

Prepared (also subject responsible if other) EIHQUUA Qiuyi Huang		No. 11/155 19-AVA 901 18 Uen		
Approved	Checked	Date 2019-03-12	Rev Z	Reference

Diameter Online Charging in MTAS

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1 Document History

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A	2013-04-26	estukar	<p>MTAS 13B</p> <ul style="list-style-type: none"> Added a note to the Carrier Select SSIs New AVP UHTZ-Offset in initial request and event request Update regarding the Scale-Factor AVP according to trouble report HQ52184 Updated table 5 for the Used-Service-Unit AVP Updated with Multi Subscriber Number Support for Generic SSC Support for CCNL Updated with Originating STOD Clarification regarding transfer of existing A-to-B session to a collocated ad-hoc conference. Added Supplementary-Service-Identity value 'Transferred to Conference'. (Trouble report HQ88934)
B	2013-09-20	ezhayic	<p>MTAS 14A</p> <ul style="list-style-type: none"> Uplift 3GPP Rel 9 Capture User Location Info in out of dialog NOTIFY Sending of Rating Group AVP Sending of SDP Type AVP Reporting trigger conditions to OCS Add new value for Operator Controlled Transfer in-SSI and Service-Specific-Info Updates for Distinctive Ring Updates for Send CCR on SDP update Updates for Distinctive Ring Correct Associated-Number values for OCB/ICB MMTel AS announcement after 200OK reply for ACR and ICB. Added Mid-Session Next-Tariff-Request timer and AoC-D timer section in Advice of Charge. Fixed numbering Added new AVP Session-Priority Improve CCFH AVP description. Playing announcements initiated from OCS

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C	2013-11-13	estukar	<p>Prompt and Collect AVPs. Separate tables for ASR/ASA and RAR/RAA. Correction considering Service-Specific AVPs. Added UHTZ-Offset for CCR-I and E. Corrected terminology according to TR HP66063. Improved the format of the AVP tables in 5.2.2 and 5.2.3. Rewrote the chapter 5.1.7 to explain the Ro version in MTAS. Added clarification and correction to the description of the Session-Id AVP. Miscellaneous clarifications</p>
D	2014-04-23	ekorrssa	<p>MTAS 14B</p> <ul style="list-style-type: none"> • Service Specific Info grouped AVP can be included in different CCR messages. • Updated FCD Auto-Answer avoidance. • Corrected AVP table in chapter 5.2.1. • Corrected the supported versions for MMT-Information and SIP-Ringing-Timestamp-Fraction in 5.2.1. • Corrected the ABNF in 5.1.1.4.1 to remove the User-Name. • Corrected the table in 5.2.142 for ECT (1900). • Updated 3GPP-MS-TimeZone format TR: HR86090. • Corrected Call Barring Cause code in chapter 5.2.36. • Added Reason-Header AVP. • Added 802 SSI. • Changes connected with TR: HR74960. • Corrected description of Served-User AVP.

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E	2014-12-05	egrzbrd	<p>MTAS 15A</p> <ul style="list-style-type: none"> Updated AVPs: Calling-Party-Address, Transaction-Info, User-Equipment-Info, MMTel-Information, Supplementary-Service, CUG-Information, Carrier-Select-Routing-Information, Supplementary-Service-Identity, 3GPP-MS-TimeZone, Matcher-Regular-Expression, Number-Portability-Routing-Information, Origin-Host, Origin-Realm, Routing-Call-Type, Services-To-Suppress, Transaction-Data-Name, Transaction-Data-Value, User-Name, Service-Specific-Data, Service-Specific-Type, Transaction-Data-Value, Transaction-Info, Transaction-Type, AS-Type, Subscription-Id ICID generation detailed New AVP Associated-Party-Address added Correction in chapters: 5.1.1.4.2 and 5.1.1.3.3 related to Associated-Party-Address AVP Multi-Device charging updated Corrected AVP Tenant (1380) to be configurable for both CCR and AOC Replaced start request with initial request New omit AVPs for HS94896 AVPs are configurable for AOC AS-Type enumerated value 0 is changed to MMTel Telephony AS TR HT10989: Clarified that MTAS configuration changes may also cause the CC-Request-Number to be 4294967295.

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F	2015-07-07	ezhayic	<p>MTAS 15B</p> <ul style="list-style-type: none"> Corrected and updated the descriptions of AVPs: Service-Number-Type, SDP-Type, Service-Specific-Info, Subscription-Id, From-Header, Calling-Party-Address, Proxy-Info, Proxy-Host, Proxy-State. Update the Subscription-Id-Data AVP with IMSI, and Redirecting Party ID with CAMEL service. Update of section 3.3.2 Mid-Session Media Changes. Update the Service-Specific-Info AVP regarding preferred language. Added Proxy-Info for RAR and ASR. New SSID: MOBILE_LOCATION_RELATED_SSC (702) Updated section 3.13.4 for the video upgrade fallback feature. Chapters 3.13 and 3.14 updated for the Assume Positive feature on Ro. Chapter 6 updated by removing already supported AVPs. Updated for the configurable rating group for the conference creation call leg. Updated AVP chapters 5.2.4, 5.2.25 5.2.161. Corrected the format in Ch. 9. Added 9.1.5 and 9.1.6 to illustrate CCAs with unsuccessful Result-Code and Announcement-Instructions AVP.

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G	2015-11-02	evitkav	MTAS 4.0.0 <ul style="list-style-type: none"> Updated CCR config column for SDP-Media-Description in Table 6. SDP-Media-Description optional to comply with standard.. Updated text for User-Name AVP. Updated for Suppress Ro message for terminating calls in HPLMN. Reports PANI change in ANI AVP. Corrected the description of User-Name AVP. Updates for AVP Analyzed-Call-Type and Service-Specific-Info. ANI AVP description changed, and Voice over WiFi content added. (See ch. 5.2.5) Updated description of Inter-Operator-Identifier AVPs according to HU10483.
H	2016-02-02	eyurzyb	MTAS 4.1.0 <ul style="list-style-type: none"> Added Transaction-SIP-Message AVP. Reporting redirecting number as Associated-Number in Service-Specific-Info AVP (chapter 5.2.124). Changes related to contentType reporting in Transaction-Info AVP. Correction of AVP table for ASR and RAR. ABNF grammar corrected for Multiple-Services-Credit-Control grouped AVP, since it was missing the Trigger AVP. Corrected description of behavior when MTAS get faulty CCA (chapter 3.15). Correction to add the Participant Join (205) and Transferred to Conference (210) AVPs. Announcement-Instructions added to Multiple-Services-Credit-Control ABNF.
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 5.2.5 Access-Network-Information AVP for MSC and VLR number. Added new Cause-Code AVP value "Long Duration Call".

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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 Clarification about AS-Type
L	2016-09-02	ezhayic	MTASv 1.4 <ul style="list-style-type: none"> Added 5 New SSIDs for 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) Added information about the usage of mtaChargingAniWithoutTrigger CM parameter to control ANI AVP sending.
M	2016-11-30	edinjia	vMTAS 1.5 <ul style="list-style-type: none"> All AVPs changed to be configurable for CCR in Chapter 5.2.1 except: Session-Id CreditControl-Request-Type CreditControl-Request-Number Correction considering CCR[event] for SSC, chapter 5.1.1.4.2 Correction a faulty description of IMS-Charging-Identifier (HU99200) Updated chapter 5.1.1.4.4 due to trouble report HV35412.

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N	2016-02-23	edandwe	<p>vMTAS 1.6</p> <ul style="list-style-type: none">• Added new values in Supplementary-Service-Identity:<ul style="list-style-type: none">○ Call Return Erasure○ UC Routing Originating○ UC Routing Terminating• Updated IMPI statement for User-Name AVP• Added new AVPs:<ul style="list-style-type: none">○ UC-Mobility-Call-Leg○ Subscriber-Type• Removed redundant supported version information in AVP descriptions• Corrected CCR Config column in Table 6 for CCA only AVPs• Editorial corrections

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S	2017-05-24	edmmdda	vMTAS 1.7, MTAS 4.7 <ul style="list-style-type: none"> Added new Instance-Id AVP. Added new values in Supplementary-Service-Identity: <ul style="list-style-type: none"> Cap Trigger O-CSI Cap Trigger T-CSI Cap Trigger Destination Based Updated AVPs: <ul style="list-style-type: none"> User-Equipment-Info AVP <ul style="list-style-type: none"> Description extended with IMEI reporting. CCR typed changed to "IUTE". Subscriber-Type AVP <ul style="list-style-type: none"> Added enum value CONSUMER(1) UC-Mobility-Call-Leg AVP <ul style="list-style-type: none"> Enum value TERMINATING_CONNECT (2) changed to TERMINATING_ACCESS (2) Service-Specific-Info AVP
T	2017-08-23	essamee	vMTAS 1.8, MTAS 4.8 <ul style="list-style-type: none"> Added new value (1022) of Service-Specific-Type AVP Added new AVPs <ul style="list-style-type: none"> Redirect-Server Redirect-Address-Type Redirect-Server-Address Retarget-Instruction Retarget-Address Retarget-Order Update for vMTAS Licensing

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U	2017-11-24	ervwyzl	<p>vMTAS 1.9, MTAS 4.9</p> <ul style="list-style-type: none">- Added new value (72 Last Redirecting Number) of Service Specific Data for Service-Specific-Type AVP (1007).- Updated AVPs Session-Id for HW19247 Calling-Party-Address for HV99089 Called-Party-Address for HW33438 Updated the description of Calling-Party-Address in 5.2.30 for HV99089- Added new SSIDs NoSubscription Call 5100 Nuisance Call 5200 UC Routing Failed Originating UC Routing Failed Terminating UC ReRouting Originating UC ReRouting Terminating- Updated Multi-device Charging feature with new CM mtasChargingProfileMultiDeviceMode according to TR HV95839.- Updated the PANI reporting details with a supporting table in 5.2.5.- Updated sections 3.3.4, 5.2.65, 5.2.139, 5.2.167, 5.2.170 for multi mobile subscriptions feature.

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V	2018-03-02	eseesom	vMTAS 1.10, MTAS 4.10 <ul style="list-style-type: none"> - Added new AVPs <ul style="list-style-type: none"> • IMS-Visited-Network-Identifier - Updated AVPs <ul style="list-style-type: none"> • Final-Unit-Action - Added new SSID <ul style="list-style-type: none"> • INCOMING COMMUNICATION ALLOWED ON WIFI - 108 • FIP ALTERNATIVE USER IDENTITY - 609 - Updated CCR Event request with AVPs <ul style="list-style-type: none"> • IMS-Visited-Network-Identifier • PS-Information • 3GPP-MS-Timezone - Added 3.3.5 and 3.3.6 for multi-device charging with multiple mobile subscriptions. - Updated chapters 3.8, 3.9 with RAR/RAA and ASR/ASA and 3.14 for Enhanced Assume Positive. - Updated 5.2.5 for Access-Network-Information for BYE and BYE response. - Updated 5.2.134 to describe the scenario to include SIP-Response-Timestamp in termination requests. - Updated References.
X	2018-06-04	erasunn	vMTAS 1.11, MTAS 4.11 <ul style="list-style-type: none"> - Added Ch 3.16 describing rounding method on CC-Time, Ch 3.3.1 and Ch 5.2.36 is updated with rounding information. - Added SCTP to chapter 2.3 - Added new SSID <ul style="list-style-type: none"> • COMMUNICATION_SETUP_ANNO UNCEMENT-5400 • WHITELIST CONDITIONAL HOTLINE-2704

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Y	2018-09-11	erasunn	vMTAS 1.12, MTAS 4.12 Added changes related to addition of rule id for CSA Service in ch. 5.2.38 Updated Subscription-Id AVP to indicate multiple occurrence possibility i.e., *[Subscription-Id], in Sec 5.1.1, as per MultiSim-MultiDevice support feature of MTAS Add new source for the ANI AVP in chapter 5.2.5 Retarget-Instruction AVPs defined optional
Z	2019-03-12	eihquua	vMTAS 1.14.0, MTAS 4.14.0 Added new SSID for Multi-Persona Service Review comment is addressed

2 Scope and Purpose

2.1 Interface Entities

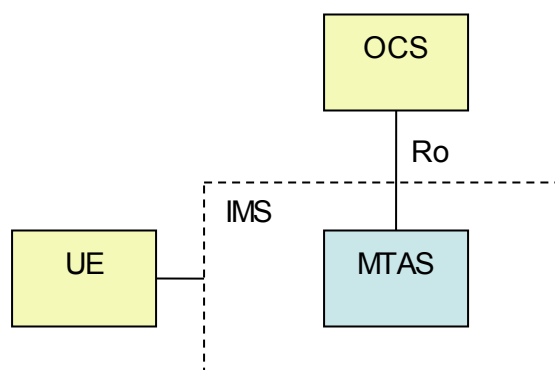


Figure 1: Interface Entities

The Ro interface is defined by 3GPP and is the reference point between a Charging Trigger Function (CTF) and an Online Charging System (OCS).

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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 OCS.

The OCS receives charging events from MTAS and uses the information contained to perform authorization, credit reservation and charging actions. The outcome of these actions is indicated in the responses returned to MTAS.

The information in this document relates to advice of charge and credit control for the MMTel service.

For further details of the CTF, the OCS and the Ro reference point, see reference [1].

2.2 Interface Role

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

MTAS sends Diameter Credit Control Request (CCR) messages to the OCS.

The OCS responds to MTAS using Diameter Credit Control Answer (CCA) messages.

OCS can also send messages to MTAS to re-authorize the quota for a session (Re-Auth-Request, RAR) or abort the current charging session (Abort-Session-Request, ASR).

Services

Table 1: Offered Services

Offered Service	Description
None	

Table 2: Used Services

Used Service	Description
Session Charging with Unit Reservation	CCR Initial, Update and Termination messages are used for credit control purposes relating to a communication session attempt.
Immediate Event Charging for Unsuccessful Attempt to Establish a SIP Session	A CCR Event message is used to convey credit control information to the OCS relating to an unsuccessful attempt to establish a communication session.

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Immediate Event Charging for Session Unrelated Event

A CCR Event message is used to convey credit control information to the OCS relating to the following session unrelated events:

- Successful activation, deactivation, modification, interrogation or invocation of a supplementary service using a supplementary service command code.
- Successful user configuration of a supplementary service.

Advice of Charge

CCR Initial, Update and Termination messages are used for advice of charge purposes relating to a communication session attempt.

Real Time Transfer of Tariff Information (RTTI)

CCR Update messages are used to convey external tariff information to the OCS, upon earlier request from OCS in CCA response code

Emergency Call Notification

A CCR Event message is used to convey credit control information to the OCS relating to an Emergency Call start or stop

2.3

Encapsulation and Addressing

This interface uses Diameter credit control messages transported over TCP or SCTP. The message contents are based on the content defined by 3GPP (see reference [3]) supplemented, where applicable, information conveyed in vendor specific AVPs, defined by Ericsson or other 3rd party vendors.

Information including OCS realm addresses and communication port numbers must be preconfigured for the connections between MTAS and all relevant OCS's. For further details on configuration see reference [7]. Connections between MTAS and OCS's are only established based on the preconfigured data.

The OCS realm address to be used for credit control for a particular SIP session is identified from the P-Charging-Function-Addresses header received in the initial SIP INVITE request. If no online charging function addresses are received in the request, credit control is not applicable. 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 online charging function address information has been configured for the user, credit control is not applicable.

The OCS realm address to be used for reporting credit control information for a particular session unrelated event is identified from the charging function address information provisioned against the user in the HSS. If no online charging function address information has been provisioned for the user, credit control is not applicable.

The OCS realm address to be used for advice of charge purposes is identified in the same manner as the OCS realm address to be used for credit control

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purposes, however in cases that no online charging function address is available, a locally configured default AOC 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 OCS realm address; however the transport mechanism and port number information is not used. MTAS always sends messages using TCP or SCTP to the provisioned port number associated with the connection to the OCS identified by the realm address.

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

3 Procedures

3.1 Overview

Session based charging with unit reservation is used for the real-time charging of SIP sessions. A charging session is established between MTAS and the OCS when a SIP session is requested and is retained until the SIP session is terminated or the session is aborted by the OCS. The OCS performs the unit determination and rating functions and informs MTAS whether the requested SIP session should be allowed to proceed and indicates the amount of time for which credit has been reserved. MTAS sends additional requests to the OCS when the specified amount of time has passed or OCS requested quota re-authorization. MTAS also notifies the OCS whenever conditions which may affect the session rating change, e.g. a successful media change. OCS can set triggers, which indicate the conditions that should generate session rating change notifications.

Immediate event charging is used to notify the OCS of unsuccessful session establishment attempts and to notify the OCS of events that are not related to SIP sessions. A single charging event message is sent from MTAS to the OCS containing all relevant charging data for the event.

Charging sessions between MTAS and the OCS are also used for advice of charge purposes. The charging session is used to transfer tariff and/or cost information between the OCS and MTAS.

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 charging messages sent to the OCS is specified in later sections.

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MTAS can operate in the following session cases:

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

Terminating – performing terminating charging for the incoming session to the terminating 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).

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

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.

3.2 Lower Level Procedures

The MTAS Diameter credit control 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 OCS nodes, including the exchange of capabilities.
- Transporting application messages between MTAS and OCS nodes.
- Detecting transport failures, including the use of watchdog messages.
- Disconnecting connections between MTAS and the OCS nodes.

For further details of the connection handling capabilities of the Diameter stack see reference [10].

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

- The maximum waiting time for a response from the OCS.
- 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 [7].

3.3 Session Charging with Unit Reservation

3.3.1 MMTel Session Set-up, Supervision and Release

Figure 2 shows an example of Diameter transactions between MTAS and an OCS for a successfully established MMTel session.

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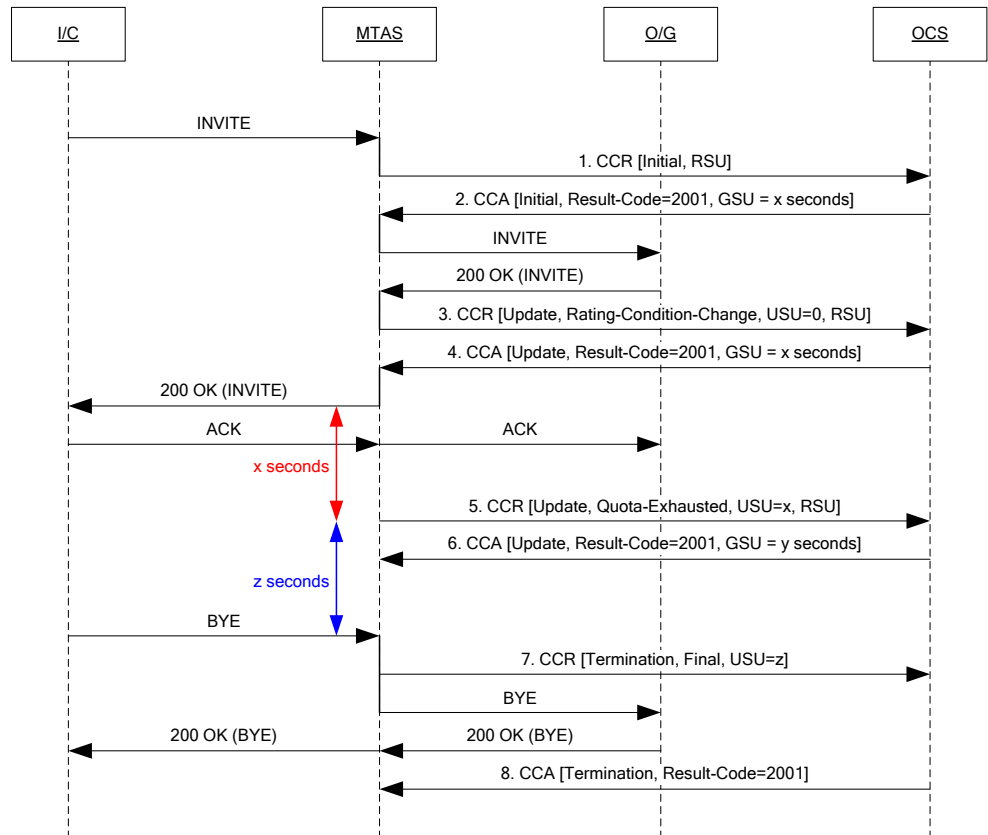


Figure 2: Successfully Established MMTEL Session

On receipt of the INVITE request, MTAS sends a CCR with CC-Request-Type indicating 'Initial Request' to the OCS. The CCR message includes a Requested-Service-Unit AVP indicating a request for credit reservation. Where an SDP offer is present in the INVITE, the SDP offer information is included in the CCR.

The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.

On receipt of a 200 OK response to the INVITE, MTAS sends a CCR with CC-Request-Type indicating 'Update Request' to the OCS. Where the 200 OK response contains the SDP answer, or where the SDP negotiation has already been completed using the reliable provisional response mechanism, the SDP answer information is included in the CCR. Where the 200 OK response contains an SDP offer, the SDP offer information is included in the CCR. The Reporting-Reason AVP in the CCR is set to 'Rating Condition Change', the Used-Service-Unit AVP is set to zero, and a Requested-Service-Unit AVP is included indicating a request for credit reservation.

In cases that the 200 OK response contains the SDP offer, MTAS generates another CCR (Update Request) on receipt of the ACK message containing the SDP answer. The SDP answer information is included in the CCR.

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The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.

MTAS monitors the service delivery time and when it reaches the amount of time granted by the OCS it generates a CCR with CC-Request-Type indicating 'Update Request' to the OCS. The Reporting-Reason AVP in the CCR is set to 'Quota Exhausted', the Used-Service-Unit AVP is set to service delivery time, and a Requested-Service-Unit AVP is included indicating a request for credit reservation.

The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.

On receipt of a BYE message, MTAS sends a CCR with CC-Request-Type indicating 'Termination Request' to the OCS. The Reporting-Reason AVP in the CCR is set to 'Final', and the Used-Service-Unit AVP is set to service delivery time since the last reported used units. The reported CC-Time in Used-Service-Unit AVP is rounded to seconds as described in Ch 3.16.

The OCS acknowledges receipt of the CCR.

The SIP headers that are used to populate the AVPs in the CCR 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

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

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

Table 3: SDP information used for different session cases

Session case	Charging case	Dialog from which SDP is taken
Originating	Originating	Incoming
Terminating	Terminating	Outgoing (see note 1)
Transit	Originating	Outgoing (see note 1)

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Session case	Charging case	Dialog from which SDP is taken
	Terminating	Incoming
Conference Focus	Originating	Outgoing (see notes 1 & 2)
Communication Completion (3PCC)	Originating	Outgoing (see notes 1 & 2)

Notes:

- [1] The SDP information is not included in charging messages generated before a SIP message has been sent to the outgoing dialog.

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 SDP information used to populate the SDP-Session-Description and SDP-Media-Component AVPs depends on the charging message trigger and on the AS session case.

The general principles for reporting SDP information are that the SDP answer is reported in preference to the SDP offer, and that the SDP is captured from the incoming or outgoing (see Table 3) when the relevant SDP information has been received from / sent to that dialog. The principles are not satisfied in the following cases:

- For a CCR (Initial Request) triggered on receipt of an initial INVITE request containing an SDP offer, SDP information received in the INVITE request on the incoming dialog is used.

In the Conference Focus session case, the SDP information for the SDP offer that will be included in the initial INVITE request sent on the outgoing dialog is used.

In the Communication Completion (3PCC) session case, no SDP information is included, since the initial INVITE request does not contain an SDP offer.

- For a CCR (Update Request) triggered on receipt of a 200 OK (INVITE) response containing an SDP offer, SDP information received in the INVITE response on the outgoing dialog is used.
- For a CCR (Update Request) triggered on receipt of a 200 OK (INVITE) response containing an SDP answer, SDP information received in the INVITE response on the outgoing dialog is used, unless the SDP negotiation has already been completed.

If the SDP negotiation has already been completed, the SDP to report is

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read from the dialog based on the session and the charging case except CCR (Update Request) triggered on receipt of Re-INVITE. See Table 3 about which dialog are used in certain scenarios. In case of CCR (Update Request) triggered on receipt of Re-INVITE SDP information received in Re-INVITE is used. The SDP information is taken from dialog on which Re-INVITE is received.

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.

For unsuccessful attempts to establish a SIP session in which the INVITE has been sent out on the outgoing dialog, the SIP header information used to populate the AVPs is captured from the incoming and outgoing dialogs as for successfully established SIP sessions.

For unsuccessful attempts to establish a SIP session in which the INVITE has not been sent out on the outgoing dialog, the SIP header information used to populate the AVPs is captured from the incoming dialog. For Terminating, Transit (originating), Conference Focus and Communication Completion (3PCC) session cases, the Call-ID is not included in charging messages.

When the flexible communication distribution service applies, the following charging is performed:

- Terminating charging is performed for the session to the primary user (A-to-B). The charging session is initiated as for a terminating session case. In cases that the session is successfully established to an IMS primary user, the charging session continues as for a terminating session case. In cases that the session is successfully established to a non-IMS primary user or to a related user, the charging session continues as for a transit session case.
- Originating charging (transit session case) is performed for the session attempt to the non-IMS primary user (B-to-B'), if applicable.
- Originating charging (transit session case) is performed for the session attempts to each invited related user (B-to-C, B-to-D etc.).

For successful user activation, deactivation, interrogation or invocation of a supplementary service using a supplementary service command code, the SIP header information used to populate the AVPs is captured from the incoming dialog.

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Terminating Charging is suppressed if CM configuration is enabled, and the served UE is located in Home Public Land Mobile Network (HPLMN) or the served UE is fixed device.

In originating cases, if the trigger condition is set for trigger type [5.2.160] 'Change In Location' and, compared with previously reported ANI AVP in CCR (Initial Request), P-Access-Network-Info header is changed in ACK from originating side, additional CCR (Update Request) is triggered to report the updated Access-Network-Information AVP. If P-Access-Network-Info header is changed in BYE from the served user, an updated Access-Network-Information AVP is reported in CCR (Termination Request). The "Change In Location" trigger type is only needed if the `mtasChargingAniWithoutTrigger` CM parameter is set to "0" (meaning not enabled). If the CM value is set to "1", the new PANI value will be reported without the need of setting the trigger type.

In originating cases, `IMS-Visited-Network-Identifier` is reported from P-Visited-Network-ID header received in INVITE or REGISTER from server user, in CCR (Initial Request).

In terminating cases, `IMS-Visited-Network-Identifier` shall be reported from P-Visited-Network-ID header received in REGISTER from the served user in CCR (Initial Request). If P-Visited-Network-ID is updated in 18x and 200 OK (INVITE), `IMS-Visited-Network-Identifier` is reported in CCR (Update Request).

3.3.2 Mid-Session Media Changes

Figure 3 shows an example of a Diameter transaction between MTAS and an OCS 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.

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

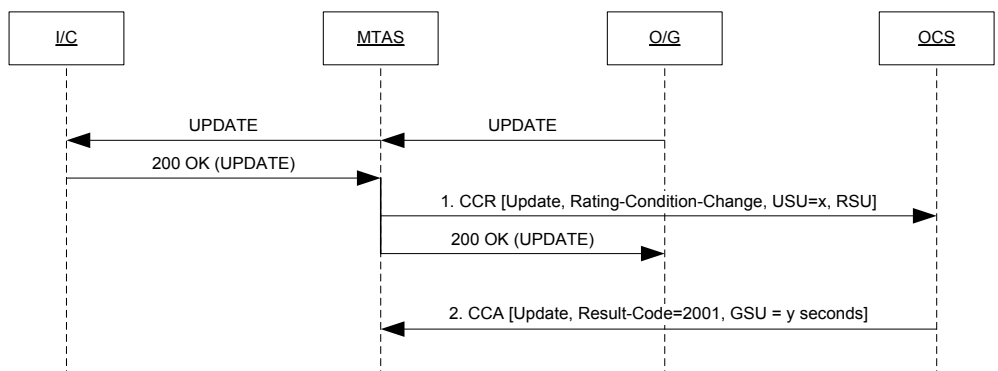


Figure 3: Media Change during an Established SIP Session

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- a On receipt of a 200 OK response to the UPDATE request, MTAS checks if a trigger for condition “change in media composition” has been set in MTAS. If no trigger condition has been set MTAS checks if CM attribute `mtasChargingProfileSendCcrOnSdpChange` is enabled or not to decide if a CCR shall be sent. If a CCR shall be sent MTAS sends a CCR with CC-Request-Type indicating ‘Update Request’ to the OCS. The Reporting-Reason AVP in the CCR is set to ‘Rating Condition Change’, the Used-Service-Unit AVP is set to service delivery time since the last reported units, and a Requested-Service-Unit AVP is included indicating a request for credit reservation. If the CCR is sent because of trigger conditions has been set for the “change in media composition” event the Trigger AVP with Trigger Type AVP “change in media_composition” is included in the CCR.
- The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.

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.

If media change is signaled by Re-INVITE CCR (Update Request) messages could be triggered on Re-INVITE and 200 OK (Re-INVITE). On receipt of a Re-INVITE request MTAS checks if a trigger for condition “change in media composition” has been set in MTAS. If no trigger condition has been set MTAS checks if CM attribute `mtasChargingProfileSendCcrOnSdpChange` is enabled or not to decide if a CCR shall be sent. The same conditions apply to 200 OK (Re-INVITE).

3.3.3 MMTel Session Attempt Rejected after Successful Unit Reservation

Figure 4 and Figure 5 show examples of Diameter transactions between MTAS and an OCS for unsuccessful attempts to establish SIP sessions.

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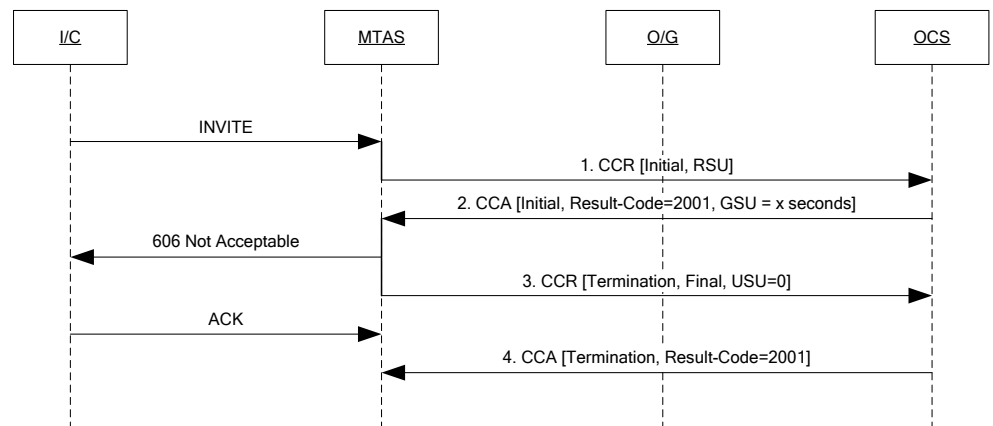


Figure 4: MMTel Session Attempt Rejected by MTAS

- On receipt of the INVITE request, MTAS sends a CCR with CC-Request-Type indicating 'Initial Request' to the OCS. The CCR message includes a Requested-Service-Unit AVP indicating a request for credit reservation. Where an SDP offer is present in the INVITE, the SDP offer information is included in the CCR.

The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.

On determining that the session set-up should not be allowed to proceed, MTAS sends a CCR with CC-Request-Type indicating 'Termination Request' to the OCS. The Reporting-Reason AVP in the CCR is set to 'Final', and the Used-Service-Unit AVP is set to zero.

The OCS acknowledges receipt of the CCR.

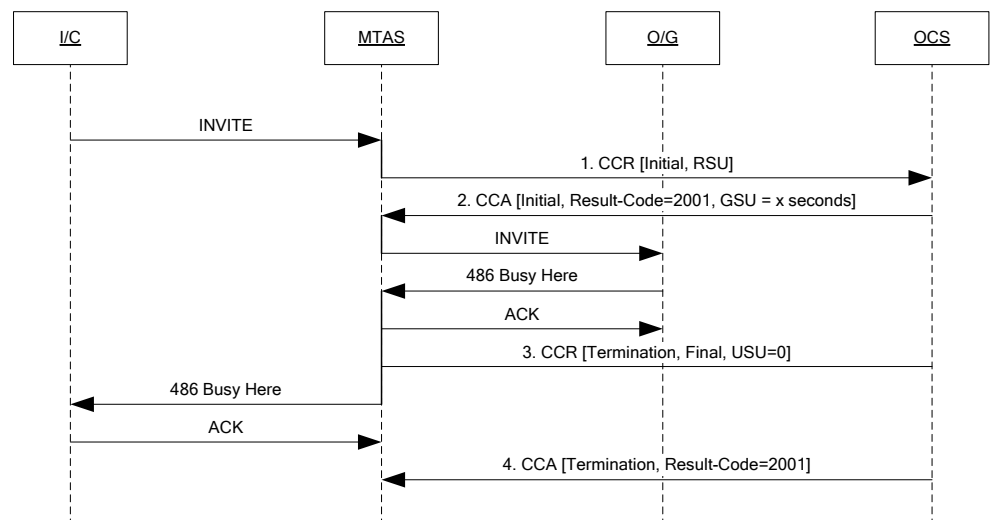


Figure 5: MMTel Session Attempt Reject by a Subsequent Node

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- a On receipt of the INVITE request, MTAS sends a CCR with CC-Request-Type indicating 'Initial Request' to the OCS. The CCR message includes a Requested-Service-Unit AVP indicating a request for credit reservation. Where an SDP offer is present in the INVITE, the SDP offer information is included in the CCR.
- b The OCS reserves an appropriate amount of credit and returns a CCA containing a Granted-Service-Unit (GSU) AVP indicating the length of time that MTAS can deliver the service.
- c On receipt of a non-2xx final response to the INVITE request, MTAS sends a CCR with CC-Request-Type indicating 'Termination Request' to the OCS. The Reporting-Reason AVP in the CCR is set to 'Final', and the Used-Service-Unit AVP is set to zero.
- d The OCS acknowledges receipt of the CCR.

