

3GPP TSG-SA5 (Telecom Management)

S5-054116

Email approved on 10 dec 2004

Title: LS response on work split for PoC charging between OMA, 3GPP2 and 3GPP
Response to: LS from OMA MCC on PoC charging standardisation work split between OMA, 3GPP and 3GPP2 (OMA-MCC-2004-0172R02 / S5-050014)
Release: Release 6
Work Item: CH, PoC-CH

Source: 3GPP SA5
To: OMA MCC WG
Cc: 3GPP SA, OMA PoC WG, 3GPP2 TSG-X
Cc: 3GPP/OMA Co-ordinator, SHARP Iain (iain.sharp@nortelnetworks.com)

Contact Person

Name: Karl-Heinz NENNER
Tel. Number: +49 228 936 18448
E-mail Address: karl-heinz.nenner@t-mobile.net

Attachments: S5-044713 [Draft TS 32.272v0.3.0 on PoC Charging]

1. Overall Description:

3GPP SA5 thank OMA MCC for the proposal on splitting the PoC charging work between OMA, 3GPP2 and 3GPP contained in OMA-MCC-2004-0172R02.

SA5 agree with OMA MCC's proposals and share the view that the work split is currently limited to PoC charging. SA5 has initiated work on a Technical Specification 3GPP TS 32.272 on PoC charging along the requirements defined by OMA MCC and OMA PoC. The attached document is an early draft for PoC charging. SA5 welcome OMA MCC's planned review of this draft and expects great benefits from feedback.

As indicated in OMA MCC's liaison, updates to other 3GPP TSs, especially TS 32.299, are also necessary in order to fully accommodate PoC charging. Due to the modular design of the 3GPP charging TSs, the updates would be minimal and timely available.

In order to further promote the joint effort on PoC charging and alignment of future charging work, members of 3GPP SA5 SWGB (Charging) will attend the 2nd joint workshop with OMA MCC and 3GPP TSG-X as per the invitation contained in OMA-MCC-2004-0190R01.

2. Actions:

To OMA MCC group.

ACTION: 3GPP SA5 kindly ask OMA MCC to review the attached draft TS and provide comments

3. Date of Next SA5 Meetings:

TITLE	TYPE	DATES	LOCATION	CTRY
3GPP SA5#40bis	WG	11 to 13 Jan 2005	Sophia Antipolis	FR
3GPP SA5#41	WG	24 to 28 Jan 2005	Lisbon	PT

Presentation of Specification to TSG or WG

Presentation to: 3GPP TSG SA WG5 (SWG-B)

Document for presentation: TS 32.272, Version 0.3.0

Presented for: -

Abstract of document:

TS 32.272 is the 3GPP Push to talk over Cellular (PoC) Charging TS for Rel-6.

Changes to the TS draft since last version as presented in 3GPP TSG SA5 Meeting #38-Bis:

- -
-

Outstanding Issues:

- Message flows in clause 5.
 - Detailed stage 3 description
-

Contentious Issues:

None

3GPP TS 32.272 V0.32.0 (2004-1109)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Service and System Aspects; Telecommunication management; Charging Management; Push-to-Talk over Cellular (PoC) charging; (Release 6)



The present document has been developed within the 3rd Generation Partnership Project (3GPPTM) and may be further elaborated for the purposes of 3GPP.

The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification. Specifications and reports for implementation of the 3GPPTM system should be obtained via the 3GPP Organizational Partners' Publications Offices.

Keywords

charging, accounting, management, [PoC](#)

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© 2004, 3GPP Organizational Partners (ARIB, CCSA, ETSI, T1, TTA, TTC).
All rights reserved.

Contents

Foreword.....	5
1 Scope.....	6
2 References.....	7
3 Definitions, symbols and abbreviations.....	10
3.1 Definitions.....	10
3.2 Abbreviations.....	13
3.3 Symbols.....	16
4 Architecture Considerations.....	18
4.1 High level PoC architecture.....	18
4.1 PoC Functional Entities.....	18
4.1.1 PoC Client.....	18
4.1.2 PoC Server.....	19
4.2 PoC offline charging architecture.....	21
4.3 PoC online charging architecture.....	22
5 PoC charging principles and scenarios.....	23
5.1 PoC charging principles.....	23
5.2 PoC offline charging scenarios.....	24
5.2.1 Basic principles.....	24
5.2.2 Diameter message flows.....	24
5.2.2.1 Message Flows - Successful Cases and Scenarios.....	25
5.2.2.1.1 Successful PoC session Establishment.....	25
5.2.3 CDR generation.....	26
5.2.4 GTP' record transfer flows.....	26
5.2.5 B _T CDR file transfer.....	26
5.3 PoC online charging scenarios.....	26
5.3.1 Basic principles.....	26
5.3.2 Diameter message flows.....	27
6 Definition of charging information.....	28
6.1 Data description for PoC offline charging.....	28
6.1.1 Diameter message contents.....	28
6.1.1.1 Summary of Offline Charging Message Formats.....	28
6.1.1.2 Structure for the Accounting Message Formats.....	28
6.1.1.2.1 Accounting-Request Message.....	28
6.1.1.2.2 Accounting-Answer Message.....	29
6.1.2 GTP' message contents.....	29
6.1.3 CDR description on the B _T interface.....	30
6.1.3.1 CDR Field Types.....	30
6.1.3.2 CDR Triggers.....	30
6.1.3.2.1 PoC Session Related CDRs.....	30
6.1.3.2.2 Session Unrelated CDRs.....	30
6.1.3.3 PoC CDR Content.....	30
6.1.3.3.1 Participating PoC Server.....	30
6.1.3.3.2 Controlling PoC Server.....	32
6.2 Data description for PoC online charging.....	34
6.2.1 Diameter message contents.....	34
6.2.1.1 Summary of Online Charging Message Formats.....	34
6.2.1.2 Structure for the Credit Control Message Formats.....	34
6.2.1.2.1 Credit-Control-Request Message.....	35
6.2.1.2.2 Credit-Control-Answer Message.....	35
6.2.2 AVPs for PoC Online Charging on the Ro interface.....	36
6.2.2.1 Definition of the PoC-Information AVP.....	36
6.2.2.2 Use of PS-Information AVP.....	37
6.2.2.3 Use of IMS-Information AVP.....	37

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is part of a series of documents that specify charging functionality and charging management in GSM/UMTS networks. The GSM/UMTS core network charging architecture and principles are specified in 3GPP TS 32.240 [1], which provides an umbrella for other charging management TSs that specify:

- the content of the CDRs per domain and subsystem (offline charging);
- the content of real-time charging messages per domain / subsystem (online charging);
- the functionality of online and offline charging for those domains and subsystems;
- the interfaces that are used in the charging framework to transfer the charging information (i.e. CDRs or charging events).

The complete document structure for these TSs is defined in TS 32.240 [1].

The present document specifies the Offline and Online Charging description for the "Push-to-Talk over Cellular" (PoC) service, based on the functional description of the PoC service in 3GPP T [R 23.979 "3GPP enablers for OMA PoC Services" \[200\]](#), in [OMA-AD-POC "Push to talk over Cellular \(PoC\) Architecture" \[203\]](#), in [OMA-CP-POC "OMA PoC Control Plane" \[204\]](#) and in [OMA-UP-POC: "OMA PoC User Plane" \[205\]](#) ~~S{s} aaa [2xy]{, bbb [2ab] and eee [2ed]}~~, respectively ~~(OMA???)~~. This charging description includes the offline and online charging architecture and scenarios specific to PoC, as well as the mapping of the common 3GPP charging architecture specified in TS 32.240 [1] onto the PoC service. It further specifies the structure and content of the CDRs for offline charging, and the charging events for online charging. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1];
- The parameters, abstract syntax and encoding rules for the CDRs are specified in TS 32.298 [51];
- A transaction based mechanism for the transfer of CDRs within the network is specified in TS 32.295 [54];
- The file based mechanism used to transfer the CDRs from the network to the operator's billing domain (e.g. the billing system or a mediation device) is specified in TS 32.297 [52];
- The 3GPP Diameter application that is used for PoC offline and online charging is specified in TS 32.299 [50].

All references, abbreviations, definitions, descriptions, principles and requirements, used in the present document, that are common across 3GPP TSs, are defined in the 3GPP Vocabulary, TR 21.905 [100]. Those that are common across charging management in GSM/UMTS domains or subsystems are provided in the umbrella document TS 32.240 [1] and are copied into clause 3 of the present document for ease of reading. Finally, those items that are specific to the present document are defined exclusively in the present document.

2 References

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

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

a) The 3GPP charging specifications

- [1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging Architecture and Principles".
- [2]-[9] Void.
- [10] 3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".
- [11] 3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".
- [12] 3GPP TS 32.252: "Telecommunication management; Charging management; Wireless Local Area Network (WLAN) charging".
- [13]-[19] Void.
- [20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".
- [21]-[29] Void.
- [30] 3GPP TS 32.270: "Telecommunication management; Charging management; Multimedia Messaging Service (MMS) charging".
- [31] 3GPP TS 32.271: "Telecommunication management; Charging management; Location Services (LCS) charging".
- [32]-[49] Void.
- [50] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application".
- [51] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) parameter description".
- [52] 3GPP TS 32.297: "Telecommunication management; Charging management; Charging Data Record (CDR) file format and transfer".
- [53] 3GPP TS 32.296: "Telecommunication management; Charging management; Online Charging System (OCS) applications and interfaces".
- [54] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".
- [55]-[69] Void.

b) other charging specifications

[70] ITU-T Recommendation D.93: "Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)".

[71]-[99] Void.

c) Common 3GPP specifications

[100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[101] 3GPP TS 22.101: "Service aspects; Service Principles".

[102] 3GPP TS 22.115: "Service aspects; Charging and billing".

[103] 3GPP TS 23.002: "Network Architecture".

[104] 3GPP TS 23.003: "Numbering, addressing and identification".

[105] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[106]-[199] Void.

d) other Domain and Service specific 3GPP / OMA / ETSI specifications

[200] 3GPP TRS 23.979: ~~3GPP enablers for OMA PoC Services~~. ~~Push to talk over cellular architecture~~

[201] 3GPP TS 23.228: "Functional stage 2 description of IMS".

[202] 3GPP TS 24.228: "Signaling flows for the IP multimedia call control based on SIP and SDP, Stage 3"

[203] OMA-AD-POC: "Push to talk over Cellular (PoC) Architecture"

[204] OMA-CP-POC: "OMA PoC Control Plane"

[205] OMA-UP-POC: "OMA PoC User Plane"

~~Ö Ö~~

~~Editor's note: PoC specific references to be added here (OMA PoC AD, RD, SA2 3GPP TR PoC ⇔ 3GPP network, Ö)~~

[206]-[299] Void.

e) Relevant ITU Recommendations

[300] ITU-T Recommendation D.93: "Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)".

[301]-[309] Void.

[310] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[311]-[329] Void.

[330] ITU-T Recommendation Q.767: "Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".

[331]-[349] Void.

[350] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[351] ITU-T Recommendation X.121: "International numbering plan for public data networks".

[352]-[399] Void.

f) Relevant IETF RFCs

- [400] IETF RFC 959 (1985): "File Transfer Protocol".
- [401] [IETF RFC 3588 \(2003\)](#): "Diameter Base Protocol"
- [402] IETF Internet-Draft "Diameter Credit Control Application"
- [403] IETF RFC 783 ([1981](#)): "Trivial File Transfer Protocol (TFTP)"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions given in 3GPP TR 21.905 [50], 3GPP TS 32.240 [1], and the following apply:

Editor's note: to be completed / remove unnecessary material

2G- / 3G-: prefixes 2G- and 3G- refers to functionality that supports only GSM or UMTS, respectively, e.g. 2G-SGSN refers only to the GSM functionality of an SGSN.

accounting: process of apportioning charges between the Home Environment, Serving Network and User.

accounting meter record: record containing one or more counters employed to register the usage of resources en masse. Includes simple event counters and/ or cumulative call second counters.

advice of charge: real-time display of the network utilisation charges incurred by the Mobile Station. The charges are displayed in the form of charging units. If a unit price is stored by the MS then the display may also include the equivalent charge in the home currency.

aoc service: combination of one or more services, both basic and supplementary, together with a number of other charging relevant parameters to define a customised service for the purpose of advice of charge.

billing: function whereby CDRs generated by the charging function are transformed into bills requiring payment.

