TSGS#26(04)0776

Source: SA5 (Telecom Management)

Title: 7 Rel-5/6 CR 32.225/299 IMS charging / Diameter charging applications

Document for: Approval

Agenda Item: 7.5.3

Doc1stevel	Specific a	CR	R	Phase	Subject	Ca	VersCu	Doc2ndLev	WorkitemsI D
SP-040776	32.225	029	--	Rel-5	Align SDP-Media-Components in ACR with CDR	F	5.6.0	S5-044646	OAM-CH
SP-040776	32.225	030	--	Rel-5	Reassign Vendor specific AVP codes - Align with CN4ís 29.230	F	5.6.0	S5-044792	OAM-CH
SP-040776	32.225	031	--	Rel-5	Correct multiple occurrence of Inter-Operator-Identifier, ApplicationServer, Application-provided-Called-Party-Address	F	5.6.0	S5-044794	OAM-CH
SP-040776	32.299	001	--	Rel-6	Reassign Vendor specific AVP codes - Align with CN4ís 29.230	A	6.0.0	S5-044793	OAM-CH
SP-040776	32.299	002	--	Rel-6	Add Threshold based re-authorisation triggers	B	6.0.0	S5-044797	CH
SP-040776	32.299	003	--	Rel-6	Add Re-authorisation triggers for flow-based online charging ñ Align with Stage 2	B	6.0.0	S5-044798	CH
SP-040776	32.299	004	--	Rel-6	Add missing elements and other corrections	F	6.0.0	S5-044800	CH

3GPP TSG-SA5 (Telecom Management) **S5-044646**
Meeting #39bis, Orlando, USA, 27 September - 1 October 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **32.225** **CR** **029** ⌘ **rev** **-** ⌘ Current version: **5.6.0** ⌘

*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 **X**

Title:	⌘	Align SDP-Media-Components in ACR with CDR
Source:	⌘	SA5 (lizdaniel@lucent.com)
Work item code:	⌘	OAM-CH
Date:	⌘	27/09/2004
Category:	⌘	**F**
Release:	⌘	REL-5

Use one 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 one of the following releases:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Inconsistency between the AVP parameter definition and CDR parameter definition. The CDR parameter definition in the ASN.1 is incorrect.
Summary of change:	⌘	The ASN.1 is corrected to show a single SDP-Media-Name in the group.
Consequences if not approved:	⌘	The CCF will not be able to generate the CDR as the ACR will not provide compatible information.

Clauses affected:	⌘	5.2.6

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

5.2.5 Bi interface Conventions

The present document gives several recommendations for the main protocol layers for the Bi interface protocol stack. These recommendations are not strictly specified features, since there are a lot of variations among the existing Billing Systems.

As a minimum, all implementations shall support a file based bulk interface for the transfer of CDRs from the CCF to the BS. The recommendation is FTP over TCP/IP.

5.2.6 Abstract Syntax Description

```
TS32225-DataTypes {42} -- to be allocated, value “42” is used to allow compilation of the code

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- Exports everything

IMPORTS

TimeStamp
FROM TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0)
umts-Operation-Maintenance (3) ts-32-205 (205) informationModel (0) asn1Module (2) version1 (1)}

IMSRecord ::= SET
{
        -- Fields used by several multimedia Record types ("Common fields"):
        -- (which field is used in which record type is defined in section 5.2.3)
        recordType                      [0] CallEventRecordType,
        retransmission                  [1] NULL OPTIONAL,
        sIP-Method                      [2] SIP-Method OPTIONAL,
        role-of-Node                    [3] Role-of-Node OPTIONAL,
        nodeAddress                     [4] NodeAddress OPTIONAL,
        session-Id                      [5] Session-Id OPTIONAL,
        calling-Party-Address           [6] InvolvedParty OPTIONAL,
        called-Party-Address            [7] InvolvedParty OPTIONAL,
        privateUserID                   [8] GraphicString OPTIONAL,
        serviceRequestTimeStamp         [9] TimeStamp OPTIONAL,
        serviceDeliveryStartTimeStamp   [10] TimeStamp OPTIONAL,
        serviceDeliveryEndTimeStamp     [11] TimeStamp OPTIONAL,
        recordOpeningTime               [12] TimeStamp OPTIONAL,
        recordClosureTime               [13] TimeStamp OPTIONAL,
        interOperatorIdentifiers        [14] InterOperatorIdentifiers OPTIONAL,
        localRecordSequenceNumber       [15] LocalRecordSequenceNumber OPTIONAL,
        recordSequenceNumber            [16] INTEGER OPTIONAL,
        causeForRecordClosing           [17] CauseForRecordClosing OPTIONAL,
        incomplete-CDR-Indication       [18] Incomplete-CDR-Indication OPTIONAL
        iMS-Charging-Identifier         [19] IMS-Charging-Identifier OPTIONAL,
        sDP-Session-Description         [20] SEQUENCE OF Graphic STRING OPTIONAL,
        list-Of-SDP-Media-Components    [21] SEQUENCE OF Media-Components-List OPTIONAL,
        gGSNaddress                     [22] NodeAddress OPTIONAL,
        serviceDeliveryFailureReason    [23] ServiceDeliveryFailureReason OPTIONAL,
        list-Of-Message-Bodies          [24] SEQUENCE OF MessageBody OPTIONAL,
        recordExtensions                [25] RecordExtensions OPTIONAL,
        -- Space left for further "common fields"

        -- Fields particular used in the S-CSCF-recordType:
        applicationServersInformation   [40] SEQUENCE OF ApplicationServersInformation OPTIONAL,


        -- Fields particular used in the P-CSCF-recordType:
        servedPartyIPAress              [50] ServedPartyIPAddress OPTIONAL,
        -- < ServedPartyIPAddress to be defined >

        -- Fields particular used in the I-CSCF-recordType:
        transactionTimestamp            [60] TimeStamp OPTIONAL,
        s-CSCF-Information              [61] S-CSCF-Information OPTIONAL,
        -- < S-CSCF-Information to be defined >

        -- Fields particular used in the MRFC-recordType:
        service-Id                      [70] Service-Id OPTIONAL,
```

```
        -- <Service-Id to be defined>

        -- Fields particular used in the MGCF-recordType:
        trunkGroupID                    [80] TrunkGroupID OPTIONAL,
        bearerService                   [81] TransmissionMedium OPTIONAL,

        -- Fields particular used in the BGCF-RecordType (start with tag 90):
        -- <empty so far>

        -- Fields particular used in the AS-RecordType:
        serviceSpecificData             [100] OCTET STRING OPTIONAL
}

ACRInterimLost ::= ENUMERATED
{
        no (0),
        yes (1),
        unknown (2)
}

ApplicationServersInformation ::= SEQUENCE
{
        applicationServersInvolved       [0] NodeAddress OPTIONAL,
        applicationProvidedCalledParties [1] SEQUENCE OF InvolvedParty OPTIONAL
}

CauseForRecordClosing ::= ENUMERATED
{
        serviceDeliveryEndSuccessfully (0),
        unSuccessfulServiceDelivery    (1),
        timeLimit                      (3),
        serviceChange                  (4), -- e.g. change in media due to Re-Invite
        managementIntervention         (5),
        maxChangeCond                  (6)  -- e.g. number in 'List of Message Bodies' exceeeded
-- partial record generation reasons to be added
--  Additional codes are for further study
}


IMS-Charging-Identifier ::= OCTET STRING

Incomplete-CDR-Indication ::= SET
{
        aCRStartLost [0] BOOLEAN, -- TRUE if ACR[Start] was lost, FALSE otherwise
        aCRInterimLost [1] ACRInterimLost,
        aCRStopLost [2] BOOLEAN -- TRUE if ACR[Stop] was lost, FALSE otherwise
}

InterOperatorIdentifiers ::= SEQUENCE
{
        originatingIOI [0] GraphicString OPTIONAL,
        terminatingIOI [1] GraphicString OPTIONAL
}

InvolvedParty ::= CHOICE
{
        sIP-URL [0] GraphicString, -- refer to rfc3261
        tEL-URL [1] GraphicString  -- refer to rfc3261
}

IPAddress ::= CHOICE
{
        ipV4Addr [0] GraphicString, -- "dot" notation is used
        ipV6Addr [1] GraphicString  -- "dot" notation is used
}

LocalRecordSequenceNumber ::= INTEGER (0..+2147483647)
-- A unique number assigned by the CCF and supplied to all CDRs. The value range
-- limits the field to a maximum 4 octet INTEGER.

Media-Components-List ::= SEQUENCE
{
        sIP-Request-Timestamp  [0] TimeStamp OPTIONAL,
        sIP-Response-Timestamp [1] TimeStamp OPTIONAL,
        sDP-Media-Components   [2] SDP-Media-Components OPTIONAL,
        mediaInitiatorFlag     [3] NULL OPTIONAL,
        authorized-QoS         [3] GraphicString OPTIONAL
}
```

```
MessageBody ::= SEQUENCE
{
        Content-Type          [0] GraphicString OPTIONAL,
        Content-Disposition   [1] GraphicString OPTIONAL,
        Content-Length        [2] INTEGER OPTIONAL,
        Originator            [3] InvolvedParty OPTIONAL
}

NodeAddress ::= CHOICE
{
        iPAddress  [0] IPAddress,
        domainName [1] GraphicString
}

RecordExtensions ::= SEQUENCE
{
        -- ...
        -- operator specific record extensions
        -- ...
}

Role-of-Node ::= ENUMERATED
{
        originating (0),
        terminating (1),
        proxy       (2),
        b2bua       (3)
}

SDP-Media-Components ::= SEQUENCE
{
        sDP-Media-Name         [0] SEQUENCE OF GraphicString OPTIONAL,
        sDP-Media-Descriptions [1] SEQUENCE OF SDP-Media-Description OPTIONAL,
        gPRS-Charging-Id       [2] INTEGER OPTIONAL,
}

SDP-Media-Description ::= SEQUENCE OF GraphicString OPTIONAL,

ServiceDeliveryFailureReason ::= GraphicString
-- holds the SIP error code as received via a SIP Final response (4xx, 5xx or 6xx)

Session-Id ::= GraphicString
-- rfc3261: example for SIP Call-ID: f81d4fae-7dec-11d0-a765-00a0c91e6bf6@foo.bar.com

Sip-Method ::= GraphicString

TransmissionMedium ::= SEQUENCE {
        -- Transmission Medium Required, refer to ITU-T Q.763:
        tMR [0] OCTET STRING (SIZE (1)) OPTIONAL,
        -- Transmission Medium USED, refer to ITU-T Q.763:
        tMU [1] OCTET STRING (SIZE (1)) OPTIONAL
}

TrunkGroupID ::= CHOICE {
        incoming [0] GraphicString,
        outgoing [1] GraphicString
}

END
```

3GPP TSG-SA5 (Telecom Management) **S5-044792**
Meeting #40, Sanya, CHINA, 15 - 19 November 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **32.225** **CR** **030** ⌘ **rev** **-** ⌘ Current version: **5.6.0** ⌘

*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 **X**

Title:	⌘	Reassign Vendor specific AVP codes - Align with CN4ís 29.230
Source:	⌘	SA5 SWGB (lizdaniel@lucent.com)
Work item code:	⌘	OAM-CH
Date:	⌘	28/10/2004
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one 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 one of the following releases:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	CN4 have reassigned the blocks of 3GPP vendor specifc AVP codes to allow backward compatibility with RADIUS. Change is need in Rel-5 to proviude forward compatibility with Rel-6. Also, for vendor specifc AVPs the V bit must be set.
Summary of change:	⌘	AVP codes for charging changed to the range 800 as per 29.230, except for the AVP Server-Capabilities where a reference is made to 29.229 for the AVP code. The code for the AVP Server-Capabilities is now defined in 29.229. The tables show that the V bit is set for the 3GPP vendor specifc AVPs.
Consequences if not approved:	⌘	There will be no forward compatibility with Rel-6 systems

Clauses affected:	⌘	7.2			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
		X		O&M Specifications	Rel-6 32.299
Other comments:	⌘	Rel-6 Mirror CR 32.299 in S5-044793.			