3.3.4

Enhanced Charging Behavior with provisioned mobile subscription

When Multi Mobile Behavior is Enabled in MMTel AS i.e mtasMmtMobileBehaviour is 1(MOBILE_ENHANCEMENT_ON) and mobile-subscription-list is provisioned, mobile subscription information is reported in CCR messages, on best effort basis,

User-Name: IMPI of device

User-Equipment-Info: IMEI of device

Instance-Id: sip.instance of device

Subscription-Id-Type=END_USER_SIP_URI,

Subscription-Id-Data=DEFAULT IMPU

Subscription-Id-Type=END_USER_E164

Subscription-Id-Data=MSISDN of subscription associated with device

Subscription-Id-Type=END_USER_IMSI

Subscription-Id-Data=IMSI of subscription associated with device

Mobile subscription MSISDN and IMSI is not reported in Subscription-ID AVPs (E164 and IMSI) , when mtasChargingProfileSuppressRoMsisdnImsiSubscriptionIdAVP is configured to TRUE(default value).

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3.3.5 Multi-device Charging with one mobile and one or more fixed devices

In case of terminating online charging and multi-device charging is activated, additional terminating charging session is created for each outgoing leg towards served user's fixed device. A CCR-Initial is sent on each additional terminating charging session in order to report information specific for particular fixed device (User-Equipment-Info AVP, User-Name AVP and SIP-Ringing-Timestamp AVP).

3.3.6 Multi Device Charging with multiple mobile subscriptions and one or more fixed devices

In case of terminating online charging and multi-device charging is activated and multi mobile subscriptions feature is enabled, additional terminating charging session is created for each outgoing leg towards served user's fixed device. A CCR-Initial is sent on main terminating charging session report Subscription-Id AVP with Default IMPU of served user. A CCR-Initial is sent on each additional terminating charging session in order to report information specific for particular fixed device (User-Equipment-Info AVP, User-Name AVP, Instance-Id AVP, Subscription-Id AVP and SIP-Ringing-Timestamp AVP).

3.4 Immediate Event Charging for Unsuccessful Attempt to Establish a SIP Session

Figure 6 show an example of a Diameter transaction between MTAS and an OCS for an unsuccessful attempt to establish a SIP session where the attempt is rejected by MTAS before credit reservation has been performed.

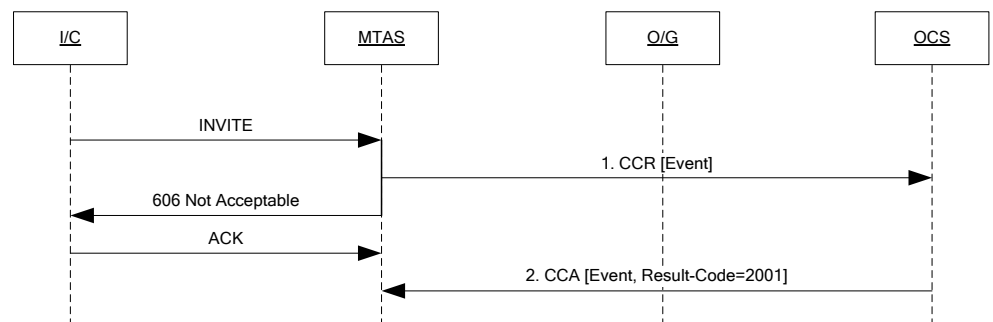


Figure 6: MMTel Session Attempt Rejected by MTAS before Credit Reservation

- On determining that the session set-up should not be allowed to proceed, MTAS sends a CCR with CC-Request-Type indicating 'Event Request' to the OCS.
- The OCS acknowledges receipt of the CCR.

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The SIP headers that are used to populate the AVPs in the CCR [Event] message are captured from the incoming dialog. For Terminating, Transit (originating), Conference Focus and Communication Completion (3PCC) session cases (see section 3.1), the Call-ID is not included in charging messages.

3.5 Immediate Event Charging for Session Unrelated Events

3.5.1 Immediate Event Charging for User Control of a Supplementary Service using an SSC

Figure 7 shows an example of a Diameter transaction between MTAS and an OCS for user control of a supplementary service using an SSC.

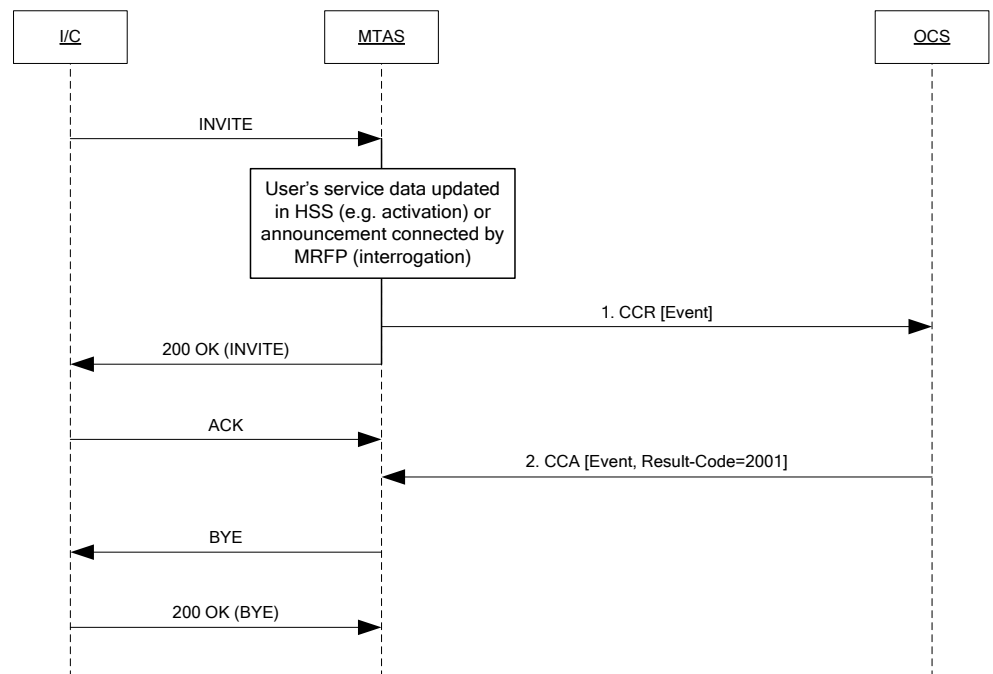


Figure 7: User Supplementary Service Control using an SSC

- When the requested supplementary service action has been successfully performed, MTAS sends a CCR with CC-Request-Type indicating 'Event Request' to the OCS.
- The OCS acknowledges receipt of the CCR.

Not all supplementary service actions trigger sending of CCR.

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3.5.2 Immediate Event Charging for User Configuration of a Supplementary Service

Figure 8 shows an example of a Diameter transaction between MTAS and an OCS for user configuration of a supplementary service via the Ut interface.

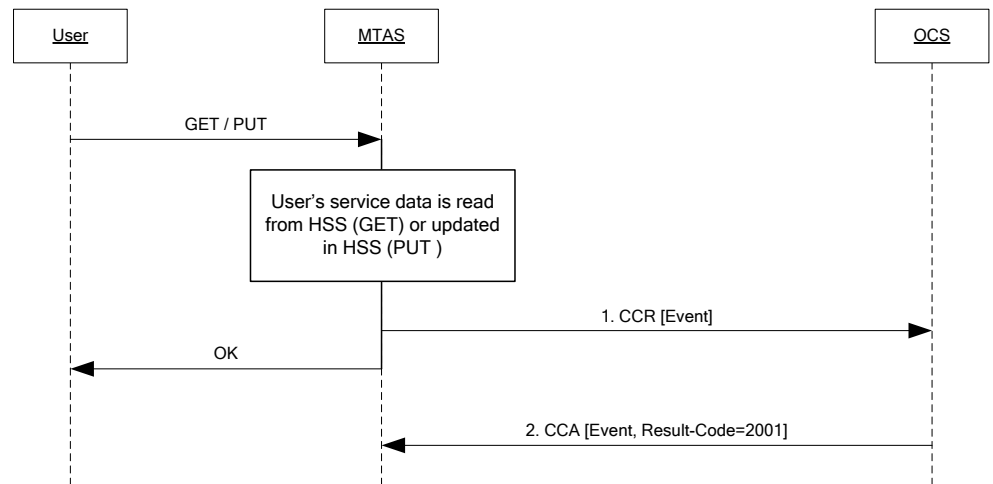


Figure 8: User Configuration of a Supplementary Service via the Ut interface

- a When the requested configuration action has been successfully performed, MTAS sends a CCR with CC-Request-Type indicating 'Event Request' to the OCS.
- b The OCS acknowledges receipt of the CCR.

3.6 Emergency Call Notification

Start and stop of an Emergency Call is indicated to OCS over the Ro interface (Online Charging) based on SIP NOTIFY received from CSCF. The content of the SIP Event header received in the NOTIFY is used by MTAS to populate the Service-Specific-Info AVP (having sub-AVPs Service-Specific-Type and Service-Specific-Data).

Note: The Service-Specific-Info grouped AVP should not be omitted from CCR messages.

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3.6.1

Start of Emergency Call for online charging subscriber

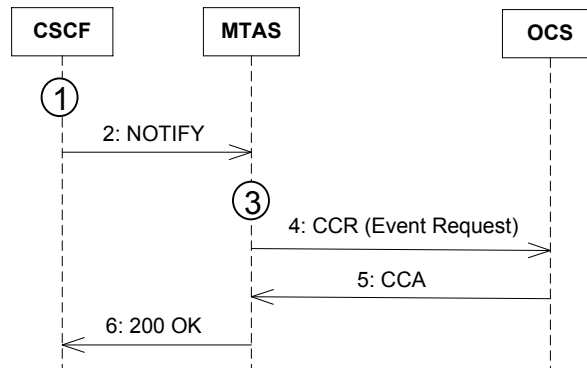


Figure 9 Start of Emergency Call for online charging subscriber

- Emergency call is initiated by a Subscriber.
- CSCF sends unsolicited SIP NOTIFY on ISC interface to originating MTAS routed to MMT or MMT Unregistered port. The relevant SIP headers are set as follows:

Table 110 Request-URI / To: Subscriber's IMPU

Table 111 From: Address of S-CSCF

Table 112 P-Charging-Vector (PCV): ICID

Table 113 P-Charging-Function-Addresses (PCFA): ECF1;ECF2

Table 114 Event: emergencyCall; start

- Emergency Call Notification function is invoked in MTAS. The following conditions hold:
 - License for MMTel is granted
 - mtasChargingProfileEmergencyCall = "Online charging"
 - License for Online charging is granted and it is enabled
 - It is found that the Subscriber is an online charging subscriber by checking that PCFA header included in the NOTIFY contains ECF addresses.
- MTAS sends CCR Event on Ro interface with Service-Specific-Info AVP (and sub-AVPs) populated to denote Emergency Call start
- OCS answers with CCA
- MTAS sends 200 "OK" to CSCF as response to the NOTIFY

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Step 5 and 6 can be interchanged.

3.6.2 End of Emergency Call for online charging subscriber

This is an alternative of the use case in 3.6.1. The Emergency Call is being terminated and the Event header in the NOTIFY contains “emergencyCall; stop” in this case. MTAS sends CCR Event to report end of Emergency Call. The sub-AVPs of Service-Specific-Info (type and data) and are populated accordingly.

3.7 Advice of Charge

3.7.1 MMTel Session Set-up, Supervision and Release

Figure 10 shows an example of Diameter transactions between MTAS and an OCS for a successfully established MMTel session from an AOC subscriber with AoC-S, AoC-D and AoC-E.

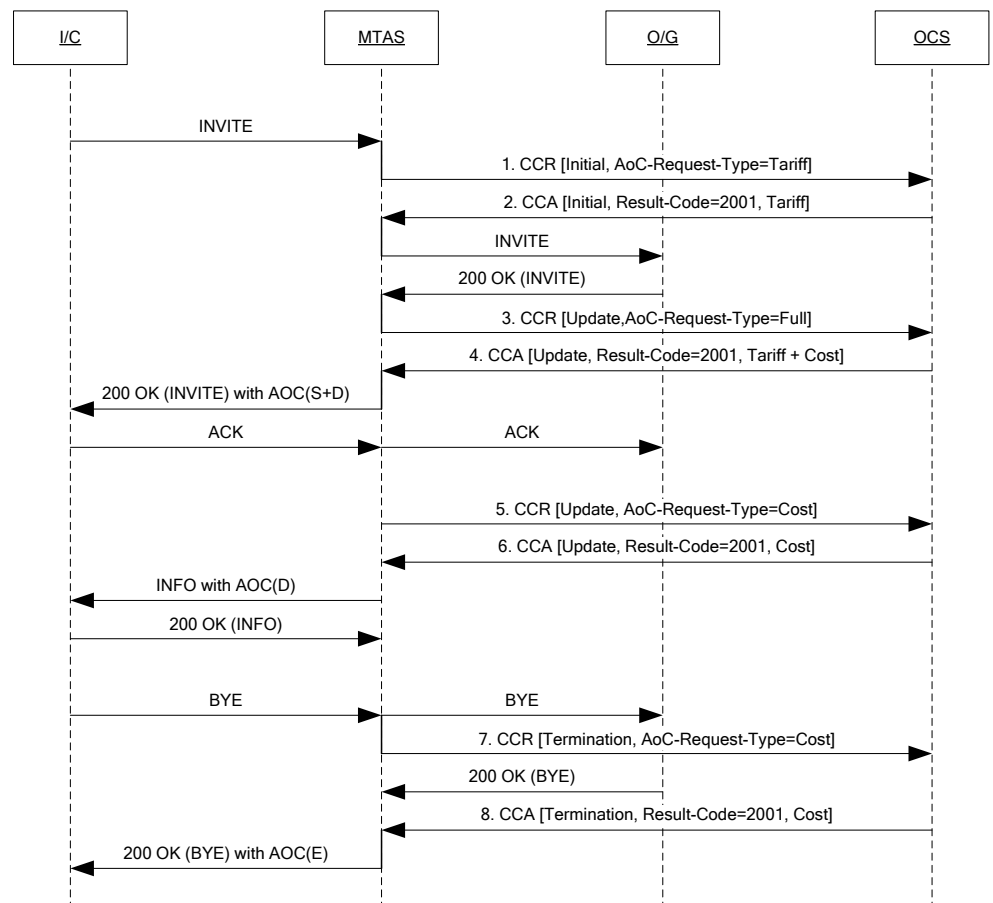


Figure 10: Successfully Established MMTel Session with AoC-S, AoC-D and AoC-E

On receipt of the INVITE request, MTAS sends a CCR with CC-Request-Type indicating ‘Initial Request’ to the OCS. The CCR message includes an AoC-Request-Type AVP indicating a request for tariff information. Where an SDP

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offer is present in the INVITE, the SDP offer information is included in the CCR.

The OCS returns a CCA containing tariff information.

On receipt of a 200 OK response to the INVITE, MTAS sends a CCR with CC-Request-Type indicating 'Update Request' to the OCS. Where the 200 OK response contains the SDP answer, or where the SDP negotiation has already been completed using the reliable provisional response mechanism, the SDP answer information is included in the CCR. Where the 200 OK response contains an SDP offer, the SDP offer information is included in the CCR. The CCR message includes an AoC-Request-Type AVP indicating a request for full information (i.e. tariff for AoC-S purposes and cost for AoC-D purposes).

In cases that the 200 OK response contains the SDP offer, MTAS generates another CCR (Update Request) on receipt of the ACK message containing the SDP answer. The SDP answer information is included in the CCR and the AoC-Request-Type AVP is set to indicate a request for tariff information (for AoC-S purposes).

The OCS returns a CCA containing tariff information and cost information.

When AoC-D applies, MTAS is required to send cost information to the subscriber at regular intervals throughout the SIP session. MTAS requests the cost information by sending a CCR with CC-Request-Type indicating 'Update Request' to the OCS containing an AoC-Request-Type AVP indicating a request for cost information.

The OCS returns a CCA containing the accumulated cost for the session.

On receipt of a BYE message, MTAS sends a CCR with CC-Request-Type indicating 'Termination Request' to the OCS. The CCR message includes an AoC-Request-Type AVP indicating a request for cost information (for AoC-D or AoC-E purposes).

The OCS returns a CCA containing the accumulated cost for the session.

3.7.2 Mid-Session Media Changes

3.7.2.1 Media Change during an AoC-S session

Figure 11 shows an example of a Diameter transaction between MTAS and an OCS for a successful media connection change during an established SIP session where AoC-S applies. 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.

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

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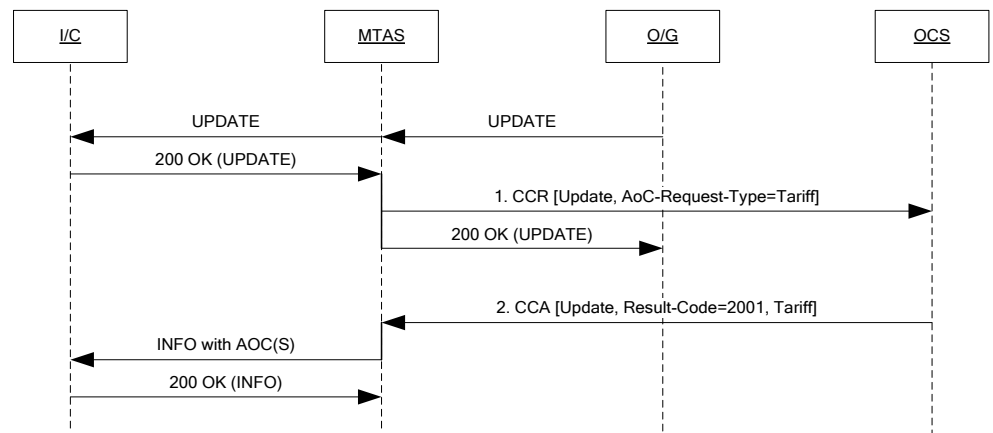


Figure 11: Media Change during an Established SIP Session with AoC-S

- On receipt of a 200 OK response to the UPDATE request, MTAS checks if a trigger for condition “change in media composition” has been set in MTAS. If no trigger condition has been set MTAS checks if CM attribute `mtasChargingProfileSendCcrOnSdpChange` is enabled or not to decide if a CCR shall be sent. If a CCR shall be sent MTAS sends a CCR with CC-Request-Type indicating ‘Update Request’ to the OCS. The CCR message includes an AoC-Request-Type AVP indicating a request for tariff information. If the CCR is sent because of trigger conditions has been set for the “change in media composition” event the Trigger AVP with Trigger Type AVP “change in media_composition” is included in the CCR.
- The OCS returns a CCA containing tariff information.

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.

3.7.2.2

Media Change during an AoC-D or AoC-E session

Figure 12 shows an example of a Diameter transaction between MTAS and an OCS for a successful media connection change during an established SIP session where AoC-D or AoC-E applies. 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.

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

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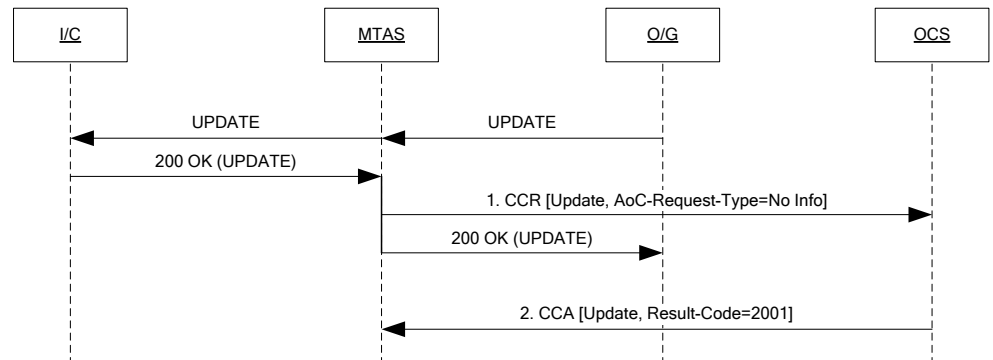


Figure 12: Media Change during an Established SIP Session with AoC-D or AoC-E

- On receipt of a 200 OK response to the UPDATE request, MTAS checks if a trigger for condition “change in media composition” has been set in MTAS. If no trigger condition has been set MTAS checks if CM attribute `mtasChargingProfileSendCcrOnSdpChange` is enabled or not to decide if a CCR shall be sent. If a CCR shall be sent MTAS sends a CCR with CC-Request-Type indicating ‘Update Request’ to the OCS. The CCR message includes an AoC-Request-Type AVP indicating that neither cost nor tariff information is required in the response. If the CCR is sent because of trigger conditions has been set for the “change in media composition” event the Trigger AVP with Trigger Type AVP “change in media_composition” is included in the CCR.
- The OCS acknowledges receipt of the CCR.

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.

3.7.3

Mid-Session Tariff Change Time

Tariff Information provided by the OCS may contain the next tariff as well as the current tariff. Where the next tariff is supplied, the OCS also specifies the time at which the tariff changes.

Figure 13 shows an example of Diameter transactions between MTAS and an OCS when the tariff change time is reached during an established MMTel session from an AOC subscriber with AoC-S.

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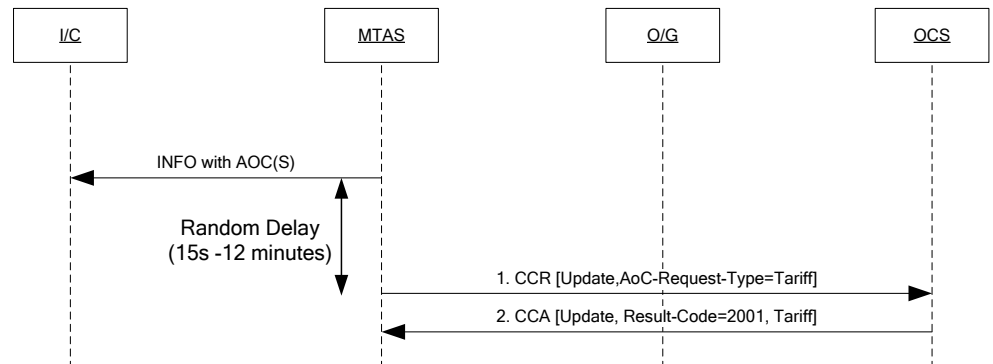


Figure 13: Tariff Change during an Established SIP Session with AoC-S

- After the tariff change time has been reached, MTAS runs a random delay timer before requesting tariff information from the OCS in order to spread the requests. When the timer expires, MTAS sends a CCR with CC-Request-Type indicating 'Update Request' to the OCS. The CCR message includes an AoC-Request-Type AVP indicating a request for tariff information.
- The OCS returns a CCA containing tariff information.

3.7.4

Mid-Session Next-Tariff-Request timer and AoC-D timer

During AoC-S and AoC-D session, if AoC-D timer gets a timeout while Next-Tariff-Request timer is running, it will trigger CCR with CC-Request-Type indicating 'Update Request' and AoC-Request-Type AVP indicating a request for cost and tariff information.

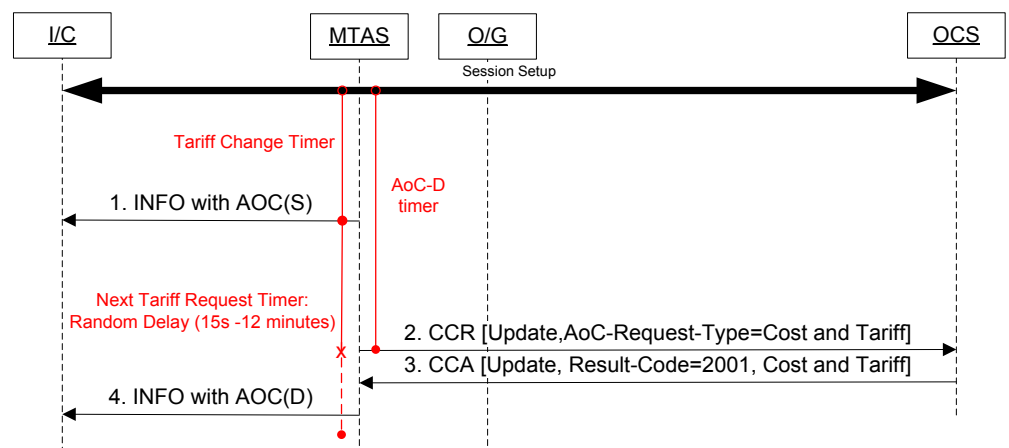


Figure 14: AoC-D timer expires during Next Tariff Timer is running

- Tariff Change Timer expires then INFO with AoC tariff information is reported to user and Next Tariff Timer is started with random number.

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- c AoC-D timer expires then Next Tariff Timer stops and triggers CCR with CC-Request-Type indicating 'Update Request' and AoC-Request-Type AVP indicating a request for cost and tariff information.
- d The OCS returns CCA with cost and tariff information.
- e INFO with AoC cost information is reported to user.

3.8 Re-authorization of quota, requested by OCS

OCS can initiate re-authorization of the quota for an established charging session by sending a RAR (Re-Auth-Request) Diameter message to MTAS. MTAS should acknowledge the request by sending RAA (Re-Auth-Answer). After the acknowledgement MTAS should send a CCR 'Update Request' to OCS indicating the current quota status. If the session is established without online charging due to the temporary fault on Diameter link and used Enhanced assume positive mode, then in response to the RAR from the OCS, MTAS sends the RAA with the result code = 5002 "Diameter_Unknown_Session_ID". Only one credit authorization should be performed at the same time. If another credit authorization is ongoing (there's an ongoing CCR message) then MTAS should only acknowledge the RAR message by sending an RAA to OCS.

3.8.1 Re-authorization of an MMTel session

Figure 15 show an example Diameter message flow between MTAS and OCS.

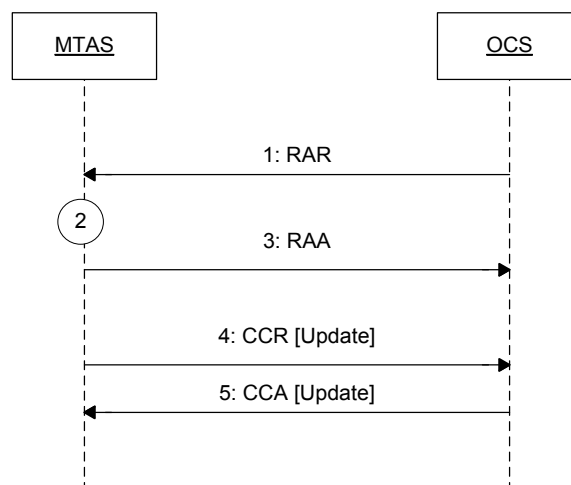


Figure 15: Re-authorization of quota

- OCS sends a Re-Auth-Request (RAR). The message includes a Session-Id AVP containing an identifier of an established charging session. MTAS

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identifies the charging session based on this AVP. The Re-Auth-Request-Type AVP should be set to AUTHORIZE_ONLY.

- MTAS checks whether another credit authorization is on-going. If another authorization is found then steps 4-5 are omitted.
- MTAS acknowledges RAR by sending Re-Auth-Answer (RAA) message to OCS. Result-Code AVP is populated according to the result of the check in step 2. If there is no collision then it is set to DIAMETER_LIMITED_SUCCESS, otherwise it is set to DIAMETER_SUCCESS.
- MTAS sends a CCR 'Update Request' to OCS. Reporting-Reason AVP is populated with 'FORCED_REAUTHORIZATION'.
- CCA message is received from OCS.

3.8.2 Re-authorization Request in Enhanced Assume Positive mode

Figure 16 show an example Diameter message flow between MTAS and OCS in Enhanced Assume Positive mode.

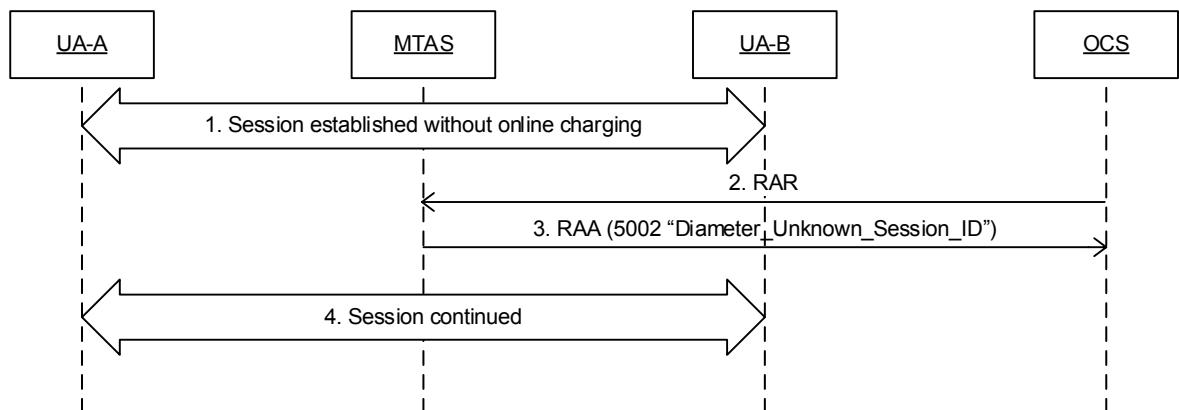


Figure 16: Handling Re-authorization Request from OCS

1. The SIP session established between UA-A and UA-B. The involved MTAS can be either originating or terminating. The session established without online charging due to the temporary fault on Diameter link.
2. Diameter link subsequently restored and the OCS sends a Re-Auth-Request (RAR) to MTAS.
3. MTAS responds with an RAA with result-code=5002 indicating "Diameter_Unknown_Session_ID" since it is in Enhanced Assume Positive mode.
4. SIP session between UA-A and UA-B is continued.

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3.9 Session aborted by OCS

OCS can initiate abort of a charging session and the associated SIP sessions by sending an ASR (Abort-Session-Request) Diameter message to MTAS. MTAS should acknowledge the request by sending an ASA (Abort-Session-Answer) message to OCS. After that, both the Diameter session and the associated SIP sessions should be terminated. If the session is established without online charging due to the temporary fault on Diameter link and used Enhanced assume positive mode, then in response to the ASR from the OCS, MTAS sends the ASA with the result code = 5002 "Diameter_Unknown_Session_ID".

3.9.1 Aborting an ongoing MMTel session

Figure 17 shows an example call flow between MTAS and OCS where an ongoing MMTel charging session is aborted by OCS.

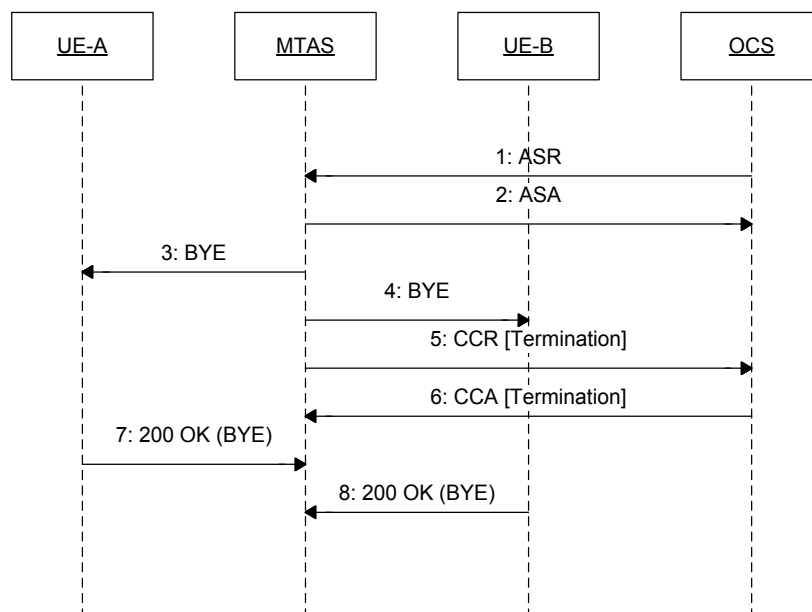


Figure 17: Charging session aborted by OCS

- 1 OCS sends an Abort-Session-Request (ASR). The message includes a Session-Id AVP containing an identifier of an established charging session. MTAS identifies the charging session based on this AVP.
- MTAS sends an Abort-Session-Answer (ASA) message to OCS to acknowledge the abort request.
 - BYE is sent to UE-A to release the SIP session
 - BYE is sent to UE-B to release the SIP session

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- MTAS sends a CCR with CC-Request-Type indicating 'Termination Request' to the OCS. The Reporting-Reason AVP in the CCR is set to 'Final', and the Used-Service-Unit AVP is set to service delivery time since the last reported used units.
- OCS acknowledges the CCR request.
- MTAS received answer for BYE request from UE-A
- MTAS received answer for BYE request from UE-B

3.9.2 Abort Session Request in Enhanced Assume Positive mode

Figure 18 shows an example call flow between MTAS and OCS where an Abort Session Request from OCS is rejected in Enhanced Assume positive mode.

