Source: **SA5 (Telecom Management)**

Title: **3 Rel-4/5 CR 32.200 (Charging principles)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Doc-2nd-Level	Workitem
SP-030406	32.200	024	-	Rel-4	Stage 2/3 alignment of Location charging principles	F	4.4.0	S5-034436	OAM-CH
SP-030406	32.200	025	-	Rel-5	Stage 2/3 alignment of Location charging principles	A	5.4.0	S5-034437	OAM-CH
SP-030406	32.200	026	-	Rel-5	Corrections on service key related procedures - Alignment with CAMEL	F	5.4.0	S5-034555	OAM-CH

CR-Form-v7

CHANGE REQUEST

	⌘	**32.200** CR	**024**	⌘rev	**-**	⌘	Current version:	**4.4.0**	⌘

*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:	⌘	Stage 2/3 alignment of Location charging principles
Source:	⌘	SA5 (alain.bibas@rd.francetelecom.com)

Work item code: ⌘	OAM-CH		***Date:*** ⌘	05/09/2003

Category: ⌘	**F**		***Release:*** ⌘	Rel-4

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
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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 stage 3 charging functionnality for LCS has been specified but the stage 2 charging specification is missing.
Summary of change: ⌘	The LCS charging principles are defined.
Consequences if not approved: ⌘	Misalignment of stage 2 and stage 3 LCS charging specifications.

Clauses affected:	⌘	3.2, 5.2.1, 5.2.2, 6.1.3, 6.2

			Y	N		
Other specs affected:	⌘			X	Other core specifications	⌘
				X	Test specifications	
			X		O&M Specifications	Rel-5 32.200

Other comments:	⌘	Rel-5 Mirror CR in S5-034437.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

KEEP the History box of the TS to be changed (see end of the present document)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3G	3rd Generation
3GPP	3G Partnership Project
AoC	Advice of Charge
APN	Access Point Name
BMD	Billing Mediation Device
BS	Billing System
CAI	Charge Advice Information
CAMEL	Customised Applications for Mobile network Enhanced Logic
CDR	Charging Data Record
CG	Charging Gateway
CGF	Charging Gateway Function
CI	Cell Identity
CS	Circuit Switched
CUG	Closed User Group
DP	Detection Point
DRP	Data Record Packet
EDP	Event Detection Point
EIR	Equipment Identity Register
EM	Element Management
FCI	Furnish Charging Information
FTAM	File Transfer, Access and Management
FTP	File Transfer Protocol
G-CDR	GGSN generated– CDR
GGSN	Gateway GPRS Service Node
GMLC	Gateway Mobile Location Center
GMSC	Gateway MSC
GPRS	General Packet Radio Service
gsmSCF	GSM Service Control Function
gsmSSF	GSM Service Switching Function
GSN	GPRS Support Node (either SGSN or GGSN)
GTP	GPRS Tunnelling Protocol
HLR	Home Location Register
HPLMN	Home PLMN
HSCSD	High Speed Circuit Switched Data
ICS	Implementation Conformance Statements
IE	Information Element
IHOSS:OSP	Internet Hosted Octet Stream Service: Octet Stream Protocol
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISP	Internal Standardized Profiles
Itf	Interface
ITU-T	International Telecommunication Union - Telecommunications Standardisation Sector
LAC	Location Area Code
LCS	~~Location~~ LoCation Services
M-CDR	Mobility Management generated-Charging Data Record
ME	Mobile Equipment
MGW	Media Gateway
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MOC	Mobile Originated Call (attempt)
MS	Mobile Station

MSC	Mobile Services Switching Centre
MSISDN	Mobile Station ISDN number
MSRN	Mobile Station Roaming Number
MTC	Mobile Terminated Call (attempt)
NE	Network Element
NM	Network Management
NMC	Network Management Centre
NSS	Network and Switching Subsystem
OA&M	Operation, Administration and Maintenance
OACSU	Off air call set-up
O-CSI	Originating CAMEL Subscription Information
OMC	Operations and Maintenance Centre
PBX	Private Branch eXchange
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
PPS	Post-processing system
PS	Packet-Switched
PSPDN	Packet-Switched Public Data Network
PT	Protocol Type (Field in GTP' header)
QoS	Quality of Service
RAB	Radio Access Bearer
RAC	Routing Area Code
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
SAC	Service Area Code
S-CDR	SGSN (PDP context) generated – CDR
SCF	Service Control Function
SCI	Subscriber Controlled (MMI) Input
SCS	System Conformance Statement
SGSN	Serving GPRS Service Node
SMF	System Management Function
SMS	Short Message Service
SS7	Signalling System No. 7
S-SMO-CDR	SGSN delivered Short message Mobile Originated – CDR
S-SMT-CDR	SGSN delivered Short message Mobile Terminated – CDR
TAP	Transferred Account Procedure
T-CSI	Terminating CAMEL Subscription Information
TDP	Trigger Detection Point
TID	Tunnel Identifier
TLV	Type, Length, Value (GTP header format)
TMN	Telecommunications Management Network
TS	Technical Specification
TV	Type, Value
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
USIM	User Service Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
VAS	Value Added Service
VLR	Visitor Location Register
VMSC	Visited MSC
VPLMN	Visited PLMN