Billing Domain: Part of the operator network, which is outside the core network, that receives and processes charging information from the core network charging functions. It includes functions that can provide billing mediation and billing end applications.

CAMEL: network feature that provides the mechanisms to support operator specific services even when roaming outside HPLMN.

CAMEL subscription information: identifies a subscriber as having CAMEL services.

CDR field Categories: the CDR fields are defined in the present document. They are divided into the following categories:

- **Mandatory:** field that shall be present in the CDR.
- **Conditional:** field that shall be present in a CDR if certain conditions are met.
- **Operator Provisionable: Mandatory:** A field that operators have provisioned to be included in the CDR for all conditions.
- **Operator Provisionable: Conditional:** A field that operators have provisioned to be included in the CDR if certain conditions are met.
- **chargeable event:** activity utilizing telecommunications network infrastructure and related services for:
 - user to user communication (e.g. a single call, a data communication session or a short message); or
 - user to network communication (e.g. service profile administration); or
 - inter-network communication (e.g. transferring calls, signalling, or short messages); or
 - mobility (e.g. roaming or inter-system handover); and
 - that the network operator wants to charge for.

charged party: user involved in a chargeable event who has to pay parts or the whole charges of the chargeable event, or a third party paying the charges caused by one or all users involved in the chargeable event, or a network operator.

charging: function whereby information related to a chargeable event is formatted and transferred in order to make it

possible to determine usage for which the charged party may be billed.

Charging Data Record (CDR): record generated by a network element for the purpose of billing a subscriber for the provided service. It includes fields identifying the user, the session and the network elements as well as information on the network resources and services used to support a subscriber session. In the traditional circuit domain, CDR has been used to denote "Call Detail Record", which is subsumed by "Charging Data Record" hereafter.

charging destination: also referred to as a destination for charging, this is a nominal reference defining the point of termination of a connection for charging purposes.

charging function: entity inside the core network domain, subsystem or service that is involved in charging for that domain, subsystem or service.

charging origin: nominal reference defining the point of origin of a connection for charging purposes.

circuit switched domain: domain within UMTS in which information is transferred in circuit mode.

delivery report: feedback information provided to an originator MMS User Agent by an MMS Relay/Server about the status of the delivery of an MM.

domain: part of a communication network that provides services using a certain technology.

Early session: tbd.

forwarded MM: MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding.

forwarding MMS user agent: MMS user agent that is the intended recipient of an MM and that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM.

Fully qualified Partial CDR (FQPC): partial CDR that contains a complete set of the fields specified in the present document. This includes all the mandatory and conditional fields as well as those fields that the PLMN operator has provisioned to be included in the CDR. The first Partial CDR shall be a Fully qualified Partial CDR.

GPRS: Packet Services for GSM and UMTS systems.

GTP': GPRS protocol used for CDR transport. It is derived from GTP with enhancements to improve transport reliability necessary for CDRs.

NOTE: This protocol is not used for tunnelling.

GSM only: qualifier indicating that this clause or paragraph applies only to a GSM system. For multi-system cases this is determined by the current serving radio access network.

Instant personal alert: tbd.

inter-system change: change of radio access between different radio access technologies such as GSM and UMTS.

in GSM,....: qualifier indicating that this paragraph applies only to GSM System.

in UMTS,....: qualifier indicating that this paragraph applies only to UMTS System.

LCS Client: software and/or hardware entity that interacts with a LCS Server for the purpose of obtaining location information for one or more Mobile Stations. LCS Clients subscribe to LCS in order to obtain location information. LCS Clients may or may not interact with human users. The LCS Client is responsible for formatting and presenting data and managing the user interface (dialogue). The LCS Client may reside in the Mobile Station (UE).

LCS Server: software and/or hardware entity offering LCS capabilities. The LCS Server accepts requests, services requests, and sends back responses to the received requests. The LCS server consists of LCS components, which are distributed to one or more PLMN and/or service provider.

Location Based Service (LBS): service provided either by teleoperator or a 3rd party service provider that utilizes the available location information of the terminal. Location Application offers the User Interface for the service. LBS is either a pull or a push type of service (see Location Dependent Services and Location Independent Services). In ETSI/GSM documentation of SoLSA, LBS is called "Location Related Service". ETSI and/or 3GPP -wide terminology harmonization is expected here.

location estimate: geographic location of an UE and/or a valid Mobile Equipment (ME), expressed in latitude and longitude data. The Location Estimate shall be represented in a well-defined universal format. Translation from this universal format to another geographic location system may be supported, although the details are considered outside the scope of the primitive services.

message ID: unique identifier for an MM.

middle tier (charging) TS: used for the 3GPP charging TSs that specify the domain / subsystem / service specific, online and offline, charging functionality. These are all the TSs in the numbering range from 3GPP TS 32.250 [10] to 3GPP TS 32.27x [3x], e.g. 3GPP TS 32.250 [10] for the CS domain, or 3GPP TS 32.270 [30] for the MMS service. Currently, there is only one "tier 1" TS in 3GPP, which is the present document that specifies the charging architecture and principles. Finally, there are a number of top tier TSs in the 32.29x numbering range ([50] ff) that specify common charging aspects such as parameter definitions, encoding rules, the common BD interface or common charging applications.

MMSE: collection of MMS-specific elements under the control of a single administration.

MMS Relay/Server: MMS-specific network entity/application that is under the control of an MMS service provider. An MMS relay/server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS.

MMS user agent: application residing on a user equipment, a mobile station or an external device that performs MMS-specific operations on a user's behalf. An MMS user agent is not considered part of an MMSE.

Multimedia Messaging Service Network Architecture (MMSNA): encompasses all the various elements that provide a complete MMS to a user.

near real time: near real time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 minute.

observed IMEI ticket: record used to describe an EIR relevant event e.g. a blacklisted IMEI.

offline charging: charging mechanism where charging information **does not** affect, in real-time, the service rendered.

online charging: charging mechanism where charging information can affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with session/service control is required.

original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded.

originator MMS user agent: an MMS user agent associated with the sender of an MM.

packet switched domain: domain within GSM and UMTS in which data is transferred in packet switched mode. Corresponds to the term "GPRS".

partial CDR: CDR that provides information on part of a subscriber session. A long session may be covered by several partial CDRs. Two formats are considered for Partial CDRs. One that contains all of the necessary fields; the second has a reduced format.

Positioning method (/locating method): method or technical solution, which is used to get an estimate of the target mobile's geographical location.

EXAMPLE: Positioning methods based on radio cell coverage, GPS or Assisted GPS methods, which are based on the Time-Of-Arrival (TOA) algorithm, and OTDOA or E-OTD methods, which are based on the Time-Difference-Of-Arrival (TDOA) algorithm. The positioning methods are further described in UTRAN Stage 2, 3GPP TS 25.305 [63] and GERAN Stage 2, 3GPP TS 43.059 [64].

Pre-established session: see early session

read-reply report: feedback information to an originator MMS user agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS user agent.

real time: real time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 second.

recipient MMS user agent: MMS user agent associated with the recipient of an MM.

Reduced Partial CDR (RPC): partial CDRs that only provide mandatory fields and information regarding changes in the session parameters relative to the previous CDR.

EXAMPLE: Location information is not repeated in these CDRs if the subscriber did not change its location.

reply-MM: In case of reply-charging the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission) is called a reply-MM.

Reporting Area: The service area for which an MS's location shall be reported.

Service Area: The location accuracy level needed for service management purposes in the 3G SGSN, e.g. a routing area or a cell. The 3G SGSN can request the SRNC to report: i) the MS's current service area; ii) when the MS moves into a given service area; or iii) when the MS moves out of a given service area.

settlement: payment of amounts resulting from the accounting process.

successful call: connection that reaches the communication or data transfer phase e.g. the "answered" state for speech connections. All other connection attempts are regarded as unsuccessful.

Talk burst: tbd.

target UE: UE being positioned.

tariff period: part of one (calendar) day during which a particular tariff is applied. Defined by the time at which the period commences (the switch-over time) and the tariff to be applied after switch-over.

tariff: set of parameters defining the network utilisation charges for the use of a particular service.

User Equipment (UE): term "User Equipment" or "UE", should for GSM be interpreted as "MS", as defined in GSM 04.02 [65??]. UE in the present document may also refer to a Mobile Equipment or User Equipment used for emergency calls, that do not have valid SIM or USIM.

UMTS only: qualifier indicating that this clause or paragraph applies only to a UMTS system. For multi-system cases this is determined by the current serving radio access network.

3.2 Abbreviations

Editor's note: to be completed / remove unnecessary material

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [50], 3GPP TS 32.240 [1] and the following apply:

3G	3 rd Generation
3GPP	3 rd Generation Partnership Project
ABNF	Augmented Backus-Naur Form
ACA	Accounting Answer
ACR	Accounting Request
AoC	Advice of Charge
APN	Access Point Name
AS	Application Server
AVP	Attribute Value Pair
B2BUA	Back-to-Back User Agent
BCF	Bearer Charging Function
BCSM	Basic Call State Model
BD	Billing Domain
BGCF	Breakout Gateway Control Function
BMD	Billing Mediation Device
BS	Billing System
BSC	Base Station Controller
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CAI	Charge Advice Information
CAMEL	Customised Applications for Mobile network Enhanced Logic
CAP	CAMEL Application Part

CCA	Credit Control Answer
CCF	Charging Collection Function
CCR	Credit Control Request
CDF	Charging Data Function
CDCF	Charging Data Collection Function
CDGF	Charging Data Generation Function
CDR	Charging Data Record
CG	Charging Gateway
CGF	Charging Gateway Function
CI	Cell Identity
CPCF	Content Provider Charging Function
CS	Circuit Switched
CSCF	Call Session Control Function (I-Interrogating; P-Proxy; and S-Serving)
CSE	CAMEL Service Environment
CTF	Charging Trigger Function
DCCA	Diameter credit control applications
DP	Detection Point
DRP	Data Record Packet
ECF	Event Charging Function
ECUR	Event Charging with Unit Reservation
EDP	Event Detection Point
EIR	Equipment Identity Register
EM	Element Management
EMS-Digits	North American Emergency Service Routing Digits
EMS-Key	North American Emergency Service Routing Key
FCI	Furnish Charging Information
FQPC	Fully Qualified Partial CDR
FTAM	File Transfer, Access and Management
G-CDR	GGSN (PDP context) generated - CDR
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMLC	Gateway MLC
GLMS	Group List Management Server
GMSC	Gateway MSC
GPRS	General Packet Radio Service
gsmSCF	GSM Service Control Function
gsmSSF	GSM Service Switching Function
GSN	GPRS Support Node (either SGSN or GGSN)
GTP	GPRS Tunnelling Protocol
GTP'	The GPRS protocol used for CDR transport. It is derived from GTP with enhancements to improve transport reliability necessary for CDRs.
H-GMLC	Home GMLC
HLR	Home Location Register
HPLMN	Home PLMN
HSCSD	High Speed Circuit Switched Data
HSS	Home Subscriber Server
IE	Information Element
IEC	Immediate Event Charging
IHOSS:OSP	Internet Hosted Octet Stream Service: Octet Stream Protocol
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISC	IMS Service Control
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunications standardization sector
JIP	Jurisdiction Information Parameter
LAC	Location Area Code
LAN	Local Area Network
LCS	LoCation Service