7.2 Additional AVPs

For the purpose of IMS charging additional AVPs are used in ACR and ACA for 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.
CC-Correlation-Id	[13]	[13]	OctetString					
CC-Input-Octets	[13]	[13]	Unsigned64					
CC-Money	[13]	[13]	Grouped					
CC-Output-Octets	[13]	[13]	Unsigned64					
CC-Request-Number	[13]	[13]	Unsigned32					
CC-Request-Type	[13]	[13]	Enumerated					
CC-Service-Specific-Units	[13]	[13]	Unsigned64					
CC-Session -Failover	[13]	[13]	Enumerated					
CC-Sub-Session-Id	[13]	[13]	Unsigned64					
CC-Time	[13]	[13]	Unsigned32					
CC-Total-Octets	[13]	[13]	Unsigned64					
CC-Unit-Type	[13]	[13]	Enumerated					
Check-Balance-Result	[13]	[13]	Enumerated					
Cost-Information	[13]	[13]	Grouped					
Cost-Unit	[13]	[13]	UTF8String					
Credit-Control	[13]	[13]	Enumerated					
Credit-Control-Failure-Handling	[13]	[13]	Enumerated					
Currency-Code	[13]	[13]	Unsigned32					
Direct-Debiting	[13]	[13]	Enumerated					
Failure-Handling-Exponent	[13]	[13]	Integer32					
Final-Unit-Action	[13]	[13]	Enumerated					
Final-Unit-Indication	[13]	[13]	Grouped					
Granted-Service-Unit	[13]	[13]	Grouped					
Granted-Service-Unit -Pool-Identifier	[13]	[13]	Unsigned32					
Granted-Service-Unit -Pool-Reference	[13]	[13]	Grouped					
Multiple-Services-Credit-Control	[13]	[13]	Grouped					
Multiple-Services-Indicator	[13]	[13]	Enumerated					
Rating-Group	[13]	[13]	Unsigned32					
Redirect-Address-Type	[13]	[13]	Enumerated					
Redirect-Server	[13]	[13]	Grouped					
Redirect-Server-Address	[13]	[13]	UTF8String					
Requested-Action	[13]	[13]	Enumerated					
Requested-Unit	[13]	[13]	Grouped					
Restriction -Filter-Rule	[13]	[13]	IPFiltrRule					
Service-Identifier	[13]	[13]	UTF8String					
Service-Parameter-Info	[13]	[13]	Grouped					
Service-Parameter-Type	[13]	[13]	Unsigned32					
Service- Parameter-Value	[13]	[13]	OctetString					
Subscription-Id	[13]	[13]	Grouped					
Subscription-Id-Data	[13]	[13]	UTF8String					
Subscription-Id-Type	[13]	[13]	Enumerated					
Tariff-Change-Usage	[13]	[13]	Enumerated					
Tariff-Time-Change	[13]	[13]	Time					
Unit-Value	[13]	[13]	Grouped					
Used-Service-Unit	[13]	[13]	Grouped					
User-Equipment-Info	[13]	[13]	Grouped					
User-Equipment-Info-Type	[13]	[13]	Unsigned32					
User-Equipment-Info-Value	[13]	[13]	UTF8String					
Value-Digits	[13]	[13]	Integer64					
Validity-Time	[13]	[13]	Unsigned32					
3GPP Diameter Accounting AVPs								
[Event-Type]	8223	7.2.16	Grouped	V				
[SIP-Method]	8224	7.2.34	UTF8String	V				
[Event]	8225	7.2.15	UTF8String	V				
[Content-Type]	8226	7.2.12	UTF8String	V				
[Content-Length]	8227	7.2.11	UTF8String	V				

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
[Content-Disposition]	8228	7.2.10	UTF8String	V				
[Role-of-Node]	8229	7.2.27	Enumerated	V				
[User Session Id]	8230	7.2.45	UTF8String	V				
[Calling-Party-Address]	8231	7.2.7	UTF8String	V				
[Called-Party-Address]	8232	7.2.6	UTF8String	V				
[Time-stamps]	8233	7.2.39	Grouped	V				
[SIP-Request-Timestamp]	8234	7.2.35	UTF8String	V				
[SIP-Response-Timestamp]	8235	7.2.36	UTF8String	V				
[Application-server]	8236	7.2.3	UTF8String	V				
[Application-provided-called-party-address]	8237	7.2.2	UTF8String	V				
[Inter-Operator-Identifier]	8238	7.2.22	Grouped	V				
[Originating-IOI]	8239	7.2.25	UTF8String	V				
[Terminating-IOI]	8240	7.2.38	UTF8String	V				
[IMS-Charging-Identifier]	8241	7.2.20	UTF8String	V				
*[SDP-Session-Description]	8242	7.2.31	UTF8String	V				
*[SDP-Media-component]	8243	7.2.28	Grouped	V				
[SDP-Media-Name]	8244	7.2.30	UTF8String	V				
*[SDP-Media-Description]	8245	7.2.29	UTF8String	V				
[GPRS-Charging-Id]	8246	7.2.18	UTF8String	V				
[GGSN-Address]	8247	7.2.17	IPAddress	V				
[Served-Party-IP-Address]	8248	7.2.32	IPAddress	V				
[Authorized-QoS]	8249	7.2.4	UTF8String	V				
[Server-Capabilities]	[19]250	[19]		V				
[Trunk-Group-Id]	8251	7.2.40	Grouped	V				
[Incoming-Trunk-Group-Id]	8252	7.2.21	UTF8String	V				
[Outgoing-Trunk-Group-Id]	8253	7.2.26	UTF8String	V				
[Bearer-Service]	8254	7.2.5	OctetString	V				
[Service-Id]	8255	7.2. 33	UTF8String	V				
[UUS-Data]	8256	7.2.46	Grouped	V				
[Amount-of-UUS-data]	8257	7.2.1	UTF8String	V				
[Mime-type]	8258	7.2.23	UTF8String	V				
[Direction]	8259	7.2.14	Enumerated	V				
[Cause]	8260	7.2.8	Grouped	V				
{Cause-Code}	8261	7.2.9	Enumerated	V				
{Node-Functionality}	8262	7.2.24	Enumerated	V				

7.2.1 Amount-of-UUS-Data AVP

The *Amount-Of-UUS-Data* AVP (AVP code 8257) 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 8237) 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 8236) 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 8249) is of type 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 8254) 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 832) 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 8231) 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 8260) 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: 8260>

{Cause-Code}

{Node-Functionality}

7.2.9 Cause-Code AVP

The *Cause-Code* AVP (AVP code 8261) 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).

7.2.10 Content-Disposition AVP

The *Content-Disposition* AVP (AVP code 8228) 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].

7.2.11 Content-Length AVP

The *Content-Length* AVP (AVP code 8227) is of type UTF8String and holds the size of the of the message-body, as described in [17].

7.2.12 Content-Type AVP

The *Content-Type* AVP (AVP code 8226) is of type UTF8String and holds the media type (e.g. application/sdp, text/html) of the message-body, as described in [17].

7.2.13 Direction AVP

The *Direction* AVP (AVP code 8259) 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

7.2.14 Event AVP

The *Event* AVP (AVP code 8225) is of type UTF8String and holds the content of the "Event" header used in SUBSCRIBE and NOTIFY messages.

7.2.15 Event-Type AVP

The *Event-Type* AVP (AVP code 8223) 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:

<Event-Type>::=<AVP Header: 8223 >

[SIP-Method]

[Event]

[Content-Type]

[Content-Length]

[Content-Disposition]

7.2.16 GGSN-Address AVP

The *GGSN-Address* AVP (AVP code 8247) is of type IPAddress and holds the IP-address of the GGSN that generated the GPRS Charging ID, as described in [2].

7.2.17 GPRS-Charging-ID AVP

The *GPRS-Charging-ID* AVP (AVP code 8246) is of type UTF8String and holds a sequence number generated by the GGSN at PDP context activation, as described in [2].

7.2.18 IMS-Charging-Identifier (ICID) AVP

The *IMS-Charging-Identifier* AVP (AVP code 8241) 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.

7.2.19 Incoming-Trunk-Group-ID AVP

The *Incoming-Trunk-Group-ID* AVP (AVP code 8252) is of type UTF8String and identifies the incoming PSTN leg.

7.2.20 Inter-Operator-Identifier AVP

The *Inter-Operator-Identifier* AVP (AVP code 8238) 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: 8238 >

[Originating-IOI]

[Terminating-IOI]

7.2.21 Mime-Type AVP

The *Mime-Type* AVP (AVP code 8258) is of type UTF8String and holds the Mime type of the User-To-User data.

7.2.22 Node-Functionality AVP

The *Node-Functionality* AVP (AVP code 8262) 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

7.2.23 Originating-IOI AVP

The *Originating-IOI* AVP (AVP code 8239) 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].

7.2.24 Outgoing-Trunk-Group-ID AVP

The *Outgoing-Trunk-Group-ID* AVP (AVP code 8253) is of type UTF8String and identifies the outgoing PSTN leg.

7.2.25 Role-of-Node AVP

The *Role-Of-Node* AVP (AVP code 8229) is of type Enumerated and specifies the role of the AS/CSCF.

The identifier can be one of the following:

ORIGINATING_ROLE 0
The AS/CSCF is applying a originating role, serving the calling subscriber.

TERMINATING_ROLE 1
The AS/CSCF is applying a terminating role, serving the called subscriber.

PROXY ROLE 2
The AS is applying a proxy role.

B2BUA_ROLE 3
The AS is applying a B2BUA role.

7.2.26 SDP-Media-Component AVP

The *SDP- Media-Component* AVP (AVP code 8243) 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: 8243 >

[SDP-Media-Name]

*[SDP-Media-Description]

[GPRS-Charging-Id]

7.2.27 SDP-Media-Description AVP

The *SDP-Media-Description* AVP (AVP code 8245) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=, etc.) related to a media component, as described in [17]. The attributes are specifying the media described in the SDP-Media-Name AVP.

7.2.28 SDP-Media-Name AVP

The *SDP-Media-Name* AVP (AVP code 8244) is of type UTF8String and holds the content of a "m=" line in the SDP data.

7.2.29 SDP-Session-Description AVP

The *SDP-Media-Description* AVP (AVP code 8242) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=, etc.) related to a session, as described in [17].

7.2.30 Served-Party-IP-Address AVP

The *Served-Party-IP-Address* AVP (AVP code 82448) is of type IPAddress and holds the IP address of either the calling or called party, depending on whether the P-CSCF is in touch with the calling or the called party. This AVP is only provided by the P-CSCF.

7.2.31 Service-ID AVP

The *Service-ID* AVP (AVP code 8255) 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.

7.2.32 SIP-Method AVP

The *SIP-Method* AVP (AVP code 8224) 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.

7.2.33 SIP-Request-Timestamp AVP

The *SIP-Request-Timestamp* AVP (AVP code 8234) is of type UTF8String and holds the time in UTC format of the initial SIP request (e.g. Invite).

7.2.34 SIP-Response-Timestamp AVP

The *SIP-Response-Timestamp AVP* (AVP code 8235) is of type UTF8String and holds the time in UTC format of the response to the initial SIP request (e.g. 200 OK).

7.2.35 Terminating-IOI AVP

The *Terminating-IOI* AVP (AVP code 8240) 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].

7.2.36 Time-Stamps AVP

The *Time-Stamp* AVP (AVP code 8233) 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: 8233 >

[SIP-Request-Timestamp]

[SIP-Response-Timestamp]

7.2.37 Trunk-Group-ID AVP

The *Trunk-Group-ID* AVP (AVP code 8251) is of type Grouped and identifies the incoming and outgoing PSTN legs.

