
Source: SA5
Title: R99 CR32.015 (Telecommunications Management;
Charging and billing; 3G call and event data for the
Packet Switched (PS) domain)
Document for: Approval
Agenda Item: 7.5.3

Doc-1st-Level	Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New	Workitem
SP-010463	S5-010428	32.015	028		R99	Decoupling of Tariff time switches on GSN- and CAMEL-level from a CDR's perspective	F	3.6.0	3.7.0	OAM-CH
SP-010463	S5-010547	32.015	029		R99	Data type definition for MSNetworkCapability corrected and aligned with TS 24.008	F	3.6.0	3.7.0	OAM-CH
SP-010463	S5-010548	32.015	030		R99	Modification of "System Type"	F	3.6.0	3.7.0	OAM-CH
SP-010463	S5-010549	32.015	031		R99	Correction of G-CDR trigger conditions	F	3.6.0	3.7.0	OAM-CH

CR-Form-v3

CHANGE REQUEST

⌘ **32.015 CR 028** ⌘ rev **-** ⌘ Current version: **3.6.0** ⌘

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Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘	Decoupling of Tariff time switches on GSN- and CAMEL-level from a CDR's perspective		
Source:	⌘	SA5		
Work item code:	⌘	OAM-CH		
		Date: ⌘ 20/07/2001		
Category:	⌘	F		
		Release: ⌘ R99		
		<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><i>Use <u>one</u> of the following categories:</i></p> <p>F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p> </td> <td style="width: 50%; vertical-align: top;"> <p><i>Use <u>one</u> of the following releases:</i></p> <p>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p> </td> </tr> </table>	<p><i>Use <u>one</u> of the following categories:</i></p> <p>F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	<p><i>Use <u>one</u> of the following releases:</i></p> <p>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p>
<p><i>Use <u>one</u> of the following categories:</i></p> <p>F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	<p><i>Use <u>one</u> of the following releases:</i></p> <p>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p>			

Reason for change:	⌘	Current specification does not prohibit that a CAMEL provided tariff time switch overrules the GSN defined one in the context of CDRs. However in roaming cases a visited PLMN does not want to allow that tariff switches relevant for the CDRs are dictated by a foreign PLMN. Tariff time switches on GSN- and CAMEL-level must be decoupled from a CDR's perspective.
Summary of change:	⌘	Existing specification is precised in the way that CAMEL provided tariff time switches must not influence existing tariff time switches in the context of CDRs. If CAMEL-provided tariff time switches need to be reported via the CDR an additional CAMEL related data item needs to be specified (this is not in the scope of this CR)
Consequences if not approved:	⌘	CDRs produced by a V-PLMN for roaming subscribers may not be evaluated by billing systems (belonging to the V-PLMN) since unknown tariff time switches (pertaining to a foreign PLMN) may occur.

Clauses affected:	⌘	5.8									
Other specs affected:	⌘	<table style="width: 100%; border: none;"> <tr> <td style="width: 40%;"><input type="checkbox"/> Other core specifications</td> <td style="width: 10%; text-align: center;">⌘</td> <td style="width: 50%;"></td> </tr> <tr> <td><input type="checkbox"/> Test specifications</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> O&M Specifications</td> <td></td> <td></td> </tr> </table>	<input type="checkbox"/> Other core specifications	⌘		<input type="checkbox"/> Test specifications			<input type="checkbox"/> O&M Specifications		
<input type="checkbox"/> Other core specifications	⌘										
<input type="checkbox"/> Test specifications											
<input type="checkbox"/> O&M Specifications											
Other comments:	⌘										

5.8 Charging support for CAMEL

CAMEL GPRS interworking can be activated for GPRS session, SGSN PDP context and mobile originated SMS based on subscription information stored in HLR. Control point for all CAMEL interactions in GPRS network domain reside at gprsSSF typically co-located with SGSN. GGSN is not aware of CAMEL service at all. For more information about CAMEL interworking (see 3GPP TS 23.078 [9]).