LR	Location Request
LRN	Location Routing Number
MAP	Mobile Application Part
MCC	Mobile Country Code (part of IMSI)
M-CDR	Mobility management generated - Charging Data Record
ME	Mobile Equipment
MGCF	Media Gateway Control Function
MGW	Media GateWay
MIME	Multipurpose Internet Mail Extensions
MLC	Mobile Location Center
MMI	Man-Machine Interface
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MMSNA	Multimedia Messaging Service Network Architecture
MMSO	Multimedia Messaging Service Originator
MMSR	Multimedia Messaging Service Recipient
MMSR/S	Multimedia Messaging Relay/Server
MNC	Mobile Network Code (part of IMSI)
MO	Mobile Originated
MOC	Mobile Originated Call (attempt)
MO-LR	Mobile Originated Location Request
MRF	Media Resource Function
MRFC	MRF Controller
MRFP	Multimedia Resource Function Processor
MS	Mobile Station
MSC	Mobile Switching Centre
MSISDN	Mobile Station ISDN number
MSRN	Mobile Station Roaming Number
MT	Mobile Terminated
MTC	Mobile Terminated Call (attempt)
MT-LR	Mobile Terminated Location Request
NA-ESRD	North American - Emergency Service Routing Digits
NA-ESRK	North American - Emergency Service Routing Key
NAR	North America Region
NE	Network Element
NI	Network Identifier (part of the APN)
NI-LR	Network Induced Location Request
NP	Number Portability
NPDB	Number Portability Data Base
OCS	Online Charging System
O-CSI	Originating CAMEL Subscription Information
OI	Operator Identifier (part of the APN)
PDN	Packet Data Network
PDP	Packet Data Protocol, e.g. IP
PDU	Packet Data Unit
PLMN	Public Land Mobile Network
PMD	Pseudonym Mediation Device functionality
PoC	Push-to-talk over Cellular
PPP	Point-to-Point Protocol
PPR	Privacy Profile Register
PS	Packet-Switched
PSPDN	Packet-Switched Public Data Network
PSTN	Public Switched Telephony Network
PT	Protocol Type (Field in GTP' header)
QoS	Quality of Service
RAB	Radio Access Bearer
RAC	Routing Area Code
RAN	Radio Access Network
R-GMLC	Requesting - GMLC
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RPC	Reduced Partial CDR

SAC	Service Area Code
SCCF	Subscriber Content Charging Function
SCCP	Signalling Connection Control Part
S-CDR	SGSN (PDP context) generated ñ CDR
SCUR	Session charging with unit reservation
SDP	Session Description Protocol
SCF	Service Control Function
SCI	Subscriber Controlled Input or Send Charging Information
SGSN	Serving GPRS Support Node
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SMS	Short Message Service
SS7	Signalling System No. 7
S-SMO-CDR	SGSN delivered Short message Mobile Originated - CDR
S-SMT-CDR	SGSN delivered Short message Mobile Terminated - CDR
TAP	Transferred Account Procedure
T-CSI	Terminating CAMEL Subscription Information
TDP	Trigger Detection Point
TID	Tunnel IDentifier
TLV	Type, Length, Value (GTP header format)
TR	Technical Report
TS	Technical Specification
TV	Type, Value
UA	User Agent
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
USIM	User Service Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	Universal Terrestrial Radio Access Network
VAS	Value Added Service
VASP	Value Added Service Provider
V-GMLC	Visited GMLC
VLR	Visitor Location Register
VMSC	Visited MSC
VPLMN	Visited PLMN
VT-CSI	Visited Terminating CAMEL Subscription Information
WLAN	Wireless LAN

3.3 Symbols

Editor's note: to be completed / remove unnecessary material

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

A	Interface between an MSC and a BSC.
<i>Ai</i>	<i>Charging Trigger in Originator MMS Relay/Server</i>
Bc	Reference point for the CDR file transfer from the Circuit Switched CGF to the BD.
Bi	Reference point for the CDR file transfer from the IMS CGF to the BD.
<i>Bi</i>	<i>Charging Trigger in Recipient MMS Relay/Server (32.270 only!)</i>
B1	Reference point for the CDR file transfer from the GMLC CGF to the BD.
Bm	Reference point for the CDR file transfer from the MMS CGF to the BD.
Bp	Reference point for the CDR file transfer from the GPRS CGF to the BD.
Bw	Reference point for the CDR file transfer from the WLAN CGF to the BD.
Bx	The reference point between any (generic) 3G domain, subsystem or service CGF and the BD.
Ga	Interface between a GSN transmitting CDRs (i.e. GGSN or SGSN) and a CDR receiving functionality (CGF).
Gb	Interface between an SGSN and a BSC.
Gc	Interface between an GGSN and an HLR.
Gd	Interface between an SMS-GMSC and an SGSN, and between a SMS-IW MSC and an SGSN.
Gf	Interface between an SGSN and an EIR.

Gi	Interface between the Packet-Switched domain and an external packet data network.
Gm	tbd.
Gn	Interface between two GSNs within the same PLMN.
Gp	Interface between two GSNs in different PLMNs.
Gr	Interface between an SGSN and an HLR.
Gs	Interface between an SGSN and an MSC/VLR.
Gx	
Gy	
Gz	
i	Charging Trigger in combined MMS Relay/Server
Iu	Interface between the RNS and the core network.
kbit/s	Kilobits per second. 1 kbit/s = 2^{10} bits per second.
Lr	Interface between Gateway MLCs.
Mbit/s	Megabits per second. 1 Mbit/s = 2^{20} bits per second.
Mc	Interface between the MGW and (G)MSC server.
Mw	tbd
R	Reference point between a non-ISDN compatible TE and MT. Typically this reference point supports a standard serial interface.
Rf	Offline Charging Reference Point between a 3G network element and the CDF.
Ro	Online Charging Reference Point between a 3G network element and the OCS.
Um	Interface between the Mobile Station (MS) and the GSM fixed network part.
Ut	tbd.
Uu	Interface between the Mobile Station (MS) and the UMTS fixed network part.
Wf	Offline Charging Reference Point between a 3GPP interworking WLAN and the CDF.
Wo	Online Charging Reference Point between a 3GPP interworking WLAN and the OCS.

4 Architecture Considerations

4.1 High level PoC architecture

<Insert here a diagram / diagrams and, as necessary, a brief description of the architecture of the part of the 3GPP system that this TS is targeting. Usually, the diagram(s) should be taken from the respective part of TS 32.240. In these diagrams, the nodes relevant for charging are colorised. A good source for the architecture description is the underlying architecture TS from SA2, e.g. 23.060 for GPRS.>

Figure 4.1 depicts the PoC reference architecture, as described in 3GPP TRS 23.979 [200].

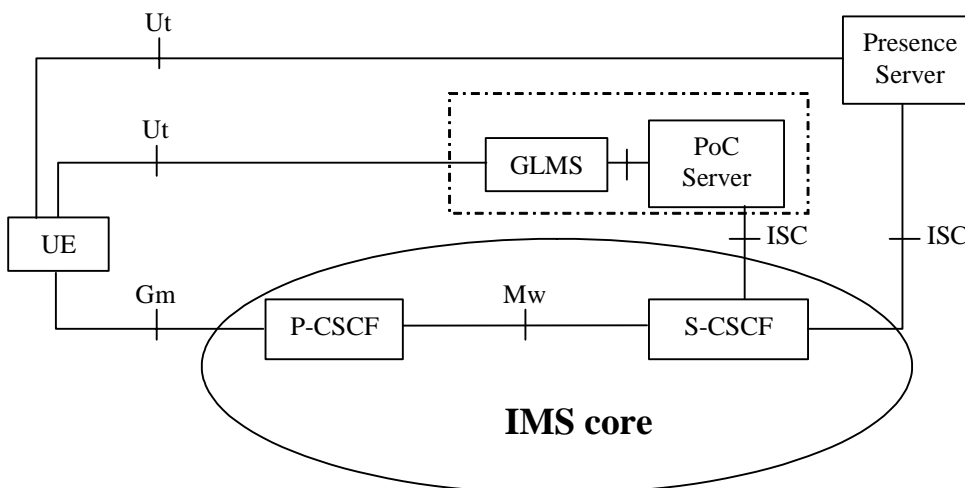


Figure 4.1: PoC service elements in the IMS architecture

Note: The I-CSCF and HSS are not shown in Figure 4.1 for the sake of simplicity.

The OMA-AD-POC [203] leverages IMS as the underlying SIP-based IP-core network. The PoC server implementing the application level network functionality for the PoC service is essentially seen as an Application Server from the IMS perspective. Consequently, communications between the IMS core and the PoC server utilize the ISC interface defined in 3GPP TS 23.228 [201].

The Group List Management Server (GLMS) is used by the PoC users to manage groups and lists (e.g. contact and access lists) that are needed for the PoC service. In the IMS architecture, the Ut interface provides these functions, hence communications between the GLMS and the UE (PoC Client) utilize the Ut interface. The GLMS is seen as a separate application server that could be also connected to other entities in addition to PoC Server (e.g. to Presence Server)

As will be described in the following sections only the PoC Server is relevant for charging.

Note: The figure may be replaced by an OMA version.

4.1 PoC Functional Entities

In the next two sentences the PoC Functional Entities, PoC Client and PoC Server are presented as described in OMA-AD-POC [203]. Also different roles of the PoC Server are described, as it will have implication the PoC charging architecture.

4.1.1 PoC Client

The PoC Client resides on the mobile terminal and is used to access PoC service. (In Figure 4.1, UE is acting as a PoC Client.)

4.1.2 PoC Server

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

The PoC server may perform a Controlling PoC Function or Participating PoC Function. The Controlling PoC Function and Participating PoC Function are different roles of the PoC server. The figures in this section show the flow of signaling traffic and media and media-related signaling traffic between Controlling PoC Function and Participating PoC Function in various configurations. Unless otherwise noted, the traffic flows shown in each figure apply to both signaling traffic and media and media-related signaling traffic in that configuration. Figure 4.2 shows the distribution of the functionality during a 1-1 PoC Session in a single Network. A PoC server may perform both a Controlling PoC function and a Participating PoC function at the same time.

Editor's note: Check the correctness of the multiplicities (1:1) in the following figures.

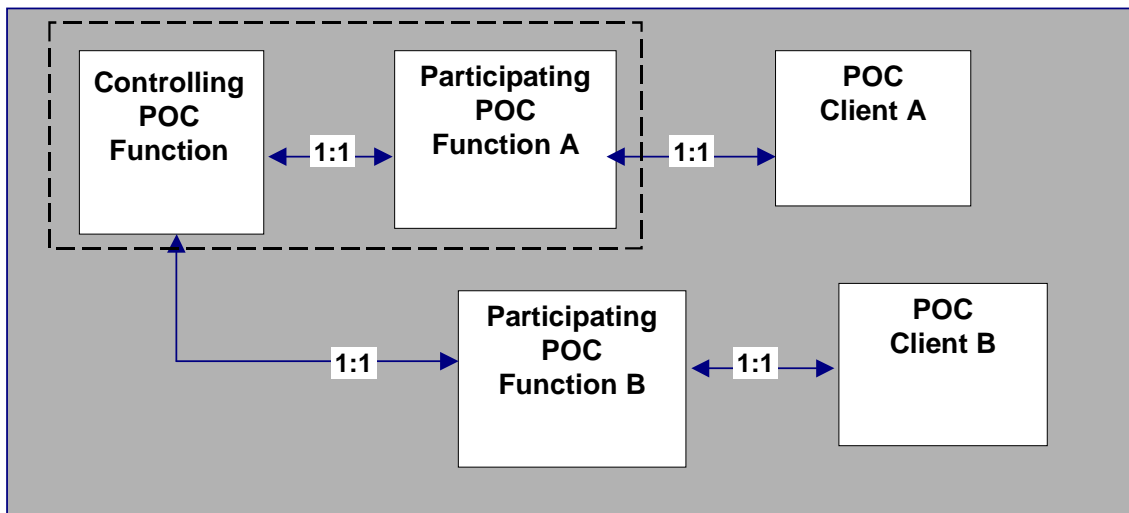


Figure 4.2 Relationship between Controlling PoC Function, Participating PoC Functions and the PoC Clients