It has the following ABNF grammar:

<Trunk-Group-ID>::=<AVP Header: 8251>

[Incoming-Trunk-Group-ID]

[Outgoing-Trunk-Group-ID]

7.2.38 User-Session-ID AVP

The *User-Session-Id* AVP (AVP code 8230) 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].

7.2.39 UUS-Data AVP

The *UUS-Data* AVP (AVP Code 8256) 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: 8256 >

[Amount-of-UUS-Data]

[Mime-Type]

[Direction]

3GPP TSG-SA5 (Telecom Management) **S5-044794**
Meeting #40, Sanya, CHINA, 15 - 19 November 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **32.225** **CR** **031** ⌘ **rev** **-** ⌘ Current version: **5.6.0** ⌘

*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 **X**

Title:	⌘	Correct multiple occurrence of Inter-Operator-Identifier, ApplicationServer, Application-provided-Called-Party-Address
Source:	⌘	SA5 SWGB (lizdaniel@lucent.com)
Work item code:	⌘	OAM-CH
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	REL-5

Use one 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 one of the following releases:
Ph2 *(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)*
Rel-7 *(Release 7)*

Reason for change:	⌘	Table 5.4, 5.8 and 7.2 use * to indicate which AVPs may have multiple occurences. However, for the AVPs:Inter-Operator-Identifier, ApplicationServer, Application-provided-Called-Party-Address, these * are inconsistent across the tables. To ensure alignment between the ACR and the CDR a new AVP: Application-Servers-Involved is needed, which includes the two existing AVPs: Application-Server and Application-Provided-Called-Party-Address. This makes it clear how the AVPs are mapped to the CDR.
Summary of change:	⌘	The tables are corrected to show that Inter-Operator-Identifier may not have multiple occurences and that the other two AVPs may. An new AVP is added in section 7.2.2.a called ApplicationServerInformation, in line with the CDR description. ApplicationServers and Application-provided-Called-Partty-Address are grouped inside this AVP. Table 5.8 is updated, replacing the current AVPs with the new ApplicationServerInformation AVP. Similarly in table 7.2. The ASN.1 for the CDR is changed to make the Applicationserver field of type GraphicString and a reference to SIP URL is added to bring the ASN.1 in line with the description of the field.
Consequences if	⌘	The CCF will not be able to populate the CDR fields for

not approved:	ApplicationServerInformation as the AVPs in the ACR are not consistent in number of occurences and relationship.

Clauses affected:	⌘	5.1.3.2.1 (table 5.4), 5.1.3.3 (table 5.8), 5.2.6, 7.2			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

5.1.3 Message Formats

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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
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-Information]	Only for S-CSCF/MRFC
~~*[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 P-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

NOTE: For AVP of type "Grouped" only the group AVP is listed in table 5.4. Detailed descriptions of the AVPs is provided in clause 7.

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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]		-	-	-	-	-	-	-
[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]		-	-	-	-	-	-	-

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
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]		-	-	-	-	-	-	-
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-Information] (see note 1)		SISE	-	-	SIS-	-	-	-
~~*[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]		SI-E	SI-E	-	SI-	SI-E	SI-E	SI-E
*[SDP-Media-component]		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 2)		SISE	SISE					SISE
[Cause]		--SE	--SE	E	--S	--SE	--SE	--SE
NOTE 1: Only present if available in the IMS node. NOTE 2: Present only if user-to-user data is included in the SIP message that triggered the ACR.								

5.2 CDR Description on the Bi Interface

Ö

5.2.6 Abstract Syntax Description

```
TS32225-DataTypes {42} -- to be allocated, value “42” is used to allow compilation of the code

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- Exports everything

IMPORTS

TimeStamp
FROM TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0)
umts-Operation-Maintenance (3) ts-32-205 (205) informationModel (0) asn1Module (2) version1 (1)}

IMSRecord ::= SET
{
        -- Fields used by several multimedia Record types ("Common fields"):
        -- (which field is used in which record type is defined in section 5.2.3)
        recordType                      [0] CallEventRecordType,
        retransmission                  [1] NULL OPTIONAL,
        sIP-Method                      [2] SIP-Method OPTIONAL,
        role-of-Node                    [3] Role-of-Node OPTIONAL,
        nodeAddress                     [4] NodeAddress OPTIONAL,
        session-Id                      [5] Session-Id OPTIONAL,
        calling-Party-Address           [6] InvolvedParty OPTIONAL,
```

```
        called-Party-Address            [7] InvolvedParty OPTIONAL,
        privateUserID                   [8] GraphicString OPTIONAL,
        serviceRequestTimeStamp         [9] TimeStamp OPTIONAL,
        serviceDeliveryStartTimeStamp   [10] TimeStamp OPTIONAL,
        serviceDeliveryEndTimeStamp     [11] TimeStamp OPTIONAL,
        recordOpeningTime               [12] TimeStamp OPTIONAL,
        recordClosureTime               [13] TimeStamp OPTIONAL,
        interOperatorIdentifiers        [14] InterOperatorIdentifiers OPTIONAL,
        localRecordSequenceNumber       [15] LocalRecordSequenceNumber OPTIONAL,
        recordSequenceNumber            [16] INTEGER OPTIONAL,
        causeForRecordClosing           [17] CauseForRecordClosing OPTIONAL,
        incomplete-CDR-Indication       [18] Incomplete-CDR-Indication OPTIONAL
        iMS-Charging-Identifier         [19] IMS-Charging-Identifier OPTIONAL,
        sDP-Session-Description         [20] SEQUENCE OF Graphic STRING OPTIONAL,
        list-Of-SDP-Media-Components    [21] SEQUENCE OF Media-Components-List OPTIONAL,
        gGSNaddress                     [22] NodeAddress OPTIONAL,
        serviceDeliveryFailureReason    [23] ServiceDeliveryFailureReason OPTIONAL,
        list-Of-Message-Bodies          [24] SEQUENCE OF MessageBody OPTIONAL,
        recordExtensions                [25] RecordExtensions OPTIONAL,
        -- Space left for further "common fields"

        -- Fields particular used in the S-CSCF-recordType:
        applicationServersInformation   [40] SEQUENCE OF ApplicationServersInformation OPTIONAL,


        -- Fields particular used in the P-CSCF-recordType:
        servedPartyIPAress              [50] ServedPartyIPAddress OPTIONAL,
        -- < ServedPartyIPAddress to be defined >

        -- Fields particular used in the I-CSCF-recordType:
        transactionTimestamp            [60] TimeStamp OPTIONAL,
        s-CSCF-Information              [61] S-CSCF-Information OPTIONAL,
        -- < S-CSCF-Information to be defined >

        -- Fields particular used in the MRFC-recordType:
        service-Id                      [70] Service-Id OPTIONAL,
        -- <Service-Id to be defined>

        -- Fields particular used in the MGCF-recordType:
        trunkGroupID                    [80] TrunkGroupID OPTIONAL,
        bearerService                   [81] TransmissionMedium OPTIONAL,

        -- Fields particular used in the BGCF-RecordType (start with tag 90):
        -- <empty so far>

        -- Fields particular used in the AS-RecordType:
        serviceSpecificData             [100] OCTET STRING OPTIONAL
}

ACRInterimLost ::= ENUMERATED
{
        no (0),
        yes (1),
        unknown (2)
}

ApplicationServersInformation ::= SEQUENCE
{
        applicationServersInvolved      [0] NodeAddress GraphicString OPTIONAL, -- SIP URL refer to
rfc3261
        applicationProvidedCalledParties [1] SEQUENCE OF InvolvedParty OPTIONAL
}

CauseForRecordClosing ::= ENUMERATED
{
        serviceDeliveryEndSuccessfully (0),
        unSuccessfulServiceDelivery    (1),
        timeLimit                      (3),
        serviceChange                  (4), -- e.g. change in media due to Re-Invite
        managementIntervention         (5),
        maxChangeCond                  (6)  -- e.g. number in 'List of Message Bodies' exceeeded
-- partial record generation reasons to be added
--  Additional codes are for further study
}


IMS-Charging-Identifier ::= OCTET STRING
```

```
Incomplete-CDR-Indication ::= SET
{
       aCRStartLost [0] BOOLEAN, -- TRUE if ACR[Start] was lost, FALSE otherwise
       aCRInterimLost [1] ACRInterimLost,
       aCRStopLost [2] BOOLEAN -- TRUE if ACR[Stop] was lost, FALSE otherwise
}

InterOperatorIdentifiers ::= SEQUENCE
{
       originatingIOI [0] GraphicString OPTIONAL,
       terminatingIOI [1] GraphicString OPTIONAL
}

InvolvedParty ::= CHOICE
{
       sIP-URL [0] GraphicString, -- refer to rfc3261
       tEL-URL [1] GraphicString  -- refer to rfc3261
}

IPAddress ::= CHOICE
{
       ipV4Addr [0] GraphicString, -- "dot" notation is used
       ipV6Addr [1] GraphicString  -- "dot" notation is used
}

LocalRecordSequenceNumber ::= INTEGER (0..+2147483647)
-- A unique number assigned by the CCF and supplied to all CDRs. The value range
-- limits the field to a maximum 4 octet INTEGER.

Media-Components-List ::= SEQUENCE
{
       sIP-Request-Timestamp  [0] TimeStamp OPTIONAL,
       sIP-Response-Timestamp [1] TimeStamp OPTIONAL,
       sDP-Media-Components   [2] SDP-Media-Components OPTIONAL,
       mediaInitiatorFlag     [3] NULL OPTIONAL,
       authorized-QoS         [3] GraphicString OPTIONAL
}

MessageBody ::= SEQUENCE
{
       Content-Type          [0] GraphicString OPTIONAL,
       Content-Disposition   [1] GraphicString OPTIONAL,
       Content-Length        [2] INTEGER OPTIONAL,
       Originator            [3] InvolvedParty OPTIONAL
}

NodeAddress ::= CHOICE
{
       iPAddress  [0] IPAddress,
       domainName [1] GraphicString
}

RecordExtensions ::= SEQUENCE
{
       -- ...
       -- operator specific record extensions
       -- ...
}

Role-of-Node ::= ENUMERATED
{
       originating (0),
       terminating (1),
       proxy       (2),
       b2bua       (3)
}

SDP-Media-Components ::= SEQUENCE
{
       sDP-Media-Name         [0] SEQUENCE OF GraphicString OPTIONAL,
       sDP-Media-Descriptions [1] SEQUENCE OF SDP-Media-Description OPTIONAL,
       gPRS-Charging-Id       [2] INTEGER OPTIONAL,
}

SDP-Media-Description ::= SEQUENCE OF GraphicString OPTIONAL,

ServiceDeliveryFailureReason ::= GraphicString
-- holds the SIP error code as received via a SIP Final response (4xx, 5xx or 6xx)
```

```
Session-Id ::= GraphicString
-- rfc3261: example for SIP Call-ID: f81d4fae-7dec-11d0-a765-00a0c91e6bf6@foo.bar.com

Sip-Method ::= GraphicString

TransmissionMedium ::= SEQUENCE {
        -- Transmission Medium Required, refer to ITU-T Q.763:
        tMR [0] OCTET STRING (SIZE (1)) OPTIONAL,
        -- Transmission Medium USED, refer to ITU-T Q.763:
        tMU [1] OCTET STRING (SIZE (1)) OPTIONAL
}

TrunkGroupID ::= CHOICE {
        incoming [0] GraphicString,
        outgoing [1] GraphicString
}

END
```

