
Source: SA5 (Telecom Management)
Title: 5 Rel-5 CR 32.225 (Charging data description for the IP
Multimedia Subsystem (IMS))
Document for: Approval
Agenda Item: 7.5.3

Doc-1st-	Spec	CR	R	Ph	Subject	Cat	Ver	Doc-2nd-	Workite
SP-030271	32.225	015	-	Rel-5	Corrections to align "Event Charging with Unit Reservation" (ECUR) with IETF Credit Control Application	F	5.2.0	S5-034262	OAM-CH
SP-030271	32.225	016	-	Rel-5	Correction of usage of Application-Provided-Called-Party-Address AVP	F	5.2.0	S5-034341	OAM-CH
SP-030271	32.225	017	-	Rel-5	Correction of "Cause" and "Service-ID" AVP	F	5.2.0	S5-034342	OAM-CH
SP-030271	32.225	018	-	Rel-5	Correction to some AVP definitions	F	5.2.0	S5-034343	OAM-CH
SP-030271	32.225	019	-	Rel-5	Correction on ICID definition	F	5.2.0	S5-034349	OAM-CH

CHANGE REQUEST

⌘ **32.225 CR 015** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘	Corrections to align "Event Charging with Unit Reservation" (ECUR) with IETF Credit Control Application	
Source:	⌘	SA5	
Work item code:	⌘	OAM-CH	Date: ⌘ 11/04/2003
Category:	⌘	F	Release: ⌘ Rel-5
		Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘	The ECUR description with Reserve Units and Debit Units Operations are not aligned with the corresponding IETF draft Diameter Credit Control Application.
Summary of change:	⌘	The message flow for ECUR in figure 6.2 is updated and the corresponding descriptions are modified.
Consequences if not approved:	⌘	The missing information elements (AVP) of the message flow for ECUR will cause errors in the Reserve and Debit Units Operations.

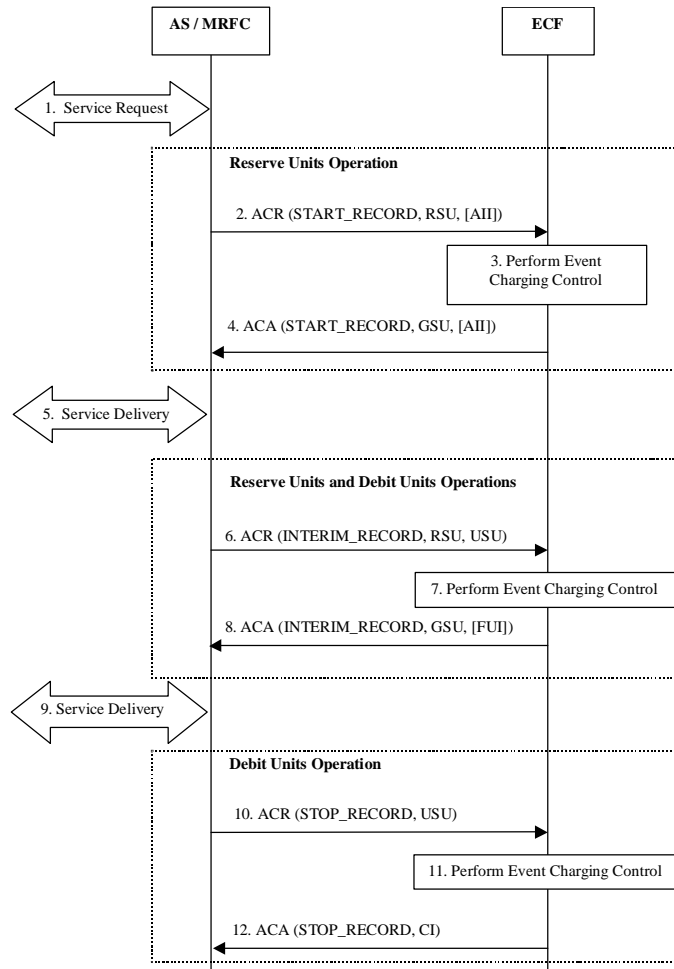
Clauses affected:	⌘	6.1.2.2.1.1								
Other specs affected:	⌘	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	Y	N		X		X		X
Y	N									
	X									
	X									
	X									
Other comments:	⌘									

How to create CRs using this form:

Change in Clause 6.1.2.2.1.1

6.1.2.2.1.1 ECUR - Reserve Units and Debit Units Operations

Figure 6.2 shows the transactions that are required on the Ro interface in order to perform ECUR with Reserve Units and Debit Units operations. Multiple replications of both of these operations are possible.



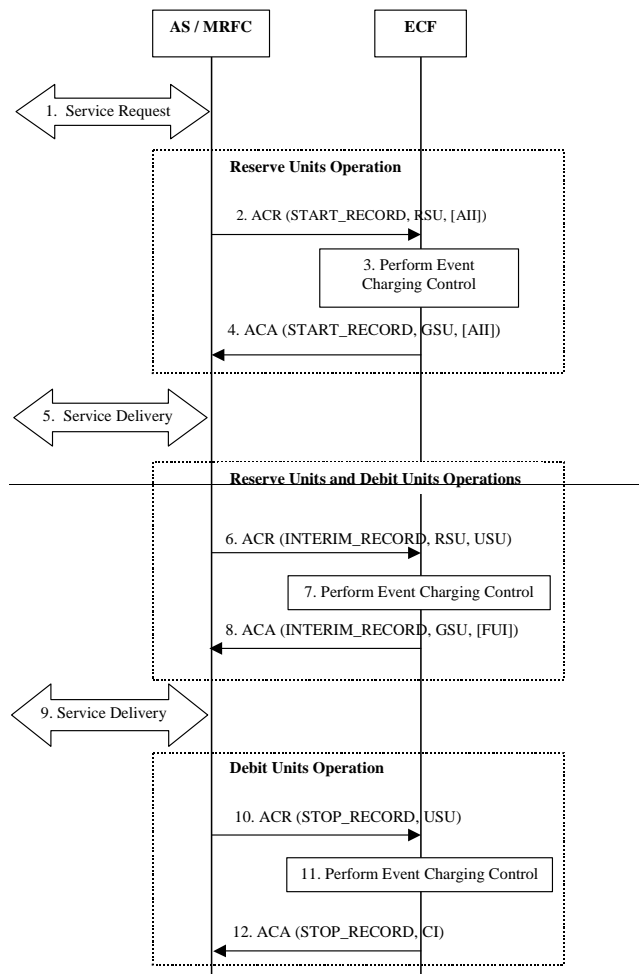


Figure 6.2: ECUR - Reserve Units and Debit Units Operations

1. The AS/MRFC receives a SIP related service request from S-CSCF. The service request may be initiated by either the user or an AS/MRFC.

The Reserve Units Operation is performed as described in TS 32.200 [2].

2. In order to perform Reserve Units operation for a number of units (monetary or non-monetary units), the AS/MRFC sends an ACR with *Accounting-Record-Type* AVP set to START_RECORD to the ECF. If known, the AS/MRFC may include *Requested-Service-Unit (RSU) AVP* (monetary or non monetary units) and *Acc-Interim-Interval (AII) AVP* in the request message.
3. If the service cost information is not received by the ECF, the ECF determines the price of the desired service according to the service specific information received by issuing a rating request to the Rating Function. If the cost of the service is included in the request, the ECF directly reserves the specified monetary amount. If the credit balance is sufficient, the ECF reserves the corresponding amount from the users account.
4. Once the reservation has been made, the ECF returns *Accounting-Answer* message with *Accounting-Record-Type* set to START_RECORD to the AS/MRFC in order to authorize the service execution (*Granted-Service-Unit* and possibly *Cost-Information* indicating the cost of the service are included in the *Accounting-Answer* message). If requested, the ECF returns the *Acc-Interim-Interval (AII) AVP* with value field set to a non-zero value.
5. Content/service delivery starts and the reserved units are concurrently controlled.

The Reserve Units and Debit Units Operations are performed as described in TS 32.200 [2].