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

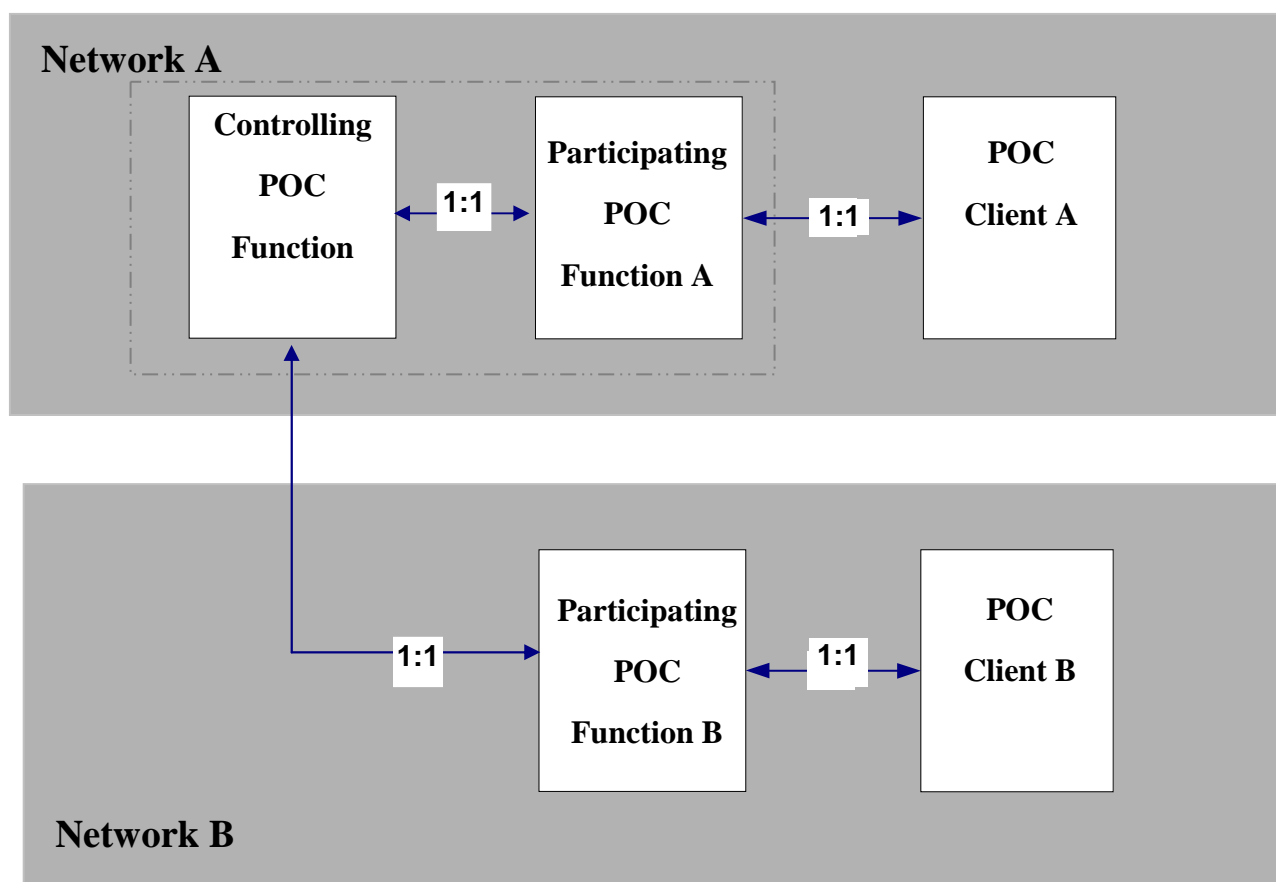


Figure 4.3 Relationship between the Controlling PoC function, Participating PoC function and PoC Clients for 1-1 PoC Session

In a PoC session there shall be only one PoC server performing the Controlling PoC Function. There can be one or more PoC servers performing the Participating PoC Function in the PoC session. Figure 4.3 shows the distribution of the functionality during a 1-1 PoC Session in a multiple network environment.

The PoC Server performing the Controlling PoC Function has N number of SIP sessions and media and talk burst control communication paths in one PoC session, where N is number of participants in the PoC session. The PoC server performing the PoC Controlling Function will have no direct communication to the PoC Client for PoC session signaling, but will interact with the PoC Client via the PoC Server performing the Participating Functioning for the PoC Client.

The PoC server performing the Controlling PoC Function will normally also route media and media-related signaling such as talk burst arbitration to the PoC Client via the PoC Server performing the Participating Functioning for the PoC Client. However, local policy in the PoC server performing the Participating PoC Function may allow the PoC server performing the Controlling PoC Function to have a direct communication path for media and media-related signaling to each PoC client. Figure 4.4 shows the signaling and media paths in this configuration for a Controlling PoC Function, Participating PoC Function and PoC Client served in the same network.

A PoC server performing the Participating PoC Function has always a direct communication path with a PoC Client and a direct communication path with the PoC server performing the Controlling PoC Function for PoC session signalling.

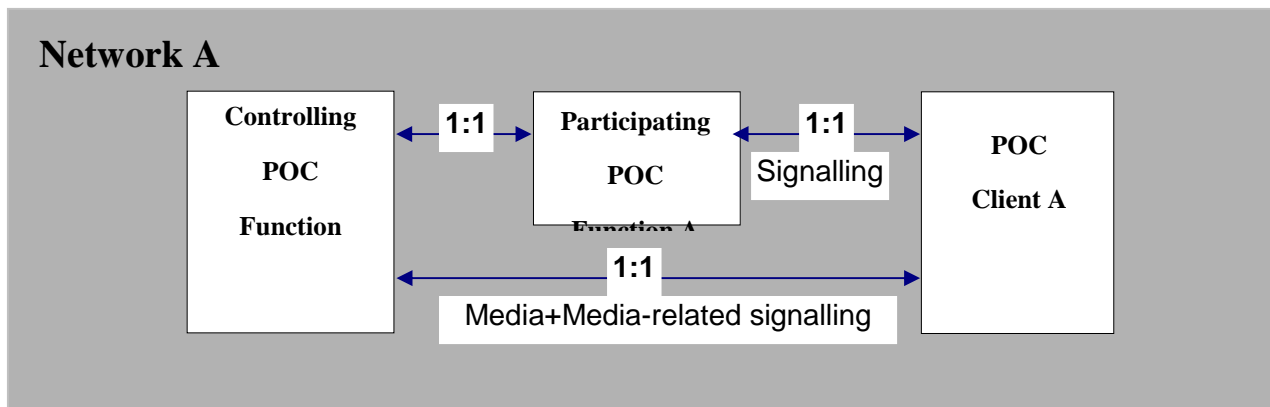


Figure 4.4 Direct Media Flow between Controlling PoC Function and PoC Client

Figure 4.5 depicts the relation between the Controlling PoC Function, Participating PoC Function and the PoC Client in multiple network environment for a PoC Group session.

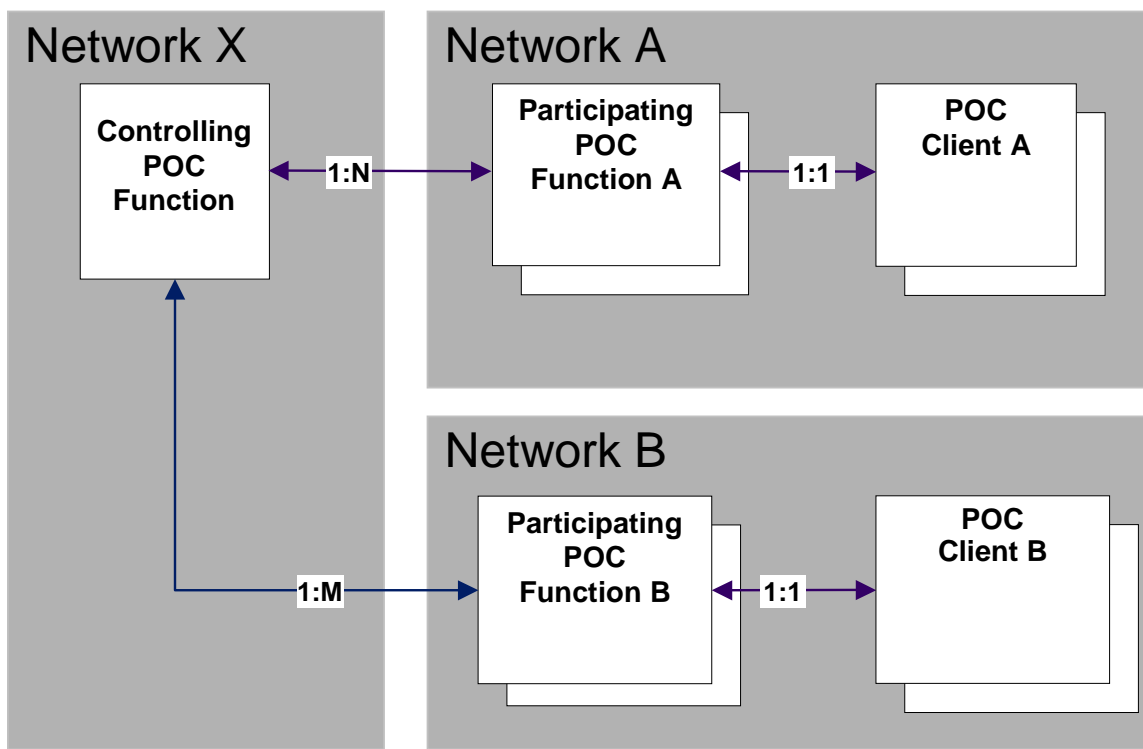


Figure 4.5 Relationship between the Controlling PoC Function, Participating PoC Function and PoC Clients for PoC Group Session

4.2 PoC offline charging architecture

Figure 4.2 depicts the PoC ~~online and~~ offline charging architecture, as described in 3GPP TRS 23.979 [200].

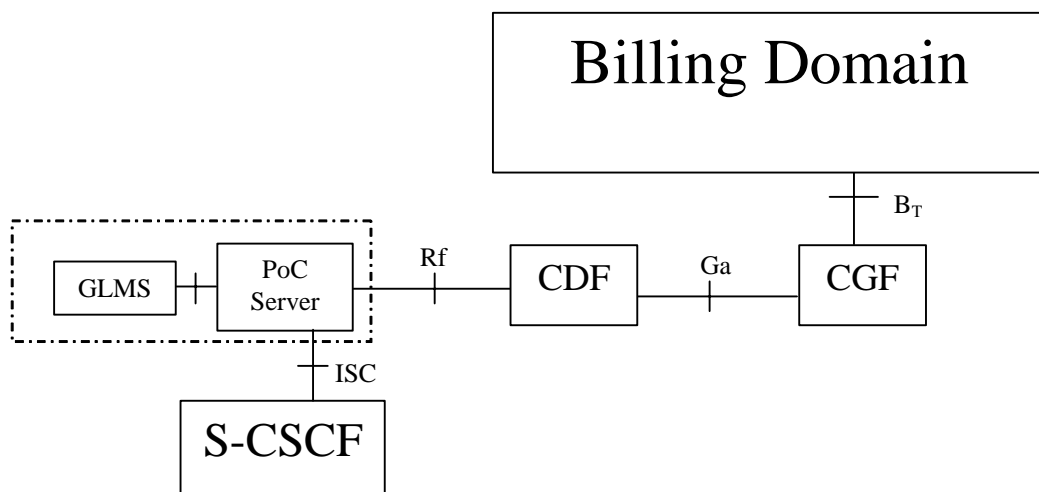


Figure 4-2 Charging architecture for PoC offline charging

As described in TS 32.240 [1], the PoC server contains an integrated CTF that generates charging events and forwards them to the CDF. The CDF, in turn, generates CDRs which are then transferred to the CGF. Finally, the CGF creates CDR files and forwards them to the Billing Domain. The possible mapping onto physical components and interfaces for the charging functions is described in 3GPP TS 32.240[1]. ~~Note: The figure may be replaced by an OMA version.~~

4.3 PoC online charging architecture

Figure 4.3 depicts the PoC online charging architecture, as described in 3GPP TRS 23.979 [200].

