OMA PoC System Description

Candidate Version 2.0 – 26 Feb 2008

Open Mobile Alliance

OMA-TS-PoC_System_Description-V2_0-20080226-C

Contents

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1. Scope

The scope of the Push to talk over Cellular (PoC) V2.0 system description document is to define the system concepts and high level procedures for the PoC service enabler V2.0. This system description is backward compatible with the PoC AD V1.0 of clause 8 and 9 of [PoC AD V1.0]. It is based on the requirements listed for the system in the PoC requirements document [PoC RD V1.0] and [PoC RD V2.0].

The system description of the SIP/IP Core and the underlying access network for PoC is out of scope of this document. When SIP/IP Core corresponds to the 3GPP IMS the architecture the 3GPP enablers for OMA PoC services are described in [3GPP TR 23.979].

Local policies referred in this document are out of scope of this specification.

2. References

2.1   Normative References

[3GPP TS 23.060]	3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description", Stage 2. URL: http://www.3gpp.org/
[3GPP TS 23.107]	3GPP TS 23.107: "Quality of Service (QoS) concept and architecture" URL: http://www.3gpp.org/
[3GPP TS 23.228]	3GPP TS 23.228: "IP Multimedia Subsystem (IMS)", Stage 2. URL: http://www.3gpp.org/
[3GPP TS 24.229]	3GPP TS 24.229: "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP)", Stage 3. URL: http://www.3gpp.org/
[3GPP TS 26.235]	3GPP TS 26.235: "Packet switched conversational multimedia applications; Default codecs", (Release 6). URL: http://www.3gpp.org/
[3GPP TS 32.272]	3GPP TS 32.272: "Push-to-Talk over Cellular (PoC) Charging". URL: http://www.3gpp.org/
[3GPP2 S.R0100-0]	3GPP2 S.R0100-0 Push-to-Talk over Cellular (PoC) System Requirements, (v1.0). URL: http://www.3gpp2.org/
[3GPP2 X S0013.4]	3GPP2 X.S0013.4: "IP Multimedia Call Control Protocol, Based on SIP and SDP", stage 3. URL: http://www.3gpp2.org/
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[OMA DM]	"OMA Device Management Protocol", Version 1.2, Open Mobile Alliance™, OMA-TS-DM_Protocol-V1_2, URL: http://www.openmobilealliance.org/
[OMA DM Bootstrap]	"Device Management Bootstrap", Version 1.2, Open Mobile Alliance™, OMA-TS-DM_Bootstrap-V1_2, URL: http://www.openmobilealliance.org/
[OMA IM TS]	"Instant Messaging using SIMPLE", Version 1.0, Open Mobile Alliance™, OMA-TS-SIMPLE_IM-V1_0, URL: http://www.openmobilealliance.org/
[OMA PoC CP]	"OMA PoC Control Plane", Version 1.0, Open Mobile Alliance™, OMA-TS-PoC_ControlPlane-V1_0, URL: http://www.openmobilealliance.org/
[OMA PoC UP]	"PoC User Plane", Version 1.0, Open Mobile Alliance™, OMA-TS-PoC_UserPlane-V1_0, URL: http://www.openmobilealliance.org/
[OMA XDM]	"OMA XML Document Management", Version 2.0, Open Mobile Alliance™, OMA-ERP-XDM-V2_0, URL: http://www.openmobilealliance.org/
[OMA-IM-AD]	"Instant Messaging using SIMPLE Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-SIMPLE_IM-V1_0, URL: http://www.openmobilealliance.org/
[PoC AD V1.0]	"Push to Talk over Cellular (PoC) - Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-PoC-V1_0, URL: http://www.openmobilealliance.org/

[PoC AD V2.0]	"Push to Talk over Cellular (PoC) - Architecture", Version 2.0, Open Mobile Alliance™, OMA-AD-PoC-V2_0, URL: http://www.openmobilealliance.org/
[PoC Invocation Descriptor]	"PoC Invocation Descriptor", Version 2.0, Open Mobile Alliance™, OMA-TS-PoC_Invocation_Descriptor-V2_0, URL: http://www.openmobilealliance.org/
[PoC RD V1.0]	"Push to Talk over Cellular Requirements", Version 1.0, Open Mobile Alliance™, OMA-RD-PoC-V1_0, URL: http://www.openmobilealliance.org/
[PoC RD V2.0]	"Push to Talk over Cellular 2 Requirements", Version 2.0, Open Mobile Alliance™, OMA-RD-PoC-V2_0, URL: http://www.openmobilealliance.org/
[Presence AD]	"Presence SIMPLE Architecture Document", Version 1.0, Open Mobile Alliance™, OMA-AD-Presence_SIMPLE-V1_0, URL: http://www.openmobilealliance.org/
[RFC2046]	IETF RFC 2046: "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", N. Freed, N. Borenstein, November 1996. URL: http://www.ietf.org/rfc/rfc2046.txt
[RFC2119]	IETF RFC 2119: "Key words for use in RFCs to Indicate Requirement Levels". S. Bradner. March 1997. URL: http://www.ietf.org/rfc/rfc2119.txt
[RFC2396]	IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax", T Berners Lee, R. Fielding, U.C. Irvine, L. Masinter, August 1998. URL: http://www.ietf.org/rfc/rfc2396.txt
[RFC3261]	IETF RFC 3261: "SIP: Session Initiation Protocol", J. Rosenberg et al, June 2002. URL: http://www.ietf.org/rfc/rfc3261.txt
[RFC3265]	IETF RFC 3265: "Session Initiation Protocol (SIP)-Specific Event Notification", A. B. Roach, June 2002. URL: http://www.ietf.org/rfc/rfc3265.txt?number=3265
[RFC3320]	IETF RFC 3320: "Signaling Compression (SigComp)", R. Price et al, January 2003. URL: http://www.ietf.org/rfc/rfc3320.txt
[RFC3321]	IETF RFC 3321: "Signaling Compression (SigComp) - Extended Operations", H. Hannu et al, January 2003. URL: http://www.ietf.org/rfc/rfc3321.txt
[RFC3325]	IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks", C. Jennings et al, November 2002 URL: http://www.ietf.org/rfc/rfc3325.txt
[RFC3485]	IETF RFC 3485: "The Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Static Dictionary for Signaling Compression (SigComp)", M. Garcia-Martin et al, February 2003. URL: http://www.ietf.org/rfc/rfc3485.txt
[RFC3486]	IETF RFC 3486: "Compressing the Session Initiation Protocol (SIP)", G. Camarillo, February 2003. URL: http://www.ietf.org/rfc/rfc3486.txt
[RFC3515]	IETF RFC 3515: "The Session Initiation Protocol (SIP) Refer Method", R. Sparks, April 2003. URL: http://www.ietf.org/rfc/rfc3515.txt
[RFC3550]	IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications", H. Schulzrinne, July 2003. URL: http://www.ietf.org/rfc/rfc3550.txt
[RFC3966]	IETF RFC 3699: "The tel URI for Telephone Numbers", H. Schulzrinne, December 2004.-12-22 URL: http://www.ietf.org/rfc/rfc3966.txt
[RFC4412]	IETF RFC 4412: "Communications Resource Priority for the Session Initiation Protocol (SIP)", H. Schulzrinne, J. Polk, February 2006. URL: http://www.ietf.org/rfc/rfc4412.txt
[RFC4975]	IETF RFC 4975: "The Message Session Relay Protocol (MSRP)", September 2007. URL: http://www.ietf.org/rfc/rfc4975.txt

2.2   Informative References

[3GPP TR 23.979]	3GPP TS 23.979: "3GPP enablers for Open Mobile Alliance (OMA) Push-to-talk over Cellular (PoC) services", Stage 2 (Release 6) URL: http://www.3gpp.org/
[3GPP TS 26.234]	3GPP TS 26.234: "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs", (Release 6). URL: http://www.3gpp.org/
[3GPP TS 33.107]	3GPP TS 33.107; "Lawful Interception architecture and functions" URL: http://www.3gpp.org/
[3GPP TS 33.108]	3GPP TS 33.108; "3G security; Handover interface for Lawful Interception (LI)" URL: http://www.3gpp.org/
[3GPP2 C.S0046-0]	3GPP2 C.S0046-0: "3G Multimedia Streaming Services", URL: http://www.3gpp2.org/
[OMA Dictionary]	"Dictionary for OMA Specifications", Version 2.4, Open Mobile Alliance™, OMA-Dictionary-V2_4. URL: http://www.openmobilealliance.org/
[OMA WAE]	"Wireless Application Environment Specification", Version 2.3, Open Mobile Alliance™, OMA-WAP-TS_WAESpec-V2_3, URL: http://www.openmobilealliance.org/

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" are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

For the purposes of the PoC specifications, the terms and definitions given in [OMA Dictionary] and the following terms and definitions apply.

1-1 PoC Session	A feature enabling a PoC User to establish a PoC Session with another PoC User.
1-many PoC Group Session	A PoC Session with many Participants and in which all Participants can communicate with each other.
1-many-1 PoC Group Session	A PoC Session established by a PoC User to a Pre-arranged PoC Group, in which one Participant is a Distinguished Participant and other Participants are Ordinary Participants.
Access Control	PoC User specified rules that define the interactions with other PoC Users, e.g. rules restricting other PoC Users that may try to establish PoC Session to the PoC User.
Ad-hoc PoC Group Session	A PoC Group Session established by a PoC User to PoC Users listed on the invitation. The list includes PoC Users or PoC Groups or both.
Advanced Revocation Alert	An alert to the PoC User that the Media transmit time will end within the time specified by the Alert Margin.
Alert Margin	The amount of time between the moment when the Advanced Revocation Alert is notifies the PoC User and the moment when the granted Media Burst for the PoC User is to be revoked.
Answer Mode	A PoC Client mode of operation for the terminating PoC Session invitation handling.
Answer Mode Indication	A PoC Service Setting indicating the current Answer Mode of the PoC Client.
Application Server	In 3GPP/3GPP2 IMS, a functional entity that implements the service logic for SIP sessions. When the SIP/IP Core used for the PoC service is according to 3GPP/3GPP2 IMS, the PoC Server implements the Application Server functionality.
Audio	General communication of sound with the exception of PoC Speech.
Automatic Answer Mode	Answer Mode where the PoC Client accepts a PoC Session establishment request without manual intervention from the PoC User. The Media is immediately played when received.
Charging Correlation ID	See [OMA Charging AD].
Charging Data Function	3GPP network entity that receives charging events from the Charging Trigger Function via the Rf reference point. It then uses the information contained in the charging events to construct CDRs.
Charging Event	See [OMA Charging AD].
Chat PoC Group	A persistent PoC Group in which a PoC User individually joins to have a PoC Session with other joined PoC Users, i.e., the establishment of a PoC Session to a Chat PoC Group does not result in other PoC Users being invited. NOTE: A Chat PoC Group is a persistent PoC Group where the <invite-members> element is set to "false" as specified in the [OMA-PoC-Document-Mgmt] "PoC Group".
Chat PoC Group Identity	PoC Group Identity of a Chat PoC Group.
Chat PoC Group Session	A PoC Session established to a Chat PoC Group.

Confirmed Indication	A signalling message returned by the PoC Server to confirm that the PoC Server, all other network elements intermediary to the PoC Server and a terminating PoC Client are able and willing to receive Media.
Contact List	A list available to the PoC User that contains the PoC Addresses and/or PoC Group Identities.
Continuous Media	Media with an inherent notion of time (e.g., PoC Speech, audio, and video).
Control Plane	The specification of the signalling between PoC Client and PoC Server, between PoC Box and PoC Server and between PoC Servers for the Push to talk over Cellular (PoC) service.
Controlling PoC Function	A function implemented in a PoC Server, providing centralized PoC Session handling, which includes Media distribution, Talk Burst Control, Media Burst Control, policy enforcement for participation in the PoC Group Sessions, and the Participant information.
Conversation	A series of Media Bursts within a PoC Session in which the inter-arrival spacing of the Media Bursts is less than a defined time interval; typically, the Media Bursts are associated to a logical exchange between two or more PoC Users.
Correlation	See [OMA Charging AD].
Discrete Media	Media that itself does not contain an element of time (e.g. images, text).
Discrete Media Transfer Final Report	A report sent to the sending PoC Client to indicate final status of the Discrete Media transfer to the receiving PoC Clients.
Discrete Media Transfer Progress Report	A report sent to the sending PoC Client to indicate progress of the Discrete Media transfer to the receiving PoC Clients.
Dispatch PoC Group	A Pre-arranged PoC Group in which one member is assigned the role of PoC Dispatcher and the other member(s) are assigned the role of PoC Fleet Members.
Dispatch PoC Session	The PoC Session of a Dispatch PoC Group, or a subset of the Dispatch PoC Group, in which the 1-many-1 communication method is used.
Distinguished Participant	A Participant in a 1-many-1 Session that sends Media to all Ordinary Participants, and that receives Media from any Ordinary Participant. NOTE: The <is-key-participant> is set to "true" as specified in [OMA-PoC-Document-Mgmt] to indicate who is the Distinguished Participant.
External P2T Networks	Private or public circuit switched or packet switched network that provide push-to-talk services similar to PoC services.
Full Duplex Call Follow-on Proceed	A feature which allows PoC Session Participant to request the other PoC Session Participants to set up another independent full duplex voice call (either a circuit switched voice call or voice-over-IP call, subject to Service Provider Policy and configuration). The full duplex voice call set up is out of the scope of this specification.
Group	A predefined set of Users together with its policies and attributes. A Group is identified by a SIP URI.
Group Advertisement	A feature that provides the capability to inform other PoC Users of the existence of a PoC Group.
Group List	A list of members in a Pre-arranged PoC Group or restricted Chat PoC Group. Each member is identified by a SIP URI or a TEL URI.
Home PoC Network	A network comprising of a Home PoC Server and SIP/IP Core operated by the PoC User's PoC service provider. The Home PoC Network is the same as the Home Network defined in 3GPP/3GPP2 IMS specifications.
Home PoC Server	The PoC Server of the PoC Service Provider that provides PoC service to the PoC User.
ID Notification Indication	An indication for a PoC Address of an Invited PoC User to be presented to, or hidden from, the other Invited PoC Users on the terminating PoC Clients. An initiator of an Ad-hoc PoC Group Session sets the indications for all the Invited PoC Users within invitation requests. Each indication takes either "SHOWN" or "HIDDEN" as its value.
Identified PoC User	A PoC User whose PoC Sessions have been lawfully authorized to be intercepted and delivered to a Law Enforcement Agency.
Included Media Content	Media content included in an invitation to a PoC Session or in a Group Advertisement.

Incoming Instant Personal Alert Barring	A PoC Service Setting for the PoC Client that indicates the PoC User's desire for the PoC service to block all incoming Instant Personal Alerts.
Incoming PoC Session Barring	A PoC Service Setting for the PoC Client that indicatesthe PoC User's desire for the PoC service to block all incoming PoC Session requests.
Instant Personal Alert	A feature in which a PoC User sends a SIP based instant message to a PoC User requesting a 1-1 PoC Session.
Invited Parties Identity Information Mode	A PoC Service Setting for the PoC Server that indicates that the PoC Client is able and PoC User is willing to receive invited parties identity information.
Invited PoC Client	A PoC Client that is invited to a PoC Session.
Invited PoC User	The PoC User who has been invited to a PoC Session.
Inviting PoC Client	A PoC Client that invites other PoC User(s) to a PoC Session.
Law Enforcement Agency	An organization authorized by a lawful authorization based on a national law to request interception measures and to receive the results of telecommunications interceptions.
Limited Segment Media Buffer	A PoC Client buffer that contains a small initial segment of the total buffered Media that can be transmitted to the PoC Server before the called PoC Client answers in order to minimise the delay due to the Media transmit delay latency.
Local Granted Mode	A permission for a PoC User to start sending Media prior to receiving the MBCP Media Burst Grant message.
Local QoE Profile	QoE Profile that a PoC Client locally applies for a given PoC Session. The Local QoE Profile is intended to be equal to the QoE Profile assigned for the PoC Session but it may differ based on restrictions associated to the subscription of the local PoC User (e.g. 'Basic' PoC Users participate with 'Basic' Local QoE Profile in PoC Sessions with 'Professional' QoE Profile).
Manual Answer Mode	A mode of operation in which the PoC Client requires the PoC User to manually accept the PoC Session invitation before the PoC Session is established.
Media	Forms of information that are exchanged between Participants. Media may come in different forms, which are referred to as Media Types.
Media Burst	Flow of Media from a PoC Client that has the permission to send Media to the receiving PoC Client(s).
Media Burst Control	Media Burst Control is a control mechanism that arbitrates requests from the PoC Clients, for the right to send Media and Multimedia
Media Burst Control Protocol	Media Burst Control Protocol (MBCP) is a protocol for performing Media Burst Control, and is defined in these specifications.
Media Burst Control Schemes	Way of using Media Burst Control according to predefined rules and procedures.
Media Filtering	A procedure of the PoC Server performing the Participating PoC Function in order to determine the Media Burst retrieval priority in case of Simultaneous PoC Sessions.
Media Parameters	SIP/SDP based information exchanged between the PoC Server and the PoC Client that specify the characteristics of the Media for a PoC Session being established or that already exists.
Media Stream	A Media Stream is an instance of the transmission of a Media Type. Multiple Media Streams can be combined to transmit multimedia.
Media Time Compression	A PoC Client operation on Media data to be transmitted, which compresses the Media in time such that the compressed Media data will be played out in a shorter time duration than the original uncompressed Media data.
Media Type	Media Types share a characteristic of human perception. Media Types are either realtime or non-realtime, like:

- PoC Speech

- Audio (e.g. music)

- Video

- Discrete Media (e.g. still image, formatted and non-formatted text, file)

Media-floor Control	The mechanism to control separate Media Streams.
Media-floor Control Entity	A Media Control resource shared by Participants in a PoC Session. The Media-floor Control Entity is controlled by a state machine to ensure that only one Participant can access the Media resource at the same time. One Media-floor Control Entity can handle one or more Media Streams according to negotiation.
Multimedia	Multimedia is the simultaneous existence of multiple Media Types like • audiovisual • video plus subtitles Multimedia from a single source that involves real-time Media Types are assumed to be synchronized.
Nick Name	A user-friendly display name that might be associated to a PoC User or a PoC Group. The Nick Name can either be provided as a "display-name" in a SIP header or in the <display-name> child element of the <entry> element for the PoC User or for the PoC Group as specified in [OMA-PoC-Document-Mgmt] or generated by PoC Server performing the Controlling PoC Function if unique Nick Names are supported and PoC User requested privacy.
NW PoC Box	A PoC functional entity in the PoC Network where PoC Session Data and PoC Session Control Data can be stored.
On-demand Session	A PoC Session set-up mechanism in which all Media Parameters are negotiated at PoC Session establishment.
Online Charging Function	3GPP entity that performs real-time credit control. Its functionality includes transaction handling, rating, online correlation and management of subscriber accounts/balances. The Online Charging Function (OCF) consists of two distinct modules, namely the Session Based Charging Function (SBCF) and the Event Based Charging Function (EBCF).
Ordinary Participant	A Participant in a 1-many-1 PoC Group Session that is only able to send and receive Media to and from the Distinguished Participant.
P2T Address	A P2T Address identifying a P2T User. The P2T Address can be used by PoC Users to communicate with P2T Users. The P2T Address used in a PoC Network points to the PoC Interworking Agent of the P2T User in the PoC Interworking service.
P2T User	A P2T User is a user of the P2T service provided by an External P2T Network.
Participant	A Participant is a PoC User in a PoC Session.
Participant Information	Information about the PoC Session and its Participants.
Participating PoC Function	A function implemented in a PoC Server, which provides PoC Session handling, which includes policy enforcement for incoming PoC Sessions and relays Talk Burst Control and Media Burst Control messages between the PoC Client and the PoC Server performing the Controlling PoC Function. The Participating PoC Function may also relay RTP Media between the PoC Client and the PoC Server performing the Controlling PoC Function.
PoC Address	An address identifying a PoC User. The PoC Address can be used by one PoC User to request communication with other PoC Users. If SIP/IP Core is the 3GPP/3GPP2 IMS the PoC Address is a public user identity.
PoC Box	A PoC functional entity where PoC Session Data and PoC Session Control Data can be stored. It can be a NW PoC Box or a UE PoC Box.
PoC Charging Event	A Chargeable Event sent by the PoC Server to the O-CTF for further processing.
PoC Client	A functional entity that resides on the User Equipment that supports the PoC service.
PoC Dispatcher	The Participant in a Dispatch PoC Session that sends Media to all PoC Fleet Members and that receives Media from any PoC Fleet Member. NOTE: The PoC Dispatcher is an enhancement to the PoC 1 Distinguished Participant.

PoC Fleet Member	A Participant in a Dispatch PoC Session that is only able to send Media to the PoC Dispatcher, and that likewise is only able to receive Media from the PoC Dispatcher. NOTE: PoC Fleet Member is the same as Ordinary Participant in PoC 1.
PoC Group	A Group supporting the PoC service. PoC User uses PoC Groups e.g. to establish PoC Group Sessions.
PoC Group Identity	A SIP URI identifying a Pre-arranged PoC Group or a Chat PoC Group. A PoC Group Identity is used by the PoC Client e.g. to establish PoC Group Sessions to the Pre-arranged PoC Groups and Chat PoC Groups.
PoC Group Session	A Pre-arranged PoC Group Session, Ad-hoc PoC Group Session or Chat PoC Group Session.
PoC Interworking Agent	Abstract entity implemented in the PoC Interworking Function, acting as a PoC Client on behalf of a PoC Remote Access User or a P2T User.
PoC Interworking Function	Part of the PoC Interworking Service, it provides conversion between PoC Network based SIP signaling, Talk Burst Control and Media Burst Control Protocol, and Media packet transport, and External P2T Network based session signaling, floor control, and media transport protocol.
PoC Interworking Service	A means to extend the PoC User experience beyond the OMA defined PoC Service and PoC Network boundaries, accomplished by interworking with other networks and systems, while not PoC compliant, being able to provide a reasonably comparable capability, involving simplex media based conferencing.
PoC Remote Access	A method of providing a compliant PoC User access to a SIP/IP Core and PoC Network via an potentially non-SIP/IP based network.
PoC Remote Access User	A user of the PoC Service accessing the service potentially via a non IMS enabled SIP/IP based network, not necessarily using a PoC Client (e.g. a PoC User, with a valid subscription, accessing PoC Services via a PSTN terminal).
PoC Server	A network element, which implements the 3GPP/3GPP2 IMS application level network functionality for the PoC service. A PoC Server can perform the role of the Controlling PoC Function or Participating PoC Function, or both at the same time.
PoC Service Provider	A PoC Service Provider provides PoC Service – on its own or in conjunction with other Value Added Services – to his PoC Subscribers.
PoC Service Setting	A set of parameters indicating the capability of the PoC Client and the willingness of the PoC User to support related PoC Client and PoC Server functionalities, e.g. Answer Mode Indication, Incoming PoC Session Barring, Incoming Instant Personal Alert Barring and Simultaneous PoC Sessions Support.
PoC Session	A PoC Session is a SIP Session established by the procedures of this specification. This specification supports the following types of PoC Sessions: 1-1 PoC Session, Ad-hoc PoC Group Session, Pre-arranged PoC Group Session, or Chat PoC Group Session.
PoC Session Charging Correlation	Making a Correlation between PoC Charging Events that belong to the same PoC Session.
PoC Session Control Data	Information about PoC Session Data e.g. time and date, PoC Session initiator.
PoC Session Data	Media Bursts and Media Burst Control information exchanged during a PoC Session e.g. Video frames, an image or Talk Burst.
PoC Session Identity	SIP URI, which identifies the PoC Session and which can be used for routing initial SIP requests. It is received by the PoC Client during the PoC Session establishment in the Contact header and/or in the MBCP Connect message in case of using Pre-established Session.
PoC Session Media Types	Media Types used in PoC Session by at least one PoC Session Participant.
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 PoC Group Session and a Pre-arranged PoC Group Session, the PoC Session Owner is the creator of the PoC Group.

PoC Session Precedence	A level of priority determined based on the Service Provider Policy and the QoE Profile associated with the PoC Session. It controls how the PoC Session is treated under competing situations with other PoC Sessions and may result in a preferred treatment for those PoC Sessions with a higher PoC Session Precedence. The definition of different levels to be applied for this feature is a decision that belongs to the PoC Service Provider.

> NOTE: A level of priority can be determined for each of four existing QoE Profiles. When 'Official Government Use' QoE Profile is used, five sub-levels of priority are determined for this QoE Profile, according to rules in [RFC4412] and WPS namespace.

PoC Speech	Communication of speech as defined by PoC version 1.0.
PoC Subscriber	Is one whose service subscription includes the PoC service. A PoC Subscriber can be the same person as a PoC User.

> NOTE: In [PoC RD V1.0] the term "PoC Subscriber" is sometimes used to mean the same as term "PoC User" in [OMA PoC AD], [OMA PoC CP] and [OMA PoC UP].

PoC User	A User of the PoC service. A PoC User can be the same person as a PoC Subscriber. A PoC User uses the PoC features through the User Equipment.
Pre-arranged PoC Group	A persistent PoC Group. The establishment of a PoC Session to a Pre-arranged PoC Group results in the members being invited.

> NOTE: A Pre-arranged PoC Group is a persistent PoC Group, where the <invite-members> element is set to "true" as specified in the [OMA-PoC-Document-Mgmt]"PoC Group".

Pre-arranged PoC Group Identity	PoC Group Identity of a Pre-arranged PoC Group.
Pre-arranged PoC Group Session	A PoC Session established by a PoC User to a Pre-arranged PoC Group.
Pre-established Session	The Pre-established Session is a SIP Session established between the PoC Client and the Home PoC Server containing at least one Media Stream bound to a Media-floor Control Entity. The PoC Client establishes the Pre-established Session prior to making requests for PoC Sessions to other PoC Users. To establish a PoC Session based on a SIP request from the PoC User, the PoC Server conferences other PoC Servers/Users to the Pre-established Session so as to create an end-to-end connection.
Primary PoC Session	A PoC Session that the PoC User selects in preference to other PoC Sessions. When the PoC User has Simultaneous PoC Sessions, the Primary PoC Session has a priority over Secondary PoC Sessions.
Push To Talk Service (P2T)	Non OMA PoC "walkie-talkie" service.
QoE Profile	Set of parameters that define, from a high level point of view, the end PoC User experience in a given PoC Session. The QoE Profile is part of the PoC User's subscription and can also be specified for PoC Groups. Each QoE Profile is associated with certain rules for underlying resource usage and potential prioritization procedures.
Receive Media Processing Capability	The capability of the PoC Client to handle Media received from the PoC Server.
Referenced Media Content	Reference(s) to Media content to be included in an invitation to a PoC Session or in a Group Advertisement.
Remote PoC Client	PoC Client that resides on the User Equipment that supports the PoC service while accessing the PoC Network via a potentially non IMS enabled SIP/IP based network.
Request with Media Content	An invitation to a PoC Session or a Group Advertisement that includes embedded media e.g. Included Media Content, Referenced Media Content or Text Content
Restricted Group	A Group that can be joined only by a PoC User that is a member of the Group. A Restricted Group has a Group List.
RTP Media	The Media carried in an RTP payload.
Secondary PoC Session	A PoC Session for which the PoC User receives Media when there is no Media present on the Primary PoC Session.