7 AVPs Used for Offline and Online Charging

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7.2 Additional AVPs

For the purpose of IMS charging additional AVPs are used in ACR and ACA for 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.
CC-Correlation-Id	[13]	[13]	OctetString					
CC-Input-Octets	[13]	[13]	Unsigned64					
CC-Money	[13]	[13]	Grouped					
CC-Output-Octets	[13]	[13]	Unsigned64					
CC-Request-Number	[13]	[13]	Unsigned32					
CC-Request-Type	[13]	[13]	Enumerated					
CC-Service-Specific-Units	[13]	[13]	Unsigned64					
CC-Session -Failover	[13]	[13]	Enumerated					
CC-Sub-Session-Id	[13]	[13]	Unsigned64					
CC-Time	[13]	[13]	Unsigned32					
CC-Total-Octets	[13]	[13]	Unsigned64					
CC-Unit-Type	[13]	[13]	Enumerated					
Check-Balance-Result	[13]	[13]	Enumerated					
Cost-Information	[13]	[13]	Grouped					
Cost-Unit	[13]	[13]	UTF8String					
Credit-Control	[13]	[13]	Enumerated					
Credit-Control-Failure-Handling	[13]	[13]	Enumerated					
Currency-Code	[13]	[13]	Unsigned32					
Direct-Debiting	[13]	[13]	Enumerated					
Failure-Handling-Exponent	[13]	[13]	Integer32					
Final-Unit-Action	[13]	[13]	Enumerated					
Final-Unit-Indication	[13]	[13]	Grouped					
Granted-Service-Unit	[13]	[13]	Grouped					
Granted-Service-Unit -Pool-Identifier	[13]	[13]	Unsigned32					
Granted-Service-Unit -Pool-Reference	[13]	[13]	Grouped					
Multiple-Services-Credit-Control	[13]	[13]	Grouped					
Multiple-Services-Indicator	[13]	[13]	Enumerated					
Rating-Group	[13]	[13]	Unsigned32					
Redirect-Address-Type	[13]	[13]	Enumerated					
Redirect-Server	[13]	[13]	Grouped					
Redirect-Server-Address	[13]	[13]	UTF8String					
Requested-Action	[13]	[13]	Enumerated					
Requested-Unit	[13]	[13]	Grouped					
Restriction -Filter-Rule	[13]	[13]	IPFiltrRule					
Service-Identifier	[13]	[13]	UTF8String					
Service-Parameter-Info	[13]	[13]	Grouped					
Service-Parameter-Type	[13]	[13]	Unsigned32					
Service- Parameter-Value	[13]	[13]	OctetString					
Subscription-Id	[13]	[13]	Grouped					
Subscription-Id-Data	[13]	[13]	UTF8String					
Subscription-Id-Type	[13]	[13]	Enumerated					
Tariff-Change-Usage	[13]	[13]	Enumerated					
Tariff-Time-Change	[13]	[13]	Time					
Unit-Value	[13]	[13]	Grouped					
Used-Service-Unit	[13]	[13]	Grouped					
User-Equipment-Info	[13]	[13]	Grouped					
User-Equipment-Info-Type	[13]	[13]	Unsigned32					
User-Equipment-Info-Value	[13]	[13]	UTF8String					

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
Value-Digits	[13]	[13]	Integer64					
Validity-Time	[13]	[13]	Unsigned32					
3GPP Diameter Accounting AVPs								
[Event-Type]	223	7.2.16	Grouped					
[SIP-Method]	224	7.2.34	UTF8String					
[Event]	225	7.2.15	UTF8String					
[Content-Type]	226	7.2.12	UTF8String					
[Content-Length]	227	7.2.11	UTF8String					
[Content-Disposition]	228	7.2.10	UTF8String					
[Role-of-Node]	229	7.2.27	Enumerated					
[User Session Id]	230	7.2.45	UTF8String					
[Calling-Party-Address]	231	7.2.7	UTF8String					
[Called-Party-Address]	232	7.2.6	UTF8String					
[Time-stamps]	233	7.2.39	Grouped					
[SIP-Request-Timestamp]	234	7.2.35	UTF8String					
[SIP-Response-Timestamp]	235	7.2.36	UTF8String					
*[Application-server-Information]	863	7.2.2a	Grouped					
[Application-server]	236	7.2.3	UTF8String					
*[Application-provided-called-party-address]	237	7.2.2	UTF8String					
*[Inter-Operator-Identifier]	238	7.2.22	Grouped					
[Originating-IOI]	239	7.2.25	UTF8String					
[Terminating-IOI]	240	7.2.38	UTF8String					
[IMS-Charging-Identifier]	241	7.2.20	UTF8String					
*[SDP-Session-Description]	242	7.2.31	UTF8String					
*[SDP-Media-component]	243	7.2.28	Grouped					
[SDP-Media-Name]	244	7.2.30	UTF8String					
*[SDP-Media-Description]	245	7.2.29	UTF8String					
[GPRS-Charging-Id]	246	7.2.18	UTF8String					
[GGSN-Address]	247	7.2.17	IPAddress					
[Served-Party-IP-Address]	248	7.2.32	IPAddress					
[Authorized-QoS]	249	7.2.4	UTF8String					
[Server-Capabilities]	250	[19]						
[Trunk-Group-Id]	251	7.2.40	Grouped					
[Incoming-Trunk-Group-Id]	252	7.2.21	UTF8String					
[Outgoing-Trunk-Group-Id]	253	7.2.26	UTF8String					
[Bearer-Service]	254	7.2.5	OctetString					
[Service-Id]	255	7.2. 33	UTF8String					
[UUS-Data]	256	7.2.46	Grouped					
[Amount-of-UUS-data]	257	7.2.1	UTF8String					
[Mime-type]	258	7.2.23	UTF8String					
[Direction]	259	7.2.14	Enumerated					
[Cause]	260	7.2.8	Grouped					
{Cause-Code}	261	7.2.9	Enumerated					
{Node-Functionality}	262	7.2.24	Enumerated					

7.2.1 Amount-of-UUS-Data AVP

The *Amount-Of-UUS-Data* AVP (AVP code 257) 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 237) is of type UTF8String and holds the called party number (SIP URL, E.164), if it is determined by an application server.

7.2.2a Application-Server-Information AVP

The *Application-Server-Information* AVP (AVP code 863) is of type Grouped and holds the Application-Server and multiple Application-Provided-Called-Party-Address.

It has the following ABNF grammar:

< Application-Server-Information >::=<AVP Header: 863 >

[Application-Server]

*[Application-Provided-Called-Party-Address]

7.2.3 Application-Server AVP

The *Application-Server* AVP (AVP code 236) is of type UTF8String and holds the SIP URL(s) of the AS(s) addressed during the session.

3GPP TSG-SA5 (Telecom Management) **S5-044793**
Meeting #40, Sanya, CHINA, 15 - 19 November 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **32.299** **CR** **001** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*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 **X**

Title:	⌘	Reassign Vendor specific AVP codes - Align with CN4ís 29.230
Source:	⌘	SA5 SWGB (Lizdaniel@lucent.com)
Work item code:	⌘	OAM-CH
Date:	⌘	28/10/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

Use one 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 one of the following releases:
Ph2 *(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)*
Rel-7 *(Release 7)*

Reason for change:	⌘	CN4 have reassigned the blocks of 3GPP vendor specifc AVP codes for the charging application to allow backward compatibility with RADIUS. Also, for vendor specifc AVPs the V bit must be set.
Summary of change:	⌘	AVP codes for charging changed to the range 800 as per 32.230, except for the AVP Server-Capabilities where a reference is made to 29.229 for the AVP code Table 7.2 indicates that the V bit must be set for 3GPP specific AVPs.
Consequences if not approved:	⌘	Operators will be unable to deploy RADIUS in the network. Misalignment with R5 if R5 change is agreed (see other comments).

Clauses affected:	⌘	7.1.2

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	Rel-6 Mirror to 32.225 CR S5-044792.

7.1.2 3GPP specific accountingAVPs

For the purpose of offline charging additional AVPs are used in ACR and ACA. The information is summarized in table 7.2 along with the AVP flag rules.

Detailed descriptions of AVPs that are used specifically for 3GPP charging are provided in the subclauses below the table. However, for AVPs that are just borrowed from other applications only the reference (e.g. [402]), is provided in table 7.2 and the detailed description is not repeated.

Table 7.2: Use Of Diameter accounting AVPs

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
3GPP Diameter Accounting AVPs								
[Event-Type]	8223	7.1.2.16	Grouped	V				
[SIP-Method]	8224	7.1.2.34	UTF8String	V				
[Event]	8225	7.1.2.15	UTF8String	V				
[Content-Type]	8226	7.1.2.12	UTF8String	V				
[Content-Length]	8227	7.1.2.11	UTF8String	V				
[Content-Disposition]	8228	7.1.2.10	UTF8String	V				
[Role-of-Node]	8229	7.1.2.27	Enumerated	V				
[User Session Id]	8230	7.1.2.45	UTF8String	V				
[Calling-Party-Address]	8231	7.1.2.7	UTF8String	V				
[Called-Party-Address]	8232	7.1.2.6	UTF8String	V				
[Time-stamps]	8233	7.1.2.39	Grouped	V				
[SIP-Request-Timestamp]	8234	7.1.2.35	UTF8String	V				
[SIP-Response-Timestamp]	8235	7.1.2.36	UTF8String	V				
[Application-server]	8236	7.1.2.3	UTF8String	V				
[Application-provided-called-party-address]	8237	7.1.2.2	UTF8String	V				
[Inter-Operator-Identifier]	8238	7.1.2.22	Grouped	V				
[Originating-IOI]	8239	7.1.2.25	UTF8String	V				
[Terminating-IOI]	8240	7.1.2.38	UTF8String	V				
[IMS-Charging-Identifier]	8241	7.1.2.20	UTF8String	V				
*[SDP-Session-Description]	8242	7.1.2.31	UTF8String	V				
*[SDP-Media-component]	8243	7.1.2.28	Grouped	V				
[SDP-Media-Name]	8244	7.1.2.30	UTF8String	V				
*[SDP-Media-Description]	8245	7.1.2.29	UTF8String	V				
[GPRS-Charging-Id]	8246	7.1.2.18	UTF8String	V				
[GGSN-Address]	8247	7.1.2.17	IPAddress	V				
[Served-Party-IP-Address]	8248	7.1.2.32	IPAddress	V				
[Authorized-QoS]	8249	7.1.2.4	UTF8String	V				
[Server-Capabilities]	[204]250	[204]		V				
[Trunk-Group-Id]	8251	7.1.2.40	Grouped	V				
[Incoming-Trunk-Group-Id]	8252	7.1.2.21	UTF8String	V				
[Outgoing-Trunk-Group-Id]	8253	7.1.2.26	UTF8String	V				
[Bearer-Service]	8254	7.1.2.5	OctetString	V				
[Service-Id]	8255	7.1.2. 33	UTF8String	V				
[UUS-Data]	8256	7.1.2.46	Grouped	V				
[Amount-of-UUS-data]	8257	7.1.2.1	UTF8String	V				
[Mime-type]	8258	7.1.2.23	UTF8String	V				
[Direction]	8259	7.1.2.14	Enumerated	V				
[Cause]	8260	7.1.2.8	Grouped	V				
{Cause-Code}	8261	7.1.2.9	Enumerated	V				
{Node-Functionality}	8262	7.1.2.24	Enumerated	V				

7.1.2.1 Amount-of-UUS-Data AVP

The *Amount-Of-UUS-Data* AVP (AVP code 8257) 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".

7.1.2.2 Application-provided-Called-Party-Address AVP

The *Application-Provided-Called-Party-Address* AVP (AVP code 8237) is of type UTF8String and holds the called party number (SIP URL, E.164), if it is determined by an application server.

7.1.2.3 Application-Server AVP

The *Application-Server* AVP (AVP code 8236) is of type UTF8String and holds the SIP URL(s) of the AS(s) addressed during the session.