Change in Clause 5.2.1

5.2.1 Charging Data Record Generation

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics etc.), the NEF of the MSC server and/or Location Registers shall be able to produce an charging data record for each of the following:

- Mobile originated call attempt;

- Mobile originated emergency call attempt;

- Mobile originated, call forwarding attempt;

- Mobile terminated call attempt;

- Roaming call attempt in a gateway MSC server;

- Incoming call attempt in a gateway MSC server;

- Outgoing call attempt from a gateway MSC server;

- Transit call attempt;

- Terminating CAMEL call attempt;

- Supplementary service actions;

- HLR interrogation;

- Location updating (HLR & VLR);

- Short message service (point-to-point), mobile originated;

- Short message service (point-to-point), mobile terminated;

- Short message service (point-to-point), mobile originated interworking MSC server;

- Short message service (point-to-point), mobile terminated gateway MSC server;

- Common equipment usage.

- Mobile terminated location request;

- Mobile originated location request;

- Network induced location request;

The purpose of each of these records are described in the following subclauses. A detailed formal description of the data defined in the present document is to be found in 3GPP TS 32.205 [5].

…

<unmodified text>

…

The LCS CDRs (LCS-MT-CDR, LCS-MO-CDR and LCS-NI-CDR) are used to collect charging information related to the LCS features that the PLMN provides in the Packet-Switched domain.

These records include details such as Record Type, Served IMSI, Sequence Number etc. The LCS records are generated based on the following trigger conditions:

- the LCS-MO-CDR, when the MSC receives the RANAP "Location report" message from the RNC;

- the LCS-MT-CDR, when the MSC receives the RANAP "Location report" message from the RNC;

- the LCS-NI-CDR, when the MSC receives the RANAP "Location report" message from the RNC.

End of Change in Clause 5.2.1

Change in Clause 5.2.2

5.2.2   Charging scenarios

This subclause contains a number of example scenarios illustrating the purpose and practical usage of the various types of records defined in the previous subclauses. These examples are by no means exhaustive.

For the purpose of these examples, the following assumptions have been made:

- that the MSC server and VLR are co-located;

- that the records are sent to a post-processing system;

- that the generation of all of the record types described in this subclause has been enabled;

- that the HLR interrogation records are produced in the HLR and not the interrogating MSC server;

- that supplementary service actions are recorded in separate CDRs.

The following conventions have been used for the figures contained within this subclause:

1) Network connections and signalling transactions are illustrated by means of solid lines and referenced by number e.g. (1).

2) Operation & Maintenance actions, such as the transfer of CDRs, are represented by means of dotted lines and referenced by letter e.g. (A).

3) The Billing System has been included in some, but not all, of the examples. The only reason for this decision is to simplify the resulting figures. The presence of a Billing System is assumed even if not explicitly included.

The following examples are included:

1) Mobile to Land (outgoing) call;

2) Land to Mobile (incoming) call;

3) Mobile to Mobile call within the same network;

4) Incoming call to a roaming subscriber;

5) Incoming call to a PLMN Service Centre;

6) Call Forwarding Unconditional;

7) Call Forwarding conditional (on Busy);

8) Delivery of a Mobile Terminated Short Message;

9) Call Hold and Multi-party services;

10) Outgoing call handled by CAMEL;

11) Incoming call handled by CAMEL without redirection;

12) Incoming call to a roaming subscriber handled by CAMEL;

13) Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL;

14) Incoming call handled by CAMEL without redirection and forwarded early using GSM SS but controlled by CAMEL;

15) Incoming call handled by CAMEL without redirection and forwarded late using GSM SS but controlled by CAMEL;

16) Early forwarded call controlled by CAMEL;

17) Late forwarded call controlled by CAMEL;

18) Incoming call handled by CAMEL with redirection imitated by CAMEL feature;

19) Incoming call handled by CAMEL in MSC Server without redirection;

20) Outgoing call handled by CAMEL Dialled CSI Trigger;

21) Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL.

22) Mobile terminated location request.
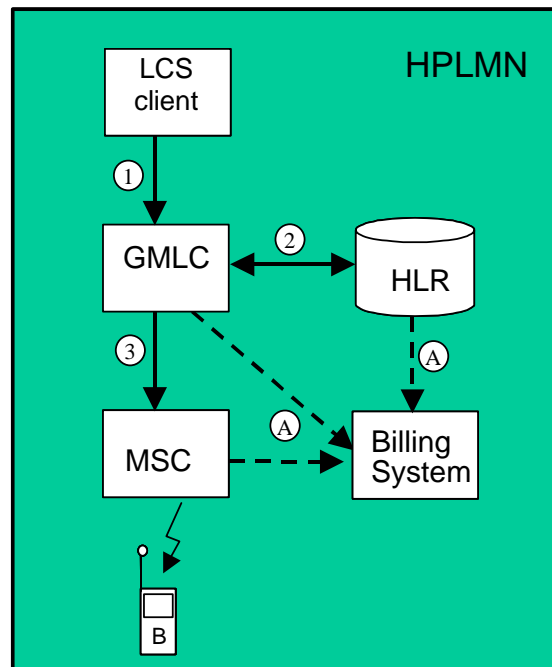
…

<unmodified text>

…

Figure 5.22 illustrates general network positioning for LCS clients external to the PLMN.

