Source:	**SA5 (Telecom Management)**
Title:	**3 Rel-6 CR 32.251/299 PS domain 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-040775	32.251	001	--	Rel-6	Add "Furnish Charging Information" procedure for GPRS	B	6.0.0	S5-044796	CH
SP-040775	32.251	002	--	Rel-6	Add data description for PS online charging	F	6.0.0	S5-044804	CH
SP-040775	32.299	005	--	Rel-6	Add definition of a new 3GPP-specific AVP: PS Furnish Charging Information AVP - Align with 32.251	B	6.0.0	S5-044805	CH

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CHANGE REQUEST

| | ⌘ | **32.251** 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: ⌘	Add "Furnish Charging Information" procedure for GPRS	
Source: ⌘	SA5 SWGB (catalan_d@tsm.es)	
Work item code:⌘ CH	***Date:*** ⌘ 17/11/2004	
Category: ⌘ **B**	***Release:*** ⌘ Rel-6	

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4   (Release 4)
Rel-5   (Release 5)
Rel-6   (Release 6)

Reason for change: ⌘	The GGSN CDRs must be aligned with the *Furnish Charging Information* Procedure specified in TS 32.299 (see CR S5-044805). A procedure description for GPRS must be added.
Summary of change:⌘	The "PS Furnish Charging Information" parameter is added to the G-CDR and eG-CDR. A description of the " PS Furnish Charging Information procedure" is added.
Consequences if not approved: ⌘	Rel-6 Diameter based GGSN charging functions will not cover part of the functionalities covered in SGSN by means of Camel procedures. Operators have developed services which use the CAMEL *Furnish Charging Information GPRS* procedure. Therefore a smooth service migration to the Rel-6 charging architecture and capabilities will not be possible if a similar procedure is not implemented in Rel-6 GPRS charging.

Clauses affected: ⌘	New 5.3.1.X and 5.3.2.X, 6.1.2, 6.1.3

	Y	N		
Other specs affected: ⌘		X	Other core specifications ⌘	
		X	Test specifications	
	X		O&M Specifications	Rel-6 32.299

Other comments: ⌘	Parent to 32.299 CR in S5-044805.

New Clause 5.3.1.X

5.3.1.x   PS Furnish Charging Information procedure

A procedure description for the procedure will be added and aligned with clause 5.3.2.x.

End of New Clause 5.3.1.X

New Clause 5.3.2.X

5.3.2.x   PS Furnish Charging Information procedure

The OCS online charging function may use this procedure to add online charging session specific information to the G-CDRs or eG-CDR by means of the Diameter Credit Control Application in the Ro interface. The data can be sent either in one Diameter Credit Control *Credit-Control-Answer* message or several Diameter Credit Control *Credit-Control-Answer* messages with append indicator.

The OCS online charging function can send multiple concatenated PS Furnish Charging Information elements per online charging session in the Ro interface.The total maximum of free format data is 160 octects per online session (This value is defined as in the CAMEL *Furnish Charging Information GPRS* procedure).

In the OCS online charging function a PS online charging session shall be identified by the GGSN-C address and the ChargingId. In the GGSN, the PS online charging session and the PS offline charging session shall be identified by the same ChargingId. Therefore the ChargingId shall allow the GGSN to correlate an online charging session with an offline charging session.

This procedure shall only apply when online and offline charging is performed simultaneously for the same session (PDP Context). In any other case, the GGSN shall discard the additional charging information sent by the OCS in the Diameter Credit Control *Credit-Control-Answer* messages.

The PS Furnish Charging Information AVP is described in TS 32.299 [50].

End of New Clause 5.3.2.X

Change in Clause 6.1.2

6.1.2   PDP context charging data in GGSN (G-CDR)

If FBC is disabled and the collection of CDR data is enabled then the GGSN data specified in table 6.2 shall be available for each PDP context.