7.1.2.4 Authorised-QoS AVP

The *Authorised-QoS* AVP (AVP code 8249) is of type UTF8String and holds the Authorised QoS as defined in TS 23.207 [200] / TS 29.207 [203] and applied via the Go interface.

7.1.2.5 Bearer-Service AVP

The *Bearer-Service* AVP (AVP code 8254) is of type OctetString and holds the used bearer service for the PSTN leg.

7.1.2.6 Called-Party-Address AVP

The *Called-Party-Address* AVP (AVP code 8232) 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.

7.1.2.7 Calling-Party-Address AVP

The *Calling-Party-Address* AVP (AVP code 8231) is of type UTF8String and holds the address (Public User ID: SIP URL, E.164, etc.) of the party initiating a session.

7.1.2.8 Cause AVP

The *Cause* AVP (AVP code 8260) 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: 8260>

{Cause-Code}

{Node-Functionality}

7.1.2.9 Cause-Code AVP

The *Cause-Code* AVP (AVP code 8261) 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 [405].

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 [405].

"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 [405].

"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 [405].

"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) [202] [405].

"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).

7.1.2.10 Content-Disposition AVP

The *Content-Disposition* AVP (AVP code 8228) 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 [406].

7.1.2.11 Content-Length AVP

The *Content-Length* AVP (AVP code 8227) is of type UTF8String and holds the size of the of the message-body, as described in [406].

7.1.2.12 Content-Type AVP

The *Content-Type* AVP (AVP code 8226) is of type UTF8String and holds the media type (e.g. application/sdp, text/html) of the message-body, as described in [406].

7.1.2.13 Direction AVP

The *Direction* AVP (AVP code 8259) 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

7.1.2.14 Event AVP

The *Event* AVP (AVP code 8225) is of type UTF8String and holds the content of the "Event" header used in SUBSCRIBE and NOTIFY messages.

7.1.2.15 Event-Type AVP

The *Event-Type* AVP (AVP code 8223) 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:

<Event-Type>::=<AVP Header: 8223 >

[SIP-Method]

[Event]

[Content-Type]

[Content-Length]

[Content-Disposition]

7.1.2.16 GGSN-Address AVP

The *GGSN-Address* AVP (AVP code 8247) is of type IPAddress and holds the IP-address of the GGSN that generated the GPRS Charging ID, as described in [1].

7.1.2.17 GPRS-Charging-ID AVP

The *GPRS-Charging-ID* AVP (AVP code 8246) is of type UTF8String and holds a sequence number generated by the GGSN at PDP context activation, as described in [1].

7.1.2.18 IMS-Charging-Identifier (ICID) AVP

The *IMS-Charging-Identifier* AVP (AVP code 8241) 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.

7.1.2.19 Incoming-Trunk-Group-ID AVP

The *Incoming-Trunk-Group-ID* AVP (AVP code 8252) is of type UTF8String and identifies the incoming PSTN leg.

7.1.2.20 Inter-Operator-Identifier AVP

The *Inter-Operator-Identifier* AVP (AVP code 8238) is of type Grouped and holds the identification of the network neighbours (originating and terminating) as exchanged via SIP signalling and described in [404].

It has the following ABNF grammar:

<Inter-Operator-Identifier>::=< AVP Header: 8238 >

[Originating-IOI]

[Terminating-IOI]

7.1.2.21 Mime-Type AVP

The *Mime-Type* AVP (AVP code 8258) is of type UTF8String and holds the Mime type of the User-To-User data.

7.1.2.22 Node-Functionality AVP

The *Node-Functionality* AVP (AVP code 8262) 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

7.1.2.23 Originating-IOI AVP

The *Originating-IOI* AVP (AVP code 8239) 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 [404].

7.1.2.24 Outgoing-Trunk-Group-ID AVP

The *Outgoing-Trunk-Group-ID* AVP (AVP code 8253) is of type UTF8String and identifies the outgoing PSTN leg.

7.1.2.25 Role-of-node AVP

The *Role-Of-Node* AVP (AVP code 8229) is of type Enumerated and specifies the role of the AS/CSCF.

The identifier can be one of the following:

ORIGINATING_ROLE 0
The AS/CSCF is applying a originating role, serving the calling subscriber.

TERMINATING_ROLE 1
The AS/CSCF is applying a terminating role, serving the called subscriber.

PROXY ROLE 2
The AS is applying a proxy role.

B2BUA_ROLE 3
The AS is applying a B2BUA role.

7.1.2.26 SDP-Media-Component AVP

The *SDP- Media-Component* AVP (AVP code 8243) 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: 8243 >

[SDP-Media-Name]

*[SDP-Media-Description]

[GPRS-Charging-Id]

7.1.2.27 SDP-Media-Description AVP

The *SDP-Media-Description* AVP (AVP code 8245) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=, etc.) related to a media component, as described in [406]. The attributes are specifying the media described in the SDP-Media-Name AVP.

7.1.2.28 SDP-Media-Name AVP

The *SDP-Media-Name* AVP (AVP code 8244) is of type UTF8String and holds the content of a "m=" line in the SDP data.

7.1.2.29 SDP-Session-Description AVP

The *SDP-Media-Description* AVP (AVP code 8242) is of type UTF8String and holds the content of an "attribute-line" (i=, c=, b=, k=, a=, etc.) related to a session, as described in [406].

7.1.2.30 Served-Party-IP-Address AVP

The *Served-Party-IP-Address* AVP (AVP code 8248) is of type IPAddress and holds the IP address of either the calling or called party, depending on whether the P-CSCF is in touch with the calling or the called party. This AVP is only provided by the P-CSCF.

7.1.2.31 Service-ID AVP

The *Service-ID* AVP (AVP code 8255) 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.

7.1.2.32 SIP-Method AVP

The *SIP-Method* AVP (AVP code 8224) 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.

7.1.2.33 SIP-Request-Timestamp AVP

The *SIP-Request-Timestamp* AVP (AVP code 8234) is of type UTF8String and holds the time in UTC format of the initial SIP request (e.g. Invite).

7.1.2.34 SIP-Response-Timestamp AVP

The *SIP-Response-Timestamp AVP* (AVP code 8235) is of type UTF8String and holds the time in UTC format of the response to the initial SIP request (e.g. 200 OK).

7.1.2.35 Terminating-IOI AVP

The *Terminating-IOI* AVP (AVP code 8240) 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 [404].

7.1.2.36 Time-stamps AVP

The *Time-Stamp* AVP (AVP code 8233) 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: 8233 >

[SIP-Request-Timestamp]

[SIP-Response-Timestamp]

7.1.2.37 Trunk-Group-ID AVP

The *Trunk-Group-ID* AVP (AVP code 8251) is of type Grouped and identifies the incoming and outgoing PSTN legs.

It has the following ABNF grammar:

<Trunk-Group-ID>::=<AVP Header: 8251>

[Incoming-Trunk-Group-ID]

[Outgoing-Trunk-Group-ID]

7.1.2.38 User-Session-ID AVP

The *User-Session-Id* AVP (AVP code 8230) is of type UTF8String and holds the session identifier. For a SIP session the *Session-ID* contains the SIP Call ID, as defined in [405].

7.1.2.39 UUS-Data AVP

The *UUS-Data* AVP (AVP Code 8256) 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: 8256 >

[Amount-of-UUS-Data]

[Mime-Type]

[Direction]

3GPP TSG-SA5 (Telecom Management) **S5-044797**
Meeting #40, Sanya, CHINA, 15 - 19 November 2004

CR-Form-v7

CHANGE REQUEST

⌘ **32.299** **CR** **002** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*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 **X**

Title:	⌘	Add Threshold based re-authorisation triggers
Source:	⌘	SA5 (ggfj@nortelnetworks.com)
Work item code:	⌘	CH
Date:	⌘	19/11/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one 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 one 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:	⌘	In order to avoid service interruption, it is useful to be able to re-authorise a quota before it has been fully consumed. Service can then continue whilst re-authorisation is in progress with a lower chance that the user obtains service when their account is empty or that service is interrupted. This requirement is also documented in TS 23.125
Summary of change:	⌘	2 new AVPs are added to the CCA message, and they are described.
Consequences if not approved:	⌘	Re-authorisation thresholds cannot be determined on a per quota basis and thus operators have less control of credit re-authorisation process. More possibilities for the service to be interrupted due to quota exhaustion before more quota is granted.

Clauses affected:	⌘	6.4.3, 7.2, 7.2.2.2, 7.2.2.3, New clauses added 5.3, 6.5, 6.5.1.

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

First Change

5.3 Other requirements

5.3.x Threshold based re-authorization triggers

The server may optionally include an indication to the client of the remaining quota threshold that shall trigger a quota re-authorization.

End of First Change

Second Change

6.4.3 Credit-Control-Answer Message

Table 6.4 illustrates the basic structure of a Diameter Credit Control *Credit-Control-Answer* message as used for online charging. This message is always used by the OCS as specified below, independent of the receiving network element and the CCR record type that is being replied to.

Table 6.4: Credit Control Answer (CCA) Message Contents for Online Charging

Diameter base protocol AVPs	
AVP	**Used in online CCA**
<Diameter Header: 272, PXY>	Yes
<Session-Id>	Yes
{Result-Code}	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Auth-Application-Id}	Yes
[Vendor-Specific-Application-Id]	Yes
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-Application-Id }	Yes
[User-Name]	Yes
[Acct-Multi-Session-Id]	No
*[Redirect-Host]	No
[Redirect-Host-Usage]	No
[Redirect-Max-Cache-Time]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
*[Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
*[Route-Record]	No
*[AVP]	No
Diameter Credit Control AVPs	
{CC-Request-Type}	Yes
{CC-Request-Number}	Yes
[CC-Subsession-Id]	Yes
[CC-Session Failover]	No
*[Subscription-Id]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Cost-Information]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
{Currency-Code}	Yes
[Cost-Unit]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes
[Redirect-Server]	Yes
[Check-Balance-Result]	Yes
[Credit-Control-Failure-Handling]	Yes
[Validity-Time]	Yes
[Direct-Debiting-Failure-Handling]	Yes

*[Multiple-Services-Credit-Control]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
[Time-Quota-Threshold]	Yes
[Volume-Quota-Threshold]	Yes
*[AVP]	Yes
[Requested-Service-Unit]	No
*[Used-Service-Unit]	No
[Tariff-Change-Usage]	Yes
*[Service-Identifier]	Yes
[Rating-Group]	Yes
*[G-S-U-Pool-Reference]	Yes
{G-S-U-Pool-Identifier}	Yes
{CC-Unit-Type}	Yes
{Unit-Value}	Yes
[Validity-Time]	Yes
[Result-Code]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes
[Redirect-Server]	Yes
{Redirect-Address-Type}	Yes
{Redirect-Server-Address}	Yes
*[AVP]	Yes

6.5 Other procedural description of the 3GPP charging applications

6.5.x Threshold based re-authorization triggers

The server may optionally include as part of the Multiple-Services-Credit-Control AVP, when it is providing a quota, an indication to the client of the remaining quota threshold that shall trigger a quota re-authorization. The Time-Quota-Threshold AVP indicates the threshold in seconds when the granted quota is time, and the Volume-Quota-Threshold AVP indicates the threshold in octets when the granted quota is volume.

If the threshold triggers were included along with the quota granted, the Credit Control client, then, shall seek re-authorisation from the server for the quota when the quota contents fall below the supplied threshold. The client shall allow service to continue whilst the re-authorisation is progress, until the original quota had been consumed.

End of second Change

Third Change

7.2. AVPs for Credit Control

For the purpose of online charging additional AVPs are used in CCR and CCA. The information is summarized in table 7.3 along with the AVP flag rules.

Detailed descriptions of AVPs that are used specifically for 3GPP charging are provided in the subclauses below the table. However, for AVPs that are just borrowed from other applications only the reference (e.g. [402]), is provided in table 7.3 and the detailed description is not repeated.

