Technical Specification Group Services and System Aspects ***TSGS#11(01)010024***
Meeting #11, Palm Springs, CA, USA, 19-22 March 2001

Source: **SA WG5**

Title: **CRs to Telecommunications Management; Charging and billing; 3G call and event data for the Packet Switched (PS) domain (32.015)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-	Doc-	Spec	CR	Rev	Phase	Subject	Cat	Version-	Version-	Workitem
SP-010024	S5-010022	32.015	020		R99	**Correct ASN.1 errors**	F	3.4.0	3.5.0	OAM-CH
SP-010024	S5-010024	32.015	021		R99	**Correction of Requests Responded IE Type Value**	F	3.4.0	3.5.0	OAM-CH
SP-010024	S5-010122	32.015	022		R99	**Correction/completion of ASN.1 module**	F	3.4.0	3.5.0	OAM-CH
SP-010024	S5-010124	32.015	023		R99	**Correct ASN.1 errors**	F	3.4.0	3.5.0	OAM-CH
SP-010024	S5-010125	32.015	024		R99	**Trigger for RNC volume report**	F	3.4.0	3.5.0	OAM-CH
SP-010024	S5-010126	32.015	025		R99	**Correction of parameter 'Served PDP Address'**	F	3.4.0	3.5.0	OAM-CH

3GPP TSG-SA5 (Telecom Management)
Sophia Antipolis, FRANCE, 18 – 26 January 2001

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Tdoc S5B010004

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CHANGE REQUEST

⌘ **32.015** **CR** **020** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	**Correct ASN.1 errors**
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	**26/01/2001**
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)

Reason for change:	⌘	Eliminate ASN.1 spec errors for processing CDRs
Summary of change:	⌘	Replace spec errors in Clause 8 with correct syntax
Consequences if not approved:	⌘	Results in CDR errors

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

```
FROM GSM1205-DataTypes{ ccitt (0) identified-organization (4) etsi(0) mobileDomain (0) gsm-
Operation-Maintenance (3) moduleId (3) gsm-12-05 (5) informationModel (0) asn1Module (2) 1 }

AddressString, ISDN-AddressString, IMSI, IMEI~~, DefaultGPRS-Handling, DefaultSMS-Handling, ServiceKey~~
FROM MAP-CommonDataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsm_Network~~Id~~
(1) module~~Id~~s (3) map-CommonDataTypes (18) version~~5~~6 (~~5~~6) }


DefaultGPRS-Handling, DefaultSMS-Handling, ServiceKey
FROM MAP-MS-DataTypes    { ccitt identified-organization (4) etsi (0) mobileDomain (0)
gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6)  }

ManagementExtension
FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2 (2) asn1Module(2) 1}


CallEventRecord ::= CHOICE
{
-- Record values 0..16 are 3G curcuit switch specific
--
    moCallRecord            [0] MOCallRecord,
    mtCallRecord            [1] MTCallRecord,
    roamingRecord           [2] RoamingRecord,
    incGatewayRecord        [3] IncGatewayRecord,
    outGatewayRecord        [4] OutGatewayRecord,
    transitRecord           [5] TransitCallRecord,
    moSMSRecord         [6] MOSMSRecord,
    mtSMSRecord         [7] MTSMSRecord,
    moSMSIWRecord           [8] MOSMSIWRecord,
    mtSMSGWRecord           [9] MTSMSGWRecord,
    ssActionRecord          [10] SSActionRecord,
    hlrIntRecord            [11] HLRIntRecord,
    locUpdateHLRRecord      [12] LocUpdateHLRRecord,
    locUpdateVLRRecord      [13] LocUpdateVLRRecord,
    commonEquipRecord       [14] CommonEquipRecord,
    recTypeExtensions       [15] ManagementExtensions,
    termCAMELIntRecord      [16] TermCAMELIntRecord,
--
    sgsnPDPRecord           [20] SGSNPDPRecord,
    ggsnPDPRecord           [21] GGSNPDPRecord,
    sgsnMMRecord            [22] SGSNMMRecord,
    sgsnSMORecord           [23] SGSNSMORecord,
    sgsnSMTRecord           [24] SGSNSMTRecord
}


CAMELInformationPDP ::= SET
{
    sCFAddress                      [1] SCFAddress OPTIONAL,
    serviceKey                      [2] ServiceKey OPTIONAL,
    defaultTransactionHandling      [3] DefaultGPRS_Handling OPTIONAL,
    cAMELAccessPointNameNI          [4] CAMELAccessPointNameNI OPTIONAL,
    cAMELAccessPointNameOI          [5] CAMELAccessPointNameOI OPTIONAL,
    numberOfDPEncountered           [6] NumberOfDPEncountered OPTIONAL,
    levelOfCAMELService             [7] LevelOfCAMELService OPTIONAL,
    freeFormatData                  [8] FreeFormatData OPTIONAL,
    fFDAppendIndicator              [9] FFDAppendIndicator OPTIONAL
}



QoSInformation  ::= CHOICE
{
    gsmQosInformation       [0] GSMQoSInformation,
```

```
    umtsQosInformation      [1] OCTET STRING (SIZE (12))}
--
-- The "GSMQoSInformation corresponds to the encoding specified in GSM TS 12.15, and shall be used
-- for pre-Release 99 terminals only.  The umtsQosInformation octet string is a 1:1 copy of the
-- contents (i.e. starting with octet 4) of the "Quality of service Profile" information element
-- specified in 3GPP TS 29.060 [22].
}
--
-- The umtsQosInformation octet string is a 1:1 copy of the contents (i.e. starting with
-- octet 3) of the "Quality of service" information element specified in TS 24.008.
}
```

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CHANGE REQUEST

⌘ **32.015** **CR** **021** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	Correction of Requests Responded IE Type Value
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	26/01/2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)

Reason for change:	⌘	Correct an error in the type value of the Requests Responded IE.
Summary of change:	⌘	The Requests Responded IE type value is listed as 250, but the correct value is 253.
Consequences if not approved:	⌘	Results in possible type value interoperability issues among vendors.

