

Prepared (also subject responsible if other) EDMMDDA Ádám Dóda		No. 13/155 19-AVA 901 18 Uen		
Approved	Checked	Date 2017-09-12	Rev T	Reference

Diameter Offline Charging in MTAS

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1 Document History

Rev	Date	Sign	Comment
A	2013-04-26	estukar	Initial revision based on 2/155 19-CRA 119 2107 (rev J). Added Closed User Group Added Dialed Number Mapping Added a note to the Carrier Select SSIs New AVP: UHTZ-Offset Updating Media-Initiator-Flag with SCN Updated Subscription-Id-Type with IMSI Added Multi Subscriber Number Added Generic SSC Added CCNL Corrected parent AVP and m-bit value for PS-Information Added originating STOD Added PIN collection for Scheduled Update: Transfer of existing A-to-B session to a collocated ad-hoc conference. Inter-Operator-Identifier, SIP-Ringing-Timestamp and SIP-Ringing-Timestamp-Fraction added to ACR Interim
B	2013-09-16	erudhes	Approved for 14A Added SCC-TADS_Decision Added SSI for the new Operator Controlled Transfer service and a new value for Call-Type Added Operator Controlled Transfer service Added Distinctive Ring Send CCR/ACR-Interim on SDP update Updated the Requested-Party-Address for CDIV target address Updated announcement after 200OK reply for ACR and ICB. Added Priority Services Added Japanese Charging Removed User Location chapter Updated Access-Network-Information AVP chapter Removed Participant-involved AVP from ACR[Event]
C	2013-11-13	estukar	Added ACR Interim format for Japanese Charging service when Telephone Directory Service (TDS) query is triggered. Added a new column in AVP List Table to indicate the supported release version. Added more explanation regarding the fields in the AVP list table. Corrected terminology according to TR HP66063.

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			<p>Added two new optional AVPs, GSM-Call-Reference-Number and MSC-Address, related to solution for TR HQ84866.</p> <p>Added clarification and correction to the description of the Session-Id AVP.</p> <p>Miscellaneous clarifications</p>
D	2014-04-30	ekorrssa	<p>MTAS 14B</p> <ul style="list-style-type: none"> - Updated Party to charge info according to HR22464. - Updated FCD Auto-Answer avoidance. - Corrected the table in 5.2.106 for ECT (1900) based on HQ95740. - Update: 3GPP-MS-TimeZone format TR: HR86090. - Update regarding Japanese Charging service. - Added Reason-Header AVP. - Merged changes from 14A regarding HR75943. - 802 SSID added. - Updated Scheduled Conference Attendant Assistance for wrong PIN code. - Update table 8 with 802 SSI. - Added new successful cause code: -200. - Changes connected with multi device charging. - Corrected description of Served-User AVP. - Subscription-ID AVP description updated.
E	2014-12-04	egrzbrd	<p>MTAS 15A</p> <ul style="list-style-type: none"> - Updated description of AVP: User-Equipment-Info-Type, Calling-Party-Address, Transaction-Info, User-Equipment-Info, MMTel-Information, Supplementary-Service, LCS-Information, CUG-Information, MSISDN, Carrier-Select-Routing-Information, Transaction-Info, Supplementary-Service-Identity, Subscription-Id, Service-Specific-Data, Service-Specific-Info, Acct-Interim-Interval, Transaction-Data-Name, Transaction-Data-Value, Transaction-Type, 3GPP-MS-TimeZone, Backward-TTC-Charging-Parameters, Acct-Interim-Interval - Updated chapters 5.1.1.4.1, 5.2.2 and 5.2.39 - Clarify the ICID generation - Made Related-ICID multiple-occurring - Multi-device Charging updated - AVP added: Associated-Party-Address - Added new omit AVPs for HS94896 - TR HT10989: Clarified that MTAS configuration changes may also cause the accounting record number to be 4294967295

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			<ul style="list-style-type: none"> - AS-Type enumerated value 0 is changed to MMTel Telephony AS.
F	2015-07-07	ezhayic	<p>MTAS 15B</p> <ul style="list-style-type: none"> - Correct the description of AVPs: Analyzed-Call-Type, SDP-Type, Forward-TTC-Charging-Headers, Backward-TTC-Charging-Headers, Subscription-Id, From-Header, Calling-Party-Address, 3GPP-MS-TimeZone, UHTZ-Offset. - Corrected Table 5 for AVPs: Backward-TTC-Charging-Headers, CCMP-User-Info, Charging-Area, Carrier-Information. - Update AVP Redirecting-Party-Address and Subscription-Id AVP with CAMEL service. - Update of section 3.3.3 Mid-Session Media Changes. - New SSID: MOBILE_LOCATION_RELATED_SSC (702) - Updated Ch. 6. By removing already supported AVPs from the list.
G	2015-11-03	evitkav	<p>MTAS 4.0.0</p> <ul style="list-style-type: none"> - Updated column ACR Config type for SDP-Media-Description in Table 5. - SDP-Media-Description optional to comply with standard. - Updated text for User-Name AVP. - Updated for report PANI update in ANI AVP. - Updated description of Analyzed-Call-Type AVP. - Corrected the description of User-Name AVP. - ANI AVP description changed, and Voice over Wi-Fi content added. (See ch. 5.2.2)
H	2016-02-02	eyurzyb	<p>MTAS 4.1.0</p> <ul style="list-style-type: none"> - Added Transaction-SIP-Message AVP.

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			<ul style="list-style-type: none"> - Updated information of AVPs: Transaction-Info, User-Equipment-Info-Type. - Corrected type of MSISDN AVP in Table 5.
J	2016-04-20	edandwe	MTAS 4.2.0 <ul style="list-style-type: none"> - Added Supplementary-Service-Identity AVP value Call Pull Request STOD (2306). - Updated section 5.2.2 Access-Network-Information AVP for MSC and VLR number. - Added new Cause-Code AVP value "Long Duration Call". - Clarified how timer triggered Interims are handled when buffered.
K	2016-08-04	erudhes	MTAS 4.3.0 <ul style="list-style-type: none"> - Added to 3.5.1 that SSC not always results in event charging - Updated Access-Network-Information AVP chapter, for reporting ANI from received re-INVITE PANI
L	2016-09-05	edinjia	MTASv 1.4 <ul style="list-style-type: none"> - Added 5 New SSIDs: GETS_FC_PRIORITY_SERVICE (5000) GETS_AN_PRIORITY_SERVICE (5001) GETS_NT_PRIORITY_SERVICE (5002) GETS_FC_GETS_AN_PRIORITY_SERVICE (5003) GETS_FC_GETS_NT_PRIORITY_SERVICE (5004) - Updated Subscription-Id AVP in section 5.2.98 for reporting IMSI in MMTel sessions.
M	2016-11-30	edinjia	vMTAS 1.5 <ul style="list-style-type: none"> - Corrected Supplementary-Service-Action for Call Completion, HV11564. - All AVPs changed to be configurable for CCR in Chapter 5.2. except: Session-Id Accounting-Record-Type Accounting-Record-Number - Corrected faulty description for IMS-Information. - Corrected faulty description for IMS-Charging-Identifier, HU99200. - Corrected chapter 5.1.1.3.8 due to trouble report HV35412. - Destination-Host AVP updated from Origin-Host AVP received in previous ACA message.

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N	2017-02-23	eandlev	MTAS 4.6/vMTAS 1.6 <ul style="list-style-type: none">- Updated IMPI statement in User-Name AVP, 5.2.123.- Added new Supplementary-Service-Identity values for Call Return Erasure, UC Routing Originating and UC Routing Terminating.- New AVPs; UC-Mobility-Call-Leg and AVP Subscriber-Type.
S	2017-05-23	eseesom	MTAS 4.7/vMTAS 1.7 <ul style="list-style-type: none">- Updated the AVP Acct-Interim-Interval with supported version information- Added Instance-Id AVP for reporting IMEI from the "+sip.instance" feature tag- Added SSIDs for CAP:<ul style="list-style-type: none">Cap Trigger O-CSI 4200Cap Trigger T-CSI 4201Cap Trigger Destination Based 4202- Updated description of the User-Equipment-Info AVP with IMEI reporting.- Updated AVP 1463 Subscriber-Type<ul style="list-style-type: none">Added enum value CONSUMER(1)- Updated AVP 1464 UC-Mobility-Call-Leg<ul style="list-style-type: none">Enum value TERMINATING_CONNECT(2) changed to TERMINATING_ACCESS(2)- Updated description of AVP Service-Specific-Data, Service-Specific-Info, Service-Specific-Type for FCIBCCCAMEL- Updated Interim Record (Media Change) with Access-Network-Information
T	2017-09-12	edmmdda	MTAS 4.8/vMTAS 1.8 <ul style="list-style-type: none">- New AVP Interim-Reason, Ro-Information, Ro-Status- Subscription-Id updated with Camel NCC service related information- Service-Specific-Info new value added MULTI_PERSONA(1022)

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2 Scope and Purpose

2.1 Interface Entities

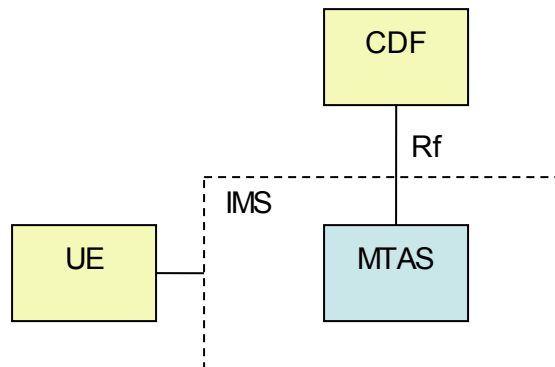


Figure 1: Interface Entities

The Rf interface is defined by 3GPP and is the reference point between a Charging Trigger Function (CTF) and a Charging Data Function (CDF).

MTAS acts a CTF, collecting the information pertaining to chargeable events, assembling this information into matching charging events, and sending these charging events towards the CDF.

The CDF receives charging events from MTAS and uses the information contained in the charging events to construct CDRs.

The information in this document relates to charging for the MMTel and SIP Trunking (ST) services.

For further details of the CTF, the CDF and the Rf reference point, see reference [1] for MTAS Rf version 1 (based on 3GPP release 7), [2] for MTAS Rf version 2 (based on 3GPP release 9) and [25] for MTAS Rf version 3 (3GPP 32.299 Release 12). The implementation of MTAS Rf version 0 (based on 3GPP release 6) is described in reference [12].

2.2 Interface Role

This document describes the services offered by the CDF that are used by MTAS.

MTAS sends Diameter Accounting Request (ACR) messages to the CDF.

The CDF responds to MTAS using Diameter Accounting Answer (ACA) messages.

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2.3 Services

Table 1: Offered Services

Offered Service	Description
None	

Table 2: Used Services

Used Service	Description
Report Accounting Information for Successfully Established SIP Session	ACR Start, Interim and Stop messages are used to convey accounting information to the CDF relating to an established communication session.
Report Accounting Information for Unsuccessful Attempt to Establish a SIP Session	An ACR Event message is used to convey accounting information to the CDF relating to an unsuccessful attempt to establish a communication session.
Report Accounting Information for Session Unrelated Event	An ACR Event message is used to convey accounting information to the CDF relating to the following session unrelated events: <ul style="list-style-type: none">a. successful activation, deactivation, modification, interrogation or invocation of a supplementary service using a supplementary service command code.b. successful user configuration of a supplementary service.
Report Update on User Location Info	ACR Interim message is used to convey accounting information to the CDF relating to the update on user location info received in an out-of-dialog NOTIFY after the call was already established.

2.4 Encapsulation and Addressing

This interface uses Diameter accounting messages transported over TCP. The message contents are based on the content defined by 3GPP (see reference [4] for release 7 and [6] for release 9) supplemented, where applicable, with Ericsson defined information conveyed in vendor specific AVPs.

Information including CDF realm addresses and communication port numbers must be preconfigured for the connections between MTAS and all relevant CDFs. For further details on configuration see reference [10]. Connections between MTAS and CDFs are only established based on the preconfigured data.

The CDF realm address to be used for reporting accounting information for a particular SIP session is identified from the P-Charging-Function-Addresses

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header received in the initial SIP INVITE request. If no charging function addresses are received in the request, a locally configured default CDF realm address is used instead. In cases where MTAS generates a session “out-of-the-blue”, the charging function address information configured for the user is obtained from the HSS. If no charging function address information has been configured for the user, a locally configured default CDF realm address is used instead.

The CDF realm address to be used for reporting accounting information for a particular session unrelated event is identified from the charging function address information provisioned against the user in the HSS. If no charging function address information has been provisioned for the user, a locally configured default CDF realm address is used instead.

Address information received in a P-Charging-Function-Addresses header may contain transport mechanism and port number information as well as the CDF realm address; however the transport mechanism and port number information is not used. MTAS always sends messages using TCP to the preconfigured port number associated with the connection to the CDF identified by the realm address.

If information relating to the CDF realm address has not been provisioned, a connection between MTAS and the CDF will not exist and therefore accounting information cannot be reported to the CDF. Accounting information may be reported to an alternative CDF, instead, if a secondary charging function address is available which identifies a CDF realm address that has been provisioned.

3 Procedures

3.1 Overview

Session based charging is used to transfer accounting data related to successfully established SIP sessions. A charging session is established between MTAS and the CDF when the SIP session has been successfully established and is retained until the SIP session is terminated. During the charging session, further accounting data may be transferred to the CDF, e.g. following a successful media change.

Event based charging is used to transfer accounting data related to unsuccessful session establishment attempts and to transfer accounting data related to events that are not related to SIP sessions. A single charging event message is sent from MTAS to the CDF containing all relevant accounting data for the event.

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MTAS acts as a back-to-back user agent (B2BUA). SIP messages received on the incoming dialog are propagated through the services and are sent out on the outgoing dialog, and vice versa. MTAS does not change the SIP headers unless required by the triggered services. The SIP header information used to populate the accounting messages sent to the CDF is specified in later sections.

MTAS can operate in the following session cases:

Originating – performing originating charging for the outgoing session from the originating MMTel or PBX user.

Terminating – performing terminating charging for the incoming session to the terminating MMTel or PBX user.

Transit – performing terminating charging for the incoming session leg targeted for the served user and performing originating charging for the outgoing session leg redirected from the served user to an alternative destination (e.g. communication diversion).

Ad-hoc Conference Focus – performing originating charging for each of the outgoing sessions requested by the conference creator.

Scheduled Conference Focus – performing charging for each successfully established traffic instance of the scheduled conference resources (focus). The scheduled conference focus charging session relates to several MMTEL sessions involved in the conference.

Communication Completion (3PCC) – performing originating charging for the outgoing session established on behalf of the originating user in order to complete a previously unsuccessful session attempt.

Enhanced Parlay X Third Party Call – performing charging for the outgoing sessions established on behalf of the Parlay X application user. The enhanced Parlay X TPC charging session relates to two MMTEL sessions involved in the call.

3.2 Lower Level Procedures

The MTAS Diameter accounting application is dependent on the connection handling capabilities of the Diameter Base Protocol which are provided by the Diameter stack. The connection handling capabilities include:

- Establishing connections between MTAS and the CDF nodes, including the exchange of capabilities.
- Transporting application messages between MTAS and CDF nodes.
- Detecting transport failures, including the use of watchdog messages.
- Disconnecting connections between MTAS and the CDF nodes.

For further details of the connection handling capabilities of the Diameter stack see reference [14].

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Various aspects of the connection handling capabilities can be configured, including:

- The maximum waiting time for a response from the CDF.
- The maximum number of message sending retries.
- The maximum time without activity before a watchdog message is sent.

For further details of configuration and suggested settings see reference [10].

3.3 Reporting Accounting Information for a Successfully Established MMTel or ST AS Session

3.3.1 MMTel or ST AS Session Set-up, Supervision and Release

Figure 2 shows an example of Diameter transactions between MTAS and a CDF for a successfully established MMTel or ST AS session.

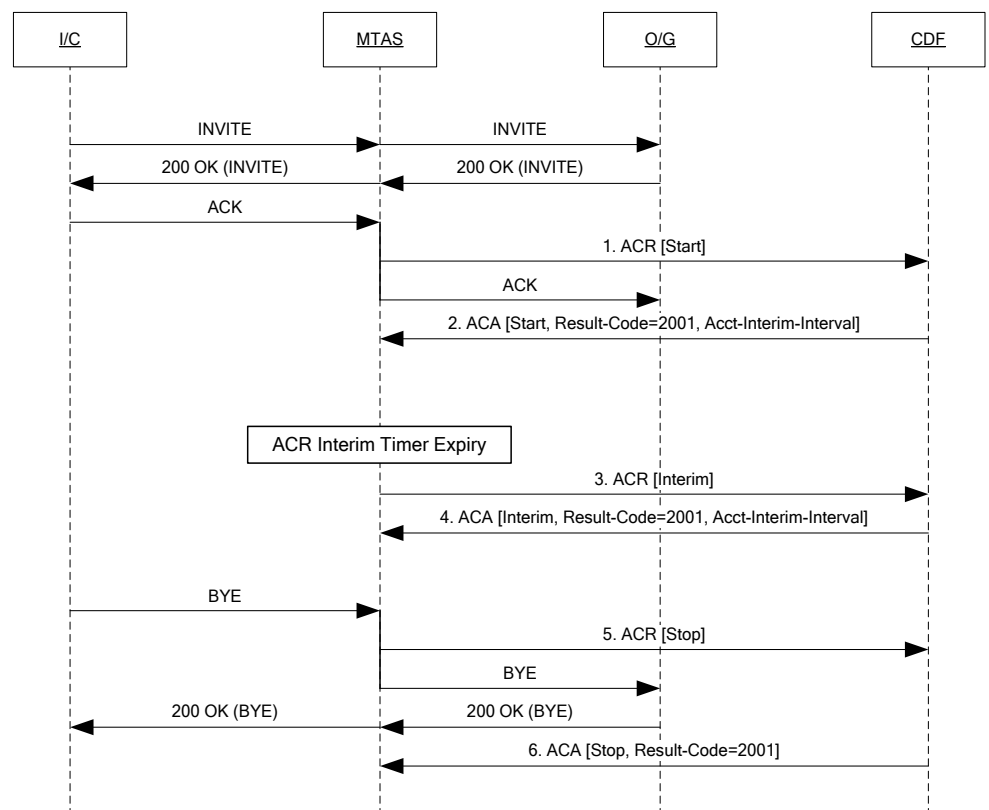


Figure 2: Successfully Established MMTel or ST AS Session

On receipt of the ACK message, MTAS sends an ACR with Accounting-Record-Type indicating 'Start Record' to the CDF.

The references 3GPP Technical Specification; Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging

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3GPP TS 32.260 (v7.6.0)[3] (release 7) and [4] (release 9) specify that the ACR should be triggered by the 200 OK (INVITE) response, however in some cases the SDP answer is conveyed in the ACK message and therefore the required SDP information would not be available if the ACR were to be generated at that point. The MTAS policy is therefore to send the ACR on receipt of the ACK instead (in all cases). In the exceptional case that the MMTel or ST AS session is terminated after to 200 OK (INVITE) response has been received but before receipt of the ACK, MTAS generates an ACR with Accounting-Record-Type indicating 'Start Record' followed immediately by an ACR with Accounting-Record-Type indicating 'Stop Record'.

The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.

On expiry of the ACR Interim Timer, MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.

The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.

On receipt of a BYE message, MTAS sends an ACR with Accounting-Record-Type indicating 'Stop Record' to the CDF. If running, the Interim ACR Timer is stopped.

The CDF acknowledges receipt of the ACR.

The SIP headers that are used to populate the AVPs in the ACR messages are captured after all services have been executed, i.e. from the outgoing dialog, with the following exceptions:

- Incoming SIP Call-ID
- Outgoing SIP Call ID
- SDP
- SIP Request URI
- From Header
- Message Body

The SIP Call-ID (used to populate the User-Session-Id AVP) is captured from the incoming dialog.

Outgoing SIP Call ID (used to populate the Outgoing-Session-Id AVP) is captured from the outgoing dialog.

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The SDP information used to populate the SDP-Session-Description and SDP-Media-Component AVPs depends on the AS session case. The SDP answer is captured is from the incoming or outgoing dialog depending on the AS session case (see Table 3) when the relevant SDP information has been received from / sent to that dialog.

Table 3: SDP information used for different session cases

Session case	Charging case	Dialog from which SDP-information is captured
Originating	Originating	Incoming
Terminating	Terminating	Outgoing
Transit	Originating	Outgoing
	Terminating	Incoming
Ad-hoc Conference Focus	Originating	Outgoing (see note 1)
Communication Completion (3PCC)	Originating	Outgoing (see note 1)

Notes:

- 1 The SDP information from the outgoing dialog is used for originating charging messages generated for each dial-out conference leg and for communication completion (3PCC) initiated sessions.

The SIP Request URI used to populate the Requested-Party-Address AVP is taken from the INVITE received on the incoming dialog on the originating MTAS. This since it is used to identify the address before any modification of the address is performed. For Communication Diversion (CDIV) on the terminating MTAS; if the stored target address differs from the SIP Request URI the target address is added to the Requested-Party-Address AVP. The From Header URI used to populate the From-Header AVP is taken from the INVITE received on the incoming dialog since it is used to identify the address before any modification of the address is performed. For the communication completion (3PCC) session case, the From Header URI used to populate the From-Header AVP, is taken from the original INVITE on which communication completion was invoked.

The Message Body (used to populate the grouped AVP Message-Body) is captured in the following cases:

- Outgoing initial INVITE (except for Scheduled Conference Service where it is taken from the incoming initial INVITE)
- Incoming BYE

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- Incoming re-INVITE
- Incoming UPDATE
- The Message Body is considered for the following SIP responses:
- Responses (except 100 Trying) for initial INVITE
- Incoming 200 OK for re-INVITE
- Incoming 200 OK for UPDATE

When the flexible communication distribution service applies and a session is successfully established to the IMS primary user (B):

- a Terminating charging (terminating session case) is performed for the successful session to the primary user (A-to-B).
- b Originating charging (transit session case) is performed for the unsuccessful session attempts to each invited related user (B-to-C, B-to-D etc.), see section 3.3.4.

When the flexible communication distribution service applies and a session is successfully established to the non-IMS primary user (B'):

- a Terminating charging (transit session case) is performed for the successful session to the primary user (A-to-B).
- b Originating charging (transit session case) is performed for the successful session to the primary user (B-to-B').
- c Originating charging (transit session case) is performed for the unsuccessful session attempts to each invited related user (B-to-C, B-to-D etc.), see section 3.3.4.

When the flexible communication distribution service applies and a session is successfully established to a related user (e.g. D):

- a Terminating charging (transit session case) is performed for the successful session to the primary user (A-to-B).
- b Originating charging (transit session case) is performed for the successful session to the accepting related user (B-to-D).
- c Originating charging (transit session case) is performed for the unsuccessful session attempts to the other invited related users (B-to-C, B-to-E etc.) and, when applicable, for an unsuccessful session attempt to the non-IMS primary user (B-to-B'), see section 3.3.4.

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3.3.2**Scheduled Conference Focus Session Set-up, Supervision and Release**

Figure 3 and Figure 4 show an example of Diameter transactions between MTAS and a CDF for a successfully established scheduled conference focus session.

Figure 3: Successfully Established Scheduled Conference Focus Session, part 1

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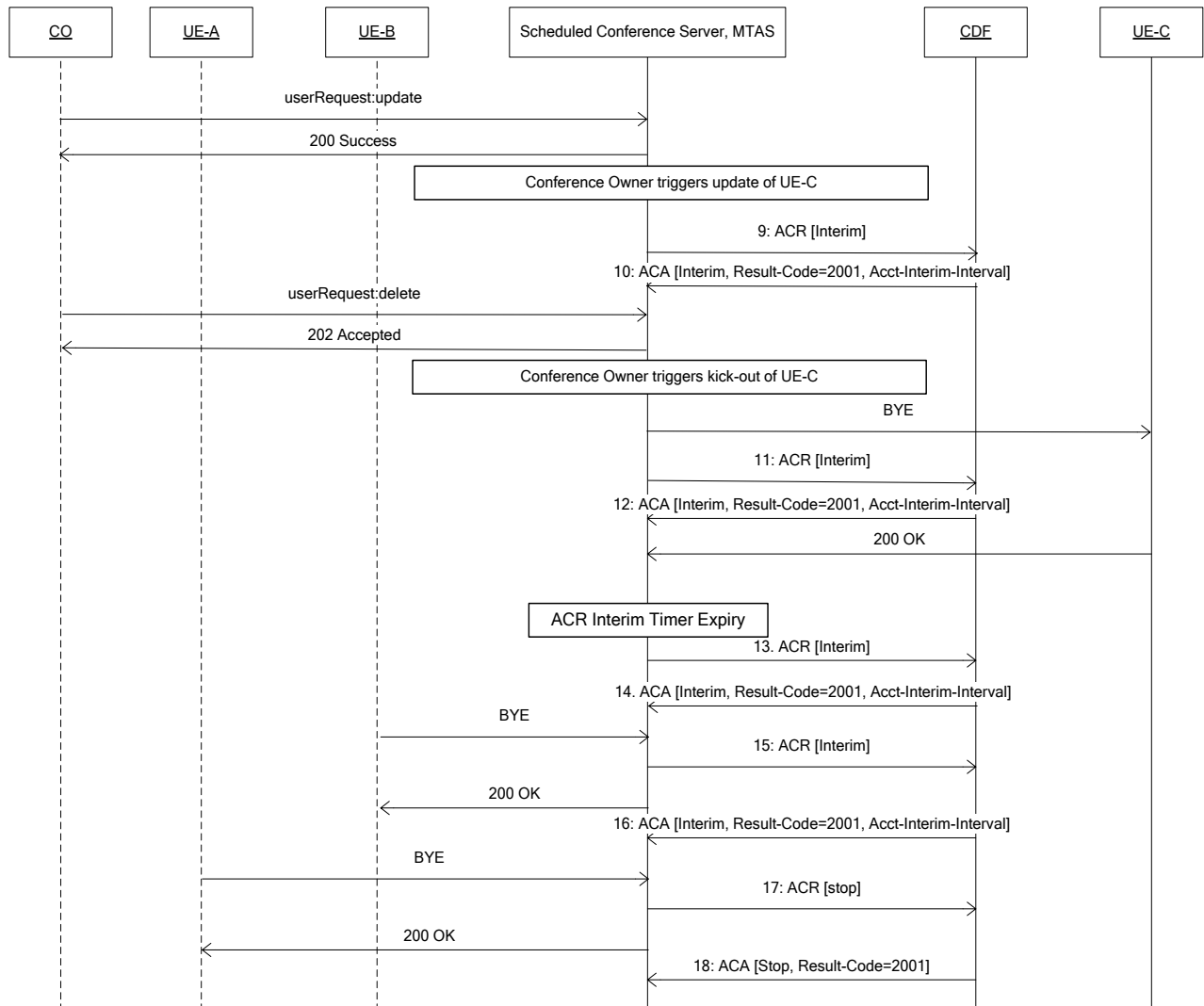


Figure 4: Successfully Established Scheduled Conference Focus Session, part 2

- 1 UE-A joins without providing the conference PIN in the INVITE. MTAS collects the PIN in-band.
On receipt of the 200 OK message from the first conference participant to the UPDATE/re-INVITE sent by the Focus, MTAS sends an ACR with Accounting-Record-Type indicating 'Start Record' to the CDF.
- 2 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.

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- 3 UE-B joins providing the conference PIN in the INVITE. On receipt of the ACK message from another conference participant, MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 4 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 5 On receipt of the ACK message from another conference participant (joined with dial-out method), MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 6 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 7 On receipt of the ACK message from another conference participant (failed join with dial-out method), MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 8 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 9 On successful focus triggered update of the conference participant. MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 10 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 11 On sending of a BYE message to a conference participant, who is not the last one, MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 12 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 13 On expiry of the ACR Interim Timer, MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 14 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.

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- 15 On receipt of a BYE message from a conference participant, who is not the last one, MTAS sends an ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF.
- 16 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.
- 17 On receipt of a BYE message from the last conference participant, MTAS sends an ACR with Accounting-Record-Type indicating 'Stop Record' to the CDF. If running, the Interim ACR Timer is stopped.
- 18 The CDF acknowledges receipt of the ACR.

The SIP headers and SDP information that are used to populate the AVPs in the ACR messages are captured from the incoming SIP dialog belonging to the SIP message triggering the ACR message.

The ACR with Accounting-Record-Type indicating 'Interim Record' triggered by expiry of the ACR Interim Timer does not contain any SIP header or SDP information.

Failed dial-in calls (even when the scheduled conference focus session is already established) are reported as described in 3.3.4.

Failed dial-out calls to the first participant (scheduled conference focus session is not yet established) are reported as described in 3.3.4.

Note: when the scheduled conference resource (focus) is terminated by the Conference Owner or due to internal failure, the charging session is terminated immediately. So, only one ACR [Stop] is generated instead of ACR [Interim]s for each participant without any SIP dialog specific information.

3.3.3 Mid-Session Media Changes

Figure 5 shows an example of a Diameter transaction between MTAS and a CDF for a successful media connection change during an established SIP session. Media changes can be instigated by either the calling party or the called party, and may be signaled using either UPDATE or re-INVITE messages. For more sequence diagrams and details of Mid-Session Media Changes see [12].

MTAS does not inform the CDF of unsuccessful attempts to change the media connection during an established session.