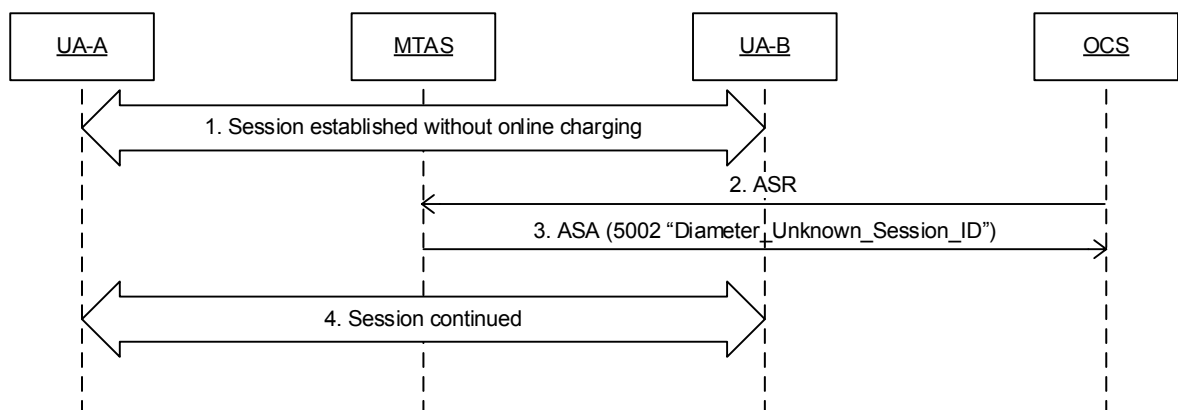


Figure 18: Handling ASR from OCS

1. The SIP session established between UA-A and UA-B. The involved MTAS can be either originating or terminating. The session established without online charging due to the temporary fault on Diameter link.
2. Diameter link is subsequently restored and the OCS sends an Abort Session Request (ASR) to MTAS
3. MTAS responds with an ASA with result-code=5002 indicating "Diameter_Unknown_Session_ID" since it is in Enhanced Assume Positive mode.
4. SIP session between UA-A and UA-B is continued.

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3.10 Trigger conditions

3.10.1 Setting trigger conditions by OCS

There could be mid-session events which affect the rating conditions of the current service. OCS can instruct MTAS to re-authorize the quota when such event occurs by setting different trigger conditions.

Figure 19 shows an example of Diameter transactions between MTAS and an OCS when OCS sets a trigger condition.

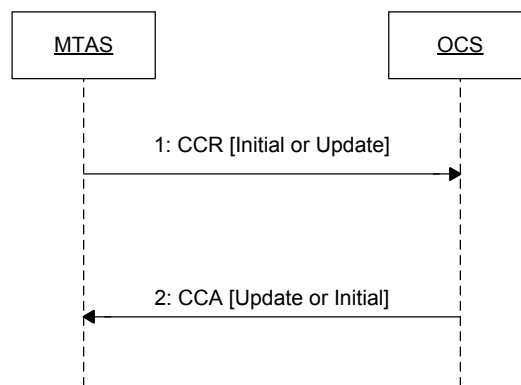


Figure 19: Setting of trigger conditions

- 1 MTAS sends a CCR message to OCS. The procedure can apply to any CCR 'Initial Request' or CCR 'Update Request' message.
- 2 A CCA message is received containing a Trigger AVP and optionally one or more Trigger-Type AVPs. MTAS updates the list of active triggers for the current charging session. If there is any Trigger-Type AVP then MTAS arms a trigger with the corresponding condition. If there is an existing armed trigger and no corresponding Trigger-Type AVP is received then the trigger is removed. If empty Trigger AVP is received without any Trigger-Type AVP then all existing trigger conditions are removed.

Note: OCS indicates trigger support by including a Trigger AVP in the message. If no Trigger AVP is received then MTAS assumes that OCS does not support triggers and the default behavior applies.

3.10.2 Reporting trigger conditions to OCS

When a trigger condition is set for the event and the event occurs then MTAS should re-authorize the quota for the session. It should send a new CCR 'Update Request' to OCS. MTAS should report the condition which led to the re-authorization by including a Trigger-Type AVP in the CCR with the appropriate trigger type. The content of the CCR message depends on the trigger condition.

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3.11 OCS Connection Failure

When MTAS is unable to send a CCR [Initial] or CCR [Event] message to an OCS due to a failure of the connection between MTAS and the OCS, it will attempt to send the message to an alternative OCS instead, if an alternative is available (see section 2.3).

When MTAS is unable to send a CCR [Update] or CCR [Termination] message to an OCS due to a failure of the connection between MTAS and the OCS, the Diameter session is considered terminated, and no further attempt is made to send CCR messages relating to the charging session.

3.12 No Reply from OCS

A timer is started whenever a CCR message is sent from MTAS to the OCS. The timer is stopped on receipt of a CCA response. If the timer expires, the CCR message is resent to the OCS. The duration of the timer and the maximum number of times that a CCR is resent are operator configurable (see reference [7]).

When the response timer expires after a CCR has been resent for the maximum number of times, MTAS takes the same action as for an OCS connection failure (see section 3.7.4).

3.13 Handling of Unsuccessful OCS Responses

3.13.1 CCA [Initial] containing Result Code 3002 or 3004 from the Primary OCS

On receipt of a CCA [Initial] message containing a command level result code indicating 3002 (Unable to Deliver) or 3004 (Too Busy), MTAS attempts to send the CCR [Initial] message to an alternative OCS instead, if an alternative is available (see section 2.3).

3.13.2 CCA [Event] containing Result Code 3002 or 3004 from the Primary OCS

On receipt of a CCA [Event] message containing a command level result code indicating 3002 (Unable to Deliver) or 3004 (Too Busy), MTAS attempts to send the CCR [Event] message to an alternative OCS instead, if an alternative is available (see section 2.3).

3.13.3 CCA [Initial] containing Unsuccessful Service Level Result Code

On receipt of a CCA [Initial] message containing a successful command level result code 2xxx (in Result-Code AVP or Experimental-Result-Code AVP) and containing an unsuccessful service level result code, MTAS terminates the Diameter charging session by sending CCR with CC-Request-Type indicating 'Termination Request' to the OCS.

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3.13.4 CCA [Update] containing Unsuccessful Service Level Result Code

On receipt of a CCA [Update] message containing a successful command level result code 2xxx and containing an unsuccessful service level result code, MTAS terminates the Diameter charging session by sending CCR with CC-Request-Type indicating 'Termination Request' to the OCS. When it meets the video upgrade fallback condition, MTAS will send another CCR [update] containing the old SDP to OCS for the media fallback.

3.14 Failure Handling

The MTAS failure handling may operate in one of the three modes:

- Credit Control Failure Handling (CCFH) – handling based on CCFH AVP received from the charging server in CCA messages.
- Assume Positive Codes – handling based on the configurable list of OCS result codes assumed as positive ones.
- Enhanced Assume Positive – handling based on CCFH AVP (when CCFH missing/other than continue or terminate handling based on value of CM `mtasChargingProfileAssumePositiveDefaultCcfh`) received from the charging server in CCA messages, and on the configurable list of OCS result codes assumed as positive ones.

CCFH, Assume Positive Codes or Enhanced Assume Positive handling can be chosen with use of `mtasChargingProfileFaultHandling` CM parameter (CCFH is the default value of this parameter).

3.14.1 Assume Positive Codes handling

When Assume Positive Codes handling is configured the command level or MSCC level result code received in CCA [Initial] or CCA [Update] message is checked against the configurable list of codes assumed as positive ones. If the received result code is present on the list then the call session is continued, otherwise the session is terminated.

Result codes excluded from the check are 2001 (Diameter Success), 3002 (Unable to Deliver) and 3004 (Too Busy) where the last two are excluded only if received in the response to CCR [Initial] request from the ECF address that is not the last one on the list of available ECF addresses (handling of 3002 and 3004 result codes in the CCA [Initial] received from the Primary ECF address is described in the chapter 3.13.1).

Result code is passed in Result-Code AVP or Experimental-Result-Code AVP on the command level or in Result-Code AVP on MSCC level.

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3.14.2 Enhanced Assume Positive handling

When Enhanced Assume Positive handling is configured the command level or MSCC level, result code received in CCA [Initial] or CCA [Update] message checked against the configurable list of codes assumed as positive ones. If the received result code is present on the list then need to check value of CCFH AVP (if CCFH is missing/other than Continue or Terminate, MTAS checks the value of CM mtasChargingProfileAssumePositiveDefaultCcch), and if this value is Continue the call session is continued, otherwise the session is terminated. If the received result code is not present on the positive list then the session terminated.

Result codes excluded from the check are 2001 (Diameter Success), 3002 (Unable to Deliver) and 3004 (Too Busy). The last two are excluded only if received in the response to CCR [Initial] request from the ECF address that is not the last one on the list of available ECF addresses (handling of 3002 and 3004 result codes in the CCA [Initial] received from the Primary ECF address is described in the chapter 3.13.1).

Result code passed in Result-Code AVP or Experimental-Result-Code AVP on the command level or in Result-Code AVP on MSCC level.

MTAS shall fall back to during session establishment for any of the following failure cases (when no CCA received from the OCS):

- Both primary and secondary destination realms are included in the list of deactivated charging realms
- Diameter stack is not configured with the ECF realm addresses
- Both primary and secondary Ro Diameter connections are unavailable due to a fault
- No receipt of CCA response to CCR message
- Internal MTAS issues which result in a failure to send the CCR message
- Tx timer expires.

MTAS shall fall back to CCFH during session modification for the following failure cases (when no CCA received from the OCS):

- Both primary and secondary Ro Diameter connections are unavailable due to a fault
- No receipt of CCA response to CCR message
- Internal MTAS issues which result in a failure to send the CCR message
- Tx timer expires.

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MTAS detects that Enhanced Assume Positive handling is selected and stored CCFH action (from last CCA message or configured in `mtasChargingProfileAssumePositiveDefaultCcfh` if CCFH AVP is missing in last CCA message). If this value is "Terminate" so MTAS falls back to CCFH and terminates the call. If CCFH action is, "Continue" so MTAS falls back to CCFH and allows call to continue without online charging.

3.14.3 Credit Control Failure Handling

The MTAS failure handling action for credit-control sessions is dependent on the value of the CCFH AVP received from the charging server in CCA messages. A local MTAS configuration parameter is used to specify the action to be taken if failures occur before a CCA message has been received from the charging server. Whenever a CCA messages is received containing a CCFH AVP, the action specified in the AVP supersedes any action previously received in an earlier CCA message for the charging session. The possible failure handling actions are (a) to terminate a session or (b) to continue a session without further online credit control. If the CCA response to the CCR initial request does not contain a CCFH AVP, the action defaults to 'terminate'.

The failure handling action is used when the following fault conditions occur:

- Unknown Charging Realm.
- Charging Realm Deactivated.
- A Failure-to-send condition exists (the MTAS is not able to communicate with the desired destination).
- A CCA message containing a protocol error (Result-Code 3xxx) at either the command level or the Multiple-Services-Credit-Control service level is received.
- A CCA message containing a transient error (Result-Code 4xxx) at either the command level or the Multiple-Services-Credit-Control service level, other than 4010, 4011 or 4012, is received.
- A CCA message containing a permanent failure (Result-Code 5xxx) at either the command level or the Multiple-Services-Credit-Control service level, other than 5030, is received.
- Tx timer expires.

The failure handling action can either be to (a) allow the call session to continue without any further online credit control, (b) reject the attempt to establish a call session, or (c) terminate the call session.

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3.14.4 Advice of Charge Failure Handling

The MTAS failure handling action for advice of charge sessions depends on the configured failure action for online charging and for the AOC service type. The session is terminated if either the online charging CCFH action is 'terminate' or if the failure action configured for the relevant type of AOC is 'terminate'.

The failure handling action is used when the following fault conditions occur:

- Unknown Charging Realm.
- Charging Realm Deactivated.
- a Failure-to-send condition exists (the MTAS is not able to communicate with the desired destination).
- a CCA message containing an unsuccessful Result-Code is received.
- a CCA message is received that does not contain expected cost or tariff information.

3.14.5 Priority Services Failure Handling

The MTAS failure handling action for resource prioritized sessions is always allow the call session to continue without any further online credit control.

3.15 CCA message validation

On receipt of a CCA message from the OCS, MTAS checks that:

- a The message contains all mandatory AVPs, i.e. Session-Id, Origin-Host, Origin-Realm, Auth-Application-Id, CC-Request-Type, and CC-Request-Number.
- b The message contains either a command level Result-Code AVP or an Experimental-Result AVP.
- c The CC-Request-Type and CC-Request-Number AVPs contain values that match the values sent in the corresponding CCR message.
- d The Result-Code AVP, if present, contains a value within the range of the error classes defined in reference [4], i.e. 1000 to 5999.
- e The Experimental-Result AVP, if present, contains a Vendor-Id AVP and an Experimental-Result-Code AVP which contain supported values.
- f A message received in response to an Initial Request or Update Request that included a Requested-Service-Unit AVP, which contains a successful command level Result-Code AVP or Experimental-Result-Code AVP also contains a Multiple-Service-Credit-Control AVP.

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- g A message received in response to an Initial Request or Update Request that included a Requested-Service-Unit AVP, which contains a successful command level Result-Code AVP or Experimental-Result-Code AVP and contains a successful service level Result-Code AVP, also contains a Granted-Service-Unit AVP.
- h A message received in response to an Initial Request or Update Request that included a Requested-Service-Unit AVP, which contains a successful command level Result-Code AVP or Experimental-Result-Code AVP and does not contain a service level Result-Code AVP, also contains a Granted-Service-Unit AVP.
- i The Granted-Service-Unit AVP, if present, contains a CC-Time AVP.
- j A message received in response to an Initial Request, Update Request or Termination Request that included an AoC-Request-Type AVP indicating a request for cost and/or tariff information, which contains a successful command level Result-Code AVP or Experimental-Result-Code AVP, also contains the relevant cost and/or tariff information.
- k The Tariff-Time-Change AVP, when present in the tariff information provided for AoC-S purposes, contains either a time that is in the future or a time that is not more than 30 seconds in the past.

MTAS ignores unrecognized and unexpected AVPs received in CCA messages.

If a CCA message does not satisfy all of these conditions, the message is considered faulty.

When a faulty message is received in response to either a CCR (Initial Request) or a CCR (Update Request), and the message contains a successful Result-Code or Experimental-Result-Code AVP, MTAS terminates SIP sessions without any CCR (Termination Request) message to the OCS.

When a faulty message is received in response to either a CCR (Initial Request) or a CCR (Update Request), and the message contains an unsuccessful Result-Code or Experimental-Result-Code AVP, MTAS handles the message as an unsuccessful CCA response and terminates SIP sessions without sending any CCR (Termination Request) message to the OCS.

When a faulty message is received in response to either a CCR (Termination Request) or a CCR (Event Request), MTAS handles the message as a successful CCA response and considers the Diameter charging session to be terminated.

On receipt of a RAR or ASR message from the OCS, MTAS checks that:

- The message contains all mandatory AVPs, i.e. Session-Id, Origin-Host, Origin-Realm, Auth-Application-Id.
- When message is a RAR, it contains Re-Auth-Request-Type AVP.

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- The Session-Id AVP contains a session id of a valid, active charging session.

If the message does not satisfy all of these conditions then the message is consider faulty. The faulty message is answered with RAA or ASA (depending on the original message) and Result-Code AVP is set according to the error condition.

3.16 Rounding method on CC-Time at session termination

The CC-Time value reported in Used-Service-Unit AVP group in CCR Termination message is rounded on the fraction of elapsed seconds, based on configuration. The GSU value received in CCA Update is considered as an upper limit for the reported CC-Time value.

The rounding mechanism supports the following options:

- Rounding Down
- Rounding to Nearest
- Rounding Up

Table 4 Rounding rules

Rounding method	Measured Chargeable Duration in seconds	Rounded Chargeable Duration in seconds
Rounding Down	X.00 – X.99	X
Rounding to Nearest	X.00 – X.49 X.50 – X.99	X X + 1
Rounding Up	X.00 X.01 – X.99	X X + 1

The rounding mechanism is controlled by a CM parameter `mtasChargingProfileRoUSURounding`.

For CC-Time reported in CCR Update messages always Rounding Down is applied, regardless from the configuration.

4 Information Model

4.1 General

The command codes used to identify messages sent on the Ro interface are specified in reference [4].

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The following commands are defined in this specification:

Table 5: Commands used on the Ro interface

Command-Name	Abbr.	Code	Direction	Section
Abort-Session-Request	ASR	274	OCS → MTAS	5.1.3
Abort-Session-Answer	ARA	274	MTAS → OCS	5.1.4
Credit-Control-Request	CCR	272	MTAS → OCS	5.1.1
Credit-Control-Answer	CCA	272	OCS → MTAS	5.1.1.4.4
Re-Auth-Request	RAR	258	OCS → MTAS	5.1.5
Re-Auth-Answer	RAA	258	MTAS → OCS	5.1.6

5 Formal Syntax or Schema

5.1 Message Contents for Online Charging

The Diameter credit control messages Credit Control Request (CCR) and Credit Control Answer (CCA) are used for online charging. Additionally MTAS supports Abort Session Request (ASR), Abort Session Answer (ASA), Re Auth Request (RAR) and Re Auth Answer (RAA) messages. The structure of the messages is based on the format of the messages defined by 3GPP in reference [3]. Additional information is included in the messages in the form of Ericsson and 3rd party vendors defined vendor specific Attribute Value Pairs (AVPs).

The purpose and content of these messages are described in sections 5.1.1 and 5.1.1.4.4.

The AVPs used in the messages are described in section 5.2.

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 Ro version 1 (based on 3GPP release 7) is configured as described in section 5.1.7.
- (2) Indicates that the AVP and its sub-AVPs are only included if MTAS Ro version 2 (based on 3GPP release 9) is configured as described in section 5.1.7.
- (3) Indicates that the AVP and its sub-AVPs are only included if MTAS Ro version 3 (based on 3GPP release 12) is configured as described in section 5.1.7.

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5.1.1 Credit Control Request Message

The Credit Control Request (CCR) message is sent from MTAS to the OCS to report information that can be used for credit control and advice of charge purposes for a given service.

5.1.1.1 Initial Request

The format of CCR (Initial Request) messages generated by MTAS is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Event-Timestamp ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ AoC-Request-Type ]
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
    { Service-Identifier }
    [ Rating-Group ]
    [ Requested-Service-Unit ]
[ Service-Information ]
    [ 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 ]
    [ Number-Portability-Routing-Information ]
    [ Requested-Party-Address ]
    [ Time-Stamps ]
        [ SIP-Request-Timestamp ]
        [ SIP-Request-Timestamp-Fraction ] (2)(3)
    [ Inter-Operator-Identifier ]
        [ Originating-IOI ]
    [ IMS-Charging-Identifier ]
    * [ SDP-Session-Description ]
    * [ SDP-Media-Component ]
        { SDP-Media-Name }
    * [ SDP-Media-Description ]
        [ Media-Initiator-Flag ]
```


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```
[ SDP-Type ]
[ Access-Network-Information ]
[ IMS-Visited-Network-Identifier ]
* [ Service-Specific-Info ]
    [ Service-Specific-Type ]
    [ Service-Specific-Data ]
    [ Carrier-Select-Routing-Information ] (3)
    [ Instance-Id ] (3)
[ PS-Information ]
    [ 3GPP-MS-TimeZone ]
[ MMTel-Information ] (3)
    * [ Supplementary-Service ] (3)
        [ CUG-Information ] (3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Analyzed-Call-Type ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Carrier-Select-Routing-Information ] (1)(2)
        [ Conference-Id ]
        [ Dial-Around-Indicator ]
        [ From-Header ]
        [ From-Header-Presentation-Status ]
    * [ Related-ICID ]
        [ Served-User ]
        [ Service-Number-Type ]
        [ SIP-Request-Timestamp-Fraction ] (1)
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
        [ Redirecting-Party-Address ]
        [ Routing-Call-Type ]
        [ Service-Suppression-Info ]
            { Matched-Regular-Expression }
            { Services-To-Suppress }
        [ CUG-Information ] (1)(2)
        [ Participants-Involved ]
        [ Participants-List ]
        [ Tenant ]
    [ Subscriber-Type ]
    * [ Transaction-Info ]
        { Transaction-Type }
        [ Transaction-SIP-Message ]
        { Transaction-Data-Name }
        * { Transaction-Data-Value }
    [ UC-Mobility-Call-Leg ]
    [ UHTZ-Offset ]
    [AS-Type]
[ User-Equipment-Info ]
    { User-Equipment-Info-Type }
    { User-Equipment-Info-Value }
[ User-Name ]
```

Notes:

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- a The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S, AoC-D or AoC-E) applies to the charging session.

The Multiple-Services-Indicator and Multiple-Services-Credit-Control AVPs are only included when credit control applies to the charging session.

If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction AVP is populated in Service-Information/IMS-Information/Time-Stamps AVP.

5.1.1.2 Termination Request

The format of CCR (Termination Request) messages generated by MTAS is as follows:

```

<CCR> ::= < Diameter Header: 272, REQ, PXY >
          < Session-Id >
          { Origin-Host }
          { Origin-Realm }
          { Destination-Realm }
          { Auth-Application-Id }
          { Service-Context-Id }
          { CC-Request-Type }
          { CC-Request-Number }
          [ Destination-Host ]
          [ Event-Timestamp ]
          * [ Subscription-Id ]
              { Subscription-Id-Type }
              { Subscription-Id-Data }
          [ Termination-Cause ]
          [ AoC-Request-Type ]
          [ Preferred-Currency-Code ]
          [ Multiple-Services-Indicator ]
          [ Multiple-Services-Credit-Control ]
              { Service-Identifier }
              [ Used-Service-Unit ]
                  { CC-Time }
                  [ Reporting-Reason ]
              [ Rating-Group ]
              [ Reporting-Reason ]
          [ Service-Information ]
              [ 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 ]
                  [ Time-Stamps ]
                      [ SIP-Request-Timestamp ]

```

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```

[ SIP-Request-Timestamp-Fraction ] (2)(3)
[ SIP-Response-Timestamp ]
[ SIP-Response-Timestamp-Fraction ] (2)(3)
[ Inter-Operator-Identifier ]
[ Originating-IOI ]
[ Terminating-IOI ]
[ IMS-Charging-Identifier ]
[ Cause-Code ]
* [ Reason-Header ]
[ Access-Network-Information ]
* [ Service-Specific-Info ]
    [ Service-Specific-Type ]
    [ Service-Specific-Data ]
[ PS-Information ]
[ 3GPP-MS-TimeZone ]
[ MMTel-Information ] (2)(3)
* [ Supplementary-Service ] (2)(3)
    [ CUG-Information ] (3)
    [ Associated-Party-Address ] (2)(3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Called-Asserted-Identity-Presentation-Status ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
        [ From-Header ]
        [ From-Header-Presentation-Status ]
    * [ Related-ICID ]
        [ 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 }
        [ Common-Policy-Rule-Identity ]
        [ CUG-Information ] (1)(2)
        [ Participants-Involved ]
        [ Participants-List ]
[ SIP-Ringing-Timestamp ] (3)
[ SIP-Ringing-Timestamp-Fraction ] (3)
* [ Transaction-Info ]
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
    * { Transaction-Data-Value }
    [ UC-Mobility-Call-Leg ]
    [ AS-Type ]
[ User-Equipment-Info ]
    { User-Equipment-Info-Type }
    { User-Equipment-Info-Value }
[ User-Name ]

```

Notes:

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- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-D or AoC-E) applies to the charging session.
- The Multiple-Services-Indicator and Multiple-Services-Credit-Control AVPs are only included when credit control applies to the charging session.
- b If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are populated in Service-Information/IMS-Information/Time-Stamps AVP.

5.1.1.3 Update Requests

The formats of CCR (Update Request) 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 the availability of additional rating information during the session establishment,
- b the consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold,
- c a media change during an established session,
- d a request for AoC information.
- e the receipt of external tariff information.
- f a change of number of involved participants in case of Enhanced Parlay X Third Party Call,

5.1.1.3.1 Update Request (additional rating information during session establishment)

The format of CCR (Update Request) messages generated by MTAS due to the availability of additional rating information during the session establishment is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
          < Session-Id >
          { Origin-Host }
          { Origin-Realm }
          { Destination-Realm }
          { Auth-Application-Id }
          { Service-Context-Id }
          { CC-Request-Type }
          { CC-Request-Number }
          [ Destination-Host ]
          [ Event-Timestamp ]
          * [ Subscription-Id ]
              { Subscription-Id-Type }
              { Subscription-Id-Data }
          [ AoC-Request-Type ]
```

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```
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
  { Service-Identifier }
  [ Rating-Group ]
  [ Requested-Service-Unit ]
  [ Used-Service-Unit ]
    { CC-Time }
    [ Reporting-Reason ]
  [ Reporting-Reason ]
  [ Trigger ]
    [ Trigger-Type ]
[ Service-Information ]
  [ 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 ]
    [ Time-Stamps ]
      [ SIP-Request-Timestamp ]
      [ SIP-Request-Timestamp-Fraction ] (2)(3)
      [ SIP-Response-Timestamp ]
      [ 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 ]
      [ SDP-Type ]
      [ Media-Initiator-Flag ]
    [ Access-Network-Information ]
    [ IMS-Visited-Network-Identifier ]
    * [ Service-Specific-Info ]
      [ Service-Specific-Type ]
      [ Service-Specific-Data ]
  [ PS-Information ]
    [ 3GPP-MS-TimeZone ]
  [ MMTel-Information ] (3)
    * [ Supplementary-Service ] (3)
      [ CUG-Information ] (3)
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Called-Asserted-Identity-Presentation-Status ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
    [ From-Header ]
    [ From-Header-Presentation-Status ]
```

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```
* [ Related-ICID ]
  [ 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 }
  [ Common-Policy-Rule-Identity ]
  [ CUG-Information ] (1)(2)
[ Tariff-Information ]
  { Apply-Tariff-Immediate }
  { Apply-Tariff-Restart }
  { Purpose }
  { Current-Tariff }
    [ Currency-Code ]
    [ Scale-Factor ]
      { Value-Digits }
      [ Exponent ]
  * [ Rate-Element ]
    { CC-Unit-Type }
    [ Unit-Value ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Cost ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Quota-Threshold ]
  { Tariff-Expiry-Policy }
  { Set-Up-Charge }
    { Value-Digits }
    [ Exponent ]
  { Connection-Attempt-Charge }
    { Value-Digits }
    [ Exponent ]
[ Tariff-Time-Change ]
[ Next-Tariff ]
  [ Currency-Code ]
  [ Scale-Factor ]
    { Value-Digits }
    [ Exponent ]
  * [ Rate-Element ]
    { CC-Unit-Type }
    [ Unit-Value ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Cost ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Quota-Threshold ]
  { Tariff-Expiry-Policy }
  { Set-Up-Charge }
    { Value-Digits }
    [ Exponent ]
  { Connection-Attempt-Charge }
    { Value-Digits }
```

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```
        [ Exponent ]
      { Origination-Identification }
        { Network-Identification }
        { Reference-ID }
    [ SIP-Ringing-Timestamp ] (3)
    [ SIP-Ringing-Timestamp-Fraction ] (3)
*   [ Transaction-Info ]
      { Transaction-Type }
      [ Transaction-SIP-Message ]
      { Transaction-Data-Name }
      * { Transaction-Data-Value }
      [ UC-Mobility-Call-Leg ]
      [AS-Type]
    [ User-Equipment-Info ]
      { User-Equipment-Info-Type }
      { User-Equipment-Info-Value }
    [ User-Name ]
```

Notes:

- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S, AoC-D or AoC-E) applies to the charging session.

The Multiple-Services-Indicator and Multiple-Services-Credit-Control AVPs are only included when credit control applies to the charging session.

The Tariff-Information AVP is only included when external tariff information is received during the session establishment.

If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are populated in Service-Information/IMS-Information/Time-Stamps AVP.

Trigger AVP is only included when the message is generated by a trigger condition.

5.1.1.3.2 Update Request (consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold)

The format of CCR (Update Request) messages generated by MTAS due to the consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
          < Session-Id >
          { Origin-Host }
          { Origin-Realm }
          { Destination-Realm }
          { Auth-Application-Id }
          { Service-Context-Id }
          { CC-Request-Type }
          { CC-Request-Number }
          [ Destination-Host ]
```

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```
[ Event-Timestamp ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
    { Service-Identifier }
    [ Rating-Group ]
    [ Requested-Service-Unit ]
    [ Used-Service-Unit ]
        { CC-Time }
        [ Reporting-Reason ]
    [ Reporting-Reason ]
[ Service-Information ]
    [ IMS-Information ]
        [ Role-of-Node ]
        { Node-Functionality }
        [ User-Session-Id ]
        [ Outgoing-Session-Id ]
        [ Session-Priority ]
    * [ Calling-Party-Address ]
    [ Called-Party-Address ]
    [ IMS-Charging-Identifier ]
    * [ Service-Specific-Info ]
        [ Service-Specific-Type ]
        [ Service-Specific-Data ]
    [ PS-Information ]
        [ 3GPP-MS-TimeZone ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
    * [ Related-ICID ]
        [ Service-Number-Type ]
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
    [AS-Type]
[ User-Equipment-Info ]
    { User-Equipment-Info-Type }
    { User-Equipment-Info-Value }
[ User-Name ]
```

Note:

- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S) applies to the charging session.

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5.1.1.3.3 Update Request (Media Change)

The format of CCR (Update Request) messages generated by MTAS due to media changes is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Destination-Host ]
[ Event-Timestamp ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ AoC-Request-Type ]
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
    { Service-Identifier }
    [ Rating-Group ]
    [ Requested-Service-Unit ]
    [ Used-Service-Unit ]
        { CC-Time }
        [ Reporting-Reason ]
    [ Reporting-Reason ]
    [ Trigger ]
        [ Trigger-Type ]
[ Service-Information ]
    [ 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)
    [ SIP-Response-Timestamp ]
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
[ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
    { SDP-Media-Name }
    * [ SDP-Media-Description ]
        [ SDP-Type ]
        [ Media-Initiator-Flag ]
* [ Service-Specific-Info ]
    [ Service-Specific-Type ]
```

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```
[ Service-Specific-Data ]
[ PS-Information ]
[ 3GPP-MS-TimeZone ]
[ 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 ]
  * [ Related-ICID ]
    [ Service-Number-Type ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    [ Participants-Involved ]
    [ Participants-List ]
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
  { Transaction-Data-Name }
  * { Transaction-Data-Value }
  [AS-Type]
[ User-Equipment-Info ]
  { User-Equipment-Info-Type }
  { User-Equipment-Info-Value }
[ User-Name ]
```

Notes:

- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S, AoC-D and AoC-E) applies to the charging session.

The Multiple-Services-Indicator and Multiple-Services-Credit-Control AVPs are only included when credit control applies to the charging session.

If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction AVP is populated in Service-Information/IMS-Information/Time-Stamps AVP.

Trigger AVP is only included when the 'Change in media composition' trigger has been set for the charging session.

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5.1.1.3.4 Update Request (Request for AoC Information)

The format of CCR (Update Request) messages generated by MTAS in order to obtain tariff information (for AOC-S) or cost information (for AOC-D) is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Destination-Host ]
[ Event-Timestamp ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ AoC-Request-Type ]
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Service-Information ]
    [ IMS-Information ]
        [ Role-of-Node ]
        { Node-Functionality }
        [ User-Session-Id ]
        [ Outgoing-Session-Id ]
        [ Session-Priority ]
        * [ Calling-Party-Address ]
        [ Called-Party-Address ]
        [ IMS-Charging-Identifier ]
        * [ Service-Specific-Info ]
            [ Service-Specific-Type ]
            [ Service-Specific-Data ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
        * [ Related-ICID ]
        [ Service-Number-Type ]
        * [ Supplementary-Service-Information ]
            { Supplementary-Service-Identity }
            { Supplementary-Service-Action }
[ UC-Mobility-Call-Leg ]
[AS-Type]
```

Note:

- The Multiple-Services-Indicator AVP is only included when credit control applies to the charging session.