Table 6.2: GGSN PDP context data (G-CDR)

Field	Category	Description
Record Type	M	GGSN PDP context record.
Network initiated PDP context	O_C	A flag that is present if this is a network initiated PDP context.
Served IMSI	M	IMSI of the served party.
GGSN Address used	M	The control plane IP address of the GGSN used.
Charging ID	M	PDP context identifier used to identify this PDP context in different records created by GSNs

Field	Category	Description
SGSN Address	M	List of SGSN addresses used during this record.
Access Point Name Network Identifier	O$_M$	The logical name of the connected access point to the external packet data network (network identifier part of APN).
PDP Type	O$_M$	PDP type, i.e. IP, PPP, or IHOSS:OSP.
Served PDP Address	O$_C$	PDP address, i.e. IPv4 or IPv6. This parameter shall be present except when both the PDP type is PPP and dynamic PDP address assignment is used.
Dynamic Address Flag	O$_C$	Indicates whether served PDP address is dynamic, which is allocated during PDP context activation. This field is missing if address is static.
List of Traffic Data Volumes	O$_M$	A list of changes in charging conditions for this PDP context, each change is time stamped. Charging conditions are used to categorize traffic volumes, such as per tariff period. Initial and subsequently changed QoS and corresponding data values are also listed.
Record Opening Time	M	Time stamp when PDP context is activated in this GGSN or record opening time on subsequent partial records.
Duration	M	Duration of this record in the GGSN.
Cause for Record Closing	M	The reason for the release of record from this GGSN.
Diagnostics	O$_M$	A more detailed reason for the release of the connection.
Record Sequence Number	C	Partial record sequence number, only present in case of partial records.
Node ID	O$_M$	Name of the recording entity.
Record Extensions	O$_C$	A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.
Local Record Sequence Number	O$_M$	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
APN Selection Mode	O$_M$	An index indicating how the APN was selected.
Served MSISDN	O$_M$	The primary MSISDN of the subscriber.
Charging Characteristics	M	The Charging Characteristics applied to the PDP context.
Charging Characteristics Selection Mode	O$_M$	Holds information about how Charging Characteristics were selected.
IMS Signalling Context	O$_C$	Included if the PDP context is used for IMS signalling
External Charging Identifier	O$_C$	A Charging Identifier received from a non-GPRS, external network entity
SGSN PLMN Identifier	O$_M$	SGSN PLMN Identifier (MCC and MNC) used during this record.
PS Furnish Charging Information	O$_C$	Online charging session specific information

6.1.3   FBC enhanced PDP context charging data in GGSN (eG-CDR)

If FBC is enabled and the collection of CDR data is enabled then the GGSN data specified in table 6.3 shall be available for each PDP context. The details of the 'List of service Data Flow' parameter is ffs. The need for eG-CDR as opposed to expanding the existing G-CDR for FBC is ffs.

Table 6.3: GGSN FBC enhanced PDP context data (eG-CDR)

Field	Category	Description
Record Type	M	Enhanced GGSN PDP context record.
Network initiated PDP context	O$_C$	A flag that is present if this is a network initiated PDP context.
Served IMSI	M	IMSI of the served party.
GGSN Address used	M	The control plane IP address of the GGSN used.
Charging ID	M	PDP context identifier used to identify this PDP context in different records created by GSNs
SGSN Address	M	List of SGSN addresses used during this record.
Access Point Name Network Identifier	O$_M$	The logical name of the connected access point to the external packet data network (network identifier part of APN).
PDP Type	O$_M$	PDP type, i.e. IP, PPP, or IHOSS:OSP.

Field	Category	Description
Served PDP Address	O_C	PDP address, i.e. IPv4 or IPv6. This parameter shall be present except when both the PDP type is PPP and dynamic PDP address assignment is used.
Dynamic Address Flag	O_C	Indicates whether served PDP address is dynamic, which is allocated during PDP context activation. This field is missing if address is static.
List of Service Data Volumes	O_M	A list of changes in charging conditions for all service data flows within this PDP context, each change is time stamped. Charging conditions are used to categorize traffic volumes, such as per tariff period and per service data flow. Initial and subsequently changed QoS and corresponding data values are also listed.
Record Opening Time	M	Time stamp when PDP context is activated in this GGSN or record opening time on subsequent partial records.
Duration	M	Duration of this record in the GGSN.
Cause for Record Closing	M	The reason for the release of record from this GGSN.
Diagnostics	O_M	A more detailed reason for the release of the connection.
Record Sequence Number	C	Partial record sequence number, only present in case of partial records.
Node ID	O_M	Name of the recording entity.
Record Extensions	O_C	A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.
Local Record Sequence Number	O_M	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
APN Selection Mode	O_M	An index indicating how the APN was selected.
Served MSISDN	O_M	The primary MSISDN of the subscriber.
Charging Characteristics	M	The Charging Characteristics applied to the PDP context.
Charging Characteristics Selection Mode	O_M	Holds information about how Charging Characteristics were selected.
IMS Signalling Context	O_C	Included if the PDP context is used for IMS signalling
External Charging Identifier	O_C	A Charging Identifier received from a non-GPRS, external network entity
SGSN PLMN Identifier	O_M	SGSN PLMN Identifier (MCC and MNC) used during this record.
PS Furnish Charging Information	O_C	Online charging session specific information