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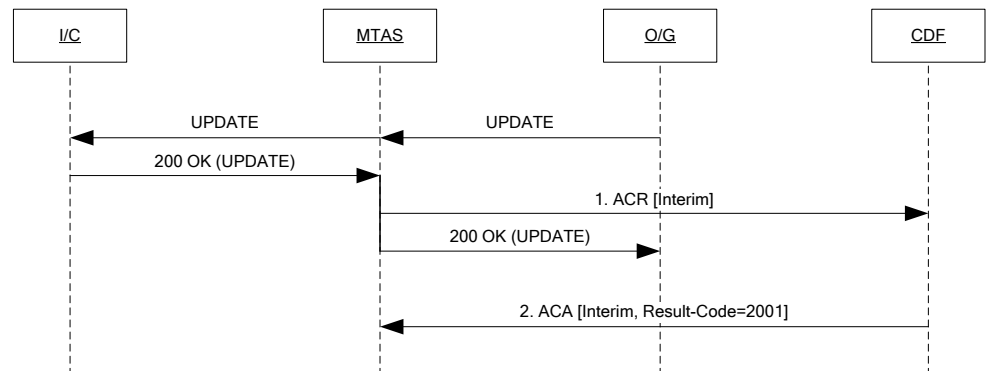


Figure 5: Media Change during an Established SIP Session

- 1 On receipt of a 200 OK response to the UPDATE request, MTAS checks the CM attribute `mtasChargingProfileSendAcrOnSdpChange` and if set to “disabled” no ACR-Interim is sent and execution stops, if set to “enabled” MTAS sends an ACR with Accounting-Record-Type indicating ‘Interim Record’ to the CDF. If running, the Interim ACR Timer is stopped.
- 2 The CDF acknowledges receipt of the ACR. If the response from the CDF contains an Acct-Interim-Interval AVP with a non-zero value, MTAS starts an Interim ACR Timer with a duration based on the received Acct-Interim-Interval value.

The SDP information used to populate the SDP-Session-Description and SDP-Media-Component AVPs depends on the AS session case. The SDP answer is captured from the same dialog as the SIP Call-ID (see Table 3) when the relevant SDP information has been received from / sent to that dialog.

In case of media change during scheduled conference focus session, the SIP headers and SDP information that are used to populate the AVPs in the ACR messages are captured from the incoming SIP dialog belonging to the SIP message triggering the media change.

3.3.4

Enhanced Parlay X Third Party Call Session Set-up, Supervision and Release

Figure 6 shows an example of Diameter transactions between MTAS and a CDF for a successfully established Enhanced Parlay X Third Party Call charging session.

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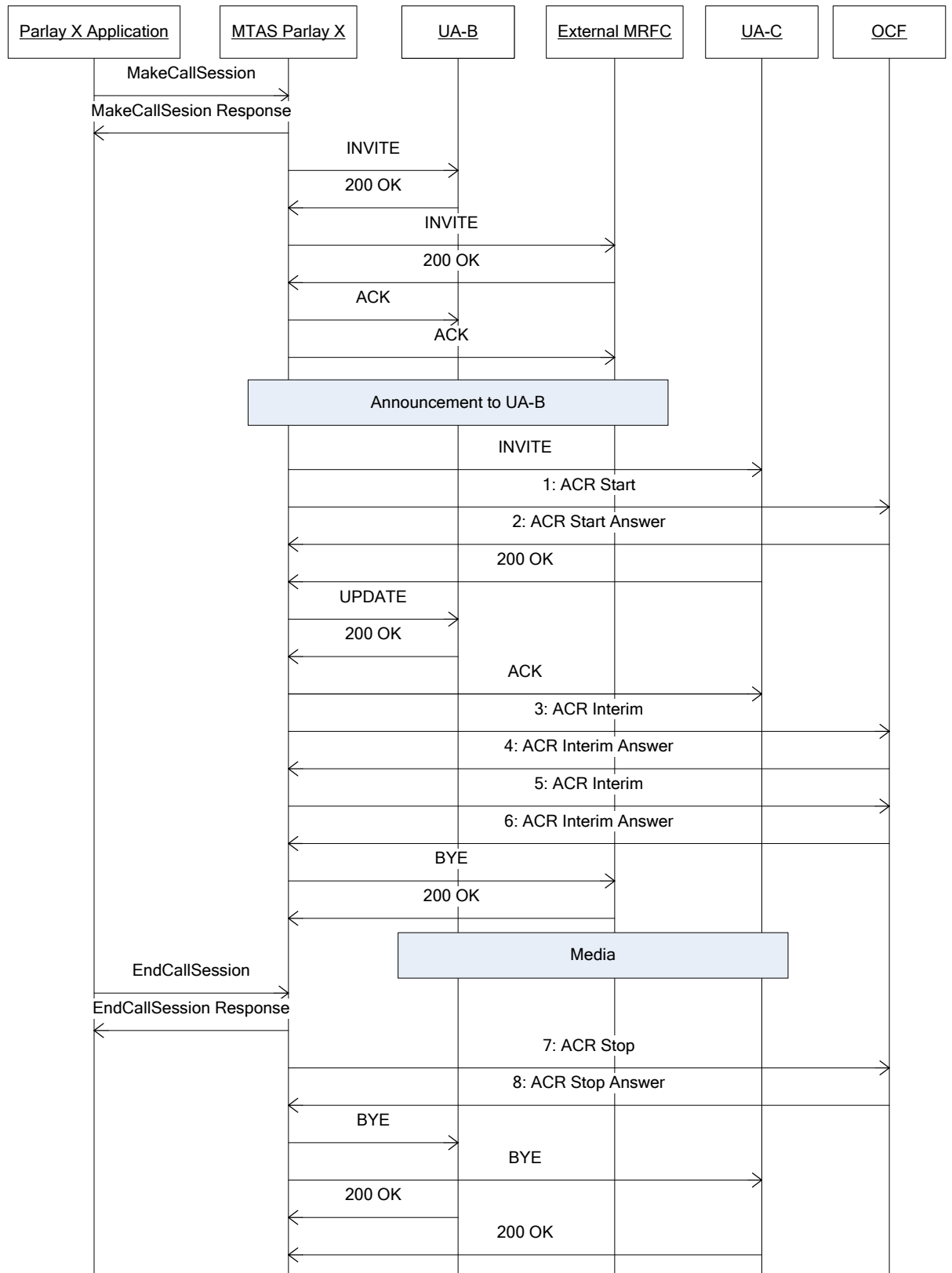


Figure 6 Enhanced Parlay X 3PCC session

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- 1 On receipt of the ACK message for 200 OK from UA-B, MTAS sends an ACR with Accounting-Record-Type indicating 'Start Record' to the CDF. The ACR relevant AVPs:
 - a. IMS-Charging-Identifier is set to the value used in INVITE to UA-B.
 - b. Related-ICID is set to a newly generated value.
 - c. SDP-Session-Description is set to the value of SDP in the ACK that triggers this ACR. In this case it is SDP of MRFC.
 - d. Participants-List contains Request-URLs of UA-B and UA-C.
 - e. Participants-Involved contains Request-URI of UA-B.
- 2 The CDF acknowledges receipt of the ACR Start (message 1).
- 3 On receipt of the 200 OK message for UPDATE from UA-B, MTAS sends ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF. The ACR relevant AVPs:
 - a. IMS-Charging-Identifier is set to the value used in INVITE to UA-B.
 - b. Related-ICID is set to the value used in ACR Start (message 1).
 - c. SDP-Session-Description is set to the value of SDP in 200 OK that triggers this ACR. In this case it is SDP of UA-B.
 - d. Participants-List contains Request-URLs of UA-B and UA-C.
 - e. Participants-Involved contains Request-URLs of UA-B and UA-C.
- 4 The CDF acknowledges receipt of the ACR Interim (message 3).
- 5 On receipt of 200 OK from UA-C, MTAS sends ACR with Accounting-Record-Type indicating 'Interim Record' to the CDF. The ACR relevant AVPs:
 - a. IMS-Charging-Identifier is set to a newly generated value.
 - b. Related-ICID is set to the value used in ACR Start (message 1).
 - c. SDP-Session-Description is set to the value of SDP in 200 OK that triggers this ACR. In this case it is SDP of UA-C.
 - d. Participants-List contains Request-URLs of UA-B and UA-C.
 - e. Participants-Involved contains Request-URLs of UA-B and UA-C.
- 6 The CDF acknowledges receipt of the ACR Interim (message 5).
- 7 On receipt of Parlay X EndCallSession request, MTAS sends ACR with Accounting-Record-Type indicating 'Stop Record' to the CDF. The ACR relevant AVPs:

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- a. IMS-Charging-Identifier is set to the value used in INVITE to UA-B.
- b. Related-ICID is set to the value used in ACR Start (message 1).
- c. Participants-List contains Request-URLs of UA-B and UA-C.
- d. Participants-Involved contains Request-URLs of UA-B and UA-C.

8 The CDF acknowledges receipt of the ACR Interim (message 7).

3.3.5 Multi-device Charging

In case of terminating charging if CM parameter `mtasChargingProfileMultiDevice` is enabled additional terminating charging sessions are created (apart from main terminating charging session described in 3.3.1) for each outgoing leg towards the IMS primary user's device. An ACR Event is sent on each additional terminating charging session in order to report information specific for particular device (User-Equipment-Info AVP, User-Name AVP and SIP-Ringing-Timestamp AVP). For details see [12].

3.4 Reporting Accounting Information for an Unsuccessful Attempt to Establish an MMTel or ST AS Session

Figure 7 and Figure 8 show examples of Diameter transactions between MTAS and a CDF for unsuccessful attempts to establish SIP sessions. For more sequence diagrams and details of Reporting Accounting Information for an Unsuccessful Attempt to Establish an MMTel or ST AS Session see [12].

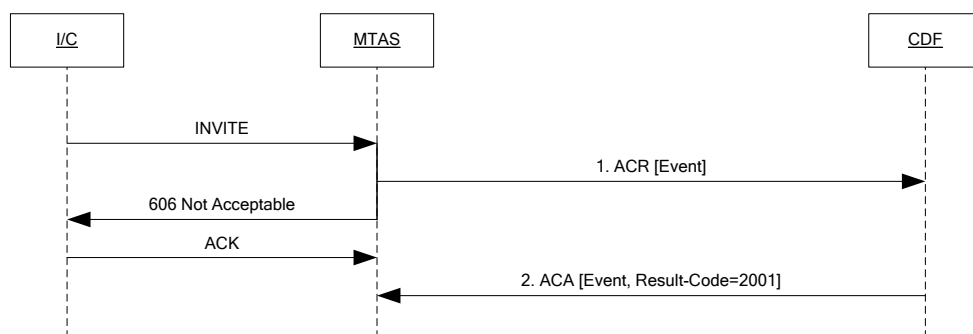


Figure 7: MMTel or ST AS Session Attempt Rejected by MTAS

- 1 On rejecting the INVITE request, MTAS sends an ACR with Accounting-Record-Type indicating 'Event Record' to the CDF.
- 2 The CDF acknowledges receipt of the ACR.

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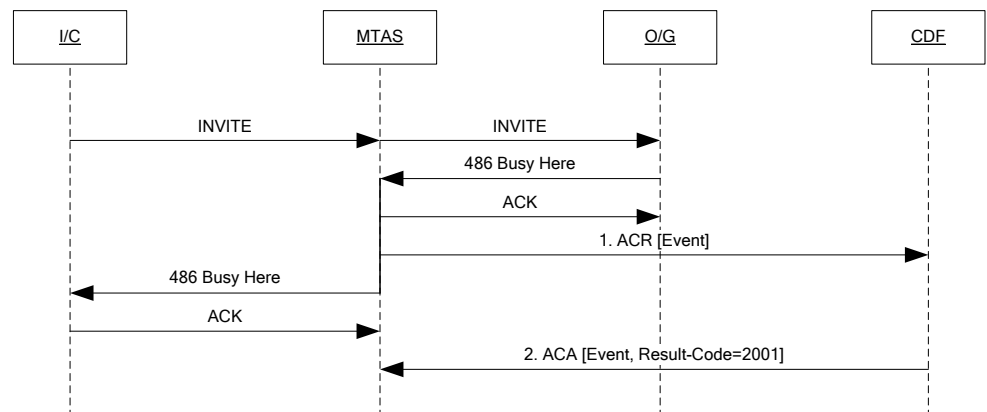


Figure 8: MMTel or ST AS Session Attempt Reject by a Subsequent Node

- 1 On receipt of a non-2xx final response to the INVITE request, MTAS sends an ACR with Accounting-Record-Type indicating 'Event Record' to the CDF.
- 2 The CDF acknowledges receipt of the ACR.

The SIP headers that are used to populate the AVPs in the ACR [Event] message are captured after all services have been executed with the following exceptions:

- Incoming SIP Call-ID
- Outgoing SIP Call-ID
- SIP Request URI
- From Header
- Reason Header

The incoming SIP Call-ID (used to populate the User-Session-Id AVP) is captured from the incoming dialog (see section 3.1). If SIP Call ID of the incoming dialog is not available, AVP is not sent.

The outgoing SIP Call-ID (used to populate the Outgoing-Session-Id AVP) is captured from the outgoing dialog (see section 3.1). If SIP Call ID of the outgoing dialog is not available AVP is not sent.

The SIP Request URI used to populate the Requested-Party-Address AVP is taken from the INVITE received on the incoming dialog since it is used to identify the address before any modification of the address is performed.

The From Header URI used to populate the From-Header AVP is taken from the INVITE received on the incoming dialog since it is used to identify the address before any modification of the address is performed. For the communication completion (3PCC) session case, the From Header URI used to populate the From-Header AVP, is taken from the original INVITE on which communication completion was invoked.

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The Reason Header used to populate the Reason-Header AVP is taken from the non-2xx final response to the INVITE request.

When the flexible communication distribution service applies and a session is not successfully established:

- a Terminating charging (terminating session case) is performed for the unsuccessful session attempt to the primary user (A-to-B).
- b Originating charging (transit session case) is performed for the unsuccessful session attempts to each invited related user (B-to-C, B-to-D etc.) and, when applicable, for an unsuccessful session attempt to the non-IMS primary user (B-to-B').

MTAS informs the CDF of unsuccessful attempts to join to a scheduled conference, with an ACR with Accounting-Record-Type indicating 'Event Record' for the first participant as well as for any additional one.

3.4.1

Reporting Accounting Information for an Unsuccessful Attempt to Establish an MMTel session due to OCB, announcement is played on established session.

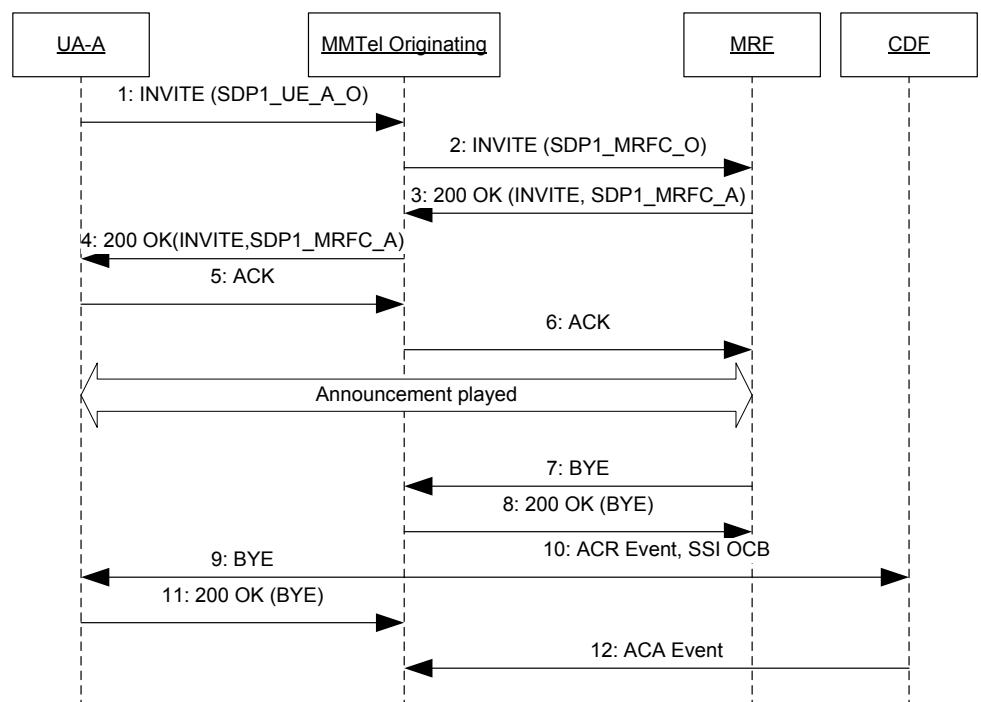


Figure 9 Established session announcement for OCB

1. UA-A sends an INVITE to MTAS with an SDP offer.

2. The R-URI is barred. MTAS checks the INVITE and the SDP, then selects the streams needed for the announcement. MTAS sends the INVITE to the MRF. The message contains the modified SDP offer received from UA-A.
3. MRF responds with a 200 OK (INVITE) containing the SDP answer, that will be sent to UA-A.
4. MTAS responds back with 200 OK containing SDP answer to UA-A.
5. ACK
6. ACK. The announcement is now played.
7. The announcement is finished, MRF sends a BYE.
8. MTAS sends 200 OK (BYE) to MRF.
9. MTAS sends a BYE to UA-A
10. MTAS sends ACR Event containing Supplementary-Service-Information populated for OCB to the CDF
11. UA-A MTAS responds with a 200 OK (BYE).
12. CDF replies with ACA Event.

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3.5 Reporting Accounting Information for Session Unrelated Events

3.5.1 Reporting Accounting Information for User Control of a Supplementary Service using an SSC

Figure 10 shows an example of a Diameter transaction between MTAS and a CDF for user control of a supplementary service using an SSC.

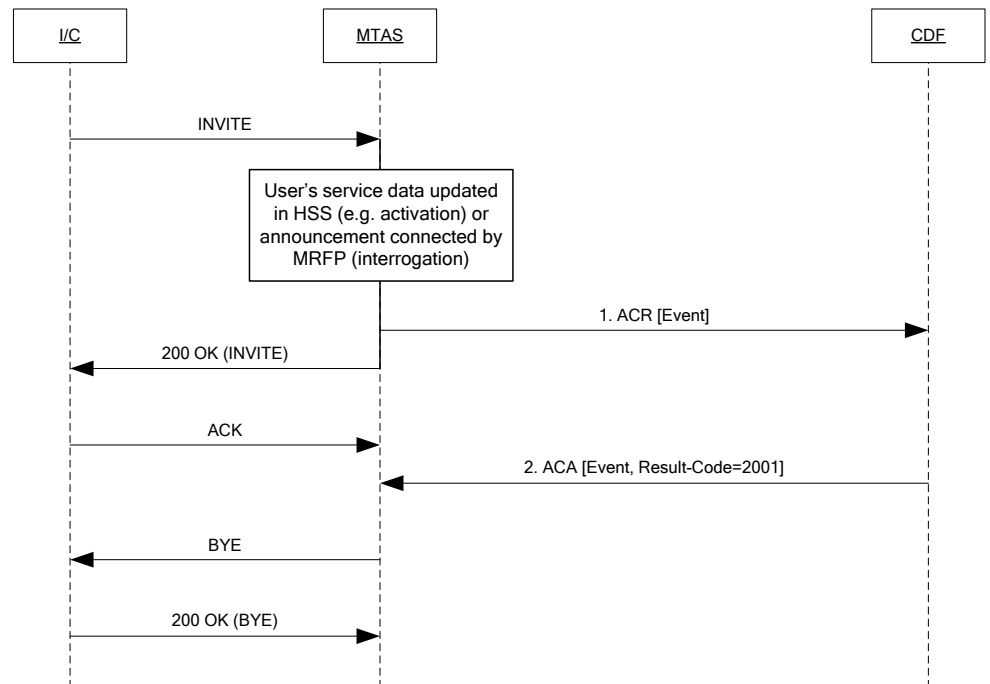


Figure 10: User Supplementary Service Control using an SSC

1 When the requested supplementary service action has been successfully performed, MTAS sends an ACR with Accounting-Record-Type indicating 'Event Record' to the CDF.

2 The CDF acknowledges receipt of the ACR.

Not all supplementary service actions trigger sending of ACR.

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3.5.2 Reporting Accounting Information for User Configuration of a Supplementary Service

Figure 11 shows an example of a Diameter transaction between MTAS and a CDF for user configuration of a supplementary service via the Ut interface.

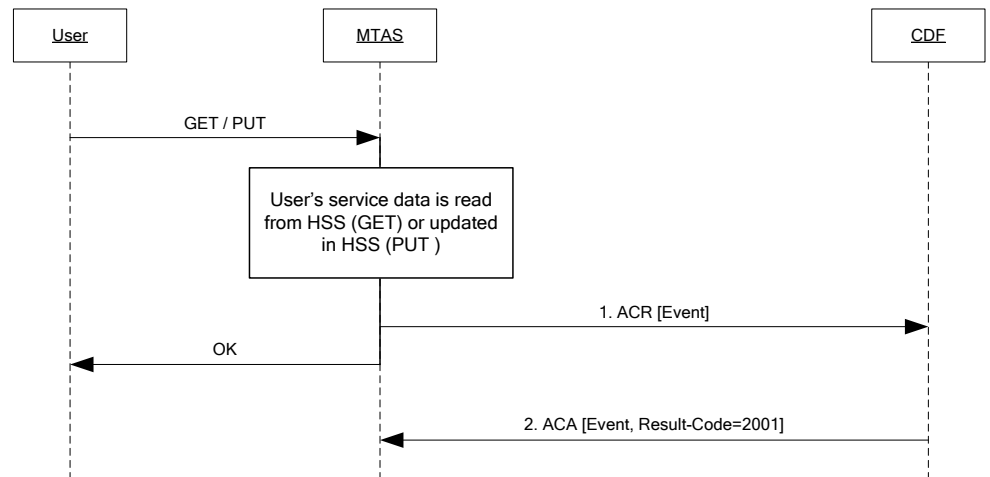


Figure 11: User Configuration of a Supplementary Service via the Ut interface

- 1 When the requested configuration action has been successfully performed, MTAS sends an ACR with Accounting-Record-Type indicating 'Event Record' to the CDF.
- 2 The CDF acknowledges receipt of the ACR.

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3.5.3 Reporting Accounting Information for User Configuration of a Scheduled Conference Focus

Figure 12 shows an example of a Diameter transaction between MTAS and a CDF for user configuration of a scheduled conference resource (focus) via the CCMP interface.

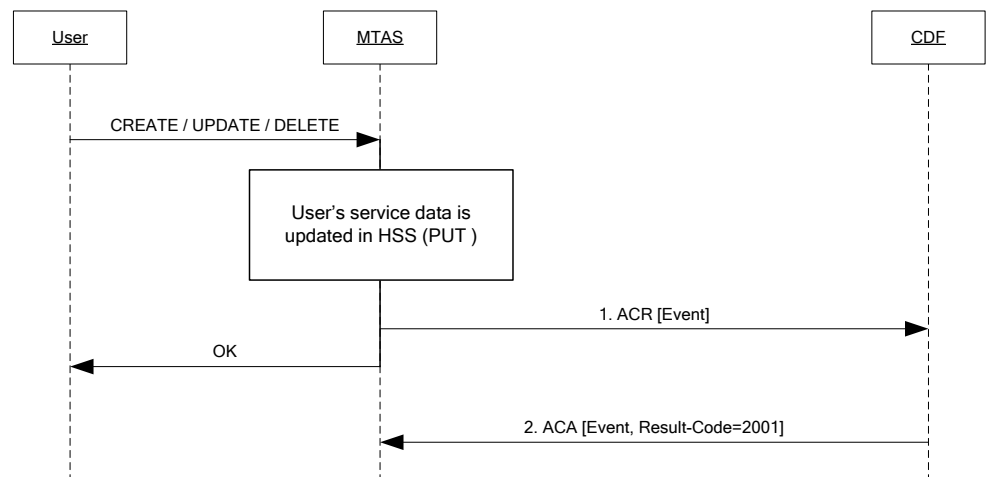


Figure 12: User Configuration of a Scheduled Conference Focus via the CCMP interface

- 1 When the requested configuration action has been successfully performed, MTAS sends an ACR with Accounting-Record-Type indicating 'Event Record' to the CDF.
- 2 The CDF acknowledges receipt of the ACR.

3.5.4 Reporting Account information for Requested Announcement

The MTAS use of event charging for the Requested Announcement service is the same as for interrogation using SSC, see section 3.5.1 and [12].

3.6 CDF Connection Failure

When MTAS is unable to send an ACR [Start] or ACR [Event] message to a CDF due to Diameter link failure or the CDF is temporarily out of order, MTAS will attempt to send the message to an alternative CDF instead, if an alternative is available. If the message cannot be sent to the alternative CDF due to Diameter link failure or the CDF is temporarily out of order, the message is depending on configuration, either buffered for later resending to the original CDF (see section 3.9) or stored for later retrieval (see section 3.10). In case the ACR [Start] message is buffered or stored, all subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered.

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When MTAS is unable to send an ACR [Interim] or ACR [Stop] message to a CDF due to a failure of the connection between MTAS and the CDF, it will depending on configuration either buffer the message for later resending to the CDF (see section 3.9) or store the message for later retrieval (see section 3.10). In the case that an ACR [Interim] message is buffered or stored, all subsequent ACR [Interim] messages and the ACR [Stop] message relating to the same Diameter charging session are also buffered or stored.

If the first buffered ACR message is ACR [Start] MTAS does not run the Interim ACR Timer and therefore does not generate any timer triggered ACR [Interim] messages for the remainder of the Diameter charging session.

3.7 No Reply from CDF

A timer is started whenever an ACR message is sent from MTAS to the CDF. The timer is stopped on receipt of an ACA response. If the timer expires, the ACR message is resent to the CDF. The duration of the timer and the maximum number of times that an ACR is resent are operator configurable (see reference [10]).

When the response timer expires after an ACR has been resent for the maximum number of times, MTAS takes the same action as for a CDF connection failure (see section 3.6).

3.8 Handling of Unsuccessful CDF Responses

3.8.1 Unsuccessful Response from the Primary CDF

3.8.1.1 ACA [Start] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Start] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS attempts to send the ACR [Start] message to an alternative CDF instead, if an alternative is available (see section 0).

If no alternative CDF is available, MTAS either buffers the ACR [Start] message for later resending to the primary CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10). All subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the primary CDF or stored for later retrieval.

If the ACR [Start] message cannot be sent to the alternative CDF due to a failure of the connection between MTAS and the alternative CDF, MTAS either buffers the ACR [Start] message for later resending to the primary CDF (see section 3.9) or stores the ACR for later retrieval (see section 3.10). All subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the primary CDF or stored for later retrieval.

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3.8.1.2 ACA [Start] containing Ericsson Experimental Result Code 4011

On receipt of an ACA [Start] message containing Ericsson experimental result code 4011 (Accounting Not Applicable) and the Backup Buffer function is enabled the ACR [Start] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated.

If the ACR Storage function is enabled the ACR is stored for later retrieval and the charging session is still open.

3.8.1.3 ACA [Start] containing any other Result Code

On receipt of an ACA [Start] message containing any other result code, MTAS attempts to send the ACR [Start] message to an alternative CDF instead, if an alternative is available.

If no alternative CDF is available and the Backup Buffer function is enabled the ACR [Start] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated. If the ACR Storage function is enabled, the ACR [start] is stored for later retrieval and the Diameter charging session is still open.

If the ACR [Start] message cannot be sent to the alternative CDF due to a failure of the connection between MTAS and the alternative CDF, MTAS either buffers the ACR [Start] message for later resending to the alternative CDF (see section 3.9) or store the ACR[start] message for later retrieval (see section 3.10. All subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the alternative CDF or stored for later retrieval.

3.8.1.4 ACA [Interim] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Interim] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS will either buffer the ACR [Interim] message for later resending to the primary CDF (see section 3.9) or store the ACR[Interim] message for later retrieval (see section 3.10). All subsequent ACR [Interim] messages and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the primary CDF or stored for later retrieval.

3.8.1.5 ACA [Interim] containing Ericsson Experimental Result Code 4011

On receipt of an ACA [Interim] message containing Ericsson experimental result code 4011 (Accounting Not Applicable), and the Backup Buffer function is enabled the ACR [Interim] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated.

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If the ACR Storage function is enabled the ACR is stored for later retrieval and the charging session is still open.

3.8.1.6 ACA [Interim] containing any other Result Code

On receipt of an ACA [Interim] message containing any other result code and the Backup Buffer function is enabled the ACR [Interim] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated. If the ACR Storage function is enabled, the ACR [start] is stored for later retrieval and the Diameter charging session is still open.

3.8.1.7 ACA [Stop] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Stop] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS will either buffer the ACR [Stop] message for later resending to the primary CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10).

3.8.1.8 ACA [Stop] containing any other Result Code

On receipt of an ACA [Stop] message containing any other result code, or containing Ericsson experimental result code 4011 (Accounting Not Applicable) and if the Backup Buffer function is enabled, the ACR [Stop] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated. If the ACR Storage function is enabled, the ACR [start] is stored for later retrieval and the Diameter charging session is still open.

3.8.1.9 ACA [Event] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Event] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS attempts to send the ACR [Event] message to an alternative CDF instead, if an alternative is available.

If no alternative CDF is available, MTAS either buffers the ACR [Event] message for later resending to the primary CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10).

If the ACR [Event] message cannot be sent to the alternative CDF due to a failure of the connection between MTAS and the alternative CDF, MTAS either buffers the ACR [Event] message for later resending to the primary CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10).