An external LCS client requests the current location of a target UE from a GMLC(1). In this release the GMLC shall not create any LCS record.

The GMLC server then interrogates the HLR of the target UE to be located to determine his current location (2). The HLR shall create an HLR interrogation record.

The GMLC sends the location service request to the MSC indicated by the HLR. The MSC sends a Location Request message to RAN that initiates the positioning procedure (3). The MSC shall create an LCS-MT record.

The records generated are subsequently transferred to the Billing System of the PLMN (A).

Figure 5.22: Mobile terminated location request

End of Change in Clause 5.2.2

Change in Clause 6.1.3

6.1.3   General Aspects of Charging Data

CDR generation and contents should be flexible and unnecessary redundancy in data should be avoided.

1. Each PDP context generates its own record types (the S-CDR for the SGSN and the G-CDR for the GGSN related to PDP contexts).

2. The SGSN can optionally provide a record for mobility management of the attached MS in the M-CDR.

3. The SGSN shall provide two SMS related records, in case of Packet-Switched domain delivered MO short message S-SMO-CDR and MT short message S-SMT-CDR.

4. MS Location information shall be included in the SGSN PDP context records.

5. Records shall only include relevant information, i.e. traffic activity since last record.

6. Change of tariff period (if used) should not cause new CDRs to be sent to avoid peaks in data transfer. Instead such events should close the existing volume counters and open new ones when appropriate traffic is detected. This can be done by having a new record in the same message. It is up to the operator how often the CDRs are transferred from a GSN.

7. Both SGSN and GGSN nodes shall collect information from same chargeable sessions (PDP contexts). A unique reference (Charging ID in combination with GGSN address) is needed to enable correlation between information from several records produced from same PDP context.

8. The RNC shall collect the amount of not transferred downlink data, i.e. data that the RNC has either discarded or forwarded to a 2G-SGSN, for an MS's RABs when instructed by the 3G-SGSN.

9. The SGSN shall generate LCS related records MT-LR-CDR, MO-LR-CDR and NI-LR-CDR if the location request is routed through the SGSN.

End of Change in Clause 6.1.3

Change in Clause 6.2

6.2 Charging Data Collection

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics etc.), the SGSN and GGSN shall be able to produce a CDRs for each of the following:

- Charging Data in the SGSN (S-CDR);

- Charging Data in the GGSN (G-CDR);

- Mobile Station Mobility Management Data in SGSN (M-CDR);

- SMS Mobile Originated Data in SGSN (S-SMO-CDR);

- SMS Mobile Terminated Data in SGSN (S-SMT-CDR);

- Mobile Originated location request in SGSN (LCS-MO-CDR);

- Mobile Terminated location request in SGSN (LCS-MT-CDR);

- Network Induced location request (LCS-NI-CDR).

The contents and purpose of each of these records are described in the following subclauses. A detailed formal description of the data defined in the present document is to be found in TS 32.215 [6].

6.2.1 Charging Data Record Generation

The S-CDR, M-CDR G-CDR, S-SMO-CDR and S-SMT-CDR, and S-SMT-CDR, LCS-MO-CDR, LCS-MT-CDR and LCS-NI-CDR are generated by the SGSN and GGSN to collect charging information such that they may be subsequently transferred to the Charging Gateway Function (CGF).

The generation of CDRs, partial CDRs and coherent trigger conditions (e.g. "maximum number of charging conditions changes") depend on the charging characteristics profile data which is determined via the charging characteristics profile index. The mechanism of conveying the charging characteristics data item (HLR -> SGSN -> GGSN) and determining the appropriate profile data by the GSNs is specified in 3GPP TS 32.215 [6].In the GSNs it shall be possible to activate and deactivate CDR generation for each Charging Characteristics profile. If CDR generation is activated, it shall be possible to define separate trigger conditions values per Charging Characteristics profile for the following triggers:

- data volume limit;

- time (duration limit);

- maximum number of charging conditions changes (QoS change, Tariff Time change).

The following subclauses describe the trigger conditions for collection of charging information and CDR generation by the SGSN/GGSN.

…

<unmodified text>

…

6.2.1.4 Triggers for LCS-MT-CDR, LCS-MO-CDR and LCS-NI-CDR Charging Information Collection

The LCS CDRs (LCS-MT-CDR, LCS-MO-CDR and LCS-NI-CDR) are used to collect charging information related to the LCS features that the PLMN provides in the Packet-Switched domain.

These records include details such as Record Type, Served IMSI, Sequence Number etc. The LCS records are generated based on the following trigger conditions:

- the LCS-MO-CDR, when the SGSN sends itsreceives the RANAP "Location report" message from the RNC response to the <xxx> message;

- the LCS-MT-CDR, when the SGSN receives the RANAP "Location report" message from the RNCsends its response to the "Provide Subscriber Location" message;

- the LCS-NI-CDR, when the SGSN receives the RANAP "Location report" message from the RNC<sends/receives> the <xxx> message.

