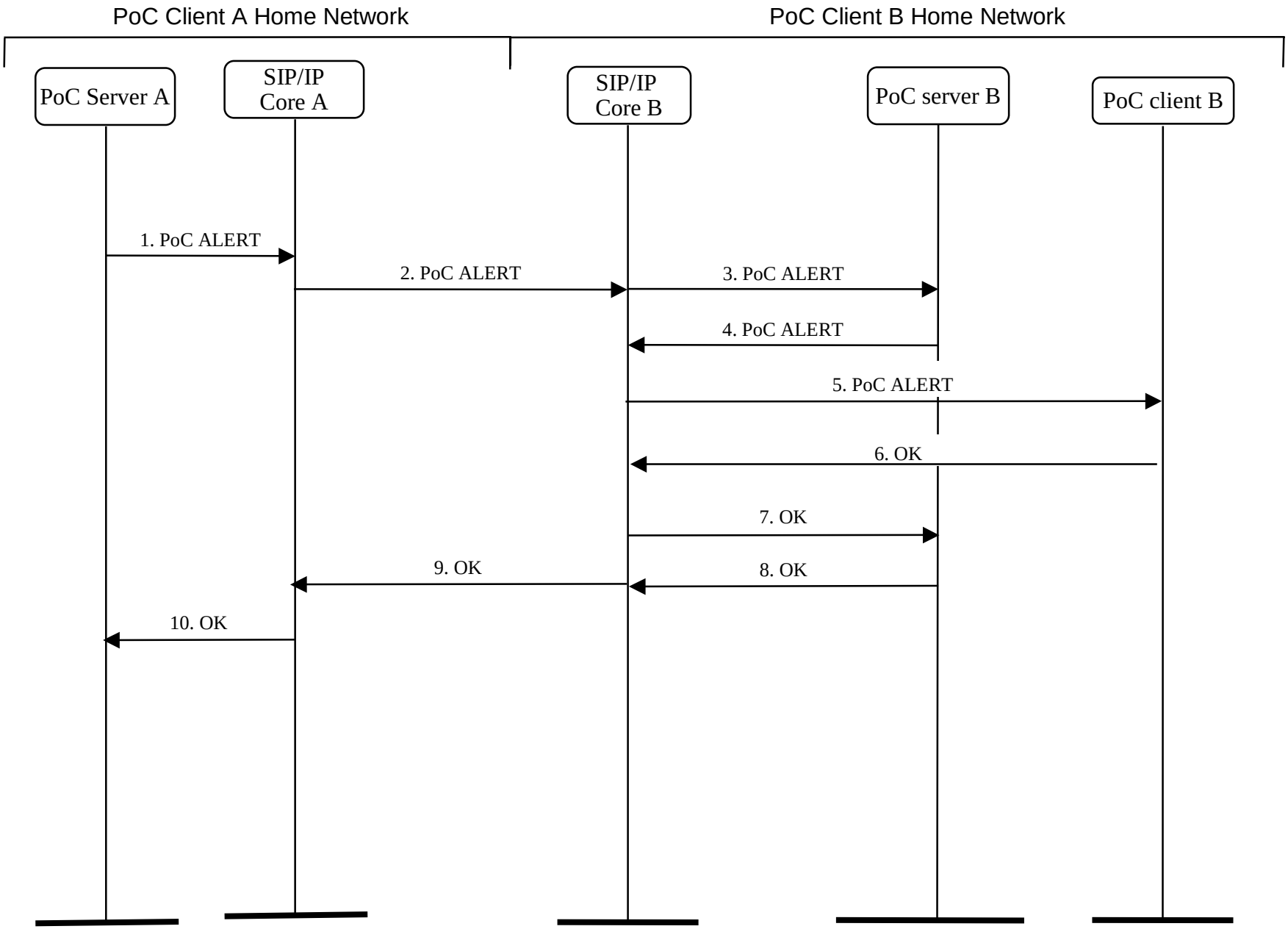

PoC client A Home Network
& Controlling Network
PoC Client B Home Network
SIP/IP
Core A
PoC server A
(participating
& controlling)
PoC server B
(participating)
SIP/IP
Core B
PoC client B
1. INVITE
2. INVITE
3. INVITE
4. OK
5. OK
6. OK
7. Floor Status
8. Floor Status