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End of Change in Clause 6.1.3

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CHANGE REQUEST

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

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Proposed change affects: │ UICC apps⌘ ☐　　ME ☐　Radio Access Network ☐　Core Network **X**

Title:	⌘	Add data description for PS online charging
Source:	⌘	**SA5** (gerald.goermer@siemens.de)

Work item code:⌘	CH		*Date:* ⌘	19/11/2004

Category:	⌘	**F**	*Release:* ⌘	Rel-6

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2　　(GSM Phase 2)
R96　(Release 1996)
R97　(Release 1997)
R98　(Release 1998)
R99　(Release 1999)
Rel-4　(Release 4)
Rel-5　(Release 5)
Rel-6　(Release 6)

Reason for change:	⌘	PS online charging description is missing.
Summary of change:	⌘	The DCCA messages CCR and CCA are defined incuding the PS-Information AVP containing all PS speficic AVPs.
Consequences if not approved:	⌘	Online Charging for FBC is not specified.

Clauses affected:	⌘	3.2, 6.2

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

Other comments:	⌘	

3.2 Abbreviations

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

3G	3rd Generation
AoC	Advice of Charge
APN	Access Point Name
BD	Billing Domain
CAMEL	Customized Applications for Mobile network Enhanced Logic
CCA	Credit Control Answer
CCR	Credit Control Request
CDF	Charging Data Function
CDR	Charging Data Record
CG	Charging Gateway
CGF	Charging Gateway Function
CI	Cell Identity
CS	Circuit Switched
CSE	CAMEL Service Environment
DCCA	Diameter Credit Control Application
ECUR	Event Charging with Unit Reservation
eG-CDR	enhanced G-CDR (enhanced by FBC)
FBC	Flow Based bearer Charging
FQPC	Fully Qualified Partial CDR
G-CDR	GGSN generated - CDR
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
GSN	GPRS Support Node (either SGSN or GGSN)
GTP	GPRS Tunnelling Protocol
GTP'	The GPRS protocol used for CDR transport. It is derived from GTP with enhancements to improve transport reliability necessary for CDRs.
HLR	Home Location Register
HPLMN	Home PLMN
IEC	Immediate Event Charging
IETF	Internet Engineering Task Force
IHOSS:OSP	Internet Hosted Octet Stream Service: Octet Stream Protocol
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunications standardization sector
LAC	Location Area Code
LR	Location Request
M-CDR	Mobility management generated - Charging Data Record
MCC	Mobile Country Code (part of IMSI)
ME	Mobile Equipment
MLC	Mobile Location Center
MMS	Multimedia Messaging Service
MNC	Mobile Network Code (part of IMSI)
MO	Mobile Originated
MO-LR	Mobile Originated - Location Request
MS	Mobile Station
MSISDN	Mobile Station ISDN number
MT	Mobile Terminated
MT-LR	Mobile Terminated - Location Request

NE	Network Element
NI	Network Identifier (part of the APN)
NI-LR	Network Induced - Location Request
OCF	Online Charging Function
OCS	Online Charging System
OI	Operator Identifier (part of the APN)
PDN	Packet Data Network
PDP	Packet Data Protocol (e.g. IP)
PDU	Packet Data Unit
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PS	Packet Switched
QoS	Quality of Service
RAB	Radio Access Bearer
RAC	Routing Area Code
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
RPC	Reduced Partial CDR
SAC	Service Area Code
S-CDR	SGSN (PDP context) generated - CDR
SCUR	Session Charging with Unit Reservation
SGSN	Serving GPRS Support Node
SMS	Short Message Service
S-SMO-CDR	SGSN delivered Short message Mobile Originated - CDR
S-SMT-CDR	SGSN delivered Short message Mobile Terminated - CDR
TR	Technical Report
TS	Technical Specification
UMTS	Universal Mobile Telecommunications System
USIM	Universal Subscriber Identity Module
UTRAN	UMTS Terrestrial Radio Access Network

End of Change in Clause 3.2

Change in Clause 6.2

6.2 Data description for PS Online Charging

To be completed and aligned with TS 32.299 and 23.125.