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3.8.1.10 ACA [Event] containing Ericsson Experimental Result Code 4011

On receipt of an ACA [Event] message containing Ericsson experimental result code 4011 (Accounting Not Applicable) and if the Backup Buffer function is enabled the ACR [Event] message is discarded.

If the ACR Storage function is enabled the ACR[Event] message is stored for later retrieval.

3.8.1.11 ACA [Event] containing any other Result Code

On receipt of an ACA [Event] message containing any other result code, MTAS attempts to send the ACR [Event] message to an alternative CDF instead, if an alternative is available.

If no alternative CDF is available and if the Backup Buffer function is enabled the ACR [Event] message is discarded. If the ACR Storage function is enabled the ACR[Event] is stored for later retrieval.

If the ACR [Event] message cannot be sent to the alternative CDF due to a failure of the connection between MTAS and the alternative CDF, MTAS either buffers the ACR [Event] message for later resending to the alternative CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10).

3.8.2 Unsuccessful Response from the Alternative CDF

3.8.2.1 ACA [Start] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Start] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS either buffers the ACR [Start] message for later resending or store the ACR for later retrieval (see section 3.10).

If buffered, the ACR [Start] message is either buffered for resending to the primary CDF or is buffered for resending to the alternative CDF.

The message is buffered for resending to the primary CDF when the ACR [Start] message was sent to the alternative CDF due to one of the following conditions:

- Primary CDF Connection Failure (see section 3.6),
- No Reply from the Primary CDF (see section 3.7), or
- ACA [Start] from Primary CDF containing Result Code 3002, 3004, 4002 or 4003 (see section 3.8.1.1).

The message is buffered for resending to the secondary CDF in all other cases.

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All subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the relevant CDF or stored for later retrieval.

3.8.2.2 ACA [Start] containing Ericsson Experimental Result Code 4011

On receipt of an ACA [Start] message containing Ericsson experimental result code 4011 (Accounting Not Applicable) and the Backup Buffer function is enabled the ACR [Start] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated.

If the ACR Storage function is enabled the ACR is stored for later retrieval and the charging session is still open.

3.8.2.3 ACA [Start] containing any other Result Code

On receipt of an ACA [Start] message containing any other result code, the ACR [Start] message is if the Backup Buffering function is enabled either buffered for resending to the primary CDF or is discarded.

The message is buffered for resending to the primary CDF when the ACR [Start] message was sent to the alternative CDF due to one of the following conditions:

- Primary CDF Connection Failure (see section 3.6),
- No Reply from the Primary CDF (see section 3.7), or
- ACA [Start] from Primary CDF containing Result Code 3002, 3004, 4002 or 4003 (see section 3.8.1.1).

The message is discarded in all other cases.

On receipt of an ACA [Start] message containing any other result code, the ACR [Start] message is if the ACR Storage function is enabled stored for later retrieval.

When the ACR [Start] message is buffered or stored, all subsequent ACR [Interim] messages, except the timer triggered ones, and the ACR [Stop] message relating to the same Diameter charging session are also buffered or stored for resending to the primary CDF.

3.8.2.4 ACA [Interim] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Interim] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS will either buffer the ACR [Interim] message for later resending to the alternative CDF (see section 3.9) or store the ACR for later retrieval (see section 3.10). All subsequent ACR [Interim] messages and the ACR [Stop] message relating to the same Diameter charging session are also buffered for resending to the alternative CDF or stored for later retrieval.

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3.8.2.5 ACA [Interim] containing any other Result Code

On receipt of an ACA [Interim] message containing any other result code, or containing Ericsson experimental result code 4011 (Accounting Not Applicable), the ACR [Interim] message is discarded if the Backup Buffer function is enabled. The Diameter charging session is considered closed and no further ACR messages are generated.

If the ACR Storage function is enabled the ACR is stored for later retrieval and the charging session is still opened.

3.8.2.6 ACA [Stop] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Stop] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS will either buffer the ACR [Stop] message for later resending to the alternative CDF (see section 3.9) or store the ACR for later retrieval.

3.8.2.7 ACA [Stop] containing any other Result Code

On receipt of an ACA [Stop] message containing any other result code, or containing Ericsson experimental result code 4011 (Accounting Not Applicable) and if the Backup Buffer function is enabled the ACR [Stop] message is discarded. The Diameter charging session is considered closed and no further ACR messages are generated.

If the ACR Storage function is enabled the ACR is stored for later retrieval and the charging session is still opened.

3.8.2.8 ACA [Event] containing Result Code 3002, 3004, 4002 or 4003

On receipt of an ACA [Event] message containing a result code indicating 3002 (Unable to Deliver), 3004 (Too Busy), 4002 (Out of Space) or 4003 (Election Lost), MTAS either buffers the ACR [Event] message for later resending or store the ACR[Event] message for later retrieval.

If the ACR [Event] message is buffered for later delivery it is either buffered for resending to the primary CDF or is buffered for resending to the alternative CDF.

The message is buffered for resending to the primary CDF when the ACR [Event] message was sent to the alternative CDF due to one of the following conditions:

- Primary CDF Connection Failure (see section 3.6),
- No Reply from the Primary CDF (see section 3.7), or
- ACA [Event] from Primary CDF containing Result Code 3002, 3004, 4002 or 4003 (see section 3.8.1.9).

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The message is buffered for resending to the secondary CDF in all other cases.

3.8.2.9 ACA [Event] containing Ericsson Experimental Result Code 4011

On receipt of an ACA [Event] message containing Ericsson experimental result code 4011 (Accounting Not Applicable), the ACR [Event] message is discarded.

3.8.2.10 ACA [Event] containing any other Result Code

On receipt of an ACA [Event] message containing any other result code, the ACR [Event] message is if the Backup Buffer function is enabled either buffered for resending to the primary CDF or is discarded.

The message is buffered for resending to the primary CDF when the ACR [Event] message was sent to the alternative CDF due to one of the following conditions:

- Primary CDF Connection Failure (see section 3.6),
- No Reply from the Primary CDF (see section 3.7), or
- ACA [Event] from Primary CDF containing Result Code 3002, 3004, 4002 or 4003 (see section 3.8.1.9).

The message is discarded in all other cases.

If the ACR Storage function is enabled the ACR is stored for later retrieval.

3.9 Backup Buffering of ACRs

When MTAS is unable to deliver an ACR message to the CDF, the message may be buffered for later resending if the Backup Buffer function is enabled. ACR messages are buffered in the following cases:

- CDF Connection Failure (see section 3.6)
- No Reply from CDF (see section 3.7)
- Receipt of ACA containing a result code of 3002 (Unable to Deliver)
- Receipt of ACA containing a result code of 3004 (Too Busy)
- Receipt of ACA containing a result code of 4002 (Out of Space)
- Receipt of ACA containing a result code of 4003 (Election Lost)

Buffered messages are stored on the file system. When an ACR message has been buffered, all subsequent ACR messages for the same Diameter charging session are also buffered so that the order of the ACR messages sent for the charging session is maintained. The amount of charging data to be buffered depends on the traffic model but the current file system capacity of 300 GB should be enough to buffer at least 3 days of traffic.

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Separate buffers are used for queuing the ACR messages destined for different destinations (based on the destination host, if known, or on the destination realm). When a buffered ACR message is successfully sent to the CDF, the next queued ACR message in the same buffer is sent.

When an attempt to send a queued ACR message fails due to any of the reasons a to f above, the ACR message remains at the head of the queue and attempts to resend the ACR message continue at regular periodic intervals.

When an attempt to send a queued ACR message fails due to any reason other than reasons listed above, the ACR message is discarded (together with all other queued ACR messages relating to the same Diameter charging session) and the next queued ACR message in the same buffer is sent.

As a consequence of buffering ACR messages, the Acct-Interim-Interval AVP received in any ACA responses to buffered ACR messages is not received or is ignored, and it has the following impact for the remainder of the affected Diameter charging sessions:

- If the first buffered ACR message in the charging session is an ACR [Start] the timer triggered ACR [Interim] will not be generated.
- If the first buffered ACR message in the charging session is an ACR [Interim] the interval for the timer triggered ACR [Interim] will not be changed.

The inability to receive ACAs in practice means that when the buffering starts the already established calls will have timer triggered ACR [Interim] while the new calls will not have timer triggered ACR [Interim].

3.10 ACR Storage

If the ACR Storage function is enabled and MTAS is unable to deliver an ACR message to the CDF, the ACR message is stored in an ACR file.

ACR messages are stored in the following cases:

- CDF Connection Failure (see section 3.6)
 - No Reply from CDF (see section 3.7)
 - Receipt of ACA containing a transient or permanent error result code
- ACR messages are stored on the file system. When an ACR message has been stored, all subsequent ACR messages for the same Diameter charging session are also stored so that the order of the ACR messages is maintained.

As a consequence of storing ACR messages, the Acct-Interim-Interval AVP received in any ACA responses to stored ACR messages is not received or is ignored, and it has the following impact for the remainder of the affected Diameter charging sessions:

- If the first stored ACR message in the charging session is an ACR [Start] the timer triggered ACR [Interim] will not be generated.

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- If the first stored ACR message in the charging session is an ACR [Interim] the interval for the timer triggered ACR [Interim] will not be changed.

The inability to receive ACAs in practice means that when the storing starts the already established calls will have timer triggered ACR [Interim] while the new calls will not have timer triggered ACR [Interim].

The ACR messages are stored in ACR files in a specific format (see [21]).

3.11 Error Handling

On receipt of an ACA message from the CDF, MTAS checks that:

- The message contains all mandatory AVPs, i.e. Session-Id, Origin-Host, Origin-Realm, Accounting-Record-Type, and Accounting-Record-Number.
- The message contains either a Result-Code AVP or an Experimental-Result AVP.
- The Accounting-Record-Type and Accounting-Record-Number AVPs contain values that match the values sent in the corresponding ACR message.
- The Result-Code AVP, if present, contains a value within the range of the error classes defined in reference [7], i.e. 1000 to 5999.
- The Experimental-Result AVP, if present, contains a Vendor-Id AVP and an Experimental-Result-Code AVP which contain supported values.

If an ACA message does not satisfy all of these conditions, the message is considered faulty and is handled as a 'failed answer' as specified in the accounting state machine described in reference [7].

MTAS ignores unrecognized and unexpected AVPs received in ACA messages.

4 Information Model

4.1 General

The command codes used to identify messages sent on the Rf interface are specified in reference [6].

The following commands are defined in this specification:

Table 4: Commands used on the Rf interface

Command-Name	Abbr.	Code	Direction	Section
Accounting-Request	ACR	271	MTAS → CDF	5.1.1
Accounting-Answer	ACA	271	CDF → MTAS	5.1.2

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5 Formal Syntax or Schema

5.1 Message Contents for Offline Charging

The Diameter accounting application messages Accounting Request (ACR) and Accounting Answer (ACA) are used for offline charging. The structure of the messages is based on the format of the messages defined by 3GPP in reference [5] for MTAS Rf version 1, reference [6] for MTAS Rf version 2 and reference [25] for MTAS Rf version 3. Additional information is included in the messages in the form of Ericsson defined vendor specific Attribute Value Pairs (AVPs).

The purpose and content of these messages are described in sections 5.1.1 and 5.1.2.

The AVPs used in the messages are described in section 5.1.3.13.

The following notation is used in this section to describe message contents:

- <AVP> indicates a mandatory AVP with a fixed position in the message.
- {AVP} indicates a mandatory AVP in the message.
- [AVP] indicates an optional AVP in the message.
- *AVP indicates that multiple occurrences of an AVP are possible.
- (1) Indicates that the AVP and its sub-AVPs are only included if MTAS Rf version 1 (based on 3GPP release 7) is configured as described in section 5.1.3.
- (2) Indicates that the AVP and its sub-AVPs are only included if MTAS Rf version 2 (based on 3GPP release 9) is configured as described in section 5.1.3.
- (3) Indicates that the AVP and its sub-AVPs are only included if MTAS Rf version 3 (based on 3GPP release 12) is configured as described in section 5.1.3.

5.1.1 Accounting Request Message

The Accounting Request (ACR) message is sent from MTAS to the CDF to report information that can be used for accounting purposes for a given service.

5.1.1.1 Start Record

The format of ACR (Start Record) messages generated by MTAS is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
          < Session-Id >
          { Origin-Host }
          { Origin-Realm }
          { Destination-Realm }
```

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```
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2)(3)
[ Event-Timestamp ]
[ User-Name ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
* [ Called-Asserted-Identity ]
[ Number-Portability-Routing-Information ]
[ Requested-Party-Address ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
    [ Originating-IOI ]
    [ Terminating-IOI ]
[ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
    { SDP-Media-Name }
    * [ SDP-Media-Description ]
        [ Media-Initiator-Flag ]
        [ SDP-Type ] (2)(3)
* [ Message-Body ] (2)(3)
    { Content-Type }
    { Content-Length }
    [ Content-Disposition ]
    [ Originator ]
* [ Service-Specific-Info ]
    [ Service-Specific-Data ]
    [ Service-Specific-Type ]
    [ Access-Network-Information ]
    [ Carrier-Select-Routing-Information ] (3)
    [ Instance-Id ] (3)
[ PS-Information ]
    [ 3GPP-MS-TimeZone ]
    [ User-Equipment-Info ]
        { User-Equipment-Info-Type }
        { User-Equipment-Info-Value }
[ MMTel-Information ] (3)
* [ Supplementary-Service ] (3)
```

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[CUG-Information] (3)
[LCS-Information] (3)
[MSISDN] (3)
[Ericsson-Service-Information]
* [IMS-Service-Identification]
[MMT-Information]
[Analyzed-Call-Type]
[Called-Asserted-Identity-Presentation-Status]
[Calling-Party-Address-Presentation-Status]
[Carrier-Select-Routing-Information] (1) (2)
[Conference-Id]
[Dial-Around-Indicator]
[From-Header]
[From-Header-Presentation-Status]
[MSISDN] (1) (2)
[Party-To-Charge]
* [Related-ICID]
[SCC-Service-Identity]
[SCC-TADS-Decision]
[Served-User]
[Service-Number-Type]
[SIP-Request-Timestamp-Fraction] (1)
[SIP-Response-Timestamp-Fraction] (1)
[SIP-Ringing-Timestamp] (1) (2)
[SIP-Ringing-Timestamp-Fraction] (1) (2)
* [Supplementary-Service-Information]
 { Supplementary-Service-Identity }
 { Supplementary-Service-Action }
 [Redirecting-Party-Address]
 [Routing-Call-Type]
 [Common-Policy-Rule-Identity]
 [Service-Suppression-Info]
 { Matched-Regular-Expression }
 { Services-To-Suppress }
 [CUG-Information] (1) (2)
 [Participants-Involved]
 [Participants-List]
 [Tenant]
 [XCON-Id]
[SIP-Ringing-Timestamp] (3)
[SIP-Ringing-Timestamp-Fraction] (3)
[Subscriber-Type]
[GSM-Call-Reference-Number]
[MSC-Address]
* [Transaction-Info]
 { Transaction-Type }
 [Transaction-SIP-Message]
 { Transaction-Data-Name }
 * { Transaction-Data-Value }
[UC-Mobility-Call-Leg]
[UHTZ-Offset]
[Forward-TTC-Charging-Headers]
 [Charging-Area]
 [Carrier-Information]
 [Additional-User-Category]
[Backward-TTC-Charging-Headers]
 [Charging-Area]

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[Carrier-Information]
[Additional-User-Category]
[Flexible-Charging-Info]
[Forward-TTC-Charging-Parameters]
[Backward-TTC-Charging-Parameters]
[AS-Type]
* [Ro-Information]
[Ro-Status]

5.1.1.2 Stop Record

The format of ACR (Stop Record) messages generated by MTAS is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
[ IMS-Charging-Identifier ]
* [ Message-Body ] (2)(3)
    { Content-Type }
    { Content-Length }
    [ Content-Disposition ]
    [ Originator ]
* [ Service-Specific-Info ]
    [ Service-Specific-Data ]
    [ Service-Specific-Type ]
    [ Cause-Code ]
* [ Reason-Header ]
[ LCS-Information ] (3)
    [ MSISDN ] (3)
[ MMTel-Information ] (2)(3)
```

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```
* [ Supplementary-Service ] (2) (3)
    [ Associated-Party-Address ] (2) (3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
        [ MSISDN ] (1) (2)
        [ Party-To-Charge ]
    * [ Related-ICID ]
        [ SCC-Service-Identity ]
        [ SCC-TADS-Decision ]
        [ Service-Number-Type ]
        [ SIP-Request-Timestamp-Fraction ] (1)
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
        [ XCON-Id ]
        [ Participants-Involved ]
        [ Participants-List ]
    * [ Transaction-Info ]
        { Transaction-Type }
        [ Transaction-SIP-Message ]
        { Transaction-Data-Name }
    * { Transaction-Data-Value }
[ AS-Type ]
```

5.1.1.3 Interim Record

The formats of ACR (Interim Record) messages generated by MTAS are described in the following subsections. The format of a message depends on the cause triggering the generation of the message:

- a Expiry of the Acct-Interim-Interval timer in MMTel or ST AS session
- b Expiry of the Acct-Interim-Interval timer in scheduled conference focus session
- c Media change
- d Scheduled conference participant join
- e Unsuccessful scheduled conference participant join with dial-out method,
- f Scheduled conference participant update
- g Scheduled conference participant leave
- h Update on user location info received
- i Enhanced Parlay X Third Party Call, Involved Participants update
- j Japanese Charging, Telephone Directory Service (TDS) query

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5.1.1.3.1 Interim Record (Acct-Interim-Interval), MMTel or ST AS session

The format of ACR (Interim Record) messages generated by MTAS due to the expiry of the Acct-Interim-Interval timer is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2) (3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
    * [ Calling-Party-Address ]
    [ Called-Party-Address ]
    [ IMS-Charging-Identifier ]
    * [ Message-Body ] (2) (3)
        { Content-Type }
        { Content-Length }
        [ Content-Disposition ]
        [ Originator ]
    * [ Service-Specific-Info ]
        [ Service-Specific-Data ]
        [ Service-Specific-Type ]
[ LCS-Information ] (3)
    [ MSISDN ] (3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
        [ MSISDN ] (1) (2)
        [ Party-To-Charge ]
    * [ Related-ICID ]
        [ SCC-Service-Identity ]
        [ SCC-TADS-Decision ]
        [ Service-Number-Type ]
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
[ AS-Type]
[ Interim-Reason ]
```

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5.1.1.3.2 Interim Record (Acct-Interim-Interval), scheduled conference focus session

The format of ACR (Interim Record) messages generated by MTAS due to the expiry of the Acct-Interim-Interval timer is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2) (3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Role-of-Node ]
    { Node-Functionality }
    [ Session-Priority ]
    [ IMS-Charging-Identifier ]
[ Ericsson-Service-Information ]
    [ MMT-Information ]
    [ Conference-Id ]
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
    [ XCON-Id ]
[ Interim-Reason ]
```

5.1.1.3.3 Interim Record (Media Change)

The format of ACR (Interim Record) messages generated by MTAS due to media changes is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2) (3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
```


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```
{ Subscription-Id-Data }
[ IMS-Information ]
  [ Event-Type ]
    { SIP-Method }
  [ Role-of-Node ]
  { Node-Functionality }
  [ Session-Priority ]
  [ User-Session-Id ]
  [ Outgoing-Session-Id ]
* [ Calling-Party-Address ]
  [ Called-Party-Address ]
  [ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
  [ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
  { SDP-Media-Name }
  * [ SDP-Media-Description ]
    [ Media-Initiator-Flag ]
    [ SDP-Type ] (2)(3)
* [ Message-Body ] (2)(3)
  { Content-Type }
  { Content-Length }
  [ Content-Disposition ]
  [ Originator ]
* [ Service-Specific-Info ]
  [ Service-Specific-Data ]
  [ Service-Specific-Type ]
  [ Access-Network-Information ]
[ LCS-Information ] (3)
  [ MSISDN ] (3)
[ MMTel-Information ] (2)(3)
  * [ Supplementary-Service ] (2)(3)
    [ Associated-Party-Address ] (2)(3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
    [ MSISDN ] (1)(2)
    [ Party-To-Charge ]
  * [ Related-ICID ]
    [ SCC-Service-Identity ]
    [ SCC-TADS-Decision ]
    [ Service-Number-Type ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    [ XCON-Id ]
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
```

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```
        { Transaction-Data-Name }
    * { Transaction-Data-Value }
[ AS-Type ]
[ Interim-Reason ]
```

5.1.1.3.4 Interim Record (Participant Join)

The format of ACR (Interim Record) messages generated by MTAS due to join of additional participant to a scheduled conference is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2)(3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
* [ Called-Asserted-Identity ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
    [ Originating-IOI ]
    [ Terminating-IOI ]
[ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
    { SDP-Media-Name }
    * [ SDP-Media-Description ]
        [ Media-Initiator-Flag ]
        [ SDP-Type ] (2)(3)
* [ Message-Body ] (2)(3)
    { Content-Type }
    { Content-Length }
```

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```
[ Content-Disposition ]
[ Originator ]
[ Access-Network-Information ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
    [ From-Header ]
    [ From-Header-Presentation-Status ]
  * [ Related-ICID ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
    [ SIP-Ringing-Timestamp ] (1)(2)
    [ SIP-Ringing-Timestamp-Fraction ] (1)(2)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    [ XCON-Id ]
  [ SIP-Ringing-Timestamp ] (3)
  [ SIP-Ringing-Timestamp-Fraction ] (3)
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
  { Transaction-Data-Name }
  * { Transaction-Data-Value }
```

5.1.1.3.5 Interim Record (Unsuccessful scheduled conference participant join with dial-out method)

The format of ACR (Interim Record) messages generated by MTAS due to failed dial-out from scheduled conference to (not first) participant is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2)(3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ IMS-Information ]
  [ Event-Type ]
    { SIP-Method }
  [ Role-of-Node ]
  { Node-Functionality }
  [ User-Session-Id ]
  [ Session-Priority ]
```

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```

* [ Calling-Party-Address ]
  [ Called-Party-Address ]
* [ Called-Asserted-Identity ]
  [ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
  [ Inter-Operator-Identifier ]
    [ Terminating-IOI ]
  [ IMS-Charging-Identifier ]
  [ Cause-Code ]
* [ Reason-Header ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
  * [ Related-ICID ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
    [ SIP-Ringing-Timestamp ] (1)(2)
    [ SIP-Ringing-Timestamp-Fraction ] (1)(2)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
  [ XCON-Id ]
[ SIP-Ringing-Timestamp ] (3)
[ SIP-Ringing-Timestamp-Fraction ] (3)
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
  { Transaction-Data-Name }
  * { Transaction-Data-Value }

```

5.1.1.3.6 Interim Record (Participant Update)

The format of ACR (Interim Record) messages generated by MTAS due to CCMP triggered update of participant is as follows:

```

<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2)(3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }

```

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```
[ IMS-Information ]
  [ Role-of-Node ]
    { Node-Functionality }
    [ Session-Priority ]
[ Ericsson-Service-Information ]
  [ MMT-Information ]
    [ Conference-Id ]
    * [ Related-ICID ]
    * [ Supplementary-Service-Information ]
      { Supplementary-Service-Identity }
      { Supplementary-Service-Action }
      [ CCMP-User-Info ]
  [ XCON-Id ]
```

5.1.1.3.7 Interim Record (Participant Leave)

The format of ACR (Interim Record) messages generated by MTAS due to leave of a participant (not-last) from a scheduled conference is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Acct-Interim-Interval ] (2)(3)
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ IMS-Information ]
  [ Event-Type ]
    { SIP-Method }
  [ Role-of-Node ]
    { Node-Functionality }
  [ User-Session-Id ]
  [ Session-Priority ]
* [ Calling-Party-Address ]
  [ Called-Party-Address ]
  [ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
  [ IMS-Charging-Identifier ]
  [ Cause-Code ]
* [ Reason-Header ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
```

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```
* [ Related-ICID ]
  [ SIP-Request-Timestamp-Fraction ] (1)
  [ SIP-Response-Timestamp-Fraction ] (1)
* [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
  [ XCON-Id ]
* [ Transaction-Info ]
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
* { Transaction-Data-Value }
```

5.1.1.3.8 Interim Record (User Location Info Received)

The format of ACR (Interim Record) messages generated by MTAS due to update on user location info is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
[ Event-Type ]
    { SIP-Method }
[ Role-of-Node ]
{ Node-Functionality }
[ Outgoing-Session-Id ]
[ User-Session-Id ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ IMS-Charging-Identifier ]
[ Access-Network-Information ]
[ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
```

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5.1.1.3.9 Interim Record (Enhanced Parlay X Third Party Call, Involved Participants update)

The format of ACR (Interim Record) messages generated by MTAS due to the change in the list of participants involved in the call is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
    { SDP-Media-Name }
    * [ SDP-Media-Description ]
        [ Media-Initiator-Flag ]
        [ SDP-Type ] (2)(3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
[ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
* [ Related-ICID ]
[ Service-Number-Type ]
* [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    { Participants-Involved }
    { Participants-List }
```

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5.1.1.3.10 Interim Record (Japanese Charging and TDS)

The format of ACR (Interim Record) messages generated by MTAS and the Japanese Charging service due to TDS query is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
[ Destination-Host ]
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Service-Context-Id ]
[ Event-Timestamp ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ IMS-Charging-Identifier ]
    * [ Calling-Party-Address ]
    [ Called-Party-Address ]
    [ Event-Type ]
        { SIP-Method }
    [ Time-Stamps ]
        [ SIP-Request-Timestamp ]
        [ SIP-Request-Timestamp-Fraction ] (2)(3)
[ Ericsson-Service-Information ]
    * [ IMS-Service-Identification ]
        [ MMT-Information ]
            [ Calling-Party-Address-Presentation-Status ]
            [ Service-Number-Type ]
        [ Backward-TTC-Charging-Headers ]
            [ Flexible-Charging-Info ]
        [ Backward-TTC-Charging-Parameters ]
```

5.1.1.4 Event Record

The formats of ACR (Event Record) messages generated by MTAS are described in the following subsections. The format of a message depends on whether the message is generated due to:

- a an unsuccessful MMTel or ST AS session attempt,
- b an unsuccessful scheduled conference start with dial-out method,
- c user-control of a supplementary service using an SSC,
Note: Requested Announcements service also uses this format.
- d user-configuration of a supplementary service via the Ut interface.

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e an unsuccessful attempt of Parlay X Enhanced Third Party Call session

5.1.1.4.1 Event Record for Unsuccessful MMTel or ST AS Session Attempt

The format of ACR (Event Record) messages generated by MTAS due to an unsuccessful attempt to establish an MMTel or ST AS communication session is as follows:

```

<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ User-Name ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
* [ Called-Asserted-Identity ]
[ Number-Portability-Routing-Information ]
[ Requested-Party-Address ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
    [ Originating-IOI ]
    [ Terminating-IOI ]
[ IMS-Charging-Identifier ]
* [ Message-Body ] (2)(3)
    { Content-Type }
    { Content-Length }
    [ Content-Disposition ]
    [ Originator ]
[ Access-Network-Information ]
[ Cause-Code ]
* [ Reason-Header ]
    [ Carrier-Select-Routing-Information ] (3)
    [ Instance-Id ] (3)
[ PS-Information ]

```

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```
[ User-Equipment-Info ]
    { User-Equipment-Info-Type }
    { User-Equipment-Info-Value }
[ MMTel-Information ] (3)
* [ Supplementary-Service ] (3)
    [ CUG-Information ] (3)
[ LCS-Information ] (3)
    [ MSISDN ] (3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Analyzed-Call-Type ]
        [ Called-Asserted-Identity-Presentation-Status ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Carrier-Select-Routing-Information ] (1)(2)
        [ Conference-Id ]
        [ Dial-Around-Indicator ]
        [ From-Header ]
        [ From-Header-Presentation-Status ]
        [ MSISDN ] (1)(2)
    * [ Related-ICID ]
        [ SCC-Service-Identity ]
        [ SCC-TADS-Decision ]
        [ Served-User ]
        [ Service-Number-Type ]
        [ SIP-Request-Timestamp-Fraction ] (1)
        [ SIP-Response-Timestamp-Fraction ] (1)
        [ SIP-Ringing-Timestamp ] (1)(2)
        [ SIP-Ringing-Timestamp-Fraction ] (1)(2)
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
        [ Redirecting-Party-Address ]
        [ Routing-Call-Type ]
        [ Common-Policy-Rule-Identity ]
        [ Service-Suppression-Info ]
            { Matched-Regular-Expression }
            { Services-To-Suppress }
        [ CUG-Information ] (1)(2)
        [ Tenant ]
    [ SIP-Ringing-Timestamp ] (3)
    [ SIP-Ringing-Timestamp-Fraction ] (3)
    [ Subscriber-Type ]
* [ Transaction-Info ]
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
    * { Transaction-Data-Value }
    [ UC-Mobility-Call-Leg ]
    [ UHTZ-Offset ]
    [ Forward-TTC-Charging-Headers ]
        [ Charging-Area ]
        [ Carrier-Information ]
        [ Additional-User-Category ]
    [ Backward-TTC-Charging-Headers ]
        [ Charging-Area ]
        [ Carrier-Information ]
```

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[Additional-User-Category]
[Flexible-Charging-Info]
[Forward-TTC-Charging-Parameters]
[Backward-TTC-Charging-Parameters]
[AS-Type]
* [Ro-Information]
[Ro-Status]