6. During content/service delivery, in order to perform Debit Units and subsequent Reserve Units operations, the AS/MRFC sends an ACR with *Accounting-Record-Type AVP* set to INTERIM_RECORD, to report the units used and request additional units, respectively. The ACR message with *Accounting-Record-Type AVP* set to INTERIM_RECORD must be sent by the AS/MRFC between the START_RECORD and STOP_RECORD either on request of the credit control application within the interim interval or if the interim interval is elapsed. If known, the AS/MRFC may include *Requested-Service-Unit AVP* (monetary or non monetary units) in the request message. The *Used-Service-Unit (USU) AVP* is complemented in the ACR message to deduct units from both the user's account and the reserved units, respectively.
7. The ECF deducts the amount used from the account. If the service cost information is not received by the ECF, the ECF determines the price of the desired service according to the service specific information received by issuing a rating request to the Rating Function. If the cost of the service is included in the request, the ECF directly reserves the specified monetary amount. If the credit balance is sufficient, the ECF reserves the corresponding amount from the users account.
8. Once the deduction and reservation have been made, the ECF returns *Accounting-Answer* message with *Accounting-Record-Type* set to INTERIM_RECORD to the AS/MRFC, in order to allow the content/service delivery to continue (new *Granted-Service-Unit (GSU) AVP* and possibly *Cost-Information (CI) AVP* indicating the cumulative cost of the service are included in the *Accounting-Answer* message). The ECF may include in the ACA message the *Final-Unit-Indication (FUI) AVP* to indicate the final granted units.
9. Content/service delivery continues and the reserved units are concurrently controlled.

The Debit Units Operation is performed as described in TS 32.200 [2].

10. When content/service delivery is completed or the final granted units have been consumed, the AS/MRFC sends ACR with *Accounting-Record-Type AVP* set to STOP_RECORD to terminate the active accounting session and report the used units.
11. The ECF deducts the amount used from the account. Unused reserved units are released, if applicable.
12. The ECF acknowledges the reception of the ACR message by sending ACA message with *Accounting-Record-Type AVP* indicating STOP_RECORD (possibly *Cost-Information AVP* indicating the cumulative cost of the service is included in the *Accounting-Answer* message).

Note: The ECUR scenario is supervised by corresponding timers (e.g., accounting interval timer) that are not shown in the figure 6.2.

End of Change in Clause 6.1.2.2.1.1
End of Document

CHANGE REQUEST

⌘ **32.225 CR 019** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Correction on ICID definition		
Source:	⌘ SA5/SWGB		
Work item code:	⌘ OAM-CH	Date:	⌘ 14/05/2003
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ The validity of the ICIDs for session related and session unrelated cases are not specified.
Summary of change:	⌘ Specify the validity of the ICID for session related and session unrelated cases.
Consequences if not approved:	⌘ Misalignment with general IMS and SIP principles for the validity of the ICID, resulting in correlation errors in the Billing System.

Clauses affected:	⌘ 5.2.4.14						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="text-align: center; padding: 2px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
	Y	N					
	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>	Test specifications						
<input checked="" type="checkbox"/>	O&M Specifications						
Other comments:	⌘						

How to create CRs using this form:

Change in Clause 5.2.4.14**5.2.4.14 IMS Charging Identifier**

This parameter holds the IMS charging identifier (ICID) as generated by the IMS node for the SIP session. The value of the ICID parameter is identical with the 'icid-value' parameter defined in [15]. The 'icid-value' is a mandatory part of the P-Charging-Vector and coded as a text-based UTF-8 charset (as are all SIP messages). For further information regarding the composition and usage of the P-Charging-Vector refer to TS 32.200 [2], TS 24.229 [14] and [15].

The ICID value is globally unique across all 3GPP IMS networks for a time period of at least one month, implying that neither the node that generated this ICID nor any other IMS node reuse this value before the uniqueness period expires. The one month minimum uniqueness period counts from the time of release of the ICID, i.e. the ICID value no longer being used. This can be achieved by using node specific information, e.g. high-granularity time information and / or topology / location information. The exact method how to achieve the uniqueness requirement is an implementation issue.

An ICID is generated by the P-CSCF during the initial IMS registration procedure for a Private User ID. This ICID is valid for all Public User IDs registered for that Private User ID until the user (Private User ID) is deregistered. All subsequent SIP session unrelated methods (e.g., REGISTER, NOTIFY, MESSAGE etc.) must use this ICID value regardless of whether the same Public User ID is used or not.

At each SIP session establishment a new, session specific ICID is generated at the first IMS network element that processes the session-initiating SIP INVITE message. This ICID is then used in all subsequent SIP messages for that session (e.g., 200 OK, (re-)INVITE, BYE etc.) until the session is terminated.

**End of Change in Clause 5.2.4.14
End of Document**

CHANGE REQUEST

⌘ **32.225 CR 018** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Corrections to some AVP definitions		
Source:	⌘ SA5 SWGB		
Work item code:	⌘ OAM-CH	Date:	⌘ 14/05/03
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ 1 st : Error in section 7.2.28 since the text is exactly the same as in 7.2.26 (SDP-Media-Description AVP)
	⌘ 2 nd : The Served-Party-IP-Address is known in P-CSCF not in S-CSCF.
Summary of change:	⌘ 1 st : Properly define SDP-Media-Description AVP ⌘ 2 nd : The information "Used in offline ACR" related to Served-Party-IP-Address is changed from "Only for S-CSCF" to "Only for P-CSCF"
Consequences if not approved:	⌘ Errors in the definitions of these AVPs.

Clauses affected:	⌘ 7.2.28, 5.1.3.2.1						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<input checked="" type="checkbox"/>	Test specifications					
	<input checked="" type="checkbox"/>	O&M Specifications					
Other comments:	⌘ None						

How to create CRs using this form:

Change in Clause 7.2.28**7.2.28 SDP-Session-Description AVP**

The *SDP-Media-Description* AVP (AVP code TBD) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=) related to a ~~media component~~ session, as described in [17].

End of Change in Clause 7.2.28**Change in Clause 5.1.3.2.1****5.1.3.2.1 Accounting-Request Message**

...

Table 5.4: Accounting-Request (ACR) Message Contents for Offline Charging

Diameter base protocol AVPs	
AVP	Used in offline ACR
<Diameter-Header:271,REQ,PXY>	Yes
<Session-Id> -- Diameter Session Id	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm}	Yes
{Accounting-Record-Type}	Yes
{Accounting-Record-Number}	Yes
[Acct-Application-Id]	No
[Vendor-Specific-Application-Id]	Yes
[User-Name]	Yes
[Accounting-Sub-Session-Id]	No
[Accounting-RADIUS-Session-Id]	No
[Acct-Multi-Session-Id]	No
[Acct-Interim-Interval]	Yes
[Accounting-Realtime-Required]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
*[Proxy-Info]	No
*[Route-Record]	No
*[AVP]	No
Diameter Credit Control AVP	
[Subscription-Id]	No
[Requested-Action]	No
*[Requested-Service-Unit]	No
*[Used-Service-Unit]	No
*[Service-Parameter-Info]	No
[Abnormal-Termination-Reason]	No
*[Accounting-Correlation-Id]	No
[Credit-Control-Failure-Handling]	No
[Direct-Debiting-Failure-Handling]	No
[Re-Transmission]	Yes
3GPP Diameter accounting AVPs	
[Event-Type]	Yes
[Role-of-node]	Yes
[User-Session-ID]	Yes
[Calling-Party-Address]	Yes
[Called-Party-Address]	Yes
[Time-stamps]	Yes
*[Application-Server]	Only for S-CSCF
*[Application-provided-Called-Party-Address]	Only for S-CSCF
*[Inter-Operator-Identifier]	Yes
[IMS-Charging-Identifier]	Yes
*[SDP-Session-Description]	Yes
*[SDP-Media-Component]	Yes
[GGSN-Address]	Yes
[Served-Party-IP-Address]	Only for PS-CSCF
[Authorised-QoS]	Only for P-CSCF
[Server-Capabilities]	Only for I-CSCF
[Trunk-Group-ID]	Only for MGCF
[Bearer-Service]	Only for MGCF
[Service-ID]	Only for MRFC
[UUS-Data]	Yes

...