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5.1.1.3.5 Update Request (External Tariff Information)

The format of CCR (Update Request) messages generated by MTAS in order to convey external tariff information, received via RTTI during an established session, is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Destination-Host ]
[ Event-Timestamp ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ AoC-Request-Type ]
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Service-Information ]
  [ 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 ]
    * [ Service-Specific-Info ]
      [ Service-Specific-Type ]
      [ Service-Specific-Data ]
  [ Ericsson-Service-Information ]
    * [ IMS-Service-Identification ]
      [ MMT-Information ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Conference-Id ]
        * [ Related-ICID ]
        [ Service-Number-Type ]
        [ SIP-Request-Timestamp-Fraction ] (1)
        * [ Supplementary-Service-Information ]
          { Supplementary-Service-Identity }
          { Supplementary-Service-Action }
        [ Tariff-Information ]
          { Apply-Tariff-Immediate }
          { Apply-Tariff-Restart }
          { Purpose }
```

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```

{ Current-Tariff }
  [ Currency-Code ]
  [ Scale-Factor ]
    { Value-Digits }
    [ Exponent ]
  * [ Rate-Element ]
    { CC-Unit-Type }
    [ Unit-Value ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Cost ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Quota-Threshold ]
  { Tariff-Expiry-Policy }
  { Set-Up-Charge }
    { Value-Digits }
    [ Exponent ]
  { Connection-Attempt-Charge }
    { Value-Digits }
    [ Exponent ]
[ Tariff-Time-Change ]
[ Next-Tariff ]
  [ Currency-Code ]
  [ Scale-Factor ]
    { Value-Digits }
    [ Exponent ]
  * [ Rate-Element ]
    { CC-Unit-Type }
    [ Unit-Value ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Cost ]
      { Value-Digits }
      [ Exponent ]
    [ Unit-Quota-Threshold ]
  { Tariff-Expiry-Policy }
  { Set-Up-Charge }
    { Value-Digits }
    [ Exponent ]
  { Connection-Attempt-Charge }
    { Value-Digits }
    [ Exponent ]
{ Origination-Identification }
  { Network-Identification }
  { Reference-ID }
[AS-Type]

```

Notes:

- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S, AoC-D or AoC-E) applies to the charging session.

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The Multiple-Services-Indicator AVP is only included when credit control applies to the charging session.

If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction AVP is populated in Service-Information/IMS-Information/Time-Stamps AVP.

5.1.1.3.6 Update Request (change of number of involved participants in case of Enhanced Parlay X Third Party Call)

The format of CCR (Update Request) messages generated by MTAS due to change of number of involved participants in case of Enhanced Parlay X Third Party Call is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Destination-Host ]
[ Event-Timestamp ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ AoC-Request-Type ]
[ Preferred-Currency-Code ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
  { Service-Identifier }
  [ Rating-Group ]
  [ Requested-Service-Unit ]
  [ Used-Service-Unit ]
    { CC-Time }
  [ Reporting-Reason ]
[ Reporting-Reason ]
[ Service-Information ]
  [ 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-Request-Timestamp-Fraction ] (2)(3)
    [ SIP-Response-Timestamp ]
    [ SIP-Response-Timestamp-Fraction ] (2)(3)
```

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```
[ IMS-Charging-Identifier ]
* [ SDP-Session-Description ]
* [ SDP-Media-Component ]
  { SDP-Media-Name }
  * [ SDP-Media-Description ]
    [ SDP-Type ]
    [ Media-Initiator-Flag ]
* [ Service-Specific-Info ]
  [ Service-Specific-Type ]
  [ Service-Specific-Data ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
    [ Calling-Party-Address-Presentation-Status ]
    [ Conference-Id ]
  * [ Related-ICID ]
    [ Service-Number-Type ]
    [ SIP-Request-Timestamp-Fraction ] (1)
    [ SIP-Response-Timestamp-Fraction ] (1)
  * [ Supplementary-Service-Information ]
    { Supplementary-Service-Identity }
    { Supplementary-Service-Action }
    { Participants-Involved }
    { Participants-List }
* [ Transaction-Info ]
  { Transaction-Type }
  [ Transaction-SIP-Message ]
  { Transaction-Data-Name }
  * { Transaction-Data-Value }
[AS-Type]
```

Notes:

- The AoC-Request-Type and Preferred-Currency AVPs are only included when advice of charge (AoC-S, AoC-D and AoC-E) applies to the charging session.
- The Multiple-Services-Indicator and Multiple-Services-Credit-Control AVPs are only included when credit control applies to the charging session.

If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction AVP is populated in Service-Information/IMS-Information/Time-Stamps AVP.

5.1.1.4 Event Request

The formats of CCR (Event Request) messages generated by MTAS are described in the following subsections. The format of a message depends on the cause the message is generated for:

- Unsuccessful MMTel session attempt

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- User control of a supplementary service using an SSC
- User configuration of a supplementary service via the Ut interface
- Emergency call notification

5.1.1.4.1 Event Request for Unsuccessful MMTel Session Attempt

The format of CCR (Event Request) messages generated by MTAS due to an unsuccessful attempt to establish an MMTel communication session is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Event-Timestamp ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ Requested-Action ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
  [ Rating-Group ]
  { Service-Identifier }
[ Service-Information ]
  [ 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 ]
    [ Number-Portability-Routing-Information ]
    [ Requested-Party-Address ]
    [ Time-Stamps ]
      [ SIP-Request-Timestamp ]
      [ SIP-Request-Timestamp-Fraction ] (2)(3)
      [ SIP-Response-Timestamp ]
      [ SIP-Response-Timestamp-Fraction ] (2)(3)
    [ Inter-Operator-Identifier ]
    [ Originating-IOI ]
    [ IMS-Charging-Identifier ]
    [ Cause-Code ]
  * [ Reason-Header ]
    [ Access-Network-Information ]
    [ IMS-Visited-Network-Identifier ]
```


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```
* [ Service-Specific-Info ]
    [ Service-Specific-Type ]
    [ Service-Specific-Data ]
    [ Carrier-Select-Routing-Information ] (3)
    [ Instance-Id ] (3)
[ PS-Information ]
    [ 3GPP-MS-TimeZone ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
    [ MMT-Information ]
        [ Analyzed-Call-Type ]
        [ Calling-Party-Address-Presentation-Status ]
        [ Carrier-Select-Routing-Information ] (1)(2)
        [ Conference-Id ]
        [ Dial-Around-Indicator ]
        [ From-Header ]
        [ From-Header-Presentation-Status ]
    * [ Related-ICID ]
        [ Served-User ]
        [ Service-Number-Type ]
        [ SIP-Request-Timestamp-Fraction ] (1)
        [ SIP-Response-Timestamp-Fraction ] (1)
    * [ Supplementary-Service-Information ]
        { Supplementary-Service-Identity }
        { Supplementary-Service-Action }
        [ Routing-Call-Type ]
        [ Service-Suppression-Info ]
            { Matched-Regular-Expression }
            { Services-To-Suppress }
        [ Tenant ]
    [ Subscriber-Type ]
* [ Transaction-Info ]
    { Transaction-Type }
    [ Transaction-SIP-Message ]
    { Transaction-Data-Name }
    * { Transaction-Data-Value }
    [ UC-Mobility-Call-Leg ]
    [ UHTZ-Offset ]
    [AS-Type]
[ User-Equipment-Info ]
    { User-Equipment-Info-Type }
    { User-Equipment-Info-Value }
[ User-Name ]
```

Notes:

- Session related CCR (Event Request) messages are only generated in a small number of failure cases, where the failure occurs very early in the MTAS processing of the SIP INVITE request (e.g. failure to retrieve the subscriber's data from the HSS). In most failure cases, MTAS will send a CCR (Initial Request) message to the OCS, followed by a CCR (Termination Request) message when the failure occurs.
- g If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are populated in Service-Information/IMS-Information/Time-Stamp AVP.

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5.1.1.4.2 Event Request for User Control of a Supplementary Service (SSC)

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

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Event-Timestamp ]
* [ Subscription-Id ]
    { Subscription-Id-Type }
    { Subscription-Id-Data }
[ Requested-Action ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
    [ Rating-Group ]
    { Service-Identifier }
[ Service-Information ]
    [ 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)
            [ SIP-Response-Timestamp ]
            [ SIP-Response-Timestamp-Fraction ] (2)(3)
        [ Inter-Operator-Identifier ]
        [ Originating-IOI ]
        [ IMS-Charging-Identifier ]
        [ Cause-Code ]
        [ Access-Network-Information ]
        [ IMS-Visited-Network-Identifier ]
        [ Instance-Id ] (3)
    [ PS-Information ]
        [ 3GPP-MS-TimeZone ]
    [ 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 ]
```

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```
[ Service-Number-Type ]
[ 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 ]
  [AS-Type]
[ User-Equipment-Info ]
  { User-Equipment-Info-Type }
  { User-Equipment-Info-Value }
[ User-Name ]
```

Notes:

- If Release 9 compatible protocol is configured then SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are populated in Service-Information/IMS-Information/Time-Stamps AVP.

5.1.1.4.3 Event Request for User Configuration of a Supplementary Service (Ut)

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

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Event-Timestamp ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ Requested-Action ]
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
  [ Rating-Group ]
  { Service-Identifier }
[ Service-Information ]
  [ IMS-Information ]
    { Node-Functionality }
    [ Session-Priority ]
```

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```
[ Ericsson-Service-Information ]
  [ MMT-Information ]
    * [ Supplementary-Service-Information ]
      { Supplementary-Service-Identity }
      { Supplementary-Service-Action }
    [ UHTZ-Offset ]
    [ AS-Type ]
  [ User-Name ]
```

5.1.1.4.4 Emergency Call Notification

The format of CCR (Event Request) messages generated by MTAS due to Emergency Call Notification is as follows:

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
< Session-Id >
{ Origin-Host }
{ Origin-Realm }
{ Destination-Realm }
{ Auth-Application-Id }
{ Service-Context-Id }
{ CC-Request-Type }
[ Event-Timestamp ]
* [ Subscription-Id ]
  { Subscription-Id-Type }
  { Subscription-Id-Data }
[ Multiple-Services-Indicator ]
[ Multiple-Services-Credit-Control ]
  [ Rating-Group ]
  { Service-Identifier }
[ Service-Information ]
  [ IMS-Information ]
    [ Event-Type ]
      { SIP-Method }
    [ Role-of-Node ]
    { Node-Functionality }
    [ User-Session-Id ]
    [ Session-Priority ]
    [ Called-Party-Address ]
    [ Time-Stamps ]
      [ SIP-Request-Timestamp ]
      [ SIP-Request-Timestamp-Fraction ] (2)(3)
      [ SIP-Response-Timestamp ]
      [ SIP-Response-Timestamp-Fraction ] (2)(3)
    [ Inter-Operator-Identifier ]
      [ Originating-IOI ]
    [ IMS-Charging-Identifier ]
    [ Cause-Code ]
  * [ Service-Specific-Info ]
    [ Service-Specific-Type ]
    [ Service-Specific-Data ]
[ Ericsson-Service-Information ]
* [ IMS-Service-Identification ]
  [ MMT-Information ]
  [ From-Header ]
```

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[From-Header-Presentation-Status]
[Service-Number-Type]
[UC-Mobility-Call-Leg]
[UHTZ-Offset]
[AS-Type]
[User-Name]

5.1.2 Credit Control Answer Message

The Credit Control Answer (CCA) message is sent from the OCS to MTAS to report the outcome of a request for credit and/or provide information for advice of charge purposes.

5.1.2.1 Initial Request

The format of CCA (Initial Request) messages supported by MTAS is as follows:

```
<CCA> ::= < Diameter Header: 272, PXY >
< Session-Id >
[ Result-Code ]
[ Experimental-Result ]
    { Vendor-Id }
    { Experimental-Result-Code }
{ Origin-Host }
{ Origin-Realm }
{ Auth-Application-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Multiple-Services-Credit-Control ]
    { Service-Identifier }
    [ Result-Code ]
    [ Granted-Service-Unit ]
        { CC-Time }
    [ Validity-Time ]
    [ Final-Unit-Indication ]
        {Final-Unit-Action }
        [ Redirect-Server ]
            { Redirect-Address-Type }
            { Redirect-Server-Address }
    [ Time-Quota-Threshold ]
    [ Trigger ]
        [ Trigger-Type ]
* [ Announcement-Instructions ]
    [ Announcement-Number ]
    [ Announcement-Type ]
    [ Announcement-Order ]
    [ Announcement-Variable-Part ]
        [Announcement-Variable-Part-Type ]
        [Announcement-Variable-Part-Data ]
    [ Announcement-Prompt-Collect-Parameter ]
        [ Announcement-Prompt-Collect-Interruptible]
        [ Announcement-Prompt-Collect-MinDigits ]
```

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```
[ Announcement-Prompt-Collect-MaxDigits ]
[ Retarget-Instruction ]
  [ Retarget-Address ]
  [ Retarget-Order ]
  [ Retarget-Reason ]
[ Low-Balance-Indication ]
[ Credit-Control-Failure-Handling ]
[ Service-Information ]
  [ AoC-Information ]
    [ Tariff-Information ]
      { Current-Tariff }
        [ Currency-Code ]
        [ Scale-Factor ]
          { Value-Digits }
          [ Exponent ]
        * [ Rate-Element ]
          { CC-Unit-Type }
          [ Unit-Value ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Cost ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Quota-Threshold ]
    [ Tariff-Time-Change ]
  [ Next-Tariff ]
    [ Currency-Code ]
    [ Scale-Factor ]
      { Value-Digits }
      [ Exponent ]
    * [ Rate-Element ]
      { CC-Unit-Type }
      [ Unit-Value ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Cost ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Quota-Threshold ]
  [ IMS-Information ]
    [ Service-Specific-Info ]
      [ Service-Specific-Type ]
      [ Service-Specific-Data ]
[ Ericsson-Service-Information ]
  [ AoC-Information ]
    [ Tariff-Information ]
      { Current-Tariff }
        { Set-Up-Charge }
          { Value-Digits }
          [ Exponent ]
        { Connection-Attempt-Charge }
          { Value-Digits }
          [ Exponent ]
    [ Next-Tariff ]
      { Set-Up-Charge }
        { Value-Digits }
        [ Exponent ]
```

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```

        { Connection-Attempt-Charge }
          { Value-Digits }
            [ Exponent ]
* [ Failed-AVP ]

```

Notes:

- All CCA (Initial Request) messages must contain either a message-level Result-Code AVP or an Experimental-Result AVP.
- The Multiple-Services-Credit-Control and Credit-Control-Failure-Handling AVPs are only expected when credit control applies to the charging session.
- The Service-Information and Ericsson-Service-Information AVPs are only expected when advice of charge (AoC-S) applies to the charging session.

5.1.2.2 Termination Request

The format of CCA (Termination Request) messages supported by MTAS is as follows:

```

<CCA> ::= < Diameter Header: 272, PXY >
          < Session-Id >
          { Result-Code }
          { Origin-Host }
          { Origin-Realm }
          { Auth-Application-Id }
          { CC-Request-Type }
          { CC-Request-Number }
          [ Multiple-Services-Credit-Control ]
            { Service-Identifier }
            [ Result-Code ]
          [ Service-Information ]
            [ AoC-Information ]
              [ AoC-Cost-Information ]
                [ Accumulated-Cost ]
                  { Value-Digits }
                    [ Exponent ] ]
            [ IMS-Information ]
              [ Service-Specific-Info ]
                [ Service-Specific-Type ]
                [ Service-Specific-Data ]
* [ Failed-AVP ]

```

Notes:

- The Multiple-Services-Credit-Control AVP is only expected when credit control applies to the charging session.
- The Service-Information AVP is only expected when advice of charge (AoC-D or AoC-E) applies to the charging session.

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5.1.2.3 Update Request

The formats of CCA (Update Request) messages supported by MTAS are described in the following subsections. The supported format of a message depends on whether the message is a response to a CCR message generated due to:

- the availability of additional rating information during the session establishment,
- h the consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold,
- i a media change during an established session,
- j a request for AoC information.
- the receipt of external tariff information.

5.1.2.3.1 Update Request (additional rating information during session establishment)

The format of CCA (Update Request) messages supported by MTAS when received in response to a CCR (Update Request) message generated due to the availability of additional rating information during the session establishment is as follows:

```
<CCA> ::= < Diameter Header: 272, PXY >
< Session-Id >
{ Result-Code }
{ Origin-Host }
{ Origin-Realm }
{ Auth-Application-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Multiple-Services-Credit-Control ]
  { Service-Identifier }
  [ Result-Code ]
  [ Granted-Service-Unit ]
    { CC-Time }
  [ Validity-Time ]
  [ Final-Unit-Indication ]
    { Final-Unit-Action }
  [ Time-Quota-Threshold ]
  [ Trigger ]
    [ Trigger-Type ]
* [ Announcement-Instructions ]
  [ Announcement-Number ]
  [ Announcement-Type ]
  [ Announcement-Order ]
  [ Announcement-Variable-Part ]
    [ Announcement-Variable-Part-Type ]
    [ Announcement-Variable-Part-Data ]
  [ Announcement-Prompt-Collect-Parameter ]
    [ Announcement-Prompt-Collect-Interruptible ]
```


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```

[ Announcement-Prompt-Collect-MinDigits ]
[ Announcement-Prompt-Collect-MaxDigits ]
[ Low-Balance-Indication ]
[ Credit-Control-Failure-Handling ]
[ Service-Information ]
  [ AoC-Information ]
    [ AoC-Cost-Information ]
      [ Accumulated-Cost ]
        { Value-Digits }
        [ Exponent ]
      * [ Incremental-Cost ]
        { Value-Digits }
        [ Exponent ]
        [ Currency-Code ]
      [ Tariff-Information ]
        { Current-Tariff }
        [ Currency-Code ]
        [ Scale-Factor ]
          { Value-Digits }
          [ Exponent ]
        * [ Rate-Element ]
          { CC-Unit-Type }
          [ Unit-Value ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Cost ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Quota-Threshold ]
        [ Tariff-Time-Change ]
      [ Next-Tariff ]
        [ Currency-Code ]
        [ Scale-Factor ]
          { Value-Digits }
          [ Exponent ]
        * [ Rate-Element ]
          { CC-Unit-Type }
          [ Unit-Value ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Cost ]
            { Value-Digits }
            [ Exponent ]
          [ Unit-Quota-Threshold ]
      [ IMS-Information ]
        [ Service-Specific-Info ]
          [ Service-Specific-Type ]
          [ Service-Specific-Data ]
      [ Ericsson-Service-Information ]
        [ AoC-Information ]
          [ Tariff-Information ]
            { Current-Tariff }
              { Set-Up-Charge }
                { Value-Digits }
                [ Exponent ]
              { Connection-Attempt-Charge }
                { Value-Digits }

```

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```

        [ Exponent ]
    [ Next-Tariff ]
        { Set-Up-Charge }
            { Value-Digits }
            [ Exponent ]
        { Connection-Attempt-Charge }
            { Value-Digits }
            [ Exponent ]
    * [ Failed-AVP ]

```

Notes:

Figure 1 The Multiple-Services-Credit-Control and Credit-Control-Failure-Handling AVPs are only expected when credit control applies to the charging session.

Figure 2 The Service-Information AVP is only expected when advice of charge (AoC-S or AoC-D) applies to the charging session.

Figure 3 The AoC-Cost-Information AVP is only expected when advice of charge (AoC-D) applies to the charging session.

Figure 4 The Tariff-Information AVP is only expected when advice of charge (AoC-S) applies to the charging session.

Figure 5 The Ericsson-Service-Information AVP is only expected when advice of charge (AoC-S) applies to the charging session.

5.1.2.3.2 Update Request (consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold)

The format of CCA (Update Request) messages supported by MTAS when received in response to a CCR (Update Request) message generated due to the consumption of the granted service units, the expiry of the validity timer, or reaching the time quota threshold is as follows:

```

<CCA> ::= < Diameter Header: 272, PXY >
    < Session-Id >
    { Result-Code }
    { Origin-Host }
    { Origin-Realm }
    { Auth-Application-Id }
    { CC-Request-Type }
    { CC-Request-Number }
    [ Multiple-Services-Credit-Control ]
        { Service-Identifier }
        [ Result-Code ]
        [ Granted-Service-Unit ]
            { CC-Time }
        [ Validity-Time ]
        [ Final-Unit-Indication ]
            { Final-Unit-Action }
        [ Time-Quota-Threshold ]

```

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```
[ Trigger ]
  [ Trigger-Type ]
* [ Announcement-Instructions ]
  [ Announcement-Number ]
  [ Announcement-Type ]
  [ Announcement-Order ]
  [ Announcement-Variable-Part ]
    [Announcement-Variable-Part-Type ]
    [Announcement-Variable-Part-Data ]
  [ Announcement-Prompt-Collect-Parameter ]
    [ Announcement-Prompt-Collect-Interruptible]
    [ Announcement-Prompt-Collect-MinDigits ]
    [ Announcement-Prompt-Collect-MaxDigits ]
[ Low-Balance-Indication ]
[ Credit-Control-Failure-Handling ]
[ Service-Information ]
  [ IMS-Information ]
    [ Service-Specific-Info ]
      [ Service-Specific-Type ]
      [ Service-Specific-Data ]
* [ Failed-AVP ]
```

5.1.2.3.3 Update Request (Media Change)

The format of CCA (Update Request) messages supported by MTAS when received in response to a CCR (Update Request) message generated due to media changes.

```
<CCA> ::= < Diameter Header: 272, PXY >
< Session-Id >
{ Result-Code }
{ Origin-Host }
{ Origin-Realm }
{ Auth-Application-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Multiple-Services-Credit-Control ]
  { Service-Identifier }
  [ Result-Code ]
  [ Granted-Service-Unit ]
    { CC-Time }
  [ Validity-Time ]
  [ Final-Unit-Indication ]
    {Final-Unit-Action }
  [ Time-Quota-Threshold ]
  [ Trigger ]
    [ Trigger-Type ]
* [ Announcement-Instructions ]
  [ Announcement-Number ]
  [ Announcement-Type ]
  [ Announcement-Order ]
  [ Announcement-Variable-Part ]
    [Announcement-Variable-Part-Type ]
    [Announcement-Variable-Part-Data ]
  [ Announcement-Prompt-Collect-Parameter ]
```

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```

[ Announcement-Prompt-Collect-Interruptible]
[ Announcement-Prompt-Collect-MinDigits ]
[ Announcement-Prompt-Collect-MaxDigits ]
[ Low-Balance-Indication ]
[ Credit-Control-Failure-Handling ]
[ Service-Information ]
  [ AoC-Information ]
    [ Tariff-Information ]
      { Current-Tariff }
        [ Currency-Code ]
        [ Scale-Factor ]
          { Value-Digits }
          [ Exponent ]
      * [ Rate-Element ]
        { CC-Unit-Type }
        [ Unit-Value ]
          { Value-Digits }
          [ Exponent ]
        [ Unit-Cost ]
          { Value-Digits }
          [ Exponent ]
        [ Unit-Quota-Threshold ]
    [ Tariff-Time-Change ]
    [ Next-Tariff ]
      [ Currency-Code ]
      [ Scale-Factor ]
        { Value-Digits }
        [ Exponent ]
      * [ Rate-Element ]
        { CC-Unit-Type }
        [ Unit-Value ]
          { Value-Digits }
          [ Exponent ]
        [ Unit-Cost ]
          { Value-Digits }
          [ Exponent ]
        [ Unit-Quota-Threshold ]
    [ IMS-Information ]
      [ Service-Specific-Info ]
        [ Service-Specific-Type ]
        [ Service-Specific-Data ]
[ Ericsson-Service-Information ]
  [ AoC-Information ]
    [ Tariff-Information ]
      { Current-Tariff }
        { Set-Up-Charge }
          { Value-Digits }
          [ Exponent ]
        { Connection-Attempt-Charge }
          { Value-Digits }
          [ Exponent ]
    [ Next-Tariff ]
      { Set-Up-Charge }
        { Value-Digits }
        [ Exponent ]
      { Connection-Attempt-Charge }
        { Value-Digits }

```

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[Exponent]
* [Failed-AVP]

Note:

- The Service-Information and Ericsson-Service-Information AVPs are only expected when advice of charge (AoC-S) applies to the charging session.

5.1.2.3.4 Update Request (Request for AoC Information)

The format of CCA (Update Request) messages supported by MTAS when received in response to a CCR (Update Request) message generated in order to obtain tariff information (for AOC-S) or cost information (for AOC-D) is as follows:

```
<CCA> ::= < Diameter Header: 272, PXY >
< Session-Id >
{ Result-Code }
{ Origin-Host }
{ Origin-Realm }
{ Auth-Application-Id }
{ CC-Request-Type }
{ CC-Request-Number }
[ Service-Information ]
  [ AoC-Information ]
    [ AoC-Cost-Information ]
      [ Accumulated-Cost ]
        { Value-Digits }
        [ Exponent ]
      * [ Incremental-Cost ]
        { Value-Digits }
        [ Exponent ]
        [ Currency-Code ]
      [ Tariff-Information ]
        { Current-Tariff }
        [ Currency-Code ]
        [ Scale-Factor ]
        { Value-Digits }
        [ Exponent ]
      * [ Rate-Element ]
        { CC-Unit-Type }
        [ Unit-Value ]
        { Value-Digits }
        [ Exponent ]
        [ Unit-Cost ]
        { Value-Digits }
        [ Exponent ]
        [ Unit-Quota-Threshold ]
      [ Tariff-Time-Change ]
      [ Next-Tariff ]
        [ Currency-Code ]
        [ Scale-Factor ]
        { Value-Digits }
        [ Exponent ]
```

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```
* [ Rate-Element ]
    { CC-Unit-Type }
    [ Unit-Value ]
        { Value-Digits }
        [ Exponent ]
    [ Unit-Cost ]
        { Value-Digits }
        [ Exponent ]
    [ Unit-Quota-Threshold ]
[ Ericsson-Service-Information ]
    [ AoC-Information ]
        [ Tariff-Information ]
            { Current-Tariff }
                { Set-Up-Charge }
                    { Value-Digits }
                    [ Exponent ]
                { Connection-Attempt-Charge }
                    { Value-Digits }
                    [ Exponent ]
            [ Next-Tariff ]
                { Set-Up-Charge }
                    { Value-Digits }
                    [ Exponent ]
                { Connection-Attempt-Charge }
                    { Value-Digits }
                    [ Exponent ]
* [ Failed-AVP ]
```

Notes:

- a The AoC-Cost-Information AVP is only expected when cost information has been requested.
- b The Tariff-Information and Ericsson-Service-Information AVPs are only expected when tariff information has been requested.

5.1.2.3.5 Update Request (External Tariff Information)

The format of CCA (Update Request) messages supported by MTAS when received in response to a CCR (Update Request) message generated in order to convey external tariff information, received via RTTI during an established session, is as follows:

```
<CCA> ::= < Diameter Header: 272, PXY >
    < Session-Id >
    { Result-Code }
    { Origin-Host }
    { Origin-Realm }
    { Auth-Application-Id }
    { CC-Request-Type }
    { CC-Request-Number }
    [ Service-Information ]
        [ AoC-Information ]
            [ Tariff-Information ]
```

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```

    { Current-Tariff }
      [ Currency-Code ]
      [ Scale-Factor ]
        { Value-Digits }
        [ Exponent ]
    * [ Rate-Element ]
      { CC-Unit-Type }
      [ Unit-Value ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Cost ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Quota-Threshold ]
    [ Tariff-Time-Change ]
    [ Next-Tariff ]
      [ Currency-Code ]
      [ Scale-Factor ]
        { Value-Digits }
        [ Exponent ]
    * [ Rate-Element ]
      { CC-Unit-Type }
      [ Unit-Value ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Cost ]
        { Value-Digits }
        [ Exponent ]
      [ Unit-Quota-Threshold ]
    [ Ericsson-Service-Information ]
      [ AoC-Information ]
        [ Tariff-Information ]
          { Current-Tariff }
            { Set-Up-Charge }
              { Value-Digits }
              [ Exponent ]
            { Connection-Attempt-Charge }
              { Value-Digits }
              [ Exponent ]
          [ Next-Tariff ]
            { Set-Up-Charge }
              { Value-Digits }
              [ Exponent ]
            { Connection-Attempt-Charge }
              { Value-Digits }
              [ Exponent ]
    * [ Failed-AVP ]

```

Note:

- The Service-Information and Ericsson-Service-Information AVPs are only expected when advice of charge (AoC-S) applies to the charging session.

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5.1.2.4 Event Request

The format of CCA (Event Request) messages supported by MTAS is as follows:

```
<CCA> ::= < Diameter Header: 272, PXY >
         < Session-Id >
         { Result-Code }
         { Origin-Host }
         { Origin-Realm }
         { Auth-Application-Id }
         { CC-Request-Type }
         { CC-Request-Number }
         [ Service-Information ]
           [ IMS-Information ]
             [ Service-Specific-Info ]
               [ Service-Specific-Type ]
                 [ Service-Specific-Data ]
         * [ Failed-AVP ]
```

5.1.3 Abort Session Request Message

The Abort Session Request (ASR) message is sent from the OCS to MTAS to abort an ongoing charging session and the associated SIP sessions. The OCS may initiate an abort session procedure to force all active sessions to be terminated for a subscriber due to changes in their price plan and/or usage preferences

The format of the ASR message supported by MTAS is as follows:

```
<ASR> ::= < Diameter Header: 274, REQ, PXY >
         < Session-Id >
         { Auth-Application-Id }
         { Destination-Host }
         { Destination-Realm }
         { Origin-Host }
         { Origin-Realm }
         * [ Proxy-Info ]
           { Proxy-Host }
           { Proxy-State }
```

5.1.4 Abort Session Answer Message

The Abort Session Answer (ASA) message is sent from MTAS to the OCS to acknowledge the ASR message. A successful ASA transaction must be followed by a CCR Terminate Request indicating that the sessions have been successfully terminated.

The format of the ASA message supported by MTAS is as follows:

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```
<ASA> ::= < Diameter Header: 274, PXY >
         < Session-Id >
         { Result-Code }
         { Origin-Host }
         { Origin-Realm }
         [ User-Name ]
         * [ Failed-AVP ]
         * [ Proxy-Info ]
           { Proxy-Host }
           { Proxy-State }
```

5.1.5 Re-Auth Request Message

The Re-Auth Request (RAR) message is sent from the OCS to MTAS to initiate a re-authentication and/or reauthorization service for a particular session.

The format of the RAR message supported by MTAS is as follows:

```
<RAR> ::= < Diameter Header: 258, REQ, PXY >
         < Session-Id >
         { Auth-Application-Id }
         { Destination-Host }
         { Destination-Realm }
         { Origin-Host }
         { Origin-Realm }
         { Re-Auth-Request-Type }
         * [ Proxy-Info ]
           { Proxy-Host }
           { Proxy-State }
```

5.1.6 Re-Auth Answer Message

The Re-Auth Answer (RAA) message is sent from the MTAS to OCS to acknowledge a RAR message.

The format of the RAA message supported by MTAS is as follows:

```
<RAA> ::= < Diameter Header: 258, PXY >
         < Session-Id >
         { Result-Code }
         { Origin-Host }
         { Origin-Realm }
         * [ Failed-AVP ]
         * [ Proxy-Info ]
           { Proxy-Host }
```

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{ Proxy-State }

5.1.7 Protocol version

MTAS supports the following versions of charging messages on the Ro interface:

- Version 1

MTAS supports the Release 7 version of credit control messages on the Ro interface, and in addition a number of AVPs defined in Release 8 in order to be able to support AOC and RTTI.

- Version 2

MTAS supports the Release 9 version of credit control messages on the Ro interface.

- Version 3

Mtas supports the Release 12 version of credit control messages on the Ro interface.

The applicable version can be configured by the operator, see reference[8]. The same version is used throughout the lifetime of any particular charging session.

5.2 Attribute Value Pairs

This section describes the AVPs applicable in CCR and CCA messages, indicating how the AVPs are used by MTAS for credit control and AOC purposes. Additionally the AVPs applicable in ASR, ASA, RAR, and RAA are described in this section.

5.2.1 Credit Control Attribute Value Pairs

This section describes the AVPs applicable in Credit Control Request (CCR) and Credit Control Answer (CCA) messages, indicating how the AVPs are used by MTAS for credit control and AOC purposes. The format of AVPs is as specified in reference [4].

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

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

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The 'CCR Types' column indicates whether the AVP is used in CCR messages with CC-Request-Type of Initial Request, Update Request, Termination Request and Event Request.

The 'CCR Flags' column indicates how MTAS sets the Vendor Specific, Mandatory and Protected flags in the AVP header (see reference [4]). 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 'CCR Config' column indicates whether the inclusion of the AVP in CCR messages is operator configurable for credit control purposes (C) and for AOC purposes (A). When a charging session is used for both credit control and AOC purposes, an AVP is only omitted from CCRs when the AVP configuration indicates that the AVP does not need to be included for either purpose. For 'operator configurable' AVPs, the details are 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 'CCA Types' column indicates whether the AVP is used in CCA messages received with CC-Request-Type of Initial Request, Update Request, Termination Request and Event Request.