An M-CDR, S-CDR and S-SMO-CDR include basic information about CAMEL service information, such as service key and SCF address, and service usage, such as CAMEL modification information and amount of signalling. CAMEL service may also send transparent free format data in one or several messages to be stored in the CDR. Each received free format data indicates whether it is overwritten or appended to previously received free format data.

CAMEL service may deny the GPRS attach, PDP context activation or sending of short message. CAMEL service may also change the APN determined by SGSN before activating PDP context or it may change the destination information of short message.

CAMEL feature to download advice of charge parameters does not need to be supported because sending of these parameters down to MS and usage in the MS is not standardised for GPRS terminals. The message itself shall however be supported and in case of a relative tariff switch is received, then at that tariff switch time volume counts shall be reported to CAMEL service.

Tariff switch times configured in GSN and those received from CAMEL service are independent, ~~and only one valid.~~
Tariff time switches reported in CDRs must not be influenced by tariff time switches provided via CAMEL. In the context of CDRs only tariff time switches defined on GSN level are valid.

CHANGE REQUEST

⌘ **32.015 CR 029** ⌘ ev **-** ⌘ Current version: **3.6.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title: ⌘ Data type definition for MSNetworkCapability corrected and aligned with TS 24.008

Source: ⌘ SA5

Work item code: ⌘ OAM-CH

Date: ⌘ 07/09/2001

Category: ⌘ **F**

Release: ⌘ R99

Use one of the following categories:

Use one of the following releases:

F (correction)

2 (GSM Phase 2)

A (corresponds to a correction in an earlier release)

R96 (Release 1996)

B (addition of feature),

R97 (Release 1997)

C (functional modification of feature)

R98 (Release 1998)

D (editorial modification)

R99 (Release 1999)

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

REL-4 (Release 4)

REL-5 (Release 5)

Reason for change: ⌘ Error in data type definition for MSNetworkCapability.

Summary of change: ⌘ MS Network Capability can have a variable length with a maximum of 8 octets, as specified in TS 24.008 v3.8.0.
The current specification in TS 32.015 only allows one octet to be used for this parameter. The data type definition must be changed to allow a variable length from 1 to 8 octets.

Consequences if not approved: ⌘ It would result in incomplete and faulty charging data.

Clauses affected: ⌘ 8.1

Other specs affected: ⌘ Other core specifications ⌘

Test specifications

O&M Specifications

Other comments: ⌘

8 Charging Data Record Structure

8.1 ASN.1 definitions for CDR information

...

| MSNetworkCapability ::= OCTET STRING (SIZE(1..8))

CR-Form-v4

CHANGE REQUEST

⌘ **32.015** **CR** **030** ⌘ ev **-** ⌘ Current version: **3.6.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Modification of "System Type"		
Source:	⌘ SA5		
Work item code:	⌘ OAM-CH	Date:	⌘ 07/09/2001
Category:	⌘ F	Release:	⌘ R99
	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)

Reason for change:	⌘ To allow operators to charge consistently for the air interface used by the customer, i.e. GSM, GERAN, UTRAN.
Summary of change:	⌘ <ol style="list-style-type: none">1. Enhance "systemType" parameter to also include the value "GERAN"2. Correct ASN.1 of the M-CDR to include the system type.
Consequences if not approved:	⌘ Operators cannot charge for use of GERAN air interface as currently only a distinction between "GSM" and "UTRAN" is supported.

Clauses affected:	⌘ 6.1.1, 6.1.3, 6.1.4, 6.1.5, 6.1.6.36, 8.1		
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
Other comments:	⌘		

6.1.1 GPRS charging data in SGSN (S-CDR)

If the collection of CDR data is enabled then the following GSM or 3G SGSN data shall be available for each PDP context.