End of Change in Clause 5.1.3.2.1
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Start of Change in Clause 7.2.29

7.2.29 Served-Party-IP-Address AVP

The *Served-Party-IP-Address* AVP (AVP code TBD) is of type IPAddress and holds the IP address of either the calling or called party, depending on whether the ~~proxy~~ P-CSCF is in touch with the calling or the called party. This AVP is only provided by the P-CSCF.

End of Change in Clause 7.2.29
End of Document

CHANGE REQUEST

⌘ **32.225 CR 017** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Correction of "Cause" and "Service-ID" AVP		
Source:	⌘ S5 SWGB		
Work item code:	⌘ OAM-CH	Date:	⌘ 14/05/03
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ There is no AVP that corresponds to the CDR-field Cause. The Cause AVP is missing and the Service-ID AVP is not listed in Table 6.4.
Summary of change:	⌘ New AVP called "Cause" is added to transfer success and failure information from IMS node to CCF/ECF. The Service-ID AVP is added to Table 6.4. Also, Authorized QoS AVP value type is defined as UTF8String.
Consequences if not approved:	⌘ It is not possible to transfer information about cause codes from IMS nodes to CCF/ECF. Therefore the CCF cannot include any cause code information in the CDRs. It is not possible to use Service-ID AVP for the MRFC in online charging.

Clauses affected:	⌘ 5.1.3.2.1, 5.1.3.3, 6.1.3.2, 6.1.3.3, 7.2						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
Y	N						
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<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications			
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
Other comments:	⌘ None						

How to create CRs using this form:

Change in Clause 5.1.3.2.1

5.1.3.2.1 Accounting-Request Message

Table 5.4 illustrates the basic structure of a Diameter *Accounting-Request* message as used for offline charging. The use of the AVPs is specified in subclause 5.1.3.3 per IMS node and ACR type.

Table 5.4: Accounting-Request (ACR) Message Contents for Offline Charging

Diameter base protocol AVPs	
AVP	Used in offline ACR
<Diameter-Header:271,REQ,PXY>	Yes
<Session-Id> -- Diameter Session Id	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm}	Yes
{Accounting-Record-Type}	Yes
{Accounting-Record-Number}	Yes
[Acct-Application-Id]	No
[Vendor-Specific-Application-Id]	Yes
[User-Name]	Yes
[Accounting-Sub-Session-Id]	No
[Accounting-RADIUS-Session-Id]	No
[Acct-Multi-Session-Id]	No
[Acct-Interim-Interval]	Yes
[Accounting-Realtime-Required]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
*[Proxy-Info]	No
*[Route-Record]	No
*[AVP]	No
Diameter Credit Control AVP	
[Subscription-Id]	No
[Requested-Action]	No
*[Requested-Service-Unit]	No
*[Used-Service-Unit]	No
*[Service-Parameter-Info]	No
[Abnormal-Termination-Reason]	No
*[Accounting-Correlation-Id]	No
[Credit-Control-Failure-Handling]	No
[Direct-Debiting-Failure-Handling]	No
[Re-Transmission]	Yes
3GPP Diameter accounting AVPs	
[Event-Type]	Yes
[Role-of-node]	Yes
[User-Session-ID]	Yes
[Calling-Party-Address]	Yes
[Called-Party-Address]	Yes
[Time-stamps]	Yes
*[Application-Server]	Only for S-CSCF
*[Application-provided-Called-Party-Address]	Only for S-CSCF
*[Inter-Operator-Identifier]	Yes
[IMS-Charging-Identifier]	Yes
*[SDP-Session-Description]	Yes
*[SDP-Media-Component]	Yes
[GGSN-Address]	Yes
[Served-Party-IP-Address]	Only for S-CSCF
[Authorised-QoS]	Only for P-CSCF
[Server-Capabilities]	Only for I-CSCF
[Trunk-Group-ID]	Only for MGCF
[Bearer-Service]	Only for MGCF
[Service-ID]	Only for MRFC
[UUS-Data]	Yes
[Cause]	Yes

End of Change in Clause 5.1.3.2.1
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Change in Clause 5.1.3.3

5.1.3.3 Detailed Message Formats

Following the base protocol specification, the following "types" of accounting data may be sent:

- Start session accounting data.
- Interim session accounting data.
- Stop session accounting data.
- Event accounting data.

ACR types Start, Interim and Stop are used for accounting data related to successful SIP sessions. In contrast, Event accounting data is unrelated accounting data, such as a simple registration or interrogation and successful service event triggered by an AS. In addition, Event accounting data are also used for unsuccessful SIP session establishment attempts.

The following table specifies per ACR type the accounting data that are sent by each of the IMS network elements:

- S-CSCF:
- P-CSCF:
- I-CSCF:
- MRFC:
- MGCF:
- BGCF:
- AS:

The ACR types in the table are listed in the following order: S (start)/I (interim)/S (stop)/E (event). Therefore, when all ACR types are possible it is marked as SISE. If only some ACR types are allowed for a node, only the appropriate letters are used (i.e. SIS or E) as indicated in the table heading. The omission of an ACR type for a particular AVP is marked with "-" (i.e. SI-E). Also, when an entire AVP is not allowed in a node the entire cell is marked as "-".

Note that not for all Grouped AVPs the individual AVP members are listed in the table. See clause 7 for a detailed list of the AVP group members and for the description of the AVPs.

For the ACA the same details listed in table 5.8 applies with the addition that *Error-Reporting-Host* AVP is supported in all ACAs in a similar manner as most other base protocol AVPs (e.g. in the same manner as *Origin-State-Id* AVP).

Table 5.8: Detailed Diameter ACR Message Contents for Offline Charging

AVP name	Node Type	S-CSCF	P-CSCF	I-CSCF	MRFC	MGCF	BGCF	AS
	Supported ACRs	S/I/S/E	S/I/S/E	E	S/I/S	S/I/S/E	S/I/S/E	S/I/S/E
AVPs from the Diameter base protocol								
<Session-Id>		SISE	SISE	E	SIS	SISE	SISE	SISE
{Origin-Host}		SISE	SISE	E	SIS	SISE	SISE	SISE
{Origin-Realm}		SISE	SISE	E	SIS	SISE	SISE	SISE
{Destination-Realm}		SISE	SISE	E	SIS	SISE	SISE	SISE
{Accounting-Record-Type}		SISE	SISE	E	SIS	SISE	SISE	SISE
{Accounting-Record-Number}		SISE	SISE	E	SIS	SISE	SISE	SISE
[Vendor-Specific-Application-Id]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Acct-Application-Id]		-	-	-	-	-	-	-
[User-Name] (see note 1)		SISE	SISE	E	SIS	SISE	SISE	SISE
[Accounting-Sub-Session-Id]		-	-	-	-	-	-	-
[Accounting-RADIUS-Session-Id]		-	-	-	-	-	-	-
[Acct-Multi-Session-Id]		-	-	-	-	-	-	-