End of Change in Clause 6.2
End of document

CR-Form-v7

CHANGE REQUEST

| ⌘ | **32.200** CR **025** | ⌘rev | **-** | ⌘ | Current version: | **5.4.0** | ⌘ |

*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: ⌘	Stage 2/3 alignment of Location charging principles	
Source: ⌘	SA5 (alain.bibas@rd.francetelecom.com)	
Work item code: ⌘	OAM-CH	***Date:*** ⌘ 05/09/2003

Category: ⌘ **A**		***Release:*** ⌘ Rel-5

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Reason for change: ⌘	The stage 3 charging functionnality for LCS has been specified but the stage 2 charging specification is missing.
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Clauses affected: ⌘	3.2, 5.2.1, 5.2.2, 6.1.3, 6.2

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

Other comments: ⌘	Rel-5 Mirror CR of S5-034436.

How to create CRs using this form:

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TV	Type, Value
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
USIM	User Service Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
VAS	Value Added Service
VLR	Visitor Location Register
VMSC	Visited MSC
VPLMN	Visited PLMN

End of Change in Clause 3.2

5.2.1   Charging Data Record Generation

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics etc.), the NEF of the MSC server and/or Location Registers shall be able to produce an charging data record for each of the following:

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- Mobile terminated call attempt;

- Roaming call attempt in a gateway MSC server;

- Incoming call attempt in a gateway MSC server;

- Outgoing call attempt from a gateway MSC server;

- Transit call attempt;

- Terminating CAMEL call attempt;

- Supplementary service actions;

- HLR interrogation;

- Location updating (HLR & VLR);

- Short message service (point-to-point), mobile originated;

- Short message service (point-to-point), mobile terminated;

- Short message service (point-to-point), mobile originated interworking MSC server;

- Short message service (point-to-point), mobile terminated gateway MSC server;

- Common equipment usage.

- Mobile terminated location request;

- Mobile originated location request;

- Network induced location request;

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…

<unmodified text>

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These records include details such as Record Type, Served IMSI, Sequence Number etc. The LCS records are generated based on the following trigger conditions:

-    the LCS-MO-CDR, when the MSC receives the RANAP "Location report" message from the RNC;

-    the LCS-MT-CDR, when the MSC receives the RANAP "Location report" message from the RNC;

-    the LCS-NI-CDR, when the MSC receives the RANAP "Location report" message from the RNC.

End of Change in Clause 5.2.1

Change in Clause 5.2.2

5.2.2   Charging scenarios

This subclause contains a number of example scenarios illustrating the purpose and practical usage of the various types of records defined in the previous subclauses. These examples are by no means exhaustive.

For the purpose of these examples, the following assumptions have been made:

-    that the MSC server and VLR are co-located;

-    that the records are sent to a post-processing system;

-    that the generation of all of the record types described in this subclause has been enabled;

-    that the HLR interrogation records are produced in the HLR and not the interrogating MSC server;

-    that supplementary service actions are recorded in separate CDRs.

The following conventions have been used for the figures contained within this subclause:

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2) Operation & Maintenance actions, such as the transfer of CDRs, are represented by means of dotted lines and referenced by letter e.g. (A);

3) The Billing System has been included in some, but not all, of the examples. The only reason for this decision is to simplify the resulting figures. The presence of a Billing System is assumed even if not explicitly included.

The following examples are included:

1) Mobile to Land (outgoing) call;

2) Land to Mobile (incoming) call;

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17) Late forwarded call controlled by CAMEL;

18) Incoming call handled by CAMEL with redirection imitated by CAMEL feature;

19) Incoming call handled by CAMEL in MSC Server without redirection;

20) Outgoing call handled by CAMEL Dialled CSI Trigger;

21) Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL.;

22) Mobile terminated location request.
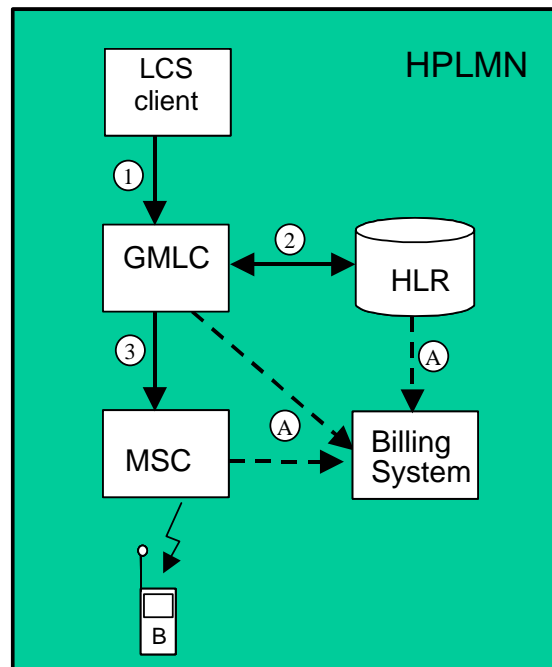
…

<unmodified text>

…

Figure 5.22 illustrates general network positioning for LCS clients external to the PLMN.

An external LCS client requests the current location of a target UE from a GMLC(1). In this release the GMLC shall not create any LCS record.

The GMLC server then interrogates the HLR of the target UE to be located to determine his current location (2). The HLR shall create an HLR interrogation record.