Sender Identification	The procedure by which the identity of the current Media sender is determined and made known to receivers on the PoC Session.
Served PoC User	A PoC User that obtains a PoC service from a Home PoC Server.
Service Instance	A Service Instance is the instantiation of a logical connection across the radio interface associated with a particular protocol stack. Service Instances, as logical connections, are mapped onto the physical layer radio connections. A Service Instance may be closely tied to a single application level flow, e.g., a voice service instance, or may support multiple application level flows, e.g., a best effort packet data service instance.
Service Provider Policy	Service Provider Policy refers to the overall policy conditions actually selected by a service provider(s) for commercial implementation of a PoC service. Service Provider Policy is established based on commercial considerations, which may concern, e.g. support/non-support of certain network or client capabilities or service features within a network. Service Provider Policy is applicable only to the network or subscribers over which the service provider has control.
SigComp	A signalling compression mechanism specified in [RFC3320]; SigComp in PoC provides for the compression of SIP requests and responses.
Simultaneous PoC Session	Functionality, where Home PoC Server discards Media for keeping conversation uninterrupted, in case a PoC User is a Participant in more than one PoC Session simultaneously using the same PoC Client.
Simultaneous PoC Sessions Support (SSS)	A PoC Service Setting for the PoC Client that indicates that the PoC Client is able and PoC User is willing to use Simultaneous PoC Sessions.
SIP Session	A SIP dialog. From [RFC3261], a SIP dialog is defined as follows: A dialog is a peer-to-peer SIP relationship between two UAs that persists for some time. A dialog is established by SIP messages, such as a 2xx response to an INVITE request. A dialog is identified by a call identifier, local tag, and a remote tag. A dialog was formerly known as a call leg in [RFC2543].
SIP URI	From RFC 3261: "A SIP or SIPS URI identifies a communications resource" and "follows the guidelines in RFC 2396 [5]". PoC uses SIP URIs to identify PoC Clients, PoC Servers, and PoC Sessions, resource lists that point to URI lists, etc.
Talk Burst	A flow of PoC Speech from a PoC Client having the permission to send PoC Speech as specified in [OMA PoC V1.0].
Talk Burst Control	A control mechanism that arbitrates requests from the PoC Clients for the right to send PoC Speech as specified in [OMA PoC V1.0].
Talk Burst Control Protocol	A protocol for performing Talk Burst Control defined in [OMA PoC UP].
Text Content	Text included in an invitation to a PoC Session or in a Group Advertisement.
Transmit Media Buffering	A PoC Client mode of operation where the PoC Client buffers Media in a buffer in the PoC Client prior to the PoC Server instructing the PoC Client to transmit the Media.
UE PoC Box	A functional entity co-located with the PoC Client in the User Equipment where PoC Session Data and PoC Session Control Data can be stored.
Unconfirmed Indication	An indication returned by the PoC Server to confirm that it is able to receive Media and believes the PoC Client is able to accept Media. The PoC Server sends the Unconfirmed Indication prior to determining that all elements on the forward path are ready or even able to receive Media.
Unrestricted Group	An Unrestricted Group is a PoC Group that any PoC User may join.
User	Any entity that uses the described features through the User Equipment.
User Equipment	A hardware device that supports a PoC Client e.g., a wireless phone.
User Plane	The User Plane includes the Media and Media control signaling (e.g., Talk Burst Control Protocol) between the PoC Client and PoC Server, between the PoC Box and the PoC Server as well as between PoC Servers.
Video	Communication of live-streamed pictures without any Audio component.

3.3 Abbreviations

For the purposes of the PoC specifications, the abbreviations given in [OMA Dictionary] and the following abbreviations apply:

3GPP   3rd Generation Partnership Project

3GPP2   3rd Generation Partnership Project 2

AMR   Adaptive Multi Rate

CDR   Charging Data Record

CS   Circuit-switched

DM   Device Management

EBCF   Event Based Charging Function

EVRC   Enhanced Variable Rate Codec

GPRS   General Packet Radio Service

IAB   Incoming Instant Personal Alert Barring

IMS   IP Multimedia Subsystem

IMSI   International Mobile Subscriber Identity

IP   Internet Protocol

IPIIM   Invited Party Identity Information Mode

ISB   Incoming PoC Session Barring

MAO   Manual Answer Override

MIME   Multipurpose Internet Mail Extensions

MSISDN   Mobile Subscriber ISDN Number

MSRP   Message Session Relay Protocol

>   NOTE: The base Message Session Relay Protocol is defined in [RFC4975].

NW   Network

O-CTF   OMA Charging Trigger Function

OMA   Open Mobile Alliance

P2T   Push To Talk

PDP   Packet Data Protocol

PoC   Push to talk over Cellular

QoE   Quality of Experience

QoS   Quality of Service

RTCP   RTP Control Protocol

RTP   Real-time Transport Protocol

SDP	Session Description Protocol
SIP	Session Initiation Protocol
SSS	Simultaneous PoC Session Support
TBCP	Talk Burst Control Protocol
UE	User Equipment
UP	User Plane
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
WPS	Wireless Priority Service
XDM	XML Document Management
XDMC	XDM Client
XDMS	XDM Server
XML	Extensible Mark-up Language

4. System concepts

4.1 Identification

4.1.1 PoC Address

Each PoC 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, PoC Remote Access Users or P2T 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 [RFC3966]. 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 subclause 4.5 *"Registration"*. Registration of one PoC Address associated with a PoC User MAY imply registration of other PoC Addresses associated with the same PoC User.

When the PoC Client registers multiple PoC Addresses, all PoC Addresses registered with the same SIP/IP Core identify the same PoC 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.

4.1.2 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] and [3GPP2 X.S0013.4].

4.1.3 PoC Group Identities

A PoC Group SHALL be identified with a PoC Group Identity. The PoC Client SHALL use PoC Group Identities for addressing PoC Groups. The PoC Group Identity is associated with individual PoC Addresses of all the PoC Group members, but it can also contain an association to other PoC Group Identities, i.e. a PoC Group inside a PoC Group. The PoC Group Identity SHALL take the form of SIP URI as defined in [RFC3261] and [RFC2396]. It SHALL be possible to create a PoC Group Identity statically and dynamically.

- An operator SHALL be able to create a static PoC Group identity which is stored in the Shared Groups XDMS as described in [OMA-XDM] for use in PoC Group Sessions.

- A PoC User SHALL be able to create a PoC Group which is stored in the Shared Groups XDMS for use in PoC Group Sessions.

- A PoC User SHALL be able to create and store a Group List as a URI List in the Shared List XDMS.

4.2   Addressing

4.2.1   Phone numbers

Phone numbers MAY be used as a PoC Address. A PoC User MAY address another PoC User, a P2T User or a PoC Remote Access User by a phone number. The PoC Client SHALL send the phone number to the SIP/IP Core in a TEL URI [RFC3966].

> NOTE: Pre-arranged PoC Groups and Chat PoC Groups are addressed with SIP URIs.

The phone number MAY use the international E.164 [ITU-T E.164] format (prefixed with a '+' sign), or a local format according to rules and procedures of [RFC3966]. The SIP/IP Core shall interpret the phone number with a leading '+' to be an E.164 number.

When addressing by TEL URI is used for a PoC Session the PoC Server MAY resolve the TEL URI 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.

4.2.2   SIP URI

A PoC User MAY address another PoC User, a P2T User, a PoC Remote Access User by a SIP URI and SHALL address a Pre-arranged PoC Group and a Chat PoC Group by a SIP URI.

4.3   Identification of inviting PoC User

The PoC Server SHALL maintain the PoC Address of the inviting PoC User used in the originating request (SIP URI, TEL URI, Nick Name or combination SIP URI + Nick Name). The PoC Server SHALL identify the PoC Groups by SIP URI and MAY identify them by Nick Name.

In the case of the PoC Group Session the PoC Server SHALL provide the PoC Group Identity to the Invited PoC Client(s).

The Home PoC Server SHALL replace the Nick Name provided by the Inviting PoC Client, if the Nick Name is configured in the Home PoC Server of the inviting PoC User.

In the case the PoC Address is restricted subclause 4.8 *"Privacy"* applies.

4.4   Talker Identification

The Talker Identification has been extended to also include the identity of the Participant sending a Media Burst, see subclause 4.4.1 "*Sender Identification"*.

4.4.1   Sender Identification

In order to provide the PoC Address and Nick Name of the Participant who is sending a Media Burst to Participants in the PoC Session the PoC Server SHALL support Sender Identification.

The PoC Server performing the Controlling PoC Function SHALL collect the PoC Addresses and Nick Names of the Participants engaged in the PoC Session when in the process of establishing the PoC Session with PoC Clients, including the initiator's PoC Address and Nick Name, which is received in the initial PoC Session establishment phase.

The PoC Server performing the Controlling PoC Function SHALL provide the PoC Address and the Nick Name, if a Nick Name is available, of the Participant at the sending PoC Client to the receiving PoC Client in the receiving Talk Burst message or, in case of other Media Type than PoC Speech, in the receiving Media Burst message.

In the case the PoC Address is restricted subclause 4.8 "*Privacy*" applies.

The Sender Identification of the Discrete Media is specified in the subclause 4.42.4 "*Discrete Media Sender Identification*".

4.5 Registration

4.5.1 General

Prior to using the PoC service the UE hosting the PoC Client SHALL perform SIP registration to the SIP/IP Core according to rules and procedures of [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/deregistration MAY be visible to the PoC Server via the POC-2 reference point. After a successful PoC service registration the PoC Client SHALL publish its PoC Service Settings to the PoC Server according to subclause 4.26 "*PoC Service Settings*" for each PoC Address that is registered with the SIP/IP core either explicitly or implicitly for the PoC Client that the PoC User intends to use for the PoC Service.

After a successful registration and a successful PoC Service Settings publish the PoC User is able to use the registered PoC Addresses:

- 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 URIs.

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 for the PoC service at any point of time by using a deregistration procedure. The SIP/IP Core MAY terminate PoC User's registration at any point of time by using a network initiated deregistration procedure.

NOTE 1: Network initiated de-registration is out of scope of the PoC specification.

The PoC Client SHALL indicate in the REGISTER request that this is a PoC registration so that it is possible for the SIP/IP Core to route the terminating requests to the PoC Client.

If the UE incorporates UE PoC Box functionality the UE SHALL include in the REGISTER request the contact address for the UE PoC Box along with an indication that this is a UE PoC Box whenever the UE PoC Box function is available to record Media Streams.

NOTE 2: When the UE hosts both the UE PoC Box and the PoC Client both the UE PoC Box and the PoC Client share the same PoC Address of the served PoC User. No registration is needed for the NW PoC Box.

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.S0013.4].

4.6 Session establishment

4.6.1 General

The originating procedures as specified the subclause 4.6.1.1 "*Originating procedures*" describe how requests are transported from the originating PoC User to the PoC Server performing the Controlling PoC Function.

The terminated procedures as specified the subclause 4.6.1.2 "*Terminated procedures*" describe how requests are transported from the PoC Server performing the Controlling PoC Function to the terminating PoC User.

Both originated and terminated procedures also define how Media Types and Media-floor Control Entities can be offered when sending a request to establish a PoC Session.

NOTE: PoC Server performing the Controlling PoC Function may locate in the originating PoC network, in the terminating PoC network or in another PoC network.

The PoC Client, SIP/IP Core and PoC Server SHOULD be able to use 3GPP/3GPP2 IMS routing mechanisms as defined in [3GPP TS 24.229] and [3GPP2 X.S0013.4].

4.6.1.1   Originating procedures

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

In its request, the PoC Client MAY offer one or more Media Types when establishing a PoC Session. The Media Types offered for a PoC Session MAY be any of the Media Types that are supported by the PoC Client.

NOTE 1: In order to ensure a common Media Type in the PoC Group Session, the PoC Client offers at least PoC Speech.

When the PoC Server in the originating network receives the request it performs the necessary originating service control. If the service control determines that the PoC Session establishment continues and the PoC Session is hosted by another PoC Server, then the originating PoC Server SHALL route the request to the PoC Server performing the Controlling PoC Function via the originating SIP/IP Core.

NOTE 2: The originating PoC Server can be the PoC Server performing the Participating PoC Function and the Controlling PoC Function in 1-1 PoC Session or Ad-hoc PoC Session.

NOTE 3: Routing of requests between domains is a function of the SIP/IP Core and is out of the scope of this specification.

4.6.1.2   Terminated procedures

The PoC Server SHALL send all requests to the same SIP/IP Core that the PoC Server received the originating request from. The PoC Server SHALL indicate in the request that it communicates using PoC service so that it is possible for the SIP/IP Core to route the request to the PoC Client.

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 PoC Session establishment continues then the terminating PoC Server SHALL route the request to the terminating PoC Client via the terminating SIP/IP Core.

When the PoC Server in the terminating network sends the request to establish a PoC Session towards the terminating PoC Client, the request SHALL either contain the same Media Types or subset of the Media Types contained in the initial received request.

The procedure for attempting to ensure a common media type is specified in subclause 4.27.2.1 "*Ensuring a common Media Type*".

4.6.1.3   Session modification

During a PoC Session, either the PoC Server or the PoC Client MAY initiate a session modification procedure. Session modification MAY be e.g. due to adding or removing Media Types and Media-floor Control Entities from the PoC Session or due to updating the Media Parameters.

Initiation of PoC Session modification SHOULD be avoided during the transfer of a Media Burst. All the modified Media Parameters SHALL be applied from the next Media Burst transfer after PoC Session modification is completed.

4.6.2   Pre-established Session

The PoC Client MAY establish one or more Pre-established Sessions with Home PoC Server prior to initiating PoC Sessions to other PoC Users. When establishing a Pre-established Session, PoC Client SHALL negotiate the Media Types and Media Parameters, which later can be used in PoC Sessions. The PoC Client MAY modify the existing Pre-established Session.

The PoC Server MAY support a Pre-established Session. The PoC Server SHALL reject the initiation of the Pre-established Session, if the Pre-established Session is not supported by the PoC Server.

Upon receiving an INVITE request from the PoC Server performing Controlling PoC Function, the PoC Server performing Participating PoC Function MAY use the existing Pre-established Session, when

- the offered Media Streams and the offered Media-floor Control Entities are same or subset of those in the existing Pre-established Session;

- the Media-floor Control Entity binding of each offered Media Stream is the same as the Media-floor Control Entity binding of the Media Stream of the same Media Type in the existing Pre-established Session; and,

- the Media Parameters of each offered Media Stream are compliant with the Media Parameters of the Media Stream of the same Media Type in the existing Pre-established Session.

NOTE: If Inviting PoC Client or PoC Server performing Participating PoC Function is not able to use an existing Pre-established Session, then it can either use the On-demand Session or make session modification for the existing Pre-established Session to get Media Types and Media Parameters to match between the invitation request and the existing Pre-established Session.

4.7   Security

The Security concepts are described in [PoC AD V2.0] *"Security Considerations"*.

4.8   Privacy

A PoC User MAY request privacy for the identity of the PoC User meaning that the PoC Address of the PoC User is hidden from other PoC Users. The PoC Client SHALL use mechanisms defined in [RFC3325] to request privacy for the identity, i.e. the PoC User's PoC Address.

The PoC Server SHALL apply the privacy in the TBCP or MBCP message, if the privacy is requested.

If an inviting, invited or joining PoC User requests privacy of his PoC Address then the following procedures SHALL take place in the system operating in the trusted domain(s):

- The PoC Server performing the Controlling PoC Function SHALL retain privacy information of the Participants for the duration of the PoC Session.

- The SIP/IP Core serving the Invited PoC User SHALL provide the privacy of the PoC Address of the inviting PoC User on Control Plane at the POC-1 reference point.

- The PoC Server performing the Controlling PoC Function SHALL provide the privacy of the PoC Addresses of Participants when providing the Participant information notifications.

- The PoC Server performing the Controlling PoC Function SHALL provide the privacy of the PoC Address of the sending PoC User at the POC-3 and POC-4 reference points.

- The PoC Server performing the Participating PoC Function SHALL provide the privacy of the PoC Address of the PoC User sending Media at the POC-3 and POC-4 reference points, if negotiated with the PoC Server performing the Controlling PoC Function or published as privacy value PoC Service Setting or invited parties identity information PoC Service Setting by the PoC Client.

If privacy for the identity is not requested then PoC Servers and SIP/IP Core passes the PoC Address of the inviting PoC User to the Invited PoC User.

If privacy for the identity is not allowed in the PoC Group authorization rules as specified in [OMA-XDM], the involved entity SHALL reject the request.

If PoC Server or SIP/IP Core is sending or receiving SIP signalling or Media traffic to/from a party which is not trusted then the involved entity SHALL remove the PoC User's PoC Address prior sending the SIP signalling or Media traffic further.

When SIP/IP Core corresponds with 3GPP/3GPP2 IMS then privacy mechanisms as defined in [3GPP TS 24.229]/[3GPP2 X.S0013.4] are used.

4.9   Talk Burst Control

Talk Burst Control is described in [PoC AD V1.0] and MAY be used for Media-floor Control Entities containing only PoC Speech.

Media Burst Control described in 4.9A "*Media Burst Control*" is an enhanced version of Talk Burst Control that supports Media-floor Control Entities containing multimedia as well as Media-floor Control Entities containing only PoC Speech..

The enhancement in 4.9A "*Media Burst Control*" uses a new set of terminology that can be mapped, using [PoC AD V1.0] terminology, as follows:

- A Media Burst includes Talk Burst as defined in [PoC AD V1.0].

- The Media Burst request includes Talk Burst request as defined in [PoC AD V1.0].

- The Media Burst Confirm response includes Talk Burst Confirm response as defined in [PoC AD V1.0].

- The Media Burst Reject response includes Talk Burst Reject response as defined in [PoC AD V1.0].

- The Media Burst Completed indication includes Talk Burst Completed indication as defined in [PoC AD V1.0].

- The No Media Burst indication includes No Talk Burst indication as defined in [PoC AD V1.0].

- The Receiving Media Burst indication includes Receiving Talk Burst indication as defined in [PoC AD V1.0].

- The Stop Media Burst indication includes Stop Talk Burst indication as defined in [PoC AD V1.0].

- The Connect Media Burst indication includes Connect Talk Burst indication as defined in [PoC AD V1.0].

- The Disconnect Media Burst indication includes Disconnect Talk Burst indication as defined in [PoC AD V1.0].

- The Media Burst Acknowledgement includes Talk Burst Acknowledgement as defined in [PoC AD V1.0].

- The Media Burst queue position request includes Talk Burst queue position request as defined in [PoC AD V1.0].

- The Media Burst request queue position status message includes Talk Burst request queue position status message as defined in [PoC AD V1.0].

4.9A Media Burst Control

The half duplex nature of the PoC service requires that before a PoC Client can send a Media Burst the PoC Client SHALL negotiate the permission to send a Media Burst.

Media Burst Control SHALL be used for PoC Speech, Audio and Video. Media Burst Control MAY be used for Discrete Media. Media Burst Control for Discrete Media SHALL be used if negotiated as described in subclause 4.27 "*Media-floor Control procedure*".

If Media Burst Control is used, the following SHALL apply:

The PoC Server performing the Controlling PoC Function SHALL cause Media Bursts to be arbitrated between PoC Clients as follows.

- The PoC Client SHALL send a request for the permission to send a Media Burst to the PoC Server. The request MAY relate to a single Media Type or any combination of the Media Types according to negotiation between the PoC Client and the PoC Server.

- The PoC Server SHOULD confirm the request to send a Media Burst or Media Bursts if no other PoC Client has the permission to send a corresponding Media Burst. The PoC Server MAY reject a request to send a Media Burst due to local policy decision by the PoC Server.

- The PoC Server SHALL reject the request to send a Media Burst if another PoC Client has the permission to send a Media Burst using the same Media-floor Control Entity and the PoC Server or the PoC Client does not support queuing.

- The PoC Server MAY queue a request to send a Media Burst in an associated Media Burst queue if queuing is supported by the PoC Server and the PoC Client. The PoC Server MAY place a request in the queue depending on the priority and timestamp of the Media Burst Request.

- For a Media-floor Control Entity where queuing has been negotiated, a queue SHALL be assigned by the PoC Server. The PoC Server MAY process the queues for Media-floor Control Entities according to predefined Media Burst Control Scheme, if a Media Burst Control Scheme is defined.

NOTE 1: The PoC Server can accept Media Burst Control Scheme relating to queuing only in case of queuing is also accepted by the PoC Server in the same PoC Session.

- If the PoC Server supports more than one level of priority, the PoC Server SHALL place a request in a Media Burst request queue according to the priority of the Participant at the PoC Client. The priority level SHALL be determined by the PoC Server and SHALL be subject to a priority request received from the PoC Client. Priority levels are defined in subclause 4.9.1A *"Media Burst request priority levels"*.

- The PoC Server MAY limit the number of positions in a Media Burst request queue. The PoC Server SHOULD support a number of queue positions per PoC Session that is at least equal to the number of Participants in a PoC Session, up to the permitted maximum number of Participants.

- At any time there SHALL be at most one request to send a Media Burst queued for each PoC Client in each queue. If a second request is received from a PoC Client when a request is already queued, the PoC Server SHALL update the attributes (i.e. the priority level) of the first request according to the second request. If the priority level of the second request is different to the priority level of the first request, the PoC Server SHALL adjust the first request to a proper position in the Media Burst queue based on the rules of *4.9.1A Media Burst request priority* levels*"*.

- The PoC Server SHALL supervise the length of a Media Burst and SHALL revoke the permission to send a Media Burst if the length exceeds the maximum Media Burst duration. The maximum Media Burst duration MAY depend on local policy, for example it can be calculated based on e.g. size or bandwidth or time.

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

- Media Burst request:

The request is sent by the PoC Client to the PoC Server in order to request permission to send a Media Burst or Media Bursts. The request MAY include:
  o Priority level request indicator, if the PoC Client requests a priority level

- Media Burst Confirm response:

The response is sent by the PoC Server to the PoC Client in order to confirm that the PoC Client has obtained permission to send one Media Burst.

The Media Burst Confirm response SHALL include:
  o Maximum duration time to send Media Burst before the permission is revoked

The Media Burst Confirm response MAY include:
  o Alert Margin

- Media Burst Reject response:

The response is sent by the PoC Server to the PoC Client to reject a request to send a Media Burst. The Media Burst reject response SHALL include:

- o A reject reason. The possible reject reason MAY be:

    - Another PoC Client already has been given permission to send a Media Burst and no queuing of the request is allowed;

    - The PoC Client is not allowed to request permission to send a Media Burst at the moment;

    - Only one Participant in the PoC Session or only one Participant connected to the requested Media-floor. For example if only one Participant is left in a PoC Session;

    - Internal PoC Server error;

    - Listen only. The Participant is not allowed to request permission to send Media;

    - No resources available e.g. due to congestion; and,

    - Other reason e.g. due to a local policy in the PoC Server.

- Media Burst Completed indication:

The indication is sent by the PoC Client to the PoC Server in order to indicate that the sending of the Media Burst is completed or PoC Client cancels before sending Media Burst or PoC Client requests the PoC Server to cancel the queued Media Burst request when queuing is supported by the PoC Client and PoC Server.

- No Media Burst indication:

The indication is sent by the PoC Server to all PoC Clients in order to inform the PoC Clients that no one has requested for the permission to send a Media Burst at the moment and, if queuing is supported, that there is no one in the queue.

- Receiving Media 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 Media Burst) in a PoC Session in order to inform them that another PoC Client has the permission to send a Media Burst and that the PoC Client(s) SHALL prepare for receiving a Media Burst.

The receiving Media Burst indication SHALL include:
- o The identity of the Participant at the PoC Client sending the Media Burst. The identity provided SHALL allow the PoC Client to determine the PoC Address in the case the sender doesn't want to be anonymous

Receiving Media Burst indication MAY include:

- o Acknowledgement request

- o PoC Group Session Identity

- o The Nick Name of the Participant at the PoC Client sending a Media Burst

- Stop Media Burst indication:

The indication is sent by the PoC Server to the PoC Client who has the permission to send a Media Burst in order to revoke the permission to send Media Bursts.
The Stop Media Burst indication SHALL include:

- o A reject reason. The possible reject reason MAY be:

    - Only one PoC User in the PoC Session, if only one Participant is connected to a Media-floor Control Entity

    - Media Burst too long indicating that the Media Burst has exceeded the maximum duration, including retry after time value

- No permission to send Media Bursts

- Media Burst pre-empted

- Media-floor occupied too long when a Participant has taken to long time to transfer Discrete Media.

- No resources available e.g. in case of congestion in the PoC Server.

- Other reason when the PoC Server does not any longer grant the Participant to send a Media Burst e.g. due to a local policy.

NOTE 2: The maximum duration time and retry after time are configurable parameters.

- o A retry-after time value indicating how long the PoC Client has to wait before a request to send a Media Burst will be confirmed. The parameter is only present if the permission to send a Media Burst is revoked due to "Media Burst is too long".

NOTE 3: The retry-after time is a configurable parameter.

- Connect Media Burst indication

    The indication is sent by the PoC Server performing Participating PoC Function in order to inform PoC Client(s) using Pre-established Session that it has been connected to a PoC Session.

    The Connect Media Burst indication MAY include:
    - o A PoC Session Identity.

    - o Identity of inviting PoC Client

    - o The Nickname provided by the inviting PoC Client

    - o The PoC Group name

    - o PoC Group Identity

    - o Invited parties identity information

    - o Indication which Media Streams are used in the PoC Session

    - o Indication what burst control protocol the PoC Session uses

- Disconnect Media Burst indication

    The indication is sent by the PoC Server performing the Participating PoC Function to the PoC Client to indicate that the PoC Session using a Pre-established Session has been released.

    The Disconnect Talk Burst indication SHALL include
    - o A PoC Session Identity.

- Media Burst Acknowledgement:

The indication is sent by the PoC Client to the PoC Server as a response to the Receiving Media Burst, e.g. when used as an indication of the incoming PoC Session in case of Pre-established Session.

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

- Media Burst request queue position status message:

The message is sent by the PoC Server to the PoC Client to indicate that the Media Burst request is queued, or to indicate changes in the status of the Media Burst request. The indication MAY include:
- o Queue position.

      o   Request priority indication

Support for queued Media Burst Control is transparent to a PoC Server performing the Participating PoC Function that is involved in Media processing. The PoC Server performing the Participating PoC Function SHALL relay all messages related to Media Burst Control to the PoC Server performing the Controlling PoC Function or PoC Client, as appropriate, in any PoC Session that is not being filtered by the PoC Server performing the Participating PoC Function, without modification of the content of the messages.

A PoC Server performing Controlling PoC Function capable of supporting queued Media Burst Control SHOULD support queued Media Burst Control for those PoC Clients that request it. A PoC Session MAY include both PoC Clients that do not support or request use of queued Media Burst Control and PoC Clients that request use of queued Media Burst Control.

As a result of a PoC User leaving a PoC Session, if the PoC Session supports queuing and the PoC Session is not released, then the PoC Server SHOULD adjust the queue as necessary (e.g. remove the queued Media Burst request(s) of the PoC User, etc).

4.9.1   Talk Burst request priority levels

The Talk Burst request priority level is enhanced to also include Media Burst request priority level, see subclause 4.9.1A *Media Burst request priority levels*".

4.9.1A Media Burst request priority levels

A PoC Server and PoC Client which supports pre-emption, or queuing, or both of Media Burst requests MAY additionally support prioritisation of Talk Burst requests and Media Burst requests. The priority of a Media Burst request of one PoC Client in one PoC Session MAY be same or different.