Table 7.3: Use Of Diameter Credit Control

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
CC-Correlation-Id	[402]	[402]	OctetString					
CC-Input-Octets	[402]	[402]	Unsigned64					
CC-Money	[402]	[402]	Grouped					
CC-Output-Octets	[402]	[402]	Unsigned64					
CC-Request-Number	[402]	[402]	Unsigned32					
CC-Request-Type	[402]	[402]	Enumerated					
CC-Service-Specific-Units	[402]	[402]	Unsigned64					
CC-Session ñFailover	[402]	[402]	Enumerated					
CC-Sub-Session-Id	[402]	[402]	Unsigned64					
CC-Time	[402]	[402]	Unsigned32					
CC-Total-Octets	[402]	[402]	Unsigned64					
CC-Unit-Type	[402]	[402]	Enumerated					
Check-Balance-Result	[402]	[402]	Enumerated					
Cost-Information	[402]	[402]	Grouped					
Cost-Unit	[402]	[402]	UTF8String					
Credit-Control	[402]	[402]	Enumerated					
Credit-Control-Failure-Handling	[402]	[402]	Enumerated					
Currency-Code	[402]	[402]	Unsigned32					
Direct-Debiting-Failure-Handling	[402]	[402]	Enumerated					
Exponent	[402]	[402]	Integer32					
Final-Unit-Action	[402]	[402]	Enumerated					
Final-Unit-Indication	[402]	[402]	Grouped					
Granted-Service-Unit	[402]	[402]	Grouped					
Granted-Service-Unit -Pool-Identifier	[402]	[402]	Unsigned32					
Granted-Service-Unit -Pool-Reference	[402]	[402]	Grouped					
Multiple-Services-Credit-Control	[402]	[402]	Grouped					
Multiple-Services-Indicator	[402]	[402]	Enumerated					
Rating-Group	[402]	[402]	Unsigned32					
Redirect-Address-Type	[402]	[402]	Enumerated					
Redirect-Server	[402]	[402]	Grouped					
Redirect-Server-Address	[402]	[402]	UTF8String					
Requested-Action	[402]	[402]	Enumerated					
Requested-Service-Unit	[402]	[402]	Grouped					
Restriction -Filter-Rule	[402]	[402]	IPFiltrRule					
Service-Identifier	[402]	[402]	UTF8String					
Service-Parameter-Info	[402]	[402]	Grouped					
Service-Parameter-Type	[402]	[402]	Unsigned32					
Service- Parameter-Value	[402]	[402]	OctetString					
Subscription-Id	[402]	[402]	Grouped					
Subscription-Id-Data	[402]	[402]	UTF8String					
Subscription-Id-Type	[402]	[402]	Enumerated					
Tariff-Change-Usage	[402]	[402]	Enumerated					
Tariff-Time-Change	[402]	[402]	Time					
Unit-Value	[402]	[402]	Grouped					
Used-Service-Unit	[402]	[402]	Grouped					
User-Equipment-Info	[402]	[402]	Grouped					
User-Equipment-Info-Type	[402]	[402]	Unsigned32					
User-Equipment-Info-Value	[402]	[402]	UTF8String					
Value-Digits	[402]	[402]	Integer64					
Validity-Time	[402]	[402]	Unsigned32					
3GPP Diameter Credit Control AVPs								
Service-Information	Tbd.	7.2.2.1	Grouped					
Time-Quota-Threshold	868	7.2.2.2	Unsigned64					
Volume-Quota-Threshold	869	7.2.2.3	Unsigned64					

7.2.1. Diameter Credit Control AVPs

tbd.

7.2.2. 3GPP Specific Credit Control AVPs

7.2.2.1 Service-Information AVP

The ServiceInformation AVP is of type Grouped. Its purpose is to allow the transmission of additional service specific information elements which are not covered in this document.

The ServiceInformation AVP has the following format:

```
Service-Information :: =  < AVP Header: TBD>
                          [PS-Information]
                          [WLAN-Information]
                          [IMS-Information]
                          [MMS-Information]
                          [LCS-Information]
```

The format and the contents of the fields inside the ServiceInformation AVP are specified in the middle-tier documents which are applicable for the specific service. Note that the formats of the fields are service-specific, i.e. the format will be different for the various services.

Further fields may be included in the ServiceInformation AVP when new services are introduced.

7.2.2.2 Time-Quota-Threshold

The Time-Quota-Threshold AVP (AVP code 868) is of type Unsigned64 and contains a threshold value in seconds. This AVP may be included within the Multiple-Services-Credit-Control AVP when this AVP also contains a Granted-Service-Units AVP containing a CC-Time AVP (i.e. when the granted quota is a time quota).

If received, the Credit Control client shall seek re-authorisation from the server for the quota when the quota contents fall below the supplied threshold. The client shall allow service to continue whilst the re-authorisation is progress, until the time at which the original quota would have been consumed.

7.2.2.3 Volume-Quota-Threshold

The Volume-Quota-Threshold AVP (AVP code 869) is of type Unsigned64 and contains a threshold value in octets. This AVP may be included within the Multiple-Services-Credit-Control AVP when this AVP also contains a Granted-Service-Units AVP containing a CC-Total-Octets, CC-Input-Octets or CC-Output-Octets AVP (i.e. when the granted quota is a volume quota).

If received, the Credit Control client shall seek re-authorisation from the server for the quota when the quota contents fall below the supplied threshold. The client shall allow service to continue whilst the re-authorisation is progress, up to the volume indicated in the original quota.

End of third change

CR-Form-v7

CHANGE REQUEST

⌘ 32.299 CR 003 ⌘rev - ⌘ Current version: 6.0.0 ⌘

*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 X

Title:	⌘	Add Re-authorisation triggers for flow-based online charging ñ Align with Stage 2
Source:	⌘	SA5 (ggfj@nortelnetworks.com)
Work item code:	⌘	CH
Date:	⌘	19/11/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one 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 one 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:	⌘	ì Re-authorisation triggersî cause the TPF to seek re-authorisation for a quota from the OCS. Some indication is therefore needed from the OCS to instruct the DCC client to monitor for specified re-authorisation triggers for a specific granted quota. To achieve this, new AVPs are required.
Summary of change:	⌘	New AVPs are added to CCR (Reporting-Reason AVP, Trigger-Type AVP), and to CCA (Trigger-Type AVP, Quota-Holding-Time AVP)
Consequences if not approved:	⌘	Stage 2 requirements will not be fulfilled.

Clauses affected:	⌘	6.4.2, 6.4.3,7.2, new cluses added to 6.5 , New clauses inctoduced under 7.2.2, new clause under 5.3 added

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

First change

5.3 Other requirements

5.3.x Re-authorization

The server may specify an idle timeout associated with a granted quota. Alternatively, the client may have a configurable default value. The expiry of that timer shall trigger a re-authorization request.

Mid-session service events (re-authorisation triggers) may affect the rating of the current service usage. The server may instruct the credit control client to re-authorize the quota upon a number of different session related triggers that can affect the rating conditions.

When a re-authorization is trigger, the client shall reports quota usage. The reason for the quota being reported shall be notified to the server.

End of first change

Second change

6.4.2 Credit-Control-Request Message

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

Table 6.3: Credit-Control-Request (CCR) Message Contents for Online Charging

Diameter Credit Control Application AVPs	
AVP	**Used in Online CCR**
<Diameter Header: 272, REQ, PXY>	Yes
<Session-Id>	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm }	Yes
{Auth-Application-Id}	Yes
[Destination-Host]	Yes
[Vendor-Specific-Application-Id]	Yes
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-Application-Id }	Yes
[User-Name]	Yes
[Acct-Multi-Session-Id]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
* [Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
* [Route-Record]	No
[Termination-Cause]	No
*[AVP]	No
{CC-Request-Type}	Yes
{CC-Request-Number}	Yes
[CC-Subsession-Id]	Yes
*[Subscription-Id]	Yes

Diameter Credit Control Application AVPs	
{Subscription-Id-Type}	Yes
{Subscription-Id-Data}	Yes
[Requested-Action]	Yes
[Requested-Service-Unit]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Used-Service-Unit]	Yes
[Tariff-Change-Usage]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Service-Parameter-Info]	Yes
[Service-Parameter-Type]	Yes
[Service-Parameter-Value]	Yes
[CC-Correlation-Id]	No
[Service-Identifier]	No
[Multiple-Services-Indicator]	Yes
*[Multiple-Services-Credit Control]	Yes
[Reporting-Reason]	Yes
*[Trigger-Type]	Yes
[Granted-Service-Unit]	No
[Requested-Service-Unit]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Used-Service-Unit]	Yes
[Reporting-Reason]	Yes
[Tariff-Change-Usage]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes

Diameter Credit Control Application AVPs	
[Tariff-Change-Usage]	No
*[Service-Identifier]	Yes
[Rating-Group]	Yes
*[G-S-U-Pool-Reference]	No
[Validity-Time]	No
[Result-Code]	No
[Final-Unit-Indication]	No
*[AVP]	Yes
[User-Equipment-Info]	Yes
{User-Equipment-Info-Type}	Yes
{User-Equipment-Info-Value}	Yes
3GPP Credit control AVPs	
[ServiceInformation]	Yes
[PS-Information]	Yes
[WLAN-Information]	Yes
[IMS-Information]	Yes
[MMS-Information]	Yes
[LCS-Information]	Yes

6.4.3 Credit-Control-Answer Message

Table 6.4 illustrates the basic structure of a Diameter Credit Control *Credit-Control-Answer* message as used for online charging. This message is always used by the OCS as specified below, independent of the receiving network element and the CCR record type that is being replied to.

Table 6.4: Credit Control Answer (CCA) Message Contents for Online Charging

Diameter base protocol AVPs	
AVP	**Used in online CCA**
<Diameter Header: 272, PXY>	Yes
<Session-Id>	Yes
{Result-Code}	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Auth-Application-Id}	Yes
[Vendor-Specific-Application-Id]	Yes
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-Application-Id }	Yes
[User-Name]	Yes
[Acct-Multi-Session-Id]	No
*[Redirect-Host]	No
[Redirect-Host-Usage]	No
[Redirect-Max-Cache-Time]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
*[Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
*[Route-Record]	No
*[AVP]	No
Diameter Credit Control AVPs	
{CC-Request-Type}	Yes
{CC-Request-Number}	Yes
[CC-Subsession-Id]	Yes
[CC-Session Failover]	No
*[Subscription-Id]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Cost-Information]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
{Currency-Code}	Yes
[Cost-Unit]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes
[Redirect-Server]	Yes
[Check-Balance-Result]	Yes
[Credit-Control-Failure-Handling]	Yes
[Validity-Time]	Yes
*[Trigger-Type]	Yes
[Direct-Debiting-Failure-Handling]	Yes
*[Multiple-Services-Credit-Control]	Yes

[Quota-Holding-Time]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Requested-Service-Unit]	No
*[Used-Service-Unit]	No
[Tariff-Change-Usage]	Yes
*[Service-Identifier]	Yes
[Rating-Group]	Yes
*[G-S-U-Pool-Reference]	Yes
{G-S-U-Pool-Identifier}	Yes
{CC-Unit-Type}	Yes
{Unit-Value}	Yes
[Validity-Time]	Yes
[Result-Code]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes
[Redirect-Server]	Yes
{Redirect-Address-Type}	Yes
{Redirect-Server-Address}	Yes
*[AVP]	Yes

6.5 Other procedural description of the 3GPP charging applications

6.5.x Re-authorization

6.5.x.1 Idle timeout

The server may specify an idle timeout associated with a granted quota using the Quota-Holding-Time AVP. If no traffic associated with the quota is observed for this time, the client shall understand that the traffic has stoped and the quota is returned to the server. The client shall start the quota holding timer when quota consumption ceases. This is always when traffic ceases, i.e. the timer is re-started at the end of each packet. It applies equally to the granted time quota and to the granted volume quota.