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

Table 6: AVP Codes and Types, and their use by MTAS in CCR/CCA messages

AVP	Vendor ID	AVP Code	Type	CCR			CCA Types	Version (1,2,3)
				Types	Flags	Config		
3GPP-MS-TimeZone	3GPP	23	OctetString	IUTE	V--	CA	-	YYY
Access-Network-Information	3GPP	1263	OctetString	IUTE	VM-	CA	-	YYY
Accumulated-Cost	3GPP	2052	Grouped	-	-	-	IUT-	YYY
Analyzed-Call-Type	Ericsson	1303	UTF8String	I-E	V--	CA	-	YYY
Announcement-Instructions	Ericsson	1441	Grouped	-	-	-	IU--	-YY
Announcement-Number	Ericsson	1442	Unsigned32	-	-	-	IU--	-YY
Announcement-Order	Ericsson	1443	Unsigned32	-	-	-	IU--	-YY
Announcement-Prompt-Collect-Interruptible	Ericsson	1444	Enumerated	-	-	-	IU--	-YY
Announcement-Prompt-Collect-MaxDigits	Ericsson	1445	Unsigned32	-	-	-	IU--	-YY
Announcement-Prompt-Collect-MinDigits	Ericsson	1446	Unsigned32	-	-	-	IU--	-YY
Announcement-Prompt-Collect-Parameter	Ericsson	1447	Grouped	-	-	-	IU--	-YY
Announcement-Type	Ericsson	1448	Unsigned32	-	-	-	IU--	-YY
Announcement-Variable-Part	Ericsson	1449	Grouped	-	-	-	IU--	-YY
Announcement-Variable-Part-Data	Ericsson	1450	UTF8String	-	-	-	IU--	-YY
Announcement-Variable-Part-Type	Ericsson	1451	Enumerated	-	-	-	IU--	-YY

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AVP	Vendor ID	AVP Code	Type	CCR			CCA Types	Version (1,2,3)
				Types	Flags	Config		
AoC-Cost-Information	3GPP	2053	Grouped	-	-	-	IUT-	YYY
AoC-Information	3GPP	2054	Grouped	-	-	-	IUT-	YYY
AoC-Request-Type	3GPP	2055	Enumerated	IUT-	VM-	CA	-	YYY
Apply-Tariff-Immediate	Ericsson	2190	Enumerated	-U--	V--	CA	-	YYY
Apply-Tariff-Restart	Ericsson	2191	Enumerated	-U--	V--	CA	-	YYY
Associated-Party-Address	3GPP	2035	UTF8String	-UTE	VM-	CA	-	-YY
AS-Type	Ericsson	1433	Enumerated	IUTE	V--	CA	----	YYY
Auth-Application-Id	-	258	Unsigned32	IUTE	-M-	CA	IUTE	YYY
Called-Asserted-Identity	3GPP	1250	UTF8String	-UT-	VM-	CA	-	YYY
Called-Asserted-Identity-Presentation-Status	Ericsson	1142	Enumerated	-UT-	V--	CA	-	YYY
Called-Party-Address	3GPP	832	UTF8String	IUTE	VM-	CA	-	YYY
Calling-Party-Address	3GPP	831	UTF8String	IUTE	VM-	CA	-	YYY
Calling-Party-Address-Presentation-Status	Ericsson	1141	Enumerated	IUTE	V--	CA	-	YYY
Carrier-Select-Routing-Information	3GPP	2023	UTF8String	I-E	VM-	CA	-	YYY
Cause-Code	3GPP	861	Integer32	--TE	VM-	CA	-	YYY
CC-Request-Number	-	415	Unsigned32	IUTE	-M-	--	IUTE	YYY
CC-Request-Type	-	416	Enumerated	IUTE	-M-	--	IUTE	YYY
CC-Time	-	420	Unsigned32	-UT-	-M-	CA	IU--	YYY
CC-Unit-Type	-	454	Enumerated	-UT-	-M-	CA	IU--	YYY
Common-Policy-Rule-Identity	Ericsson	1308	UTF8String	-UT-	V--	CA	-	YYY
Conference-Id	Ericsson	1127	UTF8String	IUTE	V--	CA	-	YYY
Connection-Attempt-Charge	Ericsson	2192	Grouped	-U--	V--	CA	IU--	YYY
Credit-Control-Failure-Handling	-	427	Enumerated	-	-	-	IU--	YYY
CUG-Information	3GPP	2304	OctetString	IUT-	VM-	CA	-	YYY
Currency-Code	-	425	Unsigned32	-U--	-M-	CA	IUT-	YYY
Current-Tariff	3GPP	2056	Grouped	-U--	VM-	CA	IU--	YYY
Destination-Host	-	293	DiameterIdentity	-UT-	-M-	CA	-	YYY
Destination-Realm	-	283	DiameterIdentity	IUTE	-M-	CA	-	YYY
Dial-Around-Indicator	Ericsson	1160	UTF8String	I-E	V--	CA	-	YYY
Ericsson-Service-Information	Ericsson	285	Grouped	IUTE	V--	CA	IU--	YYY
Event-Timestamp	-	55	Time	IUTE	-M-	CA	-	YYY
Event-Type	3GPP	823	Grouped	IUTE	VM-	CA	-	YYY
Experimental-Result	-	297	Grouped	-	-	-	I--	YYY
Experimental-Result-Code	-	298	Unsigned32	-	-	-	I--	YYY
Exponent	-	429	Integer32	IU--	-M-	CA	IUT-	YYY
Failed-AVP	-	279	Grouped	-	-	-	IUTE	YYY
Final-Unit-Action	-	449	Enumerated	-	-	-	IU--	YYY
Final-Unit-Indication	-	430	Grouped	-	-	-	IU--	YYY
From-Header	Ericsson	1153	UTF8String	IUTE	V--	CA	-	YYY
From-Header-Presentation-Status	Ericsson	1262	Enumerated	IUTE	V--	CA	-	YYY
Granted-Service-Unit	-	431	Grouped	-	-	-	IU--	YYY
IMS-Charging-Identifier	3GPP	841	UTF8String	IUTE	VM-	CA	-	YYY
IMS-Information	3GPP	876	Grouped	IUTE	VM-	CA	IUTE	YYY
IMS-Service-Identification	Ericsson	284	UTF8String	IUTE	V--	CA	-	YYY
IMS-Visited-Network-Identifier	3GPP	2713	UTF8String	IU-E	VM-	CA	-	--Y
Incremental-Cost	3GPP	2062	Grouped	-	-	-	IUT-	YYY
Instance-Id	3GPP	3402	UTF8String	I-E	VM-	CA	-	--Y
Inter-Operator-Identifier	3GPP	838	Grouped	IUTE	VM-	CA	-	YYY
Low-Balance-Indication	3GPP	2020	Enumerated	-	-	-	IU--	YYY
Matched-Regular-Expression	Ericsson	1372	UTF8String	I-E	V--	CA	-	YYY
Media-Initiator-Flag	3GPP	882	Enumerated	IU--	VM-	CA	-	YYY
MMT-Information	Ericsson	1061	Grouped	IUTE	V--	CA	-	YYY
MMTel-Information	3GPP	2030	Grouped	IUTE	VM	CA	-	-YY

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AVP	Vendor ID	AVP Code	Type	CCR			CCA Types	Version (1,2,3)
				Types	Flags	Config		
Multiple-Services-Credit-Control	-	456	Grouped	IUTE	-M-	CA	IUT-	YYY
Multiple-Services-Indicator	-	455	Enumerated	IUTE	-M-	CA	-	YYY
Network-Identification	Ericsson	2193	UTF8String	-U--	V--	CA	-	YYY
Next-Tariff	3GPP	2057	Grouped	-U--	VM-	CA	IU--	YYY
Node-Functionality	3GPP	862	Enumerated	IUTE	VM-	CA	-	YYY
Number-Portability-Routing-Information	3GPP	2024	UTF8String	I--E	VM-	CA	-	YYY
Origin-Host	-	264	DiameterIdentity	IUTE	-M-	CA	IUTE	YYY
Origin-Realm	-	296	DiameterIdentity	IUTE	-M-	CA	IUTE	YYY
Originating-IOI	3GPP	839	UTF8String	IUTE	VM-	CA	-	YYY
Origination-Identification	Ericsson	2194	Grouped	-U--	V--	CA	-	YYY
Outgoing-Session-Id	3GPP	2320	UTF8String	IUTE	VM-	CA	-	YYY
Participants-Involved	Ericsson	1389	UTF8String	IUT-	V--	CA	-	YYY
Participants-List	Ericsson	1390	UTF8String	IUT-	V--	CA	-	YYY
Preferred-Currency-Code	Ericsson	2195	Unsigned32	IUT-	V--	CA	-	YYY
PS-Information	3GPP	874	Grouped	IUTE	VM-	CA	-	YYY
Purpose	Ericsson	2196	Enumerated	-U--	V--	CA	-	YYY
Rate-Element	3GPP	2058	Grouped	-U--	VM-	CA	IU--	YYY
Rating-Group	-	432	Unsigned32	IUTE	-M-	CA	-	YYY
Reason-Header	3GPP	3401	UTF8String	--TE	VM-	CA	-	YYY
Redirect-Address-Type	-	433	Enumerated	-	-	-	I---	YYY
Redirect-Server	-	434	Grouped	-	-	-	I---	YYY
Redirect-Server-Address	-	435	UTF8String	-	-	-	I---	YYY
Redirecting-Party-Address	Ericsson	1133	UTF8String	I---	V--	CA	-	YYY
Reference-ID	Ericsson	2197	Unsigned32	-U--	V--	CA	-	YYY
Related-ICID	Ericsson	1128	UTF8String	IUTE	V--	CA	-	YYY
Reporting-Reason	3GPP	872	Enumerated	-UT-	VM-	CA	-	YYY
Requested-Action	-	436	Enumerated	---E	-M-	CA	-	YYY
Requested-Party-Address	3GPP	1251	UTF8String	I--E	VM-	CA	-	YYY
Requested-Service-Unit	-	437	Grouped	IU--	-M-	CA	-	YYY
Result-Code	-	268	Unsigned32	-	-	-	IUTE	YYY
Retarget-Address	Ericsson	1468	UTF8String	-	-	-	I---	YYY
Retarget-Instruction	Ericsson	1467	Grouped	-	-	-	I---	YYY
Retarget-Order	Ericsson	1469	Enumerated	-	-	-	I---	YYY
Retarget-Reason	Ericsson	1470	Unsigned32	-	-	-	I---	YYY
Role-of-Node	3GPP	829	Enumerated	IUTE	VM-	CA	-	YYY
Routing-Call-Type	Ericsson	1302	UTF8String	I--E	V--	CA	-	YYY
Scale-Factor	3GPP	2059	Grouped	-U--	VM-	CA	IU--	YYY
SDP-Media-Component	3GPP	843	Grouped	IU--	VM-	CA	-	YYY
SDP-Media-Description	3GPP	845	UTF8String	IU--	VM-	CA	-	YYY
SDP-Media-Name	3GPP	844	UTF8String	IU--	VM-	CA	-	YYY
SDP-Session-Description	3GPP	842	UTF8String	IU--	VM-	CA	-	YYY
SDP-Type	3GPP	2036	Enumerated	IU--	VM-	CA	-	YYY
Served-User	Ericsson	1330	UTF8String	I--E	V--	CA	-	YYY
Service-Context-Id	-	461	UTF8String	IUTE	-M-	CA	-	YYY
Service-Identifier	-	439	Unsigned32	IUTE	-M-	CA	IUT-	YYY
Service-Information	3GPP	873	Grouped	IUTE	VM-	CA	IUTE	YYY
Service-Number-Type	Ericsson	1307	Enumerated	IUTE	V--	CA	-	YYY
Service-Specific-Data	3GPP	863	UTF8String	IUTE	VM-	CA	IUTE	YYY
Service-Specific-Info	3GPP	1249	Grouped	IUTE	VM-	CA	IUTE	YYY
Service-Specific-Type	3GPP	1257	Unsigned32	IUTE	VM-	CA	IUTE	YYY
Service-Suppression-Info	Ericsson	1371	Grouped	I--E	V--	CA	-	YYY
Services-To-Suppress	Ericsson	1373	UTF8String	I--E	V--	CA	-	YYY
Session-Id	-	263	UTF8String	IUTE	-M-	--	IUTE	YYY
Session-Priority	3GPP	650	Enumerated	IUTE	V--	CA	-	YYY
Set-Up-Charge	Ericsson	2198	Grouped	-U--	V--	CA	IU--	YYY

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AVP	Vendor ID	AVP Code	Type	CCR			CCA Types	Version (1,2,3)
				Types	Flags	Config		
SIP-Method	3GPP	824	UTF8String	IUTE	VM-	CA	-	YYY
SIP-Request-Timestamp	3GPP	834	Time	IUTE	VM-	CA	-	YYY
SIP-Request-Timestamp-Fraction	3GPP	2301	Unsigned32	IUTE	VM-	CA	-	-YY
SIP-Response-Timestamp	3GPP	835	Time	-UTE	VM-	CA	-	YYY
SIP-Response-Timestamp-Fraction	3GPP	2302	Unsigned32	-UTE	VM-	CA	-	-YY
SIP-Ringing-Timestamp	Ericsson	338	Time	-UT-	V--	CA	-	YYY
SIP-Ringing-Timestamp-Fraction	Ericsson	1256	Unsigned32	-UT-	V--	CA	-	YYY
Subscriber-Type	Ericsson	1463	Enumerated	I-E	V--	CA	-	YYY
Subscription-Id	-	443	Grouped	IUTE	-M-	CA	-	YYY
Subscription-Id-Data	-	444	UTF8String	IUTE	-M-	CA	-	YYY
Subscription-Id-Type	-	450	Enumerated	IUTE	-M-	CA	-	YYY
Supplementary-Service	3GPP	2048	Grouped	IUTE	VM-	CA	-	-YY
Supplementary-Service-Action	Ericsson	1131	Enumerated	IUTE	V--	CA	-	YYY
Supplementary-Service-Identity	Ericsson	1130	Enumerated	IUTE	V--	CA	-	YYY
Supplementary-Service-Information	Ericsson	1129	Grouped	IUTE	V--	CA	-	YYY
Tariff-Expiry-Policy	Ericsson	2199	Enumerated	-U--	V--	CA	-	YYY
Tariff-Information	3GPP	2060	Grouped	-U--	VM-	CA	IU--	YYY
Tariff-Time-Change	-	451	Time	-U--	-M-	CA	IU--	YYY
Tenant	Ericsson	1380	UTF8String	I-E	V--	CA	-	YYY
Terminating-IOI	3GPP	840	UTF8String	-UT-	VM-	CA	-	YYY
Termination-Cause	-	295	Enumerated	--T-	-M-	CA	-	YYY
Time-Quota-Threshold	3GPP	868	Unsigned32	-	-	-	IU--	YYY
Time-Stamps	3GPP	833	Grouped	IUTE	VM-	CA	-	YYY
Transaction-Data-Name *	Ericsson	1266	UTF8String	IUTE	V--	CA	-	YYY
Transaction-Data-Value *	Ericsson	1267	UTF8String	IUTE	V--	CA	-	YYY
Transaction-Info *	Ericsson	1264	Grouped	IUTE	V--	CA	-	YYY
Transaction-SIP-Message *	Ericsson	1460	UTF8String	IUTE	V--	CA	-	YYY
Transaction-Type *	Ericsson	1265	Enumerated	IUTE	V--	CA	-	YYY
Trigger	3GPP	1264	Grouped	-U--	VM-	CA	IU--	YYY
Trigger-Type	3GPP	870	Enumerated	-U--	VM-	CA	IU--	YYY
UC-Mobility-Call-Leg	Ericsson	1464	Enumerated	IUTE	V--	CA	-	YYY
UHTZ-Offset	Ericsson	1388	UTF8String	I-E	V-	CA	-	YYY
Unit-Cost	3GPP	2061	Grouped	-U--	VM-	CA	IU--	YYY
Unit-Quota-Threshold	3GPP	1226	Unsigned32	-U--	VM-	CA	IU--	YYY
Unit-Value	-	445	Grouped	-U--	-M-	CA	IU--	YYY
Used-Service-Unit	-	446	Grouped	-UT-	-M-	CA	-	YYY
User-Equipment-Info	-	458	Grouped	IUTE	-M-	CA	-	YYY
User-Equipment-Info-Type	-	459	Enumerated	IUTE	-M-	CA	-	YYY
User-Equipment-Info-Value	-	460	OctetString	IUTE	-M-	CA	-	YYY
User-Name	-	1	UTF8String	IUTE	-M-	CA	-	YYY
User-Session-Id	3GPP	830	UTF8String	IUTE	VM-	CA	-	YYY
Validity-Time	-	448	Unsigned32	-	-	-	IU--	YYY
Value-Digits	-	447	Integer64	-U--	-M-	CA	IUT-	YYY
Vendor-Id	-	266	Unsigned32	-	-	-	I--	YYY

* The Flexible AVPs can be enabled via CM parameter mtasChargingProfileFlexAdministrativeState.

ABNF notation, as specified in reference [4], is used later in this section to describe grouped AVP contents.

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5.2.2 Abort Session Attribute Value Pairs

This section describes the AVPs applicable in Abort Session Request (ASR) and Abort Session Answer (ASA) messages.

Table 7 lists all AVPs applicable in ASR and/or ASA messages and identifies the AVP codes and types. The 'ASR Types' column indicates with an 'X' if the AVP is used in ASR messages. The 'ASA Types' column indicates with an 'X' if the AVP is used in ASA messages. The 'ASA Flags' column indicates how MTAS sets the Mandatory flag in the AVP header. The 'Version (1,2,3)' column indicates whether the AVP can be present when the Ro interface of MTAS is configured to the corresponding version.

Table 7: AVP Codes and Types, and their use by MTAS in ASR/ASA messages

AVP	Vendor ID	AVP Code	Type	ASR Types	ASA			Version (1,2,3)
					Types	Flags	Config	
Auth-Application-Id	-	258	Unsigned32	X	-	-	-	YYY
Destination-Host	-	293	DiameterIdentity	X	-	-	-	YYY
Destination-Realm	-	283	DiameterIdentity	X	-	-	-	YYY
Failed-AVP	-	279	Grouped	-	X	-M-	--	YYY
Origin-Host	-	264	DiameterIdentity	X	X	-M-	--	YYY
Origin-Realm	-	296	DiameterIdentity	X	X	-M-	--	YYY
Proxy-Host	3GPP	280	DiameterIdentity	X	X	-M-	--	-YY
Proxy-Info	3GPP	284	Grouped	X	X	-M-	--	-YY
Proxy-State	3GPP	33	OctetString	X	X	-M-	--	-YY
Result-Code	-	268	Unsigned32	-	X	-M-	--	YYY
Session-Id	-	263	UTF8String	X	X	-M-	--	YYY
User-Name	-	1	UTF8String	-	X	-M-	--	YYY

ABNF notation, as specified in reference [4], 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.

5.2.3 Re-Auth Attribute Value Pairs

This section describes the AVPs applicable in Re-Auth Request (RAR) and Re-Auth Answer (RAA) messages.

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Table 8 lists all AVPs applicable in RAR and/or RAA messages and identifies the AVP codes and types. The 'RAR Types' column indicates with an 'X' if the AVP is used in RAR messages. The 'RAA Types' column indicates with an 'X' if the AVP is used in RAA messages. The 'RAA Flags' column indicates how MTAS sets the Mandatory flag in the AVP header. The 'Version (1,2,3)' column indicates whether the AVP can be present when the Ro interface of MTAS is configured to the corresponding version.

Table 8: AVP Codes and Types, and their use by MTAS in RAR/RAA messages

AVP	Vendor ID	AVP Code	Type	RAR Types	RAA			Version (1,2,3)
					Types	Flags	Config	
Auth-Application-Id	-	258	Unsigned32	X	-	-	-	YYY
Destination-Host	-	293	DiameterIdentity	X	-	-	-	YYY
Destination-Realm	-	283	DiameterIdentity	X	-	-	-	YYY
Failed-AVP	-	279	Grouped	-	X	-M-	--	YYY
Origin-Host	-	264	DiameterIdentity	X	X	-M-	--	YYY
Origin-Realm	-	296	DiameterIdentity	X	X	-M-	--	YYY
Proxy-Host	3GPP	280	DiameterIdentity	X	X	-M-	--	-YY
Proxy-Info	3GPP	284	Grouped	X	X	-M-	--	-YY
Proxy-State	3GPP	33	OctetString	X	X	-M-	--	-YY
Re-Auth-Request-Type	-	285	Enumerated	X	-	-	-	YYY
Result-Code	-	268	Unsigned32	-	X	-M-	--	YYY
Session-Id	-	263	UTF8String	X	X	-M-	--	YYY

ABNF notation, as specified in reference [4], 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.

5.2.4

3GPP-MS-TimeZone

The 3GPP-MS-TimeZone AVP indicates the time zone where the MS/UE currently resides. The AVP is populated with the User Current Time Zone taken from "local-time-zone" and "daylight-saving-time" parameters in the network provided P-Access-Network-Information header, if available and CM mtasChargingTimeZoneSource set to 1. If it is not available or CM mtasChargingTimeZoneSource is not set to 1, default value is User Home Time Zone which is the UTC offset from User Common Data with no time adjustment, if provisioned.

Once the 3GPP-MS-TimeZone AVP has been included in the INVITE it will be included in all of the following charging requests.

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.

5.2.5

Access-Network-Information

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

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

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- The initial INVITE
- NPLI results from HSS if it is enabled
- An updated P-Access-Network-Info header in ACK
- An out-of-dialog NOTIFY with charging-info Event header
- A P-Access-Network-Info header in BYE from the served user
- A P-Access-Network-Info header in BYE response from the served user if CCR Terminate is triggered on reception of BYE response
- A P-Access-Network-Info in 3rd party Re-REGISTER with changed access type in P-Access-Network-Info header

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

- The latest response to the initial INVITE
- 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 out-of-dialog NOTIFY with charging-info Event header
- AP-Access-Network-Info header in BYE from the served user
- A P-Access-Network-Info header in BYE response from the served user if CCR Terminate is triggered on reception of BYE response
- A P-Access-Network-Info in 3rd party Re-REGISTER with changed access type in P-Access-Network-Info 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.

P-Access-Network-Info is not reported in case of receiving the same value as in the previously reported Access-Network-Info AVP in the previous message.

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MTAS reports updated (changed) ANI value only, e. g. in case of out-of-dialog NOTIFY with charging-info Event header or updated PANI header in ACK message.

If the ANI is collected from the P-Access-Network-Info header in BYE or BYE response from the served user, it is reported in CCR Terminate message, regardless of having been reported in previous CCR or not.

When MMTel AS receives a 3rd party Re-REGISTER with changed access type (LTE or WiFi) in P-Access-Network-Info header, it generates a charging output using CCR Update with the received network-provided PANI mapped to the ANI AVP depending on the CM attribute `mtasChargingProfileReportAccessChange`.

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

The Access-Network-Information AVP can include TimeZone and DST information inserted by P-CSCF.

For example:

P-Access-Network-Info: 3GPP-E-UTRAN-TDD;utran-cell-id-3gpp=234151D0FCE11;network-provided;local-time-zone="UTC+01:00";daylight-saving-time="01".

This AVP may be included in initial requests, terminate requests, and 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.

This AVP is only included if the "Change in Location" Trigger-Type AVP is received in one of the CCA messages. The only exception is the CCR (Initial Request); in this case the AVP is always included if the value is available. This behavior is controlled by the CM parameter, `mtasChargingAniWithoutTrigger`. It's default value is "0", meaning it is not active, and in this case MTAS behaves as described above. If it is set to "1", meaning it is activated, MTAS will send out the collected PANI even if there was no trigger type AVP received before.

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 a CCR Update with Access-Network-Information AVP populated from the P-Access-Network-Info header received in the NOTIFY.

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

The below table depicts the different scenarios and how the PANI is reported:

Charging Case	Read PANI from (#)		Report Complete PANI (##)	Wi-Fi Portion exists (####)	Report <i>Original</i> PANI	Report <i>only</i> Wi-Fi PANI
	Header	Cache				
Terminating	-	YES	-	YES	-	YES
	-	YES	-	NO	YES	-
	YES	-	-	NO	YES	-
	YES	-	-	YES	-	YES
Originating	YES	-	DISABLED	YES	-	YES
	YES	-	ENABLED	-	YES	-
	YES	-	DISABLED	NO	YES	-

The PANI is always read from the SIP/PANI header first, regardless of the case, and

(#) the reading from cache is done only for terminating cases when PANI read from the header is empty.

(##) the state of 'mtasChargingProfileReportCompletePANI' is considered only for originating cases; disregarded for terminating cases.

(####) for terminating cases when the PANI read from the header is not empty, the check for WiFi portion is done based on the CM config. If there is no configuration for WiFi check, then original PANI is reported.

The Access-Network-Information AVP can include TimeZone and DST information inserted by P-CSCF.

For example:

P-Access-Network-Info: 3GPP-E-UTRAN-TDD;utran-cell-id-3gpp=234151D0FCE11;network-provided;local-time-zone="UTC+01:00";daylight-saving-time="01".

5.2.6

Accumulated-Cost

The Accumulated-Cost AVP is a grouped AVP that holds the accumulated cost for the ongoing session.

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It has the following ABNF grammar:

```
Accumulated-Cost ::= < AVP Header: 2052 10415 >
                    { Value-Digits }
                    [ Exponent ]
```

This AVP may be included in answers. It is used in answers containing cost information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Cost Information'.

5.2.7 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 / Carrier Select Rn services and the Dialed Number Mapping service.

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

When CM parameter mtasNumNormReportAnalyzedCallType is "0" :

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

1. "Local"
2. "Non Local"
3. "IntraLata"
4. "IntraLataToll"
5. "InterLata"
6. "NanpZone1"
7. "NanpInternational"

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

8. "Local"
9. "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".

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

- a "local"
- b "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.

When CM parameter mtaNumNormReportAnalyzedCallType is "1" :

The following values can be reported for all outgoing calls (in addition to the AVP values per services that are listed in the CM parameter value "0" section above):

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

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

5.2.8 Announcement-Instructions

The Announcement-Instructions AVP is used by the OCS to provide announcement instructions to the TAS. This allows the TAS to establish appropriate connection with the announcement units. The information carried in this AVP is used by TAS to inform the MRF what announcements to play. The Announcement-Instructions AVP is included as part of the CCA response message when announcements are required.

The Announcement-Instructions AVP has the following ABNF grammar:

```
Announcement-Instructions ::= < AVP Header: 1441 193 >
    [ Announcement-Number ]
    [ Announcement-Type ]
    [ Announcement-Order ]
    [ Announcement-Variable-Part ]
    [ Announcement-Prompt-Collect-Parameter ]
```

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5.2.9 Announcement-Number

The Announcement-Number AVP contains the announcement number to be played when this AVP is received.

5.2.10 Announcement-Order

The Announcement-Order AVP contains the relative order / sequence for this announcement (applies when multiple instances of Announcement-Instructions AVP are included). It is an optional AVP within the Announcement-Instructions AVP.

It specifies the order for each announcement starting from 1. If it is missing or if it has a value 0, then this indicates that the order is not important. This shall be populated based on the order in which the announcements are generated within the OCS logic where there are multiple announcements to be played at the same point in a call.

5.2.11 Announcement-Prompt-Collect-Interruptible

The Announcement-Prompt-Interruptible-Parameter AVP is used by the OCS to provide one of announcement prompt and collect parameters for the TAS. It can have a pre-defined set of values:

- FALSE (0)
- TRUE (1)

5.2.12 Announcement-Prompt-Collect-MaxDigits

The Announcement-Prompt-Collect-MaxDigits AVP is used by the OCS to provide one of announcement prompt and collect parameters for the TAS.

5.2.13 Announcement-Prompt-Collect-MinDigits

The Announcement-Prompt-Collect-MinDigits AVP is used by the OCS to provide one of announcement prompt and collect parameters for the TAS.

5.2.14 Announcement-Prompt-Collect-Parameter

The Announcement-Prompt-Collect-Parameter AVP is used by the OCS to provide announcement prompt and collect parameters for the TAS. It has the following ABNF grammar:

```
Announcement-Prompt-Collect-Parameter :: = < AVP
Header: 1447 193>
    [ Announcement-Prompt-Collect-Interruptible ]
    [ Announcement-Prompt-Collect-MinDigits ]
    [ Announcement-Prompt-Collect-MaxDigits ]
```

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5.2.15 Announcement-Type

The Announcement-Type AVP indicates when an announcement is to be played. It is an optional AVP within the Announcement-Instructions AVP. It can have a pre-defined set of values:

- PREQUOTA_ANNOUNCEMENT (0): This indicates a pre quota announcement is requested prior to the quota is used.
- POSTQUOTA_ANNOUNCEMENT (1): This indicates a post quota announcement is requested after the quota is used
- PAC_ANNOUNCEMENT (2): This indicates a Prompt and Collect announcement is requested.

5.2.16 Announcement-Variable-Part

The Announcement-Variable-Part AVP is used by the OCS to provide additional details on how the announcement must be handled by the MTAS. This AVP is used when variable parts need to be applied as part of the announcement, to be signaled in the connection between MTAS and MRF. It has the following ABNF grammar:

```
Announcement-Variable-Part ::= < AVP Header: 1449
193>
    [ Announcement-Variable-Part-Type ]
    [ Announcement-Variable-Part-Data ]
```

5.2.17 Announcement-Variable-Part-Data

The Announcement-Variable-Part-Data AVP contains the data corresponding to the type of data specified in Announcement-Variable-Part-Type AVP.

5.2.18 Announcement-Variable-Part-Type

The Announcement-Variable-Part-Type AVP contains the type of units carried in the Announcement-Variable-Part-Data. It can have a pre-defined set of values:

- INTEGER (0): Integer (A string of numbers, which shall be announced as a single number, up to 10 digits)
- NUMBER (1): Number (A string of numbers, which shall be announced as individual digits, up to 24 digits)
- TIME (2): Time (A time string in the form HHMM)
- DATE (3): Date (A Date string in one of three forms: Month DD YYYY, YYYY Month DD, or DD Month YYYY)

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- PRICE (4): Price (A currency string, in the format AAAAAABB [AAAAAA is the integral part, BB is the decimal part] and string identifying the type of currency)

5.2.19 AoC-Cost-Information

The AoC-Cost-Information AVP is a grouped AVP that holds accumulated and/or incremental cost information for the AOC service. The presence of a Currency-Code AVP within the AoC-Cost-Information indicates that the accumulated and incremental cost information is expressed in monetary terms.

MTAS always expects the Accumulated-Cost AVP to be included.

MTAS does not use the Incremental-Cost AVP(s).

It has the following ABNF grammar:

```
AoC-Cost-Information ::= < AVP Header: 2053 10415 >
                        [ Accumulated-Cost ]
                        *[ Incremental-Cost ]
                        [ Currency-Code ]
```

This AVP may be included in answers. It is used in answers containing cost information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Cost Information'.

5.2.20 AoC-Information

The AoC-Information AVP is a grouped AVP that holds cost and/or tariff information for the AOC service.

It has the following ABNF grammar:

```
AoC-Information ::= < AVP Header: 2054 10415 >
                   [ AoC-Cost-Information ]
                   [ Tariff-Information ]
```

This AVP may be included in answers. It is used in answers containing cost and/or tariff information, which is sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to 'AOC Cost and Tariff Information', 'AOC Cost Information' or 'AOC Tariff Information'.

5.2.21 AoC-Request-Type

The AoC-Request-Type AVP indicates the type of AOC information required in the response.

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The following values are defined:

- No AOC Information 0
- AOC Cost and Tariff Information 1
- AOC Cost Information 2
- AOC Tariff Information 3

This AVP may be included in initial, update and termination requests. It is included in requests when the served user has the AOC service.

5.2.22 Apply-Tariff-Immediate

The Apply-Tariff-Immediate AVP indicates whether the tariff should be applied immediately or not.

The following values are defined:

- Start Tariff Immediately 0
- Wait for Start 1

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.23 Apply-Tariff-Restart

The Apply-Tariff-Restart AVP indicates whether the applied tariff should be restarted or not. It is important if charging has already started otherwise it makes no difference.

The following values are defined:

- No Restart 0
- Restart 1

For details of the impact of these values, see [11] and [12].

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.24 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.

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This AVP may be included in update requests, termination requests and event requests from MTAS Ro version 2.

5.2.25 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
- Redirection AS (not used) 1
- Scheduled Conference AS (not used) 2
- SCC AS (not used) 3
- Parlay X AS (not used) 4
- ST AS (not used) 5

This AVP may be included in all requests.

5.2.26 Auth-Application-Id

The Auth-Application-Id AVP is used in order to advertise support of the Diameter Credit Control Application.

The value is set to 4 which is the application ID used by the Ro interface protocol, see reference [3].

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

5.2.27 Called-Asserted-Identity

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

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.

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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 be included in update and termination requests. It is included in the first update request generated after a communication session has been accepted or in the termination request generated after a communication session has been rejected. The information is only included in one charging message during a charging session.

5.2.28

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

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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 update and termination requests. It is included in the first update request generated after a communication session has been accepted or in the termination request generated after a communication session has been rejected. It is only included when the called asserted identity is available. The information is only included in one charging message during a charging session.

5.2.29 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.

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).

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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. If `mtasConfChargingSessionBehaviorOnMove` is set to 1 and move happened, the Called-Party-Address AVP in the CCR[U] will be the same as in the CCR[I] of the 2PTY call.

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 5.2.103) contains the URI received in the incoming request.

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.

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

5.2.30 Calling-Party-Address

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

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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, two CMs under charging profile controls the behavior of Calling-Party-Address AVP.