The following priority levels are defined:

- Pre-emptive priority: A request to have permission to send Media from a Participant with pre-emptive priority SHALL cause the current Media Burst holder's permission to send Media to be revoked immediately when the request for permission from the Participant with pre-emptive priority is received, unless the current Media Burst holder is also a Participant with pre-emptive priority. When the Media Burst is released or revoked, Participants with pre-emptive priority who have requested to have permission to send Media SHALL be granted the permission to send Media in preference to Participants with high or normal priority.

- High priority: When the Media Burst is released or revoked, Participants with high priority in the queue who have requested to have permission to send Media SHALL be granted the permission to send Media in preference to Participants with normal priority.

- Normal priority: When the Media Burst is released or revoked, Participants with normal priority in the queue who have requested to have permission to send Media SHALL be granted the permission to send Media if and only if there are no outstanding requests from Participants with higher priority in the queue.

- Receive-only. A Participant with this priority is only allowed to receive Media. A request to have permission to send Media from a Participant with receive-only priority SHALL be rejected.

  NOTE 1:   When there is no request to send Media in the queue, there is no difference between the handling of Media Burst from Participants with high or normal priority.

A PoC Server and PoC Client which supports prioritisation SHALL support normal priority and at least one other priority level.

The PoC Server SHALL determine the highest Media Burst request priority level that can be granted to a PoC Client, when the PoC Client is invited to join the PoC Session. PoC Server SHALL grant the permission to send Media among the PoC Clients of the same priority level in the order of received requests.

The PoC Client MAY request the permission to send Media at a Media Burst request priority level that is the same as or lower than the highest priority permitted to the Participant. A PoC Client authorized for pre-emptive priority SHOULD

request permission to send Media at a Media Burst request priority level that is lower than pre-emptive priority unless the Participant explicitly requests to pre-empt the current sender of Media.

The PoC Server SHALL determine the highest Media Burst request priority level that can be granted to a PoC Client at the time the PoC Client is invited to join the PoC Session. The highest Media Burst request priority level MAY be based upon the Local QoE Profile of the PoC User for the PoC Session.

PoC Server MAY revoke or reject the Media Burst requests of lower priority. Under high load or other special situations, a PoC Server MAY revoke or reject Media Burst requests within a PoC Session due to low PoC Session Precedence.

> NOTE 2: The priority handling between different Media Types relies on the queuing process of Media-floor Control Entities which can e.g. be indicated by a Media Burst Control Scheme, but priority handling of different Media Types is otherwise out of scope of this specification.

4.9.2 Local Granted Mode

PoC Client and PoC Server MAY support Local Granted Mode. The PoC Server SHALL use the Local Granted Mode only towards those PoC Clients, which have proposed the support for Local Granted Mode during the PoC Session establishment or the PoC Session modification.

If the PoC Server performing the Controlling PoC Function uses the Local Granted Mode, the PoC Server SHALL include the Local Granted Mode parameter in the OK response which shows the acceptance of using Local Granted Mode to the PoC Client(s) in the PoC Session.

PoC Client MAY send a Media Burst to the PoC Server before getting Media Burst Confirm response, if Local Granted Mode is negotiated with the PoC Server performing the Controlling PoC Function. The Local Granted Mode SHALL be negotiated at the Control Plane.

The PoC Server SHALL revoke the Media Burst in case another Media Burst in the same PoC Session is already on-going or PoC Server has already granted Media Burst to another PoC Client.

> NOTE 1: Local Granted Mode can't be used in case queuing is used.

> NOTE 2: Local Granted Mode is fulfilling the requirements specified in [PoC RD V2.0] "*Pre-granted Media Burst Control*"

4.10 Handling of Simultaneous PoC Sessions

4.10.1 General

The Simultaneous PoC Sessions mean functionality, that the Home PoC Server discards Media Bursts of some PoC Sessions for maintaining a single entire Conversation.

A PoC Client and PoC Server MAY be capable of handling Simultaneous PoC Sessions. PoC Clients capable of handling Simultaneous PoC Sessions MAY become involved in Simultaneous PoC Sessions by inviting, joining or accepting more than one PoC Sessions, if handling of Simultaneous PoC Sessions is supported by the Home PoC Server. The PoC Client SHALL be aware if the Home PoC Server supports Simultaneous PoC Sessions. The PoC Client supporting the Simultaneous PoC Sessions SHOULD learn via DM-1 reference point if the Home PoC Server supports Simultaneous PoC Sessions.

> NOTE: If the Simultaneous PoC Sessions functionality is not supported, the PoC Client is allowed to handle several PoC Sessions at the same time.

The PoC Client SHALL indicate to the Home PoC Server, if the PoC Client supports Simultaneous PoC Sessions.

Each Simultaneous PoC Session SHALL have a SIP Session, Media Burst Control and Media stream established between the PoC Client and the Home PoC Server.

4.10.2   Simultaneous PoC Session setup and control

The PoC Client, which is capable of handling Simultaneous PoC Sessions, SHALL be able to select the PoC Session priority of two priority levels (primary and secondary). At most one PoC Session MAY be primary. The rest of the PoC Sessions SHALL be secondary. The session priority is used by the Home PoC Server to filter the Media to be sent to the PoC Client. Additionally the PoC Client MAY lock and unlock itself to the selected PoC Session.

Primary/secondary prioritisation SHALL be PoC User and PoC Session specific. It SHALL be possible to change the prioritisation also while the PoC Client is engaged in multiple PoC Sessions. The Primary or Secondary PoC Session configuration SHALL be stored in the Home PoC Server. The setting MAY be made on the session setup or on the session update. When received the PoC Session priority information SHALL be processed by the Home PoC Server. The lock/unlock information MAY be sent by the PoC Client to the PoC Server performing Participating PoC Function similar way. When PoC Client is locked to one PoC Session, then the Home PoC Server performing Participating PoC Function SHALL not send a Media Burst of any other PoC Session to the PoC Client until unlocked or when PoC Session is ended.

The PoC Server performing Participating PoC Function SHALL identify that the PoC Session priority and/or locking is requested. The PoC Server performing the Participating PoC Function SHALL update the PoC Session priority according to the request, if not prevented by a local policy with pre-configured settings for the priority levels. When the session priority is set primary for the PoC User, the possible previous Primary PoC Session SHALL be automatically changed to the secondary one. If locking is requested and the PoC Server performing the Participating PoC Function allows locking for this PoC Session the PoC Server performing the Participating PoC Function SHALL lock the media stream filtering the way that this PoC Session is by-passed to the PoC Client until the PoC Session ends or it is unlocked. When locked to one PoC Session the PoC Server performing the Participating PoC Function SHALL automatically unlock the possible previous locked PoC Session. The PoC Server performing Participating PoC Function SHALL send the INVITE request to the PoC Server performing the Controlling PoC Function, but without Simultaneous PoC Session specific information elements.

The session priority MAY be set also on the Pre-established Session set-up. Locking to the Pre-established Session is not relevant.

4.10.3   Setting session priority/lock-in during a PoC Session

The PoC Client MAY change the PoC Session priority also during a PoC Session. In this case the PoC Client SHALL send an UPDATE to the PoC Server performing the Participating PoC Function. In this case the UPDATE SHOULD NOT be forwarded to the PoC Server performing the Controlling PoC Function.

In the case the new PoC Session is either initiated or received, when the PoC Client is locked to another PoC Session, the PoC Client SHALL release the locking of another session by adding the unlocking request to the INVITE/UPDATE request to be able to communicate in the new PoC Session.

The PoC Server performing the Participating PoC Function SHALL change the session priority and/or locking according to the PoC Client request, if not permanently pre-configured.

The PoC Session locking has precedence over the PoC Session priority when both apply.

4.10.4   RTP Media filtering of the Simultaneous PoC Sessions (for PoC Speech)

The PoC Client MAY participate in Simultaneous PoC Sessions. If there is RTP Media in more than one PoC Session in which the PoC Client is a Participant at the same time, the Home PoC Server performing the Participating PoC Function SHALL filter the Media Bursts so that the PoC User hears a single Conversation.

The Home PoC Server performing the Participating PoC Function SHALL transfer the Media Bursts from the same PoC Session until the Conversation has ended (PoC Session is inactive long enough), or when the PoC Session is put on hold (deactivate Media Bursts) or a new Primary PoC Session is activated or another PoC Session is locked for talking/listening. The RTP Media filtering SHALL be performed by the PoC User's Home PoC Server performing the Participating PoC Function without affecting to the PoC Server performing the Controlling PoC Function.

The PoC Server performing the Participating PoC Function SHALL transfer the Media Bursts of the Primary PoC Session immediately when received, even if it was transferring the Media Bursts of the Secondary PoC Session. If the PoC User is currently sending Media in the Secondary PoC Session, the Media Burst SHALL NOT be interrupted, but the Media Burst Control messages of the Primary PoC Session SHOULD be sent to the PoC Client.

Among the Secondary PoC Sessions the PoC Server performing the Participating PoC Function SHOULD transfer the Media Burst of the on-going Conversation. After the silent period the Home PoC Server SHALL select the PoC Session for transferring RTP Media, for which the Media Burst are received first. After the previous Conversation is ended the Home PoC Server SHALL select of the several PoC Sessions with on-going Media Bursts the one according to its local policy. The PoC Client MAY lock itself temporarily into one PoC Session and thus, suspend the listening of any other PoC Session after Conversation has ended, until it is unlocked or the PoC Session is released. The PoC Client MAY send the Media Bursts request to any of the Simultaneous PoC Sessions. The possible locking to the previous PoC Session SHALL be released, when requesting the Media Burst to another PoC Session. The PoC Server performing the Participating PoC Function SHALL be able to relay the Media Burst Confirm response and also to start to transfer Media Bursts of this PoC Session.

4.10.4.1   Simultaneous PoC Session association

The PoC Server performing the Participating PoC Function SHALL select for the RTP Media filtering the Simultaneous PoC Sessions established by the same PoC Client using any registered PoC Address as determined in the subclause 4.X "Multiple registered PoC Address determination".

4.10.4.2   Media filtering of other Media Types than PoC Speech

For each PoC Session the PoC Server performing the Participating PoC Function SHALL either send all Continuous Media Types (i.e. PoC Speech, Audio, Video) to the PoC Client or discard all Continuous Media Types using the rules as described for PoC Speech in the subclause 4.10.4 *"RTP Media filtering of the Simultaneous PoC Sessions"*, when there is any overlapping Continuous Media Type in another PoC Session.

>   NOTE: Media filtering does not affect Discrete Media.

4.10.5   Participant information delivery

The possible changes in the RTP Media filtering selection in the PoC Server (from one PoC Session to another) SHALL NOT affect the distribution of the Participant information.

When the PoC Server changes the PoC Session being delivered to the PoC Client, the PoC Server SHALL indicate on the User Plane which PoC Session is being delivered to the PoC User. The PoC Client SHALL identify each Simultaneous PoC Session with a unique identifier allocated by the Home PoC Server (Participating PoC Function).

4.10.6   Monitoring

The PoC Server performing the Participating PoC Function SHOULD send the Media Burst Control messages of all Simultaneous PoC Sessions to the PoC Client.

4.10.7   Authorisation

PoC Clients MAY be provisioned an attribute to tell how many Simultaneous PoC Sessions they are allowed to participate.

>   NOTE 1:   The PoC Client provisioned value is lower or equal to the maximum amount of Simultaneous PoC Sessions provisioned at the PoC Server.

The PoC Client SHOULD avoid establishing more PoC Sessions, if the maximum amount of Simultaneous PoC Sessions is reached. In case the maximum number of PoC Sessions is reached, the PoC Server performing the Participating PoC Function SHALL interpret the Invited PoC Client as busy, or respectively SHALL reject an invitation from an Inviting PoC Client.

>   NOTE 2:   The provisioning of the maximum number of the Simultaneous PoC Sessions to the PoC Server is out of scope of this specification.

4.11 Quality feedback

The PoC Client and the PoC Server MAY send quality feedback reports to each other during a PoC Session.

Quality feedback includes the following quality feedback reports:

- Sender Report:

    The sender of a MediaBurst sends the sender report. The sender report includes:
    o Accumulated number of sent media packets since the start of the PoC Session.

- Receiver Report:

    The receiver of a Media Burst sends the receiver report. The receiver report includes:
    o Information that allows the calculation of lost media packets since the start of the PoC Session.

If the quality feedback reports are supported, the PoC Client and the PoC Server:

- SHALL send the quality feedback reports for each Continuous Media according to rules and procedures of [RFC3550];

- SHALL consider the bandwidth limitations when sending the quality feedback reports for PoC Speech; and,

- MAY consider the bandwidth limitations when sending the quality feedback reports for Continuous Media other than PoC Speech.

4.12 User Plane adaptation

The available bit rate of the radio interface is influenced by: the type of the access network, different configurative means (e.g. support for IP header compression) and the current conditions on the radio access link.

In order to guarantee a sufficient Media quality (e.g. voice or Video), the Media Burst (User Plane) bit rate must be reduced in case the Media Burst bit rate is higher than the available end-to-end bit rate. The Media Burst bit rate SHOULD be reduced if necessary by re-negotiation within the Control Plane.

Renegotiation SHOULD be avoided during a Media Burst.

User Plane adaptation describes a set of SIP methods to renegotiate parameters that change the needed throughput for the Media by either changing the coding (e.g. speech codec, Video codec, codec mode) or the packetizing of encoded frames. The PoC Client and the PoC Server performing the Controlling PoC Function SHALL support the User Plane adaptation procedure, if initiated by the other functional entity.

Both the PoC Client and the PoC Server performing the Controlling PoC Function MAY initiate the User Plane adaptation procedure.

4.13 Codecs

For optimum voice quality, end-to-end media coding is recommended for the RTP Media whenever feasible. In case a common PoC Speech codec is not utilized (e.g. in inter system communication), the PoC Server or some other network element SHOULD perform the transcoding function. The network entity which performs the transcoding SHALL also alter the RTCP reports sent to it so that the outgoing RTCP report packets reflects the changes in the RTP Media stream imposed by the transcoding. To minimize delay and voice quality reduction, it is recommended only one transcoding function occurs between the talker and any listener in the PoC Session

3GPP mandates the AMR narrowband codec as the default codec for PoC Speech, see [TS 26.235]. Further, 3GPP mandates support of the AMR wideband codec, if the User Equipment on which the PoC Client is implemented uses 16 kHz sampling frequency of the PoC Speech, see [TS 26.235].

3GPP2 mandates the EVRC codec as the default codec for PoC Speech, see [3GPP2 S.R0100-0].

For recommended Audio codecs with 3GPP Networks, see [TS 26.234] and [TS 26.235].

For recommended Audio codecs with 3GPP2 Networks, see [3GPP2 C.S0046-0].

For recommended Video codecs with 3GPP Networks, see [TS 26.235].

For recommended Video codecs with 3GPP2 Networks, see [3GPP2 C.S0046-0].

4.14   Signalling compression

The SIP/IP Core SHALL support signalling compression (SigComp) according to rules and procedures of [RFC 3320], [RFC 3485] and [RFC 3486] to reduce the transmission delays.

The PoC Client SHOULD compress the SIP signalling according to rules and procedures of [RFC 3320], [RFC 3485] and [RFC 3486] to reduce the transmission delays.

If the PoC Client initiate the signalling compression according to rules and procedures of [RFC 3320], [RFC 3485] and [RFC 3486], then the SIP/IP Core SHALL compress the SIP signalling according to [RFC 3320], [RFC 3485] and [RFC 3486].

It is RECOMMENDED that the PoC Client and the SIP/IP Core supports dynamic compression or other SigComp extended operations to improve the compression efficiency and to further reduce transmission delays (for a definition of dynamic compression and a description of other SigComp extended operations see [RFC 3321]).

> NOTE: Dynamic compression can be implemented without using the extended operations mechanisms of [RFC 3321] which is referenced here in the interest of thoroughness.

When the SIP/IP Core corresponds with 3GPP/3GPP2 IMS, then the signalling compression procedures in [3GPP TS 24.229] /[3GPP2 X.S0013.4] SHALL be used.

4.15   Charging

PoC Charging architecture supports both subscription based charging and traffic based charging as specified in [3GPP TS 32.272].

For the subscription based charging, subscription events like service activation time and subscriber PoC service profile are provided to the charging infrastructure. For subscription based charging, the identification of a PoC User includes the assigned IMSI, MSISDN or equivalents thereof, allowing the reuse of existing charging infrastructure.

For the traffic based charging, data is provided to the charging infrastructure in time to support both online and off-line billing models. Correlation between the PoC service charging data and the packet data services used is realized by adding to the PoC service CDR the appropriate identification of the packet service as generated by the underlying network. Correlation between PoC service charging data for sessions spanning multiple operator domains is realized by storing the network identification of the involved networks and charging identifiers in the generated PoC service CDRs.

4.15.1   Charging of PoC Sessions

In a PoC Session there can be number of Participants being PoC Subscribers of several different PoC operators. A PoC Server SHALL support to charge the contracted PoC Subscribers by using online and off-line billing models independently of any other PoC Network charging policy. The settlement between the involved PoC Networks is not within the scope of the current document.

The PoC Server SHALL provide the following information for the charging of the Participant:

- Number of sent and received PoC Session invitations with time stamps. The type and size of any Media content included in the invitation SHALL also be considered.

- Number and type of successful PoC Sessions, considering the following information:
  - o   PoC Session duration.

  - o   Pre-established or On-demand Session

- o   1-1 PoC Session, Ad-hoc PoC Group Session, Pre-arranged PoC Group Session or Chat PoC Group Session.

- o   Local QoE Profile used for each PoC Session by the Participant. The underlying QoS parameters negotiated by the Participant SHALL also be considered through the use of charging correlation.

- For PoC Group Sessions, the following SHALL be considered:
  - o   1-many or 1-many-1 PoC Session.

  - o   Number and identity of other Participants.

- Information about the type of Participant, considering:
  - o   Use of PoC Interworking Service.

  - o   Role taken by the Participant during the PoC Session (e.g. regular PoC Participant, PoC Dispatcher, etc) and any change to that role during the PoC Session. This information SHALL be time stamped.

  - o   Use of a PoC Box on behalf of the PoC User. NW and UE PoC Box cases SHALL be distinguished

- Number and type of Media exchanged in the PoC Session by the Participant. The following charging information SHALL be separately available for each Media Type actually exchanged by the Participant:
  - o   Identity of Participant(s) receiving a Media Burst.

  - o   Priority of Media Bursts.

  - o   Duration and volume of transmitted/received Media Bursts.

  - o   Number of Media Bursts transmitted/received. This information SHOULD be time stamped.

  - o   Codification used.

- Actions initiated by the Participant in a PoC Session. Following actions SHALL be considered in the information available for charging:
  - o   Inviting a new Participant into the PoC Session including identity of the Invited PoC User, outcome of the invitation (successful or failed session setup) and time stamp.

  - o   Adding/removing a Media Type to/from the PoC Session.

  - o   Connecting/disconnecting a Media Type for the Participant.

  - o   Expelling other Participant from the PoC Session, with time stamp.

  - o   Inviting, joining or accepting more than one PoC session

  - o   Subscription to the Participant information in a PoC Session

  - o   Amount of Participant information sent to the Participant

In the PoC architecture the Participating PoC Function measures and sends charging reports to the charging system for the charging of the Participant. The PoC Interworking Function, when performing Participating PoC Function, SHALL have the capability to send charging reports for the charging of the 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 PoC Group and a Pre-arranged PoC Group Session, the PoC Session Owner is the creator of the PoC Group.

In addition to the information considered for the charging of a Participant, the PoC Server SHALL provide the following information for the charging of the PoC Session Owner:

- Per PoC Session time: The time that there is at least one Participant in a PoC Session or a period of time independent of PoC Session usage.

- PoC Session type:
  o 1-1 PoC Session, Ad-hoc PoC Group Session, Pre-arranged PoC Group Session or Chat PoC Group Session.

  o QoE Profile assigned to the PoC Session.

- For PoC Group Sessions, the following SHALL be considered:
  o Type of the PoC Group (e.g. Dispatch PoC Groups).

- Information about Participants:
  o Number of Participants as a function of time. This charging information SHALL include the identities of the Participants and a timestamp of the joining or leaving event(s).

  o PoC Interworking Service usage.

  o Role taken by each Participant during the PoC Session (e.g. regular PoC Participant, PoC Dispatcher, etc) and any change to that role during the PoC Session. This information SHALL be time stamped.

- Media Bursts distributed to the Participants:
  o Total volume and duration of distributed Media Bursts. This information SHALL be measured independently for each Media Type exchanged in the PoC Session.

  o Each Media Burst information SHOULD be time stamped to capture the 'Sent Time'/'Receive Time' and contain the address of the source PoC Server and the list of reached Participant(s). Latency of Media Bursts SHOULD be inferable from this information.

- Number of Participant information subscriptions.
- Number of Participant information sent to the Participants.

In the PoC architecture the Controlling PoC Function measures and sends charging reports to the charging enabler for the charging of the PoC Session Owner. PoC Interworking Function, when performing Controlling PoC Function, SHALL have the capability to send charging reports for the charging of the PoC Session Owner.

4.15.2 Charging of other PoC services

A PoC Server SHALL provide the information to charge its PoC Subscriber for the following other actions:

- Number of sent/received PoC Instant Personal Alerts, including the identities of the alerted/alerting PoC Users.

- Sending/Receiving Group Advertisement, including the identities of the sending/receiving PoC Users. Type and size of any Media Content included in the Group Advertisement SHALL be considered.

- Modification of PoC Service Settings.

- Management of PoC Groups (i.e. creation and storage time for PoC Group documents). The type and size of the PoC Group SHALL be considered in the generated charging information.

- Handling of Simultaneous PoC Sessions

- Full Duplex Call Follow-on usage.

4.15.3 Charging architecture

A simplified diagram showing the online charging system, charging collection functions and the PoC related interfaces, is shown in Figure 1 *"Architecture for PoC V2.0 specific charging"*. Charging information, relating to PoC usage, may also be gathered from other access network entities using existing interfaces.
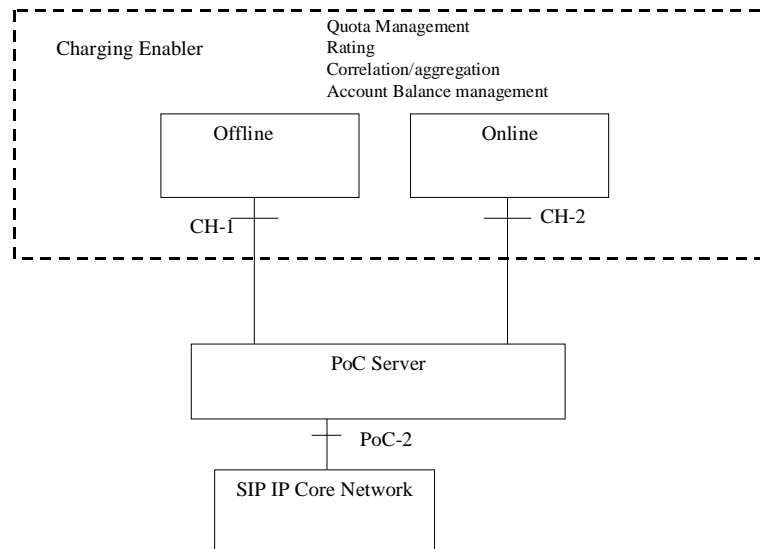
Figure 1: Architecture for PoC V2.0 specific charging

NOTE: The architecture for PoCV1.0 specific charging is described in [PoC AD V1.0]

The Charging Enabler supports both online and offline charging methods. For either method, any of the charging functions listed may be applied by the Charging Enabler, and also provides a method for determining whether online or offline charging should be used in a given situation.

PoC Server SHALL have the capability to send offline accounting information about PoC service events to the charging enabler using CH-1 interface. For 3GPP/3GPP2 IMS compliant core networks the CH-1 interface SHALL conform to the Rf interface as specified in [3GPP TS 32.272]. SIP/IP Core entities, may also use the CH-1 interface to send offline accounting information pertaining to individual PoC Sessions. The address of the Charging Data Function to be used for one side of the PoC Session (either originating or terminating) is distributed in IMS based systems via SIP signalling as described in [3GPP TS 24.229].

PoC Server SHALL have the capability to send online accounting information about PoC service events to the charging enabler using CH-2 interface. It SHALL be possible for the PoC Server to perform credit control interactions using the CH-2 interface to the online charging system. For 3GPP/3GPP2 IMS compliant core networks the CH-2 interface SHALL conform to the Ro interface as specified in [3GPP TS 32.272]. The address of the Online Charging Function to be used for one side of the PoC Session (either originating or terminating) is distributed in IMS based systems via SIP signalling as described in [3GPP TS 24.229].

4.15.4   PoC Session Charging Correlation

The PoC Server SHALL enable PoC Session Charging Correlation. The PoC Charging Events related to a PoC Session generated by the PoC Server SHALL be correlated by a Charging Correlation ID.

PoC Server performing the Controlling PoC Function:

- SHALL create a unique Charging Correlation ID during PoC Session establishment;

- SHALL send the Charging Correlation ID to PoC Servers performing the Participating PoC Function;

- SHALL include the Charging Correlation ID in PoC Charging Events for the associated PoC Session; and,

- SHALL retire the Charging Correlation ID when the PoC Session is terminated.

The PoC Server performing the Participating PoC Function:

- SHALL save the Charging Correlation ID received from the PoC Server performing the Controlling PoC Function;

- SHALL include the Charging Correlation ID in PoC Charging Events for the associated PoC Session; and,

- SHALL retire the Charging Correlation ID when the PoC Session is terminated at the Participating PoC Function.

4.16   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

1. through interconnection of the IP access networks; or

2. 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/3GPP2 IMS the roaming scenarios are specified in [3GPP TS 23.228] and [3GPP2 X.S0013.2].

4.17   Presence

The Watcher associated with the PoC Client MAY utilize presence service enabler(s) to determine the PoC presence status of other PoC Clients.

The Presence Source MAY publish presence information to the Presence Server.

The Presence Source supplied presence information is routed to the Presence Server via the PRS-1 and PRS-3 reference points.

The PoC Server MAY publish presence information to the Presence Server based on the state of the PoC Client within the PoC Session.

The PoC Server MAY obtain any presence information it requires on PoC Clients by subscribing to their Presence Status using the functionalities of the Presence Service enabler. The signalling between the Presence Server and the PoC Server SHALL be routed via the SIP/IP Core and the PRS-3 Reference Point.

NOTE: The architecture and functions of the Presence Service enabler are specified in [Presence AD].

4.18   Access Control

4.18.1   Access Control management

Access Control management includes operations that allow the XDMC to reliably manipulate the PoC User access policy located in the Shared Policy XDMS and PoC Group authorization rules located in the Shared Group XDMS. The documents describing PoC User access policy and PoC Group authorization rules MAY include references to Contact Lists or Group Lists stored in the Shared List XDMS as URI lists.

A PoC Subscriber SHALL be able to manipulate the PoC User access policy and PoC Group authorization rules when queried.

Access Control list management uses the XML Document Management operations specified in the [XDM AD V2.0].

4.18.2   PoC User access policy

PoC User access policy MAY be used by the PoC User as a means of controlling incoming and outgoing PoC Session requests from other PoC Users or PoC Groups.

If multiple PoC Addresses are registered by a PoC Client explicitly or implicitly, the PoC Client SHALL create the PoC User access policy for each PoC Address the PoC User intends to use for the PoC Service.