Alternatively, if this AVP is not present, a locally configurable default value in the client shall be used. A Quota-Holding-Time value of zero indicates that this mechanism shall not be used.

6.5.x.2 Change of charging conditions

There are a number of mid-session service events (re-authorisation triggers), which could affect the rating of the current service usage, e.g. end user QoS changes or location updates. When allocating resources, the server may instruct the credit control client to re-authorize the quota upon a number of different session related triggers that can affect the rating conditions. The server instructs the Network Element to monitor for such events by using the Trigger-Type AVP in the CCA command.
When one of the activated triggers happen a credit re-authorization shall be sent to the server including information related to the service event even if all the granted service units have not been used. The quota is also being reported.
The client shall not re-authorise the quota when events which are not included in the Trigger AVP occur.

Multiple triggers monitoring may be associated to a single quota allocation by including multiple Trigger-Type AVPs.

6.5.x.3 Reporting quota usage

The credit control client shall report the quota usage under a number of circumstances. When this happens, the reason for the quota being reported is notified to the server through the use of the Reporting-Reason AVP in the CCR. The reason for reporting credit usage can occur directly in the Multiple-Services-Credit-Control AVP, or in the Used-Service-Units AVP, depeding on whether it applies for all quota types or a particular quota type respectively. It shall not be used at command level. It shall always and shall only be sent when usage is being reported.
When the reason is RATING_CONDITION_CHANGE, the Trigger-Type AVP shall also be included to indicate the specific armed trigger event which caused the reporting and re-authorisation request.

End of second change

Third Change

7.2. AVPs for Credit Control

For the purpose of online charging additional AVPs are used in CCR and CCA. The information is summarized in table 7.3 along with the AVP flag rules.

Detailed descriptions of AVPs that are used specifically for 3GPP charging are provided in the subclauses below the table. However, for AVPs that are just borrowed from other applications only the reference (e.g. [402]), is provided in table 7.3 and the detailed description is not repeated.

Table 7.3: Use Of Diameter Credit Control

AVP Name	AVP Code	Clause Defined	Value Type	AVP Flag rules				
				Must	May	Should not	Must not	May Encr.
CC-Correlation-Id	[402]	[402]	OctetString					
CC-Input-Octets	[402]	[402]	Unsigned64					
CC-Money	[402]	[402]	Grouped					
CC-Output-Octets	[402]	[402]	Unsigned64					
CC-Request-Number	[402]	[402]	Unsigned32					
CC-Request-Type	[402]	[402]	Enumerated					
CC-Service-Specific-Units	[402]	[402]	Unsigned64					
CC-Session ñFailover	[402]	[402]	Enumerated					
CC-Sub-Session-Id	[402]	[402]	Unsigned64					
CC-Time	[402]	[402]	Unsigned32					
CC-Total-Octets	[402]	[402]	Unsigned64					
CC-Unit-Type	[402]	[402]	Enumerated					
Check-Balance-Result	[402]	[402]	Enumerated					
Cost-Information	[402]	[402]	Grouped					
Cost-Unit	[402]	[402]	UTF8String					
Credit-Control	[402]	[402]	Enumerated					
Credit-Control-Failure-Handling	[402]	[402]	Enumerated					
Currency-Code	[402]	[402]	Unsigned32					
Direct-Debiting-Failure-Handling	[402]	[402]	Enumerated					
Exponent	[402]	[402]	Integer32					
Final-Unit-Action	[402]	[402]	Enumerated					
Final-Unit-Indication	[402]	[402]	Grouped					
Granted-Service-Unit	[402]	[402]	Grouped					
Granted-Service-Unit -Pool-Identifier	[402]	[402]	Unsigned32					
Granted-Service-Unit -Pool-Reference	[402]	[402]	Grouped					
Multiple-Services-Credit-Control	[402]	[402]	Grouped					
Multiple-Services-Indicator	[402]	[402]	Enumerated					
Rating-Group	[402]	[402]	Unsigned32					
Redirect-Address-Type	[402]	[402]	Enumerated					
Redirect-Server	[402]	[402]	Grouped					
Redirect-Server-Address	[402]	[402]	UTF8String					
Requested-Action	[402]	[402]	Enumerated					
Requested-Service-Unit	[402]	[402]	Grouped					
Restriction -Filter-Rule	[402]	[402]	IPFiltrRule					
Service-Identifier	[402]	[402]	UTF8String					
Service-Parameter-Info	[402]	[402]	Grouped					
Service-Parameter-Type	[402]	[402]	Unsigned32					
Service- Parameter-Value	[402]	[402]	OctetString					
Subscription-Id	[402]	[402]	Grouped					
Subscription-Id-Data	[402]	[402]	UTF8String					
Subscription-Id-Type	[402]	[402]	Enumerated					
Tariff-Change-Usage	[402]	[402]	Enumerated					
Tariff-Time-Change	[402]	[402]	Time					
Unit-Value	[402]	[402]	Grouped					
Used-Service-Unit	[402]	[402]	Grouped					
User-Equipment-Info	[402]	[402]	Grouped					
User-Equipment-Info-Type	[402]	[402]	Unsigned32					
User-Equipment-Info-Value	[402]	[402]	UTF8String					
Value-Digits	[402]	[402]	Integer64					
Validity-Time	[402]	[402]	Unsigned32					
3GPP Diameter Credit Control AVPs								
Service-Information	Tbd.	7.2.2.1	Grouped					
Trigger-Type	870	7.2.2.x						
Quota-Holding-Time	871	7.2.2.y						
Reporting-Reason	872	7.2.2.z						

7.2.1. Diameter Credit Control AVPs

tbd.

7.2.2. 3GPP Specific Credit Control AVPs

7.2.2.1 Service-Information AVP

The ServiceInformation AVP is of type Grouped. Its purpose is to allow the transmission of additional service specific information elements which are not covered in this document.

The ServiceInformation AVP has the following format:

ServiceInformation :: = < AVP Header: *TBD*>
[PS-Information]
[WLAN-Information]
[IMS-Information]
[MMS-Information]
[LCS-Information]

The format and the contents of the fields inside the ServiceInformation AVP are specified in the middle-tier documents which are applicable for the specific service. Note that the formats of the fields are service-specific, i.e. the format will be different for the various services.

Further fields may be included in the ServiceInformation AVP when new services are introduced.

7.2.2.x Trigger-Type AVP

The Trigger-Type AVP (AVP code 870) is of type Enumerated and indicates a single re-authorisation 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-authorise the associated quota. The client shall not re-authorise the quota when events which are not included in the Trigger AVP occur.
When included in the the Credit Control Request command indicates the specific event which caused the re-authorisation request of the Reporting-Reason with value RATING_CONDITION_CHANGE associated.
It has the following values:

CHANGE_IN_SGSN_IP_ADDRESS (1)
This value is used to indicate that a change in the SGSN IP address shall cause the credit control client to ask for a re-authorisation of the associated quota.

CHANGE_IN_QOS (2)
This value is used to indicate that a change in the end user negotiated QoS shall cause the credit control client to ask for a re-authorisation of the associated quota.

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-authorisation of the associated quota.

CHANGE_IN_RAT (4)
This value is used to indicate that a change in the radio access technology shall cause the credit control client to ask for a re-authorisation of the associated quota.

7.2.2.y Quota-Holding-Time AVP

The Quota-Holding-Time AVP (AVP code 871) is of type Unsigned32 and contains the quota holding time in seconds. The client shall start the quota holding timer when quota consumption ceases. This is always when traffic ceases, i.e. the timer is re-started at the end of each packet. The Credit Control Client shall deem a quota to have expired when no traffic associated with the quota is observed for the value indicated by this AVP.

This optional AVP may only occur in a CCA command. It is contained in the Multiple-Services-Credit-Control AVP. It applies equally to the granted time quota and to the granted volume quota.

A Quota-Holding-Time value of zero indicates that this mechanism shall not be used. If the Quota-Holding-Time AVP is not present, then a locally configurable default value in the client shall be used.

7.2.2.z Reporting-Reason AVP

The Reporting-Reason AVP (AVP code 872) is of type Enumerated and specifies the reason for usage reporting for one or more types of quota for a particular category. It can occur directly in the Multiple-Services-Credit-Control AVP, or in the Used-Service-Units AVP within a Credit Control Request command reporting credit usage. It shall not be used at command level. It shall always and shall only be sent when usage is being reported.

The following values are defined for the Reporting-Reason AVP:

THRESHOLD (0)
This value is used to indicate that the reason for usage reporting of the particular quota type indicated in the Used-Service-Units AVP where it appears is that the threshold has been reached.

QHT (1)
This value is used to indicate that the reason for usage reporting of all quota types of the Multiple-Service-Credit-Control AVP where its appears is that the quota holding time specified in a previous CCA command has been hit (i.e. the quota has been unused for that period of time).

FINAL (2)
This value is used to indicate that the reason for usage reporting of all quota types of the Multiple-Service-Credit-Control AVP where its appears is that a normal PDP context termination has happened.

QUOTA_EXHAUSTED (3)
This value is used to indicate that the reason for usage reporting of the particular quota type indicated in the Used-Service-Units AVP where it appears is that the quota has been exhausted.

VALIDITY_TIME (4)
This value is used to indicate that the reason for usage reporting of all quota types of the Multiple-Service-Credit-Control AVP where its appears is that the credit authorization lifetime provided in the Validity-Time AVP has expired.

OTHER_QUOTA_TYPE (5)
This value is used to indicate that the reason for usage reporting of the particular quota type indicated in the Used-Service-Units AVP where it appears is that, for a multi-dimensional quota, one reached a trigger condition and the other quota is being reported.

RATING_CONDITION_CHANGE (6)
This value is used to indicate that the reason for usage reporting of all quota types of the Multiple-Service-Credit-Control AVP where its appears is that a change has happened in some of the the rating contions that were previously armed (through the Trigger-Type AVP, e.g. QoS, Radio Access Technology,Ö). The specific condition that has changed is indicated in an associated Trigger-Type AVP.

FORCED_REAUTHORISATION (7)
This value is used to indicate that the reason for usage reporting of all quota types of the Multiple-Service-Credit-Control AVP where its appears is that it is there has been a Server initiated re-authorisation procedure, i.e. receipt of RAR command

The values QHT, FINAL, VALIDITY_TIME, FORCED_REAUTHORISATION, RATING_CONDITION_CHANGE apply for all quota types and are used directly in the Multiple-Services-Credit-Control AVP, whereas the values THRESHOLD, QUOTA_EXHAUSTED and OTHER_QUOTA_TYPE apply to one particular quota type and shall occur only in the Used-Service-Units AVP.

When the value RATING_CONDITION_CHANGE is used, the Trigger-Type AVP shall also be included to indicate the specific event which caused the re-authorisation request.

End of third change

3GPP TSG-SA5 (Telecom Management) **S5-044800**
Meeting #40, Sanya, CHINA, 15 - 19 November 2004

CR-Form-v7

CHANGE REQUEST

⌘ **32.299** **CR** **004** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*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 **X**

Title:	⌘	Add missing elements and other corrections
Source:	⌘	SA5 (ggfj@nortelnetworks.com)
Work item code:	⌘	CH
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one 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 one 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:	⌘	As noted on the cover sheet for approval of TS32.299, the following elements require further specification/clarification: • Tariff switch • Re-authorisation Support of Capabilities Exchange and Device-Watchdog messages is mandatory according to Diameter and therefore these need to be included. The *[AVP] element in both CCA and CCR is marked as not required. However, this would prevent extension of the protocol in future releases.
Summary of change:	⌘	Further specification is added as follows: • New text on Tariff switch • New section 6.3.8 on re-authorisation • Addition of Re-Auth Request/Answer messages • Capabilities Exchange and Device Watchdog messages added • *[AVP] element is marked ëYesí in CCA and CCR
Consequences if not approved:	⌘	Incomplete/incorrect specification

Clauses affected:	⌘	6.3.7, 6.3.8, 6.4.1.1, 6.4.1.2, 6.4.2, 6.4.3. New 6.4.4 to 6.4.9

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

First change

6.3.7 Support of Tariff ~~Switch~~Changes During an Active User Session

6.3.7.1 Support of Tariff Changes using the Tariff Switch Mechanism

After a tariff switch has been reached, all the active user sessions shall report their session usage by the end of the validity period of the current request and receive new quota for resource usage for the new tariff period.