5.1.1.4.2 Event Record for Unsuccessful Scheduled Conference Start with Dial-out Method

The format of ACR (Event Record) messages generated by MTAS due to failed dial-out from scheduled conference to first participant is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Session-Priority ]
* [ Calling-Party-Address ]
[ Called-Party-Address ]
* [ Called-Asserted-Identity ]
[ Number-Portability-Routing-Information ]
[ Requested-Party-Address ]
[ Time-Stamps ]
    [ SIP-Request-Timestamp ]
    [ SIP-Response-Timestamp ]
    [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
    [ Terminating-IOI ]
[ IMS-Charging-Identifier ]
* [ Message-Body ] (2)(3)
    { Content-Type }
    { Content-Length }
    [ Content-Disposition ]
    [ Originator ]
[ Access-Network-Information ]
[ Cause-Code ]
* [ Reason-Header ]
```

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```
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Called-Asserted-Identity-Presentation-Status ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
    * [ Related-ICID ]
      [ SIP-Request-Timestamp-Fraction ] (1)
      [ SIP-Response-Timestamp-Fraction ] (1)
      [ SIP-Ringing-Timestamp ] (1)(2)
      [ SIP-Ringing-Timestamp-Fraction ] (1)(2)
    * [ Supplementary-Service-Information ]
      { Supplementary-Service-Identity }
      { Supplementary-Service-Action }
    [ XCON-Id ]
    [ SIP-Ringing-Timestamp ] (3)
    [ SIP-Ringing-Timestamp-Fraction ] (3)
  * [ Transaction-Info ]
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
    * { Transaction-Data-Value }
  [ UHTZ-Offset ]
```

5.1.1.4.3 Event Record for User Control of a Supplementary Service (SSC)

The format of ACR (Event Record) messages generated by MTAS due to user control of a supplementary service using an SSC is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ IMS-Information ]
  [ Event-Type ]
    { SIP-Method }
  [ Role-of-Node ]
  { Node-Functionality }
  [ User-Session-Id ]
  [ Session-Priority ]
* [ Calling-Party-Address ]
  [ Called-Party-Address ]
  [ Time-Stamps ]
    [ SIP-Request-Timestamp ]
```

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```
[ SIP-Response-Timestamp ]
[ SIP-Request-Timestamp-Fraction ] (2)(3)
[ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
[ Originating-IOI ]
[ IMS-Charging-Identifier ]
[ Access-Network-Information ]
[ Instance-Id ] (3)
[ MMTel-Information ] (2)(3)
* [ Supplementary-Service ] (2)(3)
  [ Associated-Party-Address ] (2)(3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ From-Header ]
    [ From-Header-Presentation-Status ]
    [ Served-User ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    [ Tenant ]
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
  { Transaction-Data-Name }
  * { Transaction-Data-Value }
[ UHTZ-Offset ]
[ Forward-TTC-Charging-Headers ]
  [ Charging-Area ]
  [ Carrier-Information ]
  [ Additional-User-Category ]
[ Backward-TTC-Charging-Headers ]
  [ Charging-Area ]
  [ Carrier-Information ]
  [ Additional-User-Category ]
  [ Flexible-Charging-Info ]
[ Forward-TTC-Charging-Parameters ]
[ Backward-TTC-Charging-Parameters ]
[ AS-Type ]
```

5.1.1.4.4 Event Record for User Configuration of a Supplementary Service (Ut)

The format of ACR (Event Record) messages generated by MTAS due to user configuration of a supplementary service via the Ut interface is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
```

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```
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    { Node-Functionality }
    [ Session-Priority ]
[ Ericsson-Service-Information ]
[ MMT-Information ]
* [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
[ UHTZ-Offset ]
```

5.1.1.4.5 Event Record for User Configuration of a Scheduled Conference (CCMP)

The format of ACR (Event Record) messages generated by MTAS due to user configuration of a scheduled conference via the CCMP interface is as follows:

```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    { Node-Functionality }
    [ Session-Priority ]
[ Ericsson-Service-Information ]
[ MMT-Information ]
* [ Related-ICID ]
* [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
[ XCON-Id ]
```

5.1.1.4.6 Event Record for unsuccessful attempt of Parlay X Enhanced Third Party Call Session

The format of ACR (Event Record) messages generated by MTAS due to unsuccessful attempt of Enhanced Parlay X TPC Session (users B and C not connected) is as follows:

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```
<ACR> ::= < Diameter Header: 271, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Accounting-Record-Type }
{ Accounting-Record-Number }
[ Acct-Application-Id ]
[ Event-Timestamp ]
[ Service-Context-Id ]
[ Service-Information ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ IMS-Information ]
    [ Event-Type ]
        { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ Outgoing-Session-Id ]
    [ Session-Priority ]
    * [ Calling-Party-Address ]
    [ Called-Party-Address ]
    [ Time-Stamps ]
        [ SIP-Request-Timestamp ]
        [ SIP-Response-Timestamp ]
        [ SIP-Request-Timestamp-Fraction ] (2)(3)
        [ SIP-Response-Timestamp-Fraction ] (2)(3)
    [ IMS-Charging-Identifier ]
    [ Cause-Code ]
    * [ Reason-Header ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
[ MMT-Information ]
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
    [ Participants-List ]
    * [ Related-ICID ]
    [ Calling-Party-Address-Presentation-Status ]
    [ From-Header ]
    [ From-Header-Presentation-Status ]
    [ Service-Number-Type ]
[ UHTZ-Offset ]
```

5.1.1.4.7 Event Record for Requested Announcement

The format of ACR (Event Record) messages generated by MTAS due to invocation of the Requested Announcement service is the same as shown in section 5.1.1.4.3.

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5.1.2 Accounting Answer Message

The Accounting Answer (ACA) message is sent from the CDF to MTAS to acknowledge an ACR message.

The format of ACA messages supported by MTAS is as follows:

```
<ACA> ::= < Diameter Header: 271, PXY >
         < Session-Id >
         [ Result-Code ]
         [ Experimental-Result ]
           { Vendor-Id }
           { Experimental-Result-Code }
         { Origin-Host }
         { Origin-Realm }
         { Accounting-Record-Type }
         { Accounting-Record-Number }
         [ Acct-Application-Id ]
         [ Acct-Interim-Interval ]
         [ Event-Timestamp ]
```

All ACA messages must contain either a Result-Code AVP or an Experimental-Result AVP.

The Acct-Interim-Interval AVP is only checked in ACA messages when the Accounting-Record-Type indicates 'Start Record' or 'Interim Record'.

5.1.3 Protocol version

MTAS supports the following versions of accounting messages on the Rf interface:

a Version 0

The ACR and ACA messages are based on Release 6 versions of the relevant 3GPP charging specifications, and are specified in reference [12].

b Version 1

The ACR and ACA messages are based on Release 7 versions of the relevant 3GPP charging specifications, and are specified in this document.

c Version 2

The ACR and ACA messages are based on Release 9 versions of the relevant 3GPP charging specifications, and are specified in this document.

d Version 3

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The ACR and ACA messages are based on Release 12 versions of the relevant 3GPP charging specifications, and are specified in this document.

The applicable version can be configured by the operator, see reference [11]. The same version is used throughout the lifetime of any particular charging session.

The salient differences between the Rf versions are described in the following sections.

5.1.3.1 Subscription-Id

The Subscription-Id AVP is only conveyed within the grouped MMT-Information AVP in version 0.

5.1.3.2 Calling-Party-Address

The Calling-Party-Address AVP is only included in start requests and event requests in version 0.

In the R6 version, in cases that the initial INVITE does not contain a P-Asserted-Identity header, the Calling-Party-Address AVP is populated with the URI received in the From header instead.

5.1.3.3 Called-Party-Address

The Called-Party-Address AVP is only included in start requests and event requests in version 0.

5.1.3.4 SIP-Request-Timestamp

The SIP-Request-Timestamp AVP in version 0 contains the time of the SIP request rounded to the nearest second. The rounded value is also used in case the SIP-Request-Timestamp-Fraction AVP is configured to be omitted.

5.1.3.5 SIP-Response-Timestamp

The SIP-Response-Timestamp AVP in version 0 contains the time of the SIP response rounded to the nearest second. The rounded value is also used in case the SIP-Response-Timestamp-Fraction AVP is configured to be omitted.

5.1.3.6 Media-Initiator-Flag

The Media-Initiator-Flag AVP is only included in interim requests in version 0.

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5.1.3.7 Access-Network-Information

The Access-Network-Information AVP is conveyed within the grouped MMT-Information AVP in version 0.

5.1.3.8 Calling-Party-Address-Presentation-Status

The Calling-Party-Address-Presentation-Status AVP is only included in start requests and event requests in version 0.

In the R6 version, in cases that the initial INVITE does not contain a P-Asserted-Identity header, the setting of the Calling-Party-Address-Presentation-Status AVP is based on the Privacy headers in the INVITE. The value 'Presentation Restricted' is used when the INVITE contains a Privacy header with content of "user". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "user".

5.1.3.9 SIP-Ringing-Timestamp

The SIP-Ringing-Timestamp AVP in version 0 contains the time of the SIP Ringing response rounded to the nearest second. The rounded value is also used in case the SIP-Ringing-Timestamp-Fraction AVP is configured to be omitted. It is conveyed within the grouped MMT-Information AVP in version 1 or 2 and in the grouped Ericsson-Service-Information AVP from version 3.

5.1.3.10 SIP-Request-Timestamp-Fraction

It is conveyed within the grouped MMT-Information AVP in version 1 and in the grouped Timestamps AVP from version 2.

5.1.3.11 SIP-Response-Timestamp-Fraction

It is conveyed within the grouped MMT-Information AVP in version 1 and in the grouped Timestamps AVP from version 2.

5.1.3.12 SIP-Ringing-Timestamp-Fraction

It is conveyed within the grouped MMT-Information AVP in version 1 or 2 and in the grouped Ericsson-Service-Information AVP from version 3.

5.1.3.13 Carrier-Select-Routing-Information

Carrier-Select-Routing-Information AVP is conveyed within the grouped MMT-Information AVP in version 1 or 2 and in the grouped IMS-Information AVP in version 3.

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5.1.3.14 MSISDN

MSISDN AVP is conveyed within the grouped MMT-Information AVP in version 1 or 2 and in the grouped LCS-Information AVP in version 3.

5.1.3.15 CUG-Information

CUG-Information AVP is conveyed within the grouped Supplementary-Service-Information AVP in version 1 or 2 and in the grouped Supplementary-Service AVP in version 3.

5.2 Attribute Value Pairs

This section describes the AVPs applicable in ACR and ACA messages, indicating how the AVPs are used by MTAS for offline charging purposes. The format of AVPs is as specified in reference [6].

Table 5 lists all AVPs applicable in ACR and/or ACA messages and identifies the AVP codes and types.

The Vendor IDs for Ericsson and 3GPP are 193 and 10415, respectively. The table also indicates the use of AVPs in ACR messages generated by MTAS.

The 'ACR Types' column indicates whether the AVP is used in ACR messages with Accounting-Record-Type of Start Record, Interim Record, Stop Record and Event Record.

The 'ACR Flags' column indicates how MTAS sets the Vendor Specific, Mandatory and Protected flags in the AVP header (see reference [6]). Note that OCS will parse the data correctly however the M-bits are set, it's only when it doesn't understand the AVP or AVP-value when it looks at the M-bit to see whether it shall reject the message or silently discard the AVP.

The 'ACR Config' column indicates whether the inclusion of the AVP in ACR messages is operator configurable. For 'operator configurable' AVPs, the details in the following sub-sections regarding the inclusion of an AVP in requests generated by MTAS are based on MTAS being configured to include the AVP. When MTAS is configured to omit an AVP, the AVP will not be included in any requests. In the case of a grouped AVP, when MTAS is configured to omit the AVP, all constituent AVPs are also omitted.

The 'ACA Types' column indicates whether the AVP is used in ACA messages received with Accounting-Record-Type of Start Record, Interim Record, Stop Record and Event Record.

The 'Version (0,1,2,3)' column indicates whether the AVP can be present in the charging messages when the Rf interface of MTAS is configured to the corresponding version.

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Table 5: AVP Codes and Types, and their use by MTAS in ACR/ACA messages

AVP	Vendor ID	AVP Code	Type	ACR			ACA	Version (0,1,2,3)
				Types	Flags	Config	Types	
3GPP-MS-TimeZone	3GPP	23	OctetString	S---	V--	Y	-	--YY
Access-Network-Information	3GPP	1263	OctetString	SI-E	VM-	Y	-	YYYY
Accounting-Record-Number	-	485	Unsigned32	SISE	-M-	N	SISE	YYYY
Accounting-Record-Type	-	480	Enumerated	SISE	-M-	N	SISE	YYYY
Acct-Application-Id	-	259	Unsigned32	SISE	-M-	Y	SISE	YYYY
Acct-Interim-Interval	-	85	Unsigned32	SI--	-M-	Y	SISE	YYYY
Additional-User-Category	Ericsson	1397	OctetString	S-E	V-	Y	-	YYYY
Analyzed-Call-Type	Ericsson	1303	UTF8String	S-E	V--	Y	-	YYYY
Associated-Party-Address	3GPP	2035	UTF8String	-ISE	VM-	Y	-	--YY
AS-Type	Ericsson	1433	Enumerated	SISE	V--	Y	-	YYYY
Backward-TTC-Charging-Headers	Ericsson	1394	Grouped	SI-E	V-	Y	-	YYYY
Backward-TTC-Charging-Parameters	Ericsson	1407	UTF8String	SI-E	V-	Y	-	YYYY
Called-Asserted-Identity	3GPP	1250	UTF8String	SI-E	VM-	Y	-	YYYY
Called-Asserted-Identity-Presentation-Status	Ericsson	1142	Enumerated	SI-E	V--	Y	-	YYYY
Called-Party-Address	3GPP	832	UTF8String	SISE	VM-	Y	-	YYYY
Calling-Party-Address	3GPP	831	UTF8String	SISE	VM-	Y	-	YYYY
Calling-Party-Address-Presentation-Status	Ericsson	1141	Enumerated	SISE	V--	Y	-	YYYY
Carrier-Information	Ericsson	1396	OctetString	S-E	V-	Y	-	YYYY
Carrier-Select-Routing-Information	3GPP	2023	UTF8String	S-E	VM-	Y	-	-YYY
Cause-Code	3GPP	861	Integer32	-ISE	VM-	Y	-	YYYY
CCMP-User-Info	Ericsson	1384	UTF8String	-I-	V--	Y	-	YYYY
Charging-Area	Ericsson	1395	UTF8String	S-E	V-	Y	-	YYYY
Common-Policy-Rule-Identity	Ericsson	1308	UTF8String	S-E	V--	Y	-	YYYY
Conference-Id	Ericsson	1127	UTF8String	SISE	V--	Y	-	YYYY
Content-Disposition	3GPP	828	UTF8String	SISE	VM-	Y	-	YYYY
Content-Length	3GPP	827	Unsigned32	SISE	VM-	Y	-	YYYY
Content-Type	3GPP	826	UTF8String	SISE	VM-	Y	-	YYYY
CUG-Information	3GPP	2304	OctetString	S-E	VM-	Y	-	-YYY
Destination-Host	-	293	DiameterIdentity	-IS-	-M-	Y	-	YYYY
Destination-Realm	-	283	DiameterIdentity	SISE	-M-	Y	-	YYYY
Dial-Around-Indicator	Ericsson	1160	UTF8String	S-E	V--	Y	-	YYYY
Ericsson-Service-Information	Ericsson	285	Grouped	SISE	V--	Y	-	YYYY
Event-Timestamp	-	55	Time	SISE	-M-	Y	SISE	YYYY
Event-Type	3GPP	823	Grouped	SISE	VM-	Y	-	YYYY
Experimental-Result	-	297	Grouped	-	-	-	SISE	YYYY
Experimental-Result-Code	-	298	Unsigned32	-	-	-	SISE	YYYY
Flexible-Charging-Info	Ericsson	1398	OctetString	SI-E	V-	Y	-	YYYY
Forward-TTC-Charging-Headers	Ericsson	1393	Grouped	S-E	V-	Y	-	YYYY
Forward-TTC-Charging-Parameters	Ericsson	1406	UTF8String	S-E	V-	Y	-	YYYY
From-Header	Ericsson	1153	UTF8String	SI-E	V--	Y	-	-YYY
From-Header-Presentation-Status	Ericsson	1262	Enumerated	SI-E	V--	Y	-	-YYY
GSM-Call-Reference-Number	Ericsson	1206	UTF8String	S---	V--	Y	-	YYYY
IMS-Charging-Identifier	3GPP	841	UTF8String	SISE	VM-	Y	-	YYYY
IMS-Information	3GPP	876	Grouped	SISE	VM-	Y	-	YYYY
IMS-Service-Identification	Ericsson	284	UTF8String	SISE	V--	Y	-	YYYY
Instance-Id	3GPP	3402	UTF8String	S-E	VM-	Y	-	---Y
Inter-Operator-Identifier	3GPP	838	Grouped	SI-E	VM-	Y	-	YYYY

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AVP	Vendor ID	AVP Code	Type	ACR			ACA	Version (0,1,2,3)
				Types	Flags	Config		
Interim-Reason	Ericsson	1465	Enumerated	-I--	V--	Y	-	-YYY
LCS-Information	3GPP	878	Grouped	SISE	VM-	Y	-	---Y
Matched-Regular-Expression	Ericsson	1372	UTF8String	S--E	V--	Y	-	YYYY
Media-Initiator-Flag	3GPP	882	Enumerated	SI--	VM-	Y	-	YYYY
Message-Body	3GPP	889	Grouped	SISE	VM-	Y	-	--YY
MMT-Information	Ericsson	1061	Grouped	SISE	V--	Y	-	YYYY
MMTel-Information	3GPP	2030	Grouped	SISE	VM-	Y	-	--YY
MSISDN	3GPP	701	OctetString	SISE	VM-	Y	-	YYYY
MSC-Address	Ericsson	1207	UTF8String	S---	V--	Y	-	YYYY
Node-Functionality	3GPP	862	Enumerated	SISE	VM-	Y	-	YYYY
Number-Portability-Routing-Information	3GPP	2024	UTF8String	S--E	VM-	Y	-	YYYY
Origin-Host	-	264	DiameterIdentity	SISE	-M-	Y	SISE	YYYY
Origin-Realm	-	296	DiameterIdentity	SISE	-M-	Y	SISE	YYYY
Originating-IOI	3GPP	839	UTF8String	SI-E	VM-	Y	-	YYYY
Originator	3GPP	864	Enumerated	SISE	VM-	Y	-	YYYY
Outgoing-Session-Id	3GPP	2320	UTF8String	SISE	VM-	Y	-	YYYY
Participants-Involved	Ericsson	1389	UTF8String	SIS-	V--	Y	-	YYYY
Participants-List	Ericsson	1390	UTF8String	SISE	V--	Y	-	YYYY
Party-To-Charge	Ericsson	1357	Unsigned32	SIS-	V--	Y	-	YYYY
PS-Information	3GPP	874	Grouped	S--E	VM-	Y	-	--YY
Reason-Header	3GPP	3401	UTF8String	-ISE	VM-	Y	-	--YY
Redirecting-Party-Address	Ericsson	1133	UTF8String	S--E	V--	Y	-	YYYY
Related-ICID	Ericsson	1128	UTF8String	SISE	V--	Y	-	YYYY
Result-Code	-	268	Unsigned32	-	-	-	SISE	YYYY
Requested-Party-Address	3GPP	1251	UTF8String	S--E	VM-	Y	-	YYYY
Role-of-Node	3GPP	829	Enumerated	SISE	VM-	Y	-	YYYY
Routing-Call-Type	Ericsson	1302	UTF8String	S--E	V--	Y	-	YYYY
Ro-Information	Ericsson	1478	Grouped	S--E	V--	Y	-	-YYY
Ro-Status	Ericsson	1477	Enumerated	S--E	V--	Y	-	-YYY
SCC-Service-Identity	Ericsson	1314	Enumerated	SISE	V--	Y	-	YYYY
SCC-TADS-Decision	Ericsson	1315	Enumerated	SISE	V--	Y	-	YYYY
SDP-Media-Component	3GPP	843	Grouped	SI--	VM-	Y	-	YYYY
SDP-Media-Description	3GPP	845	UTF8String	SI--	VM-	Y	-	YYYY
SDP-Media-Name	3GPP	844	UTF8String	SI--	VM-	Y	-	YYYY
SDP-Session-Description	3GPP	842	UTF8String	SI--	VM-	Y	-	YYYY
SDP-Type	3GPP	2036	Enumerated	SI--	VM-	Y	-	--YY
Served-User	Ericsson	1330	UTF8String	S--E	V--	Y	-	YYYY
Service-Context-Id	-	461	UTF8String	SISE	-M-	Y	-	-YYY
Service-Information	3GPP	873	Grouped	SISE	VM-	Y	-	YYYY
Service-Number-Type	Ericsson	1307	Enumerated	SISE	V--	Y	-	YYYY
Service-Specific-Data	3GPP	863	UTF8String	SIS-	VM-	Y	-	YYYY
Service-Specific-Info	3GPP	1249	Grouped	SIS-	VM-	Y	-	-YYY
Service-Specific-Type	3GPP	1257	Unsigned32	SIS-	VM-	Y	-	YYYY
Service-Suppression-Info	Ericsson	1371	Grouped	S--E	V--	Y	-	YYYY
Services-To-Suppress	Ericsson	1373	UTF8String	S--E	V--	Y	-	YYYY
Session-Id	-	263	UTF8String	SISE	-M-	N	SISE	YYYY
Session-Priority	3GPP	650	Enumerated	SISE	V--	Y	-	YYYY
SIP-Method	3GPP	824	UTF8String	SISE	VM-	Y	-	YYYY
SIP-Request-Timestamp	3GPP	834	Time	SISE	VM-	Y	-	YYYY
SIP-Request-Timestamp-Fraction	3GPP	2301	Unsigned32	SISE	VM-	Y	-	-YYY
SIP-Response-Timestamp	3GPP	835	Time	SI-E	VM-	Y	-	YYYY
SIP-Response-Timestamp-Fraction	3GPP	2302	Unsigned32	SI-E	VM-	Y	-	-YYY
SIP-Ringing-Timestamp	Ericsson	338	Time	SI-E	V--	Y	-	-YYY

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AVP	Vendor ID	AVP Code	Type	ACR			ACA	Version (0,1,2,3)
				Types	Flags	Config	Types	
SIP-Ringing-Timestamp-Fraction	Ericsson	1256	Unsigned32	SI-E	V--	Y	-	-YYY
Subscriber-Type	Ericsson	1463	Enumerated	S-E	V--	Y	-	-YYY
Subscription-Id	-	443	Grouped	SISE	-M-	Y	-	YYYY
Subscription-Id-Data	-	444	UTF8String	SISE	-M-	Y	-	YYYY
Subscription-Id-Type	-	450	Enumerated	SISE	-M-	Y	-	YYYY
Supplementary-Service	3GPP	2048	Grouped	SISE	VM-	Y	-	--YY
Supplementary-Service-Action	Ericsson	1131	Enumerated	SISE	V--	Y	-	YYYY
Supplementary-Service-Identity	Ericsson	1130	Enumerated	SISE	V--	Y	-	YYYY
Supplementary-Service-Information	Ericsson	1129	Grouped	SISE	V--	Y	-	YYYY
Tenant	Ericsson	1380	UTF8String	S-E	V--	Y	-	YYYY
Terminating-IOI	3GPP	840	UTF8String	SI-E	VM-	Y	-	YYYY
Time-Stamps	3GPP	833	Grouped	SISE	VM-	Y	-	YYYY
Transaction-Data-Name *	Ericsson	1266	UTF8String	SISE	V--	Y	-	YYYY
Transaction-Data-Value *	Ericsson	1267	UTF8String	SISE	V--	Y	-	YYYY
Transaction-Info *	Ericsson	1264	Grouped	SISE	V--	Y	-	YYYY
Transaction-SIP-Message *	Ericsson	1460	UTF8String	SISE	V--	Y	-	YYYY
Transaction-Type *	Ericsson	1265	Enumerated	SISE	V--	Y	-	YYYY
UC-Mobility-Call-Leg	Ericsson	1464	Enumerated	S-E	V--	Y	-	-YYY
UHTZ-Offset	Ericsson	1388	UTF8String	S-E	V-	Y	-	YYYY
User-Equipment-Info	-	458	Grouped	S-E	-M-	Y	-	--YY
User-Equipment-Info-Type	-	459	Enumerated	S-E	-M-	Y	-	--YY
User-Equipment-Info-Value	-	460	OctetString	S-E	-M-	Y	-	--YY
User-Name	-	1	UTF8String	S-E	-M-	Y	-	--YY
User-Session-Id	3GPP	830	UTF8String	SISE	VM-	Y	-	YYYY
Vendor-Id	-	266	Unsigned32	-	-	-	SISE	YYYY
XCON-Id	Ericsson	1346	UTF8String	SISE	V--	Y	-	YYYY

ABNF notation, as specified in reference [6], is used in this section to describe grouped AVP contents.

For 'operator configurable' AVPs, the details in the following sub-sections regarding the inclusion of an AVP in requests generated by MTAS is based on MTAS being configured to include the AVP. When MTAS is configured to omit an AVP, the AVP will not be included in any requests. In the case of a grouped AVP, when MTAS is configured to omit the AVP, all constituent AVPs are also omitted.

* The Flexible AVPs can be enabled via CM parameter
mtasChargingProfileFlexAdministrativeState

5.2.1 3GPP-MS-TimeZone

The 3GPP-MS-TimeZone AVP indicates the time zone where the MS/UE currently resides. It is populated with the User Current Time Zone taken from P-com.TimeZone header, if available. If it is not available, default value is User Home Time Zone which is UTC offset from User Common Data with no time adjustment, if provisioned.

Format of the AVP:

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Bit	7	6	5	4	3	2	1	0
Octet 1	Time Zone							
Octet 2	Spare						Daylight saving time	

The Time Zone octet indicates the difference, expressed in quarters of an hour (i.e. 15 minutes), between the local time and GMT. Range of value is from GMT-12:00 until GMT+13:00.

Time zone field is *semi-octet represented*. Semi-octet means 1 octet has two half octets and each half-octet represents a decimal digit (BCD, Binary-Coded Decimal).

In the first of the two semi octets, the first bit (bit 3 of the time zone octet) represents the algebraic sign of this difference (0: positive, 1: negative). For example '82'H means GMT+07:00 and '4a'H means GMT-06:00.



The two LSB of second octet encodes the daylight saving time:

Bits		Meaning
0	0	No adjustment for Daylight Saving Time
0	1	+1 hour adjustment for Daylight Saving Time
1	0	+2 hours adjustment for Daylight Saving Time
1	1	Reserved

Bits marked 'Spare' should be set to '0' by the sending node.

5.2.2

Access-Network-Information

The Access-Network-Information AVP contains information about the access technology.

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In originating session cases, the AVP contains information retrieved from:

- The initial INVITE request
- NPLI results from HSS if it is enabled
- An updated P-Access-Network-Info header in ACK
- An updated P-Access-Network-Info header in re-INVITE
- An out-of-dialog NOTIFY with charging-info Event header

In terminating session cases, the AVP contains information retrieved from:

- The latest response to the initial INVITE with PANI header
- NPLI results from HSS if it is enabled
- From the cache (if caching of PANI is enabled and PANI has been cached previously), if NPLI is disabled (or failed)
- An updated P-Access-Network-Info header in re-INVITE
- An out-of-dialog NOTIFY with charging-info Event header

In both originating and terminating case if the above mentioned methods fail, the AVP contains the operator provided home location information from the subscriber's transparent data, if it is available.

When multiple P-Access-Network-Info headers are received, MTAS includes information from the first header containing "network provided" information. If none of the headers contain "network provided" information, MTAS includes information from the first header.

During call setup network provided PANI headers have a preference over user provided ones. It means if a network provided ANI was already received, and later on, MTAS gets another PANI without the "network-provided" parameter, this new PANI will not be stored and reported.

The Access-Network-Information AVP can include MSC and VLR number if provided by NPLI.

The Access-Network-Information AVP is not used in transit, conference focus or communication completion (3PCC) session cases.

Example: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=1234567890ABC

This AVP may be included in start requests, event requests for unsuccessful establishment of a SIP session and in event requests for successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code. It is only included when access network information is available.

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In both originating and terminating case, if an out-of-dialog NOTIFY with charging-info Event header is received after the call was already established, and it contains a different P-Access-Network-Info value than the previously reported Access-Network-Info AVP, MTAS sends an ACR Interim with Access-Network-Information AVP populated from the P-Access-Network-Info header received in the NOTIFY.

In terminating case, if the PANI is read from the cache, and in every originating case, only the Wi-Fi portion of the P-Access-Network-Info header value will be reported in the Access-Network-Info AVP, if “reporting complete PANI” is disabled. If there is no Wi-Fi portion in the PANI, the original value will be reported.

5.2.3 Accounting-Record-Number

The Accounting-Record-Number AVP identifies this record within one session. As Session-Id AVPs are globally unique, the combination of Session-Id and Accounting-Record-Number AVPs is also globally unique, and can be used in matching accounting records with confirmations. The Accounting-Record-Number is set to the value 0 for records of type ‘Start Record’, and set the value to 1 for the first ‘Interim Record’, 2 for the second, and so on until the value for ‘Stop Record’ is one more than for the last ‘Interim Record’ or ‘Start Record’ (if no ‘Interim Record’ was sent). The Accounting-Record-Number is set to 0 for records of type ‘Event Record’.

Under exceptional fault conditions, whereby MTAS cannot determine which accounting record numbers have previously been used for a particular charging session, or MTAS purges users due to configuration changes, such as MTAS function is turned off when there are ongoing calls, the accounting record number is set to 4294967295 when generating the ‘Stop Record’.

This AVP is included in all requests and is expected in all answers.

5.2.4 Accounting-Record-Type

The Accounting-Record-Type AVP contains the type of accounting record being sent. The following values are currently defined:

- Event Record 1

An Accounting Event Record is used to indicate that a one-time event has occurred (meaning that the start and end of the event are simultaneous). This record contains all information relevant to the service, and is the only record of the service.

- Start Record 2

Accounting Start, Interim and Stop Records are used to indicate that a service of a measurable length has been given. An Accounting Start Record is used to initiate an accounting session, and contains accounting information that is relevant to the initiation of the session.

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- Interim Record 3

An Accounting Interim Record contains cumulative accounting information for an existing accounting session. An Accounting Interim Record is generated at time intervals directed by the CDF using the Acct-Interim-Interval AVP and also upon successful completion of a media change for an ongoing session if the CM attribute `mtasChargingProfileSendAcrOnSdpChange` is set to "enabled".

- Stop Record 4

An Accounting Stop Record is sent to terminate an accounting session and contains cumulative accounting information relevant to the existing session.

This AVP is included in all requests and is expected in all answers.

5.2.5 Acct-Application-Id

The Acct-Application-Id AVP is used in order to advertise support of the Accounting portion of an application.

The value is set to 3 which is the application ID used by the Rf interface protocol, see reference [7].

This AVP is included in all requests and may be included in all answers.

5.2.6 Acct-Interim-Interval

The Acct-Interim-Interval AVP included in the ACR contains the configured desired value for the interim interval.

MTAS uses information in the Acct-Interim-Interval AVP received in the ACA to decide if and when to produce accounting records. The following accounting record production behavior is directed by the inclusion of this AVP:

- The omission of the Acct-Interim-Interval AVP or its inclusion with value field set to 0 means that a time based 'Interim Record' is not sent by MTAS.
- The inclusion of the AVP with value field set to a non-zero value means that 'Interim Record' records must be produced between 'Start Record' and 'Stop Record' if the SIP session is long enough. The value field of this AVP is the nominal interval between these records in seconds.

This AVP is included in all ACR start and ACR interim requests from MTAS Rf version 2. The AVP may be included in all ACA in all Rf versions. MTAS only uses the AVP when received in the answer to start and interim requests.

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5.2.7 Additional-User-Category

- The Additional-User-Category AVP, used by the Japanese charging function, contains the value of the X-AUT header. See [23] for more information on the usage of this header.

5.2.8 Analyzed-Call-Type

The Analyzed-Call-Type AVP Holds the name of the call type that was determined by Number Analysis for this call. It is applicable to the Carrier Pre-Select / Carrier Select services as well as the Carrier Pre-Select Rn service and the Dialed Number Mapping service. It is also applicable to the Carrier Select Rn service running on the ST AS.

Depending on CM parameter setting the Analyzed-Call-Type AVP is reported for all outgoing calls, including Originating, Operator Transfer and Communication Diversion calls.

CM parameter **mtasNumNormReportAnalyzedCallType** is set to "0" For Carrier Pre-select / Carrier Select the AVP can contain the following values:

- "Local"
- "Non Local"
- "IntraLata"
- "IntraLataToll"
- "InterLata"
- "NanpZone1"
- "NanpInternational"

See ref [15] for a definition of the call types.

For Carrier Pre-select Rn / Carrier Select Rn the AVP can contain the following values:

- "Local"
- " Non Local"

If a match is found for the caller's CC and AC in the Called Party number, then the call is considered "Local", otherwise it is considered "Non Local".

For the Dialed Number Mapping service the AVP is set in case of a 10 digits call and it can contain the following values:

- "local"
- "non-local"

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The 10 digit number is composed of the Numbering Plan Area (NPA) followed by the 7 digit subscriber number. The call qualifies as a local call if the Calling User is making the call from the area which has the same NPA as the called user, independently of the Calling User's own NPA. Otherwise the call is a long-distance call.

CM parameter **mtasNumNormReportAnalyzedCallType** is set to "1":

All the services and AVP values listed in CM parameter value "0" and in addition for (all) outgoing calls it can contain the following values:

- "local"
- "non-local"
- "intralata"
- "intralatatoll"
- "interlata"
- "international"
- "national"
- "nanpzone1"

Note: The Analyzed-Call-Type AVP is reported only when Number Analysis function can provide valid call type analysis result.

5.2.9 Associated-Party-Address

The Associated-Party-Address AVP (AVP code 2035) is of type UTF8String and is used for MMTel supplementary service. In case of Call Pull feature Associated-Party-Address AVP will hold the identity of the device/alias pulling the session or the identity of the established session device.

This AVP may be included in interim requests, stop requests and event requests.

5.2.10 AS-Type

The AS-Type AVP contains information about which AS-Type that generated the charging message.

The following values are defined:

- MMTel Telephony AS 0

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- Redirection AS 1
- Scheduled Conference AS 2
- SCC AS 3
- Parlay X AS 4
- ST AS 5

This AVP may be included in all ACR requests.

5.2.11 Backward-TTC-Charging-Headers

The Backward-TTC-Charging-Headers AVP is a grouped AVP used by the Japanese charging function. It contains information about ICBS-specific AVPs and Flexible Charging .

It has the following ABNF grammar:

```
Backward-TTC-Charging-Headers ::= < AVP Header: 1394 193 >
    [ Charging-Area ]
    [ Carrier-Information ]
    [ Additional-User-Category ]
    [ Flexible-Charging-Info ]
    *[ AVP ]
```

This AVP may be included in ACR (start), ACR (event) and ACR (interim). When included in ACR (interim), it contains only Flexible-Charging-Info AVP. See [23] for more information on the usage of related SIP headers.

5.2.12 Backward-TTC-Charging-Parameters

The Backward-TTC-Charging-Parameters AVP is used by the Japanese charging function. It is populated with the stored Additional User Category, Carrier Information, Charging Area, Backward Call Indicator and Flexible Charging Information retrieved from SIP responses from P-Charging-Vector header. This AVP is only included when Japanese Charging is enabled and the related P-Charging-Vector extension ttc-charging-params is present in the SIP response. Additionally, this AVP is only included when Japanese Charging configuration parameter mtasJcBehaviorType is set to 'parameters'.

This AVP may be included in ACR (start), ACR (event) and ACR (interim). See [23] for more information on the usage of the related SIP header.

5.2.13 Called-Asserted-Identity

The Called-Asserted-Identity AVP holds the address (SIP URI or TEL URI) which identifies the finally asserted called party.

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The address (including any URI parameters and/or headers) is obtained from the P-Asserted-Identity header received in responses to the outgoing INVITE request. The address information received in the final response is always used in preference to the address information received in provisional responses. When the final response does not contain a P-Asserted-Identity header, the address information received in the first provisional response containing a P-Asserted-Identity header (if any) is used instead.

This AVP may appear several times when the P-Asserted-Identity contains multiple URIs.

For transit sessions resulting from the communication diversion service, the called-asserted-identity of the diverted-to party (C) is included in the terminating charging messages generated for the original leg (A-to-B) as well as in the originating charging messages generated for the diverted leg (B to C).

For transit sessions resulting from the flexible communication distribution service, the called-asserted-identity of the non-IMS primary user (B') or the related user (i.e. C, D etc.) to which the session is successfully established is included in the originating charging messages generated for the FCD leg (B-to-B', B-to-C etc.) as well as for the terminating charging messages generated for the original leg (A-to-B). The called-asserted-identity of the non-IMS primary user (B') or of a related user (i.e. C, D etc.) to which the session is offered but is not successfully established, is included in the originating charging messages generated for that FCD leg (B-to-B', B-to-C etc.) but is not included in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service, the called-asserted-identity of the related user (i.e. C, D etc.) to which the session is successfully established is included in the originating charging messages generated for the STOD leg (B-to-C, A-to-C etc.) as well as for the terminating or originating charging messages generated for the original leg (A-to-B).

The called-asserted-identity of the related user (i.e. C, D etc.) to which the session is offered but is not successfully established, is included in the originating charging messages generated for that STOD leg (B-to-C, A-to-C etc.) but is not included in the terminating or originating charging messages generated for the original leg (A-to-B).

For conference focus sessions, the called-asserted-identity of the conference participant is included in the originating charging messages generated for the dial-out conference leg.

Example: sip:User@Host

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the called asserted identity is available.

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In case of Scheduled Conference, this AVP can be included in the interim requests.

5.2.14 Called-Asserted-Identity-Presentation-Status

The Called-Asserted-Identity-Presentation-Status AVP contains the presentation status for the called asserted identity. When more than one called asserted identity is present, the presentation status applies to all identities. This AVP applies whenever a Called-Asserted-Identity AVP is present.

The setting of the presentation status is dependent on the P-Asserted-Identity and Privacy headers in responses to a SIP INVITE. For an originating charging case, the status is based on the information in responses received on the outgoing dialog. For a terminating charging case, the status is based on responses sent on the incoming dialog. The value 'Presentation Restricted' is used when the response contains a P-Asserted-Identity header and contains a Privacy header with content of "id". The value 'Presentation Allowed' is used in all other cases that the response contains a P-Asserted-Identity header. The presentation status determined from the final response is used when the final response contains a P-Asserted-Identity. The presentation status determined from the first provisional response containing a P-Asserted-Identity is used when the final response does not contain a P-Asserted-Identity. The Called-Asserted-Identity-Presentation-Status AVP is not used when none of the responses contain a P-Asserted-Identity header.

The following values are defined:

- Presentation Allowed 0
- Presentation Restricted 1

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the called asserted identity is available.

In case of Scheduled Conference, this AVP can be included in the interim requests.

5.2.15 Called-Party-Address

The Called-Party-Address AVP holds the address (SIP URI or TEL URI) which identifies the party to whom the SIP transaction is posted.

The address is obtained from the SIP URI or TEL URI (including any URI parameters) in the Request URI of the initial INVITE request.

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For transit sessions resulting from the communication diversion service, the address of the diverted-to party (C), as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the diverted leg (B-to-C). The address of the diverting party (B), as received in the Request URI of the incoming request, is included in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the flexible communication distribution service, the address of the non-IMS primary user (B') or the related user (i.e. C, D etc.) as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the FCD legs (B-to-B', B-to-C etc.). The address of the primary user (B), as received in the Request URI of the incoming request, is included in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by a terminating user, the address of the related user (i.e. C, D etc.) as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the STOD legs (B-to-C etc.). The address of the primary user (B), as received in the Request URI of the incoming request, is included in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by an originating user, the address of the related user (i.e. C, D etc.) as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the STOD legs (A-to-C etc.). The address of user (B), as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the original leg (A-to-B).

For conference focus sessions, the address of the conference participant, as sent in the Request URI of the outgoing request, is included in the originating charging messages generated for the dial-out conference leg.

For communication completion (3PCC) sessions, the address is obtained from the Request URI of the outgoing INVITE request. Note that the Request URI content is the same as the corresponding Request URI from the original INVITE on which communication completion was invoked.

Example: tel:+4687190000

Note that for originating session cases where the Request URI received in the incoming request is modified by MTAS before being sent in the outgoing request, the Called-Party-Address AVP contains the URI sent in the outgoing request and the Requested-Party-Address AVP (see section 5.2.71) contains the URI received in the incoming request.

In the case of SIP sessions that are rejected by MTAS without an outgoing request being sent, the Called-Party-Address AVP contains the URI received in the incoming request and the Requested-Party-Address AVP is omitted.

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In the case of successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code, the Called-Party-Address AVP contains the URI received in the incoming request and the Requested-Party-Address AVP is omitted. Where the command code URI contains PIN digits, each PIN digit will be replaced by a digit '0' in the Called-Party-Address AVP.

In the case of scheduled conference focus sessions, the Called-Party-Address AVP contains the URI received in the incoming request and the Requested-Party-Address AVP is omitted. Where the Request-URI contains PIN digits, each PIN digit will be replaced by a digit '0' in the Called-Party-Address AVP.

This AVP is included in all requests, except event requests for user configuration of a supplementary service.

For Requested Announcement service the Called-Party-Address AVP contains the URI received in the incoming request and the Requested-Party-Address AVP is omitted.

5.2.16 Calling-Party-Address

The Calling-Party-Address AVP holds the address (SIP URI or TEL URI) which identifies the party initiating the session.

If the Calling-Party-Address is a TEL URI and a Calling Party Category is provided for the calling subscriber in MTAS then the Calling Party Category is included in the Calling-Party-Address.

The address is obtained from the SIP URI or TEL URI (without any URI parameters and/or headers) in the 'P-Asserted-Identity:' of the initial INVITE. If the P-Asserted-Identity header is empty, the Terminating MTAS would use the URI of 'From header'.

This AVP may appear several times when the P-Asserted-Identity contains multiple URIs.

For transit sessions resulting from the communication diversion service, the address of the party initiating the session (A) is included in the originating charging messages generated for the diverted leg (B-to-C) as well as in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the flexible communication distribution service, the address of the party initiating the session (A) is included in the originating charging messages generated for the FCD legs (B-to-B', B-to-C etc.) as well as in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by a terminating user, the address of the party initiating the session (A) is included in the originating

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charging messages generated for the STOD legs (B-to-C etc.) as well as in the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by an originating user, the address of the party initiating the session (A) is included in the originating charging messages generated for the STOD legs (A-to-C etc.) as well as in the originating charging messages generated for the original leg (A-to-B).

For conference focus sessions, the address of the conference creator is included in the originating charging messages generated for each dial-out conference leg.

For communication completion (3PCC) sessions, the address is obtained from the P-Asserted-Identity of the outgoing INVITE. The header content is the same as the corresponding header from the original INVITE on which communication completion was invoked.

Example: sip:User@Host

This AVP may be included in all requests, except event requests for user configuration of a supplementary service. It is only included when the caller's asserted identity is available.

5.2.17 Calling-Party-Address-Presentation-Status

The Calling-Party-Address-Presentation-Status AVP contains the presentation status for the calling party address. When more than one calling party address is present, the presentation status applies to all addresses.

The following values are defined:

- Presentation Allowed 0
- Presentation Restricted 1
- Unknown 2

For an originating charging case, the presentation status is set based on the Privacy header in the initial INVITE sent on the outgoing dialog. The value 'Presentation Restricted' is used when the INVITE contains a Privacy header with content of "id". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "id". In the case of SIP sessions that are rejected by MTAS without an outgoing request being sent, the presentation status is either set to 'Presentation Allowed' or 'Presentation Restricted' as determined by the OIR supplementary service, or is set to 'Unknown' when the session is rejected before the OIR supplementary service analysis is performed.

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For a terminating charging case, the presentation status is set based on the Privacy header in the initial INVITE received on the incoming dialog. The value 'Presentation Restricted' is used when the INVITE contains a Privacy header with content of "id". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "id".

For a communication completion (3PCC) session, the presentation status is based on the Privacy header in the initial INVITE sent on the outgoing dialog. The header content is the same as the corresponding header from the original INVITE on which communication completion was invoked.

This AVP may be included in all requests, except event requests for user configuration of a supplementary service. It is included in all requests that contain a Calling-Party-Address AVP.

5.2.18 Carrier-Information

The Carrier-Information AVP, used by the Japanese charging function, contains the value of the X-Carrier-Info header. See [23] for more information on the usage of this header.

5.2.19 Carrier-Select-Routing-Information

The Carrier-Select-Routing-Information AVP contains the identity of the carrier selected for routing a communication request. The information is only applicable in originating charging messages.

When the Carrier Select or Carrier Pre-Select services apply, the AVP contains the carrier-identification-code (cic) parameter of the Request URI sent by MTAS in the initial INVITE.

Example: +44123

When the Carrier Select Rn or Carrier Pre-Select Rn services apply, the AVP contains the content of the 'rn' parameter.

Example: +49FFDB0557721953230

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the cic and/or rn parameter is available.

5.2.20 Cause-Code

The Cause-Code AVP contains the cause code identifying the reason that an attempt to establish a SIP session is unsuccessful or the reason that a successfully established SIP session is terminated.

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Within the cause codes, values ≤ 0 are reserved for successful causes while values ≥ 1 are used for failure causes. In case of errors where the session has been terminated as a result of a specific known SIP error code, the SIP error code is used as the cause code.

Successful cause code values:

- “Normal end of session” 0

The cause “Normal end of session” is used in stop requests to indicate that an ongoing SIP session has been normally released either by the user or by the network (SIP BYE message initiated by the user or initiated by the network has been received by the IMS node after the reception of the SIP ACK message).

- “200 OK” -200

This code is used in ACR Event generated after receipt of 200 OK SIP response to the initial INVITE in multi-device offline charging scenarios.

- “3xx Redirection” -3xx

The cause “3xx Redirection” is used when the SIP transaction is terminated due to MTAS receiving/initiating a 3xx response.

- “Long Duration Call” -1001

The cause “Long Duration Call” is used in ACR Stop request, when an established session is terminated by MMTel AS due to long duration call supervision.

Failure cause code values:

- “Unspecified error” 1

The cause “Unspecified error” is used when the SIP transaction is terminated due to an unknown error.

- “4xx Request failure” 4xx

“4xx Request failure” causes are used when the SIP transaction is terminated due to MTAS receiving/initiating an error response in the range 400-499. For example, if the session setup timer expires when waiting for ACK, MTAS sends an SIP 408 to the originating user and an ACR start is sent to the CDF immediately followed by an ACR stop with the 408 cause.

- “5xx Server failure” 5xx

“5xx Server failure” causes are used when the SIP transaction is terminated due to MTAS receiving/initiating an error response in the range 500-599.

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- “6xx Global failure” 6xx

“6xx Global failure” causes are used when the SIP transaction is terminated due to an IMS node receiving/initiating an error response in the range 600-699.

- “Unsuccessful session setup” 2

The cause “Unsuccessful session setup” is used in stop requests when the SIP session has not been successfully established, an unexpected SIP message, e.g. BYE, is received when waiting for the SIP ACK.

- “Internal error” 3

The cause “Internal error” is used when the SIP transaction is terminated due to an MTAS internal error (e.g. error in processing a request/response).

- “Call barred” 1000

The cause “Call barred” is used when incoming communication is barred due to ICB and announcement is played on established session.

This AVP is included in stop requests and in event requests for unsuccessful establishment of a SIP session

In case of Scheduled Conference, this AVP can be included in the interim requests.

5.2.21 CCMP-User-Info

The CCMP-User-Info AVP holds the userInfo XML of the received CCMP userRequest without control codes and white spaces.

Example:

```
<userInfo entity="xcon-userid:Bob@example.com"><info:endpoint
entity="sip:bob83@example.com"><info:media
id="1"><info:label>123</info:label><info:status>recvonly</info:status></info:
media></info:endpoint></userInfo>
```

5.2.22 Charging-Area

The Charging-Area AVP, used by the Japanese charging function, contains a copy of the P-Area-Info header. See [23] for more information on the usage of this header.

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5.2.23 Common-Policy-Rule-Identity

The Common-Policy-Rule-Identity AVP identifies the name of the rule that has been matched by an invoked rule based service. The format of the value follows the format of the rule identifier, as defined in the Common Policy document format (RFC 4745 [15]; the "id" attribute of the <rule> element).

The Common-Policy-Rule-Identity AVP is included in the charging message only in that case if the Communication Barring, FCD, STOD or DR rule based supplementary service is invoked and a rule is matched.

- In ACR (Start Record):
 - an ICB, or OCB rule with allow=true action is matched and the MMTel session is successfully established.
 - an FCD, STOD or DR rule is matched and the MMTel session is successfully established.
- In ACR (Event Record):
 - an ICB or OCB rule with allow=false action is matched, and the MMTel session establishment attempt is rejected,
 - an FCD or STOD rule is matched and the MMTel session establishment attempt is rejected,
 - an ICB or OCB rule with allow=true action is matched but the MMTel session establishment attempt is rejected by other means (e.g. User A cancels, User B rejects, No Answer, etc.),
 - an FCD or STOD rule is matched but the MMTel session establishment attempt is rejected by other means (e.g. User A cancels, User B rejects, No Answer, etc.).

5.2.24 Conference-Id

The Conference-Id AVP contains the URI of the Conference Focus which is unique for each conference traffic instance.

The MTAS serving the ad-hoc conference creator or scheduled conference participant (originating session case) includes the Conference Focus URI received in the Contact header of the 200 OK response to the initial INVITE.

The MTAS acting as the ad-hoc conference focus (conference focus session case) includes the URI assigned to the conference in the originating charging messages generated for each dial-out conference leg.

The MTAS acting as the scheduled conference focus (scheduled conference focus session case) includes the URI assigned to the conference in the terminating charging messages generated for the scheduled conference focus traffic instance.

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Example: sip:conf1234@confserver1.operator.net

This AVP may be included in start requests, interim requests, stop requests and , in case of ad-hoc conference, in event requests for unsuccessful establishment of a SIP session. It is only included for conference sessions.

5.2.25 Content-Disposition

The Content-Disposition AVP contains the value of the Content-Disposition header in the SIP message body or the SIP message body part for a multipart body.

This AVP may be included in all ACR where the Message-Body AVP is present.

5.2.26 Content-Length

The Content-Length AVP contains the length of the SIP message body or the size of the body part in bytes.

This AVP is included in all ACR where the Message-Body AVP is present.

5.2.27 Content-Type

The Content-Type AVP contains the value of the Content-Type header in the SIP message or the SIP message body part for a multipart body.

This AVP is included in all ACR where the Message-Body AVP is present.

5.2.28 CUG-Information

The CUG-Information AVP holds the “CUG Interlock Code” which identifies CUG membership within the Network for “Closed User Group” MMTel supplementary service.

5.2.29 Destination-Host

The Destination-Host AVP identifies the Diameter server, within the realm specified in the Destination-Realm AVP, which should handle the message. The server identity for a charging session is stored from the Origin-Host AVP received in the previous ACA message and is included in all subsequent ACR messages.

NOTE that if operator network uses multiple Destination-Hosts in charging session then it is recommended to use RRT based routing to avoid configuration of all hosts in peer table.

This AVP is included in all interim and stop requests.

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5.2.30 Destination-Realm

The Destination-Realm AVP contains the realm the message is to be routed to. The Destination-Realm AVP is used to perform message routing decisions.

The identity is copied from the fully qualified host name in the “ccf” (charging collection function) address parameter of the P-Charging-Function-Addresses header received in the incoming INVITE request. In cases that the incoming INVITE request does not contain any charging function address information, the locally configured ‘Default CDF Address’ is used instead.

This AVP is included in all requests.

5.2.31 Dial-Around-Indicator

The Dial-Around-Indicator AVP contains the information from the dial-around indicator (dai) parameter of the Request URI sent by MTAS in the initial INVITE and indicates how the carrier identified in the Carrier-Select-Routing-Information AVP was selected.

The information is only applicable in originating charging messages.

Example: presub

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the dai parameter is available.

5.2.32 Ericsson-Service-Information

The Ericsson-Service-Information AVP is a grouped AVP and contains information about a specific service i.e. the identity and the service specific AVPs.

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It has the following ABNF grammar:

```
Ericsson-Service-Information ::= < AVP Header: 285 193 >
```

```
*[ IMS-Service-Identification ]  
[ MMT-Information ]  
*[Transaction-Info ]  
[ UHTZ-Offset ]  
[ GSM-Call-Reference-Number ]  
[ MSC-Address ]  
[ Forward-TTC-Charging-Headers  
]  
[ Backward-TTC- Charging-  
Headers ]  
[ Forward-TTC-Charging-  
Parameters ]  
[ Backward-TTC-Charging-  
Parameters ]  
[ AS-Type ]  
[ SIP-Ringing-Timestamp ] (3)  
[ SIP-Ringing-Timestamp-  
Fraction ] (3)  
*[ AVP ]
```

This AVP is included in all ACR.

The SIP-Ringing-Timestamp and SIP-Ringing-Timestamp-Fraction AVPs are included in this grouped AVP from MTAS Rf version 3. They are included in the MMT-Information AVP if MTAS Rf version 1 or 2 is configured.

5.2.33 Event-Timestamp

The Event-Timestamp AVP contains a timestamp indicating the time that the ACR message is generated by MTAS. The value represents the number of seconds since January 1, 1900 00:00 UTC.

This AVP is included in all requests. This AVP may be included in all ACA but the information is currently not used by MTAS.

5.2.34 Event-Type

The Event-Type AVP contains information about the type of chargeable telecommunication service/event for which the accounting-request message is generated.

It has the following ABNF grammar:

```
Event-Type ::= < AVP Header: 823 10415 >  
[ SIP-Method ]
```

This AVP is included in all requests, except:

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- timer initiated interim requests.
- stop requests initiated when MTAS has triggered the termination of the session.
- event requests for user configuration of a supplementary service.

5.2.35 Experimental-Result

The Experimental-Result AVP is a grouped AVP that holds vendor specific result information.

It has the following ABNF grammar:

```
Experimental-Result ::= < AVP Header: 297 >
                        { Vendor-Id }
                        { Experimental-Result-Code }
```

This AVP may be included in answers. All answers must contain either an Experimental-Result AVP or a Result-Code AVP (see section 5.2.72).

5.2.36 Experimental-Result-Code

The Experimental-Result-Code AVP contains a vendor specific response to an Accounting Request.

The following result code is supported for Vendor-Id 193 (Ericsson):

4011 Accounting Not Applicable

This result code indicates that no further ACR messages should be sent.

An answer containing an Experimental-Result AVP with an Experimental-Result-Code AVP set to any other value is treated as if the message had not contained an Experimental-Result AVP.

This AVP is expected in all answers that contain an Experimental-Result AVP (see section 5.2.35).

5.2.37 Flexible-Charging-Info

The Flexible-Charging-Info AVP, used by the Japanese charging function, contains the value of the X-CHGInfo. See [23] for more information on the usage of this header.

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5.2.38 Forward-TTC-Charging-Headers

The Forward-TTC-Charging-Headers AVP is a grouped AVP used by the Japanese charging function. It contains information about ICBS-specific AVPs.

It has the following ABNF grammar:

Forward-TTC-Charging-Headers ::= < AVP Header: 1393 193 >

[Charging-Area]

[Carrier-Information]

[Additional-User-Category]

*[AVP]

This AVP may be included in ACR (start) and ACR (event). See [23] for more information on the usage of related SIP headers.

5.2.39 Forward-TTC-Charging-Parameters

The Forward-TTC-Charging-Parameters AVP is used by the Japanese charging function. It contains information about ICBS-specific data in the forward direction.

This AVP may be included in ACR (start) and ACR (event). See [23] for more information on the usage of the related SIP header.

5.2.40 From-Header

The From-Header AVP contains a copy of the From Header URI (without any URI parameters and/or headers) from the initial INVITE request received by MTAS.

For transit sessions resulting from the communication diversion service, the From-Header AVP included in the originating charging messages generated for the diverted leg (B-to-C) and the terminating charging messages generated for the original leg (A-to-B) contain the From Header associated with the party initiating the session (A).

For transit sessions resulting from the flexible communication distribution service, the From-Header AVP included in the originating charging messages generated for the FCD legs (B-to-B', B-to-C etc.) and the terminating charging messages generated for the original leg (A-to-B) contain the From Header associated with the party initiating the session (A).

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For transit sessions resulting from the STOD service by a terminating user, the From-Header AVP included in the originating charging messages generated for the STOD legs (B-to-C etc.) and the terminating charging messages generated for the original leg (A-to-B) contain the From Header associated with the party initiating the session (A).

For transit sessions resulting from the STOD service by an originating user, the From-Header AVP included in the originating charging messages generated for the STOD legs (A-to-C etc.) and the originating charging messages generated for the original leg (A-to-B) contain the From Header associated with the party initiating the session (A).

For conference focus sessions, the From-Header AVP included in the originating charging messages generated for each dial-out conference leg contains the From Header associated with the conference creator.

For communication completion (3PCC) sessions, the From Header URI used to populate the From-Header AVP is taken from the INVITE sent on the outgoing dialog. The header content is the same as the corresponding header from the original INVITE on which communication completion was invoked.

This AVP is included in start requests, event requests for unsuccessful establishment of a SIP session and in event requests for successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code.

This AVP is included in event requests for Requested Announcements service.

5.2.41 From-Header-Presentation-Status

The From-Header-Presentation-Status AVP contains the presentation status for the From-Header.

The following values are defined:

- Presentation Allowed 0
- Presentation Restricted 1
- Unknown 2

For an originating charging case, the presentation status is set based on the Privacy header in the initial INVITE sent on the outgoing dialog. The value 'Presentation Restricted' is used when the INVITE contains a Privacy header with content of "user". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "user". In the case of SIP sessions that are rejected by MTAS without an outgoing request being sent, the presentation status is either set to 'Presentation Allowed' or 'Presentation Restricted' as determined by the OIR supplementary service, or

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is set to 'Unknown' when the session is rejected before the OIR supplementary service analysis is performed.

For a terminating charging case, the presentation status is set based on the Privacy header in the initial INVITE received on the incoming dialog. The value 'Presentation Restricted' is used when the INVITE contains a Privacy header with content of "user". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "user".

This AVP is included in all messages containing a From-header AVP, see section 0. This includes start requests, interim requests and event requests.

5.2.42 GSM-Call-Reference-Number

The GSM-Call-Reference Number AVP holds the Call Reference Number of a call.

This AVP is included in start requests in the CAMEL Services.

5.2.43 IMS-Charging-Identifier

The IMS-Charging-Identifier AVP holds the IMS Charging Identifier (ICID) as generated by an IMS node for a SIP session.

The identifier is obtained from the P-Charging-Vector header in the initial INVITE received on the incoming dialog.

For transit sessions resulting from the communication diversion service, MTAS generates a new ICID for the outgoing dialog to the diverted-to party. The original ICID is included in the terminating charging messages generated for the original leg (A-to-B) and the new ICID is included in the originating charging messages generated for the diverted leg (B-to-C).

If AS chaining is enabled (see CM parameter `mtasSipOriginatingAsChaining` [18]) the INVITE is routed back to S-CSCF after communication diversion is executed, the S-CSCF then initiates triggering of originating services in a new originating session case in a terminating AS. A third additional MMTel session is then created (B-to-C). The new ICID is included in the originating charging messages generated for the additional outgoing leg (B-to-C).

For transit sessions resulting from the flexible communication distribution service, MTAS generates new ICIDs for the outgoing dialogs to the non-IMS primary user (B') and the related users (i.e. C, D etc.). The original ICID is included in the terminating charging messages generated for the original leg (A-to-B) and the new ICID is included in the originating charging messages generated for each FCD leg (B-to-B', B-to-C etc.).

For transit sessions resulting from the STOD service by a terminating user, MTAS generates new ICIDs for the outgoing dialogs to the primary users and

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related users (i.e. C, D etc.). The original ICID is included in the terminating charging messages generated for the original leg (A-to-B) and the new ICID is included in the originating charging messages generated for each STOD leg to related users (B-to-C etc.).

For transit sessions resulting from the STOD service by an originating user, MTAS generates new ICIDs for the outgoing dialogs to the primary users and related users (i.e. C, D etc.). The original ICID is included in the originating charging messages generated for the original leg (A-to-B) and the new ICID is included in the originating charging messages generated for each STOD leg to related users (A-to-C etc.).

For ad-hoc conference focus sessions, MTAS generates a new ICID for each dial-out conference leg. The new ICID is included in the originating charging messages generated for each dial-out conference leg.

For the scheduled conference focus traffic sessions, in the terminating charging messages generated by the conference focus, MTAS includes the IMS Charging Identifier received or sent in the corresponding SIP message triggering the charging message generation.

For communication completion (3PCC) sessions, MTAS generates a new ICID, used for both the leg to A and the leg to B. The new ICID is included in the originating charging message generated for the leg to B.

For enhanced Parlay X Third Party Call session, MTAS handling Parlay X session generates an ICID for MTAS Parlay X leg to User B and another for leg to User C. Related-ICID AVP is used in addition to this AVP to convey both ICIDs.

For terminating charging case if CM parameter `mtasChargingProfileMultiDevice` is enabled, new charging sessions are started for each outgoing leg. The original ICID (obtained from the P-Charging-Vector header in the initial INVITE received on the incoming dialog) is included in the terminating charging messages generated for the original leg (A-to-B) and for each outgoing leg towards IMS Primary users([A-to-B1]', [A-to-B2]' etc.). New ICIDs are generated included in charging messages generated for each outgoing leg to non IMS primary users and to Related users ([A-to-C]', [A-to-D]' etc.).

When the ICID is generated by MTAS it consists of the following parts:
`mOTin<seconds><micro-seconds><icid-count><process-id>`

Where:

- `mOTin` is the literal string "mOTin"
- `<seconds>` Unsigned hexadecimal integer, 8 characters long, left padded with zeroes if actual seconds is less than 8 characters.
- `<micro-seconds>` Unsigned hexadecimal integer, 5 characters long, left padded with zeroes if actual micro seconds is less than 5 characters.

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- `<icid-count>` Unsigned hexadecimal integer, 3 characters long, left padded with zeroes if actual value is less than 3 characters. Its value is increased by one every time a new ICID is generated and starts from zero.
- `<process-id>` Unsigned hexadecimal integer, 8 characters long, left padded with zeroes if actual seconds is less than 8 characters.

So the generated ICID is always 29 characters long.

Example:

mOTin5233525800be300100000442

This AVP is included in all requests, except event requests for user configuration of a supplementary service.

5.2.44 IMS-Information

The IMS-Information AVP is a grouped AVP that holds detailed information about the service.

It has the following ABNF grammar:

```

IMS-Information ::= < AVP Header: 876 10415 >
    [ Event-Type ]
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Outgoing-Session-Id]
    *[ Calling-Party-Address ]
    [ Called-Party-Address ]
    *[ Called-Asserted-Identity ]
    [ Number-Portability-Routing-Information ]
    [ Requested-Party-Address ]
    [ Time-Stamps ]
    [ Inter-Operator-Identifier ]
    [ IMS-Charging-Identifier ]
    *[ SDP-Session-Description ]
    *[ SDP-Media-Component ]
    *[ Service-Specific-Info ]
    *[ Message-Body ] (2)(3)
    [ Access-Network-Information ]
    [ Cause-Code ]
    [ Carrier-Select-Routing-Information ] (3)

```

This AVP is included in all requests.

The Carrier-Select-Routing-Information AVP is included in this grouped AVP from MTAS Rf version 3. It is included in the MMT-Information AVP if MTAS Rf version 1 or 2 is configured.

5.2.45 IMS-Service-Identification

The IMS-Service-Identification AVP holds the service identification in a feature tag format e.g. "+q.ims.icsi.mmtel".

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The feature tags are obtained from the Accept-Contact header field in the initial SIP INVITE request. An IMS-Service-Identification AVP is included for each feature tag present.

MTAS may include IMS-Service-Identification AVPs containing its own primary MMTel identifier and MMTel charged service identifier, if they are not present in the SIP message.

The table below describes the content of the IMS-Service-Identification AVPs depending of which feature tags have been received in the SIP event.

The examples assume that the primary feature tag for MMTel is “urn:urn-xxx:3gpp-service.ims.icsi.mmtel” and that the MMTel charged service identifier is “+g.ericsson.mmt”.

Table 6: IMS Service Identifiers

Accept-Contact: Feature tag	AVPs in message
No feature tag in SIP message (but recognized as MMTel).	IMS-Service-Identification = urn:urn-xxx:3gpp-service.ims.icsi.mmtel IMS-Service-Identification = +g.ericsson.mmt
+g.ims.icsi.mmtel	IMS-Service-Identification = +g.ims.icsi.mmtel IMS-Service-Identification = urn:urn-xxx:3gpp-service.ims.icsi.mmtel IMS-Service-Identification = +g.ericsson.mmt
+g.ims.icsi.mmtel; +g.vendor.service	IMS-Service-Identification = +g.ims.icsi.mmtel IMS-Service-Identification = +g.vendor.service IMS-Service-Identification = urn:urn-xxx:3gpp-service.ims.icsi.mmtel IMS-Service-Identification = +g.ericsson.mmt

This AVP is included in all requests, except event requests for user configuration of a supplementary service.

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5.2.46 Instance-Id

The Instance-Id AVP (AVP code 3402) is of type UTF8String and contains a URN generated by the device that uniquely identifies a specific device amongst all other devices. The Instance Id is transported in the Contact header of a SIP request associated with the served user.

The Instance-Id AVP populated with the simple string copy of the “+sip.instance” feature tag from the Contact header enclosed in a MIME body of the the 3rd party REGISTER message and stored in Subscribers Data.

This AVP should be included in Start requests and Event requests only when Caching Contact Data is enabled (mtasSubsDataCacheContactData=1) and the device Id information is available in Subscribers Data.

5.2.47 Inter-Operator-Identifier

The Inter-Operator-Identifier AVP is a grouped AVP that holds the identification of the network neighbors (originating and terminating) as exchanged via SIP signaling.

It has the following ABNF grammar:

```
Inter-Operator-Identifier ::= < AVP Header: 838 10415 >
                               [ Originating-IOI ]
                               [ Terminating-IOI ]
```

This AVP may be included in start requests and event requests. It is only included when originating and/or terminating network identification information is available.

5.2.48 Interim-Reason

The Interim-Reason AVP is of type Enumerated and contains the reason of ACR[Interim] generation.

The following values are defined:

- 1 CHANGE_IN_MEDIA_COMPOSITION
- 2 LONG_DURATION
- 3 INTERIM_INTERVAL_EXPIRY

5.2.49 LCS-Information

The LCS-Information AVP (AVP code 878) is of type Grouped. Its purpose is to allow the transmission of additional LCS service specific information elements.

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It has the following ABNF grammar:

```
LCS-Information ::= < AVP Header: 878 10415 >
                    [ MSISDN ] (3)
```

This AVP may be included in all types of request. The inclusion of this grouped AVP is dictated by the need to include the constituent AVPs, i.e. the LCS-Information AVP is only included when there is one or more constituent AVPs.

The MSISDN AVP is included in this grouped AVP from MTAS Rf version 3. It is included in the MMT-Information AVP if MTAS Rf version 1 or 2 is configured.

5.2.50 Matched-Regular-Expression

The Matched-Regular-Expression AVP contains string values in specific format. The AVP is used to convey the information of matched regular expression that triggers the Flexible Service Format Selection (FSFS) service suppressing other selected MTAS services.

The Matched-Regular-Expression AVP is mandatory when the Service-Suppression-Info AVP is presents in the Diameter message.

The Matched-Regular-Expression AVP contains a value with the following syntax:

```
"Header" HCOLON (matched-header) COMMA "Parameter" HCOLON
(matched-regular-expression)
```

5.2.51 Media-Initiator-Flag

The Media-Initiator-Flag AVP indicates which party has requested the media component. The calling party is identified as the initiator for all media components that are introduced during the session establishment. The party initiating an UPDATE or re-INVITE during an established session is identified as the initiator for all media components.

The Media-Initiator-Flag has the following values:

- Called Party 0
- Calling Party 1
- Unknown 2 (Not Used)

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For transit sessions resulting from the communication diversion service, the calling party (A) is considered to be the calling party for the originating charging session for the B-to-C leg, as well as for the terminating charging session for the A-to-B leg. Similarly, the diverted-to party (C) is considered to be the called party for the terminating charging session for the A-to-B leg, as well as for the originating charging session for the B-to-C leg.

For transit sessions resulting from the flexible communication distribution service, the calling party (A) is considered to be the calling party for the originating charging session for the FCD leg (B-to-B', B-to-C etc.), as well as for the terminating charging session for the A-to-B leg. Similarly, the non-IMS primary user (B') or the related user (i.e. C, D etc.) is considered to be the called party for the terminating charging session for the A-to-B leg, as well as for the originating charging session for the FCD leg.

For transit sessions resulting from the STOD service by a terminating user, the calling party (A) is considered to be the calling party for the originating charging session for the STOD leg (B-to-C etc.) as well as for the terminating charging session for the A-to-B leg. Similarly, the related user (i.e. C, D etc.) is considered to be the called party for the originating charging session for the STOD leg (B-to-C etc.) as well as for the terminating charging session for the A-to-B leg,

For transit sessions resulting from the STOD service by an originating user, the calling party (A) is considered to be the calling party for the originating charging session for the STOD leg (B-to-C etc.) as well as for the originating charging session for the A-to-B leg. Similarly, the related user (i.e. C, D etc.) is considered to be the called party for the originating charging session for the STOD leg (B-to-C etc.) as well as for the originating charging session for the A-to-B leg,

For conference focus sessions, the conference creator is considered to be the calling party for each dial-out conference leg, and the conference participant is considered to be the called party.

For communication completion (3PCC) sessions used for communication completion, the user that invoked the service is considered to be the calling party and the user to whom the communication is completed is considered to be the called party.

During Explicit Communication Transfer this AVP is set as the transferor would have requested the media component.

For the Subscriber Credit Notification feature it is MTAS that initiates the media change on behalf of the user to be notified; were the originating user is considered as the calling party while the terminating user is considered as the called party.

This AVP is included in start requests and in media based interim requests.

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5.2.52 Message-Body

The Message-Body AVP is a grouped AVP and contains information related to the SIP message bodies.

It has the following ABNF grammar:

```
Message-Body ::= < AVP Header: 889 10415 >
                  { Content-Type }
                  { Content-Length }
                  [ Content-Disposition ]
                  [ Originator ]
```

This AVP may be included multiple times; one AVP for each SIP message body that has been exchanged in this session. Each body part in a multipart body is represented by one AVP. SIP message bodies with “application/sdp” as content type are not included.

- This AVP is included in all requests if the content of a non-SDP message body is available.

5.2.53 MMT-Information

The MMT-Information AVP is a grouped AVP and holds service specific information for MMTel.

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It has the following ABNF grammar:

```
MMT-Information ::= < AVP Header: 1061 193 >
```

```
[ Analyzed-Call-Type ]
[ Called-Asserted-Identity-Presentation-
  Status ]
[ Calling-Party-Address-Presentation-
  Status ]
[ Carrier-Select-Routing-
  Information ] (1)(2)
[ Conference-Id ]
[ Dial-Around-Indicator ]
[ From-Header ]
[ From-Header-Presentation-Status ]
[ MSISDN ] (1)(2)
[ Party-To-Charge ]
* [ Related-ICID ]
[ Served-User ]
[ SIP-Request-Timestamp-Fraction ] (1)
[ SIP-Response-Timestamp-Fraction ] (1)
[ SIP-Ringing-Timestamp ] (1)(2)
[ SIP-Ringing-Timestamp-Fraction ] (1)(2)
*[ Supplementary-Service-Information ]
[ Participants-Involved ]
[ Participants-List ]
[ Tenant ]
[ XCON-Id ]
*[ AVP ]
```

The Carrier-Select-Routing-Information AVP is included in this grouped AVP if MTAS Rf version 1 or 2 is configured. It is included in the IMS-Information AVP from MTAS Rf version 3.

The SIP-Ringing-Timestamp and SIP-Ringing-Timestamp-Fraction AVPs are included in this grouped AVP if MTAS Rf version 1 or 2 is configured. They are included in the Ericsson-Service-Information AVP from MTAS Rf version 3.

The MSISDN AVP is included in this grouped AVP if MTAS Rf version 1 or 2 is configured. It is included in the LCS-Information AVP from MTAS Rf version 3.

The SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are included in the Ericsson specific MMT-Information AVP if MTAS Rf version 1 is configured. MTAS includes these AVPs in the Time-Stamps AVP group if version 2 or higher is configured.

This AVP may be included in all types of request. The inclusion of this grouped AVP is dictated by the need to include the constituent AVPs, i.e. the MMT-Information AVP is only included when there is one or more constituent AVPs.

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5.2.54 MMTel-Information

The MMTel-Information AVP (AVP code 2030) is of type Grouped. Its purpose is to allow the transmission of additional MMTel service specific information elements. It holds MMTel supplementary services invoked during MMTel service.

It has the following ABNF grammar:

```
MMTel-Information ::= < AVP Header: 2030 10415 >  
                    * [ Supplementary-Service] (2) (3)
```

This AVP may be included in ACR (start), ACR (interim), ACR(stop) and ACR (event). The inclusion of this grouped AVP is dictated by the need to include the constituent AVPs, i.e. the MMTel-Information AVP is only included when there is one or more constituent AVPs.

5.2.55 MSC-Address

The MSC-Address AVP holds the triggering MSC address of the call. This AVP is included in start requests in the IN services.

5.2.56 MSISDN

The MSISDN AVP is of type OctetString. This AVP contains an MSISDN, in international number format as described in ITU-T Rec E.164 [17], encoded as a TBCD-string, i.e. digits from 0 through 9 are encoded 0000 to 1001; 1111 is used as a filler when there is an odd number of digits; bits 8 to 5 of octet n encode digit 2n; bits 4 to 1 of octet n encode digit 2(n-1)+1.

MSISDN is used to report the VoLTE UE that originated or terminated a call setup through SCC AS.

5.2.57 Node-Functionality

The Node-Functionality AVP specifies the functionality of the node generating the accounting-request message.

The node functionality identifier used by MTAS is:

- AS 6

This AVP is included in all requests.

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5.2.58 Number-Portability-Routing-Information

The Number-Portability-Routing-Information AVP contains information on routing number received by MTAS during number portability look-up (ENUM/DNS).

This AVP may be included in start requests and event requests.

5.2.59 Origin-Host

The Origin-Host AVP identifies the endpoint that originated the Diameter message, and must be present in all Diameter messages.

This AVP is included in all requests where the configured hostId in Diameter is used, and is expected in all answers.

5.2.60 Origin-Realm

The Origin-Realm AVP contains the realm of the originator of any Diameter message and must be present in all messages.

This AVP is included in all requests where the configured realm in Diameter is used, and is expected in all answers.

5.2.61 Originating-IOI

The Originating-IOI AVP is the Inter Operator Identifier for the originating network as generated by the S-CSCF in the home network of the originating end user.

For originating and terminating sessions the identifier of the home network of the calling party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming INVITE request.

For transit sessions resulting from the communication diversion service, the identifier of the home network of the calling party (A) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the diverting party (B) is included in the originating charging messages generated for the diverted leg (B-to-C). The identifier of the home network of the calling party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming INVITE request and the identifier of the home network of the diverting party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the diverted-to party (C) that contains an originating-IOI parameter.

For transit sessions resulting from the flexible communication distribution service, the identifier of the home network of the calling party (A) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the primary user (B) is included in the originating

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charging messages generated for the FCD legs (B-to-B', B-to-C etc.). The identifier of the home network of the calling party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming INVITE request and the identifier of the home network of the primary user is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the non-IMS primary user (B') or a related user (i.e. C, D etc.) that contains an originating-IOI parameter.

For transit sessions resulting from the STOD service by a terminating user, the identifier of the home network of the calling party (A) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the primary user (B) is included in the originating charging messages generated for the STOD legs (B-to-C etc.). The identifier of the home network of the calling party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming INVITE request and the identifier of the home network of the primary user is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the related user (i.e. C, D etc.) that contains an originating-IOI parameter.

For transit sessions resulting from the STOD service by an originating user, the identifier of the home network of the calling party (A) is included in the originating charging messages generated for the original leg (A-to-B) and the home network of the primary user (A) is included in the originating charging messages generated for the STOD legs (A-to-C etc.). The identifier of the home network of the calling party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming INVITE request and the identifier of the home network of the primary user is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the related user (i.e. C, D etc.) that contains an originating-IOI parameter.

For conference focus sessions, the identifier of the home network of the conference creator is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the incoming 'conference creation' INVITE request. The identifier is included in the originating charging messages generated for each dial-out conference leg.

For communication completion (3PCC) sessions, the Originating-IOI AVP contains the identifier of the home network of the calling party and is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the called party (B) that contains an originating-IOI parameter.

This AVP may be included in start requests, event requests for unsuccessful establishment of a SIP session and in event requests for successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code. It is only included when originating network identification information is available.

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This AVP is included in event requests for Requested Announcements service.

5.2.62 Originator

The Originator AVP indicates the originating party of the message-body.

The following values are defined:

- Calling Party 0
- Called Party 1

This AVP is included in all requests where the Message-Body AVP is present.

5.2.63 Outgoing-Session-Id

The Outgoing-Session-Id AVP contains the SIP Call-ID of the outgoing dialog.

The SIP Call ID is obtained from the INVITE sent on the outgoing dialog (see section 3.3). If the SIP Call ID of the outgoing dialog is not available, AVP is not sent.

This AVP is included in all requests, except cases when SIP Call ID of the outgoing dialog is not available (e.g. barring scenarios).

After Explicit Communication Transfer (ECT) this AVP is not sent in charging requests.

In case of Scheduled Conference this AVP is not sent in charging requests.

5.2.64 Participants-Involved

The Participants-Involved AVP defines the list of addresses (Public User ID: SIP URI, TEL URI, E.164) of the parties that are involved in the ParlayX Enhanced Third Party Call.

This AVP is included in ACR if the charging session is of type Enhanced Parlay X TPC and Accounting-Record-Type is Start Record, Interim Record or Stop Record.

5.2.65 Participants-List

The Participants-List AVP defines the list of addresses (Public User ID: SIP URI, TEL URI, E.164) of the parties that are planned to take part in the ParlayX Third Party Call.

This AVP is included in all requests if the charging session is of type Enhanced Parlay X TPC.

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5.2.66 Party-To-Charge

The Party-To-Charge AVP defines the party to charge from an IN point of view.

In case of CAMEL services this AVP is populated with the value of the FurnishChargingInformation. FCIBCCCAMEL.PartyToCharge information element.

This AVP is included in all requests if the FurnishChargingInformation was received from IN.

- Calling Party 1 (default value)
- Called Party 2

For details about the CAP Furnish Charging Information operation, see [20].

5.2.67 PS-Information

The PS-Information AVP is to allow the transmission of additional PS service specific information elements.

It has the following ABNF grammar:

```
PS-Information ::= < AVP Header: 874 10415 >
                  [ 3GPP-MS-TimeZone ]
                  [ User-Equipment-Info ]
```

5.2.68 Reason-Header

The Reason-Header AVP contains the content of the Reason-header in the SIP BYE, CANCEL and SIP error (3XX,4XX, 5XX, 6XX) messages. It may contain multiple entries if there are multiple Reason headers within a SIP message.

This AVP is included in stop requests and in event requests for unsuccessful establishment of a SIP session

In case of Scheduled Conference, this AVP can be included in the interim requests.

5.2.69 Redirecting-Party-Address

The Redirecting-Party-Address AVP contains the address of the party redirecting a SIP communication request.

If the Redirecting-Party-Address is a TEL URI and a Calling Party Category is provided for the redirecting subscriber in MTAS then the Calling Party Category is included in the Redirecting-Party-Address.

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For communication diversion, it contains the Request URI from the initial INVITE request destined for the diverting party. The AVP is included in the originating charging session for the B-to-C leg.

For flexible communication distribution, it contains the Request URI from the initial INVITE request destined for the primary user (B). The AVP is included in the originating charging session for each FCD leg (B-to-B', B-to-C etc.).

For STOD by terminating user, it contains the Request URI from the initial INVITE request destined for the primary user (B). The AVP is included in the originating charging session for each STOD leg (B-to-C etc.).

For STOD by originating user, it contains the P-Asserted-Identity from the initial INVITE request from the primary user (A). The AVP is included in the originating charging session for each STOD leg (A-to-C etc.).

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is included when the identity of the diverting party needs to be included.

5.2.70

Related-ICID

The Related-ICID AVP contains the IMS Charging Identifier of another leg of the MMTel communication service when a supplementary service involving multiple call legs is involved. This allows the charging information for the related call legs to be correlated, if required.

This AVP is used for CDIV, Flexible Communication Distribution, Conference, Three Party and Session Transfer to own Device (STOD) supplementary services.

For CDIV:

- a the terminating charging messages generated by the diverting MTAS for the original leg (A-to-B) include the new IMS Charging Identifier used on the diverted leg (B-to-C).
- b the originating charging messages generated by the diverting MTAS for the diverted leg (B-to-C) include the IMS Charging Identifier used on the original leg (A-to-B).
- c the originating charging messages generated by the diverting MTAS (when AS chaining is enabled, see `mtasSipOriginatingAsChaining` [18]) for the outgoing leg (B-to-C) include the IMS Charging Identifier used on the original leg (A-to-B) if the original ICID is included in the P-Charging-Vector header.

For Flexible Communication Distribution:

- a for a communication session that is successfully established with the non-IMS primary user (B') or with one of the related users (i.e. C, D, etc.), the terminating charging messages generated by the transit MTAS for the

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original leg (A-to-B) include the new IMS Charging Identifier used on the FCD leg (B-to-B', B-to-C etc.) which was successfully established.

Note that the Related-ICID AVP is not reported in terminating charging messages generated for an unsuccessful attempt to establish a SIP session.

- b the originating charging messages generated by the transit MTAS for the FCD legs (B-to-B', B-to-C etc.) to the non-IMS primary user (B') and to each invited related user (i.e. C, D etc.) include the IMS Charging Identifier used on the original leg (A-to-B).

For Ad-hoc Conference:

- a the Ad-hoc Conference may report one or two Related-ICID AVPs in originating charging messages generated by the conference focus MTAS for each dial-out conference leg. The first Related-ICID AVP will always include the IMS Charging Identifier received in the initial INVITE requesting the conference creation. The optional second Related-ICID AVP will only be reported in case an existing A-to-B session was transferred to the conference. For this case the AVP includes the IMS Charging Identifier of the transferred session.

For Scheduled Conference:

- a for scheduled conference focus sessions, MTAS generates a new Conference ICID that is used in the terminating charging messages generated for the scheduled conference focus traffic session.
- b the charging messages generated by MTAS due to user configuration of a scheduled conference via the CCMP interface, may include the Conference ICID of the related scheduled conference focus traffic session.

For Three Party:

- a the interim charging messages generated for a 2-party session while the session is included in a 3PTY session include the IMS Charging Identifier of the related 3PTY session.

For Explicit Communication Transfer:

- a the charging messages generated for the transferee session during and after successful Explicit Communication Transfer include the IMS Charging Identifier of the transfer target session.
- b the charging messages generated for the transfer target session during and after successful Explicit Communication Transfer include the IMS Charging Identifier of the transferee session.

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For Enhanced Parlay X TPC:

- a MTAS generates a new ICID that is used for Related-ICID in all charging messages during the session. Value of Related-ICID is included in the INVITE message towards user C.

For STOD by a terminating user:

- a for a communication session that is successfully established with one of the related users (i.e. C, D, etc.), the terminating charging messages generated by the transit MTAS for the original leg (A-to-B) include the new IMS Charging Identifier used on the STOD leg (B-to-C etc.) which was successfully established.

Note that the Related-ICID AVP is not reported in terminating charging messages generated for an unsuccessful attempt to establish a SIP session.

- b the originating charging messages generated by the transit MTAS for the STOD legs (B-to-C etc.) to each invited related user (i.e. C, D etc.) include the IMS Charging Identifier used on the original leg (A-to-B).

For STOD by an originating user:

- a for a communication session that is successfully established with one of the related users (i.e. C, D, etc.), the originating charging messages generated by the transit MTAS for the original leg (A-to-B) include the new IMS Charging Identifier used on the STOD leg (A-to-C etc.) which was successfully established.

Note that the Related-ICID AVP is not reported in originating charging messages generated for an unsuccessful attempt to establish a SIP session.

- b the originating charging messages generated by the transit MTAS for the STOD legs (A-to-C etc.) to each invited related user (i.e. C, D etc.) include the IMS Charging Identifier used on the original leg (A-to-B).

For terminating charging case if CM parameter `mtasChargingProfileMultiDevice` is enabled, MTAS generates new ICIDs for the outgoing dialogs to the IMS primary user's devices. New charging sessions are started for each outgoing leg. The original ICID is included in charging messages generated for the original leg (A-to-B) and the new ICIDs are included in the charging messages generated for each outgoing leg ([A-to-B]', [A-to-B]" etc.). Charging messages sent for each outgoing leg ([A-to-B]', [A-to-B]" etc.) contain Related-ICID set to ICID of original leg (A-to-B). Charging messages sent for incoming leg (main charging session) contain all ICIDs generated for outgoing legs (e.g. in case of two outgoing dialogs to IMS Primary user's devices created in FCD case, ACR message sent for original leg (A-to-B) contain two Related-ICID AVPs.)

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This AVP may be included in start requests, interim requests, stop requests and in event requests for unsuccessful establishment of a SIP session. It is included at a diverting node, at a distributing node, at a conference focus node and at a three party node.

5.2.71 Requested-Party-Address

The Requested-Party-Address AVP holds the address (SIP URI or TEL URI) which identifies the party to whom the SIP transaction was originally posted.

It is populated with the SIP URI or TEL URI (including any URI parameters) contained in the Request-URI of the incoming request.

At an originating MTAS where the Request URI received in the incoming request is modified by MTAS before being sent in the outgoing request, the Requested-Party-Address AVP contains the URI received in the incoming request and the Called-Party-Address AVP (see section 5.2.15) contains the URI sent in the outgoing request.

For communication completion (3PCC) sessions, the Requested-Party-Address AVP is not included.

For Communication Diversion (CDIV) on the terminating MTAS; if the stored target address differs from the SIP Request URI the target address is added to the Requested-Party-Address AVP.

Example: tel:87190000;phone-context=+46

This AVP may be included in start requests and event requests. It is only included if the address differs from the Called Party Address.

5.2.72 Result-Code

The Result-Code AVP indicates whether a particular request was completed successfully or whether an error occurred.

Diameter provides the following classes of errors (see reference [6]):

- 1xxx (Informational)
- 2xxx (Success)
- 3xxx (Protocol Errors)
- 4xxx (Transient Failures)
- 5xxx (Permanent Failure)

This AVP may be included in answers. All answers must contain either a Result-Code AVP or an Experimental-Result AVP (see section 5.2.35).

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5.2.73 Role-of-Node

The Role-of-Node AVP specifies the role of a SIP IP Multimedia node.

The role of node identifier values used by MTAS are:

- Originating 0

MTAS is applying an originating role, serving the calling subscriber.

- Terminating 1

MTAS is applying a terminating role, serving the called subscriber.

For transit sessions resulting from the communication diversion service, MTAS uses two separate charging sessions – a terminating charging session for the original incoming leg (A-to-B) and an originating charging session for the diverted leg (B-to-C).

For sessions that encounter the flexible communication distribution service, MTAS uses a terminating charging session for the original incoming leg (A-to-B) and may use originating charging sessions for the outgoing leg to a non-IMS primary user (B-to-B') and for the outgoing legs to related users, B-to-C, B-to-D etc.

For transit sessions resulting from the STOD service by a terminating user, MTAS uses a terminating charging session for the original incoming leg (A-to-B) and may use originating charging sessions for the outgoing legs to related users, B-to-C, B-to-D etc.

For transit sessions resulting from the STOD service by an originating user, MTAS uses an originating charging session for the original outgoing leg (A-to-B) and may use originating charging sessions for the outgoing legs to related users, A-to-C, A-to-D etc.

This AVP is included in all requests, except event requests for user configuration of a supplementary service.

5.2.74 Routing-Call-Type

The Routing-Call-Type AVP holds the name of the call type that was used by Carrier Pre-Select to determine the carrier for this call. It is applicable to the Carrier Pre-Select service as well as the Carrier Pre-Select Rn service.

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For Carrier Pre-select the AVP can contain the following values:

- "Local"
- "Non Local"
- "IntraLata"
- "IntraLataToll"
- "InterLata"
- "NanpZone1"
- "NanpInternational"

See ref [15] for a definition of the call types.

For Carrier Pre-select Rn the AVP can contain the following values:

- "Local"
- "Remote"

If a match is found for the caller's CC and AC in the Called Party number, then the call is considered "Local", otherwise it is considered "Remote".

5.2.75 Ro-Information

The Ro-Information AVP is a grouped AVP that contains information about the corresponding Ro interface for the actual call or call attempt.

It has the following ABNF grammar:

```
Ro-Information ::= < AVP Header: 1478 193 >
                  [ Ro-Status ]
```

5.2.76 Ro-Status

The Ro-Status AVP contains the status of the Ro session/event.

The following value is defined:

- SUPPRESSED 1

The AVP will be included in the ACR start or event message when the B number is classified as toll-free and the Ro session/event is suppressed accordingly.

5.2.77 SCC-Service-Identity

The SCC-Service-Identity AVP contains the identity of the service being used in SCC AS session.

The following values are defined:

- Terminating Access Domain Selection (T-ADS) 0

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- Service Domain Selection (SDS) 100
- Single Radio Voice Call Continuity (SRVCC) 200

5.2.78 SCC-TADS-Decision

The SCC-TADS-Decision AVP contains the result of T-ADS for a terminating session in SCC AS. The following results are defined:

- No selection 0
- No selection and Reject 1
- Terminate on VoLTE UE on PS 2
- Terminate on VoLTE UE on CS 3
- Terminate on VoLTE UE on PS or CS 4
- Breakout to CS with Prefix 5
- Breakout to CS with MSRN 6

5.2.79 SDP-Media-Component

The SDP-Media-Component AVP is a grouped AVP that contains information about media used for an IMS session.

The media component information is obtained from the SDP answer signaled on either the incoming or outgoing dialog depending on the AS session case (see section 3.3). In case of established session announcements for ACR, ICB and DND media component information is obtained from the SDP answer negotiated with MRF.

It has the following ABNF grammar:

```
SDP-Media-Component ::= < AVP Header: 843 10415 >
                        [ SDP-Media-Name ]
                        *[ SDP-Media-Description ]
                        [ Media-Initiator-Flag ]
                        [ SDP-Type ] (2) (3)
```

This AVP may be included in start requests and media based interim requests. It is only included when SDP information with one or more media-level section is available. A separate SDP-Media-Component AVP is included for each media-level section.

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5.2.80 SDP-Media-Description

The SDP-Media-Description AVP holds the content of an “attribute-line” (i=, c=, b=, k=, a=, etc.) related to a media component, as described in reference [9]. The attributes are specifying the media described in the SDP-Media-Name AVP.

The media description is obtained from the SDP answer signaled on either the incoming or outgoing dialog depending on the AS session case (see section 3.3). In case of established session announcements for ACR, ICB and DND media component information is obtained from the SDP answer negotiated with MRF.

This AVP may be included in start requests and media based interim requests. It is only included when the media-level section of the media component includes one or more “attribute lines” other than media name (m=).

5.2.81 SDP-Media-Name

The SDP-Media-Name AVP holds the content of an “m=” line in the SDP data.

The media name is obtained from the SDP answer signaled on either the incoming or outgoing dialog depending on the AS session case (see section 3.3). In case of established session announcements for ACR, ICB and DND media component information is obtained from the SDP answer negotiated with MRF.

This AVP may be included in start requests and media based interim requests. It is included whenever an SDP-Media-Component AVP is present.

5.2.82 SDP-Session-Description

The SDP-Session-Description AVP holds the content of an “attribute-line” (i=, c=, b=, k=, a=, etc.) related to a session, as described in reference [9].

The information is obtained from the SDP answer signaled on either the incoming or outgoing dialog depending on the AS session case (see section 3.3). In case of established session announcements for ACR, ICB and DND media component information is obtained from the SDP answer negotiated with MRF.

This AVP may be included in start requests and media based interim requests. It is only included when SDP information is available.

5.2.83 SDP-Type

The SDP-Type AVP holds information if the SDP media component was of type SDP offer or SDP answer.

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The values are:

- SDP Offer 0
- SDP Answer 1

This AVP may be included in start requests and media based interim requests. It is included when SDP information is available.

5.2.84 Served-User

The Served-User AVP contains the P-ServedUser-value from P-Served-User header, as received in a SIP INVITE request, defined in [19].

The Served user is the user belonging to the domain in question, i.e. the user that originated the request, the user the request was originated on behalf of, or the user the request was terminated on.

The Served-User AVP is included in start requests and event requests.

5.2.85 Service-Context-Id

The Service-Context-Id AVP contains a unique identifier of the MTAS Diameter accounting service that applies to the charging session.

The Service-Context-Id has a format defined by reference [4].

If MTAS Rf version 1 (based on 3GPP release 7) is configured, the Service-Context-Id for MMTel is:

<MNC.MCC>.7.<service-context>@<domain>

If MTAS Rf version 2 (based on 3GPP Release 9) is configured, the Service-Context-Id for MMTel is:

<MNC.MCC>.9.<service-context>@<domain>

If MTAS Rf version 3 (based on 3GPP Release 12) is configured, the Service-Context-Id for MMTel is:

<MNC.MCC>.12.<service-context>@<domain>

The <service-context>@<domain> component may be configured by the operator. It is controlled by the mtasChargingProfileServContext parameter in the MtasChargingProfile Managed Object, see reference [11]. The default parameter setting is:

32260@3gpp.com

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The <MNC.MCC> component may also be configured by the operator. It is controlled by the `mtasChargingProfileServContextOperatorId` parameter in the `MtasChargingProfile` Managed Object, see reference [11].

This AVP is included in all requests.

5.2.86 Service-Information

The Service-Information AVP is a grouped AVP that holds the Subscription-Id and IMS-Information AVPs.

It has the following ABNF grammar:

```
Service-Information ::= < AVP Header: 873 10415 >
                        [ Subscription-Id ]
                        [ IMS-Information ]
                        [ PS-Information ]
                        [ MMTel-Information ] (2) (3)
                        [ LCS-Information ] (3)
```

This AVP is included in all requests.

The MMTel-Information AVP is included in this grouped AVP from MTAS Rf version 2.

The LCS-Information AVP is included in this grouped AVP from MTAS Rf version 3.

5.2.87 Service-Number-Type

Defines the type of service number: OSN, NSN or a regular E164. The AVP is used to convey the communication type to the charging server. It is set by Number Normalisation service otherwise it is set to unknown value.

The Service-Number-Type could be the following:

0 – OSN service number

1 – NSN service number

2 – regular E164 non-service number

3 – unknown number type

5.2.88 Service-Specific-Data

The Service-Specific-Data AVP holds data of service specific info.

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The Service-Specific-Data is only configurable if MTAS Rf version 0 is configured. In other Rf versions, it will be a sub-AVP of Service-Specific-Info AVP, which is configurable.

5.2.89 Service-Specific-Info

The Service-Specific-Info AVP is a grouped AVP that holds the Service-Specific-Data and Service-Specific-Type AVPs.

It has the following ABNF grammar:

```
Service-Specific-Info ::= < AVP Header: 1249 10415 >
                        [Service-Specific-Data ]
                        [Service-Specific-Type ]
```

This AVP is included in all requests if applicable.

The Service Specific Type value '1' indicates the IN service is a CAMEL service. In this case AVP contains the information received in the FurnishChargingInformation. FCIBCCCAMEL. FreeFormatData information element.

The others possible Service Specific Type values are presented in Table 7.

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Table 7 summarizes how this AVP and its sub-AVPs will be used in ACRs:

Service-Specific-Type (Octet 2-4 in hexadecimal and decimal format)		Service-Specific-Data	
0x3F9	The parameter value '1017' indicates the Provider Specific Information	(see next column)	The customized charging information provisioned by operator using the CAI3G interface. String of 1-50 characters.
0x3FA	The parameter value '1018' indicates the Provider Specific Information	(see next column)	The customized charging information provisioned by operator using the CAI3G interface. String of 1-50 characters.
0x3FB	The parameter value '1019' indicates the Provider Specific Information	(see next column)	The customized charging information provisioned by operator using the CAI3G interface. String of 1-50 characters.
0x3FC	The parameter value '1020' indicates the Provider Specific Information	(see next column)	The customized charging information provisioned by operator using the CAI3G interface. String of 1-50 characters.
0x3FD	The parameter value '1021' indicates the Provider Specific Information	(see next column)	The customized charging information provisioned by operator using the CAI3G interface. String of 1-50 characters.
0x3FE	The parameter value '1022' indicates MULTI_PERSONA	Primary	Persona whose URI belongs to the first (to the default) IMPU in the IRS set
		Alternative	Persona whose URI belongs to not the first (not to the default) IMPU in the IRS set

Note:

- Octet 1 of the Service-Specific-Type AVP's data field is always set to the value of 0xAB.
- For details about the CAP Furnish Charging Information operation, see [20].

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5.2.90 Service-Specific-Type

The Service-Specific-Type AVP holds type of service specific info.

5.2.91 Service-Suppression-Info

The Service-Suppression-Info is a grouped AVP containing information about the services to be suppressed by the Flexible Service Format Selection (FSFS) service, and the matching header and regular expression in the incoming INVITE message.

It has the following ABNF grammar:

```
Service-Suppression-Info ::= < AVP Header: 1371 193 >
                             { Matched-Regular-Expression }
                             { Services-To-Suppress }
```

This AVP may be included in the start requests and event requests.

5.2.92 Services-To-Suppress

The Services-To-Suppress AVP contains the abbreviated service names separated with comma. The AVP is used to convey a list of MTAS services suppressed by the Flexible Service Format Selection (FSFS) service.

The Services-To-Suppress AVP is under Service-Suppression-Info AVP and it is mandatory when the Service-Suppression-Info AVP is presents in the Diameter message.

The Services-To-Suppress AVP contains a value with the following syntax:

```
(abbreviated-service-name) * (COMMA abbreviated-service-name)
```

5.2.93 Session-Id

The Session-Id AVP is used to identify a specific session. All messages pertaining to a specific session must include only one Session-Id AVP and the same value must be used throughout the life of a session. The Session-Id must be globally and eternally unique, as it is meant to uniquely identify a user session without reference to any other information, and may be needed to correlate historical authentication information with accounting information.

The MTAS session id consists of the following parts:

```
<origin-host>;<mtime>;<ltime>;<process-id>;<dialog-id>;<charging-case><impu>
```

Where:

- `<origin-host>` is the MTAS host. Configured by the operator. See the `hostId` parameter in [24]. Has no limitation on its length.

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- `<mtime>`, `<ltime>` is the number of milliseconds since 1990-01-01:00:00 (including “leap seconds”). Both have a maximum length of twelve characters.
- `<process-id>` is the process identity. Have a maximum length of twelve characters.
- `<dialog-id>` is the MTAS dialog identity. Have a maximum length of twelve characters.
- `<charging-case>` is set to 0, indicating offline charging. It is always one character long.
- `<impu>` is the default IMPU of the served user. Has no limitation on its length.

Example:

```
mtas.ericsson.com;11466393;795597789;1612;2;0;sip:A@ericsson.com
```

This AVP is included in all requests and is expected in all answers.

5.2.94 Session-Priority

The Session-Priority AVP is used to indicate resource priority of the IMS multimedia session towards charging systems. The value of AVP is mapped from Wps namespace of the SIP Resource-priority header (RPH) defined in [22].

The Session-Priority AVP maps the following values from the RPH:

RPH wps attribute	Session-Priority AVP
wps.0	Priority-0
wps.1	Priority-1
wps.2	Priority-2
wps.3	Priority-3
wps.4	Priority-4

This AVP is included only in ACR requests related to SIP sessions that have been initialized with RPH in the initial INVITE.

5.2.95 SIP-Method

The SIP-Method AVP identifies the name of the SIP Method (INVITE, UPDATE etc.) causing the accounting-request message to be generated.

This AVP is included in all requests, except:

- timer initiated interim requests.

This AVP is included in event requests for Requested Announcements service.

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5.2.99 SIP-Response-Timestamp-Fraction

The SIP-Response-Timestamp-Fraction AVP holds the millisecond fraction related to the SIP-Response-Timestamp.

This AVP is included in all requests containing a SIP-Response-Timestamp AVP.

5.2.100 SIP-Ringing-Timestamp

The SIP-Ringing-Timestamp AVP contains the time of the 180 Ringing response to the initial SIP INVITE request. The value represents the number of seconds since January 1, 1900 00:00 UTC. In case the SIP-Ringing-Timestamp-Fraction AVP is included in the request, the number of seconds is rounded *downwards*. Otherwise, if the AVP is configured to be omitted, the number of seconds is rounded to the nearest integer (upwards or downwards).

When more than one 180 Ringing is received in response to the INVITE, e.g. due to forking and CM parameter `mtasChargingProfileMultiDevice` is disabled,, the time associated with the 1st 180 Ringing response is used. For terminating charging case if more than one 180 Ringing is received in response to the INVITE and CM parameter `mtasChargingProfileMultiDevice` is enabled the time associated with the 180 Ringing response received on the particular outgoing dialog is used for generating charging messages sent on charging session associated with this outgoing leg. Charging messages sent for incoming leg (main charging session) contain SIP-Ringing-Timestamp associated with outgoing leg on which the call was accepted (see [26] FS Offline Charging) In case when the call has not been accepted on any outgoing leg, charging messages sent for incoming leg (main charging session) does not contain SIP-Ringing-Timestamp.

This AVP may be included in start requests and in event requests for unsuccessful establishment of a SIP session. It is included when a 180 Ringing response has been received.

5.2.101 SIP-Ringing-Timestamp-Fraction

The SIP-Ringing-Timestamp-Fraction AVP holds the millisecond fraction related to the SIP-Ringing-Timestamp.

This AVP is included in all requests containing a SIP-Ringing-Timestamp AVP.

5.2.102 Subscriber-Type

The Subscriber-Type is an enumerated AVP that contains the type of the subscriber.

Possible Values:

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5.2.103 Subscription-Id

The Subscription-Id AVP is a grouped AVP and contains information to identify either the MMTel end user's subscription or the PBX's subscription.

The subscription Identifier of the calling user is used for originating sessions and the subscription Identifier of the called user is used for terminating sessions. For MMTel the subscription Identifier is provisioned in HSS and transported via the proprietary 'msisdn' parameter in the Route header in the initial INVITE request. In cases that an 'msisdn' parameter is not present in the INVITE request, the default public user identity of the user is used instead.

For transit sessions resulting from the communication diversion service, the subscription Identifier of the diverting user (B) is used in both the originating charging messages generated for the diverted leg (B-to-C) and the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the flexible communication distribution service, the subscription Identifier of the primary user (B) is used in the originating charging messages generated for the FCD legs (B-to-B', B-to-C etc.) and the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by a terminating user, the subscription Identifier of the primary user (B) is used in the originating charging messages generated for the STOD legs (B-to-C etc.) and the terminating charging messages generated for the original leg (A-to-B).

For transit sessions resulting from the STOD service by an originating user, the subscription Identifier of the primary user (A) is used in the originating charging messages generated for the STOD legs (A-to-C etc.) and the originating charging messages generated for the original leg (A-to-B).

In case of scheduled conference sessions, when the served user cannot be determined, the scheduled conference service number is used to populate the Subscription-Id AVP.

For communication completion (3PCC) sessions, the subscription Identifier of the calling user determined for the original unsuccessful communication attempt is stored and is used in the originating charging messages generated for the communication completion session.

For SCC-AS, Service Domain Selection, the Subscription-Id AVP is populated with the IMSI received in the CAP IDP.

For CAMEL services, the Subscription-Id AVP is populated with the IMSI sent in the CAP IDP.

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It has the following ABNF grammar:

```
Subscription-Id ::= < AVP Header: 443 >
                  { Subscription-Id-Type }
                  { Subscription-Id-Data }
```

This AVP can be reported multiple times with different subscription id types, like IMSI, E.164 number or SIP-URI value.

IMSI is reported in the following cases:

- Originating SDS service (SCC AS), IMSI is received from the MSC in the CAP IDP message
- CAMEL NCC service (MMTEL AS), when IMSI is either provisioned or taken from registration data and sent in the CAP IDP message
- MMTel services, when IMSI is provisioned in User Common Data.

The AVP may be included in all charging requests.

5.2.104 Subscription-Id-Data

The Subscription-Id-Data AVP contains the identity of the charged party. The Subscription-Id-Type AVP defines which type of identifier is used (for more information see section 5.2.102).

This AVP is included in all requests.

5.2.105 Subscription-Id-Type

The Subscription-Id-Type AVP contains an indication of the type of identifier carried by the Subscription-Id AVP (for more information see section 5.2.102).

The following values are supported:

- End User E.164 0

The identifier is in the form of an international E.164 number.

- End User IMSI 1

The identifier is in the form of an International Mobile Subscriber Identity.

- End User SIP 2

The identifier is in the form of a SIP URI.

This AVP is included in all requests.

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5.2.106 Supplementary-Service

The Supplementary-Service AVP (AVP code 2048) is of type Grouped and holds the specific supplementary service details for one MMTel supplementary service.

It has the following ABNF grammar:

```
Supplementary-Service ::= < AVP Header: 2048 10415 >
                        [ Associated-Party-Address ]
                        [ CUG-Information ] (3)
```

This AVP may be included in ACR (start), ACR (interim), ACR (stop) and ACR (event). The inclusion of this grouped AVP is dictated by the need to include the constituent AVPs, i.e. the Supplementary-Service AVP is only included when there is one or more constituent AVPs.

The CUG-Information AVP is included in this grouped AVP from MTAS Rf version 3. It is included in the Supplementary-Service-Information AVP if MTAS Rf version 1 or 2 is configured.

5.2.107 Supplementary-Service-Action

The Supplementary-Service-Action AVP contains the type of action performed on a supplementary service.

The following values are defined:

- Use of Service 0
- SSC Activation 100
- SSC Deactivation 101
- SSC Interrogation 102
- SSC Modification 103
- SSC Activation request when already activate 104
- SSC Deactivation request when already inactive 105
- SSC Modification request with no change 106
- SSC Invocation 107
- Ut Service Activation 300
- Ut Service Deactivation 301
- Ut Interrogation 302
- Ut Modification of Active Service Data 303
- Ut Modification requested with no change 306
- CCMP Conference Creation 400
- CCMP Conference Deletion 401
- CCMP Conference Update 402
- CCMP User Creation 403

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- CCMP User Deletion 404
- CCMP User Update 405

This AVP may be included in all requests. It is always included when the Supplementary-Service-Information AVP is included.

Table 8, Table 9 and Table 10 show the applicable combinations of Supplementary-Service-Identity and Supplementary-Service-Action.

Table 8: Applicable Supplementary Service Identities for Actions 000 to 107

Supplementary-Service-Identity		Supplementary-Service-Action								
		000	100	101	102	103	104	105	106	107
		U	A	D	Int	M	A-	D-	M-	Inv
-1	Non-Service Specific									
0	Forward Unconditional	•	•	•	•	•	•	•	•	
1	Forward on Busy	•	•	•	•	•	•	•	•	
2	Forward on No Reply	•	•	•	•	•	•	•	•	
3	Forward on Not Logged In	•								
4	Forward on Not Reachable	•	•	•	•	•	•	•	•	
5	Forward Do-Not-Disturb	•	•	•	•	•	•	•	•	
10	Forward Unconditional (complex rules)									
11	Forward on Busy (complex rules)									
12	Forward on No Reply (complex rules)									
13	Forward on Not Logged In (complex rules)									
14	Forward on Not Reachable (complex rules)									
15	Forward Do-Not-Disturb (complex rules)									
20	Deflection	•								
30	Communication Diversion (CDIV)				•					
31	Communication Diversion No Answer Timeout		•			•			•	
32	Communication Diversion After Bye	•								
100	Incoming Communication Barring (ICB)	•								
101	Outgoing Communication Barring (OCB)	•								

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Supplementary-Service-Identity	
102	Anonymous Communication Rejection (ACR)
105	Incoming Communication Allow ing
106	Outgoing Communication Allow ing
107	Do-Not-Disturb Communication Barring (DNDCB)
110	ACR (complex rules)
111	DNDCB (complex rules)
121	Outgoing Barring Program (single program)
122	Outgoing Barring Programs (multiple programs)
130	Dynamic Black List
131	Malicious Communication Rejection
140	National Toll Restriction
141	International Toll Restriction
200	Conference Creation
201	Participant Addition
202	Participant Removal
203	Conference Completion
204	Scheduled Conference (administration)
205	Participant Join
206	Participant Leave
207	Conference Active
208	Conference Inactive
209	Participant Update
210	Transferred to Conference
211	Attendant Assistance
400	Communication Waiting
500	Flexible Communication Distribution

Supplementary-Service-Action								
000	100	101	102	103	104	105	106	107
U	A	D	Int	M	A-	D-	M-	Inv
•	•	•	•		•	•		
•								
•								
•	•	•	•		•	•		
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Supplementary-Service-Identity	
501	Serial FCD
502	Parallel FCD
503	FCD Divert Primary
504	Flexible FCD
505	FCD Auto-Answer Avoidance
600	Originating Identity Presentation (OIP)
601	Originating Identity Restriction (OIR)
602	Terminating Identity Presentation (TIP)
603	Terminating Identity Restriction (TIR)
606	Calling Name Identity Presentation
607	Flexible Identity Presentation
608	Originating Calling Name Identity Presentation
700	Supplementary Service Codes
701	Generic Supplementary Service Codes
702	Mobile Location Related Supplementary Service Codes
800	Permanent MCID
801	Temporary MCID
802	Originating Permanent MCID
901	Forward Unconditional to VM
902	Forward on Busy to VM
903	Forward on No Reply to VM
904	Forward on Not Logged In to VM
905	Forward on Not Reachable to VM
906	Forward Unconditional to VM (complex rules)
907	Forward on Busy to VM (complex rules)
908	Forward on No Reply to VM (complex rules)

Supplementary-Service-Action								
000	100	101	102	103	104	105	106	107
U	A	D	Int	M	A-	D-	M-	Inv
•								
•								
•	•	•	•	•	•	•	•	
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Supplementary-Service-Identity	
909	Forward on Not Logged In to VM (complex rules)
910	Forward on Not Reachable to VM (complex rules)
911	Forward Do-Not-Disturb to VM
912	Forward Do-Not-Disturb to VM (complex rules)
913	Forward on Busy and No Reply to VM
1000	Abbreviated Dialing
1100	User Call Admission Control
1101	Group Call Admission Control
1102	PBX level Call Admission Control
1200	Three Party Session
1201	Two Party Session – Transition to Three Party
1202	Two Party Session- Transition to Two Party
1203	Two Party Session – In Three Party
1300	Carrier Select
1301	Carrier Pre-Select
1302	Carrier Pre-Select local
1303	Carrier Pre-Select non-local
1401	Communication Completion Busy Subscriber Request
1402	Communication Completion Busy Subscriber Call
1403	Communication Completion Busy Subscriber Revocation
1411	Communication Completion No Reply Request
1412	Communication Completion No Reply Call
1413	Communication Completion No Reply Revocation
1421	Communication Completion Not Logged-in Request
1422	Communication Completion Not Logged-in Call
1423	Communication Completion Not Logged-in Revocation

Supplementary-Service-Action								
000	100	101	102	103	104	105	106	107
U	A	D	Int	M	A-	D-	M-	Inv
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Supplementary-Service-Identity	
1500	Short Number Dialing
1600	Requested Announcement
1700	User Common Data
1800	Long-Distance Mobile Number Policing
1900	Explicit Communication Transfer
2000	Calling Party Category
2100	Parlay X Call Notification / Parlay X Call Notification in MMTel
2101	Parlay X 3PCC Session
2200	Number Portability Outgoing
2201	Number Portability Incoming
2300	Session Transfer to Own Device
2301	Serial STOD
2302	Parallel STOD
2303	Flexible STOD
2304	Call Pull STOD
2305	Unsuccessful Call Pull STOD
2306	Call Pull Request STOD
2400	Customized Alerting Tones
2500	Flexible Service Format Selection
2600	Call Return without announcement prompt
2601	Call Return with announcement prompt
2602	Call Return Erasure
2700	Unconditional hotline
2701	Instant hotline
2702	Delayed hotline
2703	Delayed hotline voicemail

Supplementary-Service-Action								
000	100	101	102	103	104	105	106	107
U	A	D	Int	M	A-	D-	M-	Inv
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Supplementary-Service-Identity	
2800	Dialed Number Mapping
3200	Closed User Group
3300	Multi Subscriber Number
3500	Operator Controlled Transfer
3600	Media Policy Stream Block
4000	Answer Confirmation Query
4001	Answer Confirmation Accept
4002	Answer Confirmation Rejection
4100	UC Routing Originating
4101	UC Routing Terminating
4200	Cap Trigger O-CSI
4201	Cap Trigger T-CSI
4202	Cap Trigger Destination Based
5000	GETS_FC_PRIORITY_SERVICE
5001	GETS_AN_PRIORITY_SERVICE
5002	GETS_NT_PRIORITY_SERVICE
5003	GETS_FC_GETS_AN_PRIORITY_SERVICE
5004	GETS_FC_GETS_NT_PRIORITY_SERVICE

Supplementary-Service-Action								
000	100	101	102	103	104	105	106	107
U	A	D	Int	M	A-	D-	M-	Inv
•								
•								
								•
•								
•								
•								
•								
•								
•								
•								
•								
•								
								•
								•
								•
								•
								•

Notes: 1) Modification of the Supplementary Service Codes service is used to indicate a change to the PIN.

Table 9: Applicable Supplementary Service Identities for Actions 300 to 306

Supplementary-Service-Identity	
-1	Non-Service Specific
0	Forward Unconditional

Supplementary-Service-Action				
300	301	302	303	306
UA	UD	UI	UM	UM-
		•		•
•	•		•	

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Supplementary-Service-Identity	
1	Forward on Busy
2	Forward on No Reply
3	Forward on Not Logged In
4	Forward on Not Reachable
5	Forward Do-Not-Disturb
10	Forward Unconditional (complex rules)
11	Forward on Busy (complex rules)
12	Forward on No Reply (complex rules)
13	Forward on Not Logged In (complex rules)
14	Forward on Not Reachable (complex rules)
15	Forward Do-Not-Disturb (complex rules)
20	Deflection
30	Communication Diversion (CDIV)
31	Communication Diversion No Answer Timeout
32	Communication Diversion After Bye
100	Incoming Communication Barring (ICB)
101	Outgoing Communication Barring (OCB)
102	Anonymous Communication Rejection (ACR)
105	Incoming Communication Allow ing
106	Outgoing Communication Allow ing
107	Do-Not-Disturb Communication Barring (DNDCB)
110	ACR (complex rules)
111	DNDCB (complex rules)
121	Outgoing Barring Program (single program)
122	Outgoing Barring Programs (multiple programs)
130	Dynamic Black List

Supplementary-Service-Action				
300 UA	301 UD	302 UI	303 UM	306 UM-
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•			
•	•		•	
•	•		•	
•	•			
•	•		•	
•	•		•	

Supplementary-Service-Identity603 Terminating Identity Restriction (TIR)[illegible]

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Supplementary-Service-Identity

606 Calling Name Identity Presentation

607 Flexible Identity Presentation

608 Originating Calling Name Identity Presentation

700 Supplementary Service Codes

800 Permanent MCID

801 Temporary MCID

802 Originating Permanent MCID

901 Forward Unconditional to VM

902 Forward on Busy to VM

903 Forward on No Reply to VM

904 Forward on Not Logged In to VM

905 Forward on Not Reachable to VM

906 Forward Unconditional to VM (complex rules)

907 Forward on Busy to VM (complex rules)

908 Forward on No Reply to VM (complex rules)

909 Forward on Not Logged In to VM (complex rules)

910 Forward on Not Reachable to VM (complex rules)

911 Forward Do-Not-Disturb to VM

912 Forward Do-Not-Disturb to VM (complex rules)

913 Forward on Busy and No Reply to VM

1000 Abbreviated Dialing

1100 User Call Admission Control

1101 Group Call Admission Control

1102 PBX level Call Admission Control

1200 Three Party Session

Supplementary-Service-Action				
300 UA	301 UD	302 UI	303 UM	306 UM-
•	•			
•	•			
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	
•	•		•	

Supplementary-Service-Identity[illegible]

Supplementary-Service-Action				
300 UA	301 UD	302 UI	303 UM	306 UM-
•	•		•	
•	•		•	
•	•		•	
•	•		•	

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Table 10: Applicable Supplementary Service Identities for Actions 400 to 405

		Supplementary-Service-Action					
		400	401	402	403	404	405
		CC	CD	CU	UC	UD	UU
200	Conference Creation						
201	Participant Addition				•		
202	Participant Removal					•	
203	Conference Completion						
204	Scheduled Conference (administration)	•	•	•			
205	Participant Join						
206	Participant Leave						
207	Conference Active						
208	Conference Inactive						
209	Participant Update						•
210	Transferred to Conference						
211	Attendant Assistance						

5.2.108 Supplementary-Service-Identity

The Supplementary-Service-Identity AVP contains the identity of the supplementary service being configured or used.

The following values are defined:

Miscellaneous

- Non-Service Specific -1

Diversion

- Forward Unconditional 0
- Forward on Busy 1
- Forward on No Reply 2
- Forward on Not Logged In 3
- Forward on Not Reachable 4

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- Forward Do-Not-Disturb 5
- Forward Unconditional (complex rules) 10
- Forward on Busy (complex rules) 11
- Forward on No Reply (complex rules) 12
- Forward on Not Logged In (complex rules) 13
- Forward on Not Reachable (complex rules) 14
- Forward Do-Not-Disturb (complex rules) 15

- Deflection 20

- Communication Diversion (CDIV) 30
- Communication Diversion No Answer Timeout 31
- Communication Diversion After Bye 32

Barring

- Incoming Communication Barring (ICB) 100
- Outgoing Communication Barring (OCB) 101
- Anonymous Communication Rejection (ACR) 102
- Incoming Communication Allowing 105
- Outgoing Communication Allowing 106
- Do-Not-Disturb Communication Barring (DNDCB) 107

- ACR (complex rules) 110
- DNDCB (complex rules) 111

- Outgoing Barring Program (single program) 121
- Outgoing Barring Programs (multiple programs) 122

- Dynamic Black List (DBL) 130
- Malicious Communication Rejection 131

- National Toll Restriction 140
- International Toll Restriction 141

Conference

- Conference Creation 200
- Participant Addition 201
- Participant Removal 202
- Conference Completion 203
- Scheduled Conference (administration) 204
- Participant Join 205
- Participant Leave 206
- Conference Active 207
- Conference Inactive 208
- Participant Update 209
- Transferred to Conference 210
- Attendant Assistance 211

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- Event Package Subscription 220 (Not Used)

For Ad-hoc conference, the Conference Creation and Conference Completion apply at the originating MTAS serving the conference creator. Participant Addition, Participant Join, Participant Removal and Event Package Subscription apply at an MTAS acting as the Conference Focus. Participant Join is only used in the case where an existing terminating A-to-B session is transferred in to the conference.

The Transferred to Conference value only applies to the leftover A-to-B session following a completed move session to conference operation, at the originating MTAS serving the conference creator in a collocated Conference Focus deployment.

For Scheduled Conference, the Conference Creation and Conference Completion values applies at the originating MTAS serving the conference participant. Participant Join, Participant Leave, Conference Active, Conference Inactive and Conference Completion apply at an MTAS acting as the Conference Focus.

Communication Waiting

- Communication Waiting 400

Flexible Communication Distribution

- Flexible Communication Distribution (FCD) 500
- Serial FCD 501
- Parallel FCD 502
- FCD Divert Primary 503
- Flexible FCD 504
- FCD Auto-Answer Avoidance 505

Identity Presentation

- Originating Identity Presentation (OIP) 600
- Originating Identity Restriction (OIR) 601
- Terminating Identity Presentation (TIP) 602
- Terminating Identity Restriction (TIR) 603
- Calling Name Identity Presentation 606
- Flexible Identity Presentation 607
- Originating Calling Name Identity Presentation 608

Supplementary Service Codes

- Supplementary Service Codes 700
- Generic Supplementary Service Codes 701
- Mobile Location Related Supplementary Service Codes 702

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Malicious Communication Identification (MCID)

- Permanent MCID 800
- Temporary MCID 801
- Originating Permanent MCID 802

Voice Mail

- Forward Unconditional to VM 901
- Forward on Busy to VM 902
- Forward on No Reply to VM 903
- Forward on Not Logged In to VM 904
- Forward on Not Reachable to VM 905
- Forward Unconditional to VM (complex rules) 906
- Forward on Busy to VM (complex rules) 907
- Forward on No Reply to VM (complex rules) 908
- Forward on Not Logged In to VM (complex rules) 909
- Forward on Not Reachable to VM (complex rules) 910
- Forward Do-Not-Disturb to VM 911
- Forward Do-Not-Disturb to VM (complex rules) 912
- Forward on Busy and No Reply to VM 913

Abbreviated Dialing

- Abbreviated Dialing 1000

Call Admission Control

- User Call Admission Control 1100
- Group Call Admission Control 1101
- PBX level Call Admission Control 1102

Three Party (3PTY)

- Three Party Session 1200
- Two Party Session – Transition to Three Party 1201
- Two Party Session – Transition to Two Party 1202
- Two Party Session – In Three Party 1203

Carrier Selection

- Carrier Select 1300
- Carrier Pre-Select 1301
- Carrier Pre-Select local 1302
- Carrier Pre-Select non-local 1303

Since Carrier Pre-Select cannot be configured together with Carrier Pre-Select Rn only one of the SSIs: 1301/1302/1303 can be used for a call.

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Communication Completion (CC)

- CC Busy Subscriber (CCBS) Activation 1400 (Not Used)
- CC Busy Subscriber (CCBS) Request 1401
- CC Busy Subscriber (CCBS) Call 1402
- CC Busy Subscriber (CCBS) Revocation 1403

- CC No Reply (CCNR) Activation 1410 (Not Used)
- CC No Reply (CCNR) Request 1411
- CC No Reply (CCNR) Call 1412
- CC No Reply (CCNR) Revocation 1413

- CC Not Logged-in (CCNL) Request 1421
- CC Not Logged-in (CCNL) Call 1422
- CC Not Logged-in (CCNL) Revocation 1423

Short Number Dialing

- Short Number Dialing 1500

Requested Announcement

- Requested Announcement 1600

User Common Data

- User Common Data 1700

Address Policing

- Long-Distance Mobile Number Policing 1800
- Explicit Communication Transfer 1900

Calling Party Category

- Calling Party Category 2000

Parlay X

- Call Notification / Call Notification in MMTel 2100
- 3PCC Session 2101

Number Portability

- Number Portability Outgoing 2200
- Number Portability Incoming 2201

Session Transfer to Own Device

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- Session Transfer to Own Device 2300
- Serial STOD 2301
- Parallel STOD 2302
- Flexible STOD 2303
- Call Pull STOD 2304
- Unsuccessful Call Pull STOD 2305
- Call Pull Request STOD 2306

Customized Alerting Tones

- Customized Alerting Tones 2400

Flexible Service Format Selection

- Flexible Service Format Selection 2500

Call Return

- Call Return without announcement prompt 2600
- Call Return with announcement prompt 2601
- Call Return Erasure 2602

Hotline

- Unconditional hotline 2700
- Instant hotline 2701
- Delayed hotline 2702
- Delayed hotline voicemail 2703

Dialed Number Mapping

- Dialed Number Mapping 2800

Closed User Group

- Closed User Group 3200

Multi Subscriber Number

- Multi Subscriber Number 3300

Distinctive Ring

- Distinctive Ring with mapping 3400
- Distinctive Ring without mapping 3401

Operator Controlled Transfer

- Operator Controlled Transfer 3500

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Media Policy

- Media Policy Stream Block 3600

Answer Confirmation

- Answer Confirmation Query 4000
- Answer Confirmation Accept 4001
- Answer Confirmation Rejection 4002

Answer Confirmation Query is sent when Answer Confirmation function is called. Answer Confirmation Accept is sent when participant accepts request to join the conference. Answer Confirmation Rejection is sent when participant rejects to join the conference or timeout for the Play&Collect in Answer Confirmation occurs.

Unified Communication Routing Service

- UC Routing Originating 4100
- UC Routing Terminating 4101

CAP

- Cap Trigger O-CSI 4200
- Cap Trigger T-CSI 4201
- Cap Trigger Destination Based 4202

PriorityService

- GETS_FC_PRIORITY_SERVICE 5000
- GETS_AN_PRIORITY_SERVICE 5001
- GETS_NT_PRIORITY_SERVICE 5002
- GETS_FC_GETS_AN_PRIORITY_SERVICE 5003
- GETS_FC_GETS_NT_PRIORITY_SERVICE 5004

This AVP may be included in all requests. It is always included when the Supplementary-Service-Information AVP is included.

5.2.109 Supplementary-Service-Information

The Supplementary-Service-Information AVP is a grouped AVP and contains information relating to the configuration or use of a supplementary service.

It has the following ABNF grammar:

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Supplementary-Service-Information ::= < AVP Header: 1129 193 >