AVP name	Node Type	S-CSCF	P-CSCF	I-CSCF	MRFC	MGCF	BGCF	AS
	Supported ACRs	S/I/S/E	S/I/S/E	E	S/I/S	S/I/S/E	S/I/S/E	S/I/S/E
[Acct-Interim-Interval]		SIS-	SIS-	-	SIS-	SIS-	SIS-	SIS-
[Accounting-Realtime-Required]		-	-	-	-	-	-	-
[Origin-State-Id]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Event-Timestamp]		SISE	SISE	E	SIS	SISE	SISE	SISE
*[Proxy-Info]		-	-	-	-	-	-	-
*[Route-Record]		-	-	-	-	-	-	-
*[AVP]		-	-	-	-	-	-	-
Diameter Credit Control AVP								
[Subscription-Id]		-	-	-	-	-	-	-
[Requested-Action]		-	-	-	-	-	-	-
*[Requested-Service-Unit]		-	-	-	-	-	-	-
*[Used-Service-Unit]		-	-	-	-	-	-	-
*[Service-Parameter-Info]		-	-	-	-	-	-	-
[Abnormal-Termination-Reason]		-	-	-	-	-	-	-
*[Accounting-Correlation-Id]		-	-	-	-	-	-	-
[Credit-Control-Failure-Handling]		-	-	-	-	-	-	-
[Direct-Debiting-Failure-Handling]		-	-	-	-	-	-	-
[Re-Transmission]		SISE	SISE	E	SIS	SISE	SISE	SISE
3GPP Diameter accounting AVPs								
[Event-Type]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Role-of-Node]		SISE	SISE	E	SIS	SISE	SISE	SISE
[User-Session-Id]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Calling-Party-Address]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Called-Party-Address]		SISE	SISE	E	SIS	SISE	SISE	SISE
[Time-stamps]		SISE	SISE	E	SIS	SISE	SISE	SISE
*[Application-server] (see note 1)		SISE	-	-	-	-	-	-
*[Application-Provided-Called-Party-Address] (see note 1)		SISE	-	-	-	-	-	-
[Inter-Operator-Identifiers] (see note 1)		SISE	SISE	E	SIS	SISE	SISE	SISE
[IMS-Charging-Identifier]		SISE	SISE	E	SIS	SISE	SISE	SISE
*[SDP-Session-Description] (see note 2)		SI-E	SI-E	-	SI-	SI-E	SI-E	SI-E
*[SDP-Media-component] (see note 2)		SI-E	SI-E		SI-	SI-E	SI-E	SI-E
[GGSN-Address]		SI-E	SI-E		SI-	SI-E	SI-E	SI-E
[Served-Party-IP-Address] (see note 1)		-	SISE	-	-	-	-	-
[Authorized-QoS] (see note 1)		-	SISE	-	-	-	-	-
[Server-Capabilities]		-	-	E	-	-	-	-
[Trunk-Group-ID]		-	-	-	-	SISE	-	-
[Bearer-Service]		-	-	-	-	SISE	-	-
[Service-Id]		-	-	-	SIS	-	-	-
[UUS-Data] (see note 3)		SISE	SISE					SISE
[Cause]		--SE	--SE	E	--S	--SE	--SE	--SE

NOTE 1: Only present if available in the IMS node.
 NOTE 2: Present in Interim and Event ACRs only if the SIP transactions that triggered the ACR contained SDP.
 NOTE 3: Present only if user-to-user data is included in the SIP message that triggered the ACR.

End of Change in Clause 5.1.3.3

Change in Clause 6.1.3.2

6.1.3.2 Structure for the Accounting Message Formats

The following is the basic structure shared by all online charging messages. This is based directly on the format of the *Accounting-Request* and *Accounting-Answer* messages defined in the base Diameter protocol specification [3] with the extensions defined in [13].

Those Diameter AVPs that are used for ~~off~~online charging are marked "Yes" in tables 6.2 to 6.3. Those Diameter AVPs that are not used for online charging are marked "No" in tables 6.2 to 6.3. This implies that their content can (Yes) or can not (No) be used by the ECF for charging purposes.

The following symbols are used in the tables:

- <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 is possible.

6.1.3.2.1 Accounting-Request Message

Table 6.2 illustrates the basic structure of a Diameter *Accounting-Request* message as used for IMS online charging.

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

Diameter Base Protocol AVPs	
AVP	Used in Online ACR
<Diameter Header: 271, REQ, PXY>	Yes
<Session-Id>	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm }	Yes
{Accounting-Record-Type}	Yes
{Accounting-Record-Number}	Yes
[Acct-Application-Id]	No
[Vendor-Specific-Application-Id]	Yes
[User-Name]	Yes
[Accounting-Sub-Session-Id]	No
[Accounting-RADIUS-Session-Id]	No
[Acct-Multi-Session-Id]	No
[Acct-Interim-Interval]	Yes
[Accounting-Realtime-Required]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
* [Proxy-Info]	No
* [Route-Record]	No
*[AVP]	No
Diameter Credit Control AVPs	
[Subscription-Id]	Yes
[Requested-Action]	Yes
*[Requested-Service-Unit]	Yes
*[Used-Service-Unit]	Yes
[Tariff-Switch-Definition]	Yes
*[Service-Parameter-Info]	Yes
[Abnormal-Termination-Reason]	Yes
*[Accounting-Correlation-Id]	No
[Credit-Control-Failure-Handling]	Yes
[Direct-Debiting-Failure-Handling]	Yes
[Re-Transmission]	Yes
3GPP Diameter accounting AVPs	
[Event-Type]	Yes
[Role-of-node]	Yes
[User-Session-ID]	Yes
[Calling-Party-Address]	Yes
[Called-Party-Address]	Yes
[Time-stamps]	Yes
*[Application-Server]	No
*[Application-Provided-Called-Party-Address]	No
*[Inter-Operator-Identifier]	Yes
[IMS-Charging-Identifier]	Yes
*[SDP-Session-Description]	Yes
*[SDP-Media-Component]	Yes
[GGSN-Address]	Yes
[Served-Party-IP-Address]	No
[Authorised QoS]	No
[Server-Capabilities]	No
[Trunk-Group-ID]	No
[Bearer-Service]	No
[Service-Id]	Yes
[UUS-Data]	Yes
[Cause]	Yes
End of Change in Clause 6.1.3.2	

Change in Clause 6.1.3.3

6.1.3.3 Detailed Message Formats

Following the protocol specifications, the following "types" of accounting data may be sent:

- Start session accounting data.
- Interim session accounting data.
- Stop session accounting data.
- Event accounting data.

ACR types start, interim and stop are used for accounting data related to successful SIP sessions. In contrast, event accounting data is used for session-unrelated accounting data, such as a simple registration or interrogation, and for accounting data related to unsuccessful SIP session establishment attempts.

The following table specifies per ACR type the accounting data that are sent by MRFC and AS.

Tables 6.4 and 6.5 are the basic structure for online charging messages via Ro Interface. This is based directly on the *Accounting-Request* and *Accounting-Answer* messages defined in the Diameter protocol specifications [3] and [13].

Table 6.4: Detailed Diameter ACR Message Contents for online Charging

AVP name	Node Type	MGC <u>F</u> M <u>R</u> F <u>C</u>	AS
	Supported ACRs	S/I/S/E	S/I/S/E
AVPs from Diameter Base Protocol			
<Session-ID>		SISE	SISE
{Origin-Host}		SISE	SISE
{Origin-Realm}		SISE	SISE
{Destination-Realm}		SISE	SISE
{Accounting-Record-Type}		SISE	SISE
{Accounting-Record-Number}		SISE	SISE
[Acct-Application-ID]		-	-
[Vendor-Specific-Application-ID]		SISE	SISE
[User-Name]		SISE	SISE
[Accounting-Sub-Session-ID]		-	-
[Accounting-RADIUS-Session-ID]		-	-
[Acct-Multi-Session-ID]		-	-
[Acct-Interim-Interval]		SIS-	SIS-
[Accounting-Realtime-Required]		-	-
[Origin-State-ID]		SISE	SISE
[Event-Timestamp]		SISE	SISE
*[Proxy-Info]		-	-
*[Route-Record]		-	-
*[AVP]		-	-
Diameter Credit-Control AVP			
[Subscription-Id]		SISE	SISE
[Requested-Action]		SISE	SISE
*[Requested-Service-Unit]		SISE	SISE
*[Used-Service-Unit]		SISE	SISE
[Tariff-Switch-Definition]		SISE	SISE
*[Service-Parameter-Info]		SISE	SISE
[Abnormal-Termination-Reason]		SISE	SISE
*[Accounting-Correlation-Id]		SISE	SISE
[Credit-Control-Failure-Handling]		SISE	SISE
[Direct-Debiting-Failure-Handling]		SISE	SISE
*[Granted-Service-Unit]		-	-
[Cost-Information]		-	-
[Final-Unit-Indication]		-	-
[Check-Balance-Result]		-	-
[Re-Transmission]		SISE	SISE
3GPP Diameter Accounting AVPs			
[Event-Type]		SISE	SISE
[Role-of-Node]		SISE	SISE
[User-Session-ID]		SISE	SISE
[Calling-Party-Address]		SISE	SISE
[Called-Party-Address]		SISE	SISE
[Time-stamps]		SISE	SISE
[Application-server]		-	-
[Application-provided-called-party-address]		-	-
[Inter-Operator-Identifiers]		SISE	SISE
[IMS-Charging-Identifier]		SISE	SISE
*[SDP-Session-Description]		SI-E	SI-E
*[SDP-Media-component]		SI-E	SI-E
[SDP-Media-Name]		SI-E	SI-E
[GGSN-Address]		SI-E	SI-E
GPRS-Charging-Id]		SI-E	SI-E
[Served-Party-IP-Address]		-	-
[Authorized-QoS]		-	-
[Server-Capabilities]		-	-
[Trunk-Group-ID]		-	-
[Bearer-Service]		-	-
[Service-Id]		-SISE	-
[UUS-Data]		SISE	SISE
[Cause]		--SE	--SE