> NOTE 1: The PoC User access policy need not contain any rules.

The PoC User access policies include:

- General access rules;

- Media Type specific access rules; and,

- PoC Box criteria access rules.

In case several access rules, described above, are applicable the following main rule applies:

- If any of the access rules indicates 'block' then 'block' is applied to the request.

- If none of the access rules indicates 'block' and any of the access rules indicates 'manual answer' then 'manual answer' is applied to the request.

- If none of the access rules indicates 'block' or 'manual answer' then 'automatic answer' is applied to the request.

- If access rule is not defined, then 'manual answer' is applied to the request.

> NOTE 2: PoC User's Answer Mode Indication setting also affects the Answer Mode applied to the request as described in the subclause 4.30 *"Answer Mode"*.

> NOTE 3: PoC User access policies are superseded by the Incoming PoC Session Barring state.

4.18.2.1   General access rules

The PoC User access rules SHALL support the following actions:

- Allow/block PoC User and PoC Groups incoming PoC Session request

- Block anonymous PoC User's incoming PoC Session request

- Allow PoC Users to be treated in Automatic Answer Mode

The PoC User access rules MAY support the following actions:

- Allow PoC Users to override Manual Answer Mode Indication setting, known as MAO.

The access rules MAY be applied also on the delivery of the Instant Personal Alerts.

4.18.2.2   Media Type specific access rules

The Media Type specific access rules SHALL support following:

- Allow PoC User to configure Automatic or Manual Answer Mode for PoC Session offering Video

- Allow PoC User to configure Automatic or Manual Answer Mode for PoC Session offering Audio

- Allow PoC User to configure Automatic or Manual Answer Mode for PoC Session offering Discrete Media.

> NOTE: Manual Answer Mode is applied for PoC Speech, Audio and Video and Automatic Answer Mode is appliedfor Discrete Media, if the corresponding access rule is not defined.

The Media Type specific access rules SHALL be PoC User specific.

4.18.2.3   PoC Box criteria access rules

The PoC Server MAY support the PoC Box criteria access rules.

The XDMC MAY support configuration of PoC Box criteria access rule conditions.

If the PoC Server supports PoC Box the PoC Server performing the Participating PoC Function of the Invited PoC Client SHALL check the PoC Box criteria access rule conditions defined by the Invited PoC User.

The PoC Box criteria access rule SHALL support the following action:

- PoC Server unconditional forwarding of invitations to the NW PoC Box when the PoC User is not registered with a PoC Client and UE PoC Box.

  NOTE 1: When the PoC Service Setting is expired because, e.g., the PoC User is not registered, the same access rule is applied.

  NOTE 2: The PoC Server can identify the non-registered PoC User from the incoming INVITE request from the SIP/IP Core.

- Use the default PoC Box (i.e., UE or NW PoC Box) if both UE and NW PoC Box can be connected.

A local policy MAY be used to determine if all Media Types in an invitation to a PoC Session can be forwarded to the PoC Box or not.

4.18.3   PoC Group authorization rules

The PoC Group owner MAY use authorization rules to control permissions to access a Pre-arranged and Chat PoC Group. The PoC Group authorization rules SHALL support the following actions:

- Allow/block PoC User initiating the PoC Session

- Allow/block PoC User joining the PoC Session

- Allow/block PoC User adding Participants to the PoC Session

- Allow/block PoC User removing Participants from the PoC Session

- Allow/block subscription to the Participant Information

- Allow/forbid the anonymity of certain Participants

- Allow/block PoC User adding Media to and removing Media from the PoC Session

- Allow/block PoC User adopting the PoC Dispatcher role

- Allow/block PoC User transferring the PoC Dispatcher role

- Allow/block PoC User sending the Group Advertisements to the PoC Group

- Allow certain Media Burst Control Schemes for a certain PoC Session initiator

4.19   Incoming PoC Session Barring

If the PoC User has set Incoming PoC Session Barring active and if neither the NW PoC Box nor UE PoC Box is used, then a Participating PoC Function of the Invited PoC Client SHALL NOT send the received incoming PoC Session request to the PoC Client and SHALL send a 'busy' response towards the Inviting PoC Client.

If the PoC User has set Incoming PoC Session Barring active and if either the NW PoC Box or UE PoC Box or both are supported, then the incoming PoC Session request SHALL be routed as specified in subclause 4.28 *"PoC Box handling"*.

4.20   Incoming Instant Personal Alert Barring

If the PoC User has set the Incoming Instant Personal Alert Barring active, then the Participating PoC Function of the recipient PoC Client SHALL NOT send the received Instant Personal Alert to the PoC Client and SHALL send a 'busy' response towards the sending PoC Client.

4.21   Deactivate/reactivate incoming Media Bursts

The deactivation/reactivation of the incoming Media is enhanced also to include Media Bursts, see subclause *4.21.1 "Deactivate/reactivate incoming Media Bursts"*.

4.21.1   Deactivate/reactivate incoming Media Bursts

When a PoC Client wants temporarily to deactivate incoming Media Bursts it SHALL send a request to the PoC Server to place the Media on hold. The PoC Server performing the Controlling PoC Function SHALL stop transmitting Media Bursts to the PoC Client until the corresponding Media Stream is activated again. Deactivation and reactivation are Media Stream specific and SHALL be made via signalling path through reference points POC-1, POC-2 and IP-1.

4.22   PoC communication methods

PoC service allows a PoC User to communicate with a single Participant in a 1-1 PoC Session and communicate with a group of Participants in a 1-many or 1-many-1 PoC Group Session.

Hence, three different methods of communication are supported.

4.22.1   Communication in a 1-1 PoC Session

When communicating in a 1-1 PoC Session, each Continuous or Discrete Media, which is bound to a Media-Floor Control Entity, is transferred between two individual Participants in a half-duplex fashion and each Discrete Media, which is not bound to a Media-Floor Control Entity, can be transferred between two individual Participants in a full-duplex fashion.

4.22.2   Communication in a 1-many PoC Group Session

When communication in a 1-many PoC Session, each Continuous or Discrete Media, which is bound to a Media-Floor Control Entity, is transferred between several Participants in a half-duplex fashion and each Discrete Media, which is not bound to a Media-Floor Control Entity, can be transferred between several Participants in a full-duplex fashion. Each Participant receives all Media Streams that are transmitted by any other Participant in the PoC Session.

This is default method of communication for all types of PoC Group Sessions.

4.22.3   Communication in a 1-many-1 PoC Group Session

When communicating in a 1-many-1 PoC Group Session, each Continuous or Discrete Media, which is bound to a Media-Floor Control Entity, is transferred between several Participants in a half-duplex fashion and each Discrete Media, which is not bound to a Media-Floor Control Entity, can be transferred between several Participants in a full-duplex fashion. The 1-many-1 PoC Group Session consists of one Distinguished Participant (e.g., PoC Dispatcher), that acts as a central node, and a set of Ordinary Participants (e.g., PoC Fleet Members if the PoC Session was initiated by a PoC Dispatcher). All Ordinary Participants receive Media Streams from the Distinguished Participant. Only the Distinguished Participant receives Media Streams from any Ordinary Participant. All Participants receive Media Burst Control signalling.

The 1-many-1 configuration is an optional configuration, which MAY be used by a Pre-arranged PoC Group, or subset of the Dispatch PoC Group.

If the PoC Dispatcher functionality is supported, the 1-many-1 communication topology SHALL be supported.

Pre-arranged PoC Groups capable of utilizing 1-many-1 PoC Group Sessions SHALL maintain a PoC-specific attribute that indicates whether the Pre-arranged PoC Group is capable of supporting the use of a 1-many-1 PoC Group Session.

If a Pre-arranged PoC Group is capable of utilizing a 1-many-1 PoC Group Session, each member of the Group SHALL be identified as capable of acting as a Distinguished Participant or as an Ordinary Participant.

A Pre-arranged PoC Group member capable of acting as a Distinguished Participant MAY be the initiator of a 1-many-1 PoC Session. If this PoC Session type is selected, the Pre-arranged PoC Group member that initiated the PoC Session SHALL initially act as the Distinguished Participant in the PoC Session.

A Pre-arranged PoC Group member only capable of acting as an Ordinary Participant SHALL NOT be able to initiate a 1-many-1 PoC Group Session.

According to the Service Provider Policy, the 1-many-1 PoC Group Session MAY be limited only to Pre-arranged PoC Groups composed of authorised PoC Users (e.g., the PoC Dispatcher and the rest of PoC Fleet Members to be included in the 1-many-1 PoC Group Session). Details on Dispatch PoC Groups and Dispatch PoC Sessions are covered in subclause 4.38 "*PoC Dispatcher*"

4.23   PoC service provisioning

OMA Device Management [OMA DM] and OMA Client Provisioning [OMA Client Provisioning] provide protocols and data structures to provision and manage a mobile terminal over the air. Either method or a combination of the two methods MAY be used to provision and manage the PoC service feature configurations on a mobile terminal.

The PoC service provider sets up PoC service feature configurations remotely in the User Equipment by using the provisioning mechanisms specified in [OMA Client Provisioning] or in [OMA DM Bootstrap]. The PoC Service provider SHOULD update the PoC service feature configurations remotely in the User Equipment by using [OMA DM].

The PoC Client SHALL be able to receive the provisioning parameters, either via OMA Client Provisioning or via OMA DM profile, and sent by service provider. The exact syntax and definition of parameters needed for PoC service are specified in [OMA Client Provisioning] and in [OMA DM].

NOTE: In cases of networks where the provisioning systems specified in [OMA Client Provisioning] and [OMA DM] are not supported the provisioning system is out of scope of this specification.

Updates to the provisioned parameters SHOULD be done as specified in [OMA DM].

How any PoC Subscriber specific service attributes are provisioned to the PoC Server is out of scope of this specification.

4.24   Quality of Service traffic classes

The selection of QoS traffic classes for the PoC Control and User Plane is dependent on the QoS traffic classes supported by the underlying networks.

When QoE Profiles are used, PoC Clients SHOULD follow the procedures specified in sub-clause 4.41 "*Quality of Experience (QoE)*" for the selection of the appropriate traffic class(es) to be utilized in the underlying network. Otherwise, the following SHALL apply.

For the case when different PDP contexts [3GPP TS 23.060] or Service Instances are used for PoC signalling and User Plane, it is recommended that the PoC Clients SHOULD separately utilize the traffic class that is best suitable for signalling (e.g., Interactive traffic class) and the traffic class that is best suitable for the User Plane (e.g. Streaming or Conversational traffic classes). If the requested level of QoS or traffic classes for the Control Plane and/or User Plane are not available, the system should attempt to use the negotiated QoS or request an alternative QoS traffic class. Additionally, the Media Burst Control MAY be routed over the same PDP context or Service Instance intended for the PoC Signalling. The details of the QoS used are described in [3GPP TS 23.107].

For the case when one single PDP context or Service Instance is used for both PoC signalling and Media the PoC Client SHOULD utilize the QoS traffic class that is determined to be the best available considering the overall balance between PoC Session Media bearer establishment latency and Media QoS (e.g. interactive traffic class).

4.25 PoC Feature Interaction with Circuit Switched services

The User Equipment supporting the PoC Client MAY support circuit switched (CS) voice communications. In this case, the PoC service and CS voice service modes are co-located in the User Equipment. Supporting notification of incoming CS call during an ongoing PoC Session as well as a notification of an incoming PoC Session set up during an ongoing CS call depends on the capabilities of the UE. Inter-working between CS and PoC services is not supported.

> NOTE: The specification of the network notification is out of scope of this specification.

4.26 PoC Service Settings

The PoC Client SHALL control PoC Service Settings via the POC-1 reference point.

The PoC Client SHALL provide to the Home PoC Server the following PoC Service Settings:

- Answer Mode Indication;
  - Incoming PoC Session Barring;
  - Incoming Instant Personal Alert Barring; and
  - Simultaneous PoC Sessions Support.

The PoC Client MAY provide to the Home PoC Server the following PoC Service Settings:

  - Invited Parties Identity Information Mode;
  - Support for Media Content included in a request;
  - Support for Referenced Media Content included in a request;
  - Support for Text Content included in a request;
  - PoC Box Use; and
  - Privacy.

If multiple PoC Addresses are registered by a PoC Client explicitly or implicitly, the PoC Client SHALL publish the PoC Service Setting for each PoC Address.

The PoC Client MAY publish different PoC Service Settings values for each PoC Address.

The PoC Server SHALL apply the PoC Service Settings that the PoC Client publishes for requests involving that specific PoC Address.

The following subclause describes the PoC Service Settings in more detail.

> NOTE: PoC Client will get the information about supported optional features that are related to PoC Service Settings by provisioning as specified in subclause 4.23 *"PoC service provisioning"*.

4.26.1 Answer Mode Indication

The PoC Client SHALL provide the Home PoC Server with its current Answer Mode Indication setting. The Home PoC Server SHALL store the Answer Mode Indication setting provided by the PoC Client for the Served PoC User.

The possible Answer Mode Indication settings are:

- Automatic Answer Mode; and

- Manual Answer Mode.

If the PoC Client supports both the Automatic Answer Mode and the Manual Answer Mode the PoC Client SHALL allow the PoC User to change the Answer Mode Indication setting.

The Home PoC Server SHALL request the Invited PoC Client to answer the PoC Session with a specific Answer Mode by indicating the requested Answer Mode in all initial PoC Session invitations to the Served PoC User based on the Answer Mode Indicationsetting, the Access Rules and any indication indicating the requested Answer Mode specifically included by the Inviting PoC User.

4.26.2   Incoming PoC Session Barring (ISB)

The PoC Client SHALL provide the Home PoC Server with its current Incoming PoC Session Barring setting. The Home PoC Server SHALL store the Incoming PoC Session Barring setting provided by the PoC Client for the Served PoC User.

The PoC Client SHALL allow the PoC User to change the Incoming PoC Session Barring setting.

The possible Incoming PoC Session Barring settings are:

- Incoming PoC Session Barring settings active; or,

- Incoming PoC Session Barring settings not active.

If the Incoming PoC Session Barring is active the Home PoC Server SHALL reject all incoming invitations for the Served PoC User.

4.26.3   Incoming Instant Personal Alert Barring (IAB)

The PoC Client SHALL provide the Home PoC Server with its current Incoming Instant Alert Barring setting. If the Home PoC Network supports Incoming Instant Personal Alert Barring, the Home PoC Server SHALL store the Incoming Instant Personal Alert Barring setting provided by the PoC Client for the Served PoC User.

If the PoC Client supports Incoming Instant Personal Alert Barring, the PoC Client SHALL allow the PoC User to change the Incoming Instant Personal Alert Barring setting in the Home PoC Network.

The possible Incoming Instant Personal Alert Barring settings are:

- Incoming Instant Personal Alert Barring active; or,

- Incoming Instant Personal Alert Barring not active.

If the Incoming Instant Personal Alert Barring is active the PoC Server SHALL reject all incoming Instant Personal Alerts for the Served PoC User.

4.26.4   Simultaneous PoC Sessions Support (SSS)

If the PoC Client supports Simultaneous PoC Sessions, the PoC Client SHALL indicate the Simultaneous PoC Sessions Support setting to the Home PoC Server. If the PoC Client does not support Simultaneous PoC Sessions, the PoC Client SHALL indicate that the Simultaneous PoC Sessions Support setting is not active when providing PoC Service Settings to the Home PoC Server.

If the Home PoC Network supports Simultaneous PoC Sessions, the Home PoC Server SHALL store the Simultaneous PoC Sessions Support setting provided by the PoC Client for the Served PoC User.

The possible Simultaneous PoC Sessions Support settings are:

- Simultaneous PoC Sessions Support active;or,

- Simultaneous PoC Sessions Support not active.

If the Simultaneous PoC Sessions Support setting is Simultaneous PoC Sessions Support active, the PoC Server behaves as specified in subclause 4.10 "*Handling of Simultaneous PoC Sessions*".

> NOTE 1: If there are ongoing PoC Sessions the new value of the Simultaneous PoC Sessions Support setting will not take effect immediately.

4.26.5   Invited Parties Identity Information Mode (IPIIM)

The Home PoC Server SHALL store the Invited Parties Identity Information Mode setting provided by the PoC Client for the Served PoC User in regions where this functionality is not restricted due to regulations.

The PoC Client MAY support the Invited Parties Identity Information Mode. If Invited Parties Identity Information Mode is supported by the PoC Client, the PoC Client SHALL allow the PoC User to change the Invited Parties Identity Information Mode.

The possible Invited Parties Identity Information Mode settings are:

- Invited Parties Identity Information Mode active; or,

- Invited Parties Identity Information Mode not active.

If the Invited Parties Identity Information Mode is active the Home PoC Server SHALL deliver the invited parties identity information to the PoC Client for the Served PoC User.

> NOTE: When there is no available service setting for Invited Parties Identity Information Mode, the default for Invited Parties Identity Information Mode is not active".

4.26.6   Support for Media Content included in a request

The PoC Service Settings for Support of Media Content included in a request MAY be indicated by the PoC Client to indicate whether the PoC User is willing to accept requests with Media Content included..

The PoC Client MAY include the following PoC Service Settings:

- Support for Media Content included in a request;

- Support for Referenced Media Content included in a request; and

- Support for Text Content included in a request.

4.26.6.1   Support for Media Content included in a request

The Home PoC Server SHALL store the Support for Media Content included in a request setting if provided by the PoC Client for the Served PoC User.

The PoC Client MAY support Media Content included in a request. If Media Content included in a request is supported by the PoC Client, the PoC Client SHALL allow the PoC User to change the Support for Media Content included in a request.

The possible Support for Media Content included in a request settings are:

- Support for Media Content included in a request supported ; or

- Support for Media Content included in a request not supported

If the Support for Media Content included in a request is not supported the Home PoC Server SHALL remove any Media Content included in the request before forwarding to the PoC Client for the Served PoC User.

NOTE: When there is no available service setting for Support for Media Content included in a request the default setting is not supported

4.26.6.2   Support for Referenced Media Content included in a request

The Home PoC Server SHALL store the Support for Reference Media Content included in a request setting if provided by the PoC Client for the Served PoC User.

The PoC Client MAY support referenced Media Content included in a request. If referenced Media Content included in a request is supported by the PoC Client, the PoC Client SHALL allow the PoC User to change the Support for Referenced Media Content included in a request.

The possible Support for Referenced Media Content included in a request settings are:

- Support for Referenced Media Content included in a request supported; or

- Support for Referenced Media Content included in a request not supported.

If the Support for Referenced Media Content included in a request is not supported the Home PoC Server SHALL remove any reference to Media Content included in the request before forwarding to the PoC Client for the Served PoC User.

NOTE: When there is no available service setting for Support for Referenced Media Content included in a request the default setting is not supported.

4.26.6.3   Support for Text Content included in a Request

The Home PoC Server SHALL store the Support for Text Content included in a request setting if provided by the PoC Client for the Served PoC User.

The PoC Client MAY support Text Content included in a request. If Text Content included in a request is supported by the PoC Client, the PoC Client SHALL allow the PoC User to change the Support for Text Content included in a request.

The possible Support for Text Content included in a request settings are:

- Support for Text Content included in a request supported; or

- Support for Text Content included in a request not supported.

If the Support for Text Content included in a request is not supported the Home PoC Server SHALL remove any Text Content included in the request before forwarding to the PoC Client for the Served PoC User.

NOTE: When there is no available service setting for Support for Text Content included in a request the default setting is not supported .

4.26.7   PoC Box Use

The PoC Box Use setting describes whether the terminating PoC Client wants to route the incoming PoC Session invitation to the PoC Box or how the terminating PoC Client wants to route the incoming PoC Session invitations.

The Home PoC Server SHALL store the PoC Box Use setting provided by the PoC Client for the Served PoC User.

The PoC Client SHALL allow the PoC User to change the PoC Box Use setting if the PoC Client supports the PoC Box function.

The possible PoC Box Use Settings are:

- unwilling; or

- unconditional; or

- conditional

If the PoC Box Use setting is unwilling the PoC Server SHALL NOT route the incoming PoC Session invitations to the UE PoC Box or the NW PoC Box of the Served PoC User.

If the PoC Box Use setting is conditional the PoC Server SHALL route the incoming PoC Session invitations to the UE PoC Box or the NW PoC Box of the Served PoC User based on the PoC Box criteria access rules for default PoC Box as specified in subclause 4.18.2.3 *"PoC Box criteria access rules"* only conditionally and those conditions are specified in subclause 4.28.1 *"General"*.

If the PoC Box Use setting is unconditional the PoC Server SHALL route the incoming PoC Session invitations to the UE PoC Box or the NW PoC Box of the Served PoC User based on the PoC Box criteria access rules for default PoC Box as specified in subclause 4.18.2.3 *"PoC Box criteria access rules"* unconditionally.

4.26.8 Privacy

The PoC Server in the Home PoC Network SHALL store the Privacy PoC Service Setting provided by the PoC Client for the Served PoC User if the Privacy PoC Service Setting is supported by the PoC Server.

The PoC Client MAY publish the Privacy PoC Service Settings to indicate whether the PoC Client wants to be anonymous or not during the PoC Session establishment in the case of Automatic Answer Mode of On-demand Session.

The possible Privacy settings are:

- non-anonymous: indicate that the publishing PoC Client does not want to be anonymous when invited; or

- anonymous: indicate that the publishing PoC Client wants to be anonymous when invited.

If the Privacy PoC Service Settings is anonymous, the PoC Server SHALL NOT transfer the identity to the Inviting PoC Client.

4.27 Media-floor Control procedure

4.27.1 General

A PoC Session MAY consist of one or more Media Streams. There MAY be one or more Media Streams for the same Media Type. For those Media Streams that use Media-floor Control, each Media Stream or multiple Media Streams SHALL be controlled by separate Media-floor Control Entity. Each Media-floor Control Entity SHALL use the Media Burst Control procedures described in subclause 4.9A Media *Burst Control*".

The Media-floor Control Entity SHALL reside in the PoC Client and in the PoC Server performing Controlling PoC Function.

The characteristics of Media Types and Media-floor Control Entity SHALL be negotiated during the establishment of a PoC Session and they can be modified during the PoC Session by session modification procedure.

A Media-Floor Control Entity SHALL be identified by a unique identifier.

One, more or all Participants in a PoC Session MAY be connected to a Media-floor Control Entity.
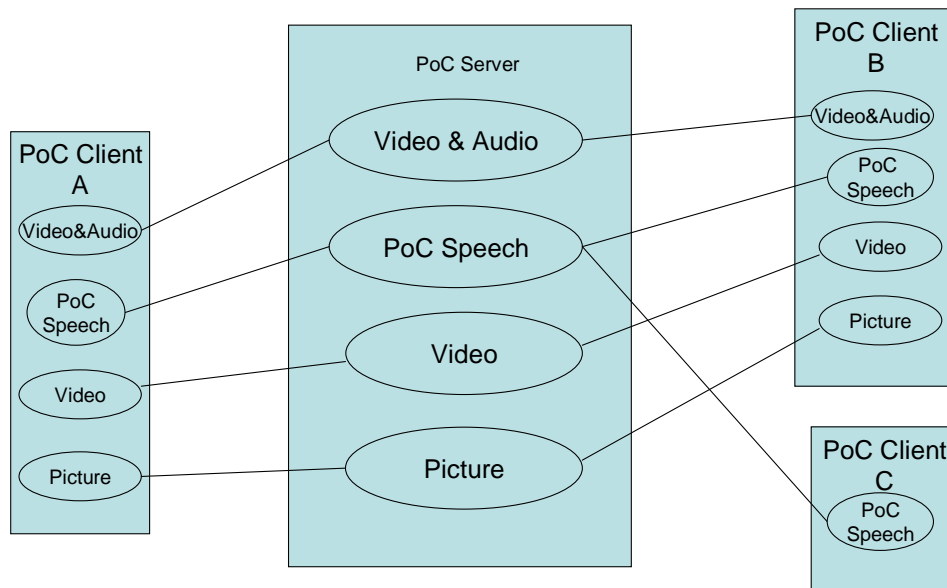
Figure 2: Media-floor Control Entities

In Figure 2 *"Media-floor Control Entities"*, there are four types of Media-floor Control Entities negotiated by PoC Server and PoC Client:

- One Media-floor Control Entity for Video & Audio; and,

- One Media-floor Control Entity for Speech; and,

- One Media-floor Control Entity for Video; and,

- One Media-floor Control Entity for Discrete Media (Optional).

The PoC Client A and the PoC Client B are connected to four Media-floor Control Entities while the PoC Client C is connected only to the Media-floor Control Entity for PoC Speech (the reason may be that PoC Client C is a Version 1 PoC Client). Video is included in two different Media Streams, each controlled by a different Media-floor Control Entity.

4.27.2   Binding between Media Types and Media-floor Control Entities

A PoC Session MAY consist of multiple Media Streams of multiple Media Types such as Audio, Video, PoC Speech and Discrete Media. For Media the use of Media-floor Control entities is described in subclause 4.27.1 "*General*".

The binding between the Media Types and the Media-floor Control Entities SHALL be negotiated between PoC Client and PoC Server at the PoC Session setup. The binding between Media Types and Media-floor Control Entities MAY be negotiated during the PoC Session with session modification procedure.

If a binding between a Media Type and a Media-floor Control Entity is offered and the Media Type is accepted, then the offered Media-floor Control Entity and the offered binding between the Media Types and the Media-floor Control Entities SHALL also be accepted. If a Discrete Media Type is offered without a binding to a Media-floor Control Entity and the Discrete Media Type is accepted, then the accepted Discrete Media Type SHALL NOT be bound to any Media-floor Control Entity.

The PoC Client and PoC Server SHALL include the Media Types and Media-floor Control Entities for the PoC Session together with the binding between Media Types and Media-floor Control Entities, if the binding exists, when sending an offer in INVITE request. When sending INVITE request to the terminating PoC Server, the originating PoC Server SHALL offer the same Media Types and Media-floor Control Entities as offered in the incoming INVITE request received from the

originating PoC Client unless the originating PoC Server offers less Media Types than those offered in the original INVITE request according to the originating PoC User's PoC service subscription..

The PoC Client and the PoC Server SHALL include the Media Types and Media-floor Control Entities accepted for the PoC Session together with the binding between Media Types and Media-floor Control Entities, if binding exists, when sending an answer in OK response. The PoC Server SHALL send OK response to the originating PoC Client after it has received an acceptance response from one of the terminating PoC Clients in 1-1 PoC Session, Ad-hoc PoC Group Session, and Pre-arranged PoC Group Session.

When sending OK response to the originating PoC Client for a newly created PoC Session, the originating PoC Server SHALL answer either same or subset of Media Types, Media-floor Control Entities and the Media-floor Control Entity bindings, if binding exists, as those offered in the INVITE request received from the originating PoC Client.

The PoC Server SHALL include the same Media Types, Media-floor Control Entities and the Media-floor Control Entity bindings, if binding exists, as those allowed and offered in the INVITE request received from the originating PoC Client, when sending an answer in OK response in Chat PoC Group Session if the PoC Session does not yet exist.

The offer and answer SHALL be used to characterize the Media Types and Media-floor Control Entities together with their binding(s), if binding exists. In case that Media Type is bound to Media-floor Control Entity, the port number defined for Media-floor Control Entity SHALL identify the Media that any Media-floor Control message applies to.

Media-floor Control Entity MAY be bound to one or more Media Types. In case Media-floor Control Entity is bound to more than one Media Type, the Media-floor Control message sent to or received from port number defined for that Media-floor Control Entity applies to all Media Types that are bound to that Media-floor Control Entity.