The GMLC sends the location service request to the MSC indicated by the HLR. The MSC sends a Location Request message to RAN that initiates the positioning procedure (3). The MSC shall create an LCS-MT record.

The records generated are subsequently transferred to the Billing System of the PLMN (A).

Figure 5.22: Mobile terminated location request

End of Change in Clause 5.2.2

Change in Clause 6.1.3

6.1.3   General Aspects of Charging Data

CDR generation and contents should be flexible and unnecessary redundancy in data should be avoided.

1. Each PDP context generates its own record types (the S-CDR for the SGSN and the G-CDR for the GGSN related to PDP contexts).

2. The SGSN can optionally provide a record for mobility management of the attached MS in the M-CDR.

3. The SGSN shall provide two SMS related records, in case of Packet-Switched domain delivered MO short message S-SMO-CDR and MT short message S-SMT-CDR.

4. MS Location information shall be included in the SGSN PDP context records.

5. Records shall only include relevant information, i.e. traffic activity since last record.

6. Change of tariff period (if used) should not cause new CDRs to be sent to avoid peaks in data transfer. Instead such events should close the existing volume counters and open new ones when appropriate traffic is detected. This can be done by having a new record in the same message. It is up to the operator how often the CDRs are transferred from a GSN.

7. Both SGSN and GGSN nodes shall collect information from same chargeable sessions (PDP contexts). A unique reference (Charging ID in combination with GGSN address) is needed to enable correlation between information from several records produced from same PDP context.

8. The RNC shall collect the amount of not transferred downlink data, i.e., data that the RNC has either discarded or forwarded to a 2G-SGSN, for an MS's RABs when instructed by the 3G-SGSN.

9. The SGSN shall generate LCS related records MT-LR-CDR, MO-LR-CDR and NI-LR-CDR if the location request is routed through the SGSN.

End of Change in Clause 6.1.3

Change in Clause 6.2

6.2 Charging Data Collection

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics etc.), the SGSN and GGSN shall be able to produce a CDRs for each of the following:

- Charging Data in the SGSN (S-CDR);

- Charging Data in the GGSN (G-CDR);

- Mobile Station Mobility Management Data in SGSN (M-CDR);

- SMS Mobile Originated Data in SGSN (S-SMO-CDR);

- SMS Mobile Terminated Data in SGSN (S-SMT-CDR);

- Mobile Originated location request in SGSN (LCS-MO-CDR);

- Mobile Terminated location request in SGSN (LCS-MT-CDR);

- Network Induced location request (LCS-NI-CDR).

The contents and purpose of each of these records are described in the following subclauses. A detailed formal description of the data defined in the present document is to be found in TS 32.215 [6].

6.2.1 Charging Data Record Generation

The S-CDR, M-CDR G-CDR, S-SMO-CDR, and S-SMT-CDR, LCS-MO-CDR, LCS-MT-CDR and LCS-NI-CDR are generated by the SGSN and GGSN to collect charging information such that they may be subsequently transferred to the Charging Gateway Function (CGF).

The generation of CDRs, partial CDRs and coherent trigger conditions (e.g. "maximum number of charging conditions changes") depend on the charging characteristics profile data which is determined via the charging characteristics profile index. The mechanism of conveying the charging characteristics data item (HLR -> SGSN -> GGSN) and determining the appropriate profile data by the GSNs is specified in 3GPP TS 32.215 [6].In the GSNs it shall be possible to activate and deactivate CDR generation for each Charging Characteristics profile. If CDR generation is activated, it shall be possible to define separate trigger conditions values per Charging Characteristics profile for the following triggers:

- data volume limit;

- time (duration limit);

- maximum number of charging conditions changes (QoS change, Tariff Time change).

The following subclauses describe the trigger conditions for collection of charging information and CDR generation by the SGSN/GGSN.

…

<unmodified text>

…

6.2.1.4 Triggers for LCS-MT-CDR, LCS-MO-CDR and LCS-NI-CDR Charging Information Collection

The LCS CDRs (LCS-MT-CDR, LCS-MO-CDR and LCS-NI-CDR) are used to collect charging information related to the LCS features that the PLMN provides in the Packet-Switched domain.

These records include details such as Record Type, Served IMSI, Sequence Number etc. The LCS records are generated based on the following trigger conditions:

- the LCS-MO-CDR, when the SGSN ~~sends its~~receives the RANAP "Location report" message from the RNC ~~response to the <xxx> message~~;

- the LCS-MT-CDR, when the SGSN receives the RANAP "Location report" message from the RNC~~sends its response to the "Provide Subscriber Location" message~~;

- the LCS-NI-CDR, when the SGSN receives the RANAP "Location report" message from the RNC~~<sends/receives> the <xxx> message~~.

End of Change in Clause 6.2
End of document

CR-Form-v7

CHANGE REQUEST

| ⌘ | **32.200** CR **026** | ⌘rev | **-** | ⌘ | Current version: | **5.4.0** | ⌘ |

*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:	⌘	Corrections on service key related procedures - Alignment with CAMEL
Source:	⌘	SA5 (NEC, Siemens)
Work item code:⌘	OAM-CH	***Date:*** ⌘ 05/09/2003

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:
  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 current 32.200 describes procedures for IMS online event based charging related to service key, however the description conflicts with the service key notion used in CAMEL.
Summary of change:⌘		The "Service Key" term is replaced by the "Service Identifier" term.
Consequences if not approved:	⌘	IMS online event based charging will be interpreted wrongly which may lead to improper implementations.