End of Change in Clause 6.1.3.3**Change in Clause 7.2**

7.2 Additional AVPs

For the purpose of IMS charging additional AVPs are used in ACR and ACA for both online and offline charging. The use of these AVPs are described in subclause 5.1.3 for offline charging and in subclause 6.1.3 for online charging. The information is summarized in table 7.2 along with the AVP flag rules.

Detailed descriptions of AVPs that are used specifically for IMS charging are provided in the subclauses below the table. However, for AVPs that are just borrowed from other applications only the reference (e.g. [13]), is provided in table 7.2 and the detailed description is not repeated.

Table 7.2: Use Of Diameter Credit Control and 3GPP accounting AVPs for IMS

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
AVPs from Diameter Credit Control								
[Subscription-Id]		[13]						
[Requested-Action]		[13]						
*[Requested-Service-Unit]		[13]						
*[Used-Service-Unit]		7.2.4144	Grouped					
{Unit-Type}		7.2.3841	Enumerated					
{Unit-Value}		7.2.3942	Float64					
{Unit-Value-After-Tariff-Switch}		7.3.4043	Float64					
{Currency-Code}		[13]						
[Tariff-Switch-Definition]		7.2.3437	OctetString					
*[Service-Parameter-Info]		[13]						
[Abnormal-Termination-Reason]		[13]						
*[Accounting-Correlation-Id]		[13]						
[Credit-Control-Failure-Handling]		[13]						
[Direct-Debiting-Failure-Handling]		[13]						
*[Granted-Service-Unit]		7.2.4719	Grouped					
{Unit-Type}		7.2.3841	Enumerated					
{Unit-Value}		7.2.3942	Float64					
{Unit-Value-After-Tariff-Switch}		7.3.4043	Float64					
{Currency-Code}		[13]						
[Cost-Information]		7.2.4413	Grouped					
{Cost}		[13]						
{Currency-Code}		[13]						
[Final-Unit-Indication]		[13]						
[Check-Balance-Result]		[13]						
[Re-Transmission]		[13]						
3GPP Diameter Accounting AVPs								
[Event-Type]		7.2.4416	Grouped					
{SIP-Method}		7.2.3434	UTF8String					
[Event]		7.2.4315	UTF8String					
[Content-Type]		7.2.4012	UTF8String					
[Content-Length]		7.2.911	UTF8String					
[Content-Disposition]		7.2.810	UTF8String					
[Role-of-Node]		7.2.2427	Enumerated					
[User Session Id]		7.2.4245	UTF8String					
[Calling-Party-Address]		7.2.7	UTF8String					
[Called-Party-Address]		7.2.6	UTF8String					
[Time-stamps]		7.2.3639	Grouped					
{SIP-Request-Timestamp}		7.2.3235	UTF8String					
{SIP-Response-Timestamp}		7.2.3336	UTF8String					
[Application-server]		7.2.3	UTF8String					
[Application-provided-called-party-address]		7.2.2	UTF8String					
[Inter-Operator-Identifier]		7.2.2022	Grouped					
{Originating-IOI}		7.2.2225	UTF8String					
{Terminating-IOI}		7.2.3538	UTF8String					
[IMS-Charging-Identifier]		7.2.4820	UTF8String					
*[SDP-Session-Description]		7.2.2831	UTF8String					
*[SDP-Media-component]		7.2.2528	Grouped					
{SDP-Media-Name}		7.2.2730	UTF8String					
*[SDP-Media-Description]		7.2.2629	UTF8String					
[GPRS-Charging-Id]		7.2.4618	UTF8String					
[GGSN-Address]		7.2.4517	IPAddress					

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
[Served-Party-IP-Address]		7.2.2932	IPAddress					
[Authorized-QoS]		7.2.4	TBD UTF8String					
[Server-Capabilities]		[19]						
[Trunk-Group-Id]		7.2.3740	Grouped					
[Incoming-Trunk-Group-Id]		7.2.4921	UTF8String					
[Outgoing-Trunk-Group-Id]		7.2.2326	UTF8String					
[Bearer-Service]		7.2.5	OctetString					
[Service-Id]		7.2.3033	UTF8String					
[UUS-Data]		7.2.4346	Grouped					
[Amount-of-UUS-data]		7.2.1	UTF8String					
[Mime-type]		7.2.2423	UTF8String					
[Direction]		7.2.4214	Enumerated					
[Cause]		7.2.8	Grouped					
{Cause-Code}		7.2.9	Enumerated					
{Node-Functionality}		7.2.24	Enumerated					

7.2.1 Amount-of-UUS-Data AVP

The *Amount-Of-UUS-Data* AVP (AVP code TBD) is of type UTF8String and holds the amount (in octets) of User-to-User data conveyed in the body of the SIP message with content-disposition header field equal to "render".

7.2.2 Application-Provided-Called-Party-Address AVP

The *Application-Provided-Called-Party-Address* AVP (AVP code TBD) is of type UTF8String and holds the called party number (SIP URL, E.164), if it is determined by an application server.

7.2.3 Application-Server AVP

The *Application-Server* AVP (AVP code TBD) is of type UTF8String and holds the SIP URL(s) of the AS(s) addressed during the session.

7.2.4 Authorised-QoS AVP

The *Authorised-QoS* AVP (AVP code TBD) is of type ~~(TBD)~~ UTF8String and holds the Authorised QoS as defined in TS 23.207 [7] / TS 29.207 [8] and applied via the Go interface.

7.2.5 Bearer-Service AVP

The *Bearer-Service* AVP (AVP code TBD) is of type OctetString and holds the used bearer service for the PSTN leg.

7.2.6 Called-Party-Address AVP

The *Called-Party-Address* AVP (AVP code TBD) is of type UTF8String and holds the address (Public User ID: SIP URL, E.164, etc.) of the party to whom a session is established.

7.2.7 Calling-Party-Address AVP

The *Calling-Party-Address* AVP (AVP code TBD) is of type UTF8String and holds the address (Public User ID: SIP URL, E.164, etc.) of the party initiating a session.

7.2.8 Cause AVP

The Cause AVP (AVP code TBD) is of type Grouped. The Cause AVP includes the *Cause-Code* AVP that contains the cause value and the *Node-Functionality* AVP that contains the function of the node where the cause code was generated.

Cause has the following ABNF grammar:

```
<Cause> ::= <AVP Header: TBD>
           {Cause-Code}
           {Node-Functionality}
```

7.2.9 Cause-Code AVP

The *Cause-Code* AVP (AVP code TBD) is of type Enumerated and includes the cause code value from IMS node. It is used in *Accounting-request[stop]* and/or *Accounting-request[event]* messages.

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, then the SIP error code is also used as the cause code.

Successful cause code values.

"Normal end of session" _____ 0

The cause "Normal end of session" is used in *Accounting-request[stop]* message 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).

"Successful transaction" _____ -1

The cause "Successful transaction" is used in *Accounting-request[event]* message to indicate a successful SIP transaction (e.g. REGISTER, MESSAGE, NOTIFY, SUBSCRIBE). It may also be used by an Application Server to indicate successful service event execution.