6.2.1 Diameter message contents

6.2.1.1 Summary of Online Charging Message Formats

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

First interrogation,

Zero, one or more intermediate interrogations.

Final interrogation.

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

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

Table 6.10 describes the use of these messages for PDP context based online charging.

Command-Name	Source	Destination	Abbreviation
Credit-Control-Request	GGSN	OCS	CCR
Credit-Control-Answer	OCS	GGSN	CCA

Table 6.10: Online Charging Messages Reference Table for PDP context

Table 6.11 describes the use of these messages for Flow based online charging.

Command-Name	Source	Destination	Abbreviation
Credit-Control-Request	TPF	OCS	CCR
Credit-Control-Answer	OCS	TPF	CCA

Table 6.11: Online Charging Messages Reference Table for FBC

6.2.1.2 Structure for the Credit Control Message Formats

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

6.2.1.2.1 Credit-Control-Request Message

Table 6.12 illustrates the basic structure of a Diameter CCR message from the TPF as used for PS online charging.

Table 6.12: Credit-Control-Request (CCR) Message Contents

AVP	Category	Description
Session-Id	M	Described in TS 32.299 [50]
Origin-Host	M	Described in TS 32.299 [50]
Origin-Realm	M	Described in TS 32.299 [50]
Destination-Realm	M	Described in TS 32.299 [50]
Auth-Application-Id	M	Described in TS 32.299 [50]
Service-Context-Id	M	Described in TS 32.299 [50]
CC-Request-Type	M	Described in TS 32.299 [50]
CC-Request-Number	M	Described in TS 32.299 [50]
Destination-Host	O_M	Described in TS 32.299 [50]
User-Name	O_M	Described in TS 32.299 [50]

AVP	Category	Description
Origin-State-Id	O$_C$	Described in TS 32.299 [50]
Event-Timestamp	O$_C$	Described in TS 32.299 [50]
Sub-session-Id	O$_C$	Described in TS 32.299 [50]
Subscription-Id	O$_M$	Described in TS 32.299 [50]. As a minimum the IMSI and the MSISDN have to be included.
Termination-Cause	O$_C$	Described in TS 32.299 [50]
Requested-Service-Unit	O$_C$	Described in TS 32.299 [50]
Multiple-Services-Indicator	O$_C$	Described in TS 32.299 [50]
Multiple-Services-Credit Control	O$_C$	Described in TS 32.299 [50]
CC-Correlation-Id	O$_C$	Described in TS 32.299 [50]
Route-Record	O$_C$	Described in TS 32.299 [50]
AVP	O$_M$	Described in TS 32.299 [50]
Service-Information	O$_C$	Described in TS 32.299 [50]
PS-Information	O$_C$	Described in subclause 6.2.2

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

6.2.1.2.2 Credit-Control-Answer Message

Table 6.13 illustrates the basic structure of a DCCA message as used for the TPF. This message is always used by the OCS as specified below, independent of the receiving TPF and the CCR request type that is being replied to.