CM 1:

mtasChargingProfileUseFromHeaderAsCallingPartyAddressWhenNoPai - to control if the terminating MTAS should use the URI of 'From header' as the Calling-Party-Address when the P-Asserted-Identity is empty in the initial INVITE.

CM 2: mtasChargingProfileUseUnknownAsCallingPartyAddressWhenNoPai - to control if MTAS should use 'unknown' as the Calling-Party-Address when the P-Asserted-Identity is empty in the initial INVITE.

The following will be the behavior of CallingPartyAddress when PAI is empty under the combination of these two CMs:

CM 1	CM 2	Originating MTAS	Terminating MTAS
enabled	enabled	'unknown'	URI of 'From header'
enable	disabled	absence of AVP	URI of 'From header'
disabled	enabled	'unknown'	'unknown'
disabled	disabled	absence of AVP	absence of AVP

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 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).

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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 invokele: 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.

5.2.31

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". The value 'Unknown' is used in requests sent before the initial INVITE has been sent on the outgoing dialog.

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.

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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.

5.2.32 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 initial requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the cic parameter is available.

5.2.33 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.

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 termination 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).

- "3xx Redirection" -3xx

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

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- “Long Duration Call” -1001

The cause “Long Duration Call” is used in CCR termination request, when an established session is terminated by MTAS due to long duration call supervision.

Failure causes 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.

- “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.

- “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 termination requests when the SIP session has not been successfully established (e.g. SIP ACK is not received).

- “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).

- “Decline” 603

The cause “Decline” is used in Enhanced Parlay X Third Party Call online charging session (A-B session) when the SIP session between user A and B is terminated due to unsuccessful SIP session setup between user A and C.

- Call barred 1000

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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 termination requests and in event requests for unsuccessful establishment of a SIP session.

5.2.34 CC-Request-Number

The CC-Request-Number AVP identifies the request within a session. As Session-Id AVP's are globally unique, the combination of Session-Id and CC-Request-Number is also globally unique, and can be used in matching credit-control messages with confirmations. The CC-Request-Number is set to 0 for requests of type 'Initial Request' and is incremented by one in each subsequent 'Update Request' and 'Termination Request' message sent. The CC-Request-Number is set to 0 in requests of type 'Event Request'.

Under exceptional fault conditions, whereby MTAS cannot determine which request 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 CC-Request-Number is set to 4294967295 when generating the 'Termination Request'.

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

5.2.35 CC-Request-Type

The CC-Request-Type AVP contains the type of credit control request being sent.

The following values are currently defined:

- Initial Request 1

A Credit Control Initial Request is used to initiate a credit-control or advice of charge session and contains information that is relevant to the initiation of the session.

- Update Request 2

A Credit Control Update Request is used during an existing credit-control or advice of charge session. Update requests are sent every time a credit-control re-authorization is needed at the expiry of the allocated quota or validity time, whenever the media has been successfully changed (using SIP UPDATE or Re-INVITE), and when cost and/or tariff information is required for advice of charge purposes.

- Termination Request 3

A Credit Control Termination Request is sent to terminate a credit-control or advice of charge session and contains information relevant to the existing session.

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- Event Request 4

A Credit Control Event Request is used when there is no need to maintain any session state in the OCS. The request contains all information relevant to the service.

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

5.2.36 CC-Time

The CC-Time AVP contains the length of the granted or used time in seconds. Granted time must be greater than zero. CC-Time is the only unit type supported by MTAS.

This AVP may be included in update and termination requests and in initial and update responses. It is included in requests in cases where it is necessary to report service usage for previously granted service units. It is included in successful responses containing granted service units. The reported CC-Time value is rounded down to seconds. In case of termination requests, the rounding method of CC-Time value is configurable as described in Ch 3.16.

5.2.37 CC-Unit-Type

The CC-Unit-Type AVP contains the type of units.

The following values are supported:

- Time 0
- Money 1

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.38 Common-Policy-Rule-Identity

This 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; 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.

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- In CCR (Update Request):
 - 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
 - a CSA rule matched with valid action present and MMTel session is successfully established.
- In CCR (Termination Request):
 - 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.)
 - a CSA rule is matched with valid action present and MMTel session establishment attempt is rejected.

5.2.39

Conference-Id

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

The MTAS serving the conference creator (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 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.

Example: sip:conf1234@confserver1.operator.net

This AVP may be included in initial requests, update requests, termination requests and in event requests for unsuccessful establishment of a SIP session. It is only included for conference sessions.

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5.2.40 Connection-Attempt-Charge

The Connection-Attempt-Charge AVP is a grouped AVP that holds the charge for an attempt to connect a session.

It has the following ABNF grammar:

```
Connection-Attempt-Charge ::= < AVP Header: 2192 193 >
                               { Value-Digits }
                               [ Exponent ]
```

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.41 Credit-Control-Failure-Handling

The Credit-Control-Failure-Handling (CCFH) AVP defines the action to be taken in credit-control session fault situations. The information in this AVP overrides the local configuration data for the remainder of the credit-control session.

The following values are supported:

- Terminate 0

The service should only be granted whilst there is a connection to the OCS. If MTAS cannot send an update request to the OCS due to a connection failure, or if the Tx timer expires whilst awaiting an OCS response to an update request, the credit-control request should be regarded as failed, and the end user's service session should be terminated.

- Continue 1

The service should be granted even when there is no connection to the OCS. If MTAS cannot send an update request to the OCS due to a connection failure, or if the Tx timer expires whilst awaiting an OCS response to an update request, the end user's service session should be allowed to continue without further online credit control.

If a Credit-Control-Failure-Handling AVP is received containing any other value, MTAS shall handle it in the same way as value 0 (Terminate), or if the Enhanced Assume Positive mode is set, MTAS checks the CM `mtasChargingProfileAssumePositiveDefaultCcfh`, and uses this value.

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If a Credit-Control-Failure-Handling AVP is not included in the CCA, MTAS shall handle it in the same way as value 0 (Terminate), or if the Enhanced Assume Positive mode is set, MTAS checks the CM `mtasChargingProfileAssumePositiveDefaultCcfh`, and uses this value.

This AVP is only used in answers from the OCS relating to credit-control sessions. It is not used in answers relating to advice of charge sessions.

5.2.42 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. Set to the CUG Interlock Code value if it is presented in the INVITE request.

5.2.43 Currency-Code

The Currency-Code AVP contains a currency code that specifies in which currency the AVPs that contain monetary units are given. The currency code is expressed using the numeric value defined in the ISO 4217 standard.

The actual currency provided in an external tariff (RTTI) or used in an answer may differ from the value specified in the Preferred-Currency-Code AVP (see section 5.2.85). MTAS treats cost or tariff information received without an associated Currency-Code AVP in the answer as being expressed in non-monetary units.

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information expressed in monetary terms to the OCS. It is used in answers containing cost and/or tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to ‘AOC Cost and Tariff Information’, ‘AOC Cost Information’ or ‘AOC Tariff Information’, that are expressed in monetary terms.

5.2.44 Current-Tariff

The Current-Tariff AVP is a grouped AVP that holds tariff information for the current tariff. The presence of a Currency-Code AVP within the Current-Tariff AVP indicates that the tariff information is expressed in monetary terms.

The Current-Tariff AVP in a CCR has the following ABNF grammar:

```
Current-Tariff ::= < AVP Header: 2056 10415 >
                  [ Currency-Code ]
                  [ Scale-Factor ]
                  *[ Rate-Element ]
                  { Tariff-Expiry-Policy }
                  { Set-Up-Charge }
                  { Connection-Attempt-Charge }
```

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The Current-Tariff AVP that is under the Service-Information and AoC-Information AVPs in a CCA message has the following ABNF grammar:

```
Current-Tariff ::= < AVP Header: 2056 10415 >
                  [ Currency-Code ]
                  [ Scale-Factor ]
                  *[ Rate-Element ]
```

The Current-Tariff AVP that is under Ericsson-Service-Information AVP in a CCA message has the following ABNF grammar:

```
Current-Tariff ::= < AVP Header: 2056 10415 >
                  [ Set-Up-Charge ]
                  [ Connection-Attempt-Charge ]
```

MTAS supports a maximum of six rate elements within the Current-Tariff AVP. If more than six are present, the first six are used and the remainders are ignored.

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.45 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 CCA [Initial] message and is included in all subsequent CCR messages.

This AVP is included in all update and termination requests.

5.2.46 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 "ecf" (event charging function) address parameter of the P-Charging-Function-Addresses header received in the incoming INVITE request. For conference focus sessions, and for event requests generated for supplementary service configuration actions that have been requested via the Ut interface, MTAS retrieves charging function address information directly from the HSS.

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In the case of advice of charge sessions, if no “ecf” address parameters are received in the INVITE request, MTAS uses a default address as specified in the `mtasAocPrimaryEcfAddress` and `mtasAocSecondaryEcfAddress` parameters in the `MtasAoc Managed Object`, see [8].

This AVP is included in all requests.

5.2.47 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 initial requests and in event requests for unsuccessful establishment of a SIP session. It is only included when the dai parameter is available.

5.2.48 Ericsson-Service-Information

The Ericsson-Service-Information AVP is a grouped AVP that holds information about a specific service, e.g. the identity and the service specific AVPs.

The Ericsson-Service-Information AVP in a CCR message has the following ABNF grammar:

```
Ericsson-Service-Information ::= < AVP Header: 285 193 >
                                *[ IMS-Service-Identification ]
                                [ MMT-Information ]
                                *[ Transaction-Info ]
                                [ UHTZ-Offset ]
                                [ SIP-Ringing-Timestamp ] (3)
                                [ SIP-Ringing-Timestamp-
                                  Fraction ] (3)
                                [ AS-Type ]
                                *[ AVP ]
```

The Ericsson-Service-Information AVP in a CCA message has the following ABNF grammar:

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

This AVP is included in all requests and may be used in answers from the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an `AoC-Request-Type` AVP (see section

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5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

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

5.2.49 Event-Timestamp

The Event-Timestamp AVP contains a timestamp indicating the time that the CCR 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.

5.2.50 Event-Type

The Event-Type AVP is a grouped AVP that holds information about the type of chargeable telecommunication service/event for which the charging message is generated.

It has the following ABNF grammar:

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

This AVP may be included in all requests. It is included in requests in cases where the request is generated as a result of a SIP message.

5.2.51 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 initial answers. All answers must contain either an Experimental-Result AVP or a Result-Code AVP (see section 5.2.105).

5.2.52 Experimental-Result-Code

The Experimental-Result-Code AVP contains a vendor specific outcome to the requested action.

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

2002 External Tariff Required

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This result code indicates that the OCS requires an external tariff. This external tariff needs to be received in (or before) the CCR (Update) that is triggered by the 200 OK (INVITE).

An answer containing this result code is treated as a success, i.e. success but an external tariff is required.

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 5.2.51).

5.2.53 Exponent

The Exponent AVP contains the exponent value associated with a Value-Digits AVP. Where decimal numbers need to be represented, the number is represented by a Value-Digits AVP and an Exponent AVP. For example, the decimal number 1.25 is represented by a Value-Digits AVP set to 125 and an Exponent AVP set to -2 (i.e. 125×10^{-2}). Similarly, large numbers may be represented using a Value-Digits AVP and an Exponent AVP. For example, the number 1.25 million may be represented by a Value-Digits AVP set to 125 and an Exponent AVP set to 4 (i.e. 125×10^4).

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing cost and/or tariff information, which is sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to 'AOC Cost and Tariff Information', 'AOC Cost Information' or 'AOC Tariff Information'.

5.2.54 Failed-AVP

The Failed-AVP AVP provides debugging information in cases where a request is rejected or not fully processed due to erroneous information in a specific AVP. The value of the Result-Code AVP (see section 5.2.105) will provide information on the reason for the Failed-AVP AVP.

It has the following ABNF grammar:

```
Failed-AVP ::= < AVP Header: 279 >
              1*{ AVP }
```

This AVP may be included in answers from the OCS. It is included in cases where a request is rejected due to erroneous or missing information.

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5.2.55 Final-Unit-Action

The Final-Unit-Action AVP indicates the action to be taken when the final units for the service have been consumed.

The following values are supported:

- Terminate 0
- Redirect 1

This AVP may be included in answers from the OCS. It is used in responses that contain the final granted units for the service for a real-time credit control session.

5.2.56 Final-Unit-Indication

The Final-Unit-Indication AVP indicates that the Granted-Service-Unit AVP in the CCA contains the final units for the service. After these units have been consumed, MTAS is responsible for executing the action indicated in the Final-Unit-Action AVP.

It has the following ABNF grammar:

```
Final-Unit-Indication ::= < AVP Header: 430 >
                        { Final-Unit-Action }
                        [ Redirect-Server ]
```

This AVP may be included in answers from the OCS. It is used in responses that contain the final granted units for the service for a real-time credit control session.

5.2.57 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 initial requests and may be included in update requests, termination requests and event requests. It is included in the first update request at an originating node, or in the termination request at an originating node if no update requests have been generated. It is included in 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.

5.2.58 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". The value 'Unknown' is used in requests sent before the initial INVITE has been sent on the outgoing dialog.

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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 "user". The value 'Presentation Allowed' is used when the INVITE does not contain a Privacy header with content of "user".

This AVP may be included in all requests. It is included in all requests containing a From-Header AVP, see section 5.2.57.

5.2.59 Granted-Service-Unit

The Granted-Service-Unit (GSU) AVP contains the number of units that MTAS can provide to the end user before the service must be released or a new credit control request made. MTAS only supports continuous time based charging.

It has the following ABNF grammar:

```
Granted-Service-Unit ::= < AVP Header: 431 >
                        { CC-Time }
```

This AVP may be included in answers from the OCS. It is used in responses that contain granted units for a real-time credit control session.

5.2.60 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` [8]) 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.).

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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 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 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 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 MTAS generates a new ICID for each leg (leg A-B and A-C). The new ICID is included in the originating charging messages generated for each leg.

For terminating charging case if CM parameter `mtasChargingProfileMultiDeviceMode` is set to 1 ("Rf and Ro") or 3 ("Ro only"), additional terminating charging session is started for each outgoing leg towards primary user's fixed device. 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.
- `<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.

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Example:

mOTin5233525800be300100000442

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

5.2.61 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 ]
    [ Requested-Party-Address ]
    [ Time-Stamps ]
    [ Inter-Operator-Identifier ]
    [ IMS-Charging-Identifier ]
    *[ SDP-Session-Description ]
    *[ SDP-Media-Component ]
    *[ Service-Specific-Info ]
    [ Cause-Code ]
    [ Access-Network-Information ]
    [ IMS-Visited-Network-Identifier ]
    [ 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 Ro version 3. It is included in the MMT-Information AVP if MTAS Ro version 1,2 is configured.

5.2.62 IMS-Service-Identification

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

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.

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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 9: 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.

5.2.63 IMS-Visited-Network-Identifier

The IMS-Visited-Network-Identifier AVP (AVP code 2713) is of type UTF8String and contains the contents of the SIP P-header "P-Visited-Network-ID".

The IMS-Visited-Network-Identifier AVP is conveyed within the grouped IMS-Information AVP.

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

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- The initial INVITE request

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

- The latest response to the initial INVITE with PVNI header
- From the cache (PVNI has been cached previously).

Example: P-Visited-Network-ID: ims.mnc077.mcc234.3gppnetwork.org

5.2.64 Incremental-Cost

The Incremental-Cost AVP is a grouped AVP that holds the incremental cost since the last AOC interaction for the ongoing session.

It has the following ABNF grammar:

```
Incremental-Cost ::= < AVP Header: 2062 10415 >
                    { Value-Digits }
                    [ Exponent ]
```

This AVP may be included in answers from the OCS. MTAS does not use the Incremental-Cost AVP.

5.2.65 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 may be included in Initial requests and Event requests only when Caching Contact Data is enabled (mtasSubsDataCacheContactData=1) and the device Id information is available in Subscribers Data.

5.2.66 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.

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It has the following ABNF grammar:

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

This AVP may be included in all requests.

Terminating-IOI is only present in one request per session. For example, if the Terminating-IOI is sent in the initial request there is no instance of it in the update request.

Originating-IOI can be present in maximum two requests per session. The second request containing Originating-IOI always contains Terminating-IOI. For example, if Originating-IOI is sent in the initial request there might be an instance of it in an update request and if that is the case that request also includes the Terminating-IOI, subsequent requests will not contain Originating-IOI.

5.2.67 Low-Balance-Indication

The Low-Balance-Indication AVP indicates if the subscriber balance went below a designated threshold by its account. This indication can be used to advise the end user about the need to replenish his balance.

The following values are defined:

- Not Applicable 0
- Yes 1

This AVP may be included in answers from the OCS.

5.2.68 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 information in this AVP is taken from the incoming INVITE message.

The Matched-Regular-Expression AVP is mandatory when the Service-Suppression-Info AVP is present 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)
```

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5.2.69 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 following values are defined:

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

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.

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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 initial requests and may be included in update requests. It is included in update requests whenever an SDP-Media-Component AVP is present.

5.2.70 MMT-Information

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

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 ]
    *[ Related-ICID ]
    [ Served-User ]
    [ SIP-Request-Timestamp-Fraction ]
    [ SIP-Response-Timestamp-Fraction ]
    [ SIP-Ringing-Timestamp ] (1)(2)
    [ SIP-Ringing-Timestamp-Fraction ] (1)(2)
    *[ Supplementary-Service-Information ]
    [ Tariff-Information ]
    [ Tenant ]
    *[ AVP ]
```

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

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

The SIP-Request-Timestamp-Fraction and SIP-Response-Timestamp-Fraction AVPs are introduced in the grouped Time-Stamp AVP by 3GPP in Release 9. If interface version is set to Release 7, then MTAS includes these AVPs in the Ericsson specific MMT-Information AVP. If interface is configured to use a Release 9 based protocol, then these AVPs will be included in Time-Stamp AVP.

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.

5.2.71 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]
```

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.

5.2.72 Multiple-Services-Credit-Control

The Multiple-Services-Credit-Control AVP contains AVPs related to the independent credit-control of multiple services feature. MTAS currently only includes one instance of the Multiple-Services-Credit-Control AVP in any particular charging message.

The Multiple-Services-Credit-Control AVP in a CCR message has the following ABNF grammar:

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```
Multiple-Services-Credit-Control ::= < AVP Header: 456 >
                                   { Service-Identifier }
                                   [ Requested-Service-Unit ]
                                   [ Used-Service-Unit ]
                                   [ Reporting-Reason ]
```

[Trigger] The Multiple-Services-Credit-Control AVP in a CCA message has the following ABNF grammar:

```
Multiple-Services-Credit-Control ::= < AVP Header: 456 >
                                   { Service-Identifier }
                                   [ Result-Code ]
                                   [ Granted-Service-Unit ]
                                   [ Validity-Time ]
                                   [ Final-Unit-Indication ]
                                   [ Time-Quota-Threshold ]
                                   [ Trigger ]
                                   *[ Announcement-
                                     Instructions]
                                   [ Retarget-Instruction ]
```

This AVP may be included in initial, update and termination requests and in answers from the OCS. For sessions that require real-time credit control, it is included in all initial and update requests and is included in termination requests in cases where it is necessary to report service usage for previously granted service units. It is not included in requests for sessions that do not require real-time credit control (i.e. require advice of charge only). It is included in answers that are sent in response to an initial request or update request that contained a request for service units for a real-time credit control session.

5.2.73 Multiple-Services-Indicator

The Multiple-Services-Indicator AVP indicates that MTAS is capable of handling multiple services independently within a session.

The following value is supported:

- Multiple Services Supported 1

This AVP may be included in all requests. It is included for sessions that require real-time credit control. It is not included in requests for sessions that do not require real-time credit control (i.e. require advice of charge only).

5.2.74 Network-Identification

The Network-Identification AVP is a string that identifies the network that originated the external tariff (RTTI).

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This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.75 Next-Tariff

The Next-Tariff AVP is a grouped AVP that holds tariff information for the next tariff. The presence of a Currency-Code AVP within the Next-Tariff AVP indicates that the tariff information is expressed in monetary terms.

The Next-Tariff AVP is a CCR message has the following ABNF grammar:

```
Next-Tariff ::= < AVP Header: 2057 10415 >
               [ Currency-Code ]
               [ Scale-Factor ]
               *[ Rate-Element ]
               { Tariff-Expiry-Policy }
               { Set-Up-Charge }
               { Connection-Attempt-Charge }
```

The Next-Tariff AVP that is under the Service-Information and AoC-Information AVPs in a CCA message has the following ABNF grammar:

```
Next-Tariff ::= < AVP Header: 2057 10415 >
               [ Currency-Code ]
               [ Scale-Factor ]
               *[ Rate-Element ]
```

The Next-Tariff AVP that is under Ericsson-Service-Information AVP in a CCA message has the following ABNF grammar:

```
Next-Tariff ::= < AVP Header: 2057 10415 >
               [ Set-Up-Charge ]
               [ Connection-Attempt-Charge ]
```

MTAS supports a maximum of six rate elements within the Next-Tariff AVP. If more than six are present, the first six are used and the remainders are ignored.

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS when both the current tariff and the next tariff are available. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information', when both the current tariff and the next tariff are available.

5.2.76 Node-Functionality

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

The node functionality identifier used by MTAS is:

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This AVP is included in all requests.

5.2.77 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). The inclusion of this AVP is dependent on the setting of `mtasChargingProfileOmitCcr` (where the primary key is set to the vendor ID for 3GPP)

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

5.2.78 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. Populated with the Diameter Host Name configured against the node for credit control purposes.

5.2.79 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. Populated with the Diameter Realm Name configured against the node for credit control purposes.

5.2.80 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.

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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 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.

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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 all requests. It is only included when originating network identification information is available. Originating-IOI information sent in one request is not repeated in subsequent requests.

5.2.81 Origination-Identification

The Origination-Identification AVP is a grouped AVP which holds the identity of the source of the external tariff (RTTI) update.

It has the following ABNF grammar:

```
Origination-Identification ::= < AVP Header: 2194 193 >
                               { Network-Identification }
                               { Reference-ID }
```

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.82 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.

5.2.83 Participants-Involved

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

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This AVP is included in all requests except event requests and can be included in initial request if the charging session is of type Enhanced Parlay X Third Party Call.

5.2.84 Participants-List

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

This AVP is included in all requests except event requests if the charging session is of type Enhanced Parlay X Third Party Call.

5.2.85 Preferred-Currency-Code

The Preferred-Currency-Code AVP indicates the preferred currency as provisioned in the user's AOC service data. MTAS indicates a preference for cost or tariff information in non-monetary units by omitting the Preferred-Currency-Code AVP from the request.

The Preferred-Currency-Code AVP contains a currency code that specifies in which currency the AVPs that contain monetary units are given. The currency code is expressed using the numeric value defined in the ISO 4217 standard.

This AVP may be included in initial, update and termination requests. It is included in requests when the served user has the AOC service with a preferred currency provisioned. The actual currency used in an answer may differ from the preferred currency indicated.

5.2.86 Proxy-Host

Contains the identity of the host that added the Proxy-Info field, see ref [3].

5.2.87 Proxy-Info

Contains information about the host, see ref [3].

When received in an ASR or RAR message, the AVP is included in the corresponding answer message, i.e. ASA or RAA, respectively.

5.2.88 Proxy-State

Contains local information, see ref [3].

5.2.89 PS-Information

The purpose of PS-Information AVP is to allow the transmission of additional PS service specific information elements. The ABNF format for PS-Information AVP is as follows:

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

5.2.90 Purpose

The Purpose AVP specifies how the external tariff should be used.

The following values are supported:

- New Tariff 0

Use this tariff for the session that the request identifies. Replace any existing tariff that may exist.

- Add-on Charge 1

This is a supplementary charge for the session. It should be applied in addition to the existing tariff.

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.91 Rate-Element

The Rate-Element AVP is a grouped AVP that holds one element of a tariff provided for the AOC service.

A rate element that is not the final rate element within the tariff must contain a Unit-Quota-Threshold AVP indicating when the next rate element must be applied. A rate element with a unit type of 'money' is treated as a final rate element.

The Unit-Value AVP indicates the number of units (of the type specified by the CC-Unit-Type AVP) that result in a cost. The Unit-Value AVP is not used by MTAS when the unit type specified is 'money'.

The Unit-Cost AVP indicates the cost incurred. When the unit type specified is 'time', the cost is incurred when the number of units specified in the Unit-Value AVP has been used.

It has the following ABNF grammar:

```
Rate-Element ::= < AVP Header: 2058 10415 >
                { CC-Unit-Type }
                [ Unit-Value ]
                [ Unit-Cost ]
                [ Unit-Quota-Threshold ]
```

Examples:

Fixed cost of 0.08 units:

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CC-Unit-Type = Money
Unit-Cost = 8×10^{-2}

Rate of 0.02 units per 15 seconds for one hour:

CC-Unit-Type = Time
Unit-Value = 15
Unit-Cost = 2×10^{-2}
Unit-Quota-Threshold = 3600 seconds

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.92 Rating-Group

The Rating-Group AVP contains the charging key and generally identifies a rating group. All the services subject to the same rating type are part of the same rating group.

The Rating-Group AVP value can be configured by CM attributes `mtasChargingProfileRatingGroupSession` for session based CCRs, i.e. initial, update and termination requests, and `mtasChargingProfileRatingGroupEvent` for event based CCRs, i.e. event request, in the applicable charging profile [8].

The value in the session based CCRs for the conference creation call leg in a collocated ad-hoc conference deployment can be configured to a different value than other call legs by the CM attribute `mtasChargingProfileConferenceCreationRatingGroupSession`.

5.2.93 Re-Auth-Request-Type

The Re-Auth-Request-Type AVP is used to inform the client of the action expected upon expiration of the Authorization-Lifetime. The following values are defined:

- Authorize Only 0

An authorization only re-auth is expected upon expiration of the Authorization-Lifetime. This is the default value if the AVP is not present in answer messages that include the Authorization-Lifetime.

- Authorize-Authenticate 1

An authentication and authorization re-auth is expected upon expiration of the Authorization-Lifetime.

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5.2.94 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 termination requests and in event requests for unsuccessful establishment of a SIP session.

5.2.95 Redirect-Server

The Redirect-Server AVP (AVP Code 434) is of type Grouped and contains the address information of the redirect server (e.g SIP Server) with which the end user is to be connected when the account cannot cover the service cost. It MUST be present when the Final-Unit-Action AVP is set to REDIRECT, refer Diameter Credit Control Application [5].

```
Redirect-Server ::= < AVP Header: 434 >
{ Redirect-Address-Type }
{ Redirect-Server-Address }
```

5.2.96 Redirect-Address-Type

The Redirect-Address-Type AVP (AVP Code 433) is of type Enumerated and defines the address type of the address given in the Redirect-Server-Address AVP. The address type can be one of the following:

- IPv4 Address(0): The address type is in the form of IPv4 address
- IPv6 Address(1): The address type is in the form of IPv6 address
- URL(2): The address type is in the form of Uniform Resource Locator
- SIP URI(3): The address type is in the form of SIP Uniform Resource Identifier

The only supported type is SIP URI(3).

5.2.97 Redirect-Server-Address

The Redirect-Server-Address AVP (AVP Code 435) is of type UTF8String and defines the address of the redirect server (e.g., SIP Server) with which the end user is to be connected when the account cannot cover the service cost. The content of the Redirect-Server-Address should be of SIP URI (3) type.

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5.2.98 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.

For communication diversion or CAMEL 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 initial requests. It is included when the identity of the diverting party needs to be included.

5.2.99 Reference-ID

The Reference-ID AVP is a non-negative integer that is associated with the identity of the external tariff (RTTI) originator.

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.100 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.

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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` [8]) 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:

- 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 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.

- 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 Conference:

- the originating charging messages generated by the conference focus MTAS for each dial-out conference leg include the IMS Charging Identifier received in the initial INVITE requesting the conference creation.

For Three-Party:

- the 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

- 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.

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- 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.

For STOD by a terminating user:

- 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.

- 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:

- 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.

- 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 Parlay-X Third Party Call the charging messages include generated value for both originating charging sessions.

For Enhanced Parlay-X Third Party Call the charging messages include IMS Charging Identifier generated for second charging session A-C.

This AVP may be included in initial requests, update requests, termination 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.

5.2.101

Reporting-Reason

The Reporting-Reason AVP specifies the reason for usage reporting. It can occur directly in the Multiple-Services-Credit-Control AVP or in the Used-Service-Unit AVP.

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MTAS uses the following values:

- Threshold 0

This value is used to indicate that the reason for usage reporting is that the time quota threshold has been reached.

- Final 2

This value is used to indicate that the reason for usage reporting is that normal service termination has occurred or that the service has been terminated because the final quota previously granted has been exhausted.

- Quota Exhausted 3

This value is used to indicate that the reason for usage reporting is that the granted quota has been exhausted.

- Validity Time 4

This value is used to indicate that the reason for usage reporting is that the validity time associated with the granted quota has expired.

- Rating Condition Change 6

This value is used to indicate that the reason for usage reporting is that a change has occurred that may affect the rating of the service (e.g. a media change has taken place).

Reporting reasons 'Threshold' and 'Quota Exhausted' are included in the Used-Service-Units AVP, whereas reasons 'Final', 'Validity Time' and 'Rating Condition Change' are including directly in the Multiple-Services-Credit-Control AVP.

This AVP may be included in update and termination requests. It is included in cases that the CCR message contains used service units.

5.2.102 Requested-Action

The Requested-Action AVP indicates the requested action associated with an event request.

The following values are used:

- Direct Debiting 0

This AVP is included in event requests.

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5.2.103 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 5.2.29) contains the URI sent in the outgoing request.

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

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

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

5.2.104 Requested-Service-Unit

The Requested-Service-Unit AVP is used to indicate a request for credit reservation. When sent by MTAS, the AVP is always empty. The OCS is responsible for rating and unit determination.

This AVP may be included in initial requests and update requests. It is included for sessions that require real-time credit control in requests when credit reservation is required. It is not included in requests for sessions that do not require real-time credit control (i.e. require advice of charge only).

5.2.105 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 [4]):

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

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In addition to the Result-Code AVP included at the command level, a CCA message may contain a Result-Code AVP within a Multiple-Services-Credit-Control AVP.

When a Multiple-Services-Credit-Control AVP is received that does not include a Result-Code AVP, the AVP is treated as if it had contained a Result-Code AVP with the same result code as indicated at the command level.

When an unsuccessful result code (i.e. non 2xxx) is included at the command level, the entire request is considered to have failed and the MTAS action taken is based on the command level result code only.

This AVP may be included in answers. All answers must contain either a Result-Code AVP or an Experimental-Result AVP (see section 5.2.51). The result code received in responses to termination requests and event requests is not used by MTAS.

5.2.106 Retarget-Instruction

The Retarget-Instruction AVP is a grouped AVP containing the Retarget-address, Retarget-Order and Retarget-Reason AVPs. The contents of this AVP is used to perform a retarget action towards the address specified in Retarget-Address during the call setup.

```
Retarget-Instruction ::= < AVP Header: 1467 >
    [ Retarget-Address (1468) ]
    [ Retarget-Order (1469) ]
    [ Retarget-Reason (1470) ]
```

5.2.107 Retarget-Address

The Retarget-Address AVP contains the address to which a retarget action needs to be performed during the call setup. The address contained in this AVP is of the format of a SIP-URI with an E.164 TEL-URI part.

5.2.108 Retarget-Order

The Retarget-Order AVP is of type Enumerated. This AVP specifies if the Online charging is required or not after the retarget action is performed with the retargeted address.

The following values are used:

- ONLINE_CHARGING_REQUIRED 0
- NO_ONLINE_CHARGING_REQUIRED 1

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5.2.109 Retarget-Reason

The Retarget-Reason AVP specifies the reason for which the retarget action was requested by the OCS.

5.2.110 Role-of-Node

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

The roles 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.

5.2.111 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:

- 10. "Local"
- 11. "Non Local"
- 12. "IntraLata"
- 13. "IntraLataToll"
- 14. "InterLata"
- 15. "NanpZone1"
- 16. "Nanplnternational"

The name of the call type used to determine the carrier for this call.

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

- 17. "Local"
- 18. "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".

5.2.112 Scale-Factor

The Scale-Factor AVP is a grouped AVP that holds a multiplication factor to be applied to the calculation of monetary and non-monetary tariffs.

It has the following ABNF grammar:

```
Scale-Factor ::= < AVP Header: 2059 10415 >
                { Value-Digits }
                [ Exponent ]
```

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.113 SDP-Media-Component

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

The media component information can either relate to an SDP offer or to an SDP answer, depending on the SIP message triggering the generation of the CCR message (see section 5.2.116).

It has the following ABNF grammar:

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

This AVP may be included in initial requests and update 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.

5.2.114 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 [6]. The attributes are specifying the media described in the SDP-Media-Name AVP.

The media description is obtained from the SDP offer or the SDP answer, depending on the SIP message triggering the generation of the CCR message (see section 5.2.116).

This AVP may be included in initial requests and update 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=).

5.2.115 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 offer or the SDP answer, depending on the SIP message triggering the generation of the CCR message (see section 5.2.116).

This AVP may be included in initial requests and update requests. It is included whenever an SDP-Media-Component AVP is present.