PoC client A Home Network
& Controlling Network
PoC Client B Home Network
SIP/IP
Core A
PoC server A
(participating
& controlling)
PoC server B
(participating)
SIP/IP
Core B
PoC client B
1. INVITE
2. INVITE
3. INVITE
4. INVITE
5. INVITE
6. RINGING
7. RINGING
8. RINGING
9. RINGING
10. RINGING
11. OK
12. OK
13. Ok
14. OK
15. OK
16. Floor Status
17. Floor Status

Originating part




PoC Client A Home Network
PoC client A
SIP/IP Core A
POC Server A
1. PoC ALERT
2. PoC ALERT
3. OK
4. OK
The reception of the PoC ALERT request is acknowledged by the PoC Client B.


PoC Client A Home Network
PoC Client B Home Network
PoC Server A
SIP/IP Core A
SIP/IP Core B
PoC server B
PoC client B
1. PoC ALERT
2. PoC ALERT
3. PoC ALERT
4. PoC ALERT
5. PoC ALERT
6. OK
7. OK
8. OK
9. OK
10. OK

Technical Specification Group Services and System Aspects Meeting #22, Hawaii, USA, 15-18 December 2003

TSGS#22(03)0787

Title: **Reply to LS to 3GPP on principles for overlapping issues with OMA regarding PoC**

Response to: OMA-REQ-2003-0676R02 (SP-030566)

Source: TSG SA

To: OMA REQ

Cc:

Contact Person:

Name: Michele Zarri

Tel. Number: +44 79 3200 2114

E-mail Address: Michele.zarri@t-mobile.co.uk

Attachments: None

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1. Overall Description:

TSG SA would like to thank OMA REQ for their reply on the "principles for overlapping issues with OMA regarding PoC".

3GPP TSG SA would like to provide the following responses to the three actions raised in this liaison statement:

1. OMA would request 3GPP to kindly provide additional information on its work on conferencing service and its applicability to PoC.

SA2 has started the analysis of the implications of PoC on the 3GPP system in TR 23.979. At this stage SA2 has no firm conclusions on how the 3GPP conferencing solution relates to PoC but it is expected that the capabilities provided by e.g. the Ut interface can be reused to support PoC as already perceived in the OMA PoC Architecture document.

2. 3GPP is requested to analyse its impact to underlining cellular and IP multimedia networks and to develop any necessary enhancements in Release 6 in order to support PoC implementation.

See answer to Q1 above. In addition SA1and SA2 would welcome input from OMA identifying what their expectations on the underlying network is in order to successfully deploy the PoC enabler, this will allow SA1 to perform an analysis and bridge possible gaps in the stage 1 documents and enhance the progress of the SA2 TR 23.979.

3. SA1 is kindly requested to provide comments on the attached draft PoC RD by 12th of Nov.2003 for consideration in the final RD review within November.

SA1 has not received the RD during its last meeting and therefore was not able to respond by the requested date. However SA1 has received a presentation of the PoC RD at meeting #22 at the end of October. Based on the presentation SA1 did not find new requirements that needed to be added to the stage 1 documents in order to support the OMA enabler. SA1 will follow closely the development of the work in SA2 to make sure that if new requirements are discovered during the architecture study they can be swiftly included to the stage 1 documents.

2. Actions:

To OMA group.

ACTION: TSG SA asks OMA group to provide information on the expectations in terms of performance of the underlying network responsible to deliver the PoC services. This information can be analysed by TSG SA WG 1 (S1) and TSG SA WG 2 (S2). so that it can be made sure that the 3GPP system is capable of supporting the OMA enabler.

3. Date of Next TSG-SA Meetings:

TSG-SA WG 1 meeting#23	12th – 16th January 2004	Innsbruck, Austria
TSG-SA WG 2 meeting#37	12th – 16th January 2004	Innsbruck, Austria
TSG-SA WG 2 meeting#38	16th – 20th February 2004	Atlanta, USA
TSG-SA Meeting #23	15th – 17th March 2004	Phoenix, USA
TSG-SA Meeting #24	7th – 9th June 2004	Korea