Table 6.13: Credit-Control-Answer (CCA) Message Contents

AVP	Category	Description
{Session-Id}	M	Described in 32.299 [50]
{Result-Code}	M	Described in 32.299 [50]
{Origin-Host}	M	Described in 32.299 [50]
{Origin-Realm}	M	Described in 32.299 [50]
{Destination-Realm}	-	Described in 32.299 [50]
{Auth-Application-Id}	M	Described in 32.299 [50]
{Service-Context-Id}	-	Described in 32.299 [50]
{CC-Request-Type}	M	Described in 32.299 [50]
{CC-Request-Number}	M	Described in 32.299 [50]
[Destination-Host]	-	Described in 32.299 [50]
[User-Name]	-	Described in 32.299 [50]
[CC-Sub-Session-Id]	-	Described in 32.299 [50]
[Acct-Multi-Session-Id]	-	Described in 32.299 [50]
[Origin-State-Id]	-	Described in 32.299 [50]
[Event-Timestamp]	-	Described in 32.299 [50]
*[Subscription-Id]	-	Described in 32.299 [50]
[Service-Identifier]	-	Described in 32.299 [50]
[Termination-Cause]	-	Described in 32.299 [50]
[Requested-Service-Unit]	-	Described in 32.299 [50]
[Requested-Action]	-	Described in 32.299 [50]
*[Used-Service-Unit]	O$_C$	Described in 32.299 [50]
[Multiple-Service-Indicator]	O$_C$	Described in 32.299 [50]
*[Multiple-Services-Credit-Control]	O$_M$	Described in 32.299 [50]
*[Service-Parameter-Info]	-	Described in 32.299 [50]
[CC-Correlation-Id]	-	Described in 32.299 [50]
[User-Equipment-Info]	-	Described in 32.299 [50]
[CC-Session-Failover]	O$_C$	Described in 32.299 [50]
[Final-Unit-Indication]	O$_C$	Described in 32.299 [50]
[Credit-Control-Failure-Handling]	O$_C$	Described in 32.299 [50]
[Validity-Time]	O$_M$	Described in 32.299 [50]
[Redirect-Host]	O$_C$	Described in 32.299 [50]
[Redirect-Host-Usage]	O$_C$	Described in 32.299 [50]
[Redirect-Max-Cache-Time]	O$_C$	Described in 32.299 [50]
[Failed-AVP]	O$_C$	Described in 32.299 [50]
*[Proxy-Info]	-	Described in 32.299 [50]

AVP	Category	Description
*[Route-Record]	O_C	Described in 32.299 [50]
*[AVP]	O_M	Described in 32.299 [50]

6.2.2 AVPs for PS Online Charging on the Ro interface

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

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

6.2.2.1 Definition of the PS-Information AVP

The detailed structure of the PS-Information AVP can be found in table 6.14.

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

Table 6.14: Structure of the PS-Information AVP

AVP Name	AVP Code	Defined	Value Type	AVP Flag rules			
				Must	May	Should not	Must not
[IMSI]		[50]	UTF8String				
[MSISDN		[50]	UTF8String				
[Charging-Id		[50]	UTF8String				
[PDP Type		[50]	Enumerated				
[PDP-Address		[50]	IPAddress				
[GPRS-Negotiated-QoS-Profile		[50]	UTF8String				
[SGSN-Address		[50]	IPAddress				
[SGSN-IPv6-Address		[50]	IPAddress				
[RNC-Unsent-Data-Volume		[50]	Unsigned32				
[MS-Network-Capabilities		[50]	UTF8String				
[GGSN-Address		[50]	IPAddress				
[GGSN-IPv6-Address		[50]	IPAddress				
[CG-Address		[50]	IPAddress				
[CG-IPv6-Address		[50]	IPAddress				
[IMSI-MCC-MNC		[50]	UTF8String				
[GGSN- MCC-MNC		[50]	UTF8String				
[NSAPI		[50]	UTF8String				
[APN-Info		[50]	UTF8String				
[Session-Stop-Indicator		[50]	Unsigned32				
[Selection-Mode		[50]	UTF8String				
[Charging-Characteristics		[50]	Unsigned32				
[SGSN-PLMN-Id		[50]	UTF8String				
[MS-TimeZone		[50]	UTF8String				
[CAMEL-Charging-Info]		[50]	UTF8String				
[Charging-Rule-Based-Name]		[50]	UTF8String				
[Calling-Party-Address]		[50]	UTF8String				
[IMS-Charging-Identifier]		[50]	UTF8String				
[User-Location-Info]		[50]	UTF8String				
[Radio-Access-Technology]		[50]	UTF8String				

End of Change in Clause 6.2

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CHANGE REQUEST

| ⌘ | **32.299** CR **005** | ⌘**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 definition of a new 3GPP-specific AVP: PS Furnish Charging Information AVP - Align with 32.251
Source:	⌘	SA5 SWGB (catalan_d@tsm.es)
Work item code:⌘	CH	**Date:** ⌘ 17/11/2004
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:	⌘	A procedure similar to the CAMEL *Furnish Charging Information* Procedure is needed to allow that equivalent functionality is provided for services being controlled and charged by means of the Rel-6 Diameter Credit Control Application.
Summary of change:⌘		A new 3GPP specific AVP is defined in the Ro interface. The OCS uses this information element to send service specific data to the network elements for an online charged session. When offline charging is active in parallel, this information is also transparently sent on the Rf interface in order to allow its addition into CDRs.
Consequences if not approved:	⌘	Rel-6 Diameter based online charging will not cover part of the functionalities implemented via CAMEL procedures. Operators have developed services which use the CAMEL *Furnish Charging Information* procedure. Therefore a smooth service migration to the Rel-6 charging architecture and capabilities will not be possible if a similar procedure is not implemented in Rel-6 charging.