5.2.116 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 [6].

The information used to populate SDP AVPs can either relate to an SDP offer or to an SDP answer, depending on the SIP message triggering the generation of the CCR message.

Table 10 shows the SDP information used for each SIP message triggering a CCR message (containing SDP AVPs) during the establishment of a communication session.

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Table 10: SDP information used during session establishment

Triggering message	SDP information used
INVITE with SDP	SDP offer contained in the INVITE.
200 OK (INVITE) without SDP	SDP answer from previously completed offer/answer negotiation.
200 OK (INVITE) with SDP	SDP offer or answer contained in the 200 OK.
ACK with SDP	SDP answer contained in the ACK.

Table 11 shows the SDP information used for each SIP message triggering a CCR message (containing SDP AVPs) for a media change during an established communication session.

Table 11: SDP information used during media changes

Triggering message	SDP information used
Re-INVITE with SDP	SDP offer from Re-INVITE
200 OK (UPDATE) with SDP	SDP answer contained in the 200 OK.
200 OK (Re-INVITE) without SDP	SDP answer from previously completed offer/answer negotiation.
200 OK (Re-INVITE) with SDP	SDP offer or answer contained in the 200 OK.
ACK with SDP	SDP answer contained in the ACK.

This AVP may be included in initial requests and in update requests indicating a change of rating conditions. It is only included when SDP information is available.

5.2.117 SDP-Type

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

- SDP Offer 0
- SDP Answer 1

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5.2.118 Served-User

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

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 initial requests and event requests.

5.2.119 Service-Context-Id

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

The Service-Context-Id has a format defined by reference [3].

The Service-Context-Id for MMTel can be:

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

The Service-Context-Id value is fully configurable by the operator.

For credit control purposes, the component is controlled by the `mtasChargingProfileServContext` and `mtasChargingServContextWithPrefix` parameter in the `MtasChargingProfile` Managed Object, see reference [8]. The default parameter setting is:

`32260@ericsson.com`

For advice of charge purposes, the component is controlled by the `mtasAocServiceContextId` parameter in the `MtasAoc` Managed Object, see reference [8]. The default parameter setting is:

`AOC-IMS@ericsson.com`

The `<MNC.MCC>` component may also be configured by the operator. It is controlled by the `mtasChargingProfileServContextOperatorId` parameter in the `MtasChargingProfile` Managed Object and only used when `mtasChargingServContextWithPrefix` is set to TRUE, see reference [8]

When both credit control and advice of charge apply to the same charging session, the Service-Context-Id defined for credit control purposes is used.

If `mtasChargingServContextWithPrefix` is set to false, then the value of `mtasChargingProfileServContext` put into Service-Context AVP without any prefix added, the configured value is copied to the AVP.

This AVP is included in all requests.

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5.2.120 Service-Identifier

The Service-Identifier AVP contains the identifier of a service. The specific service the request relates to is uniquely identified by the combination of Service Context-Id and Service-Identifier AVPs.

The following identifier is used for the MMTel service:

Service-Id = 1 (MMTel Communication)

This AVP may be included in initial requests, update requests and termination requests and in answers from the OCS. It is included for sessions that require real-time credit control. It is not included in requests for sessions that do not require real-time credit control (i.e. require advice of charge only). It may be included in an answer that is sent in response to a request that contained a request for service units for a real-time credit control session.

5.2.121 Service-Information

The Service-Information AVP is a grouped AVP that holds additional 3GPP service specific information.

The Service-Information AVP in a CCR message has the following ABNF grammar:

```
Service-Information ::= < AVP Header: 873 10415 >
                        { IMS-Information }
                        [ MMTel-Information ]
```

The Service-Information AVP in a CCA message has the following ABNF grammar:

```
Service-Information ::= < AVP Header: 873 10415 >
                        { AoC-Information }
```

This AVP is included in all requests and may be included in answers if MTAS Ro version 2 or higher is configured. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.122 Service-Number-Type

It 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

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1 – NSN service number

2 – regular E164 non-service number

3 – unknown number type

5.2.123 Service-Specific-Data

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

5.2.124 Service-Specific-Info

The Service-Specific-Info AVP holds service specific data.

It has the following ABNF grammar:

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

Table 12 summarizes how this AVP and its sub-AVPs will be used in CCRs:

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Service-Specific-Type (Octet 2-4 in hexadecimal and decimal format)		Service-Specific-Data	
0x3E9 (1001)	The parameter value '1001' indicates the Call Direction	0	Origination
		1	Termination
0x3EA (1002)	The parameter value '1002' indicates that the primary call type is used	10	Direct International
		11	National
		13	Toll Free
		14	Directory Assistance
0x3EE (1006)	The parameter value '1006' indicates the Emergency-Callback-Mode	1	Call is within the Emergency Callback Period
0x3EF (1007)	The parameter value '1007' indicates the Supplementary-Service-Type	5	CallForward
		32	Calling Line Identity Restriction
		59	Directory-Assistance Transfer Request
		72	Last Redirecting Number
		255	Emergency Call Start
		256	Emergency Call End
0x3F0 (1008)	The parameter value '1008' indicates the Supplementary-Service-Mode	1	UnConditional
		2	Busy
		3	NoAnswer
0x3F3 (1011)	Associated-Number	(see next column)	String containing the PUID of the calling party or the phone number from the initial INVITE's URI, matching an operator transferor number. If mtasChargingReportRedirectingNumber is enabled, the string will contain the user part of the last redirecting SIP URI.
0x3F6 (1014)	The parameter value '1014' indicates the Supplementary-Service-Category (Call Forwarding Destination Type)	2	Voicemail
0x3F7 (1015)	The parameter value '1015' indicates the Collected Digits	(see next column)	Contains the collected digit(s) to be sent from TAS to OCS as a result of a prompt and collect session etc.
0x3F8 (1016)	The parameter value '1016' indicates the Preferred Language	(see next column)	The language code in CCA format. For more info, see [7].

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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

Table 12 Usage of Service-Specific-Info in CCRs.

Note:

- Octet 1 of the Service-Specific-Type AVP's data field is always set to the value of 0xAB.

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- [1007, 59] and [1011, Associated-Number] are present together for Directory-Assistance Transfer Request.

Table 13 summarizes how this AVP and its sub-AVPs will be used in CCAs:

Service-Specific-Type (Octet 2-4 in hexadecimal and decimal format)		Service-Specific-Data	
0x3F8 (1016)	The parameter value '1016' indicates the Preferred Language	(see next column)	The language code in CCA format. For more info, see [7].
0x7D1 (2001)	The parameter value '2001' means OCS indicates additional reasons for service denial.	1	Block list
		2	Time-of-day restriction
		3	Insufficient MOU Allowance
		4	Insufficient MB Allowance
		5	Insufficient Credit to Fund the Call
		99	Other

Table 13 Usage of Service-Specific-Info in CCAs.

5.2.125 Service-Specific-Type

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

5.2.126 Service-Suppression-Info

The Service-Suppression-Info AVP 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 initial requests and event requests.

5.2.127 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 information in this AVP is taken from the incoming INVITE message.

The Services-To-Suppress AVP is mandatory when the Service-Suppression-Info AVP is present in the Diameter message.

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

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

5.2.128 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 [16]. Has no limitation on its length.
- <mtime>, <ltime> is the number of milliseconds since 1990-01-01:00:00 (including "leap seconds"). Both have a maximum length of ten characters.
encoding = (unixtime - 631152000) * (1000 << 16)
mtime = encoding >> 32
ltime = encoding
Where encoding is a 64 bit value, mtime and ltime shall be 32 bit integers.
- <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 1, indicating online 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;1;sip:A@ericsson.com

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

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5.2.129 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 [15].

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 CCR requests related to SIP sessions that have been initialized with RPH in the initial INVITE.

5.2.130 Set-Up-Charge

The Set-Up-Charge AVP is a grouped AVP that holds the charge for a session set-up.

It has the following ABNF grammar:

```
Set-Up-Charge ::= < AVP Header: 2198 193 >
                  { Value-Digits }
                  [ Exponent ]
```

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.131 SIP-Method

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

This AVP may be included in all requests. It is included in requests in cases where the request is generated as a result of a SIP message.

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5.2.132 SIP-Request-Timestamp

The SIP-Request-Timestamp AVP holds the time of the SIP request (e.g. INVITE, UPDATE) identified in the SIP-Method AVP. The value represents the number of seconds since January 1, 1900 00:00 UTC.

This AVP is included in initial requests and may be included in update requests, termination requests and event requests. It is included in update requests arising from media changes, in termination requests arising from SIP session termination, in 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.

5.2.133 SIP-Request-Timestamp-Fraction

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

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

5.2.134 SIP-Response-Timestamp

The SIP-Response-Timestamp AVP holds the time of the response (e.g. 200 OK) to the SIP request identified in the SIP-Method AVP. The value represents the number of seconds since January 1, 1900 00:00 UTC.

This AVP may be included in update requests, termination requests and event requests. It is included in update requests arising from media changes, in termination requests arising from SIP session termination or when the termination request is triggered on BYE response, in 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.

5.2.135 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.

5.2.136 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.

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When more than one 180 Ringing is received in response to the INVITE, e.g. due to forking and CM parameter `mtasChargingProfileMultiDeviceMode` is set to 0 ("Disable"), 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 `mtasChargingProfileMultiDeviceMode` is set to 1 ("Rf and Ro") or 3 ("Ro only"), 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.

This AVP may be included in update requests and termination requests. It is included when a 180 Ringing response has been received.

5.2.137 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.

5.2.138 Subscriber-Type

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

Possible Values:

0 BUSINESS

1 CONSUMER

5.2.139 Subscription-Id

The Subscription-Id AVP is a grouped AVP and contains information to identify the end user'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. 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), obtained from the Route header in the received INVITE request (or the default public user identity), is used in both the originating charging messages generated for the diverted leg

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(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), obtained from the Route header of the received INVITE request (or the default public user identity), 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).

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.

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 Multi Mobile Subscriptions Feature in MMTel AS, the Subscription-Id AVP is populated with,

- Default IMPU (SIP URI)
- MSISDN (E164)
- IMSI (IMSI)

The last two are for the mobile subscription associated with the device used.

For SCC-AS, Terminating Access Domain Service, when Multi Mobile Subscriptions Feature is enabled the Subscription-Id AVP is populated with,

- Default IMPU (SIP URI)
- MSISDN (E164)

The last one is for the mobile subscription associated with the device used.

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It has the following ABNF grammar:

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

This AVP is included in all requests.

5.2.140 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.

This AVP is included in all requests.

5.2.141 Subscription-Id-Type

The Subscription-Id-Type AVP contains an indication of the type of identifier carried by the Subscription-Id AVP.

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.

5.2.142 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)
```

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.

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

5.2.143 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

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

Table 14 and Table 15 show the applicable combinations of Supplementary-Service-Identity and Supplementary-Service-Action.

Table 14: Applicable Supplementary Service Identities for Actions 000 to 107

		Supplementary-Service-Action								
		000	100	101	102	103	104	105	106	107
Supplementary-Service-Identity		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	•								

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Supplementary-Service-Identity	
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)
108	Incoming Communication Allow ed On Wifi
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

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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		•	•			•		•
		•	•			•		•
•								

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Supplementary-Service-Identity	
141	International Toll Restriction
200	Conference Creation
201	Participant Addition
202	Participant Removal
203	Conference Completion
205	Participant Join
210	Transferred to Conference
400	Communication Waiting
500	Flexible Communication Distribution
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 (FIP)
608	Originating Calling Name Identity Presentation
609	FIP Alternative User Identity
700	Supplementary Service Codes
701	Generic Supplementary Service Codes
702	Mobile Location Related Supplementary Service Codes
800	Permanent MCID

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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		Reference	

Supplementary-Service-Identity	
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
1000	Abbreviated Dialing
1100	User Call Admission Control
1101	Group 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

[illegible]

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Supplementary-Service-Identity	
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
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 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

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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•								
•			•					
•								
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Supplementary-Service-Identity

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
2704	Whitelist Conditional Hotline
2800	Dialed Number Mapping
3200	Closed User Group
3300	Multi Subscriber Number
3500	Operator Controlled Transfer
3600	Media Policy After Bye
4000	Answer Confirmation Query
4001	Answer Confirmation Accept
4002	Answer Confirmation Rejection
4100	UC Routing Originating
4101	UC Routing Terminating
4102	UC Routing Failed Originating
4103	UC Routing Failed Terminating
4104	UC ReRouting Originating
4105	UC ReRouting Terminating
4200	Cap Trigger O-CSI
4201	Cap Trigger T-CSI

[illegible]

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		Reference	

		Supplementary-Service-Action								
		000	100	101	102	103	104	105	106	107
Supplementary-Service-Identity		U	A	D	Int	M	A-	D-	M-	Inv
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									•
5100	NOSUBSCRIPTION_CALL	•								
5200	NUISANCE_CALL	•								
5400	COMMUNICATION_SETUP_ANNOUNCEMENT	•								
5600	MULTI_PERSONA_SERVICE	•								

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

Table 15: Applicable Supplementary Service Identities for Actions 300 to 306

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

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Supplementary-Service-Identity	
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)
108	Incoming Communication Allow ed On Wifi
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
205	Participant Join

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

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		Reference	

		Supplementary-Service-Action				
		300	301	302	303	306
Supplementary-Service-Identity		UA	UD	UI	UM	UM-
210	Transferred to Conference					
400	Communication Waiting	•	•			
500	Flexible Communication Distribution	•	•		•	
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 (FIP)	•	•			
608	Originating Calling Name Identity Presentation					
609	FIP Alternative User Identity	•	•			
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)	•	•		•	

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Approved	Checked	Date	Rev
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		Reference	

Supplementary-Service-Identity	
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 or No Reply to VM
1000	Abbreviated Dialing
1100	User Call Admission Control
1101	Group 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
1500	Short Number Dialing
1600	Requested Announcement

[illegible]

Prepared (also subject responsible if other)		No.		
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Supplementary-Service-Identity

1700	User Common Data
1800	Long-Distance Mobile Number Policing
2000	Calling Party Category
2100	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
2704	Whitelist Conditional Hotline
2800	Dialed Number Mapping
3200	Closed User Group

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

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Supplementary-Service-Identity

- 3400 Distinctive Ring with mapping
- 3401 Distinctive Ring without mapping
- 3500 Operator Controlled Transfer
- 3600 Media Policy Stream Block
- 4000 Answer Confirmation Query
- 4001 Answer Confirmation Accept
- 4002 Answer Confirmation Rejection

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

5.2.144 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
- 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

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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
- Incoming Communication Allowed On Wifi 108
- 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
- Participant Join 205
- Transferred to Conference 210
- Event Package Subscription 220 (Not Used)

Conference Creation and Conference Completion apply at the MTAS serving the conference creator. Participant Addition, Participant Removal, Participant Join, Transferred to Conference and Event Package Subscription 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

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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 (FIP) 607
- Originating Calling Name Identity Presentation 608
- FIP Alternative User Identity 609

Supplementary Service Codes

- Supplementary Service Codes 700
- Generic Supplementary Service Codes 701
- Mobile Location Related Supplementary Service Codes 702

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

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Multi-Persona Service

- Multi_Persona_Service 1130

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.

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

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Address Policing

- Long-Distance Mobile Number Policing 1800

Explicit Communication Transfer

- Explicit Communication Transfer 1900

Calling Party Category

- Calling Party Category 2000

Parlay X

- Call Notification in MMTel 2100
- 3PCC Session 2101

Number Portability

- Number Portability Outgoing 2200
- Number Portability Incoming 2201

Session Transfer to Own Device

- 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

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Hotline

- Unconditional hotline 2700
- Instant hotline 2701
- Delayed hotline 2702
- Delayed hotline voicemail 2703
- Whitelist Conditional Hotline 2704

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

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 send when Answer Confirmation function is called. Answer Confirmation Accept is send when participant accepts request to join the conference. Answer Confirmation Rejection is send 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
- UC Routing Failed Originating 4102
- UC Routing Failed Terminating 4103

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- UC ReRouting Originating 4104

UC ReRouting Terminating 4105CAP

- Cap Trigger O-CSI 4200
- Cap Trigger T-CSI 4201
- Cap Trigger Destination Based 4202

PriorityService

- GETS_FC_PRIOTITY_SERVICE 5000
- GETS_AN_PRIOTITY_SERVICE 5001
- GETS_NT_PRIOTITY_SERVICE 5002
- GETS_FC_GETS_AN_PRIORITY_SERVICE 5003
- GETS_FC_GETS_NT_PRIORITY_SERVICE 5004

NoSubscription Call

- NoSubscription Call 5100

Nuisance Call

- Nuisance Call 5200

Communication Setup Ann Service

- COMMUNICATION_SETUP_ANNOUNCEMENT 5400

Multi-Persona Service

- MULTI_PERSONA_SERVICE 5600This AVP may be included in all requests. It is always included when the Supplementary-Service-Information AVP is included.

5.2.145 Supplementary-Service-Information

The Supplementary-Service-Information AVP is a grouped AVP that holds information relating to the configuration, invocation or use of a supplementary service.

It has the following ABNF grammar:

```
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 }
```

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[CUG-Information] (1)(2)
* [AVP]

The CUG-Information AVP is included in this grouped AVP if MTAS Ro version 1,2 is configured. It is included in the Supplementary-Service AVP from MTAS Ro 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 initial request for the originating charging session for each dial-out conference leg. The 'use' of the conference service (participant removal) is included in the termination request 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 update request generated on receipt of the 200 OK response to the initial INVITE and the 'use' of the conference service (conference completion) is included in the termination request.

For originating sessions used to create a 3PTY session, the 'use' of the three party service (three party session) is included in all requests generated throughout the 3PTY session.

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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 update request 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 update requests 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 update request 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 termination request.

For Communication Completion (3PCC) sessions, the 'use' of the Communication Completion service is included in the initial request for the originating charging session for the leg to user B.

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.

5.2.146 Tariff-Expiry-Policy

The Tariff-Expiry-Policy AVP contains an indication of the preferred behavior when the last sub-tariff has been assigned a Unit-Quota-Threshold and when that Unit-Quota-Threshold expires before the Tariff-Time-Change is reached.

The following values are supported:

- Cycle 0
Start again with the 1st sub-tariff.
- Defined by Network Operator 1
Network specific behavior.

This AVP may be included in update requests. It is included in requests that are used to convey external (RTTI) tariff information to the OCS.

5.2.147 Tariff-Information

The Tariff-Information AVP is a grouped AVP that holds a tariff definition. It contains the tariff currently applicable. If the current tariff has a time limited validity period the next tariff is also included together with an indication of when the next tariff becomes applicable.

The Tariff-Information AVP in a CCR message has the following ABNF grammar:

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```
Tariff-Information ::= < AVP Header: 2060 10415 >
                        { Apply-Tariff-Immediate }
                        { Apply-Tariff-Restart }
                        { Purpose }
                        { Current-Tariff }
                        [ Tariff-Time-Change ]
                        [ Next-Tariff ]
                        { Origination-Identification }
```

The Tariff-Information AVP in a CCA message has the following ABNF grammar:

```
Tariff-Information ::= < AVP Header: 2060 10415 >
                        { Current-Tariff }
                        [ Tariff-Time-Change ]
                        [ Next-Tariff ]
```

This AVP may be included in update requests and answers. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.148 Tariff-Time-Change

The Tariff-Time-Change AVP contains the time that the tariff of the service will be changed. The value represents the number of seconds since January 1, 1900 00:00 UTC.

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS when both the current tariff and the next tariff are available. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information', when both the current tariff and the next tariff are available.

5.2.149 Tenant

The Tenant AVP contains the name of the configured Virtual Telephony Provider (VTP) the Served User belongs to.

It is derived from Host part in: P-Served-User or P-Asserted-Identity header in originating MTAS or P-Served-User or Request-URI in terminating MTAS.

The P-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 Tenant AVP is included in initial requests and event requests.

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5.2.150 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 the 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 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

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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 update and termination requests. It is only included when terminating network identification information is available. Terminating-IOI information sent in one request is not repeated in subsequent requests.

5.2.151 Termination-Cause

The Termination-Cause AVP contains the reason why the credit-control or advice of charge session was terminated by MTAS. It is only present in the CCR (Termination Request) message and is used to tell the OCS why the session was terminated.

MTAS uses the following termination codes:

- Bad Answer 3

This is used when MTAS has received a CCA message containing invalid information.

- Authorization Expired 6

This is used when the user's access has been terminated because its authorized session time has expired.

The Termination-Cause AVP is not used in normal SIP session termination cases or in cases where MTAS terminates a SIP session, e.g. due to lack of MRFP resources.

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This AVP may be included in termination requests. It is included in termination requests that are generated for sessions that are terminated due to one of the reasons described above.

5.2.152 Time-Quota-Threshold

The Time-Quota-Threshold AVP contains a quota threshold for the granted service units. MTAS sends a new request for credit reservation to the OCS when the unused quota falls below the quota threshold. MTAS will allow the service to continue whilst the new credit control request is in progress. The quota threshold is given in seconds.

This AVP may be included in answers from the OCS. It is used in responses that contain granted units for the service for a real-time credit control session when the OCS requires a new credit reservation request before the granted units are fully consumed.

5.2.153 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 ]
```

This AVP is included in initial requests and may be included in update requests, termination requests and event requests. It is included in update requests arising from media changes, in termination requests arising from SIP session termination, in 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.

5.2.154 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. It is populated with the name of the stored SIP header field or the message body type.

5.2.155 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. It is populated with the value of the stored SIP header field or the message body content.

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5.2.156 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 initial requests, update requests, termination requests and event requests. It is included only if the triggering SIP message contains a SIP header configured to be reported by the operator.

5.2.157 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.

5.2.158 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 being reported by the Transaction-Info AVP.

Possible values:

0	SIP request
1	SIP response

5.2.159 Trigger

The Trigger AVP holds the trigger types. The presence of the Trigger AVP without any Trigger-Type AVP in a CCA allows OCS to disable all the triggers. The presence of the Trigger AVP in the CCR identifies the event(s) triggering the CCR. The ABNF format for Trigger AVP is as follows:

```
<Trigger> ::= < AVP Header: 1264 >
              *[ Trigger-Type ]
```

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5.2.160 Trigger-Type

The Trigger-Type AVP indicates a single re-authorization event type. When included in the Credit Control Answer command, the Trigger-Type AVP indicates the events that shall cause the credit control client to re-authorize the associated quota. The client shall not re-authorize the quota when events which are not included in the Trigger AVP occur. When included in the Credit Control Request command indicates the specific event which caused the re-authorization request of the Reporting-Reason with value RATING_CONDITION_CHANGE associated.

Currently the following trigger types are supported by MTAS:

- Change In Location (3): This value is used to indicate that a change in the end user location shall cause the credit control client to ask for a re-authorization of the associated quota.
- Change In Media Composition (40): This value is used to indicate that a successful update of the SDP shall cause the credit control client to ask for a re-authorization of the associated quota.

5.2.161 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 |
| 2 | TERMINATING_ACCESS |

5.2.162 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 initial and event request.

5.2.163 Unit-Cost

The Unit-Cost AVP is a grouped AVP that holds the cost element of a rate element within a tariff.

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It has the following ABNF grammar:

```
Unit-Cost ::= < AVP Header: 2061 10415 >
              { Value-Digits }
              [ Exponent ]
```

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.164 Unit-Quota-Threshold

The Unit-Quota-Threshold AVP indicates the durability of a rate element within a tariff, i.e. indicates the number of units of the specified type that can be consumed before the next rate element comes into effect.

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.165 Unit-Value

The Unit-Value AVP is a grouped AVP that specifies the number of units within a tariff that result in a charge.

It has the following ABNF grammar:

```
Unit-Value ::= < AVP Header: 445 >
                { Value-Digits }
                [ Exponent ]
```

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing tariff information, which are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to either 'AOC Cost and Tariff Information' or 'AOC Tariff Information'.

5.2.166 Used-Service-Unit

The Used-Service-Unit AVP contains the amount of used units measured from the point when the service became active or, in case of update requests used during the charging session, from the point where the previous measurement ended.

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It has the following ABNF grammar:

```
Used-Service-Unit ::= < AVP Header: 446 >
                      { CC-Time }
                      [ Reporting-Reason ]
```

It may be included in update and termination requests. It is included in all cases where it is necessary to report service usage.

5.2.167 User-Equipment-Info

The User-Equipment-Info AVP allows the credit-control client 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.

The ABNF format for User-Equipment-Info AVP is as follows:

```
User-Equipment-Info ::= < AVP Header: 458 >
                        { User-Equipment-Info-Type }
                        { User-Equipment-Info-Value }
```

The User-Equipment-Info AVP is used with terminating charging when the CM parameter `mtasChargingProfileMultiDeviceMode` is set to 1 ("Rf and Ro") or 3 ("Ro only") and in terminating and originating charging case when `mtasMmtMobileBehaviour` is set to `MOBILE_ENHANCEMENT_ON` and `Mobile-Subscription-List` is provisioned. 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 Primary User's device. User-Equipment-Info-Type and User-Equipment-Info-Value are obtained using following algorithm:

- 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
- 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
- else (if the sip.instance does not match neither IMEISV nor MAC formats), the User Equipment Info is stored as MODIFIED_EUI64 type

Once the User-Equipment-Info-Type AVP and User-Equipment-Info-Value AVP have been updated they will be included in all of the following charging requests.

Additionally, 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

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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.

5.2.168 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.

- IMEISV 0
The identifier contains the International Mobile Equipment Identifier and Software Version in the international IMEISV format according to 3GPP TS 23.003.
- MAC 1
The 48-bit MAC address.
- EUI64 2
The 64-bit identifier used to identify hardware instance of the product.
- MODIFIED_EUI64 3
There are a number of types of terminals that have identifiers other than IMEI, IEEE 802 MACs, or EUI-64. These identifiers can be converted to modified EUI-64 format or by using some other methods referred to in the service-specific documentation.

5.2.169 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.

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5.2.170 User-Name

The User-Name AVP contains the Private User Identity (IMPI) of the served user cached by MTAS during 3rd party extended registration. The AVP is sent in the following two scenarios:

1. Terminating charging case if CM parameter `mtasChargingProfileMultiDeviceMode` is set to 1 ("Rf and Ro") or 3 ("Ro only"), 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.

3. Terminating and originating case if `mtasMmtMobileBehaviour` is 1(MOBILE_ENHANCEMENT_ON) and mobile-subscription-list is provisioned.

For unregistered mobile subscription case, The IMPI provisioned in mobile subscription list is used.

4. Originating case if `mtasSccMobileBehaviour` is 1(MOBILE_ENHANCEMENT_ON).
5. Terminating case if `mtasSccMobileBehaviour` is 1(MOBILE_ENHANCEMENT_ON).

The AVP contains the IMPI of the mobile subscription identified by Accept-Contact header on incoming Initial INVITE.

In case `mtasChargingProfileMultiDeviceMode` is set to 1 ("Rf and Ro") or 3 ("Ro only"), when the IMPI is not known (such as after a failover when the only data MTAS has comes from the polling SUBSCRIBE/NOTIFY that does not include PRID information), a "dummy" value should be stored for future use in the User-name AVP in Online Charging in the following form:

- Mobile: 9999
- Fixed Devices: 0001

In `mtasChargingProfileUserPrivateIdentityReportingBehavior` case, if there is cached IMPI, User-Name AVP will be only present in the CCR initial and CCR event messages.

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5.2.171 User-Session-Id

The User-Session-Id AVP contains the SIP Call-ID of the incoming dialog

The SIP Call ID is obtained from the INVITE received on the incoming dialog (see section 3.3). If 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).

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

5.2.172 Validity-Time

The Validity-Time AVP contains the validity time for the granted service units. The measurement of the validity time is started upon receipt of the CCA message. If the granted service units have not been consumed within the validity time, MTAS sends a new request for credit reservation to the OCS. The validity time is given in seconds.

This AVP may be included in answers from the OCS. It is used in responses that contain granted units for the service for a real-time credit control session when the credit reservation has a finite lifetime.

5.2.173 Value-Digits

The Value-Digits AVP contains the significant digits of a number. Where decimal numbers need to be represented, the number is represented by a Value-Digits AVP and an Exponent AVP. For example, the decimal number 1.25 is represented by a Value-Digits AVP set to 125 and an Exponent AVP set to -2 (i.e. 125×10^{-2}). Similarly, large numbers may be represented using a Value-Digits AVP and an Exponent AVP. For example, the number 1.25 million may be represented by a Value-Digits AVP set to 125 and an Exponent AVP set to 4 (i.e. 125×10^4).

This AVP may be included in update requests and in answers from the OCS. It is included in requests that are used to convey external (RTTI) tariff information to the OCS. It is used in answers containing cost and/or tariff information. Those answers are sent in response to requests containing an AoC-Request-Type AVP (see section 5.2.21) set to 'AOC Cost and Tariff Information', 'AOC Cost Information' or 'AOC Tariff Information'.

5.2.174 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).

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An answer containing an Experimental-Result AVP with a Vendor-Id AVP set to any other value is treated as if the message had contained a Result-Code AVP (see section 5.2.105) set to 4010 (End User Service Denied).

This AVP is expected in all answers that contain an Experimental-Result AVP (see section 5.2.51).

6 Related Standards

The CCR and CCA messages are based on the messages and contents specified in references [2] and [3].

MTAS does not include the following AVPs when generating CCR messages:

- Origin-State-Id
- Route-Record

MTAS does not generate the following information in the Multiple-Services-Credit-Control AVP included in CCR messages:

- Envelope
- AF-Correlation-Information

When sending a CCR message requesting credit reservation, MTAS includes an empty Requested-Service-Unit AVP in the Multiple-Services-Credit-Control AVP.

When sending a CCR message reporting used service units, MTAS does not generate the following information in the Used-Service-Unit AVP in the Multiple-Services-Credit-Control AVP:

- Tariff-Change-Usage
- CC-Total-Octets
- CC-Input-Octets
- CC-Output-Octets
- CC-Service-Specific-Units
- Event-Charging-Timestamp

MTAS does not generate the following information in the IMS-Information AVP included in CCR messages:

- Alternate-Charged-Party-Address
- Associated-URI
- Application-Server-Information
- Served-Party-IP-Address
- Server-Capabilities
- Trunk-Group-ID
- Bearer-Service
- Service-Id

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- Message-Body
- Early-Media-Description
- IMS-Communication-Service-Identifier

MTAS does not generate the following information in the SDP-Media-Component AVP included in CCR messages:

- Media-Initiator-Party
- Authorized-QoS
- 3GPP-Charging-Id
- Access-Network-Charging-Identifier-Value

MTAS does not use the following AVPs when received in CCA messages:

- CC-Session-Failover
- Cost-Information
- Direct-Debiting-Failure-Handling
- Redirect-Host
- Redirect-Host-Usage
- Redirect-Max-Cache-Time
- Route-Record

MTAS does not use the following AVPs when received in the Multiple-Services-Credit-Control AVP:

- Rating-Group
- G-S-U-Pool-Reference
- Volume-Quota-Threshold
- Quota-Holding-Time
- Quota-Consumption-Time
- PS-Furnish-Charging-Information
- Envelope-Reporting
- Time-Quota-Mechanism

MTAS does not use the following AVPs when received in the Granted-Service-Unit AVP within a Multiple-Services-Credit-Control AVP:

-
- CC-Total-Octets
- CC-Input-Octets
- CC-Output-Octets
- CC-Service-Specific-Units

MTAS does not use the following AVPs when received in the Final-Unit-Indication AVP within a Multiple-Services-Credit-Control AVP:

- Restriction-Filter-Rule
- Filter-Id
- Redirect-Server

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MTAS ignores any unexpected AVPs when received in CCA messages.

7 Terminology

7.1 Abbreviations

3GPP	3 rd Generation Partnership Project
3PCC	3 rd Party Call Control
3PTY	Three Party
ABNF	Augmented Backus-Naur Form
ANI	Access-Network-Info
AOC	Advice of Charge
AoC-D	Advice of Charging During
AoC-E	Advice of Charge End
AoC-S	Advice of Charge Start
AS	Application Server
ASA	Abort Session Answer
ASR	Abort Session Request
AVP	Attribute-Value Pair
CCA	Credit Control Answer
CCBS	Communication Completion on Busy
CCNL	Communication Completion on Not Logged-in
CCNR	Communication Completion on No Reply
CCR	Credit Control Request
CDIV	Communication Diversion
CPC	Calling Party Category
CSA	Communication Setup Announcement
CTF	Charging Trigger Function
CUG	Closed User Group
DND	Do Not Disturb
DR	Distinctive Ring
DST	Daylight Saving Time
FCD	Flexible Communication Distribution
FCDDP	Flexible Communication Distribution Divert Primary

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FSFS	Flexible Service Format Selection
HSS	Home Subscriber Server
ICID	IMS Charging Identifier
IMPU	IP Multimedia Public Identity
IOI	Inter-Operator Identifier
IRS	Implicit Registration Set
IVNI	IMS-Visited-Network-Identifier
MCC	Mobile Country Code
MMTel	Multimedia Telephony
MNC	Mobile Network Code
MSISDN	Mobile Subscriber Integrated Services Digital Network
OCS	Online Charging System
PANI	P-Access-Network-Info
PIN	Personal Identification Number
PVNI	P-Visited-Network-ID
RAA	Re-Auth Answer
RAR	Re-Auth Request
RPH	Resource-Priority header
RTTI	Real-time Transfer of Tariff Information
SCTP	Stream Control Transmission Protocol
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SSC	Supplementary Service Code
TCP	Transmission Control Protocol
URI	Unified Resource Identifier
UTC	Coordinated Universal Time

7.2 Definitions

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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; IP Multimedia Subsystem (IMS) charging
3GPP TS 32.260 (v7.6.0)
- [3] 3GPP Technical Specification; Telecommunication management; Charging management; Diameter charging applications
3GPP TS 32.299 (v8.9.0)
- [4] Diameter Base Protocol
RFC 3588
- [5] Diameter Credit Control Application
RFC 4006
- [6] Session Description Protocol
RFC 4566
- [7] MTAS Charging Management Guide
3/1553-AVA 901 09/n**
- [8] TSP: MTAS Parameter Description
1/190 84-AVA 901 09/9-x**
CBA: Managed Object Model MTAS
155 54-LZN 765 0163/9-V1
- [9] TSP: Diameter Stack Statement of Compliance
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CBA: Diameter Base Protocol Statement of Compliance
1/174 02-CXP 904 0375
- [10] TSP: Diameter Stack Function Specification
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- [11] 3GPP SIP Transfer of IP Multimedia Service Tariff Information,
3GPP TS 29.658 (v8.0.0)
- [12] ISUP Signalling Aspects of charging
ETSI ES 201 296 (V1.3.1)
- [13] Common Policy: A Document Format for Expressing Privacy Preferences
RFC 4745
- [14] The SIP P-Served-User Private-Header
RFC 5502

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[15] Communications Resource Priority for SIP
RFC 4412

[16] TSP: Diameter Parameter List
1/1551-CRA 119 0019/n**
CBA:

** See the Customer or Support library for the Application System in question
to get the correct document version.

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9 Appendix 1 - Protocol Bindings

The following sections detail the protocol bindings for credit reservation / consumption, event reporting and advice of charge. It is not an exhaustive list and should not be considered as such. Not all AVPs have been shown. It is assumed that capabilities exchanges have been done.

9.1 Basic MMTel Session Establishment (Originating MTAS)

9.1.1 Initial Request on receipt of INVITE

The following CCR message illustrates the content of an initial request sent to the charging server by an originating MTAS node on receipt of a SIP INVITE request containing an SDP offer containing a single audio media stream.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 1 (Initial)
CC-Request-Number = 0
Event-Timestamp = 3436507983
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Requested-Service-Unit (empty)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = INVITE
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        Time-Stamps
            SIP-Request-Timestamp = 3436507983
        Inter-Operator-Identifier
            Originating-IOI = home1.net
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
        SDP-Session-Description = v=0
        SDP-Session-Description = o=A0 12345 0 IN IP4 111.22.33.44
        SDP-Session-Description = s=-
        SDP-Session-Description = c=IN IP4 222.33.44.55
        SDP-Session-Description = t=0 0
```