Clauses affected:	⌘	7.3.1, 7.3.2, 7.3.3.1.2, 7.3.3.3.2

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

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

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7.3.1   Basic Principles

There are two sub-functions for on-line charging that require a more detailed description: rating and unit determination. Both rating and unit determination can be implemented centralized, i.e. on the ECF, or decentralized, that is, on the AS/MRFC.

Unit determination refers to the calculation of the number of non-monetary units (service units, data volume, time and events) that shall be assigned prior to starting service delivery.

- With *Centralized Unit Determination,* the ECF determines the number of non-monetary units that a certain service user can consume based on a service identifier ("service key") received from the AS/MRFC.

- With the *Decentralized Unit Determination* approach, the AS/MRFC determines itself how many units are required to start service delivery, and requests these units from the ECF.

After checking the service user's account balance, the ECF returns the number of granted units to the AS/MRFC. The AS/MRFC is then responsible for the supervision of service delivery. Particularly, the AS/MRFC shall limit service delivery to the corresponding number of granted units.

Rating refers to the calculation of a price out of the non-monetary units calculated by the unit determination function.

- With the *Centralized Rating* approach, the AS/MRFC and the ECF exchange information about non-monetary units. The ECF translates these units into monetary units. The centralized rating approach is well suited in deployments where the AS/MRFC is within the network operator domain.

- With the *Decentralized Rating* approach, the corresponding rating control is performed within the AS/MRFC. Consequently, AS/MRFC and ECF exchange information about monetary units. This approach may be favourable for external AS/MRFC deployment.

Two cases for on-line event charging can be distinguished: immediate event charging and event charging with unit reservation. In the case of immediate event charging, granting units to the AS/MRFC is performed in a single operation that also includes the deduction of the corresponding monetary units from the subscriber's account. In contrast, event charging with unit reservation includes also the process of requesting, reserving and possibly returning units. The deduction of the corresponding monetary units then occurs upon conclusion of the event charging transaction.

7.3.2   Basic Operations and Scenarios

Immediate event charging is performed by the use of the "Debit Units" operation:

- "Debit Units Request"; sent from AS/MRFC → ECF
  After receiving a service request from the subscriber, the AS/MRFC sends a Debit Units Request to the ECF. The AS/MRFC may either specify a service key identifier (centralised unit determination) or the number of units requested (decentralised unit determination).

- "Debit Units Response"; sent from ECF → AS/MRFC
  The ECF replies with a Debit Units Response, which informs the AS/MRFC of the number of units granted as a result of the Debit Units Request. This includes the case where the number of units granted indicates the permission to render the requested service.

In addition, the "Reserve Units" operation is used in case of event charging with reservation:

- "Reserve Units Request"; sent from AS/MRFC → ECF
  Request to reserve a number of units for the service to be provided by an AS/MRFC. In case of centralised unit determination, the AS/MRFC specifies a service key identifier in the Reserve Unit Request, and the ECF determines the number of units requested. In case of decentralised unit determination, the number of units requested is specified by the AS/MRFC.

- "Reserve Units Response"; sent from ECF → AS/MRFC
Response from the ECF which informs the AS/MRFC of the number of units that were reserved as a result of the "Reserve Units Request".

The consumed units are deducted from the subscriber's account after service delivery. Thus, the reserved and consumed units are not necessarily the same. Using this operation, it is also possible for the AS/MRFC to modify the current reservation, including the return of previously reserved units.

7.3.3   Charging Scenarios

In order to perform event charging via Ro, the scenarios between the involved entities UE-A, ECF and AS/MRFC need to be defined. The charging flows shown in this subclause include scenarios with immediate event charging and event charging with reservation. In particular, the following cases are shown:

1) Immediate Event Charging

   a)   Decentralized Unit Determination and Centralized Rating

   b)   Centralized Unit Determination and Centralized Rating

   c)   Decentralized Unit Determination and Decentralized Rating

2) Event charging with Reservation

   a)   Decentralized Unit Determination and Centralized Rating

   b)   Centralized Unit Determination and Centralized Rating

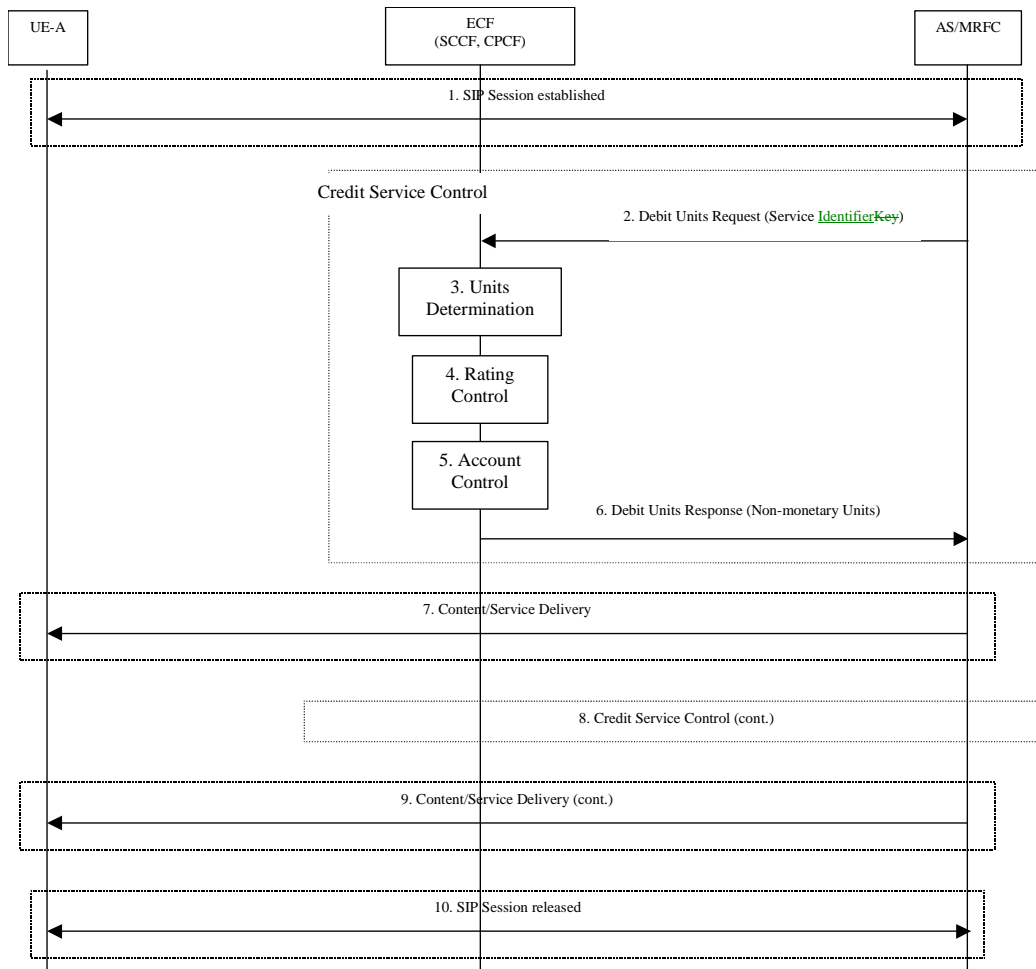   c)   Decentralized Unit Determination and Decentralized Rating

The combination of Centralized Unit Determination with Decentralized Rating is not possible.

7.3.3.1   Immediate Event Charging

****************   NEXT CHANGE   ****************************

7.3.3.1.2   Centralized Unit Determination and Centralized Rating

In the following scenario, AS/MRFC asks the ECF to assign of units based on the specified service key identifier specified by the AS/MRFC.

Figure 7.2: Immediate Event Charging with Centralized Rating and Centralized Unit Determination

1. **SIP Session Establishment:** the SIP session is established and the UE-A requests the desired content from the AS/MRFC.
2. **Debit Units Request:** depending on the service requested by the UE-A, the AS/MRFC selects the service ~~key~~ identifier and forwards the Debit Units Request to the ECF.
3. **Units Determination:** the ECF determines the number of non-monetary units needed for the content/service delivery, based on the received service key.
4. **Rating Control:** assisted by the rating entity the ECF calculates the number of monetary units that represent the price for the number of units determined in item 3.
5. **Account Control:** provided that the user's credit balance is sufficient, the ECF triggers the deduction of the calculated amount from the subscriber's account.
6. **Debit Units Response:** the ECF informs the AS/MRFC of the number of granted units. This includes the case where the number of units granted indicates the permission to render the service that was identified by the received service key.
7. **Content/Service Delivery:** the AS/MRFC delivers the content/service at once, in fractions or in individually chargeable items, corresponding to the number of granted units.
8. **Credit Service Control (cont.):** this function block is optional and a replication of items 2 to 6.
9. **Content/Service Delivery (cont.):** the continuation of content delivery occurs in correspondence with the occurrence of item 8.
10. **SIP Session released:** the SIP session is released.