The PoC Server MAY restrict the number of Media-floor Control Entities in a PoC Session based on its local policy. The PoC Server MAY restrict certain Media Type bindings for a Media-floor Control Entity that can be negotiated in a PoC Session based on the PoC Server local policy.

4.27.2.1   Ensuring a common Media Type

In order to reach a common Media Type during a PoC Group Session establishment, the PoC Speech is handled with precedence over the other Media Types.

When accepting the incoming INVITE request for a PoC Group Session, the terminating PoC Client SHOULD accept at least the offered PoC Speech.

4.28   PoC Box handling

4.28.1   General

The Inviting PoC Client;

- MAY explicitly indicate that a PoC Session is to be established with the Invited PoC User's PoC Box;

- MAY explicitly indicate that a PoC Session is to be established directly with the Invited PoC User without involvement of a PoC Box.

The PoC Client MAY publish the PoC Service Setting for the PoC Box function and the parameters for the PoC Service Setting PoC Box Use SHALL contain the PoC User's unwillingness to route the incoming PoC Session to the PoC Box or the indication whether the incoming PoC Session is routed to the PoC Box unconditionally or conditionally as specified in subclause 4.26.7 *"PoC Box Use"*.

The conditions for routing the incoming PoC Session to a PoC Box when the PoC Box Use setting indicates conditional SHALL be:

- when the PoC Server does not receive the ringing response from the PoC Client for certain time after the PoC Server sent the invitation to the PoC Client in case of Manual Answer Mode;

- when the PoC Server does not receive the invitation accept or reject response from the PoC Client for certain time after the PoC Server received the ringing response from the PoC Client in case of Manual Answer Mode;

- when the PoC Server does not receive the invitation accept or reject response from the PoC Client for certain time after the PoC Server sent the invitation to the PoC Client in case of Automatic Answer Mode;

- when the the PoC Client is busy participating in another PoC Session; and,

- when the Incoming PoC Session Barring setting of the Invited PoC User indicates Incoming PoC Session Barring active.

The incoming PoC Session SHALL be routed to a PoC Box when the Invited PoC User has explicitly indicated using the PoC Box Use setting set to indicate unconditional that incoming PoC Sessions are to be routed to the PoC Box.

The XDMC in the UE SHALL allow the PoC User to change its willingness to route the incoming PoC Sessions to NW PoC Box when the PoC Client is not registered with the SIP/IP Core as specified in subclause 4.18.2.3 *"PoC Box criteria access rules"*.

If the Inviting PoC Client is compliant only to the PoC version 1.0 specification, the PoC Server performing the Controlling PoC Function SHALL include in the PoC Session invitation an indication indicating that the Inviting PoC Client is compliant only to the PoC version 1.0 specification.

According to the PoC Box criteria access rule and/or the PoC Service Setting, the terminating PoC Server performing the Participating PoC Function SHALL perform the necessary routing control (e.g., forward the incoming PoC Session invitation to the PoC Box conditionally or unconditionally, not forward to the PoC Box, and etc…).

NOTE 1: A PoC Session can be established with the NW PoC Box or the UE PoC Box (see subclause 4.28.2 *"UE PoC Box handling"* and 4.28.3 *"NW PoC Box handling"*) depending on the PoC Box criteria access rule as described in 4.18.2.3 *"PoC Box criteria access rules"*.

If PoC Session invitation contains an indication indicating that the Inviting PoC Client is compliant only to the PoC version 1.0 specification and the PoC Session invitation is to be routed to a PoC Box based upon the routing control, the terminating PoC Server performing the Participating PoC Function based on the Service Provider Policy:

- SHALL remove the indication indicating that the Inviting PoC Client is compliant only to the PoC version 1.0 specification, if the regional and national regulations allow the connections to a PoC Box without an indication being provided to the Inviting PoC User, before continuing routing of the PoC Session invitation.

- SHALL route the PoC Session to the NW PoC Box, or

- SHALL reject the PoC Session.

NOTE 2: PoC Sessions initiated by Inviting PoC Client compliant only to PoC version 1.0 specification can be routed to NW PoC Box only.

When the PoC Box receives an invitation to a PoC Session, the PoC Box SHALL accept the invitation and return a PoC Box indication in responses to the invitation.

If PoC Box indication and PoC Box type indication are received in responses to an invitation to a PoC Session, a PoC Server SHALL forward the PoC Box indication and the PoC Box type indication towards the Inviting PoC Client.

The Inviting PoC Client:

- SHALL indicate to the PoC User that a PoC Session is established with an Invited PoC User's PoC Box.; and,

- MAY differentiate between a NW PoC Box or a UE PoC Box (see subclause 4.28.2 "*UE PoC Box handling*" and 4.28.3 "*NW PoC Box handling*") if information is available in responses to the PoC Session invitation request.

If the PoC User is not willing to receive an incoming PoC Session invitation, e.g. in case the maximum amount of Simultaneous PoC Sessions is achieved, the PoC Client MAY route the incoming PoC Session invitation to the NW PoC

Box, if NW PoC Box is supported as described in subclause 4.28.3 "*NW PoC Box handling*" or to the UE PoC Box as described in subclause 4.28.2 "*UE PoC Box handling*", if UE PoC Box is supported.

If the only Participants in a PoC Session are PoC Boxes then the PoC Session SHALL be released.

If the Invited PoC Client supports the redirection of the incoming invitations to the NW PoC Box by the Invited PoC User, the address of the Invited PoC User's NW PoC Box SHALL be provisioned in the PoC Client.

4.28.2   UE PoC Box handling

When the PoC User activates the UE PoC Box functionality the UE SHALL re-register via the POC-9 reference point with the SIP/IP Core the contact for the UE PoC Box as specified in subclause 4.5.1 *"General"*. If the PoC User deactivates the PoC Box functionality the UE SHALL de-register the PoC Box contact with the SIP/IP Core.

When the UE PoC Box receives an invitation to join a PoC Session either directly via the POC-9 reference point or via the PoC Client it SHOULD accept the invitation immediately and SHALL return its contact along with the indication that this is a UE PoC Box in the OK response. The UE PoC Box SHALL indicate in its answer in the OK the Media Parameters it is capable of storing, the Talk Burst Control and Media Burst Control protocols it supports.

When the UE PoC Box receives a Media Burst it SHOULD store that Media Burst along with the PoC Address of the sending PoC User and the date and time that the Media Burst was received.

When the UE PoC Box is participating in a PoC Session it SHALL perform similar procedures for receiving Media as a PoC Client performs when receiving Media.

When a PoC Client receives an invitation to a PoC Session a PoC User MAY direct the UE PoC Box to accept the PoC Session.

> NOTE: When the PoC Client is participating in another PoC Session(s) and does not support additional Simultaneous PoC Session, the PoC Client can direct the incoming PoC Session invitation to the collocated UE PoC Box.

4.28.3   NW PoC Box handling

When the NW PoC Box receives an invitation to join a PoC Session via the PoC Server in the Home PoC Network, the PoC Box SHOULD accept the invitation immediately and SHALL return in responses to the invitation a PoC Box indication, the Media Parameters it is capable of storing, the Talk Burst Control and Media Burst Control protocols it supports.

When the NW PoC Box receives a Media Burst it SHOULD store that Media Burst along with the PoC Address of the sending PoC User and the date and time that the Media Burst was received.

The retrieval of PoC Session Control Data and PoC Session Data is not specified in this version of the specification.

The NW PoC Box SHALL be able to send PoC Session Control Data when requested by the served PoC User and manage PoC Session Data according to the corresponding PoC Session Control Data. The NW PoC Box SHALL be able to send Media when the served PoC User requests the NW PoC Box to send recorded Media to the PoC User.

4.28.3.1   NW PoC Box handling PoC Session invitation from PoCv1.0 Client

> NOTE: This optional functionality is only provided to ensure that the PoC Clients compliant only to PoC version 1.0 specification are able to leave a message in the NW PoC Box without violating any relevant regional or national regulations

NW PoC Box MAY support PoC Sessions initiated by Inviting PoC Client compliant only to PoC version 1.0 specification. If supported and the PoC Session invitation contains the indication indicating that the Inviting PoC Client is compliant only to the PoC version 1.0 specification and the NW PoC Box accepted the PoC Session invitation, the NW PoC Box SHALL request permission to send Media. After the NW PoC Box is granted the permission to send Media, the NW PoC Box SHALL send the Media indicating the recording (e.g. a beep). The NW PoC Box SHALL discard the received Media until the NW PoC Box finishes sending the Media indicating the recording.

4.29   Invocation of PoC Client from Browsing

The PoC Client MAY support the browser-based PoC Client invocation functionality.

If the PoC Client supports the browser-based PoC Client invocation functionality, when the User Equipment receives a document as specified in [PoC Invocation Descriptor], through the browser, that has a MIME media type for invocation of PoC Client registered in [OMA WAE];

- the PoC Client SHALL be invoked and the PoC Invocation Descriptor SHALL be passed through to the PoC Client; and

- the PoC Client SHALL initiate a PoC Session that is specified by the PoC Invocation Descriptor.

4.30   Answer Mode

4.30.1   General

The Home PoC Server of the Invited PoC Client determines the Answer Mode that is requested of the PoC Client based on several conditions, e.g. the PoC Client's Answer Mode Indication indicated by the PoC Service Settings, the Access Rules, and any indication indicating the requested Answer Mode contained in the incoming PoC Session invitation, and if the PoC Server already has a PoC Session with the PoC Client, etc.

If the determined Answer Mode is Automatic Answer Mode, the Home PoC Server of the Invited PoC Client SHALL either forward the invitation request to the Invited PoC Client or in the case of a Pre-established Session send a connect message to Invited PoC Client, and response the invitation request at the same time.

If the determined Answer Mode is Manual Answer Mode, the Home PoC Server of the Invited PoC Client SHALL forward invitation request to the PoC Client and wait for the answer from the Invited PoC Client. The Home PoC Server SHALL request the Invited PoC Client to use the determined Answer Mode by including the determined Answer Mode in the forwarded invitation request.

PoC Server SHALL support both Manual Answer Mode and Automatic Answer Mode. PoC Client SHALL support either Manual Answer Mode or Automatic Answer Mode or both. The PoC Server MAY support manual answer override and polite calling. The PoC Client MAY support manual answer override and polite calling.

4.30.2   Answer Mode determination procedures

Answer Mode for PoC Session is based on originating PoC User's selection or terminating PoC User's settings. The cases where originating PoC User has selected the Answer Mode for PoC Session are described in subclauses 4.30.3 "*Manual answer override (MAO)*" and 4.30.4 "*Polite calling*". In those cases, the originating PoC Client has included an indication indicating the requested Answer Mode in its PoC Session invitation.

In cases where no indication indicating the requested Answer Mode is contained in an incoming PoC Session invitation, the determination for used Answer Mode SHALL be performed at terminating Participating PoC Function. The determination SHALL be based on terminating PoC User's access rules settings and the published Answer Mode Indication PoC Service Setting as described in 4.26.1 "*Answer Mode*".

On determination of the Answer Mode for the PoC Session in the case where incoming PoC Session invitation does not contain an indication indicating the requested Answer Mode, following rules apply:

   1) Firstly the access rules configured by Invited PoC User are checked. The access rules to be checked are the default access rules as specified in 4.18.2.1 "*General access rules*" and Media Type specific access rules as specified in 4.18.2.2 "*Media Type specific access* rules". If any of these access rules indicates Manual Answer and no access rule indicates 'block', then Manual Answer Mode SHALL be applied.

   2) If the access rules checking allow Automatic Answer, then the PoC Service Setting Answer Mode Indication published by Invited PoC Client SHALL be checked, and if Automatic Answer Mode Indication has been published by the terminating PoC User, then Automatic Answer Mode for the PoC Session SHALL be applied.

3) if the Invited PoC User already participates in another PoC Session using the Invited PoC User's PoC Address of this PoC Session, then Manual Answer Mode SHOULD be applied.

4) if the Invited PoC User already participates in another PoC Session using any other PoC Address registered by the PoC Client of the Invited PoC User as specified in the subclause 4.47 "*Multiple registered PoC Address determination*", then Manual Answer Mode SHOULD be used otherwise Automatic Answer Mode is applied.

4.30.3   Manual answer override (MAO)

A PoC Client MAY initiate a PoC Session with a request to override the Answer Mode Indication setting of Invited PoC Client(s) if the Answer Mode Indication setting is the Manual Answer Mode.

The PoC Server in the Home PoC Network of the PoC User requesting manual answer override SHALL authorize the MAO request. If authorization is not successful the establishment of the PoC Session SHALL be rejected.

The PoC Server performing the Participating PoC Function serving the Invited PoC User SHALL authorize the MAO request when received in an invitation request. If authorization is not successful the invitation request SHALL be rejected.

4.30.4   Polite calling

A PoC Client MAY initiate a PoC Session with a request to override Answer Mode Indication setting of Invited PoC Client(s) if the Answer Mode Indication setting is the Automatic Answer Mode.

If the PoC Server receives a manual answer request in an invitation request the PoC Server performing the Participating PoC Function serving an Invited PoC User SHALL use the Manual Answer Mode procedure independent on the Answer Mode Indication setting of the PoC User's PoC Clients.

NOTE: If Manual Answer Mode is not supported by the Invited PoC Client the invitation request can be automatically rejected by the Invited PoC Client.

4.31   Advanced Revocation Alert

The PoC Client MAY support the Advanced Revocation Alert which indicates remaining Media transmit time to the PoC User. The PoC Servers SHOULD support Advanced Revocation Alert functionality.

The PoC Client SHOULD indicate an alert to the PoC User before the Media transmit time is almost ending, if it received Media Burst Control message including maximum transmit time and Alert Margin time from PoC Server performing Controlling PoC Function. The PoC Client MAY have the capability to configure the alert (e.g., sound, volume, vibration, time etc).

If Advanced Revocation Alert is supported, the PoC Server performing Controlling PoC Function SHALL include maximum transmit time information and SHOULD include Alert Margin time in the Media Burst Confirm response message based on Service Provider Policy.

If the PoC Client receives the Media Burst Control message which includes maximum transmit time information, the PoC Client knows the maximum transmit time to send Media Bursts.

The PoC Client SHALL run the timer using maximum transmit time information. The PoC Client MAY display the remaining time information to the PoC User or indicate an alert (e.g., beep, lightning, vibration, etc.) to the PoC User that remaining transfer time is almost ending.

4.32   Requests with included media content

4.32.1   General

The PoC Client MAY include an amount of media in invitations to PoC Sessions or in Group Advertisement messages.

The media content MAY be included, subject to PoC Service Provider policies, as:

- Referenced Media Content;

- Text Content; or,

- Included Media Content.

A PoC Client MAY indicate whether reception of media content included in an incoming PoC request is currently allowed in the PoC Service Setting published to the Home PoC Server of the served PoC User as described in the subclause 4.26.6 *"Support for Media Content included in a* request*"*.

The types of media allowed to be included in the request MAY be limited by Service Provider Policy.

4.32.2   Referenced Media Content

The PoC Client MAY insert a reference to any media stored in the network in invitations to PoC Sessions or in Group Advertisement messages.

The PoC Client and the PoC Server MAY support referenced Media Content in the invitations when initiating a PoC Session or in Group Advertisement messages.

If the PoC Client and the PoC Server support referenced Media Content the PoC Client MAY include a reference to media in invitations to PoC Sessions and in Group Advertisement messages.

> NOTE 1: Examples of types of media can be found in [RFC2046].

If the PoC Server performing the Controlling PoC Function supports Referenced Media Content and a request with Referenced Media Content is received, the PoC Server MAY remove the Referenced Media Content according to a local policy in the PoC Server.

If the Home PoC Server serving the PoC User receiving the request supports referenced Media Content include in a request, the Home PoC Server (performing the Participating PoC Function) SHALL keep or remove the Referenced Media Content in PoC Session invitation(s) and in Group Advertisement request(s) according to the PoC Service Settings set by the Served PoC Client and according to local policy in the PoC Server.

If the PoC Client includes a reference to media in the invitation to a PoC Session the PoC Client SHALL also include an indication of the intent of the referenced media and the type of media of the referenced media.

> NOTE 2: The intent of the referenced media could be to replace the local ring tone generated by a PoC Client on receipt of the invitation in Manual Answer Mode or to provide media (e.g. an image) in parallel to the local tones generated by the PoC Client.

If the Invited PoC Client supports referenced Media Content included in a request and the reception of referenced Media Content included in a request is allowed according to the PoC User's PoC Service Setting then when the PoC Client receives a PoC Session invitation with referenced Media Content included and the referenced and the Media Type is supported, the PoC Client:

1. SHOULD, if the intent of the referenced media is to replace local generated tones in case of Manual Answer Mode and the PoC Client allows replacement (e.g. configurable by the PoC User) of local generated tones:

    a.   fetch the media using the received reference; and,

    b.   render the media to the PoC User instead of local generated tones.

> NOTE 3: The PoC Client can stop fetching the media and display/play local generated tones e.g. if the PoC Client determines that the referenced media is too large.

    or,

2. SHOULD, if the intent of the referenced media is other than to replace local generated tones in case of Manual Answer Mode or if the PoC Client does not allow replacement of local generated tones (e.g. configurable by the PoC User) or in case of Automatic Answer Mode:

    a. Perform the action that the PoC Client normally would do e.g. generate local tones in case of Manual Answer Mode or accept the invitation in case of Automatic Answer Mode;

    b. Fetch the media using the received reference; and,

    c. When media is received render the media to the PoC User.

If the PoC Client supports referenced Media Content included in a request and the reception of referenced Media Content included in a request is allowed according to the PoC User's PoC Service Setting then when the PoC Client receives a Group Advertisement request with referenced media included then if the referenced Media Type is supported the PoC Client SHOULD:

    a. Fetch the media using the received reference; and,

    b. When media is received render the media to the PoC User.

4.32.3 Text Content

The Inviting PoC Client MAY include text in invitation to PoC Sessions or in Group Advertisement messages. The information can be useful for the Invited PoC User, in the case of an invitation to a PoC Session as basis for the decision whether to accept the invitation or not, or in case of a Group Advertisement whether to join a PoC Group Session or not.

The PoC Client and PoC Server MAY support Text Content included in a PoC Session invitation or in a Group Advertisement request.

If the Home PoC Server supports Text Content included in a request the allowed maximum size of the text allowed SHALL be provisioned in the PoC Client and in the PoC Server. The allowed maximum size of text SHALL be an operator configurable parameter.

   NOTE: The configuration of the PoC Server is out of scope of this specification.

If the Home PoC Server serving the PoC User receiving the request supports Text Content included in a request, the Home PoC Server (performing the Participating PoC Function):

- SHALL forward the included Text Content in the request to the PoC Client, if the size of media content is below the allowed maximum size of the Text Content and if the Text Content included in a request is supported in the PoC Service Settings; or,

- SHALL discard the Text Content, if the size of the media content exceeds the allowed maximum size of the Text Content or if the reception of Text Content included in a request is not allowed according to the PoC User's PoC Service Setting.

If the PoC Server performing the Controlling PoC Function supports Text Content included in a request, the PoC Server MAY remove the text content in PoC Session invitation(s) and in Group Advertisement request(s) according to local policy in the PoC Server.

If the Invited PoC Client supports Text Content included in a request, and the reception of Text Content included in a request is allowed, according to the PoC User's PoC Service Setting, and if the PoC Client receives a PoC Session invitation with Text Content included then the PoC Client:

1. SHOULD, in case of Manual Answer Mode, render the text to the PoC User along with normal behaviour (e.g. generating local ring signals).

2. SHOULD, in case of Automatic Answer Mode

    a.   accept the invitation; and,

    b.   render the text to the PoC User.

If the PoC Client supports Text Content included in a request, and the reception of Text Content included in a request is allowed according to the PoC User's PoC Service Setting, then when the PoC Client receives a Group Advertisement request with Text Content included the PoC Client SHOULD render the text to the PoC User.

4.32.4 Included Media Content

The Inviting PoC Client MAY include Media Content in a PoC Session invitation or in a Group Advertisement request

The PoC Client and the PoC Server MAY support Media Content included in a PoC Session invitation or in a Group Advertisement request.

If the Home PoC Server supports Media Content included in a request the allowed maximum total size of all the media content SHALL be provisioned in the PoC Client. The allowed maximum total size of all the media content to be included in requests SHALL be an operator configurable value.

If the PoC Server performing the Controlling PoC Function supports Media Content included in a request and a request is received with media content the PoC Server:

- SHALL forward the media content towards all PoC Users invited to the PoC Session or receiving the Group Advertisement, if authorization is successful and the size of the media content is below the allowed maximum total size of all the media content; or,

- SHALL either discard non-authorized media content or reject the request, based on a Service Provider Policy, if authorization is not successful.

- SHALL either discard all media content or reject the request, based on a Service Provider Policy, if the media content exceeds the allowed maximum total size of all the media content.

NOTE: Media content identification and authorization is according to local policy (e.g. only allow media content in requests for 1-1 PoC Sessions).

If the Home PoC Server serving the PoC User receiving the request supports Media Content included in a request, then if a request with media content is received by the Home PoC Server (performing the Participating PoC Function), the PoC Server:

- SHALL forward the media in the request to the PoC Client, if authorization is successful and the size of media content is below the allowed maximum total size of all the media content and if the reception of Media Content included in a request is allowed according to the PoC User's PoC Service Setting; or,

- SHALL either discard the non-authorized media content or reject the request based on Service Provider Policy, if authorization is not successful or if the media content exceeds the allowed maximum total size of all the media content.

- SHALL discard the media content if the reception of Media Content included in a request is not allowed according to the PoC User's PoC Service Setting.

If the Invited PoC Client supports Media Content included in a request (e.g. configurable by the PoC User) and the Media Type is supported, the PoC Client:

1. SHOULD, in case of Manual Answer Mode, render the media to the PoC User. The Included Media Content MAY replace normal behavior (e.g. generating local ring signals).

2. SHOULD, in case of Automatic Answer Mode

    a.   accept the invitation; and,

    b.   render the media to the PoC User.

If the PoC Client supports Media Content included in a request, and the reception of Media Content included in a request is allowed according to the PoC User's PoC Service Setting, then when the PoC Client receives a Group Advertisement request with Media Content included then the PoC Client SHOULD render the media to the PoC User, if the Media Type is supported.

4.33   Invited Parties Identity Information

The PoC Server SHALL support the invited parties identity information functionality based on Service Provider Policy and configuration. A PoC Client MAY support invited parties identity information functionality.

> NOTE: It is recommended that the Service Provider Policy enables this functionality except in the case where this functionality is prohibited by local regulations.

The PoC Client MAY set ID Notification Indications for each PoC Address of all the Invited PoC Users in the invitation when it establishes an Ad-hoc PoC Group Session or 1-1 PoC Session.

When a PoC Server performing the Controlling PoC Function receives a request to initiate an Ad-hoc PoC Group Session or 1-1 PoC Session with ID Notification Indications:

- the PoC Server performing the Controlling PoC Function MAY, according to the settings of the Service Provider Policy, modify the ID Notification Indications in the received invitation; and

- the PoC Server performing the Controlling PoC Function SHALL include PoC Addresses of all Invited PoC Users to all terminating PoC Servers performing the Participating PoC Function with the ID Notification Indications of each PoC Address of all the Invited PoC Users.

When a terminating PoC Server performing the Participating PoC Function receives an invitation for an Ad-hoc PoC Group or 1-1 PoC Session Session with the ID Notification Indications of each PoC Address of all the Invited PoC Users:

- the terminating PoC Server performing the Participating PoC Function MAY, according to the settings of the Service Provider Policy, modify the ID Notification Indications in the received invitation, and

- the terminating PoC Server performing the Participating PoC Function SHALL send the invitation to Invited PoC Client(s) with the ID Notification Indications of each PoC Address of all the Invited PoC Users except in the case that the Invited PoC User has configured the PoC Service setting to indicate the Invited Parties Identity Information Mode is not active. In that case the terminating PoC Server performing the Participating PoC Function SHALL NOT include the invited party identity information in the invitation request.

When a PoC Server performing the Controlling PoC Function and/or the Participating PoC Function receives request to initiate an Ad-hoc PoC Group Session or 1-1 PoC Session with no ID Notification Indication, the PoC Server performing the Controlling PoC Function and/or the Participating PoC Function SHALL set the ID Notification Indications based on the settings of the PoC Service Provider, where the default setting SHOULD make the ID Notification Indication of the PoC Address of the Invited PoC User be "HIDDEN".

In case one or more of the Invited PoC Addresses have been indicated as "HIDDEN" in ID Notification Indication(s):

- A PoC Server performing the Controlling PoC Function SHALL inform all terminating PoC Server(s) performing the Participating PoC Function of the all PoC Addresses with ID Notification Indications.

- A terminating PoC Server performing the Participating PoC Function SHALL indicate, in the invitation to the Invited PoC User, the total number of the Invited PoC Users whose PoC Addresses are indicated as "HIDDEN" in the ID Notification Indications and SHALL remove the PoC User Addresses of any PoC User indicated as "HIDDEN" in the ID Notification Indications in the invitation to the Invited PoC Client.

When a terminating PoC Server performing the Participating PoC Function remove identity information from an invitation according to the PoC service provider's settings, the terminating PoC Server performing the Participating PoC Function MAY indicate, in the invitation to the Invited PoC User, the total number of the Invited PoC Users.

The Invited PoC Client MAY support displaying the list of invited parties identity information and the total number of ID Notification Indications set to "HIDDEN" on the User Equipment.

If the invited party identity information is supported, a PoC Client SHALL be able to publish its Invited Parties Identity Information Mode setting for its Home PoC Server. The Home PoC Server handles the identity information according to the setting, when the Home PoC Server receives the invitation request containing the invited parties identity information.

4.34 Full Duplex Call Follow-on Proceed

4.34.1 General

The PoC Server MAY support Full Duplex Call Follow-on Proceed. The PoC Client MAY support Full Duplex Call Follow-on Proceed. If supported the following applies.

The Full Duplex Call Follow-on Proceed allows a Participant to send an indication to the other Participants to initiate/join another independent full duplex voice call (either a circuit switched voice call or voice-over-IP call, subject to Service Provider Policy and configuration).

> NOTE 1: The full duplex voice call initiation is out of the scope of this specification. The full duplex voice call is to be initiated by full duplex voice client (circuit switched client or voice-over-IP client), which is collocated in the UE with PoC Client.

> NOTE 2: After the originating PoC Client sends the Full Duplex Call Follow-on Proceed distribution indication, the full duplex voice client collocated with the originating PoC Client initiates the full duplex voice call.

A PoC Client sends to the PoC Server performing the Controlling PoC Function a Full Duplex Call Follow-on Proceed distribution indication containing one or more addresses to be used by the other Participants to initiate the full duplex voice call.

> NOTE 3: Multiple addresses can be provided, only if they identify the same full duplex voice call

> NOTE 4: Each address can be a TEL URI (E.164) or a SIP URI

The PoC Server performing the Controlling PoC Function upon reception of a Full Duplex Call Follow-on Proceed distribution indication sends to the other Participants a Full Duplex Call Follow-on Proceed distribution indication containing the same information as the received Full Duplex Call Follow-on Proceed distribution indication.