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```
SDP-Media-Component
  SDP-Media-Name = m=audio 3458 RTP/AVP 0 96
  SDP-Media-Description = a=rtpmap:0 PCMU
  SDP-Media-Description = a=rtpmap:96 G726-32/8000
  Media-Initiator-Flag = 1 (Calling)
Access-Network-Information = 3GPP-UTRAN-TDD; utran-cell-id-
                             3gpp=1234567890ABC;network-provided;local-
                             timezone="UTC+01:00";daylight-saving-time="01"
IMS-Visited-Network-Identifier =
    ims.mnc077.mcc234.3gppnetwork.org

Ericsson-Service-Information
  IMS-Service-Identification = +g.ericsson.mmt
  IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
  MMT-Information
    Calling-Party-Address-Presentation-Status = 2 (Unknown)
    From-Header = tel:02476000001;phone-context=homel.net;ext=6789
    From-Header-Presentation-Status = 2 (Unknown)
    SIP-Request-Timestamp-Fraction = 135
    UHTZ-Offset = UTC+01:00
```

9.1.2 Initial Response

The following CCA message illustrates the content of a response to the initial request in section 9.1.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 1 (Initial)
CC-Request-Number = 0
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
    Validity-Time = 500
    Time-Quota-Threshold = 5
  Credit-Control-Failure-Handling = 0 (Terminate)
```

9.1.3 Update Request on receipt of 200 OK (INVITE) response

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node on receipt of a SIP 200 OK response to the INVITE request in section 9.1.1. The CCR message contains the negotiated SDP. Differences in the message content from the initial request in section 9.1.1 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
```

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```

Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436507990
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Requested-Service-Unit (empty)
Used-Service-Units
    CC-Time = 0
    Reporting-Reason = 6 (Rating Condition Change)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = INVITE
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        Called-Asserted-Identity = tel:+442476000002
        Time-Stamps
            SIP-Request-Timestamp = 3436507983
            SIP-Response-Timestamp = 3436507990
        Inter-Operator-Identifier
            Originating-IOI = home1.net
            Terminating-IOI = home2.net
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
        SDP-Session-Description = v=0
        SDP-Session-Description = o=B0 54321 10 IN IP4 111.22.33.44
        SDP-Session-Description = s=-
        SDP-Session-Description = c=IN IP4 222.33.44.66
        SDP-Session-Description = t=0 0
        SDP-Media-Component
            SDP-Media-Name = m=audio 3458 RTP/AVP 0
            SDP-Media-Description = a=rtpmap:0 PCMU
            Media-Initiator-Flag = 1 (Calling)Ericsson-Service-Information
        IMS-Service-Identification = +g.ericsson.mmt
        IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
        MMT-Information
            Called-Asserted-Identity-Presentation-Status = 0 (Allowed)
            Calling-Party-Address-Presentation-Status = 0 (Allowed)
            From-Header = tel:02476000001;phone-context=home1.net;ext=6789
            From-Header-Presentation-Status = 0 (Allowed)
            SIP-Request-Timestamp-Fraction = 135
            SIP-Response-Timestamp-Fraction = 456
            SIP-Ringing-Timestamp = 3436507984

```

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SIP-Ringing-Timestamp-Fraction = 007

9.1.4 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.1.3.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
  Validity-Time = 500
  Time-Quota-Threshold = 5
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.1.5 Update Response with unsuccessful Result-Code

The following CCA message illustrates the content of a response with unsuccessful Result-Code in both the command level and MSCC level to the update request in section 9.1.3.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 4012 (DIAMETER_CREDIT_LIMIT_REACHED)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 4012 (DIAMETER_CREDIT_LIMIT_REACHED)
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.1.6 Update Response with announcement instructions requested by OCS

The following CCA message illustrates the content of a response with announcement instructions requested by OCS to the update request in section 9.1.3.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
```

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```

Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
  Announcement-Instructions
    Announcement-Number = 24
    Announcement-Order = 1
    Announcement-Type = 0 (PREQUOTA_ANNOUNCEMENT)
    Announcement-Variable-Part
      Announcement-Variable-Part-Type = 4 (PRICE)
      Announcement-Variable-Part-Data = 10
  Announcement-Instructions
    Announcement-Number = 14
    Announcement-Order = 2
    Announcement-Type = 1 (POSTQUOTA_ANNOUNCEMENT)
Credit-Control-Failure-Handling = 0 (Terminate)

```

9.2 Action on reaching Quota Threshold

9.2.1 Update Request

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node when the threshold (e.g. 5s) associated with the granted quota (e.g. 300s) is reached. Differences in the message content from the update request in section 9.1.3 are highlighted.

```

<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 2
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508285
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Requested-Service-Unit (empty)
Used-Service-Units
  CC-Time = 295
  Reporting-Reason = 0 (Threshold)

```

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Service-Information

IMS-Information

Role-of-Node = 0 (Originating)

Node-Functionality = 6 (AS)

User-Session-Id = 843817637684230998sdasdh09

Calling-Party-Address = sip:IMS_Subscriber_A@home1.net

Calling-Party-Address = tel:+442476000001

Called-Party-Address = sip:IMS_Subscriber_B@home2.net

IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025

Ericsson-Service-Information

IMS-Service-Identification = +g.ericsson.mmt

IMS-Service-Identification = urn:urn-xxx:3gpp-

service.ims.icsi.mmtel

MMT-Information

Calling-Party-Address-Presentation-Status = 0 (Allowed)

9.2.2 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.2.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 2
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
  Validity-Time = 500
  Time-Quota-Threshold = 5
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.3 Action on Media Change

9.3.1 Update Request

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node when the media has been successfully changed, e.g. on receipt of a 200 OK response to a SIP UPDATE during an established MMTel session. Differences in the message content from the update request in section 9.2 are highlighted. This example reflects the use of SIP UPDATE by the called party to add video to the media session.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
```


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Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 3
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508300
Subscription-Id
 Subscription-Id-Type = 0 (E.164)
 Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
 Service-Identifier = 1 (MMTel Communication Service)
 Requested-Service-Unit (empty)
 Used-Service-Units
 CC-Time = 15
 Reporting-Reason = 6 (Rating Condition Change)
Service-Information
 IMS-Information
 Event-Type
 SIP-Method = UPDATE
 Role-of-Node = 0 (Originating)
 Node-Functionality = 6 (AS)
 User-Session-Id = 843817637684230998sdasdh09
 Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
 Calling-Party-Address = tel:+442476000001
 Called-Party-Address = sip:IMS_Subscriber_B@home2.net
 Time-Stamps
 SIP-Request-Timestamp = 3436508299
 SIP-Response-Timestamp = 3436508299
 IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
 SDP-Session-Description = v=0
 SDP-Session-Description = o=A0 12345 0 IN IP4 111.22.33.44
 SDP-Session-Description = s=-
 SDP-Session-Description = c=IN IP4 222.33.44.55
 SDP-Session-Description = t=0 0
 SDP-Media-Component
 SDP-Media-Name = m=audio 3458 RTP/AVP 0
 SDP-Media-Description = a=rtpmap:0 PCMU
 Media-Initiator-Flag = 0 (Called)
 SDP-Media-Component
 SDP-Media-Name = m=video 3400 RTP/AVP 98
 SDP-Media-Description = a=rtpmap:98 H.261
 Media-Initiator-Flag = 0 (Called)
Ericsson-Service-Information
 IMS-Service-Identification = +g.ericsson.mmt
 IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
 MMT-Information
 Calling-Party-Address-Presentation-Status = 0 (Allowed)
 SIP-Request-Timestamp-Fraction = 100
 SIP-Response-Timestamp-Fraction = 750

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9.3.2 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.3.1. Note the omission of the Time-Quota-Threshold AVP in this example is purely to allow different behavior to be illustrated, and has no further significance.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 3
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Result-Code = 2001 (Success)
    Granted-Service-Unit
        CC-Time = 300
        Validity-Time = 500
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.4 Action on consumption of granted quota

9.4.1 Update Request

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node when the granted quota (e.g. 300s) has been used. Differences in the message content from the update request in section 9.2.1 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 4
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508600
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Requested-Service-Unit (empty)
    Used-Service-Units
        CC-Time = 300
        Reporting-Reason = 3 (Quota Exhausted)
Service-Information
```

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```
IMS-Information
  Role-of-Node = 0 (Originating)
  Node-Functionality = 6 (AS)
  User-Session-Id = 843817637684230998sdasdh09
  IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
  Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
  Calling-Party-Address = tel:+442476000001
  Called-Party-Address = sip:IMS_Subscriber_B@home2.net
Ericsson-Service-Information
  IMS-Service-Identification = +g.ericsson.mmt
  IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
MMT-Information
  Calling-Party-Address-Presentation-Status = 0 (Allowed)
```

9.4.2 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.4.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 4
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
  Validity-Time = 500
  Time-Quota-Threshold = 5
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.5 Action on MMTel Session Termination

9.5.1 Termination Request

The following CCR message illustrates the content of a termination request sent to the charging server by an originating MTAS node when the communication session is terminated due to a SIP BYE. Differences in the message content from the update request in section 9.4.1 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 3 (Termination)
```

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```
CC-Request-Number = 5
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508330
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Requested-Service-Unit (empty)
    Used-Service-Units
        CC-Time = 30
        Reporting-Reason = 2 (Final)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = BYE
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        Time-Stamps
            SIP-Request-Timestamp = 3436508330
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
    MMT-Information
        Calling-Party-Address-Presentation-Status = 0 (Allowed)
        SIP-Request-Timestamp-Fraction = 321
```

9.5.2 Termination Response

The following CCA message illustrates the content of a response to the termination request in section 9.5.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 3 (Termination)
CC-Request-Number = 5
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Result-Code = 2001 (Success)
```

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9.6 External Tariff (RTTI)

This section shows a CCR (Initial) and a CCA (Initial) which indicates that an external tariff is required. The subsequent CCR (Update) contains the external tariff which was received as part of the session set-up using the RTTI mechanism.

9.6.1 Initial Request on receipt of INVITE

The following CCR message illustrates the content of an initial request sent to the charging server by an originating MTAS node on receipt of a SIP INVITE request containing an SDP offer containing a single audio media stream.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 1 (Initial)
CC-Request-Number = 0
Event-Timestamp = 3436507983
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Multiple-Services-Credit-Control
    Service-Identifier = 1 (MMTel Communication Service)
    Requested-Service-Unit (empty)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = INVITE
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        Time-Stamps
            SIP-Request-Timestamp = 3436507983
        Inter-Operator-Identifier
            Originating-IOI = home1.net
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
        SDP-Session-Description = v=0
        SDP-Session-Description = o=A0 12345 0 IN IP4 111.22.33.44
        SDP-Session-Description = s=-
        SDP-Session-Description = c=IN IP4 222.33.44.55
        SDP-Session-Description = t=0 0
        SDP-Media-Component
            SDP-Media-Name = m=audio 3458 RTP/AVP 0 96
            SDP-Media-Description = a=rtpmap:0 PCMU
            SDP-Media-Description = a=rtpmap:96 G726-32/8000
            Media-Initiator-Flag = 1 (Calling)
```

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```
Access-Network-Information = 3GPP-UTRAN-TDD; utran-cell-id-3gpp=1234567890ABC

Ericsson-Service-Information
  IMS-Service-Identification = +g.ericsson.mmt
  IMS-Service-Identification = urn:urn-xxx:3gpp-service.ims.icsi.mmtel
  MMT-Information
    Calling-Party-Address-Presentation-Status = 2 (Unknown)
    From-Header = tel:02476000001;phone-context=homel.net;ext=6789
    From-Header-Presentation-Status = 2 (Unknown)
    SIP-Request-Timestamp-Fraction = 135
    UHTZ-Offset = UTC+01:00
```

9.6.2 Initial Response

The following CCA message illustrates the content of a response to the initial request in section 9.6.1. The response contains an Experimental-Result with a code indicating 'external tariff required'.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Experimental-Result
  Vendor-Id = 193 (Ericsson)
  Experimental-Result-Code = 2002 (External-Tariff-Required)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 1 (Initial)
CC-Request-Number = 0
Multiple-Services-Credit-Control
  Service-Identifier = 1 (MMTel Communication Service)
  Result-Code = 2001 (Success)
  Granted-Service-Unit
    CC-Time = 300
  Validity-Time = 500
  Time-Quota-Threshold = 5
Credit-Control-Failure-Handling = 0 (Terminate)
```

9.6.3 Update Request

The following CCR message illustrates the content of an update request when a 3rd Party Carrier has sent a new tariff for the session in progress. Differences in the message content from the initial request in section 9.6.1 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Destination-Host = ecf99.ecf.ericsson.com
```

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Event-Timestamp = 3436507985
Subscription-Id
 Subscription-Id-Type = 0 (E.164)
 Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
 IMS-Information
 Event-Type
 SIP-Method = INVITE
 Role-of-Node = 0 (Originating)
 Node-Functionality = 6 (AS)
 User-Session-Id = 843817637684230998sdasdh09
 IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
 Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
 Calling-Party-Address = tel:+442476000001
 Called-Party-Address = sip:IMS_Subscriber_B@home2.net
 Time-Stamps
 SIP-Request-Timestamp = 3436507983
 IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
Ericsson-Service-Information
 IMS-Service-Identification = +g.ericsson.mmt
 IMS-Service-Identification = urn:urn-xxx:3gpp-service.ims.icsi.mmtel
 MMT-Information
 Calling-Party-Address-Presentation-Status = 0 (Allowed)
 From-Header = tel:02476000001;phone-context=home1.net;ext=6789
 From-Header-Presentation-Status = 0 (Allowed)
 SIP-Request-Timestamp-Fraction = 135
 Tariff-Information
 Apply-Tariff-Immediate = 0
 Apply-Tariff-Restart = 1
 Purpose = 0
 Current-Tariff
 Currency-Code = 978
 Rate-Element
 CC-Unit-Type = Money
 Unit-Cost
 Value-Digits = 2
 Exponent = 1
 Unit-Quota-Threshold = 300 (5 minutes)
 Rate-Element
 CC-Unit-Type = Time
 Unit-Value
 Value-Digits = 6
 Exponent = 2
 Unit-Cost
 Value-Digits = 3
 Exponent = 1
 Unit-Quota-Threshold = 0 (No expiry)
 Tariff-Expiry-Policy = 0 (Cycle)
 Set-Up-Charge
 Connection-Attempt-Charge
 Tariff-Change-Time = 3468960078
 Next-Tariff
 Currency-Code
 Rate-Element
 CC-Unit-Type = Money

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```

Unit-Cost
  Value-Digits = 4
  Exponent = 1
  Unit-Quota-Threshold = 3600 (1 hour)
Rate-Element
  CC-Unit-Type = Time
  Unit-Value
    Value-Digits = 9
    Exponent = 1
  Unit-Cost
    Value-Digits = 2
    Exponent = 1
    Unit-Quota-Threshold = 0
Tariff-Expiry-Policy = 0
Set-Up-Charge
  Value-Digits = 0
  Exponent = 1
Connection-Attempt-Charge
  Value-Digits = 0
  Exponent = 1
Origination-Identification
  Network-Identification = 02A1
  Reference-ID = 8989898989

```

9.6.4 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.6.3.

```

<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 1

```

9.7 Basic MMTel Session Establishment rejected by MTAS before an Initial Request has been sent (Originating MTAS)

9.7.1 Event Request on receipt of INVITE

The following CCR message illustrates the content of an event request sent to the charging server by an originating MTAS node on rejecting a SIP INVITE request before a CCR Initial Request has been sent.

```

<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;360;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com

```


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```
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
Event-Timestamp = 3436507983
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Requested-Action = 0 (Direct Debiting)
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
  IMS-Information
    Event-Type
      SIP-Method = INVITE
    Role-of-Node = 0 (Originating)
    Node-Functionality = 6 (AS)
    User-Session-Id = 843817637684230998sdasdh09
    Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
    Calling-Party-Address = tel:+442476000001
    Called-Party-Address = sip:IMS_Subscriber_B@home2.net
    Time-Stamps
      SIP-Request-Timestamp = 3436507983
      SIP-Response-Timestamp = 3436507983
    Inter-Operator-Identifier
      Originating-IOI = home1.net
    IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
    Cause-Code = 503 (Service Unavailable)
    Access-Network-Information = 3GPP-UTRAN-TDD; utran-cell-id-
                                3gpp=1234567890ABC
  Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
  MMT-Information
    Calling-Party-Address-Presentation-Status = 2 (Unknown)
    From-Header = tel:02476000001;phone-context=home1.net;ext=6789
    From-Header-Presentation-Status = 2 (Unknown)
    SIP-Request-Timestamp-Fraction = 014
    SIP-Response-Timestamp-Fraction = 182
    UHTZ-Offset = UTC+01:00
```

9.7.2 Event Response

The following CCA message illustrates the content of a response to the initial request in section 9.7.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;360;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
```

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9.8 Successful Activation of a Supplementary Service using a Supplementary Service Command Code

9.8.1 Event Request on receipt of INVITE

The following CCR message illustrates the content of an event request sent to the charging server by an originating MTAS node on successful activation of Communication Forwarding on No Reply.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;361;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
Event-Timestamp = 3436507983
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Requested-Action = 0 (Direct Debiting)
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
  IMS-Information
    Event-Type
      SIP-Method = INVITE
      Role-of-Node = 0 (Originating)
      Node-Functionality = 6 (AS)
      User-Session-Id = 843817637684230998sdasdh09
      Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
      Calling-Party-Address = tel:+442476000001
      Called-Party-Address = sip:*61*3568047%23;phone-context=
                           birmingham.bt.co.uk;user=phone
    Time-Stamps
      SIP-Request-Timestamp = 3436507983
      SIP-Response-Timestamp = 3436507983
    Inter-Operator-Identifier
      Originating-IOI = home1.net
    IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
    Access-Network-Information = 3GPP-UTRAN-TDD; utran-cell-id-
                               3gpp=1234567890ABC
  Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
    MMT-Information
      Calling-Party-Address-Presentation-Status = 2 (Unknown)
      SIP-Request-Timestamp-Fraction = 014
      SIP-Response-Timestamp-Fraction = 182
      From-Header = tel:02476000001;phone-context=home1.net;ext=6789
      From-Header-Presentation-Status = 2 (Unknown)
      Supplementary-Service-Information
        Supplementary-Service-Identity = 2 (CFNR)
        Supplementary-Service-Action = 100 (SSC Activation)
```

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UHTZ-Offset = UTC+01:00

9.8.2 Event Response

The following CCA message illustrates the content of a response to the event request in section 9.8.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;361;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
```

9.9 Successful User Configuration Change

9.9.1 Event Request on receipt of Ut Request

The following CCR message illustrates the content of an event request sent to the charging server by an MTAS node following successful configuration changes to the subscriber's service data. The example shows the result of a Ut request that both activates forwarding on no-reply and deactivates incoming communication barring.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;370;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
Event-Timestamp = 3436507983
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Requested-Action = 0 (Direct Debiting)
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
  IMS-Information
    Node-Functionality = 6 (AS)
Ericsson-Service-Information
  MMT-Information
    Supplementary-Service-Information
      Supplementary-Service-Identity = 2 (CFNR)
      Supplementary-Service-Action = 300 (Ut Service Activation)
    Supplementary-Service-Information
      Supplementary-Service-Identity = 100 (ICB)
      Supplementary-Service-Action = 301 (Ut Service Deactivation)
UHTZ-Offset = UTC+01:00
```

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9.9.2 Event Response

The following CCA message illustrates the content of a response to the event request in section 9.9.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;370;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 4 (Event)
CC-Request-Number = 0
```

9.10 Emergency Call Notification

9.10.1 Event Request on Emergency Call Start

The following CCR message illustrates the content of an event request sent to the charging server by an originating MTAS node following a SIP NOTIFY with Event header “emergencyCall; start” received from CSCF.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY 4 >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;370;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 4 (EVENT)
Event-Timestamp = 3436507983
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
  IMS-Information
    Time-Stamps
      SIP-Request-Timestamp = 3436507983
      SIP-Response-Timestamp = 3436507983
    Service-Specific-Info
      Service-Specific-Type = 1007
      Service-Specific-Data = 255 (Emergency Call Start)
```

9.10.2 Event Request on Emergency Call Stop

The following CCR message illustrates the content of an event request sent to the charging server by an originating MTAS node following a SIP NOTIFY with Event header “emergencyCall; stop” received from CSCF.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY 4 >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;370;1;1
```

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```
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.MMTel-IMS@ericsson.com
CC-Request-Type = 4 (EVENT)
Event-Timestamp = 3436507983
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
Multiple-Services-Indicator = 1 (Multiple Services Supported)
Service-Information
  IMS-Information
    Time-Stamps
      SIP-Request-Timestamp = 3436507983
      SIP-Response-Timestamp = 3436507983
    Service-Specific-Info
      Service-Specific-Type = 1007
      Service-Specific-Data = 256 (Emergency Call End)
```

9.10.3 Event Response on Emergency Call Notification

The following CCA message illustrates the content of a response to the event request sent as a result of an Emergency Call Notification.

```
<CCA> ::= < Diameter Header: 272, PXY >
  Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;370;1;1
  Result-Code = 4011 (DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE)
  Origin-Host = ecf99.ecf.ericsson.com
  Origin-Realm = ecf.ericsson.com
  Auth-Application-Id = 4
  CC-Request-Type = 4 (Event)
```

9.11 AOC Session Establishment (Originating MTAS)

The following sections illustrate an advice of charge session, i.e. a session where advice of charge is required without any credit-control.

9.11.1 Initial Request on receipt of INVITE

The following CCR message illustrates the content of an initial request sent to the charging server by an originating MTAS node on receipt of a SIP INVITE request containing an SDP offer containing a single audio media stream.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
  Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
  Origin-Host = mtas123.mtas.ericsson.com
  Origin-Realm = mtas.ericsson.com
  Destination-Realm = ecf.ericsson.com
  Auth-Application-Id = 4
  Service-Context-Id = 7.AOC-IMS@ericsson.com
  CC-Request-Type = 1 (Initial)
  CC-Request-Number = 0
  Event-Timestamp = 3436507983
```

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```
Subscription-Id
  Subscription-Id-Type = 0 (E.164)
  Subscription-Id-Data = 442476123456
AoC-Request-Type = 0 (No AOC Information)
Service-Information
  IMS-Information
    Event-Type
      SIP-Method = INVITE
    Role-of-Node = 0 (Originating)
    Node-Functionality = 6 (AS)
    User-Session-Id = 843817637684230998sdasdh09
    Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
    Calling-Party-Address = tel:+442476000001
    Called-Party-Address = sip:IMS_Subscriber_B@home2.net
    Time-Stamps
      SIP-Request-Timestamp = 3436507983
    Inter-Operator-Identifier
      Originating-IOI = home1.net
    IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
    SDP-Session-Description = v=0
    SDP-Session-Description = o=A0 12345 0 IN IP4 111.22.33.44
    SDP-Session-Description = s=-
    SDP-Session-Description = c=IN IP4 222.33.44.55
    SDP-Session-Description = t=0 0
    SDP-Media-Component
      SDP-Media-Name = m=audio 3458 RTP/AVP 0 96
      SDP-Media-Description = a=rtpmap:0 PCMU
      SDP-Media-Description = a=rtpmap:96 G726-32/8000
      Media-Initiator-Flag = 1 (Calling)
    Access-Network-Information = 3GPP-UTRAN-TDD; utran-cell-id-
                                3gpp=1234567890ABC
  Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
  MMT-Information
    Calling-Party-Address-Presentation-Status = 2 (Unknown)
    From-Header = tel:02476000001;phone-context=home1.net;ext=6789
    From-Header-Presentation-Status = 2 (Unknown)
    SIP-Request-Timestamp-Fraction = 014
    UHTZ-Offset = UTC+01:00
```

9.11.2 Initial Response

The following CCA message illustrates the content of a response to the initial request in section 9.11.1.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 1 (Initial)
CC-Request-Number = 0
```

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9.11.3 AoC-S Update Request on receipt of 200 OK (INVITE) response

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node on receipt of a SIP 200 OK response to the INVITE request in section 9.11.1. The CCR message contains the negotiated SDP. Differences in the message content from the initial request in section 9.11.1 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.AOC-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436507990
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
AoC-Request-Type = 3 (AOC Tariff Information)
Currency-Code = 752 (SEK)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = INVITE
            Role-of-Node = 0 (Originating)
            Node-Functionality = 6 (AS)
            User-Session-Id = 843817637684230998sdasdh09
            Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
            Calling-Party-Address = tel:+442476000001
            Called-Party-Address = sip:IMS_Subscriber_B@home2.net
            Called-Asserted-Identity = tel:+442476000002
        Time-Stamps
            SIP-Request-Timestamp = 3436507983
            SIP-Response-Timestamp = 3436507990
        Inter-Operator-Identifier
            Originating-IOI = home1.net
            Terminating-IOI = home2.net
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
        SDP-Session-Description = v=0
        SDP-Session-Description = o=B0 54321 10 IN IP4 111.22.33.44
        SDP-Session-Description = s=-
        SDP-Session-Description = c=IN IP4 222.33.44.66
        SDP-Session-Description = t=0 0
        SDP-Media-Component
            SDP-Media-Name = m=audio 3458 RTP/AVP 0
            SDP-Media-Description = a=rtpmap:0 PCMU
            Media-Initiator-Flag = 1 (Calling)
    Ericsson-Service-Information
        IMS-Service-Identification = +g.ericsson.mmt
        IMS-Service-Identification = urn:urn-xxx:3gpp-
        service.ims.icsi.mmtel
        MMT-Information
```

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Called-Asserted-Identity-Presentation-Status = 0 (Allowed)
 Calling-Party-Address-Presentation-Status = 0 (Allowed)
 From-Header = tel:02476000001;phone-context=home1.net;ext=6789
 From-Header-Presentation-Status = 0 (Allowed)
 SIP-Request-Timestamp-Fraction = 014
SIP-Response-Timestamp-Fraction = 456
SIP-Ringing-Timestamp = 3436507984
SIP-Ringing-Timestamp-Fraction = 007

9.11.4 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.11.3.

```

<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 1
Service-Information
  AoC-Information
    Tariff-Information
      Current-Tariff (e.g. 1 unit/min (for 10 min), 1 unit/5min)
        Rate-Element
          CC-Unit-Type = 0 (Time)
          Unit-Value
            Value-Digits = 6
            Exponent = 1
          Unit-Cost
            Value-Digits = 1
          Unit-Quota-Threshold = 600
        Rate-Element
          CC-Unit-Type = 0 (Time)
          Unit-Value
            Value-Digits = 3
            Exponent = 2
          Unit-Cost
            Value-Digits = 1
          Tariff-Time-Change = 3436509000
      Next-Tariff (e.g. 2 units/min)
        Rate-Element
          CC-Unit-Type = 0 (Time)
          Unit-Value
            Value-Digits = 6
            Exponent = 1
          Unit-Cost
            Value-Digits = 2

```


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9.11.5 AoC-D Update Request

The following CCR message illustrates the content of an update request sent to the charging server by an originating MTAS node when cost information is required for AoC-D purposes. Differences in the message content from the update request in section 9.11.3 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.AOC-IMS@ericsson.com
CC-Request-Type = 2 (Update)
CC-Request-Number = 2
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508300
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
AoC-Request-Type = 2 (AOC Cost Information)
Currency-Code = 752 (SEK)
Service-Information
    IMS-Information
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
MMT-Information
    Calling-Party-Address-Presentation-Status = 0 (Allowed)
```

9.11.6 Update Response

The following CCA message illustrates the content of a response to the update request in section 9.11.5.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 2 (Update)
CC-Request-Number = 2
Service-Information
    AoC-Information
        AoC-Cost-Information
```

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Accumulated-Cost
Value-Digits = 6
Currency-Code = 752 (SEK)

9.11.7 AoC-E Termination Request

The following CCR message illustrates the content of a termination request sent to the charging server by an originating MTAS node when cost information is required for AoC-E purposes. Differences in the message content from the update request in section 9.11.5 are highlighted.

```
<CCR> ::= < Diameter Header: 272, REQ, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
Origin-Host = mtas123.mtas.ericsson.com
Origin-Realm = mtas.ericsson.com
Destination-Realm = ecf.ericsson.com
Auth-Application-Id = 4
Service-Context-Id = 7.AOC-IMS@ericsson.com
CC-Request-Type = 3 (Termination)
CC-Request-Number = 3
Destination-Host = ecf99.ecf.ericsson.com
Event-Timestamp = 3436508401
Subscription-Id
    Subscription-Id-Type = 0 (E.164)
    Subscription-Id-Data = 442476123456
AoC-Request-Type = 2 (AOC Cost Information)
Currency-Code = 752 (SEK)
Service-Information
    IMS-Information
        Event-Type
            SIP-Method = BYE
        Role-of-Node = 0 (Originating)
        Node-Functionality = 6 (AS)
        User-Session-Id = 843817637684230998sdasdh09
        Calling-Party-Address = sip:IMS_Subscriber_A@home1.net
        Calling-Party-Address = tel:+442476000001
        Called-Party-Address = sip:IMS_Subscriber_B@home2.net
        Time-Stamps
            SIP-Request-Timestamp = 3436508400
        IMS-Charging-Identifier = AyretyU0dm+602IrT5tAFrbHLso=023551025
Ericsson-Service-Information
    IMS-Service-Identification = +g.ericsson.mmt
    IMS-Service-Identification = urn:urn-xxx:3gpp-
service.ims.icsi.mmtel
MMT-Information
    Calling-Party-Address-Presentation-Status = 0 (Allowed)
    SIP-Request-Timestamp-Fraction = 987
```

9.11.8 Termination Response

The following CCA message illustrates the content of a response to the termination request in section 9.11.7.

```
<CCA> ::= < Diameter Header: 272, PXY >
Session-Id = mtas123.mtas.ericsson.com;9099841;599793627;354;1;1
```

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Result-Code = 2001 (Success)
Origin-Host = ecf99.ecf.ericsson.com
Origin-Realm = ecf.ericsson.com
Auth-Application-Id = 4
CC-Request-Type = 3 (Termination)
CC-Request-Number = 3
Service-Information
 AoC-Information
 AoC-Cost-Information
 Accumulated-Cost
 Value-Digits = 7
 Currency-Code = 752 (SEK)