"End of SUBSCRIBE dialog" _____ -2

The cause "End of SUBSCRIBE dialog" is used to indicate the closure of a SIP SUBSCRIBE dialog. For instance a successful SIP SUBSCRIBE transaction terminating the dialog has been detected by the IMS node (i.e. SUBSCRIBE with expire time set to 0).

"3xx Redirection" _____ -3xx

The cause "3xx Redirection" is used when the SIP transaction is terminated due to an IMS node receiving/initiating a 3xx response [16].

Failure cause code values.

"Unspecified error" _____ 1

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

"4xx Request failure" _____ 4xx

The cause "4xx Request failure" is used when the SIP transaction is terminated due to an IMS node receiving/initiating a 4xx error response [16].

"5xx Server failure" _____ 5xx

The cause "5xx Server failure" is used when the SIP transaction is terminated due to an IMS node receiving/initiating a 5xx error response [16].

"6xx Global failure" 6xx

The cause "6xx Global failure" is used when the SIP transaction is terminated due to an IMS node receiving/initiating a 6xx error response [16].

"Unsuccessful session setup" 2

The cause "Unsuccessful session setup" is used in the Accounting-request[stop] when the SIP session has not been successfully established (i.e. Timer H expires and SIP ACK is not received or SIP BYE is received after reception of the 200OK final response and SIP ACK is not received) [14] [16].

"Internal error" 3

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

7.2.87.2.10 Content-Disposition AVP

The *Content-Disposition* AVP (AVP code TBD) is of type UTF8String and indicates how the message body or a message body part is to be interpreted (e.g. session, render), as described in [17].

7.2.97.2.11 Content-Length AVP

The *Content-Length* AVP (AVP code TBD) is of type UTF8String and holds the size of the of the message-body, as described in [17].

7.2.107.2.12 Content-Type AVP

The *Content-Type* AVP (AVP code TBD) is of type UTF8String and holds the media type (e.g. application/sdp, text/html) of the message-body, as described in [17].

7.2.117.2.13 Cost-Information AVP

The *Cost-Information* AVP (AVP Code TBD) is of type Grouped and is used to return the cost information of a service in the *Accounting-Answer* command. The included *Cost* AVP contains the cost of the service event and the *Currency-Code* specifies in which currency the cost was given.

When the *Requested-Action* AVP with value PRICE_ENQUIRY is included in the *Accounting-Request* command the *Cost-Information* AVP sent in the succeeding *Accounting-Answer* command contains the cost estimation of the requested service, without any reservation being made.

The *Cost-Information* AVP included in the *Accounting-Answer* command with the *Accounting-Record-Type* set to INTERIM_RECORD contains the accumulated cost for the session without taking any credit- reservation into account.

The *Cost-Information* AVP included in the *Accounting-Answer* command with the *Accounting-Record-Type* set to EVENT_RECORD or STOP_RECORD contains the total cost for the requested service. It has the following ABNF grammar.

When the Requested-Action AVP is set to RESERVE_UNITS in the *Accounting-Request* (ACR) and the Unit-Type in the *Requested-Service-Unit* AVP is set to SERVICE_CREDIT_MONEY, the *Cost-Information* AVP sent in the succeeding *Accounting Answer* (ACA) contains the requested cost information.

It has the following ABNF grammar:

```
<Cost-Information>: :=<AVP Header: TBD>
```

```
{ Cost }
```

```
{ Currency-Code }
```


7.2.127.2.14 Direction AVP

The *Direction* AVP (AVP code TBD) is of type Enumerated and indicates whether the UUS data travels in up-link or down-link direction. The following values are defined:

UPLINK	0
DOWNLINK	1

7.2.137.2.15 Event AVP

The *Event* AVP (AVP code TBD) is of type UTF8String and holds the content of the "Event" header used in SUBSCRIBE and NOTIFY messages.

7.2.147.2.16 Event-Type AVP

Reflects the type of chargeable telecommunication service/event for which the accounting-request message is generated, such as: "session", "register", "subscribe".

The *IMS-Event-Type* AVP (AVP code TBD) is of type Grouped and contains information about the type of chargeable telecommunication service/event for which the accounting-request message is generated.

It has the following ABNF grammar:

```
<IMS-Event-Type>::=<AVP Header: TBD >
    [ SIP-Method]
    [ Event ]
    [ Content-Type ]
    [ Content-Length ]
    [ Content-Disposition ]
```

7.2.157.2.17 GGSN-Address AVP

The *GGSN-Address* AVP (AVP code TBD) is of type IPAddress and holds the IP-address of the GGSN that generated the GPRS Charging ID, as described in [2].

7.2.167.2.18 GPRS-Charging-ID AVP

The *GPRS-Charging-ID* AVP (AVP code TBD) is of type UTF8String and holds a sequence number generated by the GGSN at PDP context activation, as described in [2].

7.2.177.2.19 Granted-Service-Unit AVP

If the ACA containing the *Granted-Service-Unit* AVP contains a *Tariff-Switch-Definition* AVP, the *Unit-Value-After-Tariff-Switch* AVP may be included. In this case the *Unit-Value* AVP contains the granted units before the tariff switch time and the *Unit-Value-After-Tariff-Switch* AVP gives the units granted after the tariff switch.

If the ACA containing the *Granted-Service-Unit* AVP contains a *Tariff-Switch-Definition* AVP but no *Unit-Value-After-Tariff-Switch* AVP is included, the granted *Unit-Value* is used before and after the tariff switch.

An ACA containing a *Granted-Service-Unit* AVP with *Unit-Value-After-Tariff-Switch* AVP MUST contain a *Tariff-Switch-Definition* AVP. If the *Tariff-Switch-Definition* AVP is missing, the *Unit-Value-After-Tariff-Switch* AVP is ignored and it is proceeded as without a tariff change.

It has the following ABNF grammar:

```
<Granted-Service-Unit>::=< AVP Header: TBD >
```

{ Unit-Type }
 { Unit-Value }
 [Unit-Value-After-Tariff Switch]
 [Currency-Code]

~~7.2.187.2.20~~ 7.2.207.2.20 IMS-Charging-Identifier (ICID) AVP

The *IMS-Charging-Identifier* AVP (AVP code TBD) is of type UTF8String and holds the IMS Charging Identifier (ICID) as generated by a IMS node for a SIP session and described in subclause 5.2.4.10.

~~7.2.197.2.21~~ 7.2.207.2.21 Incoming-Trunk-Group-ID AVP

The *Incoming-Trunk-Group-ID* AVP (AVP code TBD) is of type UTF8String and identifies the incoming PSTN leg.

~~7.2.207.2.22~~ 7.2.207.2.22 Inter-Operator-Identifier (IOI) AVP

The *Inter-Operator-Identifier* AVP (AVP code TBD) is of type Grouped and holds the identification of the network neighbours (originating and terminating) as exchanged via SIP signalling and described in [15].

It has the following ABNF grammar:

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

~~7.2.217.2.23~~ 7.2.217.2.23 Mime-Type AVP

The *Mime-Type* AVP (AVP code TBD) is of type UTF8String and holds the Mime type of the User-To-User data.

7.2.24 Node-Functionality AVP

The *Node-Functionality*AVP (AVP code TBD) is of type Enumerated and includes the *functionality* identifier of the *node* where the cause code was generated.

The functionality identifier can be one of the following:

S-CSCF 0
P-CSCF 1
I-CSCF 2
MRFC 3
MGCF 4
BGCF 5
AS 6
UE 7

~~7.2.227.2.25~~ 7.2.227.2.25 Originating-IOI AVP

The *Originating-IOI* AVP (AVP code TBD) is of type UTF8String (alphanumeric string) and holds the Inter Operator Identifier for the originating network as generated by the S-CSCF in the home network of the originating end user [15].

7.2.237.2.26 ~~7.2.237.2.26~~ Outgoing-Trunk-Group-ID AVP

The *Outgoing-Trunk-Group-ID* AVP (AVP code TBD) is of type UTF8String and identifies the outgoing PSTN leg.