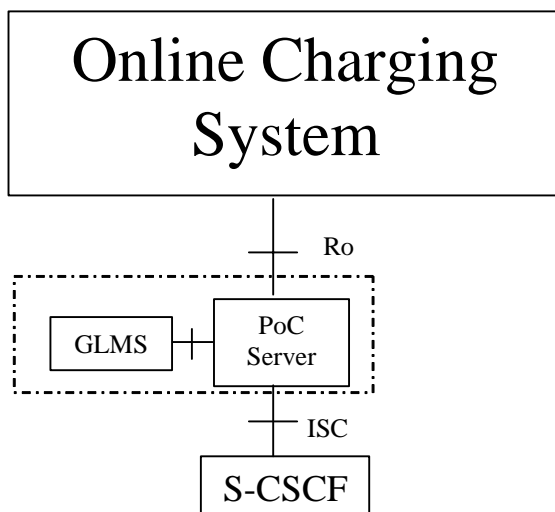


Figure 4-3 Charging architecture for PoC online charging

For online charging, the PoC Server utilises the R_o interface and application towards the OCS as specified in TS 32.299 [50]. ~~Note: The figure may be replaced by an OMA version.~~

5 PoC charging principles and scenarios

5.1 PoC charging principles

The PoC service consists of the following set of sub-services

- Early-Session (pre established session) setup
- PoC-Session participation
- Instant personal alert
- PoC talk burst sending and receiving
- [PoC group advertisement](#)

Each of these sub-services may or may not be charged.

The charged parties may be any of the participants, depending on the role he is taking. These roles are

- ~~PoC session owner~~
- PoC session inviter
- Participant
- ~~Group Owner~~[Session Owner \(by GLMS\)](#)
- [Instant Personal Alert User](#)

For example, the PoC session ~~owner~~[inviter](#) may be charged for the session participation of all participants, ~~each~~ participant may be charged for his sent talk bursts and no charging is done for talk burst receiving.

The determination, which [subscriber](#)-role is charged for which sub-service may either be done on the OCS or billing system or may be preconfigured at the PoC server. The latter variant reduces charges requests and charging load on the OCS or BS.

~~The pre-established session~~[Early sessions](#) will be charged as one-~~time events~~ (IEC). The charging is done at early session establishment and is independent of the duration of the early session.

~~The~~ Instant personal alerts [delivery](#) -will be charged as one-~~time events~~ (IEC).

PoC session participation will be charged by Session charging with unit reservation (SCUR), metered by duration. This leaves open a rating models that use or ignore the duration. Within the PoC session several sub-typed are distinguished, namely Ad-Hoc Group Talk, Instant Group Talk, [Instant Personal Talk](#) and Chat Group Talk. From the charging perspective these differ only in rating and the option to assign different charged parties. PoC session participation charging for a single party will be independent of the number of participants for efficiency reasons. Charging models that depend on the number of participants would complicate metering on the PoC server and generate [on- and offline](#) charging requests/~~CDRs~~ each time a participant joins or leaves the session. Note that this does not rule out that each party is charged for its participation, whereby the operator would gain revenues that reflect resource consumption.

Talk burst exchange will be charged by SCUR. This is an important efficiency improvement since event based talk burst charging would imply the need to generate events or CDRs for each talk burst potentially for each charged party. The metering may be done either

- By accumulated talk burst duration
- By accumulated talk burst volume
- By number of talk bursts

Details how this is supported are specific to online and offline charging and will be given in the subsequent sections. Charging for talk burst sending will be independent of the number of receivers or linear with that number for efficiency reasons. Charging models that depend on the number of ~~receivers~~ recipients would complicate metering on the PoC server and generate charging requests/CDRs each time the number of receivers change. Note that this does not rule out to charge the receivers, whereby the operator would gain revenues that reflect resource consumption.

5.2 PoC offline charging scenarios

< If this TS does not specify offline charging for XXX, then an appropriate reference or other explanation shall be provided (cf. scope clause), and all following subclauses shall only have the text 'Void. Refer to clause 5.2f. >

5.2.1 Basic principles

The charging models as given in section 5.1 will be supported for offline charging. CDRs will be generated for the charged parties that are configured in the PoC server.

These CDRs will contain distinguished service usage data for any of the described sub-services. They may contain only usage data related to one subscriber or may aggregate service usage. The latter case occurs e.g. in the charging model where the session owner is charged for all session participants.

Accumulated or detailed talk burst usage data given in the CDRs will hold duration, volume and number of talk bursts. It is up to the BS to rate them according to selected rate plans.

~~Single-Event~~ CDRs will be generated for the early session ~~setup~~ establishment and instant personal alerts delivery.

~~Start, i~~ Interim and final CDRs will be generated for PoC session participation and talk burst usage. The generation of interim CDRs will be governed by configurable timers at the PoC server.

5.2.2 Diameter message flows

~~< Describe here the Diameter message flows if the separation of CTF and CDF is standardised for the domain / system that this TS is targeting. Otherwise, insert the following text. >~~

~~{Not applicable, as the separation of the CTF and CDF is not in the scope of the XXX <domain> charging standards. Refer to clause 4.2 for further information.~~

~~Vendors may nevertheless implement a separate CTF and CDF for XXX <domain> charging. In this case, the approach chosen shall conform to the principles and protocol applications specified in TS 32.299 [50].}~~

The flows described in the present document specify the charging communications between PoC server and the charging functions for different charging scenarios. The SIP messages associated with these charging scenarios are shown primarily for general information and to illustrate the charging triggers. They are not intended to be exhaustive of all the SIP message flows discussed in TS 24.228 [202].

5.2.2.1 Message Flows - Successful Cases and Scenarios

5.2.2.1.1 Successful PoC session Establishment

Figure 5.1 shows the Diameter transactions that are required between PoC Server and CDF during PoC session establishment originated by a PoC Client.

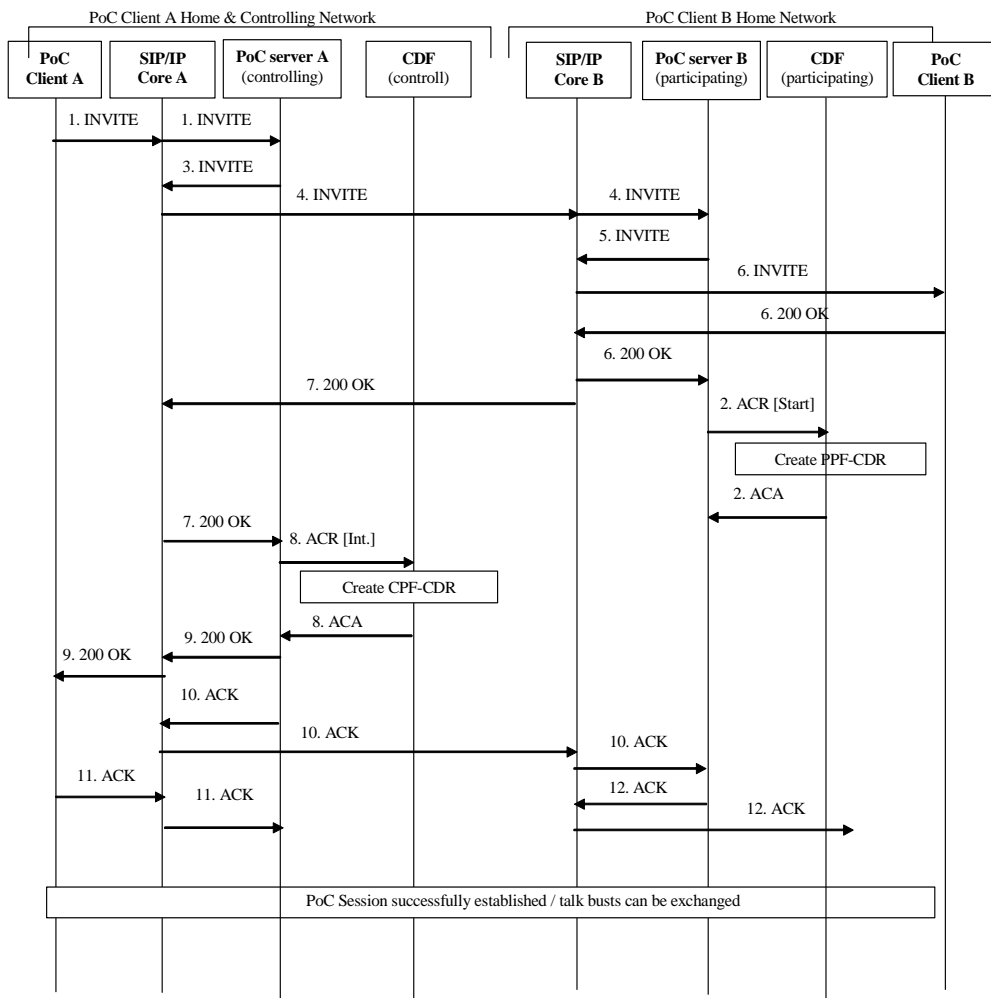


Figure 5.1: Message Sequence Chart for Offline Charging PoC Session Establishment

5.2.2.1.2 PoC talk burst exchange

tbd.

5.2.2.1.3 Instant personal alert

tbd.

5.2.2.1.4 Early session setup

tbd.

5.2.3 CDR generation

5.2.4 GTPí record transfer flows

< Describe here the GTPí message flows if the separation of CDF and CGF is standardised for the domain / system that this TS is targeting. Otherwise, insert the following text. >

{Not applicable, as the separation of the CDF and CGF is not in the scope of the XXX <domain> charging standards. Refer to clause 4.2 for further information.

Vendors may nevertheless implement a separate CDF and CGF for XXX <domain> charging. In this case, the approach chosen shall conform to the principles and protocol applications specified in TS 32.295 [54]. }

5.2.5 B_T CDR file transfer

< Replace the 'X' above with the appropriate letter, e.g. 'C' for CS, 'P' for PS, 'I' for IMS, etc. >

5.3 PoC online charging scenarios

< If this TS does not specify online charging for XXX, then an appropriate reference or other explanation shall be provided (cf. scope clause), and all following subclauses shall only have the text 'Void. Refer to clause 5.3'. >

5.3.1 Basic principles

PoC online charging is done according to the general principles of Diameter credit control applications (DCCA) as specified in TS 32.299 [50]. The PoC server generates online charging ~~messages~~events that contain distinguishable service usage data for any of the sub-services.

PoC online charging utilizes one time event charging for Early (Pre-established) Sessions (session setup is charged only) and Instant Personal Alerts and session charging for PoC Session and PoC Talk Burst Exchange. Thus the PoC online charging interface will address both the Session based charging function (SBCF) and the Event based charging function (EBCF) with the OCS. There will be a general PoC service with four sub-services in the interface. Each of the sub-services ~~have~~has specific charging information and behaviour. The DCCA concept of multiple service credit control will be supported. As described by DCCA, unused reserved units for PoC session participation will be released on session termination.