7.3.3.2.2   Centralized Unit Determination and Centralized Rating

In the following scenario, the AS/MRFC requests the ECF to reserve units based on the ~~specified~~ service identifier ~~key~~ specified by the AS/MRFC. An account debit operation is carried out following the conclusion of service delivery.
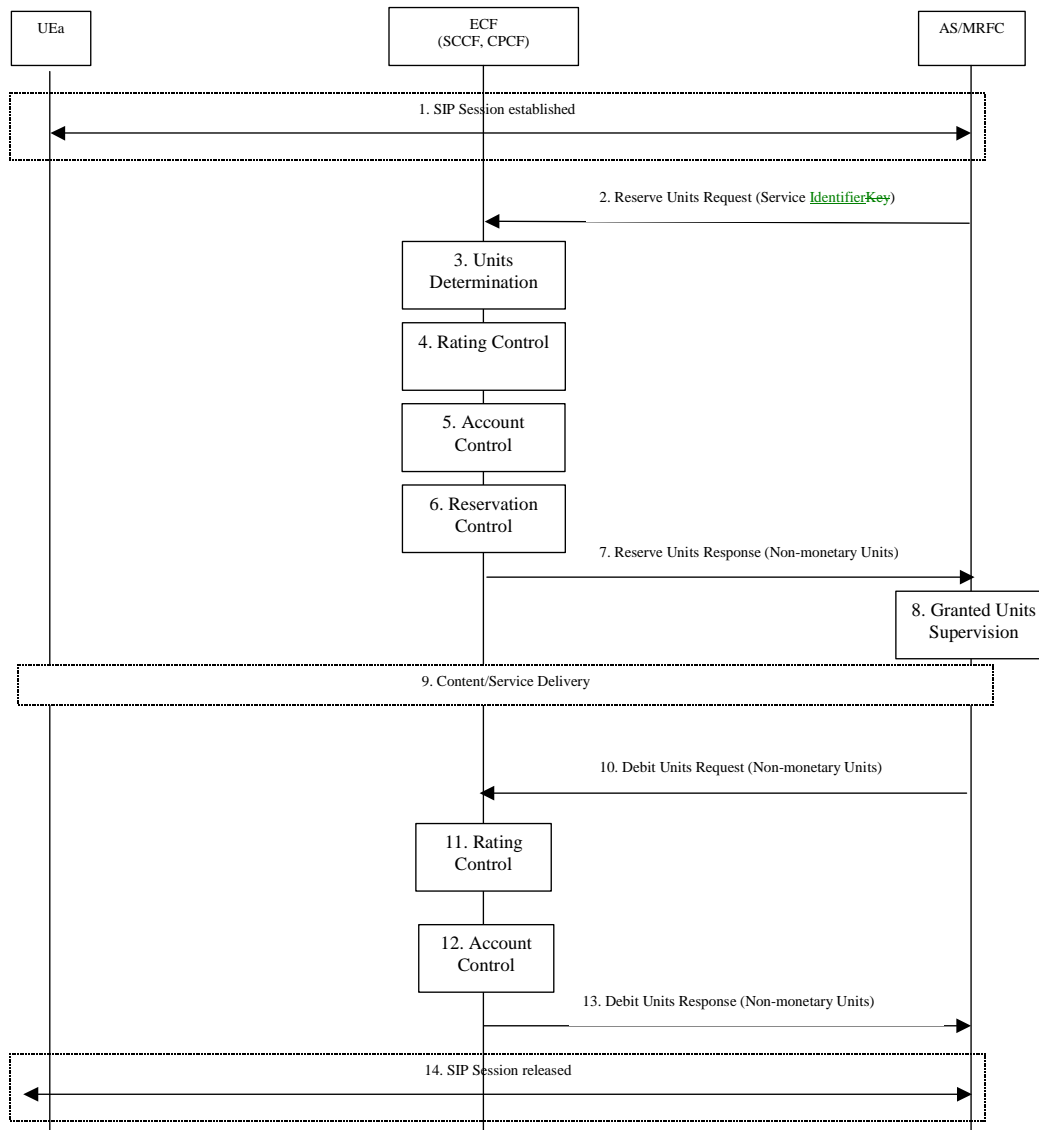

Figure 7.5: Event Charging with Reservation / Centralized Unit Determination and Centralized Rating

1. **SIP Session Establishment:** the SIP session is established and the UE-A requests the desired content from the AS/MRFC.
2. **Reserve Units Request:** depending on the service requested by the UE-A, the AS/MRFC selects the service ~~key~~ identifier and forwards the Reserve Units Request to the ECF.
3. **Units Determination:** the ECF determines the number of non-monetary units needed for the content/service delivery, based on the received service key.

4. **Rating Control:** assisted by the rating entity the ECF calculates the number of monetary units that represent the price for the number of units determined in item 3.

5. **Account Control:** the ECF checks whether the user's account balance is sufficient for the requested reservation.

6. **Reservation Control:** if the user's account balance is sufficient, then the corresponding reservation is made.

7. **Reserve Units Response:** the ECF informs the AS/MRFC of the reserved number of units. This includes the case where the number of units reserved indicates the permission to render the service that was identified by the received service key. Items 2 to 7 may be repeated several times.

8. **Granted Units** Supervision**:** simultaneously with the service delivery, the AS/MRFC monitors the consumption of the reserved units.

9. **Content/Service Delivery:** the AS/MRFC delivers the content/service at once, in fractions or in individually chargeable items, corresponding to the reserved number of units.

10. **Debit Units Request:** the AS/MRFC provides according to previous Reserve Units Response either the request to deduct of an amount corresponding to the consumed number of units from the subscriber's account, or solely the indication of whether the service was successfully delivered or not. In the case that no further units are required for this service, an appropriate indication triggering the release of the remaining reservation is given.

11. **Rating Control:** assisted by the rating entity the ECF calculates the number of monetary units to deduct from the subscriber's account.

12. **Account Control:** the ECF triggers the deduction of the calculated amount from the subscriber's account.

13. **Debit Units Response:** the ECF informs the AS/MRFC of the actually deducted units. Items 10 to 13 may be repeated several times.

14. **SIP Session Released:** the SIP session is released.

********************   End of Change   *****************************