7.2.247.2.27 ~~7.2.247.2.27~~ Role-of-Node AVP

The *Role-Of-Node* AVP (AVP code TBD) is of type Enumerated and specifies the role of the CSCF, as relevant for the chargeable telecommunication service/event.

The identifier can be one of the following:

ORIGINATING_ROLE 0

The CSCF is applying a originating role, serving the calling subscriber.

TERMINATING_ROLE 1

The CSCF is applying a terminating role, serving the called subscriber.

7.2.257.2.28 ~~7.2.257.2.28~~ SDP-Media-Component AVP

The *SDP-Media-Component* AVP (AVP code TBD) is of type Grouped and contains information about media used for a IMS session.

It has the following ABNF grammar:

```
<SDP-Media-Component> ::= <AVP Header: TBD >
    [ SDP-Media-Name ]
    *[ SDP-Media-Description ]
    [ GPRS-Charging-Id ]
```

7.2.267.2.29 ~~7.2.267.2.29~~ SDP-Media-Description AVP

The *SDP-Media-Description* AVP (AVP code TBD) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=) related to a media component, as described in [17]. The attributes are specifying the media described in the SDP-Media-Name AVP.

7.2.277.2.30 ~~7.2.277.2.30~~ SDP-Media-Name AVP

The *SDP-Media-Name* AVP (AVP code TBD) is of type UTF8String and holds the content of a "m=" line in the SDP data.

7.2.287.2.31 ~~7.2.287.2.31~~ SDP-Session-Description AVP

The *SDP-Media-Description* AVP (AVP code TBD) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=) related to a media component, as described in [17].

7.2.297.2.32 ~~7.2.297.2.32~~ Served-Party-IP-Address AVP

The *Served-Party-IP-Address* AVP (AVP code TBD) is of type IPAddress and holds the IP address of either the calling or called party, depending on whether the proxy is in touch with the calling or the called party.

7.2.307.2.33 ~~7.2.307.2.33~~ Service-ID AVP

The *Service-ID* AVP (AVP code TBD) is of type UTF8String and identifies the service the MRFC is hosting. For conferences the conference ID is used as the value of this parameter.

7.2.317.2.34 SIP-Method AVP

The *SIP-Method* AVP (AVP code TBD) is of type UTF8String and holds the name of the SIP Method (INVITE, UPDATE etc.) causing an accounting request to be sent to the CCF.

7.2.327.2.35 SIP-Request-Timestamp AVP

The *SIP-Request-Timestamp* AVP (AVP code TBD) is of type UTF8String and holds the time in UTC format of the initial SIP request (e.g. Invite).

7.2.337.2.36 SIP-Response-Timestamp AVP

The *SIP-Response-Timestamp* AVP (AVP code TBD) is of type UTF8String and holds the time in UTC format of the response to the initial SIP request (e.g. 200 OK).

7.3.347.2.37 Tariff-Switch-Definition AVP

The *Tariff-Switch-Definition* AVP (AVP Code TBD) is of type OctetString and contains the tariff switch timer.

This AVP can be included in the *Accounting Answer* which is sent as a result of the previous *Accounting Request* with *Requested-Action* AVP set to RESERVE_UNITS. The tariff switch timer is evaluated relative to the timestamp of the preceding *Accounting Request* command. When the tariff switch timer expires, the AS/MRFC uses the *Unit-Value-After-Tariff-Switch*, if provided in the ACA, as granted units.

If a tariff switch has occurred, the *Tariff-Switch-Definition* AVP should be included in the next ACR together with the units used before the tariff switch (*Unit-Value* AVP) and the units used after the tariff switch (*Unit-Value-After-Tariff-Switch* AVP).

7.2.357.2.38 Terminating-IOI AVP

The *Terminating-IOI* AVP (AVP code TBD) is of type UTF8String (alphanumeric string) and holds the Inter Operator Identifier for the originating network as generated by the S-CSCF in the home network of the terminating end user [15].

7.2.367.2.39 Time-Stamps AVP

The *Time-Stamp* AVP (AVP code TBD) is of type Grouped and holds the time of the initial SIP request and the time of the response to the initial SIP Request.

It has the following ABNF grammar:

```
<Time-Stamps>::=< AVP Header: TBD >
    [SIP-Request-Timestamp]
    [SIP-Response-Timestamp]
```

7.2.377.2.40 Trunk-Group-ID AVP

The *Trunk-Group-ID* AVP (AVP code TBD) is of type Grouped and identifies the incoming and outgoing PSTN legs.

It has the following ABNF grammar:

```
<Trunk-Group-ID>::=<AVP Header: TBD>
    [ Incoming-Trunk-Group-ID ]
    [ Outgoing-Trunk-Group-ID ]
```

7.2.387.2.41 Unit-Type AVP

The *Unit-Type* AVP is of type Enumerated (AVP Code TBD) and contains the type of the unit. The unit type can be one of the following:

SERVICE_CREDIT_TIME 0

The unit is of type "time" and is given in seconds.

SERVICE_CREDIT_VOLUME 1

The unit is of type "volume" and is given in kB.

SERVICE_CREDIT_EVENT 2

The unit is of type "event" and is given as a number of events.

SERVICE_CREDIT_MONEY 3

The unit is of type "money" and is given as a monetary value, whose currency SHOULD be specified by the *Currency-Code* AVP.

SERVICE_CREDIT_SERVICE 4

The unit of type "service" and is given as a selected service.

7.2.397.2.42 Unit-Value AVP

The *Unit-Value* AVP is of type Float64 (AVP Code TBD) and contains the granted or used Unit-Value. The value can be time in seconds, volume in kB, number of events or monetary amount depending on the given *Unit-Type*.

If the *Unit-Type* AVP is set to "time" in the *Accounting-Answer* command, the *Unit Value* AVP specifies the granted time in seconds (measured from the moment when the services becomes active or from the previous Answer command) until a new *Accounting-Request* MUST be sent.

If the *Unit Type* AVP is set to "time" in the *Accounting-Request* command, the *Unit-Value* AVP specifies the used time since previous report or time requested by the service element (e.g. AS/MRFC).

If the *Unit-Type* AVP is set to "volume" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted volume in kB (measured from the moment when the services becomes active or from the previous Answer command) until a new *Accounting-Request* MUST be sent. If the *Unit-type* AVP is set to "volume" in the *Accounting-Request* command, the *Unit-Value* AVP specifies the used volume since previous report or volume requested by service element (e.g. AS/MRFC).

If the *Unit-Type* AVP is set to "event" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted number of events (measured from the moment when the service becomes active or from the previous Answer command) until a new *Accounting-Request* MUST be sent. If the *Unit-type* AVP is set to "event" in the *Accounting-Request* command, the *Unit-Value* AVP specifies the used number of events since previous report or number of events requested by the service element (e.g. AS/MRFC).

If the *Unit-Type* AVP is set to "money" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted monetary amount, which the end user can use until a new *Accounting-Request* MUST be sent. If the *Unit-Type* AVP is set to "money" in the *Accounting-Request* command, the *Unit-Value* AVP specifies the used monetary amount since previous report or the monetary amount requested by the service element (e.g. AS/MRFC).

If the *Accounting-Answer* command contains a *Tariff-Switch-Definition* AVP and a *Unit-Value-After-Tariff-Switch* AVP, the *Unit-Value* AVP in the *Accounting-Answer* contains the amount of units granted before the tariff change. In this case, the following holds:

- If the *Unit-Type* AVP is set to "time" in the *Accounting-Answer* command, the *Unit Value* AVP specifies the granted time before the tariff switch in seconds (measured from the moment when the services becomes active or from the previous Answer command) until the tariff switch occurs or a new *Accounting-Request* MUST be sent.

- If the *Unit-Type* AVP is set to "volume" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted volume before the tariff switch in kB (measured from the moment when the services becomes active or from the previous *Answer* command) until the tariff switch occurs or a new *Accounting-Request* MUST be sent.
- If the *Unit-Type* AVP is set to "event" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted number of events before the tariff switch (measured from the moment when the service becomes active or from the previous *Answer* command) until the tariff switch occurs or a new *Accounting-Request* MUST be sent.
- If the *Unit-Type* AVP is set to "money" in the *Accounting-Answer* command, the *Unit-Value* AVP specifies the granted monetary amount before the tariff switch, which the end user can use until the tariff switch occurs or a new *Accounting-Request* MUST be sent.