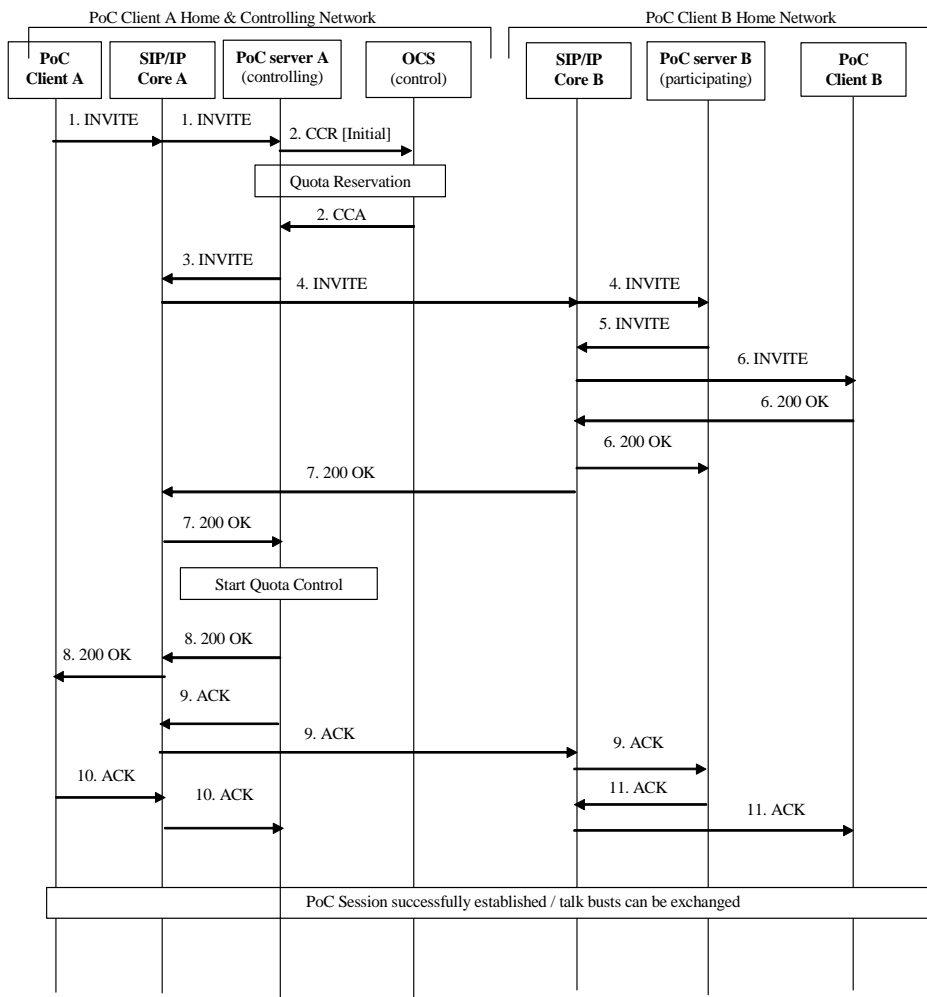
Talk burst exchange is a session based service with SCUR which may be metered by duration, volume or number. The metering is done on the PoC server and governed in a DCCA conformal way by the OCS. Upon charging request it returns granted units of either of the three types. Unused reserved units for talk burst exchange will be released at PoC session termination or based on an inactivity timer.

Editor's note: Describe the usage of service units e.g. for talk burst duration, session participation duration

5.3.2 Diameter message flows

5.3.2.1 Successful PoC session Establishment

Figure 5.2 shows the Diameter transactions that are required between PoC Server and OCS during PoC session establishment originated by a PoC Client.



Note: The interface between the participating PoC server and the OCS is similar as for the controlling PoC server and not illustrated in this figure.

Figure 5.2: Message Sequence Chart for Online Charging PoC Session Establishment

Note: Detailed message description including the handling of RSU, GSU and USU should be added.

5.3.2.2 PoC talk burst exchange

tbd.

5.3.2.3 Instant personal alert

tbd.

5.3.2.4 Early session setup

tbd.

6 Definition of charging information

< Provide some introductory statements here. >

6.1 Data description for PoC offline charging

< Provide some introductory statement as appropriate. If this TS does not specify offline charging for XXX, then an appropriate reference or other explanation shall be provided (cf. scope clause), and all following subclauses shall only have the text ì Void. Refer to clause 6.1f. >

6.1.1 Diameter message contents

<Based on subclause 5.2.2. If not applicable as per 5.2.2, insert only the following text->

{Not applicable. Refer to subclause 5.2.2 for further information.}

6.1.1.1 Summary of Offline Charging Message Formats

The PoC server generate accounting information that can be transferred to the CDF. For this purpose, the PoC Charging application employs the *Accounting-Request* (ACR) and *Accounting-Answer* (ACA) messages from the base Diameter protocol.

Table 6.1 describes the use of these messages for offline charging.

Table 6.1: Offline Charging Messages Reference Table

Command-Name	Source	Destination	Abbreviation
Accounting-Request	PoC Server	CDF	ACR
Accounting-Answer	CDF	PoC Server	ACA

6.1.1.2 Structure for the Accounting Message Formats

PoC offline charging used the diameter accounting application with the two messages ACR and ACA. The request can be of type start, stop, interim and event. The accounting request message includes all charging information and the answer is just an acknowledgement of the request message. Detailed information about the diameter offline charging application is described in TS 32.299 [50].

This sub clause describes the different AVPs used in the accounting messages.

6.1.1.2.1 Accounting-Request Message

Table 6.2 illustrates the basic structure of a Diameter ACR message as used for PoC offline charging.

Table 6.2: Accounting-Request (ACR) Message Contents for Offline Charging

AVP	Type	Category	Description
Session-Id	Value	M	Described in Diameter Base Protocol [401]
Origin-Host	Value	M	Described in Diameter Base Protocol [401]
Origin-Realm	Value	M	Described in Diameter Base Protocol [401]
Destination-Realm	Value	M	Described in Diameter Base Protocol [401]
Accounting-Record-Type	Value	M	Described in Diameter Base Protocol [401]
Accounting-Record-Number	Value	M	Described in Diameter Base Protocol [401]
Acct-Application-Id	Value		Described in Diameter Base Protocol [401]
Vendor-Specific-Application-Id	Value	Qc	Described in Diameter Base Protocol [401]
User-Name	Value	Qc	Described in Diameter Base Protocol [401]
Accounting-Sub-Session-Id	Value	:	Described in Diameter Base Protocol [401]
Acct-Session-Id	Value	:	Described in Diameter Base Protocol [401]
Acct-Multi-Session-Id	Value	:	Described in Diameter Base Protocol [401]

AVP	Type	Category	Description
Acct-Interim-Interval	Value	O _C	Described in Diameter Base Protocol [401]
Accounting-Realtime-Required	Value	-	Described in Diameter Base Protocol [401]
Origin-State-Id	Value	O _C	Described in Diameter Base Protocol [401]
Event-Timestamp	Value	O _C	Described in Diameter Base Protocol [401]
Proxy-Info	Multiple	-	Described in Diameter Base Protocol [401]
Route-Record	Multiple	-	Described in Diameter Base Protocol [401]
AVP	Multiple	-	Described in Diameter Base Protocol [401]
Service-Information	Grouped	O _C	Described in TS 32.299 [50]
PS-Information	Grouped	O _C	Described in TS 32.251 [11]
IMS-Information	Grouped	O _C	Described in TS 32.260 [20]
PoC-Information	Grouped	O _C	Described in subclause 6.2.2

NOTE: For AVP of type "Grouped" only the group AVP is listed in table 6.2. Detailed descriptions of the AVPs are provided in TS 32.299 [50].

6.1.1.2.2 Accounting-Answer Message

Table 6.3 illustrates the basic structure of a Diameter ACA message as used for PoC charging. This message is always used by the CDF as specified below, regardless of the PoC server it is received from and the ACR record type that is being replied to.

Table 6.3: Accounting-Answer (ACA) Message Contents for Offline Charging

AVP	Type	Category	Description
Session-Id	Value	M	Described in Diameter Base Protocol [401]
Result-Code	Value	M	Described in Diameter Base Protocol [401]
Origin-Host	Value	M	Described in Diameter Base Protocol [401]
Origin-Realm	Value	M	Described in Diameter Base Protocol [401]
Accounting-Record-Type	Value	M	Described in Diameter Base Protocol [401]
Accounting-Record-Number	Value	M	Described in Diameter Base Protocol [401]
Acct-Application-Id	Value	O _C	Described in Diameter Base Protocol [401]
Vendor-Specific-Application-Id	Value	-	Described in Diameter Base Protocol [401]
User-Name	Value	O _C	Described in Diameter Base Protocol [401]
Accounting-Sub-Session-Id	Value	-	Described in Diameter Base Protocol [401]
Acct-Session-Id	Value	-	Described in Diameter Base Protocol [401]
Acct-Multi-Session-Id	Value	-	Described in Diameter Base Protocol [401]
Error-Reporting-Host	Value	-	Described in Diameter Base Protocol [401]
Acct-Interim-Interval	Value	O _C	Described in Diameter Base Protocol [401]
Accounting-Realtime-Required	Value	-	Described in Diameter Base Protocol [401]
Origin-State-Id	Value	O _C	Described in Diameter Base Protocol [401]
Event-Timestamp	Value	O _C	Described in Diameter Base Protocol [401]
Proxy-Info	Multiple	-	Described in Diameter Base Protocol [401]
AVP	Multiple	-	Described in Diameter Base Protocol [401]

Category in tables 6.2 and 6.3 shall use the categories according to subclause 5.4 in TS 32.240 [1].

6.1.2 GTP_i message contents

< Based on subclause 5.2.4. If not applicable as per 5.2.4, insert only the following text. >

{Not applicable. Refer to subclause 5.2.4 for further information.}

>

6.1.3 CDR description on the B_T interface

~~<Replace the 'Xi' above with the appropriate letter, e.g. 'C' for CS, 'P' for PS, 'I' for IMS, etc.>~~

~~<This clause shall contain one subclause for each CDR type specified for XXX. These subclauses shall contain a tabular representation of the CDR, including a brief description for each parameter. Note that a more complete description and the ASN.1 description of the CDRs and their parameters shall be provided in TS 32.298.>~~

6.1.3.1 CDR Field Types

The content of the PoC CDR type is defined in Tables 6.4. For the CDR type the field definition includes the field name, category and description. The detailed field descriptions are provided in TS 32.298 [51].

The CDF provides the CDRs at the Bi interface in the format and encoding described in TS 32.298 [51]. Additional CDR formats and contents may be available at the interface to the billing system to meet the requirements of the billing system, these are outside of the scope of 3GPP standardisation.

6.1.3.2 CDR Triggers

6.1.3.2.1 PoC Session Related CDRs

Reflecting the usage of PoC sessions CDRs are generated by the CDF on a per session level. In the scope of the present document the term "PoC session" refers to the following cases:

- 1 to 1 PoC sessions ~~from 1 to 1~~,
- PoC group sessions ~~from~~ (1 to many).

Accounting information for SIP sessions is transferred from the PoC server to the CDF using Diameter ACR Start, Interim and Stop messages. A PoC session CDR is opened in the CDF upon reception of a Diameter ACR [Start] message. Partial CDRs may be generated upon reception of a Diameter ACR [Interim] message, which is sent by the network entity towards the CDF due to a session modification procedure (i.e. change in media). Session CDRs are updated, or partial CDRs are generated upon reception of a diameter ACR [Interim] message, which is sent by the network entity due to expiration of the Accounting-Interim-Interval AVP. The CDF closes the final session CDR upon reception of a Diameter ACR [Stop] message, which indicates that the SIP session is terminated.

Accounting information for unsuccessful session set-up attempts may be sent by the PoC server to the CDF employing the Diameter ACR [Event] message. The behaviour of the CDF upon receiving ACR [Event] messages is specified in subclause 6.1.3.2.2.

6.1.3.2.2 Session Unrelated CDRs

To reflect chargeable events not directly related to a PoC session the CDF may generate CDRs upon the occurrence of session unrelated SIP procedures, such as

- Instant personal alert,
- PoC early session.

Accounting information for SIP session-unrelated procedures is transferred from the PoC server to the CDF using Diameter ACR [Event] messages. Session unrelated CDRs are created in the CDF in a "one-off" action based on the information contained in the Diameter ACR [Event] message. One session unrelated CDR is created in the CDF for each Diameter ACR [Event] message received, whereas the creation of partial CDRs is not applicable for session unrelated CDRs.

6.1.3.3 PoC CDR Content

The detailed description of the field is provided in TS 32.298 [51].

6.1.3.3.1 Participating PoC Function

The table 6.4 contains the content of Participating PoC Function (PPF) Charging Data Record.