> NOTE 5: If the terminating PoC User acknowledges the Full Duplex Call Follow-on Proceed distribution indication, the full duplex voice client collocated with the terminating PoC Client initiates the full duplex voice call to the provided address (if multiple addresses are provided, selection is based on local settings and subject to Service Provider Policy and configuration).

The PoC Client, when the full duplex voice client collocated with the PoC Client successfully establishes the full duplex voice call:

- SHOULD release the PoC Session, or

- SHOULD remove PoC Speech from the PoC Session, if the PoC Session included Media Types additional to the PoC Speech.

> NOTE 6: The timing of the PoC Session release and the PoC Session modification is not specified in detail.

> NOTE 7: Any type of PoC Session is converted to dial-in full duplex voice conference.

4.34.2   Full Duplex Call Follow-on Proceed support negotiation

A PoC Client and a PoC Server MAY support the Full Duplex Call Follow-on Proceed. If supported the following applies.

The PoC Client SHALL indicate the Full Duplex Call Follow-on Proceed support at the PoC Session establishment.

The PoC Server performing the Controlling PoC Function SHALL include the PoC Client's Full Duplex Call Follow On support indication into Participant Information.

When Pre-established Session is used, the PoC Server performing the Participating PoC Function SHALL indicate at PoC Session establishment towards the PoC Server performing the Controlling PoC Function the PoC Client's Full Duplex Call Follow On support negotiated at the Pre-established Session establishment.

When On-demand Session is used, the PoC Server performing the Participating PoC Function SHALL relay the PoC Client's Full Duplex Call Follow On support indication towards the PoC Server performing the Controlling PoC Function.

4.35   Retrieving members of Pre-arranged PoC Groups

The PoC Server MAY retrieve members in other Pre-arranged PoC Groups by inviting a Pre-arranged PoC Group to a PoC Session e.g. when the Pre-arranged PoC Group is hosted in other domain.

The Pre-arranged PoC Group(s) hosted by the PoC Server(s) MAY reside on separate Shared Group XDM Servers, each possibly owned by a different PoC Service Provider or otherwise in another administrative domain.

> NOTE 1: An External P2T Network considered as another administrative domain can also host a Pre-arranged PoC Group to be retrieved by a PoC Server for the establishment of a PoC Session.

When a PoC Server hosting a Pre-arranged PoC Group receives an invitation from another PoC Server indicating willingness to perform the Controlling PoC Function, the PoC Server hosting the Pre-arranged PoC Group SHALL authorize the request using the PoC Address of the initiator of the invitation. The authorization MAY be based on the policy for Pre-arranged PoC Groups and inter-domain agreements.

If authorization is successful the PoC Server hosting the Pre-arranged PoC Group SHALL return a list of PoC Group members of the Pre-arranged PoC Groups.

Members of the Pre-arranged PoC Group SHALL be returned only if the PoC Server indicating willingness to perform the Controlling PoC Function and the PoC Server hosting a Pre-arranged Group are PoC Version 2.0 (or later) Servers.

> NOTE 2: If authorization fails or the PoC Server indicating willingness to perform the Controlling PoC Function is a Version 1.0 PoC Server the PoC Server hosting the Pre-arranged PoC Group will return a reject response with an appropriate reason.

4.36   Ad-hoc PoC Group Sessions with Multiple PoC Groups

The PoC Client MAY include one or more PoC Group Identities identifying Pre-arranged PoC Groups in the list of Invited PoC Users when initiating an Ad-hoc PoC Group Session.

If the PoC Server performing the Controlling PoC Function receives one or more PoC Group Identities in the list of Invited PoC Users in a Ad-hoc PoC Group Session request the PoC Server MAY invite members in the Pre-arranged PoC Group based on the policy for Ad-hoc PoC Groups and inter-domain agreements. The members of the Pre-arranged PoC Group SHALL be retrieved as specified in subclause 4.35 *"Retrieving members of Pre-arranged PoC Groups"*.

> NOTE: If the PoC Server performing Controlling PoC Function hosts the Pre-arranged-PoC Group included in the list of the Invited PoC Users, the PoC Server can retrieve the URIs of the PoC Group members and invite them directly.

If the URI list returned from the PoC Server hosting a Pre-arranged PoC Group includes an URI that identifies another Pre-arranged PoC Group the members in that Pre-arranged PoC Group MAY be retrieved as specified in subclause 4.35 "*Retrieving members of Pre-arranged PoC Groups*" depending on the policy of the PoC Server performing the Controlling PoC Function receiving the initial request for the Ad-hoc PoC Group Session.

When the Ad-hoc PoC Group Session is established the policy for Ad-hoc PoC Group (e.g. release policy, maximum number of Participants, etc.) SHALL apply. The PoC Server performing the Controlling PoC Function SHALL only once invite a PoC User if the same PoC User is a member in more than one Pre-arranged PoC Group or if the PoC User is already in the list of Invited PoC Users.

In case the PoC User that is a member of the Pre-arranged PoC Group tries to initiate a Pre-arranged PoC Group Session, when the Ad-hoc PoC Group Session involving that Pre-arranged PoC Group Identity is already ongoing (e.g., the PoC Client did not receive an invitation by the Ad hoc PoC Group Session due to being out of radio range or not being powered on), the PoC Server hosting the Pre-arranged PoC Group SHALL initiate a new Pre-arranged PoC Group Session separately

4.37   Media Burst Control Schemes

Media Burst Control Scheme is a way of using Media Burst Control according to predefined rules and procedures. The PoC Server performing the Controlling PoC Function MAY support Media Burst Control Schemes.

> NOTE 1: One example of a Media Burst Control Schema can be that if queuing is supported, the PoC Server can apply a Media Burst Control Scheme that one queue is assigned for all the associated Media-floor Control Entities.

> NOTE 2: PoC Server can use for 1-1 PoC Session and Ad hoc PoC Group Session a Media Burst Control Scheme according to the Service Provider Policy. Media Burst Control Schemes are out of scope of PoC specifications.

The PoC Client MAY support Media Burst Control Schemes. The originating PoC Client MAY initiate a PoC Session by providing an indication of the Media Burst Control Scheme to be used in the PoC Session invitation request.

If the PoC Server performing the Controlling PoC Function supports Media Burst Control Schemes, the followings apply:

- On receiving a Pre-arranged or Chat PoC Group Session set-up request with the indicated Media Burst Control Scheme, the PoC Server performing the Controlling PoC Function SHALL seek the allowed Media Burst Control Schemes in PoC Group information and apply Media Burst Control Scheme defined for the Pre-arranged or Chat PoC Group if included in the PoC Group information. If not included or not indicated in PoC Session set-up request, the PoC Server performing the Controlling PoC Function MAY choose a Media Burst Control Scheme according to the local policy.

- On receiving an Ad-hoc PoC Group Session and 1-1 PoC Session set-up request, the PoC Server performing the Controlling PoC Function SHALL apply the Media Burst Control Scheme indicated in the PoC Session set-up request. If not included, the PoC Server performing the Controlling PoC Function MAY choose any Media Burst Control Scheme according to the local policy.

> NOTE 3: Typically the standardised Media Burst Control procedure is used if no special Media Burst Control Scheme is requested.

- The PoC Server performing the Controlling PoC Function MAY indicate to the PoC Client the Media Burst Control Scheme used in the PoC Session in the INVITE request or the OK response.

- The PoC Client MAY indicate to the PoC User which Media Burst Control Scheme is used in the PoC Session when the PoC Session is established.

4.38   PoC Dispatcher

4.38.1   General

The PoC Client and the PoC Server MAY support the PoC Dispatcher functionality.

4.38.2   Creating a Dispatch PoC Group and Assigning the PoC Dispatcher role

An authorized PoC User MAY create a Dispatch PoC Group and store it in the Shared Group XDMS for use in Dispatch PoC Sessions. A Dispatch PoC Group SHALL be a Pre-arranged PoC Group.

If a Pre-arranged PoC Group is a Dispatch PoC Group, each member of the Pre-arranged PoC Group SHALL be identified as allowed or not allowed to act as PoC Dispatcher. Members not allowed to act as PoC Dispatcher always act as PoC Fleet Members, while members allowed to act as PoC Dispatcher MAY also act as PoC Fleet Members. At least one member SHALL be identified as being PoC Dispatcher capable. Only one single PoC User SHALL be active in the role of PoC Dispatcher at any one time, but more than one PoC User MAY be configured as capable of acting in the role of PoC Dispatcher.

The Dispatch PoC Group owner MAY use authorization rules to control permissions to perform some special actions by the active PoC Dispatcher. As described in subclause 4.18.3 *"PoC Group authorization rules"*, the Dispatch PoC Group authorization rules SHALL consider the following actions:

- Allow/block a PoC User adopting the PoC Dispatcher role.

- Allow/block the active PoC Dispatcher transferring the PoC Dispatcher role.

4.38.3   Dispatch PoC Sessions

A PoC Dispatcher capable PoC Client SHALL support the initiation of a Dispatch PoC Session by sending an invitation to the Dispatch PoC Group that explicitly indicates the PoC Dispatcher role. Upon reception of the invitation, the PoC Server SHALL validate that the inviting PoC User is identified as a PoC Dispatcher capable PoC User for the Dispatch PoC Group. If the validation fails, the invitation SHALL be rejected. If the validation is correct, the establishment procedure SHALL be according to the following:

- Inviting the whole Dispatch PoC Group: if the invitation does not include a list of PoC Users, then all the PoC Fleet Members of the Dispatch PoC Group SHALL be invited to the Dispatch PoC Session by the PoC Server performing the Controlling PoC Function. Other member(s) of the Dispatch PoC Group identified as being PoC Dispatcher capable MAY be invited as PoC Fleet Member(s) to the Dispatch PoC Session.

- Inviting a sub-set of the Dispatch PoC Group: if the invitation includes a list of one or more individual PoC Users, the PoC Server performing the Controlling PoC Function SHALL validate that the included PoC Users are members of the Dispatch PoC Group. If the validation is correct, the PoC Server performing the Controlling PoC Function SHALL only invite, as PoC Fleet Members, the PoC Users explicitly included in the invitation. The policies associated to the Dispatch PoC Groups SHALL be applicable to this Dispatch PoC Session.

- If the invitation for the whole Dispatch PoC Group is sent when there is an already established Dispatch PoC Session with the whole Dispatch PoC Group, the PoC Server performing the Controlling PoC Function SHAL reject the Dispatch PoC Session establishment, indicating the reason for rejection.

- If the invitation for a sub-set of the Dispatch PoC Group is sent when there is an already established Dispatch PoC Session with the whole Dispatch PoC Group or a sub-set of it, then:

    o If the inviting PoC User is the PoC Dispatcher for the other Dispatch PoC Sessions, the PoC Server performing the Controlling PoC Function SHALL establish a separate parallel Dispatch PoC Session, associated with a unique PoC Session Identity, with the sub-group indicated in the invitation.

    o If the inviting PoC User is not the PoC Dispatcher for the other Dispatch PoC Sessions, the PoC Server performing the Controlling PoC Function SHALL reject the establishment.

- When inviting a PoC Client as PoC Dispatcher, the PoC Server performing the Controlling PoC Function SHALL explicitly indicate the PoC Dispatcher role in the (re-)invitation for the Dispatch PoC Session sent to that PoC Client.

- The PoC Server performing the Controlling PoC Function SHALL include a Dispatch PoC Session indication in the (re-)invitation for the Dispatch PoC Session and in the confirmation of the Dispatch PoC Session (re-)establishment.

NOTE: The Dispatch PoC Session indication can be used to confirm that the contacted PoC Group is actually a Dispatch PoC Group.

A PoC Dispatcher capable PoC Client SHALL support Simultaneous PoC Sessions. A PoC Dispatcher MAY establish simultaneous Dispatch PoC Sessions with different Dispatch PoC Groups.

The PoC Dispatcher SHALL have the capability to use the manual answer override when establishing the Dispatch PoC Session.

The PoC Server performing the Controlling PoC Function MAY resend an invitation to a Dispatch PoC Session to those PoC Fleet Members(s) who did not respond to the original invitation (e.g., due to being out of access network coverage).

If authorized according to the Dispatch PoC Group policy, the PoC Dispatcher SHALL have the capability to expel any PoC Fleet Member from a Dispatch PoC Session (including all PoC Fleet Members at once).

A PoC Fleet Member for a Dispatch PoC Group MAY send an invitation to the identity of the Dispatch PoC Group. In this case:

- If there is no Dispatch PoC Session established for the whole Dispatch PoC Group:

    o   The PoC Server hosting the Dispatch PoC Group SHALL select one of the PoC Dispatcher capable PoC Users for the Dispatch PoC Group and SHALL invite only that selected PoC User to a 1-1 PoC Session with the inviting PoC Fleet Member.

    o   The PoC Dispatcher selection decision SHALL be based on local policy (e.g. load balancing, etc). Moreover, the selection decision MAY be based on the status of the PoC Dispatcher as reported by the Presence Server.

- If there is a Dispatch PoC Session already established for the whole Dispatch PoC Group, the PoC Fleet Member SHALL join the Dispatch PoC Session already established with the whole Dispatch PoC Group.

A PoC Dispatcher capable PoC Client MAY send an invitation for a Dispatch PoC Group that requests the PoC Fleet Member role. When the PoC Server performing the Controlling PoC Function receives an invitation from a PoC Dispatcher capable PoC User that requests the PoC Fleet Member role, the Controlling PoC Function SHALL follow the same procedures as those followed for PoC Fleet Members.

Following the procedures considered in subclause 4.10 *"Handling of Simultaneous PoC Sessions"*, a PoC Client acting as a PoC Fleet Member MAY automatically set the priority of a new incoming Dispatch PoC Session to be the Primary PoC Session in case Simultaneous PoC Sessions are used.

If the PoC Dispatcher leaves the Dispatch PoC Session without first successfully transferring the PoC Dispatcher role to another Participant, the PoC Server performing the Controlling PoC Function SHALL release the Dispatch PoC Session.

4.38.3.1   Transfer of the PoC Dispatcher role

During an already established Dispatch PoC Session and when requested by the PoC User active in the role of PoC Dispatcher, the PoC Client SHALL request the transfer of the PoC Dispatcher role to another PoC User selected by the PoC User active in the role of PoC Dispatcher. Alternatively, the PoC Client MAY indicate a special SIP URI identifying all the PoC Dispatcher capable PoC Users of the Dispatch PoC Group as possible targets for the transfer request:

- When the Controlling PoC Function receives a request to transfer the PoC Dispatcher role, it SHALL first check if the PoC Dispatcher is allowed to transfer the PoC Dispatcher role according to the Dispatch PoC Group policy. If the validation fails, the Controlling PoC Function SHALL reject the request. Otherwise, the Controlling PoC Function SHALL proceed as follows.

- If the Controlling PoC Function receives a request to transfer the PoC Dispatcher role to another PoC User, it SHALL invite the indicated PoC User to join the PoC Session as PoC Dispatcher if, and only if, the PoC User is identified as being PoC Dispatcher capable for the Dispatch PoC Group associated with the Dispatch PoC Session. Otherwise, the request to transfer the PoC Dispatcher role SHALL be rejected.

- If the Controlling PoC Function receives a request to transfer the PoC Dispatcher role to a special target URI identifying all the PoC Dispatcher capable PoC Users of the Dispatch PoC Group, the Controlling PoC Function SHALL select one of the PoC Users identified as being PoC Dispatcher capable for the Dispatch PoC Group and SHALL invite this selected PoC User to join the PoC Session as PoC Dispatcher. The target PoC User selection decision SHALL be based on local policy (e.g. load balancing, etc). If no PoC User can be selected by the Controlling PoC Function, the transfer request SHALL be rejected.

- When a PoC Dispatcher capable PoC Client receives an invitation to join an already established Dispatch PoC Session as PoC Dispatcher, it SHALL ask the PoC User for confirmation:

  o If that PoC User accepts, the PoC Client SHALL answer with an indication of this acceptance and the Controlling PoC Function SHALL include that PoC Client as the PoC Dispatcher for the PoC Session. The Controlling PoC Function SHALL indicate the previous PoC Client taking the role of PoC Dispatcher that the PoC Dispatcher role has been transferred to the PoC User who is the new PoC Dispatcher. The previous PoC Client who had the role of PoC Dispatcher remains in the Dispatch PoC Session as PoC Fleet Member.

  NOTE: Following appropriate PoC Session control procedures, the previous PoC Client who had the role of PoC Dispatcher is always able to leave the Dispatch PoC Session after successfully transferring the role to another Participant.

  o If that PoC User does not accept, the PoC Client SHALL answer with an indication of the rejection, and the Controlling PoC Function SHALL NOT include that PoC Client in the Dispatch PoC Session as PoC Dispatcher. The previous PoC Client who had the role of PoC Dispatcher SHALL remain as the PoC Dispatcher of the Dispatch PoC Session.

Based on local configuration policy, the PoC Server performing the Controlling PoC Function SHALL notify the transfer of the Dispatcher role to another PoC Dispatcher capable PoC User as part of the Participant information.

A PoC Fleet Member capable PoC Client SHALL have the capability to subscribe to the Participant information in order to receive notifications that convey Participant roles in the Dispatch PoC Session.

4.38.4   Media Burst Control for Dispatch PoC Sessions

If requested during PoC Session (re-)establishment, the PoC Dispatcher SHALL have pre-emptive Media Burst priority over the PoC Fleet Members in an ongoing Dispatch PoC Session.

4.39   PoC Interworking Service

The PoC Server MAY support the PoC Interworking Service. The PoC Client MAY support the PoC Interworking Service.

4.39.1   General

If the PoC Interworking Service is supported, the PoC Server SHALL be able to support P2T Users and Remote PoC Users from one or more external networks simultaneously on the same PoC Session.

  NOTE 1: If the PoC Interworking Service is supported with P2T Users or PoC Remote Access Users, the PoC Server has a trusted relationship with the PoC Interworking Function connecting the PoC Network to the External P2T Network or remote access networks, regardless of the network domain. Different domains are assumed to be under the control of different operators.

If the PoC Interworking Service is supported, the PoC Server SHALL support PoC Interworking Service charging. PoC charging principles as described in subclause 8.15 *"Charging"* SHALL apply to the PoC Interworking Service.

  NOTE 2: The PoC Interworking Agent and the PoC Interworking Function acts as an IP protocol translator and an application level gateway if the External P2T Network or the remote access network and the PoC Network have different IP address space or different IP version.

4.39.2   PoC Interworking with External P2T Systems

The PoC Server MAY support the PoC Interworking with External P2T Systems. If the PoC Interworking Service is supported the PoC Server interacts with the PoC Interworking Function as specified by the POC-4 interface.

If the PoC Interworking Service is supported, the PoC Server SHALL support P2T Users from multiple external P2T Networks to simultaneously participate in a given PoC Session.

> NOTE 1: The external P2T system is assumed to manage its own subscribers, users, and services, and is outside the scope of OMA PoC Specifications.

If the PoC Interworking Service is supported, the PoC Server SHALL

- recognize the involvement of P2T Users from External P2T Networks and PoC Remote Access Users (e.g. for generation of interworking specific charging events) based on a received interworking indication.

> NOTE 2: Within the PoC Network, the P2T Address of the P2T Users points to the PoC Interworking Function which acts as a PoC Interworking Agent on behalf of the P2T User in the External P2T Network

The PoC Server SHALL handle PoC Session invitations, Instant Personal Alerts or Group Advertisements from a P2T User transparently to the other PoC Users involved in the communication.

The following bullet lists identify the intended scope of the PoC Interworking Service specification.

If the PoC Interworking Service is supported, the PoC Server together with the PoC Interworking Function enables a PoC User or a P2T User to:

- invite, join, or be invited to PoC Sessions of the following communication modes: 1-to-1 PoC Sessions, PoC Group Sessions for Ad-hoc PoC Groups, Pre-arranged PoC Groups, Chat PoC Groups, and 1-many-1 PoC Sessions.

- send or receive an Instant Personal Alert.

- send or receive an Group Advertisement.

- receive and forward Participant Information for the PoC Session.

If the PoC Interworking Service is supported, the PoC Server supports the following PoC functions following the same procedures as those involving the PoC Clients:

- negotiation with the PoC Interworking Agent of either the Talk Burst Control Protocol or the Media Burst Control Protocol or both,

- negotiation with the PoC Interworking Agent of codec and Media Parameters for each Media Types used within the PoC Session,

- negotiation with the PoC Interworking Agent of ongoing session modification,

- negotiation with the PoC Interworking Agent of either the Talk Burst Control Protocol options or the Media Burst Control Protocol options or both,,

- negotiation with the PoC Interworking Agent of ongoing session User Plane adaptation.

> NOTE 3: The functionalities and communication modes supported by the PoC Interworking Service assume that similar functionalities and communication modes are supported in the External P2T Network; if a given mode or feature is not supported in an External P2T Network, then the PoC Interworking Function, responsible for mapping PoC functionality to equivalent P2T functions, allows for compliant PoC service actions and events from the perspective of PoC Session participants by emulating the unsupported PoC functionality in an appropriate way.

If the PoC Interworking Service is supported, the PoC Server together with the PoC Interworking Function can support following PoC functions as requested by the P2T Users:

- Manual Answer Override, Polite Calling.

If the PoC Interworking Service is supported, the PoC Server or the PoC Interworking Function can arrange that a single media flow be associated with multiple users in an External P2T Network, i.e., it is not necessary to send multiple copies of a given media flow to an PoC Interworking Function in support of multiple P2T Users in the External P2T Network, and, vice verse for the PoC Interworking Function to the PoC Network as specified in subclause 4.43 *"PoC Media Traffic Optimisation"*.

If PoC Interworking Service is supported, the PoC Server together with the PoC Interworking Function can support the transfer of Participant Information to P2T Users or PoC Users, upon request.

4.39.3 Remote Access to PoC Service

PoC Clients MAY support PoC Remote Access. PoC Servers MAY support PoC Remote Access.

If PoC Remote Access is supported, the PoC Interworking Agent SHALL:

- register as a PoC Client for PoC Service

- publish PoC Service Settings

- negotiate with the PoC Server based on the host User Equipment capabilities during the PoC Session establishment:

    o either Talk Burst Control Protocol or Media Burst Control Protocol or both

    o either Talk Burst Control Protocol options or Media Burst Control Protocol options or both

    o codec and Media Parameters

    o User Plane adaptation

- limit PoC Service requests to those supported by the PoC Interworking Service

NOTE 1: Within the PoC Network, the PoC Address of a PoC User registered for PoC Remote Access will point to the PoC Interworking Agent. or the Remote PoC Client.

NOTE 2: Routing of messages between the PoC Network with SIP/IP Core corresponding to 3GPP/3GPP2 IMS and the Remote PoC Client in network with SIP/IP Core not corresponding to 3GPP/3GPP2 IMS is out of scope of this specification.

The PoC Server SHALL handle a PoC Session invitation, an Instant Personal Alert or a Group Advertisement from a PoC Remote Access User transparently to the other PoC Users involved in the communication (e.g. Sender Identification)

4.40 Operator Specified Warning Message

The operator specified warning message is a string of free texts that is sent from the PoC Server to the PoC Client in order to present miscellaneous information from the PoC Service Provider to the PoC User. If the PoC Service Provider wants to notify arbitrary warning information other than the texts which are statically implemented on the PoC Client and the PoC Server, the PoC Service Provider may utilise this functionality.

Based on the local policy determined by the PoC Service Provider, various languages may be used in the operator specified warning message.

- A PoC Server MAY support the operator specified warning message.

- A PoC Client SHOULD display the operator specified warning message if it is sent from the PoC Server and if the language of the message is supported.

NOTE: UEs which have limited capability for displaying such a message may not be able to support multiple languages.

- A PoC Server MAY support its own set of languages.

- The PoC Client MAY support its own set of languages.

- A PoC Client MAY request to the PoC Server the language that it can accept in a request message.

- If the operator specified warning message is supported, the PoC Server MAY include miscellaneous information as the operator specified warning message in a response to a request message sent from a PoC Client. The PoC Server SHALL send back a response using the language requested by the PoC Client in the operator specified warning message if the PoC Server supports the language.

- A PoC Client SHOULD display the received operator specified warning message to the PoC User as it is received

4.41   Quality of Experience (QoE)

Quality of Experience (QoE) Profiles enable end-to-end quality of service management capabilities and allow the PoC Service Provider to suit different PoC User's needs in terms of customer experience and quality of service they may require given their different contexts, thus, it enables user differentiation and a rational use of network resources.

4.41.1   General

Quality of Experience (QoE) Profiles apply to individual's PoC User subscription with the PoC Service Provider, to Pre-arranged PoC Groups and, finally, to PoC Sessions.

PoC Servers SHALL support QoE Profiles. PoC Clients SHOULD support QoE Profiles.

Each PoC Service Provider can decide whether to use QoE Profiles or not. If QoE Profiles are used, the following SHALL apply.

A QoE Profile SHALL be defined for each PoC subscriber. If not explicitly defined the lowest profile ('Basic') SHALL be used.

If authorized by the Service Provider Policy, the PoC Group owner MAY define and assign a QoE Profile for a Pre-arranged PoC Group. The assigned QoE Profile SHALL be stored in Shared Group XDMS as an attribute of the PoC Group.

NOTE 1: It is possible that a Pre-arranged PoC Group has no QoE Profile assigned in the PoC Group document.

Those PoC Clients that support the QoE feature and PoC Servers SHALL support the following QoE Profiles:

The possible QoE Profile(s) SHALL be:

- 'Basic' profile: Intended for users who do not have high Quality of Experience expectations, such as via "best effort" communication; or,

- 'Premium' profile: Intended for users who have demanding Quality of Experience expectations, such as via interactive 1 communication and higher priority; or

- 'Professional' profile: Intended for users involved in special applications for professional use and that therefore have demanding Quality of Experience expectations, such as via streaming communication and higher priority.

Those PoC Clients that support the QoE feature and PoC Servers MAY support the following QoE Profile:

- 'Official Government Use' profile: Intended for those users who require priority access to PoC Service according to one of the 5-levels existing in the WPS namespace, as specified in [RFC4412]. Subject to applicable regulations, when the 'Official Government Use' profile is implemented in a PoC network domain, this profile SHALL take precedence over all other QoE profiles.

NOTE 2: The use of the WPS namespace is subject to be changed in order to be aligned with the namespace used in 3GPP Multimedia Priority Service.

NOTE 3: The above profiles are arranged in increasing order of priority, but only one QoE Profile can be associated to PoC User's subscription.

Each QoE Profile SHALL be associated with a set of well-defined QoS and prioritization parameters that are understandable for the specific underlying network(s) and also applicable to the PoC Server itself to actually obtain the target quality of experience for the end user. The appropriate QoE to QoS mapping(s) SHALL be provisioned to PoC Clients as reflected in subclause 4.41.2 *"QoE provisioning"*.

As described in subclause 4.41.3 *"Setting the QoE Profile for the PoC Session"*, based on the QoE Profile proposed by the Inviting PoC Client and the QoE Profile associated to the involved PoC Group, the PoC Server SHALL assign a QoE Profile for each PoC Session at the PoC Session establishment time. When a QoE Profile has been assigned for the PoC Session and each involved PoC Client knows the Local QoE Profiles that is acceptable for him based on individual constraints, the involved PoC Clients and PoC Servers:

- SHOULD apply/request the corresponding QoS in the underlying network for the transport of PoC Session Media and signalling.

- MAY apply the corresponding prioritization and pre-emption procedures.

4.41.2   QoE provisioning

If QoE Profiles are used, the following SHALL apply.