Table 5: GPRS SGSN PDP context data

Field		Description
Record Type	M	GPRS SGSN PDP context record.
Network Initiated PDP Context	C	Present if this is a network initiated PDP context.
System Type	C	Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. Indicates 3G-UMTS System; Not present for GSM GPRS.
Served IMSI	M	IMSI of the served party (if Anonymous Access Indicator is FALSE or not supplied).
Served IMEI	C	The IMEI of the ME, if available.
Served MSISDN	O	The primary MSISDN of the subscriber.
SGSN Address	M	The IP address of the current SGSN.
MS Network Capability	O	The mobile station Network Capability.
Routing Area	O	Routing Area at the time of the record creation.
Local Area Code	O	Location area code at the time of the record creation.
Cell Identifier	O	Cell identity or Service Area Code (SAC) at the time of the record creation.
Charging ID	M	PDP context identifier used to identify this PDP context in different records created by GSNs
GGSN Address Used	M	The IP address of the GGSN currently used. The GGSN address is always the same for an activated PDP.
Access Point Name Network Identifier	M	The logical name of the connected access point to the external packet data network (network identifier part of APN).
APN Selection Mode	O	An index indicating how the APN was selected.
PDP Type	M	PDP type, i.e. IP, PPP, IHOSS:OSP
Served PDP Address	C	PDP address of the served IMSI, i.e. IPv4 or IPv6
List of Traffic Data Volumes	M	A list of changes in charging conditions for this PDP context, each time stamped. Charging conditions are used to categorise traffic volumes, such as per QoS/tariff period. Initial and subsequently changed QoS and corresponding data values are listed. In GSM, data volumes are in Octets above the SMDCP layer and are separated for uplink and downlink traffic. In 3G, data volumes are in octets above the GTP-U layer and are separated for uplink and downlink traffic.
Record Opening Time	M	Time stamp when PDP context activation is created in this SGSN or record opening time on following partial records
Duration	M	Duration of this record in the SGSN.
SGSN Change	C	Present if this is first record after SGSN change.
Cause for Record Closing	M	The reason for the release of record from this SGSN.
Diagnostics	O	A more detailed reason for the release of the connection.
Record Sequence Number	C	Partial record sequence number in this SGSN. Only present in case of partial records.
Node ID	O	Name of the recording entity
Record Extensions	O	A set of network/ manufacturer specific extensions to the record.
Local Record Sequence Number	O	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Access Point Name Operator Identifier	M	The Operator Identifier part of the APN.
RNC Unsent Downlink Volume	C	The downlink data volume which the RNC has not sent to MS.

CAMEL Information	C	Set of CAMEL information related to PDP context. For more information see Description of Record Fields.
Charging Characteristics	C	The Charging Characteristics flag retrieved from subscriber's data as described in subclause 6.1.6.5.

6.1.3 GPRS mobile station mobility management data in SGSN (M-CDR)

If the collection of MS mobility management data is enabled then GSM or 3G SGSN shall start collecting information each time the mobile is attached to the SGSN.

Table 7: GPRS SGSN Mobile Station mobility management data

Field		Description
Record Type	M	GPRS SGSN mobility management record.
Served IMSI	M	IMSI of the MS.
Served IMEI	C	The IMEI of the ME, if available.
Served MSISDN	O	The primary MSISDN of the subscriber.
SGSN Address	M	The IP address of the current SGSN.
MS Network Capability	O	The mobile station network capability.
Routing Area	O	Routing Area at the time of the record creation..
Local Area Code	O	Location Area Code at the time of record creation.
Cell Identifier	O	The Cell Identity or Service Area Code (SAC) at the time of the record creation.
Change of Location	O	A list of changes in Routing Area Identity, each time stamped.
Record Opening Time	M	Timestamp when this record was opened.
Duration	O	Duration of this record.
SGSN Change	C	Present if this is first record after SGSN change.
Cause for Record Closing	M	The reason for the release of the record in this SGSN.
Diagnostics	O	A more detailed reason for the release of the connection.
Record Sequence Number	C	Partial record sequence number in this SGSN; only present in case of partial records.
Node ID	O	Name of the recording entity.
Record Extensions	O	A set of network/ manufacturer specific extensions to the record.
Local Record Sequence Number	O	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Charging Characteristics	C	The Charging Characteristics flag set used by the SGSN.
System Type	C	Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. Indicates 3G-UMTS System; Not present for GSM-GPRS.
CAMEL Information	C	Set of CAMEL related to Attach/Detach session. For more information see Description of Record Fields.