```
{ Supplementary-Service-Identity }
{ Supplementary-Service-Action }
[ Redirecting-Party-Address ]
[ Routing-Call-Type ]
[ Common-Policy-Rule-Identity ]
[ Service-Suppression-Info ]
    { Matched-Regular-Expression }
    { Services-To-Suppress }
[ CCMP-User-Info ]
[ CUG-Information ] (1)(2)
*[ AVP ]
```

The CUG-Information AVP is included in this grouped AVP if MTAS Rf version 1 or 2 is configured. It is included in the Supplementary-Service AVP from MTAS Rf version 3.

For transit sessions resulting from the communication diversion service, the 'use' of the relevant type of diversion (e.g. forward unconditional) is included in both the terminating charging session for the A-to-B leg and the originating charging session for the B-to-C leg. The redirecting party address is included in the originating charging session for the B-to-C leg.

For transit sessions resulting from the flexible communication distribution service, the 'use' of the relevant type of distribution (e.g. serial) is included in the terminating charging session for the A-to-B leg and in the originating charging sessions for the FCD legs (B-to-B', B-to-C etc.). The redirecting party address is included in the originating charging sessions for the FCD legs.

For terminating sessions where the flexible communication distribution service applies and the session is successfully established to the IMS primary user, the 'use' of the relevant type of distribution (e.g. serial) is included in the terminating charging session for the A-to-B leg.

For transit sessions resulting from the STOD service, the 'use' of the relevant type of distribution (e.g. serial) is included in the originating and terminating charging session for the A-to-B leg and in the originating charging sessions for the STOD legs (A-to-C or B-to-C etc.).

For originating sessions subject to carrier pre-selection, the routing call type is included in the instance of Supplementary-Service-information containing a Supplementary-Service-Identity AVP indicating use of Carrier Pre-Select.

For conference focus sessions, the 'use' of the conference service (participant addition) is included in the ACR start for the originating charging session for each dial-out conference leg. The 'use' of the conference service (participant removal) is included in the ACR stop for the originating charging session for each dial-out conference leg.

For originating sessions used to create a conference, the 'use' of the conference service (conference creation) is included in the ACR start and the

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'use' of the conference service (conference completion) is included in the ACR stop.

For the leftover (originating or terminating) A-to-B session following a completed move session to conference operation, the 'use' of the conference service (Transferred to Conference) is included in the ACR stop.

For originating sessions used to create a 3PTY session, the 'use' of the three party service (three party session) is included in all ACR messages generated throughout the 3PTY session.

For originating and terminating sessions that become involved in a 3PTY session, the 'use' of the three party service (two party session – transition to three party) is included in the ACR interim generated when the media connection has been updated to involve the remote party in the three party connection. Whilst the session remains involved in the 3PTY session, the 'use' of the three party service (two party session – in three party) is included in all ACR interims generated. When the session reverts to a two party session, the 'use' of the three party service (two party session – transition to two party) is included in the ACR interim generated when the media connection has been updated to connect the remote party back to the served user. If the session is terminated whilst it is involved in the 3PTY session, the 'use' of the three party service (two party session – in three party) is included in the ACR stop.

For communication completion (3PCC) sessions, the 'use' of the communication completion service is included in the start request or event request for the originating charging session for the leg to user B.

For scheduled conference focus sessions, the userInfo XML is included in the interim requests generated due to CCMP triggered update of a participant.

This AVP may be included in all requests. It is included when notification of the configuration, activation, deactivation, interrogation, invocation or use of a supplementary service is required.

This AVP is included in event requests for Requested Announcements service.

5.2.110 Tenant

Derived from Host part in: Served-User or P-Asserted-Identity header in originating MTAS or Served-User or Request-URI in terminating MTAS.

The Tenant AVP contains the name of the configured VTP the Served User belongs to.

The Served User is the user belonging to the domain in question, i.e. the user that originated the request, the user the request was originated on behalf of, or the user the request was terminated on.

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The Tenant AVP is included in start requests and event requests.

5.2.111 Terminating-IOI

The Terminating-IOI AVP is the Inter Operator Identifier for the terminating network as generated by the S-CSCF in the home network of the terminating end user.

For originating, terminating and communication completion (3PCC) sessions the identifier of the home network of the called party is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request. The identifier received in the final response is always used in preference to the identifier received in provisional responses. When the final response does not contain a terminating-IOI parameter, the identifier received in the first provisional response containing a terminating-IOI parameter (if any) is used instead.

For transit sessions resulting from the communication diversion service, the identifier of the home network of the diverting party (B) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the diverted-to party (C) is included in the originating charging messages generated for the diverted leg (B-to-C). The identifier of the home network of the diverting party is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the diverted-to party that contains an originating-IOI parameter. The identifier of the home network of the diverted-to party is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request sent to the diverted-to party, as for an originating session.

For transit sessions resulting from the flexible communication distribution service, the identifier of the home network of the primary user (B) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the non-IMS primary user (B') or related user (i.e. C, D etc.) is included in the originating charging messages generated for the FCD legs (B-to-B', B-to-C etc.). The identifier of the home network of the primary user is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the non-IMS primary user or a related user that contains an originating-IOI parameter. The identifier of the home network of the non-IMS primary user and of the related users is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request sent to the FCD leg, as for an originating session.

For transit sessions resulting from the STOD service by a terminating user, the identifier of the home network of the primary user (B) is included in the terminating charging messages generated for the original leg (A-to-B) and the home network of the related user (i.e. C, D etc.) is included in the originating charging messages generated for the STOD legs (B-to-C etc.). The identifier of the home network of the primary user (B) is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response

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to the outgoing INVITE request sent to the related user that contains an originating-IOI parameter. The identifier of the home network of the related users is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request sent to the STOD leg, as for an originating session.

For transit sessions resulting from the STOD service by an originating user, the identifier of the home network of the primary user (A) is included in the originating charging messages generated for the original leg (A-to-B) and the home network of the related user (i.e. C, D etc.) is included in the originating charging messages generated for the STOD legs (A-to-C etc.). The identifier of the home network of the primary user (A) is obtained from the originating-IOI parameter of the P-Charging-Vector header received in the first response to the outgoing INVITE request sent to the related user that contains an originating-IOI parameter. The identifier of the home network of the related users is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request sent to the STOD leg, as for an originating session.

For conference focus sessions, the identifier of the home network of a dial-out conference participant is obtained from the terminating-IOI parameter of the P-Charging-Vector header received in responses to the outgoing INVITE request sent to the conference participant, as for an originating session.

This AVP may be included in start requests and event requests. It is only included when terminating network identification information is available.

5.2.112 Time-Stamps

The Time-Stamps AVP is a grouped AVP that holds the time of the SIP request and the time of the response to the SIP Request.

It has the following ABNF grammar:

```
Time-Stamps ::= < AVP Header: 833 10415 >
               [ SIP-Request-Timestamp ]
               [ SIP-Response-Timestamp ]
               [ SIP-Request-Timestamp-Fraction ] (2) (3)
               [ SIP-Response-Timestamp-Fraction ] (2) (3)
```

This AVP is included in start requests, stop requests, media based interim requests, event requests for unsuccessful establishment of a SIP session and in event requests for successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code.

This AVP is included in event requests for Requested Announcements service.

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The SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are only included in this group if MTAS Rf version 2 or higher is configured. They are included in the Ericsson specific MMT-Information AVP if version 1 is configured.

5.2.113 Transaction-Data-Name

The Transaction-Data-Name AVP indicates the SIP header field name or the message body type that is being reported by the Transaction-Info AVP.

5.2.114 Transaction-Data-Value

The Transaction-Data-Value AVP indicates the SIP header field value or the message body content that is being reported by the Transaction-Info AVP.

5.2.115 Transaction-Info

The Transaction-Info AVP is a grouped AVP that holds a SIP header field that was captured from the received SIP request message or the received SIP response by the Flexible AVP function.

It has the following ABNF grammar:

```
Transaction-Info ::= < AVP Header: 1264 193 >
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
    * { Transaction-Data-Value }
```

This AVP may be included in start requests, stop requests, media based interim requests, event requests for unsuccessful establishment of a SIP session and in event requests for successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code.

5.2.116 Transaction-SIP-Message

The Transaction-SIP-Message AVP is a UTF8String AVP in the Transaction-Info grouped AVP. It indicates the SIP message from where the reported information is taken. In case of a SIP response, the reason phrase is included as well.

5.2.117 Transaction-Type

The Transaction-Type AVP is an enumerated AVP in the Transaction-Info grouped AVP. It indicates the type of the SIP message that contained the SIP header field which is being reported by the Transaction-Info AVP.

Possible values:

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- 0 SIP request
- 1 SIP response

5.2.118 UC-Mobility-Call-Leg

The UC-Mobility-Call-Leg is an enumerated AVP that identifies the call leg in the UC Mobility Solution.

Possible Values:

- 0 ORIGINATING_ACCESS
- 1 TERMINATING_TRUNK
- 2 TERMINATING_ACCESS

5.2.119 UHTZ-Offset

The UHTZ-Offset AVP indicates the home time zone with compensation for DST for the user. Value of AVP is UTC offset from User Common Data, counted from User Zone Area, User UTC offset or MTAS UTC offset. The AVP is coded as a text string as follows:

Starting with "UTC", "+"or"-", 2 digits (from 00 to 14), ":", 2 digits (from 00 to 45).

This AVP may be included in start and event request.

5.2.120 User-Equipment-Info

The User-Equipment-Info AVP is sent in accounting message to indicate the identity and capability of the terminal the subscriber is using for the connection to network.

This AVP is used to report mobile hardware ID such as ESN, IMEISV or MEID as well.

It has the following ABNF grammar:

```
User-Equipment-Info ::= < AVP Header: 458 >
{ User-Equipment-Info-Type }
{ User-Equipment-Info-Value }
```

The contents of User-Equipment-Info-Type AVP and User-Equipment-Info-Value AVP come from P-com.User-Equipment-Info SIP header, except terminating charging case when CM parameter mtasChargingProfileMultiDevice is enabled. In this case User-Equipment-Info is fetched from the "sip.instance" parameter of the Accept-Contact header (if present) at the point when INVITE is sent on outgoing dialog to the IMS

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Primary User's device. User-Equipment-Info-Type and User-Equipment-Info-Value are obtained using following algorithm:

1. if the sip.instance starts with "urn:gsma:imei:" and the value following matches the international IMEISV format according to 3GPP TS 23.003 [3GPPIMEI], then the User Equipment Info is stored as IMEISV
2. else if the sip.instance starts with "urn:uuid:" and the value following is the 48-bit MAC address formatted as described in [RAD802.1X], e.g. 000cf1126028, then the User Equipment Info is stored as MAC type
3. else (if the sip.instance does not match neither IMEISV nor MAC formats), the User Equipment Info is stored as MODIFIED_EUI64 type

If P-com.User-Equipment-Info SIP header is present in 180 Ringing, 200 OK (INVITE) or SIP error response received on the particular outgoing dialog then stored User-Equipment-Info is updated with value of the P-com.User-Equipment-Info SIP header.

Additionally the if none of the cases above were applied User-Equipment-Info AVP will be populated with the IMEI of the served user which is cached by MTAS from the Contact SIP header encapsulated in 3rd party REGISTER body. User-Equipment-Info-Type and User-Equipment-Info-Value are obtained using following algorithm:

1. if the sip.instance starts with "urn:gsma:imei:" and the value following matches the international IMEISV format according to 3GPP TS 23.003 [3GPPIMEI], then the User Equipment Info is stored as IMEISV
2. if the sip.instance starts with "urn:gsma:imei:" and the value following matches the international IMEI format, then the User Equipment Info is stored in following way:
 - The User-Equipment-Info-Type AVP should contain 0 (corresponds to IMEISV format). Other types of instance Id should be ignored.
 - The User-Equipment-Info-Value AVP should contain the IMEI number converted into IMEISV format:
 - a. Dash separators ("-") removed;
 - b. The last Check Digit (D) replaced with the Software Version Number (SVN) from URN parameter if it present, or extended with the hexadecimal "F" digit in order to get complete 16 digits IMEISV form.

5.2.121 User-Equipment-Info-Type

The User-Equipment-Info-Type AVP defines the type of user equipment information contained in the User-Equipment-Info-Value AVP.

The AVP Values used are the following:

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Value	Descriptor	Description
0	IMEISV	Contains the International Mobile Equipment Identifier and Software Version in the international IMEISV format according to 3GPP TS 23.003
1	MAC	48-bit MAC address
2	EUI64	64-bit identifier used to identify a hardware instance
3	MODIFIED_EUI64	There are a number of types of terminals that have identifiers other than IMEI, IEEE 802 MACs, or EUI-64 which can be converted to modified EUI-64 format
4	ESN	Electronic Serial Number of mobile handset
5	MEID	Mobile Equipment ID

This AVP is a single occurrence in ACR and it can indicate only one equipment type in the session assuming the device has one of the types defined above. ESN and MEID values are non-standard.

5.2.122 User-Equipment-Info-Value

The User-Equipment-Info-Value AVP identifies the user equipment. The User-Equipment-Info-Type AVP defines which type of identifier is used.

5.2.123 User-Name

The User-Name AVP contains the Private User Identity (IMPI), i.e. the value of the P-com.PrivateUserID SIP header. If the SIP header is missing this AVP is not present, with exception for:

1. Terminating charging case if CM parameter `mtasChargingProfileMultiDevice` is enabled, or
2. Terminating and originating case if `mtasChargingProfileUserPrivateIdentityReportingBehavior` is enabled. This usage is only applicable for CDMA-LTE deployments.

In both cases, the AVP contains the IMPI of the served user which is cached by MTAS during the 3rd party extended registration.

5.2.124 User-Session-Id

The User-Session-Id AVP contains the SIP Call-ID of the incoming dialog.

The SIP Call ID is obtained from either the INVITE received on the incoming dialog (see section 3.3). If the SIP Call ID of the incoming dialog is not available, AVP is not sent.

This AVP is included in all requests, except cases when SIP Call ID of the incoming dialog is not available (e.g. call out of the blue).

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After Explicit Communication Transfer (ECT) this AVP is not sent in charging requests.

5.2.125 Vendor-Id

The Vendor-Id AVP is used within the Experimental-Result AVP to identify the vendor to which the Experimental-Result-Code AVP relates. The only value supported on this interface is 193 (Ericsson).

An answer containing an Experimental-Result AVP with a Vendor-Id AVP set to any other value is treated as if the message had not contained an Experimental-Result AVP.

This AVP is expected in all answers that contain an Experimental-Result AVP (see section 5.2.35).

5.2.126 XCON-Id

The XCON-Id is the unique identity of the scheduled conference resource (focus), allocated at conference creation and used for identifying the conference resource (focus) during administration of the conference and during the lifetime of each scheduled conference focus traffic instance.

Example: xcon:abcde1234

This AVP may be included in start requests, interim requests, stop requests and in event requests for scheduled conference administration. It is only included for scheduled conference sessions.

6 Related Standards

The ACR and ACA messages are based on the messages and contents specified in references [3] and [5] for MTAS Rf version 1 (based on 3GPP release 7). The messages and contents are specified in references [4] and [6] for MTAS Rf version 2 (based on 3GPP release 9).

Additionally MTAS Rf version 2 (based on 3GPP release 9) extended with the Reason-Header AVP from the 3GPP 32.299 Release 12 [25].

MTAS does not include the following AVPs when generating ACR messages:

- Origin-State-Id
- Proxy-Info
- Route-Record

MTAS includes the Destination-Host AVP when generating ACR (Interim) and ACR (Stop) messages.

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MTAS does not generate the following information in the IMS-Information AVP included in ACR messages:

-
- Alternate-Charged-Party-Address
- Associated-URI
- Application-Server-Information
- Served-Party-IP-Address
- Server-Capabilities
- Trunk-Group-ID
- Bearer-Service
-
- Early-Media-Description
- IMS-Communication-Service-Identifier
- Online-Charging-Flag
- Real-Time-Tariff-Information
- Account-Expiration
- Initial-Ims-Charging-Identifier
- Event

MTAS does not generate the following information in the SDP-Media-Component AVP included in ACR messages:

- Media-Initiator-Party
- Authorized-QoS
- 3GPP-Charging-Id
- Access-Network-Charging-Identifier-Value

MTAS does not use the following AVPs when received in ACA messages:

- User-Name
- Error-Reporting-Host
- Origin-State-Id
- Event-Timestamp
- Proxy-Info

MTAS ignores any unexpected AVPs when received in ACA messages.

7 Terminology

7.1 Abbreviations

3GPP	3 rd Generation Partnership Project
3PCC	3 rd Party Call Control
3PTY	Three Party
AAA	Authentication, Authorization and Accounting

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ABNF	Augmented Backus-Naur Form
ACA	Accounting Answer
ACR	Accounting Request
ANI	Access-Network-Info
AS	Application Server
AVP	Attribute-Value Pair
CAMEL	Customized Applications Mobile network Enhanced Logic
CAP	CAMEL Application Part
CCMP	Centralized Conferencing Manipulation Protocol
CCBS	Communication Completion on Busy
CCNL	Communication Completion on Not Logged-in
CCNR	Communication Completion on No Reply
CDF	Charging Data Function
CDIV	Communication Diversion
CO	Conference Owner
CPC	Calling Party Category
CTF	Charging Trigger Function
CUG	Closed User Group
DND	Do Not Disturb
DR	Distinctive Ring
FCD	Flexible Communication Distribution
FCDDP	Flexible Communication Distribution Divert Primary
FSFS	Flexible Service Format Selection
HSS	Home Subscriber Server
ICBS	Interconnection Charge Billing System
ICID	IMS Charging Identifier
ICS	IMS Centralized Services
IDP	Initial Detection Point(CAP message)
IMPU	IP Multimedia Public Identity
IOI	Inter-Operator Identifier
IRS	Implicit Registration Set
MCC	Mobile Country Code
MMTel	Multimedia Telephony

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MNC	Mobile Network Code
MSISDN	Mobile Subscriber Integrated Services Digital Network
MSRN	Mobile Station Routing Number
NCC	Northbound Call Control
PANI	P-Access-Network-Info
PIN	Personal Identification Number
RPH	Resource-Priority Header
SCC	Service Centralization and Continuity
SDP	Session Description Protocol
SDS	Service Domain Selection
SIP	Session Initiation Protocol
SR-VCC	Single Radio Voice Call Continuity
SSC	Supplementary Service Code
ST	SIP Trunking
STOD	Session Transfer to Own Device
T-ADS	Terminating Access Domain Selection
TCP	Transmission Control Protocol
TDS	Telephone Directory Service
TPC	Third Party Call
URI	Unified Resource Identifier
UTC	Coordinated Universal Time

7.2 Definitions

Offline Charging	Offline charging is a process where charging information is collected at the same time as the service is delivered, and has no real-time effect on the service delivery.
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8 References

- [1] 3GPP Technical Specification; Telecommunication management; Charging management; Charging architecture and principles
3GPP TS 32.240 (v7.2.0)
- [2] 3GPP Technical Specification; Telecommunication management; Charging management; Charging architecture and principles
3GPP TS 32.240 (v9.2.0)

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- [3] 3GPP Technical Specification; Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging
3GPP TS 32.260 (v7.6.0)
- [4] 3GPP Technical Specification; Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging
3GPP TS 32.260 (v9.9.0)
- [5] 3GPP Technical Specification; Telecommunication management; Charging management; Diameter charging applications
3GPP TS 32.299 (v7.7.0)
- [6] 3GPP Technical Specification; Telecommunication management; Charging management; Diameter charging applications
3GPP TS 32.299 (v9.8.0)
- [7] Diameter Base Protocol
RFC 3588
- [8] Diameter Credit Control Application
RFC 4006
- [9] Session Description Protocol
RFC 4566
- [10] TSP: MTAS Charging Management
3/1553-AVA 901 09/n **

CBA: MTAS Charging Management
3/1553-AVA 901 29/n **
- [11] TSP: MTAS Parameter Description
1/190 84-AVA 901 09/n **

CBA: Managed Object Model (MOM)
155 54-LZN 765 0163/n **
- [12] Offline Charging in MTAS
62/155 17-AVA 901 18
- [13] TSP: Diameter Stack Statement of Compliance
1/174 02-CRA 119 0019/1
CBA: Statement of Compliance to RFC 6733 – Diameter Base Protocol 1/174 02-APA 901 44/1
- [14] TSP: Diameter Stack Function Specification
73/155 17-ANA 901 04/1
CBA: Diameter Function Specification 1/155 17-CXP 904 0375
- [15] Carrier Select in MTAS
12/155 17-AVA 901 18

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- [16] Common Policy: A Document Format for Expressing Privacy Preferences
RFC 4745
- [17] ITU-T Recommendation E.164: "The international public telecommunication
numbering plan"
- [18] SIP in MTAS
52/155 17-AVA 901 18
- [19] The SIP P-Served-User Private-Header
RFC 5502
- [20] MTAS CAP Support
28/155 19-AVA 901 18
- [21] ACR Storage in MTAS
15/155 19-AVA 901 18
- [22] Communications Resource Priority for SIP
RFC 4412
- [23] MTAS Interface to CSCF (ISC, Ma, Pw)
3/155 19-AVA90118
- [24] TSP: Diameter Parameter List
1/1551-CRA 119 0019/2
CBA: Managed Object Model (MOM) 155 54-LZN 765 0163/n **
- [25] 3GPP Technical Specification; Telecommunication management; Charging
management; Diameter charging applications, [3GPP TS 32.299 \(v12.2.0\)](#)

** See the Customer or Support library for the Application System in question