Table 6.4: Charging Data of PPF-CDR

Field	Category	Description
Record Type	M	Identifies the PoC service record.
Retransmission	O _O	This parameter, when present, indicates that information from retransmitted Diameter ACRs has been used in this CDR
SIP Method	O _O	Specifies the SIP-method for which the CDR is generated. Only available in session unrelated cases. This parameter corresponds to SIP-Event-Type AVP
Role of Node	O _M	This fields indicates the role of the AS/CSCF. This parameter corresponds to Role-of-Node AVP
Node Address	O _M	This item holds the address of the node providing the information for the CDR. This may either be the IP address or the FQDN of the IMS node generating the accounting data. This parameter corresponds to the <i>Origin-Host</i> AVP
Session ID	O _M	The Session identification. For a SIP session the Session-ID contains the SIP Call ID as defined in the Session Initiation Protocol RFC 3261 [404]. This parameter corresponds to User-Session-ID AVP
Calling Party Address	O _M	The address (Public User ID) of the party requesting a service or initiating a session. This field holds either the SIP URL (according to IETF RFC 3261 [404]) or the TEL URL (according to RFC 2806 [403]) of the calling party. This parameter corresponds to Calling-Party-Address AVP
Called Party Address	O _M	In the context of an end-to-end SIP transaction this field holds the address of the party (Public User ID) to whom the SIP transaction is posted. This parameter corresponds to Called-Party-Address AVP
Service Request Time Stamp	O _M	This field contains the time stamp which indicates the time at which the service was requested. This parameter corresponds to SIP-Request-Timestamp AVP in START ACR
Service Delivery Start Time Stamp	O _M	This field holds the time stamp reflecting either: successful session set-up, a delivery unrelated service, an unsuccessful session set-up and an unsuccessful session unrelated request. This parameter corresponds to SIP-Response-Timestamp AVP in START ACR
Service Delivery End Time Stamp	O _O	This field records the time at which the service delivery was terminated. It is Present only in SIP session related case. This parameter corresponds to SIP-Request-Timestamp AVP in STOP ACR
Record Opening Time	O _O	A time stamp reflecting the time the CCF opened this record. Present only in SIP session related case
Record Closure Time	M _O	A Time stamp reflecting the time the CCF closed the record
Inter Operator Identifiers	O _O	Holds the identification of the home network (originating and terminating) if exchanged via SIP signalling, as recorded in the <i>Inter-Operator-Identifier</i> AVP
Originating IOI	O _O	This parameter corresponds to Originating-IOI AVP
Terminating IOI	O _O	This parameter corresponds to Terminating-IOI AVP
Local Record Sequence Number	O _M	This field includes a unique record number created by this node. The number is allocated sequentially for each partial CDR (or whole CDR) including all CDR types. The number is unique within the CCF
Record Sequence Number	O _O	This field contains a running sequence number employed to link the partial records generated by the CCF for a particular session
Cause For Record Closing	O _M	This field contains a reason for the release of the CDR
Incomplete CDR Indication	O _O	This field provides additional diagnostics when the CCF detects missing ACRs
IMS Charging Identifier	O _M	This parameter holds the IMS charging identifier (ICID) as generated by the IMS node for the SIP session. This parameter corresponds to IMS-Charging-Identifier (ICID) AVP
SDP Session Description	O _O	Holds the Session portion of the SDP data exchanged between the User Agents if available in the SIP transaction. This parameter corresponds to SDP-Session-Description AVP
List of SDP Media Components	O _O	This is a grouped field comprising several sub-fields associated with one media component. It may occur several times in one CDR. The field is present only in a SIP session related case
SIP Request Timestamp	O _M	This parameter contains the time of the SIP Request (usually a (Re)Invite). This parameter corresponds to SIP-Request-Timestamp AVP in INTERM ACR
SIP Response Timestamp	O _M	This parameter contains the time of the response to the SIP Request (usually a 200 OK). This parameter corresponds to SIP-Response-Timestamp AVP in INTERM ACR
SDP Media Components	O _M	This is a grouped field comprising several sub-fields associated with one media component. Since several media components may exist for a session in parallel these sub-fields may occur several times. This parameter corresponds to SDP-Media-Component AVP

<u>Field</u>	<u>Category</u>	<u>Description</u>
SDP Media Name	O_M	This field holds the name of the media as available in the SDP data. This parameter corresponds to SDP-Media-Name
SDP Media Description	O_M	This field holds the attributes of the media as available in the SDP data. This parameter corresponds to SDP-Media-Description
GPRS Charging ID	O_M	This parameter holds the GPRS charging ID (GCID) which is generated by the GGSN for a GPRS PDP context. This parameter corresponds to GPRS-Charging-Id AVP
Media Initiator Flag	O_O	This field indicates if the called party has requested the session modification and it is present only if the initiator was the called party
GGSN Address	O_O	This parameter holds the control plane IP address of the GGSN that handles one or more media component(s) of a IMS session. This parameter corresponds to GGSN-Address AVP
Service Delivery Failure Reason	O_O	Holds the reason for why a requested service could not be successfully provided (i.e. SIP error codes taken from SIP-Method AVP). This field is not present in case of a successful service delivery
Service Specific Data	O_O	This field contains service specific data
List of Message Bodies	O_O	This grouped field comprising several sub-fields describing the data that may be conveyed end-to-end in the body of a SIP message. Since several message bodies may be exchanged via SIP-signalling, this grouped field may occur several times
Content-Type	O_O	This sub-field of Message Bodies holds the MIME type of the message body. Examples are: application/zip , image/gif , audio/mpeg , etc. This parameter corresponds to UUS-Data AVP/Mime-Type AVP or Event-Type AVP/ Content-Type
Content-Disposition	O_O	This sub-field of Message Bodies holds the content disposition of the message body inside the SIP signalling. Content-disposition header field equal to <code>renderf</code> , indicates that the body part should be displayed or otherwise rendered to the user. Content disposition values are: <code>session</code> , <code>render</code> , <code>inline</code> , <code>icon</code> , <code>alert</code> , <code>attachment</code> , etc. This parameter corresponds to Even-Type AVP / Content-Disposition AVP
Content-Length	O_O	This sub-field of Message Bodies holds the size of the data of a message body in bytes. This parameter corresponds to UUS-Data AVP/ Amount-of-UUS-data AVP or Event-Type AVP / Content-Length AVP
Originator	O_O	This sub-field of the "List of Message Bodies" indicates the originating party of the message body. This parameter corresponds to UUS-Data AVP/ Direction AVP
PoC-Information	O_O	Tbd.
Record Extensions	O_O	A set of operator/manufacture specific extensions to the record, conditioned upon existence of an extension

6.1.3.3.2 Controlling PoC Function

The table 6.5 contains the content of Controlling PoC Function (CPF) Charging Data Record.

Table 6.5: Charging Data of CPF-CDR

<u>Field</u>	<u>Category</u>	<u>Description</u>
Record Type	M	Identifies the PoC service record.
Retransmission	O_O	This parameter, when present, indicates that information from retransmitted Diameter ACRs has been used in this CDR
SIP Method	O_O	Specifies the SIP-method for which the CDR is generated. Only available in session unrelated cases. This parameter corresponds to SIP-Event-Type AVP
Role of Node	O_M	This fields indicates the role of the AS/CSCF. This parameter corresponds to Role-of-Node AVP
Node Address	O_M	This item holds the address of the node providing the information for the CDR. This may either be the IP address or the FQDN of the IMS node generating the accounting data. This parameter corresponds to the Origin-Host AVP
Session ID	O_M	The Session identification. For a SIP session the Session-ID contains the SIP Call ID as defined in the Session Initiation Protocol RFC 3261 [404]. This parameter corresponds to User-Session-ID AVP
Calling Party Address	O_M	The address (Public User ID) of the party requesting a service or initiating a session. This field holds either the SIP URL (according to IETF RFC 3261 [404]) or the TEL URL (according to RFC 2806 [403]) of the calling party. This parameter corresponds to Calling-Party-Address AVP
Called Party Address	O_M	In the context of an end-to-end SIP transaction this field holds the address of the party (Public User ID) to whom the SIP transaction is posted. This parameter corresponds to Called-Party-Address AVP

<u>Field</u>	<u>Category</u>	<u>Description</u>
Service Request Time Stamp	O_M	This field contains the time stamp which indicates the time at which the service was requested. This parameter corresponds to SIP-Request-Timestamp AVP in START ACR
Service Delivery Start Time Stamp	O_M	This field holds the time stamp reflecting either: successful session set-up, a delivery unrelated service, an unsuccessful session set-up and an unsuccessful session unrelated request. This parameter corresponds to SIP-Response-Timestamp AVP in START ACR
Service Delivery End Time Stamp	O_O	This field records the time at which the service delivery was terminated. It is Present only in SIP session related case. This parameter corresponds to SIP-Request-Timestamp AVP in STOP ACR
Record Opening Time	O_O	A time stamp reflecting the time the CCF opened this record. Present only in SIP session related case
Record Closure Time	O_M	A Time stamp reflecting the time the CCF closed the record
Inter Operator Identifiers	O_O	Holds the identification of the home network (originating and terminating) if exchanged via SIP signalling, as recorded in the <i>Inter-Operator-Identifier</i> AVP
Originating IOI	O_O	This parameter corresponds to Originating-IOI AVP
Terminating IOI	O_O	This parameter corresponds to Terminating-IOI AVP
Local Record Sequence Number	O_M	This field includes a unique record number created by this node. The number is allocated sequentially for each partial CDR (or whole CDR) including all CDR types. The number is unique within the CCF
Record Sequence Number	O_O	This field contains a running sequence number employed to link the partial records generated by the CCF for a particular session
Cause For Record Closing	O_M	This field contains a reason for the release of the CDR
Incomplete CDR Indication	O_O	This field provides additional diagnostics when the CCF detects missing ACRs
IMS Charging Identifier	O_M	This parameter holds the IMS charging identifier (ICID) as generated by the IMS node for the SIP session. This parameter corresponds to IMS-Charging-Identifier (ICID) AVP
SDP Session Description	O_O	Holds the Session portion of the SDP data exchanged between the User Agents if available in the SIP transaction. This parameter corresponds to SDP-Session-Description AVP
List of SDP Media Components	O_O	This is a grouped field comprising several sub-fields associated with one media component. It may occur several times in one CDR. The field is present only in a SIP session related case
SIP Request Timestamp	O_M	This parameter contains the time of the SIP Request (usually a (Re)Invite). This parameter corresponds to SIP-Request-Timestamp AVP in INTERM ACR
SIP Response Timestamp	O_M	This parameter contains the time of the response to the SIP Request (usually a 200 OK). This parameter corresponds to SIP-Response-Timestamp AVP in INTERM ACR
SDP Media Components	O_M	This is a grouped field comprising several sub-fields associated with one media component. Since several media components may exist for a session in parallel these sub-fields may occur several times. This parameter corresponds to SDP-Media-Component AVP
SDP Media Name	O_M	This field holds the name of the media as available in the SDP data. This parameter corresponds to SDP-Media-Name
SDP Media Description	O_M	This field holds the attributes of the media as available in the SDP data. This parameter corresponds to SDP-Media-Description
GPRS Charging ID	O_M	This parameter holds the GPRS charging ID (GCID) which is generated by the GGSN for a GPRS PDP context. This parameter corresponds to GPRS-Charging-Id AVP
Media Initiator Flag	O_O	This field indicates if the called party has requested the session modification and it is present only if the initiator was the called party
GGSN Address	O_O	This parameter holds the control plane IP address of the GGSN that handles one or more media component(s) of a IMS session. This parameter corresponds to GGSN-Address AVP
Service Delivery Failure Reason	O_O	Holds the reason for why a requested service could not be successfully provided (i.e. SIP error codes taken from <i>SIP-Method</i> AVP). This field is not present in case of a successful service delivery
Service Specific Data	O_O	This field contains service specific data
List of Message Bodies	O_O	This grouped field comprising several sub-fields describing the data that may be conveyed end-to-end in the body of a SIP message. Since several message bodies may be exchanged via SIP-signalling, this grouped field may occur several times
Content-Type	O_O	This sub-field of Message Bodies holds the MIME type of the message body. Examples are: application/zip, image/gif, audio/mpeg, etc. This parameter corresponds to UUS-Data AVP/Mime-Type AVP or Event-Type AVP/ Content-Type

<u>Field</u>	<u>Category</u>	<u>Description</u>
Content-Disposition	O_o	This sub-field of Message Bodies holds the content disposition of the message body inside the SIP signalling. Content-disposition header field equal to <code>render</code> , indicates that the body part should be displayed or otherwise rendered to the user. Content disposition values are: session, render, inline, icon, alert, attachment, etc. This parameter corresponds to Even-Type AVP / Content-Disposition AVP
Content-Length	O_o	This sub-field of Message Bodies holds the size of the data of a message body in bytes. This parameter corresponds to UUS-Data AVP/ Amount-of-UUS-data AVP or Event-Type AVP / Content-Length AVP
Originator	O_o	This sub-field of the "List of Message Bodies" indicates the originating party of the message body. This parameter corresponds to UUS-Data AVP/ Direction AVP
PoC-Information	O_o	Tbd.
Record Extensions	O_o	A set of operator/manufacture specific extensions to the record, conditioned upon existence of an extension

6.2 Data description for PoC online charging

< Provide some introductory statement as appropriate. If this TS does not specify online charging for XXX, then an appropriate reference or other explanation shall be provided (cf. scope clause), and all following subclauses shall only have the text `Void`. Refer to clause 6.2. >

6.2.1 Diameter message contents

6.2.1.1 Summary of Online Charging Message Formats

PoC Online Charging uses the approach based on a series of "interrogations" as defined by Diameter Credit Control Application [402]:

- First interrogation.
- Zero, one or more intermediate interrogations.
- Final interrogation.