In order to avoid the need for mass simultaneous quota refresh, the traffic usage can be split into resource usage before a tariff switch and resources used after a tariff switch.

The Tariff-Time-Change AVP is used to determine the tariff switch time as described by [402].

The Tariff-Change-Usage AVP is used within the Used-Service-Units AVP to distinguish reported usage before and after the tariff time change.

The Tariff-Change-Usage AVP is used within the Multiple-Services-Credit-Control AVP to allow separate quotas to be granted for use before and after the tariff switch. If this AVP is not present, the granted quota may be consumed both before and after the tariff switch, but usage must still be reported separately.

6.3.7.2 Support of Tariff Changes using Validity Time AVP

Changes to the tariffs pertaining to the service during active user sessions may also be handled using the Validity Time AVP as described by [402].

Editor's note: Additional details need to be added.

~~may be handled in the following ways.~~

- ~~Tariff Changes handled using Validity Time AVP; or~~
- ~~Tariff changes handled using the Tariff Switch Time AVP.~~

~~*Editor's note: This subclause should be updated according the method described in [402] It needs to be further clarified if Tariff Switch can also be applied in the case of time a the unit of measurement or only in the case of volume.*~~

End of first change

Second change

6.3.8 Support of Re-authorisation

Mid Diameter CC session re-authorisations of multiple active resource quotas within a DCC (sub-)session can be achieved using a single Diameter *Credit Control Request/Answer* message sequence.

The OCS may also re-authorise multiple active resource quotas within a DCC (sub-)session by using a single Diameter *Re-Auth-Request/Answer* message sequence.

New quota allocations received by the Network Element override any remaining held quota resources after accounting for any resource usage while the re-authorisation was in progress.

End of second change

Third Change

6.4.1 Summary of Online Charging Message Formats

6.4.1.1 General

The Diameter credit control application [402] specifies an approach based on a series of "interrogations":

- Initial interrogation.
- Zero, one or more interim interrogations.
- Final interrogation.

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

All of these interrogations use Credit-*Control-Request* and *Credit-Control-Answer* messages defined in the Diameter Credit Control Application [402] specification. The *Credit-Control-Request* for the "interim interrogation" and "final interrogation" reports the actual number of "units" that were used, from what was previously reserved. This determines the actual amount debited from the subscriber's account.

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

Table 6.1: Online Charging Messages Reference Table

Command-Name	Source	Destination	Abbreviation
Credit-Control-Request	Network Element	OCS	CCR
Credit-Control-Answer	OCS	Network Element	CCA
Re-Auth-Request	OCS	Network Element	RAR
Re-Auth-Answer	Network Element	OCS	RAA
Capabilities-Exchange-Request	Network Element/OCS	Network Element/OCS	CER
Capabilities Exchange Answer	Network Element/OCS	Network Element/OCS	CEA
Device-Watchdog-Request	Network Element/OCS	Network Element/OCS	DWR
Device-Watchdog-Answer	Network Element/OCS	Network Element/OCS	DWA

CER/CEA and DWR/DWA are mandatory Diameter capabilities for capabilities exchange and transport failure detection.

6.4.1.~~1~~2 Structure for the Credit Control Message Formats

The following is the basic structure shared by all online charging messages. This is based directly on the format of the ~~*Credit-Control-Request* and *Credit-Control-Answer*~~ messages defined in the Diameter Credit Control Application specification [402].

Those Diameter Credit Control AVPs that are used for 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 OCS 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.

Where the AVPsí are marked as ëYesí, they are then mandatory, if marked ëNoí, they are not used, if marked ëOptionalí, then their use is subject to their inclusion in the relevant domain specific charging TS, if marked ëConditionalí, then its use is subject to condition specified in this TS, if marked as ëOut of Scopeí (OoS), then, the decision on its use is defined from the specification it has been derived from and is not subject to judgement within this TS.

End of third change

Fourth change

6.4.2 Credit-Control-Request Message

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

Table 6.3: Credit-Control-Request (CCR) Message Contents for Online Charging

Diameter Credit Control Application AVPs	
AVP	**Used in ~~Online CCR~~3GPP**
<Diameter Header: 272, REQ, PXY>	Yes
<Session-Id>	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm }	Yes
{Auth-Application-Id}	Yes
[Destination-Host]	Yes
[Vendor-Specific-Application-Id]	Yes
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-Application-Id }	Yes
[User-Name]	Yes
[Acct-Multi-Session-Id]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
* [Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
* [Route-Record]	No
[Termination-Cause]	No
*[AVP]	~~No~~Yes
{CC-Request-Type}	Yes
{CC-Request-Number}	Yes
[CC-Subsession-Id]	Yes
*[Subscription-Id]	Yes
{Subscription-Id-Type}	Yes
{Subscription-Id-Data}	Yes
[Requested-Action]	Yes
[Requested-Service-Unit]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Used-Service-Unit]	Yes

Diameter Credit Control Application AVPs	
[Tariff-Change-Usage]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Service-Parameter-Info]	Yes
[Service-Parameter-Type]	Yes
[Service-Parameter-Value]	Yes
[CC-Correlation-Id]	No
[Service-Identifier]	No
[Multiple-Services-Indicator]	Yes
*[Multiple-Services-Credit Control]	Yes
[Granted-Service-Unit]	No
[Requested-Service-Unit]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
*[Used-Service-Unit]	Yes
[Tariff-Change-Usage]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Tariff-Change-Usage]	No
*[Service-Identifier]	Yes
[Rating-Group]	Yes
*[G-S-U-Pool-Reference]	No
[Validity-Time]	No
[Result-Code]	No
[Final-Unit-Indication]	No
*[AVP]	Yes
[User-Equipment-Info]	Yes
{User-Equipment-Info-Type}	Yes
{User-Equipment-Info-Value}	Yes
3GPP Credit control AVPs	
[ServiceInformation]	Yes
[PS-Information]	Yes
[WLAN-Information]	Yes
[IMS-Information]	Yes
[MMS-Information]	Yes
[LCS-Information]	Yes

End of fourth change

Fifth Change

6.4.3 Credit-Control-Answer Message

Table 6.4 illustrates the basic structure of a Diameter Credit Control *Credit-Control-Answer* message as used for online charging. This message is always used by the OCS as specified below, independent of the receiving network element and the CCR record type that is being replied to.

Table 6.4: Credit Control Answer (CCA) Message Contents for Online Charging

Diameter base protocol AVPs	
AVP	**Used in ~~online CCA~~3GPP**
<Diameter Header: 272, PXY>	Yes
<Session-Id>	Yes
{Result-Code}	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Auth-Application-Id}	Yes
[Vendor-Specific-Application-Id]	Yes
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-Application-Id }	Yes
[User-Name]	Yes
[Acct-Multi-Session-Id]	No
*[Redirect-Host]	No
[Redirect-Host-Usage]	No
[Redirect-Max-Cache-Time]	No
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
*[Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
*[Route-Record]	No
*[AVP]	~~no~~Yes
Diameter Credit Control AVPs	
{CC-Request-Type}	Yes
{CC-Request-Number}	Yes
[CC-Subsession-Id]	Yes
[CC-Session Failover]	No
*[Subscription-Id]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Cost-Information]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
{Currency-Code}	Yes
[Cost-Unit]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes

[Redirect-Server]	Yes
[Check-Balance-Result]	Yes
[Credit-Control-Failure-Handling]	Yes
[Validity-Time]	Yes
[Direct-Debiting-Failure-Handling]	Yes
*[Multiple-Services-Credit-Control]	Yes
[Granted-Service-Unit]	Yes
[Tariff-Time-Change]	Yes
[CC-Time]	Yes
[CC-Money]	Yes
{Unit-Value}	Yes
{Value-Digits}	Yes
[Exponent]	Yes
[Currency-Code]	Yes
[CC-Total-Octets]	Yes
[CC-Input-Octets]	Yes
[CC-Output-Octets]	Yes
[CC-Service-Specific-Units]	Yes
*[AVP]	Yes
[Requested-Service-Unit]	No
*[Used-Service-Unit]	No
[Tariff-Change-Usage]	Yes
*[Service-Identifier]	Yes
[Rating-Group]	Yes
*[G-S-U-Pool-Reference]	Yes
{G-S-U-Pool-Identifier}	Yes
{CC-Unit-Type}	Yes
{Unit-Value}	Yes
[Validity-Time]	Yes
[Result-Code]	Yes
[Final-Unit-Indication]	Yes
{Final-Unit-Action}	Yes
*[Restriction-Filter-Rule]	Yes
*[Filter-Id]	Yes
[Redirect-Server]	Yes
{Redirect-Address-Type}	Yes
{Redirect-Server-Address}	Yes
*[AVP]	Yes

6.4.4 Re-Auth-Request Message

Table 6.5 illustrates the basic structure of a Diameter Credit Control *Re-Auth-Request* message as used for online charging.

Table 6.5: Re-Auth-Request (RAR) Message Contents for Online Charging

Diameter Credit Control Application AVPs	
AVP	**Used in 3GPP**
<Diameter Header: 258, REQ, PXY>	Yes
<Session-Id>	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
{Destination-Realm}	Yes
{Destination-Host}	Yes
{Auth-Application-Id}	Yes
{Re-Auth-Request-Type}	Yes
[User-Name]	Yes
[Origin-State-Id]	Yes
[Event-Timestamp]	Yes
* [Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
* [Route-Record]	No

Diameter Credit Control Application AVPs	
*[AVP]	Yes
[CC-Sub-Session-Id]	Yes
[G-S-U-Pool-Identifier]	Yes
[Service-Identifier]	Yes
[Rating-Group]	Yes

Editor's note: The rationale for "NO" above should be provided. If the message is identical to the definition in DCC the table may be replaced by a reference to DCC.

6.4.5 Re-Auth-Answer Message

Table 6.6 illustrates the basic structure of a Diameter Credit Control *Re-Auth-Answer* message as used for online charging.

Table 6.6: Re-Auth-Answer (RAA) Message Contents for Online Charging

Diameter Credit Control Application AVPs	
AVP	Used in 3GPP
<Diameter Header: 258, PXY>	Yes
<Session-Id>	Yes
{Result-Code}	Yes
{Origin-Host}	Yes
{Origin-Realm}	Yes
[User-Name]	Yes
[Origin-State-Id]	Yes
[Error-Message]	Yes
[Error-Reporting-Host]	Yes
*[Failed-AVP]	Yes
*[Redirect-Host]	Yes
[Redirect-Host-Usage]	Yes
[Redirect-Host-Cache-Time]	Yes
* [Proxy-Info]	No
{ Proxy-Host }	No
{ Proxy-State }	No
*[AVP]	Yes

Editor's note: The rationale for "NO" above should be provided. If the message is identical to the definition in DCC the table may be replaced by a reference to DCC.

6.4.6. Capabilities-Exchange-Request Message

The Capabilities-Exchange-Request message structure is described in [401].

6.4.7 Capabilities-Exchange-Answer Message

The Capabilities-Exchange-Answer message structure is described in [401].

6.4.8 Device-Watchdog-Request Message

The Device-Watchdog-Request message structure is described in [401].

6.4.9 Device-Watchdog-Answer Message

The Device-Watchdog-Answer message structure is described in [401].

End of fifth change