QoE Profiles are used as a way to define a mapping between different types of quality of service expected by the PoC Users at application level and different profiles of performance criteria to be realized at underlying network level. In order to receive the appropriate mapping(s), PoC Clients SHOULD support provisioning of QoE Profile(s) through OMA DM according to the following rules:

- Depending on the PoC User subscription, one mapping SHALL be received per authorized QoE Profile.

- Each mapping SHALL cover the QoS to be provided for each of the Media Types in the PoC Session. Media Types can be logically grouped according to any desirable criteria (e.g. continuous vs discrete Media Types) so that the same QoS parameters are applicable to every logically grouped Media Type.

NOTE 1: Any mapping mechanism must consider the concrete underlying network capabilities (i.e QoS framework…).

NOTE 2: For different types of access networks, the same QoE Profile may map to different QoS parameters due to the use of different QoS frameworks.

4.41.3   Setting the QoE Profile for the PoC Session

4.41.3.1   General

QoE Profile assignation and application for PoC Sessions SHALL be supported by PoC Servers and SHOULD be supported by PoC Clients. For those PoC Service Providers using this capability, the setting of the QoE Profile for the PoC Session SHALL be according to the following.

Each PoC Session SHALL have a unique QoE Profile assigned by the Controlling PoC Function at PoC Session establishment time.

Based on PoC User's selection, the originating PoC Client SHOULD indicate in the initial invitation the desired QoE Profile to be applied for outgoing PoC Sessions on a session-by-session basis, according to the following:

- The indicated QoE Profile SHALL be an authorized QoE Profile according to PoC User's subscription, as provisioned by the PoC Service Provider (described in subclause 4.41.2 "*QoE provisioning*").

- For Pre-established Sessions, the PoC Client SHOULD include the desired QoE Profile at the initial establishment or later modification(s) of the Pre-established Session.

- For outgoing PoC Sessions using On-demand Session, the PoC Client SHOULD include the QoE Profile in the initial invitation.

PoC Servers and PoC Clients using QoE Profiles SHALL interpret the absence of an explicit QoE Profile indication as an implicit indication of 'Basic' QoE Profile.

Upon reception of the initial invitation, the Participating PoC Function serving the originating PoC Client SHALL check the QoE Profile indicated by the PoC Client:

- If the requested QoE Profile is not authorized for the served PoC User, the establishment request SHALL be rejected. If the requested QoE Profile is authorized for the served PoC User, the Participating PoC Function SHALL send the invitation to the Controlling PoC Function without modifying the indicated QoE Profile.

- For PoC Sessions using Pre-established Session, the QoE Profile indicated by the PoC Client for the initial establishment of the Pre-established Session SHALL be indicated by the Participating PoC Function in the invitation sent to the Controlling PoC Function.

If QoE Profiles are used by the PoC Service Provider, upon reception of the initial invitation, the Controlling PoC Function SHALL assign a QoE Profile for the PoC Session according to the following:

- For Pre-arranged PoC Group Session:

  o when there is no QoE Profile defined in the PoC Group document, the QoE Profile for the PoC Session SHALL be the QoE Profile requested by the Inviting PoC Client. When different from the 'Basic' QoE Profile, the QoE Profile assigned for the PoC Session SHALL be explicitly indicated in the invitation(s) sent to the Invited PoC Client(s).

  o when there is a QoE Profile defined in the PoC Group document and the requested QoE Profile is not the 'Official Government Use' QoE Profile, the Controlling PoC Function SHALL first check if the QoE Profile requested by the Inviting PoC Client is equal or higher than the QoE Profile defined for the PoC Group. If it is lower, the Controlling PoC Function SHALL reject the invitation. Otherwise, the QoE Profile for the PoC Session SHALL be the QoE Profile defined in the PoC Group document. The Controlling PoC Function SHALL explicitly indicate the QoE Profile assigned for the PoC Session in the invitation(s) sent to the Invited PoC Client(s). The Controlling PoC Function SHALL also indicate in the invitation(s) that the QoE Profile for the PoC Session is mandatory.

  o When the requested QoE Profile is the 'Official Government Use' QoE Profile, the QoE Profile for the PoC Session SHALL always be the 'Official Government Use' QoE Profile. The Controlling PoC Function SHALL explicitly indicate the 'Official Government Use' QoE Profile in the invitation(s) sent to the Invited PoC Client(s).

- For 1-1 and Ad-hoc PoC Group Sessions, the QoE Profile for the PoC Session SHALL be the QoE Profile explicitly or implicitly indicated in the invitation from the originating PoC Client. When different from the 'Basic' QoE Profile, the QoE Profile assigned for the PoC Session SHOULD be explicitly indicated in the invitation(s) sent to the Invited PoC Client(s).

- Redirecting a PoC Session to a PoC Box SHALL NOT impact to the QoE Profile.

- The QoE Profile SHALL NOT be changed during a PoC Session.

Upon reception of the initial invitation, the Participating PoC Function serving an Invited PoC User SHALL check the QoE Profile assigned for the PoC Session against the QoE Profile subscribed by the Invited PoC User. If the QoE Profile for the

PoC Session is mandatory and it is not allowed based on the PoC User's Subscription, the Participating PoC Function SHALL reject the invitation, indicating the reason for rejection. Otherwise, the Participating PoC Function SHALL forward the invitation to the Invited PoC Client without any change.

In the first response to the initial invitation each terminating PoC Client SHOULD indicate their Local QoE Profile according to the following:

- The Local QoE Profile SHOULD be the QoE Profile proposed in the incoming invitation if the terminating PoC User's subscription allows that proposed QoE Profile.

- The Local QoE Profile SHOULD be the maximum acceptable QoE Profile according to the PoC User's subscription, in case the requested QoE Profile is not authorized for the Invited PoC User.

- In case of automatic answer and Pre-established Session in the terminating side, the terminating Participating PoC Function SHOULD indicate the Local QoE Profile on behalf of the Invited PoC Client, based on the desired QoE Profile communicated by the PoC Client during the Pre-established Session establishment.

In case of On-demand Session, upon reception of the final response from the terminating PoC Client, the Participating PoC Function serving an Invited PoC User SHALL check the Local QoE Profile indicated by the PoC User. If the Local QoE Profile is not authorized for the served PoC User, the PoC Server SHALL reject the PoC Session establishment towards the inviting party and SHALL release the PoC Session towards the served PoC User.

PoC Servers using QoE Profiles SHALL interpret the absence of an explicit indication about the Local QoE Profile from a PoC Client as an implicit indication of 'Basic' Local QoE Profile for that PoC Client.

The Local QoE Profile for the Inviting PoC Client SHALL be:

- Equal to the requested QoE Profile for PoC Sessions using On-demand Session.

- Equal to the QoE Profile communicated by the PoC Client during the Pre-established Session set-up, in case of Pre-established Session in the inviting side.

Each PoC Client SHOULD apply his Local QoE Profile for the PoC Session when performing resource reservation in the underlying network.

Each PoC Client MAY apply his Local QoE Profile for potential prioritization and pre-emption procedures.

The QoE Profile assigned for the PoC Session and the Local QoE Profile for each PoC Client SHALL be included in the charging information.

4.41.3.2   Users joining/leaving an on-going PoC Session

In case a PoC User leaves or joins an on-going PoC Session, the QoE Profile for the PoC Session SHALL not be modified.

A PoC Client joining to an on-going Chat PoC Group Session or re-joining to an on-going PoC Session SHALL follow the behaviour for Inviting PoC Clients described in subclause 4.41.3 *"Setting the QoE Profile for the PoC Session"*. If the joining is successful, the Local QoE Profile for the PoC User SHALL be the QoE Profile requested by the PoC Client.

> NOTE: In these scenarios the QoE Profile requested by the PoC Client is not used to assign the QoE Profile for the PoC Session, therefore the Local QoE Profile assigned to the PoC Client can be different from the QoE Profile assigned to the PoC Session.

Upon reception of a request to join an on-going Chat PoC Group Session or to re-join an on-going PoC Session, the PoC Server performing the Controlling PoC Function SHALL:

- Reject the joining or re-joining request, if the requested QoE Profile is lower than the QoE Profile assigned to the on-going PoC Session and if the QoE Profile assigned to the on-going PoC Session is mandatory.

- Otherwise, add the PoC Client to the on-going PoC Session without modifying the QoE Profile assigned to the PoC Session.

4.41.4   Prioritization and pre-emption

The PoC Server and PoC Client MAY support the prioritization and pre-emption.

The Controlling PoC Function SHOULD determine the PoC Session Precedence from the QoE Profile assigned for the PoC Session, as defined by the PoC Service Provider.

The PoC Server and PoC Client MAY support three levels of PoC Session Precedence, according to Basic, Premium and Professional QoE Profiles.

Additionally, the PoC Server and PoC Client MAY support a higher level of PoC Session Precedence assigned to Official Government Use QoE Profile. Within this level of priority there are 5-levels of priority according to the WPS namespace, as reflected in [RFC4412]. These five levels of priority represent levels of PoC Session Precedence and they are represented by a number from 0 to 4, where 0 is used for the highest priority level and 4 is used for the lowest priority level.

The Participating PoC Function SHOULD directly determine the PoC Session Precedence from the Local QoE Profile applied for the served PoC Client in the PoC Session, as defined by the PoC Service Provider.

If the prioritization and pre-emption capability is supported, then under high load situations at the PoC Server:

- The PoC Server SHALL prioritise the signalling of a PoC Session with higher PoC Session Precedence among the signalling of other PoC Sessions with lower PoC Session Precedence.

- When located on the Media path, the PoC Server SHOULD prioritise the Continuous Media flows of PoC Sessions of higher PoC Session Precedence over Continuous Media flows of PoC Sessions of lower PoC Session Precedence.

- When performing the Controlling PoC Function, the PoC Server MAY revoke the Media Burst sending permissions, or reject the Media Burst requests, of PoC Clients participating in PoC Sessions of lower PoC Session Precedence.

- In case of several PoC Session establishment requests of the same PoC Session Precedence, the PoC Server SHALL service the requests based on the order of the requests.

- According to Service Provider Policy, the PoC Server MAY pre-empt (i.e., release) PoC Sessions of lower PoC Session Precedence due to the requests of PoC Sessions of a higher PoC Session Precedence.

When a PoC Server acting as a Participating PoC Function serving a PoC Client with existing PoC Session(s) established using any PoC Address of the Invited PoC Client as specified in the subclause 4.47 "*Multiple registered PoC Address determination*" receives a PoC Session invitation with an Official Government Use QoE Profile, then subject to Service Provider Policy:

- If the PoC Client does not support Simultaneous PoC Sessions, and if the incoming PoC Session has a higher PoC Session Precedence than the currently existing PoC Session, PoC Server performing the Participating PoC Function SHALL release the PoC Session and send the new incoming invitation to the destined PoC Client.

- If Simultaneous PoC Sessions are supported, and the maximum number of PoC Sessions has not been reached and none are locked, the PoC Server performing the Participating PoC Function SHALL send the new incoming invitation to the destined PoC Client.

- If Simultaneous PoC Sessions are supported and the maximum number of PoC Sessions has been reached, and if the incoming request has a higher PoC Session Precedence than the lowest currently established PoC Session, the PoC Server performing the Participating PoC Function SHALL release the PoC Session of lowest PoC Session Precedence and send the new incoming invitation to the destined PoC Client.

- If Simultaneous PoC Sessions are supported and one of the PoC Sessions is locked, and if the incoming PoC Session has a higher PoC Session Precedence than the locked PoC Session, the PoC Server performing the Participating PoC Function SHALL release the locked PoC Session and send the new incoming invitation to the destined PoC Client.

4.41.5   QoE mismatch

If the PoC Client fails to reserve the resources the PoC Client requested from the underlying network according to the Local QoE Profile, as provisioned by the PoC Service Provider, the PoC Client SHOULD inform back to the serving Participating PoC Function about the QoE mismatch.

The Participating PoC Function SHOULD send this information to the Controlling PoC Function.

The available information about the QoE mismatch SHALL be included in the charging information.

4.42   Discrete Media transfer

4.42.1   General

In addition to the Continuous Media, the PoC Server SHALL support the transfer of Discrete Media. The PoC Client MAY support Discrete Media.

If the PoC Client supports Discrete Media, the PoC Client MAY initiate the PoC Session establishment procedure with Discrete Media as described in subclause 4.6 *"Session establishment"*. The PoC Client SHALL include MSRP protocol and offered Media Types into PoC Session invitation. If the terminating PoC Client accepts the Discrete Media in the PoC Session invitation, the terminating PoC Client SHALL include MSRP protocol and accepted Media Types into PoC Session invitation response.

If the PoC Client supports Discrete Media, the PoC Client MAY add Discrete Media to already existing PoC Session by initiation of the PoC Session modification procedure as described in subclause *4.6.1.3 "Session modification"*. The PoC Client SHALL add MSRP protocol and offered Media Types into PoC Session modification request. If the terminating PoC Client accepts the Discrete Media in the PoC Session invitation, the terminating PoC Client SHALL include MSRP protocol and accepted Media Types into PoC Session modification response.

> NOTE: OMA IM specified IM session mechanism is utilized (chapter 6.1.2 in OMA SIP/SIMPLE IM TS)

4.42.2   MSRP Session establishment

MSRP protocol can deliver any arbitrary MIME content. MSRP protocol provides a session mode messaging scheme and all MSRP-based messaging occurs in the context of a session. The Session Description Protocol (SDP) with its offer/answer model provides for MSRP session management, and the Session Initiation Protocol acts as a carrier for session signaling. A typical case involves more than a few instant messages exchanges over MSRP protocol. The MSRP protocol itself does not limit the size of messages, however the PoC Clients and PoC Server SHALL negotiate maximum supported message size using SDP. A reliable transport layer protocol is a required such as TCP.

The MSRP protocol provides for message chunking that allows multiple sessions to share one TCP connection. A sender can fragment its message, which can be of any MIME or multi MIME type. An MSRP message MAY convey a file name, if the MIME body is a file.

> NOTE: OMA IM specified IM Session mechanism is utilized.

4.42.3   File transfer with extended SDP information

If the PoC Client supports Discrete Media, the PoC Client MAY support file transfer with extended SDP information.

If the PoC Client supports Discrete Media and extended SDP information, the PoC Client SHALL include for each file a separate Discrete Media into PoC Session invitation or PoC Session modification request. The PoC Client SHALL include information on offered file (e.g., file name, file size, file type) as media parameters of the Discrete Media. MSRP itself does not need any extensions.

> NOTE 1: OMA IM specified file transfer mechanism is utilized.

NOTE 2:   This mechanism defines the SDP attribute extensions and usage conventions needed for meeting the requirements on file transfer services within SIP sessions using MSRP as the transfer protocol within the session.

4.42.4   Discrete Media Sender Identification

When the PoC Server performing the Controlling PoC Function receives a Discrete Media Burst, the PoC Server performing the Controlling PoC Function SHALL include the Discrete Media Burst sender's PoC Address and Nick Name, which were negotiated by the Discrete Media Burst sender during PoC Session initiation or available in the PoC Group data.

NOTE: The PoC Server does not always know the Nick Name, if the privacy is not requested by the sender.

In the case the PoC Address is restricted subclause 4.8 "*Privacy*" applies.

4.42.5   Discrete Media reports

4.42.5.1   General

When transferring Discrete Media, the PoC Server performing the Controlling PoC Function SHALL support Discrete Media Transfer Final Report and Discrete Media Transfer Progress Report.

If PoC Client supports Discrete Media it MAY support requesting transfer of Discrete Media Transfer Progress Reports and Discrete Media Transfer Final Reports and SHALL support providing information essential for the generation of Discrete Media Transfer Final Report and Discrete Media Transfer Progress Report, if requested.

When requesting transfer reports the PoC Client MAY request either Discrete Media Transfer Progress Report, Discrete Media Transfer Final Report or both. The PoC Client MAY request Discrete Media Transfer Final Report for any Discrete Media transfer irrespective of the transfer mode and MAY request Discrete Media Transfer Progress Report only for Discrete Media transfer using MSRP.

4.42.5.2   Requesting Discrete Media reports

The PoC Client sending the Discrete Media MAY request from the PoC Server performing the Controlling PoC Function, the Discrete Media Transfer Progress Report, Discrete Media Transfer Final Report or both at the PoC Session setup or at the PoC Session modification.

4.42.5.3   Discrete Media transfer progress information

If the PoC Client sending the Discrete Media has negotiated the use of Discrete Media Transfer Progress Report, the PoC Server performing the Controlling PoC Function SHALL provide the amount of data received per destination and error information, if reported at any destination to the PoC Client sending the Discrete Media.

In addition the PoC Server performing the Controlling PoC Function MAY provide the time stamp information.

4.42.5.4   Discrete Media transfer status collection and report creation

If Discrete Media Transfer Progress Report or Discrete Media Transfer Final Report or both are requested from the PoC Server performing the Controlling PoC Function by the PoC Client sending the Discrete Media, the PoC Server performing the Controlling PoC Function:

1.   SHALL request reports from the PoC Client(s) receiving the Discrete Media;

2.   SHALL provide Discrete Media Transfer Final Report or Discrete Media Transfer Progress Report or both per each PoC Client receiving the Discrete Media, as negotiated at PoC Session setup or at PoC Session modification; and,

3.   SHALL generate and transfer the reports to the PoC Client, which sent Discrete Media according to local policy.

4.43   PoC Media Traffic Optimisation

Traffic via the POC-4 reference point can be optimised by setting Media transmissions to unidirectional transmission: The Participating PoC Function MAY request the Controlling PoC Function to set Media transmission via the POC-4 reference point to unidirectional transmission from the Controlling PoC Function to the Participating PoC Function for PoC Clients with Media off hold.

The Controlling PoC Function indicates to the Participating PoC Functions whether it does not support traffic optimisation: If the Controlling PoC Function receives a request from the Participating PoC Function to set the Media transmission via the POC-4 reference point to unidirectional transmission for PoC Clients with Media off hold and if the Controlling PoC Function does not support POC-4 traffic optimisation then the Controlling PoC Function SHALL reject the request.

Traffic optimised Media are transferred from the PoC Server performing the Controlling PoC Function to the terminating PoC Server via the POC-4 reference point and distributed within the terminating PoC Server to the Participating PoC Functions of the terminating PoC Clients. In this case the Media transfer is set to unidirectional transmission for a PoC Client with Media off hold. The PoC Server performing the Participating PoC Function SHALL forward Media received from the Controlling PoC Function for PoC Clients with transmission via the POC-4 reference point set to bidirectional transmission. The forwarded Media SHALL have the same Media Parameters as those negotiated for the PoC Client with unidirectional transmission.

> NOTE: Bidirectional transmission is used for the Media transferred by the Controlling PoC Function to the Participating PoC Function and vice-versa, whereas unidirectional transmission refers to Media transferred by the Participating PoC Function to the Controlling PoC Function.

Figure 3 depicts the transfer and distribution of Media.

The PoC Media Traffic Optimisation cannot be used in PoC Session, in which the 1-many-1 communication method is used.
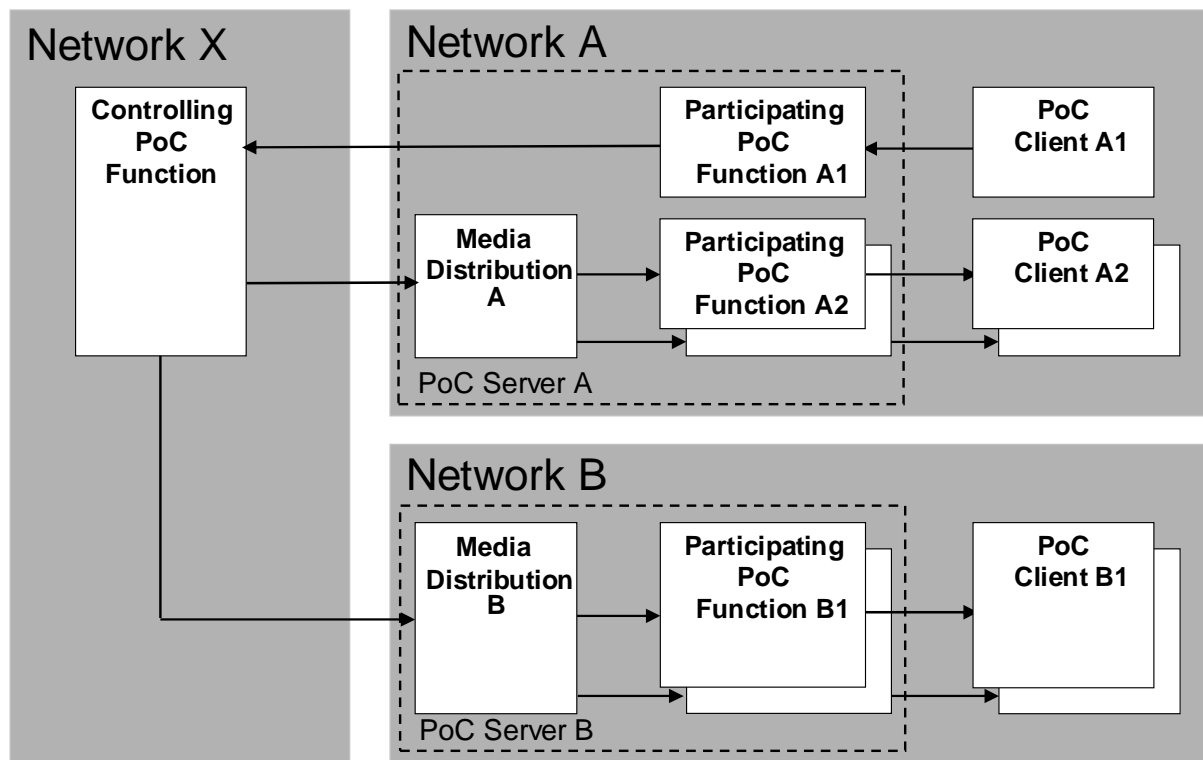
Figure 3: Media transfer and distribution when using PoC Media Traffic Optimisation

PoC Client A1 is sending PoC Media. The Media is forwarded by Participating PoC Function A1 to the Controlling PoC Function. The Controlling PoC Function forwards the Media to all PoC Servers providing Participating PoC Functions for the PoC Clients participating in the PoC Session. The PoC Servers Providing the Participating PoC Functions distribute the Media to all Participating PoC Functions except the Participating PoC Function of the sending PoC Client.

4.44   Lawful Interception (LI)

4.44.1   General

The following subclauses describe the PoC service related events and information elements that can be of interest to a Law Enforcement Agency, subject to regional and national laws.

The PoC service, its underlying network, or both SHOULD be able to provide the information identified herein in this document to a Law Enforcement Agency when required.

It MAY be required that when privacy or anonymity is invoked by an Identified PoC User, the available PoC Address information of all Participants in the PoC Session are provided to a Law Enforcement Agency.

   NOTE: A PoC Server performing the Participating PoC Function can obtain the PoC Addresses of Participants in the PoC Session via Participant Information even if Participants have requested privacy.

The combination of a unique identifier and a timestamp is a commonly used mechanism to assist with the proper correlation of the sequence of events during delivery to a Law Enforcement Agency. The assignment and management of the unique identifier is outside the scope of PoC.

When the SIP/IP Core corresponds with 3GPP IMS, the PoC lawful interception delivery is done as in the [3GPP TS 33.107] and [3GPP TS 33.108].

4.44.2 PoC Session Events and Informational Elements

This subclause describes the PoC events that can be of interest to a Law Enforcement Agency concerning origination and termination attempts, establishment, control, and release of PoC Sessions, including Instant Personal Alerts, for an Identified PoC User.

1. When the Identified PoC User attempts to initiate or receives an invitation to any type of PoC Session, or when the Identified PoC User sends or receives an Instant Personal Alert.

2. When the Identified PoC User answers an invitation to a PoC Session or if another PoC User answers an invitation from the Identified PoC User.

3. When the Identified PoC User's invitation is redirected to another service or PoC User (e.g., PoC Box).

4. When any PoC Session in which the Identified PoC User is involved is completed or when an initiation is abandoned or unsuccessful.

5. When a new PoC User is added to a PoC Session involving the Identified PoC User.

6. When the Identified PoC User joins and/or leaves any Chat PoC Group.

7. When the Media parameters (e.g., codec or Media Format) of any PoC Session in which the Identified PoC User is involved changes and the Identified PoC User's Participating PoC Function is aware of the change.

8. When there is a request for an addition or removal of a Media Stream for any PoC Session involving the Identified PoC User.

Informational elements for these events MAY include, but are not limited to the following:

1. Identities of the Identified PoC User (e.g., PoC Addresses).

2. Location of the Identified PoC User (at the beginning and end of PoC Sessions), if known by the PoC service.

3. Event type (e.g., origination, termination, Instant Personal Alert).

4. Identities of other PoC Users and/or PoC Groups involved in the PoC Session.

5. PoC Session Identities

6. PoC host identity

7. Media Type

8. Timestamp of the event.

4.44.3 Media Burst Control Events and Informational Elements

This subclause describes the Talk and Media Burst Control events of those Media Types used in PoC Sessions involving the Identified PoC User that can be of interest to a Law Enforcement Agency.

1. When the Identified PoC User requests permission to send Media.

2. When the Identified PoC User is granted permission to send Media and/or that permission is revoked.

3. If queuing is supported, when the Identified PoC User is queued, when any pre-emption of the Identified PoC User occurs, and when the Identified PoC User cancels his/her queued request.

Informational elements for these events MAY include, but are not limited to the following:

1. Identities of the Identified PoC User (e.g., PoC Address)

2. Identity of the Participant with the permission to send Media

3. Event type (e.g., request, revocation, grant, queue query)

4. PoC Session Identities.

5. RTP Timestamp of the event.

4.44.4 PoC Content

This subclause describes the Media Burst (i.e., PoC content) that can be of interest to a Law Enforcement Agency of those Media Types used in PoC Sessions involving the Identified PoC User .

Informational elements for the PoC content MAY include, but are not limited to the following:

1. Identities of the Identified PoC User (e.g., PoC Addresses).

2. Media Type.

3. RTP Timestamp of the Media Burst.

4. Media Burst.

4.45   Media buffering capability

4.45.1   General

The PoC Client MAY support Media buffering capability negotiation. The PoC Server MAY support Media buffering capability negotiation.

The PoC Client MAY support Limited Segment Media Buffer preload capability. The PoC Server MAY support Limited Segment Media Buffer preload capability by the PoC Client.

The PoC Client MAY support Media Time Compression of buffered Media. The PoC Server MAY support Media Time Compression of buffered Media by the Client.

NOTE: Media Time Compression results in more Media details per time. To avoid loss of Media details it is recommended not to employ Media Time Compression if low quality Media codecs are used.

The PoC Server performing the Controlling PoC Function MAY determine when to instruct the PoC Client to transmit Media based on the Transmit Media Buffering capability indicated by the PoC Client (i.e the PoC Server may delay instructing the PoC Client to transmit Media in the Unconfirmed Indication scenario when the PoC Client is able to buffer the Media).

The PoC Server SHOULD support controlling the transmitted Media data rate based on the Receive Media Processing capability indicated by the PoC Client (i.e the PoC Server is able to transmit the Media at a data rate that the PoC Client is able to handle).