6.1.4 GPRS MO SMS data in SGSN (S-SMO-CDR)

If enabled, an S-SMO-CDR SGSN Mobile originated SMS record shall be produced for each short message sent by a mobile subscriber via the SGSN.

Table 8: SGSN Mobile originated SMS record

Field		Description
Record Type	M	SGSN Mobile Originated SMS.
Served IMSI	M	The IMSI of the subscriber.
Served IMEI	O	The IMEI of the ME, if available.
Served MSISDN	O	The primary MSISDN of the subscriber.
MS Network Capability	M	The mobile station network capability.
Service Centre	M	The address (E.164) of the SMS-service centre.
Recording Entity	M	The E.164 number of the SGSN.
Location Area Code	O	The Location Area Code from which the message originated.
Routing Area Code	O	The Routing Area Code from which the message originated.
Cell Identifier	O	The Cell Identity or Service Area Code (SAC) from which the message originated.
Event Time Stamp	M	The time at which the message was received by the SGSN from the subscriber.
Message Reference	M	A reference provided by the MS uniquely identifying this message.
SMS Result	C	The result of the attempted delivery if unsuccessful.
Record Extensions	O	A set of network/ manufacturer specific extensions to the record.
Node ID	O	Name of the recording entity.
Local Record Sequence Number	O	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Charging Characteristics	C	The Charging Characteristics flag set used by the SGSN.
System Type	C	Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. Indicates 3G-UMTS System; Not present for GSM GPRS.
Destination Number	O	The destination short message subscriber number.
CAMEL Information	C	Set of CAMEL information related to SMS session. For more information see Description of Record Fields.

6.1.5 GPRS MT SMS data in SGSN (S-SMT-CDR)

If enabled, an SGSN Mobile terminated SMS record shall be produced for each short message received by a mobile subscriber via the SGSN.

Table 9: SGSN Mobile terminated SMS record

Field		Description
Record Type	M	SGSN Mobile terminated SMS.
Served IMSI	M	The IMSI of the subscriber.
Served IMEI	O	The IMEI of the ME, if available.
Served MSISDN	O	The primary MSISDN of the subscriber.
MS Network Capability	M	The mobile station network capability
Service Centre	M	The address (E.164) of the SMS-service centre.
Recording Entity	M	The E.164 number of the SGSN.
Location Area Code	O	The Location Area Code to which the message was delivered.
Routing Area Code	O	The Routing Area Code to which the message was delivered.
Cell Identifier	O	The Cell Identity or Service Area Code (SAC) to which the message was delivered.
Event Time Stamp	M	Delivery time stamp, time at which message was sent to the MS by the SGSN.
SMS Result	C	The result of the attempted delivery if unsuccessful.
Record Extensions	O	A set of network/ manufacturer specific extensions to the record.
Node ID	O	Name of the recording entity.
Local Record Sequence Number	O	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Charging Characteristics	C	The Charging Characteristics flag set used by the SGSN.
System Type	C	Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. Indicates 3G-UMTS System; Not present for GSM GPRS.

6.1.6.36 System Type

This field is present conditionally, indicating the use of a 3G the UTRAN or GERAN air-interface for the provision of service recorded by this CDR.

In the case of service provided by a GSM air interface, this field is not present.

Note that the ASN.1 contains a value of “unknown” which may be used in other domains but not in the PS domain.