If the *Accounting-Answer* command contains a *Tariff-Switch-Definition* AVP but no *Unit-Value-After-Tariff-Switch* AVP, the *Unit-Value* AVP in the *Accounting-Answer* contains the total amount of units granted irrespective of the tariff change.

If the *Accounting-Answer* command contains a *Tariff-Switch-Definition* AVP and a tariff switch occurred, the next *Accounting-Request* contains the *Unit-Value* AVP and the *Unit-Value-After-Tariff-Switch* AVP. The *Unit-Value* AVP contains the service units used before the tariff switch.

7.3.407.2.43 Unit-Value-After-Tariff-Switch AVP

The *Unit-Value-After-Tariff-Switch* AVP is of type Float64 (AVP Code TBD) and contains the granted or used Unit-Value after a tariff switch. The value can be time in seconds, volume in kB, number of events or monetary amount depending on the given *Unit-Type*.

The *Unit-Value-After-Tariff-Switch* AVP can only occur in combination with a *Tariff-Switch-Definition* AVP.

If the *Unit-Type* AVP is set to "time" in the *Accounting-Answer* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the granted time in seconds (measured from the moment when the tariff change occurs) until a new *Accounting-Request* MUST be sent.

If the *Unit Type* AVP is set to "time" in the *Accounting-Request* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the used time after tariff switch.

If the *Unit-Type* AVP is set to "volume" in the *Accounting-Answer* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the granted volume in kB (measured from the moment when the tariff change occurs) until a new *Accounting-Request* MUST be sent. If the *Unit-type* AVP is set to "volume" in the *Accounting-Request* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the used volume after tariff switch.

If the *Unit-Type* AVP is set to "event" in the *Accounting-Answer* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the granted number of events (measured from the moment when the tariff change occurs) until a new *Accounting-Request* MUST be sent. If the *Unit-type* AVP is set to "event" in the *Accounting-Request* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the used number of events after tariff switch.

If the *Unit-Type* AVP is set to "money" in the *Accounting-Answer* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the granted monetary amount, which the end user can use (measured from the moment when the tariff change occurs) until a new *Accounting-Request* MUST be sent. If the *Unit-Type* AVP is set to "money" in the *Accounting-Request* command, the *Unit-Value-After-Tariff-Switch* AVP specifies the used monetary amount after tariff switch.

7.2.417.2.44 Used-Service-Unit AVP

The *Used-Service-Unit* AVP is of type Grouped AVP (AVP Code TBD) and contains the amount of used units since the previous *Accounting-Answer* command. The included *Unit-Type* AVP defines the type of the unit and the *Unit-Value* AVP contains the used amount. If the unit type is "money", a *Currency-Code* AVP SHOULD be included.

If the previous ACA contained a *Tariff-Switch-Definition* AVP, the *Unit-Value-After-Tariff-Switch* AVP must be included in the *Used-Service-Unit* AVP in the ACR, if the tariff switch was encountered. In this case the *Unit-Value* AVP contains the units used before the tariff switch and the *Unit-Value-After-Tariff-Switch* AVP gives the units used after the tariff switch.

It has the following ABNF grammar:

```
<Used-Service-Unit>::=< AVP Header: TBD >
    { Unit-Type }
    { Unit-Value }
    { Unit-Value-After-Tariff-Switch }
    [ Currency-Code ]
```

7.2.427.2.45 User-Session-ID AVP

The *User-Session-Id* AVP (AVP code TBD) is of type UTF8String and holds the session identifier. For a SIP session the *Session-ID* contains the SIP Call ID, as defined in [16].

7.2.437.2.46 UUS-Data AVP

The *UUS-Data* AVP (AVP Code TBD) is of type Grouped AVP and holds information about the sent User-To-User data.

It has the following ABNF grammar:

```
<Used-Service-Unit>::=< AVP Header: TBD >
    [Amount-of-UUS-Data]
    [Mime-Type]
    [Direction]
```

End of Change in Clause 7.2
End of Document

CHANGE REQUEST

⌘ **32.225 CR 016** ⌘ rev **-** ⌘ Current version: **5.2.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘	Correction of usage of Application-Provided-Called-Party-Address AVP
Source:	⌘	S5 SWG-B
Work item code:	⌘	OAM-CH
		Date: ⌘ 15/05/2003
Category:	⌘	F
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Use <u>one</u> of the following categories:</p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p> </div> <div style="width: 45%;"> <p>Use <u>one</u> of the following releases:</p> <p>2 (GSM Phase 2)</p> <p>R96 (Release 1996)</p> <p>R97 (Release 1997)</p> <p>R98 (Release 1998)</p> <p>R99 (Release 1999)</p> <p>Rel-4 (Release 4)</p> <p>Rel-5 (Release 5)</p> <p>Rel-6 (Release 6)</p> </div> </div>
Release:	⌘	Rel-5

Reason for change: ⌘ It is defined in the table 6.2 that Application-Provided-Called-Party-Address AVP is not included in ACR when online charging is used. However, the Application-Provided-Called-Party-Address AVP must be available also when online charging is used.

Summary of change: ⌘ The "Used in Online ACR" information changed from "No" to "Yes".

Consequences if not approved: ⌘ In online cases there is no possibility to deliver Application-Provided-Called-Party-Address to the ECF and therefore it cannot be used for charging.

Clauses affected:	⌘	6.1.3.2.1								
Other specs Affected:	⌘	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	Y	N		X		X		X
Y	N									
	X									
	X									
	X									
Other comments:	⌘	None								

How to create CRs using this form:

Change in Clause 6.1.3.2.1

6.1.3.2.1 Accounting-Request Message

Table 6.2 illustrates the basic structure of a Diameter *Accounting-Request* message as used for IMS online charging.

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

Diameter Base Protocol AVPs	
AVP	Used in Online ACR
<Diameter Header: 271, REQ, PXY>	Yes
<Session-Id>	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm }	Yes
{Accounting-Record-Type}	Yes
{Accounting-Record-Number}	Yes
[Acct-Application-Id]	No
[Vendor-Specific-Application-Id]	Yes
[User-Name]	Yes
[Accounting-Sub-Session-Id]	No
[Accounting-RADIUS-Session-Id]	No
[Acct-Multi-Session-Id]	No
[Acct-Interim-Interval]	Yes
[Accounting-Realtime-Required]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
* [Proxy-Info]	No
* [Route-Record]	No
*[AVP]	No
Diameter Credit Control AVPs	
[Subscription-Id]	Yes
[Requested-Action]	Yes
*[Requested-Service-Unit]	Yes
*[Used-Service-Unit]	Yes
[Tariff-Switch-Definition]	Yes
*[Service-Parameter-Info]	Yes
[Abnormal-Termination-Reason]	Yes
*[Accounting-Correlation-Id]	No
[Credit-Control-Failure-Handling]	Yes
[Direct-Debiting-Failure-Handling]	Yes
[Re-Transmission]	Yes
3GPP Diameter accounting AVPs	
[Event-Type]	Yes
[Role-of-node]	Yes
[User-Session-ID]	Yes
[Calling-Party-Address]	Yes
[Called-Party-Address]	Yes
[Time-stamps]	Yes
*[Application-Server]	No
*[Application-Provided-Called-Party-Address]	YesNo
*[Inter-Operator-Identifier]	Yes
[IMS-Charging-Identifier]	Yes
*[SDP-Session-Description]	Yes
*[SDP-Media-Component]	Yes
[GGSN-Address]	Yes
[Served-Party-IP-Address]	No
[Authorised QoS]	No
[Server-Capabilities]	No
[Trunk-Group-ID]	No
[Bearer-Service]	No
[UUS-Data]	Yes

The detailed use of the AVPs for MRFC/AS and for each ACR record type (start/interim/stop/event) is specified in subclause 6.1.3.3.

End of Change in Clause 6.1.3.2.1
End of Document