4.45.2   PoC Client Transmit Media Buffering capability

The PoC Client MAY indicate information on its Transmit Media Buffering capabilities for each Media Stream to the Home PoC Server when establishing a Pre-established Session, and the PoC Server performing the Controlling PoC Function when establishing an On-demand Session or when modifying the Media capabilities. The PoC Client MAY indicate to the PoC Server the following information:

- Limited Segment Media Buffer preload support

- Media Time Compression support

- Maximum transmit data rate

- Transmit Media buffer size

- Media Time Compression factor

NOTE: It is not necessary for PoC Clients supporting Media buffering capability negotiation to indicate Media buffering capability for those Media Types not requiring Media buffering.

4.45.3 PoC Client Receive Media Processing Capability

The PoC Client MAY indicate information on its Receive Media Processing Capabilities for each Media Type to the Home PoC Server when establishing a Pre-established Session, establishing an On-demand Session or when modifying the Media capabilities. The PoC Client MAY indicate to the PoC Server the "Maximum receive data rate".

4.45.4 PoC Server Media processing handling

If the PoC Client has informed the PoC Server performing the Controlling PoC Function about its Transmit Media Buffering capabilities, the PoC Server performing the Controlling PoC Function MAY use the information indicated by the PoC Client about its "Transmit Media buffer size", "Media Time Compression factor" and "Maximum transmit data rate" to determine when to instruct the PoC Client to transfer Media to the PoC Sever. If the PoC Client has indicated Limited Segment Media Buffer preload support the PoC Server performing the Controlling PoC Function MAY instruct the PoC Client to transmit a Limited Segment of its Media buffer prior to instructing the PoC Client to transfer the rest of its Media.

In the case of a Pre-established Session where the PoC Client has informed the Home PoC Server about its Transmit Media Buffering Capabilities, the Home PoC Server MAY forward the PoC Client's Transmit Media Buffering Capabilities to the PoC Server performing the Controlling PoC Function.

If the PoC Client has informed the PoC Server about its Receive Media Processing Capabilities, the PoC Server SHOULD transfer the Media with data rate not higher than "Maximum receive data rate" indicated by the PoC Client.

4.46 Multiple Continuous Media synchronization

The PoC Client sending multiple Continuous Media that are synchronized SHALL send Sender Report according to rules and procedures of [RFC3550].

NOTE: In order to allow the receiving PoC Client to synchronize the Media Bursts, the sending PoC Client needs to send the Sender Report as soon as possible after receiving the Media Burst Confirm.

4.47 Multiple registered PoC Address determination

The PoC Server performing the Participating PoC Function SHALL determine the PoC Addresses used by the same PoC Client.

5. High level procedures (Informative)

The flow charts in the following subclauses 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. Call flows does not indicate whether information elements are mandatory or optional.

The interworking between the PoC Server and the Shared XDM Servers is not described in the high level procedure but can be assumed to take place depending on implementation either prior to the flow takes place or when the flow takes place.

Information stored in the Shared XDM Servers is needed when:

- Inviting PoC Users to a Pre-arranged PoC Group.

- Adding PoC Users to an ongoing Pre-arranged PoC Group or a Chat PoC Group.

- When a PoC User is joining a Pre-arranged PoC Group or a Chat PoC Group for Access Control.

- When performing Access Control on terminating side before inviting a PoC User to a PoC Session.

- Sending a Group Advertisement to a Pre-arranged PoC Group or a Chat PoC Group.

5.1   Pre-established Session

5.1.1   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, Media Type and Talk Burst Control and/or Media Burst Control messages 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 can be established after the initial registration. The Figure 4 *"Pre-established Session"* presents the high level description of the Pre-established Session procedure.
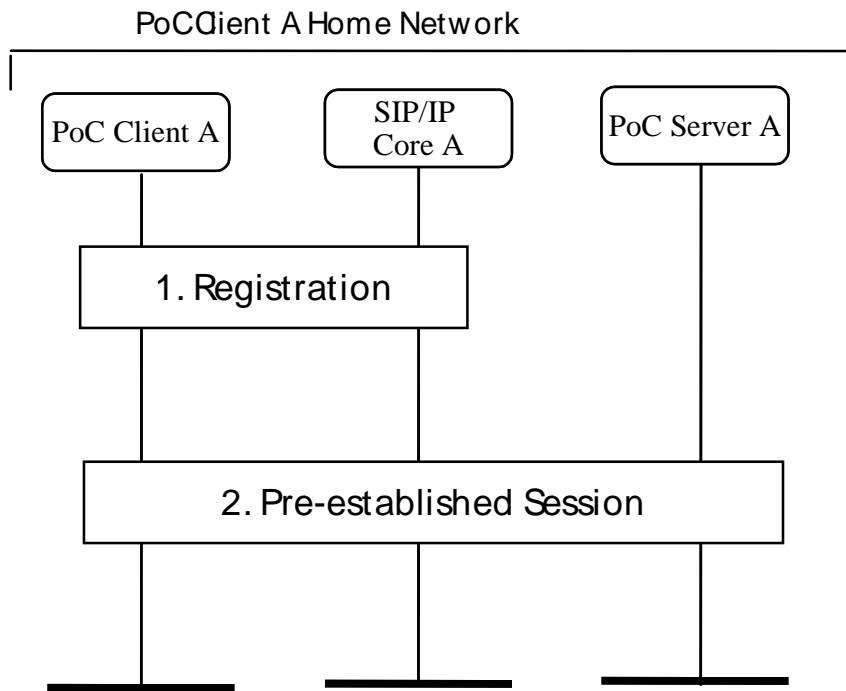
Figure 4: Pre-established Session

0. The PoC Client registers to the SIP/IP Core. The registration is described in the subclause 4.5 *"Registration"*.

1. 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 is established the PoC Client is able to activate media bearer whenever needed:

    - immediately after the Pre-established Session procedure or;

    - when the actual SIP signalling for the PoC Session is initiated.

5.1.2   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 5 *"Pre-established Session"* presents the Pre-established Session establishment flow.
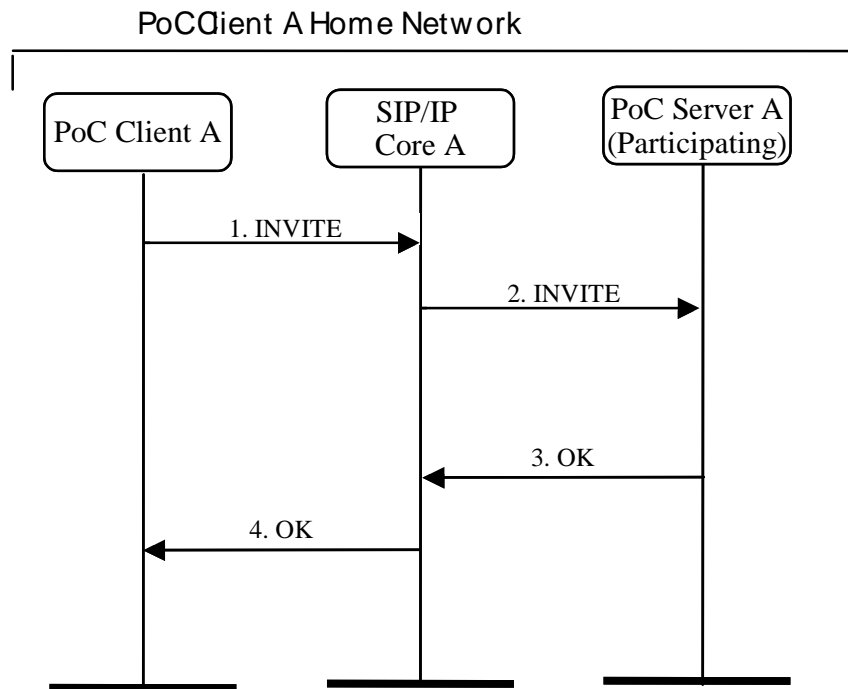
Figure 5: Pre-established Session

1. The PoC Client sends an INVITE request to the SIP/IP Core containing a PoC indication.

    Information elements contained in INVITE request:

    a. Participating function URI

    b. Media Parameters of PoC Client A for inactive media stream(s)

    c. PoC service indication

    d. PoC Address of the PoC User at the PoC Client A

    e. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

    f. Media-floor Control Entities proposal.

    g. Desired QoE Profile.

2. The SIP/IP Core forwards the request to the PoC Server based on the PoC service indication and the Participating Function URI in the request.

    Information elements contained in INVITE request:

    a. Participating function URI

    b. Media Parameters of PoC Client A with inactive media stream(s)

    c. PoC Service indication

    d. PoC Address of the PoC User at the PoC Client A

    e. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

    f. Media-floor Control Entities proposal.

    g.   Desired QoE Profile

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

    Information elements contained in OK response:

    a.   Media Parameters of PoC Server A

    b.   A conference URI that identifies the Pre-established Session

    c.   Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

    d.   Media-floor Control Entities response.

    e.   QoE Profile for the Pre-established session.

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

    Information elements contained in OK response:

    a.   Media Parameters of PoC Server A

    b.   A conference URI that identifies the Pre-established Session

    c.   Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

    d.   Media-floor Control Entities response if a proposal for Media-floor Control Entities was included in the request.

    e.   QoE Profile for the Pre-established session.

The procedure for establishing a PoC Session with other users within the Pre-established Session is described in the subclause 5.2 *"Ad-hoc PoC Group Session and 1-1 PoC Session setup"* and in the subclause 5.3 *"Pre-arranged PoC Group Session setup"*.

5.2   Ad-hoc PoC Group Session and 1-1 PoC Session setup

In the Ad-hoc PoC Group Session setup one PoC User selects several other PoC Users, or Pre-arranged PoC Groups, or both 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 User is invited by the inviting PoC User.

5.2.1   Ad-hoc PoC Group Session invitation from PoC Client

In the following subclauses different setup scenarios are described from the Inviting PoC Client point of view.

Chapter 5.2.1.1 *"Confirmed indication using On-demand Session"* describes a case where right-to-speak indication is given to the inviting PoC User when one of the Invited PoC Users has accepted the invitation using On-demand Session establishment.

Chapter 5.2.1.2 *"Unconfirmed Indication using On-demand Session"* describes a case where right-to-speak indication is given to the inviting PoC User when the Invited PoC User is registered and uses automatic answer.

Chapter 5.2.1.3 *"Confirmed indication using Pre-established Session"* describes a case where right-to-speak indication is given to the inviting PoC User when one of the Invited PoC Users has accepted the invitation and the Inviting PoC Client has Pre-established Session.

Chapter 5.2.1.4 *"Unconfirmed Indication using Pre-established Session"* describes a case where right-to-speak indication is given to the inviting PoC User when one of the Invited PoC Users is registered and uses automatic answer and the inviting PoC User has a Pre-established Session.

5.2.1.1   Confirmed Indication using On-demand Session

This subclause describes a case where right-to-speak indication is given to the inviting PoC User when one of the Invited PoC Users has accepted the invitation and the final response is not sent before the first accepted indication from the terminating network is received. Figure 6 *"Confirmed indication using On-demand Session"* shows the signalling flow for this scenario.

Figure 6: Confirmed 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 Users;

    b. Media Parameters of PoC Client A

    c. PoC Service indication

    d. PoC Address of the PoC User at the PoC Client A

    e. A manual answer override request

f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

g. Media-floor Control Entities proposal.

h. Desired QoE Profile.

i. Media included in the request.

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

Information elements contained in INVITE request:

a. A list of PoC Addresses of Invited PoC Users;

b. Media Parameters of PoC Client A

c. PoC service indication

d. PoC Address of the PoC User at the PoC Client A

e. Manual answer override request, if selected by PoC Client A

f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

g. Media-floor Control Entities proposal.

h. Desired QoE Profile.

i. Media included in the request.

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 Controlling PoC Function and Participating PoC Function. The PoC Server A (participating & controlling) sends invitations to the PoC Clients of the Invited PoC Users as described in the subclause 5.2.2 "*Ad-hoc PoC Group session invitation to the PoC Client*". When the first ALERTING response is received the PoC Server A (participating & controlling) sends ALERTING response towards the PoC Client A, when the final response OK is not yet sent.

4. SIP/IP Core A forwards the ALERTING response to the PoC Client A.

5. 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 supported Media Types in the OK response can depend on the local policy independent of the supported Media Types contained in the first acceptance response received by the PoC Server A (participating & controlling). The OK response includes the following information:

Information elements contained in OK response:

a. Media Parameters of PoC Server A (participating & controlling)

b. Selected Talk Burst Control and/or Media Burst Control Protocol Protocol.

c. Media-floor Control Entities response

d. QoE Profile for the PoC Session

6. 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)

b. Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

      c.   Media-floor Control Entities response

      d.   QoE Profile for the PoC Session

7.   Since one Participant is connected, the PoC Server A (participating & controlling) sends the Talk Burst confirm response to the PoC Client A.

8.   The PoC Client A sends media to the PoC Server A (participating & controlling).

If none of the Invited PoC Users accepts the invitation, the PoC Server A (participating & controlling) rejects the PoC Session.

The negotiated Media Types of Participants in the PoC Session can be obtained as described in the subclause 5.10 *"Subscription to Participant information"*.

5.2.1.2   Unconfirmed Indication using On-demand Session

This subclause describes a case where right-to-speak indication is given to the inviting PoC User when one of the Invited PoC Users is registered and uses automatic answer. In this case the PoC Server sends the final response after receiving the first auto-answer response from the terminating side and adds the Unconfirmed Indication to the final response. In this case the media buffering is supported and the Talk Burst confirm is sent after the first auto answer response is received. If buffering is not supported the Talk Burst confirm is sent after the first response to the invitation is received.

Figure 7 *"Unconfirmed Indication using On-demand Session"* shows the signalling flow for this scenario.
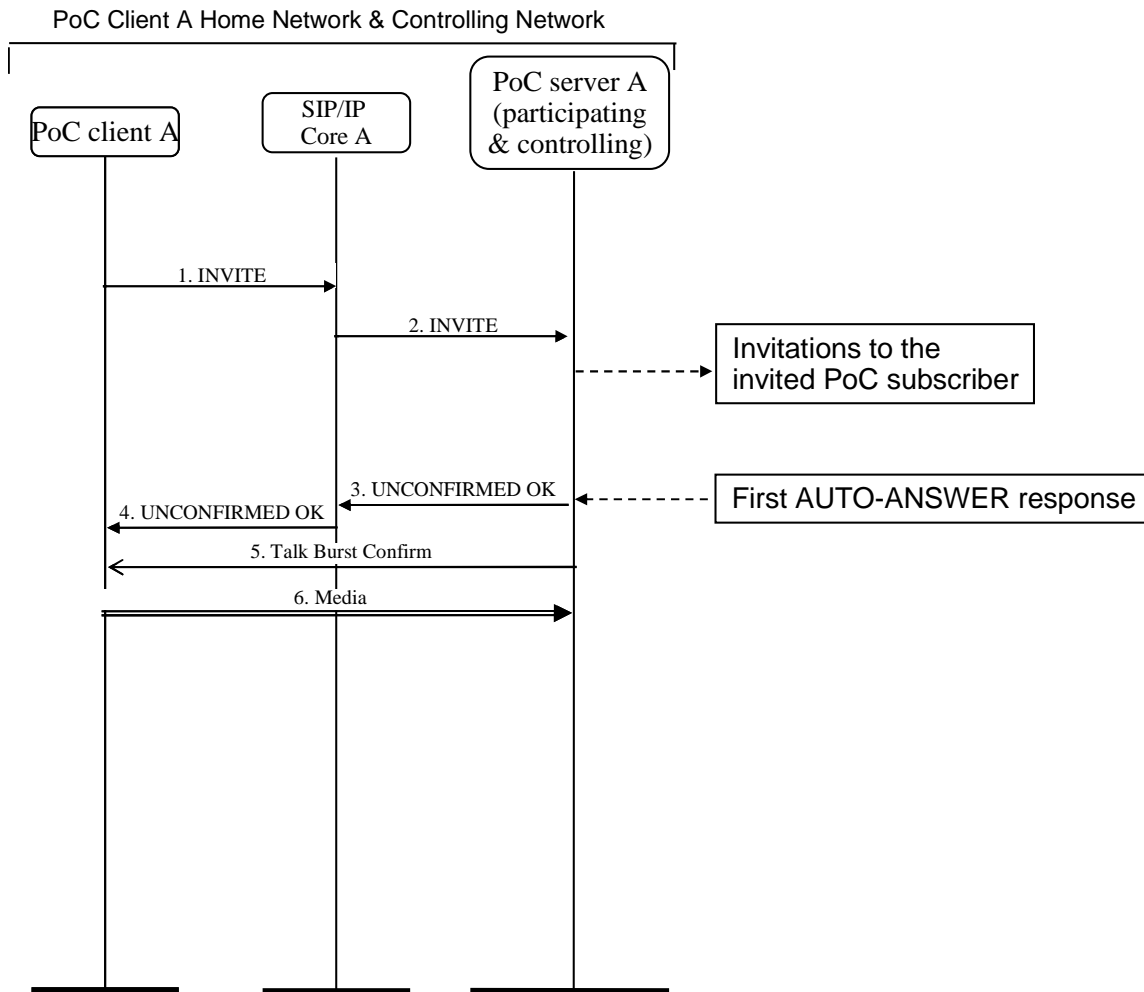
Figure 7: Unconfirmed Indication using On-demand Session

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 Users;

   b.   Media Parameters of PoC Client A

   c.   PoC service indication

   d.   PoC Address of the PoC User at the PoC Client A

   e.   A manual answer override request

   f.   Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

   g.   Media-floor Control Entities proposal.

   h.   Desired QoE Profile.

   i.   Media included in the request.

2. SIP/IP Core A routes the INVITE request to the PoC Server A (participating & controlling) based on PoC Address of inviting PoC User at the PoC Client and PoC Service indication.

   Information elements contained in INVITE request:

   a. A list of PoC Addresses of Invited PoC Users;

   b. Media Parameters of PoC Client A

   c. PoC Service indication

   d. PoC Address of the PoC User at the PoC Client A

   e. Manual answer override request, if selected by PoC Client A

   f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

   g. Media-floor Control Entities proposal.

   h. Desired QoE Profile.

   i. Media included in the request.

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 Controlling PoC Function and Participating PoC Function. The PoC Server A (participating and controlling) sends invitations to the PoC Clients of the Invited PoC Subscribers as described in the subclause 5.2.2 "*Ad-hoc PoC Group Session invitation to the PoC Client*". 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 Users are yet connected in the PoC Session. The supported Media Types in the UNCONFIRMED OK response can depend on the local policy independent of the supported Media Types contained in the first AUTO-ANSWER response received by the PoC Server A (participating & controlling).

   Information elements contained in UNCONFIRMED OK response:

   a. Media Parameters of PoC Server A (participating & controlling)

   b. Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

   c. Media-floor Control Entities response.

   d. QoE Profile for the PoC Session

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)

   b. Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

   c. Media-floor Control Entities response.

   d. QoE Profile for the PoC Session

5. The PoC Server A (participating & controlling) sends the message Talk Burst confirm response 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.

If none of the Invited PoC Users accepts the invitation, the PoC Server A (participating & controlling) rejects the PoC Session.

The negotiated Media Types of Participants in the PoC Session can be obtained as described in the subclause 5.10 *"Subscription to Participant information"*.

5.2.1.2A Unconfirmed Indication using On-demand Session and PoC Client buffering

This subclause describes a case where the PoC Client has the ability to perform Media buffering and communicates the buffering capability to the PoC Server. In this case the PoC Client includes an indication of its ability to perform buffering and its buffer size in the INVITE request and the PoC Server sends the final response after receiving the first auto-answer response from the terminating side and adds the Unconfirmed Indication to the final response along with and indication of permission for the PoC Client to buffer the Media. Upon receiving the first Confirmed response the PoC server will send the Talk Burst Confirm and in this case the PoC Server does not perform media buffering.

Figure 8 *"Indication using On-demand Session with PoC Client buffering"* shows the signalling flow for this scenario.
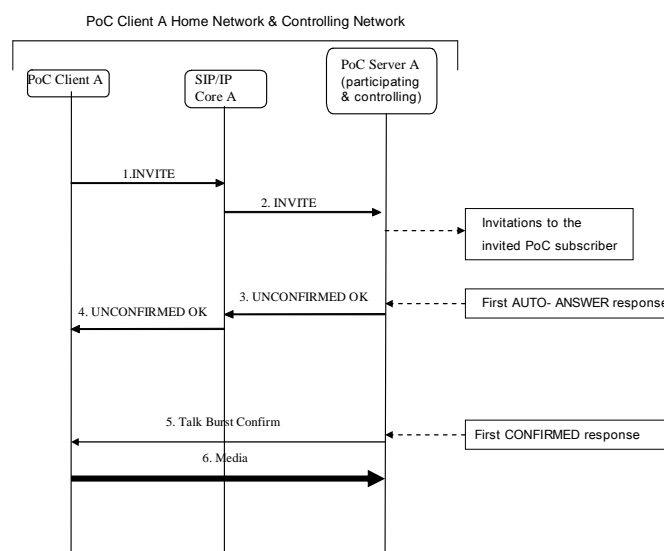
Figure 8: Indication using On-demand Session with PoC Client buffering

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. The PoC Client is buffering Media from the PoC User.

   Information elements contained in INVITE request:

   a. A list of PoC Addresses of Invited PoC Users;

   b. Media Parameters of PoC Client A

   c. PoC service indication

   d. PoC Address of the PoC User at the PoC Client A

   e. A manual answer override request

   f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

   g. Media-floor Control Entities proposal.

   h. Desired QoE Profile.

      i.   Client buffer size and indication.

      j.   Media included in the request.

2.   SIP/IP Core A routes the INVITE request to the PoC Server A (participating & controlling) based on PoC Address of inviting PoC User at the PoC Client and PoC Service indication.

    Information elements contained in INVITE request:

    a.   A list of PoC Addresses of Invited PoC Users;

    b.   Media Parameters of PoC Client A

    c.   PoC Service indication

    d.   PoC Address of the PoC User at the PoC Client A

    e.   Manual answer override request, if selected by PoC Client A

    f.   Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

    g.   Media-floor Control Entities proposal.

    h.   Desired QoE Profile.

    i.   Client buffer size and indication.

    j.   Media included in the request.

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 Controlling PoC Function and Participating PoC Function. The PoC Server A (participating and controlling) sends invitations to the PoC Clients of the Invited PoC Subscribers as described in the subclause 5.2.2 "*Ad-hoc PoC Group Session invitation to the PoC Client*". 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 Users are yet connected in the PoC Session and providing an indication of permission for the PoC Client to continue to perform Media buffering. The supported Media Types in the UNCONFIRMED OK response can depend on the local policy independent of the supported Media Types contained in the first AUTO-ANSWER response received by the PoC Server A (participating & controlling).

    Information elements contained in UNCONFIRMED OK response:

    a.   Media Parameters of PoC Server A (participating & controlling)

    b.   Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

    c.   Media-floor Control Entities response.

    d.   QoE Profile for the PoC Session

    e.   Client buffering permission indication

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)

    b.   Selected Talk Burst Control Protocol and/or Media Burst Control Protocol.

    c.   Media-floor Control Entities response.

    d.   QoE Profile for the PoC Session

    e. Client buffering permission indication

5. The PoC Server A (participating & controlling) receives the first confirmed response from the terminating side and sends the message Talk Burst confirm response 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) send the Media to the Invited PoC Clients that are connected.

If none of the Invited PoC Users accepts the invitation, the PoC Server A (participating & controlling) rejects the PoC Session.

The negotiated Media Types of Participants in the PoC Session can be obtained as described in the subclause 5.10 *"Subscription to Participant information"*.

5.2.1.2B Unconfirmed Indication using On-demand Session and PoC Client buffering with Limited Segment preload

This subclause describes a case where the PoC Client supports the Limited Segment preload and has the ability to perform Media buffering and communicates the buffering capability to the PoC Server. In this scenario the PoC Server also supports the ability to buffer Media of a limited size. In this case the PoC Client includes an indication of its ability to perform buffering, its buffer size and an indication of Limited Segment preload support in the INVITE request and the PoC Server sends the final response after receiving the first auto-answer response from the terminating side and adds the Unconfirmed Indication to the final response along with and indication of permission for the PoC Client to buffer the Media and the right to send a Limited Segment of Media of specified size to be buffered at the PoC Server. Upon receiving the first Confirmed response the PoC server will send the Talk Burst Confirm and in this case the media buffering in the PoC Server is limited to the size of the Limited Segment preload.

Figure 9 *"Unconfirmed Indication using On-demand Session with PoC Client buffering and Limited Segment preload"* shows the signalling flow for this scenario.
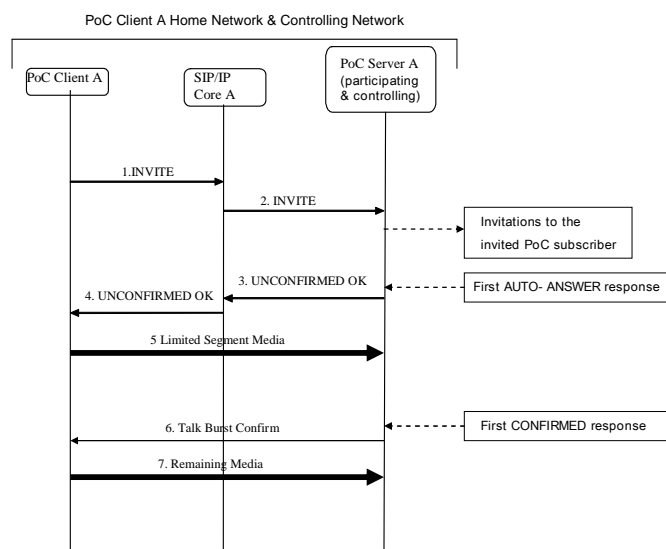

Figure 9: Unconfirmed Indication using On-demand Session with PoC Client buffering and Limited Segment preload

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. The PoC Client is buffering Media from the PoC User.

Information elements contained in INVITE request:

a. A list of PoC Addresses of Invited PoC Users.

b. Media Parameters of PoC Client A.

c. PoC service indication.

d. PoC Address of the PoC User at the PoC Client A.

e. A manual answer override request.

f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

g. Media-floor Control Entities proposal.

h. Desired QoE Profile.

i. Client buffer size and indication.

j. Limited Segment preload indication.

k. Media included in the request.

2. SIP/IP Core A routes the INVITE request to the PoC Server A (participating & controlling) based on PoC Address of inviting PoC User at the PoC Client and PoC Service indication.

Information elements contained in INVITE request:

a. A list of PoC Addresses of Invited PoC Users.

b. Media Parameters of PoC Client A.

c. PoC Service indication.

d. PoC Address of the PoC User at the PoC Client A.

e. Manual answer override request, if selected by PoC Client A.

f. Talk Burst Control Protocol and/or Media Burst Control Protocol proposal.

g. Media-floor Control Entities proposal.

h. Desired QoE Profile.

i. Client buffer size and indication.

j. Limited Segment preload indication.

k. Media included in the request.

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 Controlling PoC Function and Participating PoC Function. The PoC Server A (participating and controlling) sends invitations to the PoC Clients of the Invited PoC Subscribers as described in the subclause 5.2.2 "*Ad-hoc PoC Group Session invitation to the PoC Client*". 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 Users are yet connected in the PoC Session and providing an indication of permission for the PoC Client to continue to perform Media buffering and to send a Limited Segment of Media up to a specified size (the size of Limited Segment specified must be sufficiently large to cover the worst case round trip for sending a Talk Burst confirm message and receiving the first Media packet). The supported Media Types in the UNCONFIRMED OK response can depend on the local policy independent of the supported Media Types contained in the first AUTO-ANSWER response received by the PoC Server A (participating & controlling).