8 Charging Data Record Structure

8.1 ASN.1 definitions for CDR information

.....

```

SGSNMMRecord ::= SET
{
    recordType                [0] CallEventRecordType,
    servedIMSI                [1] IMSI,
    servedIMEI                [2] IMEI OPTIONAL,
    sgsnAddress               [3] GSNAddress,
    msNetworkCapability       [4] MSNetworkCapability OPTIONAL,
}
    
```

routingArea	[5] RoutingAreaCode OPTIONAL,
locationAreaCode	[6] LocationAreaCode OPTIONAL,
cellIdentifier	[7] CellId OPTIONAL,
changeLocation	[8] SEQUENCE OF ChangeLocation OPTIONAL,
recordOpeningTime	[9] TimeStamp,
duration	[10] CallDuration OPTIONAL,
sgsnChange	[11] SGSNChange OPTIONAL,
causeForRecClosing	[12] CauseForRecClosing,
diagnostics	[13] Diagnostics OPTIONAL,
recordSequenceNumber	[14] INTEGER OPTIONAL,
nodeID	[15] NodeID OPTIONAL,
recordExtensions	[16] ManagementExtensions OPTIONAL,
localSequenceNumber	[17] LocalSequenceNumber OPTIONAL,
servedMSISDN	[18] MSISDN OPTIONAL,
chargingCharacteristics	[19] ChargingCharacteristics OPTIONAL,
cAMELInformationMM	[20] CAMELInformationMM OPTIONAL,
systemType	[21] SystemType OPTIONAL

}

.....

SystemType ::= ENUMERATED

{

unknown	(0),
iuUTRAN	(1),
gGERAN	(2)

}

END

CHANGE REQUEST

⌘ **32.015** **CR** **031** ⌘ ev **-** ⌘ Current version: **3.6.0** ⌘

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Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Correction of G-CDR trigger conditions		
Source:	⌘ SA5		
Work item code:	⌘ OAM-CH	Date:	⌘ 07/09/2001
Category:	⌘ F	Release:	⌘ R99
	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)

Reason for change:	⌘ Trigger conditions for G-CDR closure need to be corrected. As the text in 32.015 is ambiguous regarding closure conditions.
Summary of change:	⌘ No G-CDR closure shall be required in case of SGSN change, regardless of the SGSN type(s). The ambiguous text in 32.015, describing the trigger for closure of the G-CDR, was deleted.
Consequences if not approved:	⌘ The TS will contain trigger criterias for the G-CDR closure that can not be implemented.

Clauses affected:	⌘ 5.6.3		
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
Other comments:	⌘		

5.6.3 Triggers for G-CDR Charging Information Collection

A G-CDR is used to collect charging information related to the packet data information for a GPRS mobile in the GGSN.

If, according to the Charging Characteristics of a PDP context, CDR generation is activated a G-CDR shall be opened at PDP context activation, and record includes details such as Record Type, Served IMSI, Sequence Number etc. Not all of the charging information to be collected is static, and other charging information is directly dependent on dynamic GPRS usage.

A G-CDR shall be opened for each activated PDP context, and record details such as Record Type, Served IMSI, Sequence Number etc. Not all of the charging information to be collected is static, and other charging information is directly dependent on dynamic GPRS usage.

The "List of Traffic Data Volumes" attribute of the G-CDR consists of a set of containers, which are added following specific trigger conditions, and identify the volume count on encountering that trigger condition. The trigger conditions are as for the S-CDR (see subclause 5.6.1 on "Triggers for S-CDR Charging Information Collection") with exception that an SGSN change of the same system type (GSM or 3G) will not close the G-CDR. Subsequent partial records may be opened if the G-CDR is closed and the PDP context is still active.

The Partial Record generation trigger thresholds are those associated to the Charging Characteristics of the related PDP context determined as follows:

- If a "PDP context Charging Characteristics" is present in the PDP context data, it shall be used;
- Otherwise a default charging profile shall be applied.

The Partial Record generation trigger thresholds are GSN configuration parameters defined by the operator through O&M means.

In the event that the G-CDR is closed and the PDP context remains active, a further G-CDR is opened with an incremented Sequence Number in the GGSN.