Clauses affected:	⌘	6.2.1, 6.4.3, 7.1.2, 7.2 (New sections 7.1.2.X, 7.2.2.X,7.2.2.Y,7.2.2.Z)

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
		X		O&M Specifications	Rel-6 32.251

Other comments:	⌘	Child to 32.251 CR in S5-044796.

6.2.1 Accounting-Request Message

Table 6.1 illustrates the basic structure of a Diameter *Accounting-Request* message as used for offline charging.

Table 6.1: 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
[Vendor-Id]	Yes
{ Auth-Application-Id }	Yes
{ Acct-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]	Yes
{ Proxy-Host }	Yes
{ Proxy-State }	Yes
*[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]	Only for IMS (S-CSCF)
Application Servers Involved	Only for IMS (S-CSCF)
*Application Provided Called Parties	Only for IMS (S-CSCF)
*[Application-provided-Called-Party-Address]	Only for IMS (S-CSCF)
*[Inter-Operator-Identifier]	Yes
originating IOI	Yes
terminating IOI	Yes
[IMS-Charging-Identifier]	Yes
*[SDP-Session-Description]	Yes
*[SDP-Media-Component]	Yes
SIP Request Timestamp	Yes
SIP Response Timestamp	Yes
SDP Media Components	Yes
SDP Media Name	Yes
SDP Media Description	Yes
GPRS Charging ID	Yes
Media Initiator Flag	Yes
Authorised QoS	Yes

[GGSN-Address]	Yes
[Served-Party-IP-Address]	Only for IMS (P-CSCF)
[Authorized-QoS]	Only for IMS (P-CSCF)
[Server-Capabilities]	Only for IMS (I-CSCF)
[Trunk-Group-ID]	Only for IMS (MGCF)
[Bearer-Service]	Only for IMS (MGCF)
[Service-ID]	Only for IMS (MRFC)
[UUS-Data]	Yes
Content-Type	Yes
Content-Disposition	Yes
Content-Length	Yes
Originator	Yes
[Cause]	Yes
[PS-Furnish-Charging-Information]	Yes
{GPRS-Charging-Id}	Yes
{PS-Free-Format-Data}	Yes
[PS-Append-Free-Format-Data]	Yes

NOTE: A detailed description of the AVPs is provided in clause 7.

Editor's note: The Application Provided Called Party issue needs to be reviewed & corrected if needed.

End of Change in Clause 6.2.1

Change in Clause 6.4.3

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
*[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
3GPP Diameter Credit Control AVPs	
[PS-Furnish-Charging-Information]	Yes
{GPRS-Charging-Id}	Yes
{PS-Free-Format-Data}	Yes
[PS-Append-Free-Format-Data]	Yes