In addition to a series of interrogations, also a one time event (interrogation) can be used e.g. in the case when service execution is always successful.

All of these interrogations use Credit-Control-Request (CCR) and Credit-Control-Answer (CCA) messages defined in TS 32.299 [50].

The CCR for the "intermediate interrogation" and "final interrogation" reports the actual number of "units" that were used, from what was previously reserved. This determines the actual amount debited from the subscriber's account.

Table 6.5 describes the use of these messages for online charging.

<u>Command-Name</u>	<u>Source</u>	<u>Destination</u>	<u>Abbreviation</u>
Credit-Control-Request	PoC Server	OCS	CCR
Credit-Control-Answer	OCS	PoC Server	CCA

Table 6.5: Online Charging Messages Reference Table

6.2.1.2 Structure for the Credit Control Message Formats

IMS online charging used the diameter credit control application with the two messages CCR and CCA. The request performs rating of the PoC service and reserves units on the users account. The answer replies back with amount of reserved units or an error code if the user is out of credit. Detailed information about the diameter online charging application is described in TS 32.299 [50].

This sub clause describes the different AVPs used in the credit control messages.

6.2.1.2.1 Credit-Control-Request Message

Table 6.6 illustrates the basic structure of a Diameter CCR message from the PoC Server as used for PoC online charging.

Table 6.6: Credit-Control-Request (CCR) Message Contents

AVP	Type	Category	Description
Session-Id	value	M	Described in Diameter Base Protocol [401]
Origin-Host	value	M	Described in Diameter Base Protocol [401]
Origin-Realm	value	M	Described in Diameter Base Protocol [401]
Destination-Realm	value	M	Described in Diameter Base Protocol [401]
Auth-Application-Id	value	M	Described in Diameter Base Protocol [401]
Service-Context-Id	value	M	Described in Diameter Credit Control Application [402]
CC-Request-Type	value	M	Described in Diameter Credit Control Application [402]
CC-Request-Number	value	M	Described in Diameter Credit Control Application [402]
Destination-Host	value	O _C	Described in Diameter Base Protocol [401]
User-Name	value	O _C	Described in Diameter Base Protocol [401]
CC-Sub-Session-Id	value	O _M	Described in Diameter Credit Control Application [402]
Acct-Multi-Session-Id	value	O _C	Described in Diameter Credit Control Application [402]
Origin-State-Id	value	O _C	Described in Diameter Base Protocol [401]
Event-Timestamp	value	O _C	Described in Diameter Base Protocol [401]
Subscription-Id	Multiple-grouped	O _C	Described in Diameter Credit Control Application [402]
Service-Identifier	Value	O _C	Described in Diameter Credit Control Application [402]
Termination-Cause	value	O _C	Described in Diameter Base Protocol [401]
Requested-Service-Unit	grouped	O _C	Described in Diameter Credit Control Application [402]
Requested-Action	value	O _C	Described in Diameter Credit Control Application [402]
Used-Service-Unit	Multiple-grouped	O _C	Described in Diameter Credit Control Application [402]
Multiple-Services-Indicator	value	O _C	Described in Internet-Draft, Diameter Credit Control Application [402]
Multiple-Services-Credit Control	Multiple-grouped	O _C	Described in Diameter Credit Control Application [402]
Service-Parameter-Info	Multiple-Grouped	O _C	Described in Diameter Credit Control Application [402]
CC-Correlation-Id	value	O _C	Described in Diameter Credit Control Application [402]
UserñEquipment-Info	Multiple-Grouped	O _C	Described in Diameter Credit Control Application [402]
Service-Information	grouped	O _C	Described in TS 32.299 [50]
PS-Information	grouped	O _C	Described in TS 32.251 [11]
IMS-Information	grouped	O _C	Described in TS 32.260 [20]
PoC-Information	Grouped	O _C	Described in subclause 6.2.2

The full description of the AVPs is specified in TS 32.299 [50].

6.2.1.2.2 Credit-Control-Answer Message

Table 6.7 illustrates the basic structure of a Diameter CCA message as used for the PoC Server. This message is always used by the OCS as specified below, independent of the receiving PoC server and the CCR request type that is being replied to.

Table 6.7: Credit-Control-Answer (CCA) Message

AVP	Type	Category	Description
Session-Id	Value	M	Described in Diameter Base Protocol [401]
Result-Code	Value	M	Described in Diameter Base Protocol [401]
Origin-Host	Value	M	Described in Diameter Base Protocol [401]
Origin-Realm	Value	M	Described in Diameter Base Protocol [401]
Auth-Application-Id	Value	M	Described in Diameter Base Protocol [401]
CC-Request-Type	Value	M	Described in Diameter Credit Control Application [402]
CC-Request-Number	Value	M	Described in Diameter Credit Control Application [402]
User-Name	Value	O _C	Described in Diameter Base Protocol [401]
CC-Session-Failover	Value	O _C	Described in Diameter Credit Control Application [402]

AVP	Type	Category	Description
CC-Sub-Session-Id	Value	Q _M	Described in Diameter Credit Control Application [402]
Acct-Multi-Session-Id	Value	Q _C	Described in Diameter Base Protocol [401]
Origin-State-Id	Value	Q _C	Described in Diameter Base Protocol [401]
Event-Timestamp	Value	Q _C	Described in Diameter Base Protocol [401]
Granted-Service-Unit	grouped	Q _C	Described in Diameter Credit Control Application [402]
Multiple-Services-Credit-Control	Multiple-grouped	Q _C	Described in Diameter Credit Control Application [402]
Final-Unit-Indication	Grouped	Q _C	Described in Diameter Credit Control Application [402]
Check-Balance-Result	Value	Q _C	Described in Diameter Credit Control Application [402]
Credit-Control-Failure-Handling	Value	Q _C	Described in Diameter Credit Control Application [402]
Direct-Debiting-Failure-Handling	Value	Q _C	Described in Diameter Credit Control Application [402]
Validity-Time	Value	Q _C	Described in Diameter Credit Control Application [402]
Redirect-Host	Multiple-value	Q _C	Described in Diameter Base Protocol [401]
Redirect-Host-Usage	Value	Q _C	Described in Diameter Base Protocol [401]
Redirect-Max-Cache-Time	Value	Q _C	Described in Diameter Base Protocol [401]
Proxy-Info	Multiple-grouped	Q _C	Described in Diameter Base Protocol [401]
Route-Record	Multiple-Value	Q _C	Described in Diameter Base Protocol [401]
Failed-AVP	Multiple-grouped	Q _C	Described in Diameter Base Protocol [401]
AVP	Multiple-value	Q _C	Described in diameter base protocol [401]

6.2.2 AVPs for PoC Online Charging on the Ro interface

The use of the Attribute Value Pairs (AVPs) that are defined in the Diameter Base [401] and DCCA [402] is available in the Diameter application specification TS 32.299 [50].

AVPs that are used for PoC online charging are provided in the Service-Information AVP.

6.2.2.1 Definition of the PoC-Information AVP

The detailed structure of the PoC-Information AVP can be found in table 6.8.

The AVP header bit denoted as 'M', indicates whether support of the AVP is required. The AVP header bit denoted as 'V', indicates whether the optional Vendor-ID field is present in the AVP header. For further details, see Diameter Base [401].

AVP Name	AVP Code	Defined in	Value Type	AVP Flag rules			
				Must	May	Should not	Must not
PoC-Server-Role		[50]	Enumerated	M,V	P		
PoC-Session-Type		[50]	Enumerated	M,V	P		
PoC-Subscriber-Session-Role		[50]	Enumerated	M,V	P		

Table 6.8: Structure of the PoC-Information AVP

Editor's note: The following AVP definitions should be moved to TS 32.299 after finalization.

PoC-Server-Role AVP

The PoC Server Role AVP (AVP code xxx) is of type Enumerated and specifies the role of the PoC server.

The identifier can be one of the following:

- 0 Participating PoC Server
- 1 Controlling PoC Server

PoC-Subscriber-Session-Role AVP

The PoC Subscriber Session Role AVP (AVP code xxx) is of type Enumerated and specifies the role of the subscriber.

The identifier can be one of the following:

- 0 POC SESSION INITIATOR
- 1 POC INVITING PARTICIPANT
- 2 POC PARTICIPANT
- 3 POC GROUP OWNER

PoC Session Type AVP

The PoC Session Type AVP (AVP code xxx) is of type Enumerated and specifies the type of the PoC session.

The identifier can be one of the following:

- 0 1 to 1 PoC session
- 1 PoC group session

Editor's note: Some more parameter need e.g. number of recipients, parameters for instant personal alert and early session setup.

6.2.2.2 Use of PS-Information AVP

Only a parameter subset of the PS-Information AVP is used for PoC online charging. Details of the structure can be found in table 6.9.

AVP Name	AVP Code	Defined in	Value Type	AVP Flag rules			
				Must	May	Should not	Must not
Charging-Id		[50]	UTF8String	M,V	P		
GGSN-Address		[50]	IPAddress	M,V	P		

Table 6.9: Used parameter of the PS-Information AVP

The PS-Information AVP is defined in 3GPP TS 32.251 [11]. The detailed description of the used AVPs can be found in TS 32.299[50].

6.2.2.3 Use of IMS-Information AVP

Only a parameter subset of the IMS-Information AVP is used for PoC online charging. Details of the structure can be found in table 6.10.

<u>AVP Name</u>	<u>AVP Code</u>	<u>Defined in</u>	<u>Value Type</u>	<u>AVP Flag rules</u>			
				<u>Must</u>	<u>May</u>	<u>Should not</u>	<u>Must not</u>
Event-Type		[50]	UTF8String	M,V	P		
User-Session-ID		[50]	UTF8String	M,V	P		
Calling-Party-Address		[50]	UTF8String	M,V	P		
Called-Party-Address		[50]	UTF8String	M,V	P		
Time-stamp		[50]	Grouped	M,V	P		
Inter-Operator-Identifier		[50]	Grouped	M,V	P		
IMS-Charging-Identifier		[50]	UTF8String	M,V	P		
SDP-Session-Description		[50]	UTF8String	M,V	P		
SDP-Media-Components		[50]	Grouped	M,V	P		
UUS-Data		[50]	Grouped	M,V	P		
Cause		[50]	Grouped	M,V	P		

Table 6.14: Used parameter of the IMS-Information AVP

The detailed description of the IMS-Information AVPs can be found in TS 32.260[20] and individual AVPs are defined in TS 3GPP 32.299 [50].

Annex A (informative):
Change history

< Provide here the change history of the TS as appropriate >

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Mar 2004			--	--	First draft	-	0.0.1.
Aug 2004					Architecture and charging principles added	0.0.1	0.1.0
Sep 2004					SA5#39bis	0.1.0	0.2.0
Nov 2004					SA5#40	0.2.0	0.3.0