End of Change in Clause 6.4.3

Change in Clause 7.1.2

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	Must	May	Should not	Must not	May Encr.
3GPP Diameter Accounting AVPs								
[Event-Type]	223	7.1.2.16	Grouped					
[SIP-Method]	224	7.1.2.34	UTF8String					
[Event]	225	7.1.2.15	UTF8String					
[Content-Type]	226	7.1.2.12	UTF8String					
[Content-Length]	227	7.1.2.11	UTF8String					
[Content-Disposition]	228	7.1.2.10	UTF8String					
[Role-of-Node]	229	7.1.2.27	Enumerated					
[User Session Id]	230	7.1.2.45	UTF8String					
[Calling-Party-Address]	231	7.1.2.7	UTF8String					
[Called-Party-Address]	232	7.1.2.6	UTF8String					
[Time-stamps]	233	7.1.2.39	Grouped					
[SIP-Request-Timestamp]	234	7.1.2.35	UTF8String					
[SIP-Response-Timestamp]	235	7.1.2.36	UTF8String					
[Application-server]	236	7.1.2.3	UTF8String					
[Application-provided-called-party-address]	237	7.1.2.2	UTF8String					
[Inter-Operator-Identifier]	238	7.1.2.22	Grouped					
[Originating-IOI]	239	7.1.2.25	UTF8String					
[Terminating-IOI]	240	7.1.2.38	UTF8String					
[IMS-Charging-Identifier]	241	7.1.2.20	UTF8String					
*[SDP-Session-Description]	242	7.1.2.31	UTF8String					
*[SDP-Media-component]	243	7.1.2.28	Grouped					
[SDP-Media-Name]	244	7.1.2.30	UTF8String					
*[SDP-Media-Description]	245	7.1.2.29	UTF8String					
[GPRS-Charging-Id]	246	7.1.2.18	UTF8String					
[GGSN-Address]	247	7.1.2.17	IPAddress					
[Served-Party-IP-Address]	248	7.1.2.32	IPAddress					
[Authorized-QoS]	249	7.1.2.4	UTF8String					
[Server-Capabilities]	250	[204]						
[Trunk-Group-Id]	251	7.1.2.40	Grouped					
[Incoming-Trunk-Group-Id]	252	7.1.2.21	UTF8String					
[Outgoing-Trunk-Group-Id]	253	7.1.2.26	UTF8String					
[Bearer-Service]	254	7.1.2.5	OctetString					
[Service-Id]	255	7.1.2. 33	UTF8String					
[UUS-Data]	256	7.1.2.46	Grouped					
[Amount-of-UUS-data]	257	7.1.2.1	UTF8String					
[Mime-type]	258	7.1.2.23	UTF8String					
[Direction]	259	7.1.2.14	Enumerated					
[Cause]	260	7.1.2.8	Grouped					
{Cause-Code}	261	7.1.2.9	Enumerated					
{Node-Functionality}	262	7.1.2.24	Enumerated					
[PS-Furnish-Charging-Information]	865	7.2.2.x	Grouped					
{GPRS-Charging-Id}	846	7.1.2.18	UTF8String					
{PS-Free-Format-Data}	866	7.2.2.y	OctetString					
[PS-Append-Free-Format-Data]	867	7.2.2.z	Enumerated					

End of Change in Clause 7.1.2

New Clause 7.1.2.X

7.1.2.X   PS-Furnish-Charging-Information

This information element may be received in a CCA message via the Ro interface. In situations where online and offline charging are active in parallel, the information element is transparently copied into an ACR to be sent on the Rf interface. The detailed description of this AVP is provided in section 7.2.2.x.

End of Change in Clause 7.1.2.X

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 –Failover	[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					
PS-Furnish-Charging-Information	865	7.2.2.x	Grouped					
GPRS-Charging-Id	846	7.1.2.18	UTF8String					
PS-Free-Format-Data	866	7.2.2.y	OctetString					
PS-Append-Free-Format-Data	867	7.2.2.z	Enumerated					

Changes in section 7.2.2

7.2.2.X   PS-Furnish-Charging-Information AVP

The PS-Furnish-Charging-Information AVP (AVP code 865) is of type Grouped. Its purpose is to add online charging session specific information, received via the Ro interface, onto the Rf interface in order to facilitate its inclusion in CDRs. The PS- Furnish-Charging-Information AVP has the following format:

PS-Furnish-Charging-Information :: = < AVP Header: *TBD*>
                    {GPRS-Charging-Id}
                    {PS-Free-Format-Data}
                    [PS-Append-Free-Format-Data]

7.2.2.Y   PS-Free-Format-Data AVP

The PS-Free-Format-Data AVP (AVP code 866) is of type OctectString and holds online charging session specific data.

7.2.2.Z   PS-Append-Free-Format-Data AVP

The PS-Append-Free-Format-Data AVP (AVP code 867) is of type enumerated and indicates if the information sent in the PS-Free-Format-Data AVP must be appended to the PS-free-format-data stored for the online-session.

The following values are defined:

0   'Append': If this AVP is present and indicates 'Append', the GGSN shall append the received PS free format data to the PS free format data stored for the online charging session.

1   'Overwrite': If this AVP is absent or in value 'Overwrite', the GGSN shall overwrite all PS free format data already stored for the online charging session.

The GGSN shall ignore this AVP if no PS free format data is stored for the online charging session.

End of Changes in 7.2.2

End of Change in Clause 7.2
End of Document