Clauses affected:	⌘	7.3.4.6
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

7.3.4.6 Data Record Transfer Response

The message shall be sent as a response of a received Data Record Transfer Request. Also, several Data Record Transfer Requests can be responded by a single Data Record Transfer Response.

Table 17: Information Elements in a Data Record Transfer Response

Information Element	Presence requirement
Cause	Mandatory
Requests Responded	Mandatory
Private Extension	Optional

The Cause value is the same (whatever the value) for all those messages responded by that particular Response.

Possible Cause values are:

- "Request Accepted";
- "No resources available";
- "Service not supported";
- "System failure";
- "Mandatory IE incorrect";
- "Mandatory IE missing";
- "Optional IE incorrect";
- "Invalid message format";
- "Version not supported";
- "Request not fulfilled";
- "Request already fulfilled";
- "Request related to possibly duplicated packet already fulfilled".

The Requests Responded information element contains the IE Type, Length and the Sequence Numbers (each 2 octets) of the Data Record Transfer Requests.

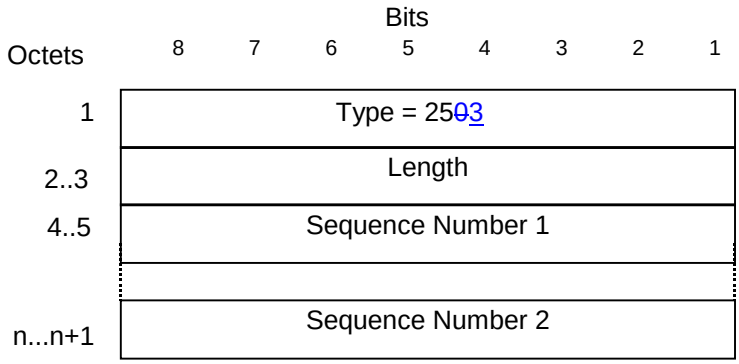

Figure 19: Requests Responded information element

The optional Private Extension contains vendor or operator specific information.

Depending on the Cause value severity and general occurrence frequency, the node that sent the corresponding Data Record Transfer Request, may start to direct its CDRs to another CGF.

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SA5#18(01)0122
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CHANGE REQUEST

⌘ **32.015** **CR** **022** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

Title:	⌘	**Correction/completion of ASN.1 module**
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	**02/03/2001**
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
- ***F*** *(essential 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)*

Reason for change:	⌘	1. ASN.1 module definition incomplete, e.g. does not allow parameter export and automated processing. 2.“SystemType” definition cannot be re-used due to too limited definition.
Summary of change:	⌘	1. Definition of the object identifier for ‘GPRS-Charging-DataTypes’ in section 8. 2. “SystemType” definition enhanced to be re-usable by 32.005.
Consequences if not approved:	⌘	1. The module is not usable for development tools 2. CDR parameters can not be re-used by other TSs

Clauses affected:	⌘	8.1
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	This CR also proposes an editorial change in the value name that indicates UMTS air interface usage in the System Type parameter, from “umtsRel99” to “iuUTRAN”. The existing name could be, and has been, misinterpreted as indicating a release dependency in the system Type.

8.1 ASN.1 definitions for CDR information

GPRS-Charging-DataTypes {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-015 (15) informationModel (0) asn1Module (2) version1 (1)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

—EXPORTS everything

IMPORTS

.....

```
SystemType  ::= ENUMERATED
{

    unknown             (0)
    umtsRel99iuUTRAN    (1)

```

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CHANGE REQUEST

⌘ **32.015** **CR** **023** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	**Correct ASN.1 errors**
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	02/032001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)

Reason for change:	⌘	In the case where CDR decoding errors are found, it should be possible to inform the generating node about the error. Existing codes do not explictly cover this situation. A new Cause code is therefore added to account for such an error.
Summary of change:	⌘	A new Cause code is added in section 7.3.1 and 7.3.4.6
Consequences if not approved:	⌘	CDRs in errors are not clearly reported and hence may be overlooked.

Clauses affected:	⌘	7.3.1, 7.3.4.6
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

7.3.1 List of all GTP' message types

…

For Cause Codes: Cause values used in requests: 49 to 63, Cause values used in responses indicating acceptance: 177 to 191, Cause values used in responses indicating rejection: 241 to 255.

Charging related Cause values introduced for the present document:

In requests:

63 This node is about to go down
62 Another node is about to go down
61 The receive buffers are becoming full
60 The transmit buffers are becoming full
59 System failure

In responses indicating acceptance:

177 CDR decoding error

In responses indicating rejection:

255 Request not fulfilled
254 Sequence numbers of released/cancelled packets IE incorrect
253 Request already fulfilled
252 Request related to possibly duplicated packets already fulfilled

…

7.3.4.6 Data Record Transfer Response

…

Possible Cause values are:

- "Request Accepted";
- "No resources available";
- "Service not supported";
- "System failure";
- "Mandatory IE incorrect";
- "Mandatory IE missing";
- "Optional IE incorrect";
- "Invalid message format";
- "Version not supported";
- "Request not fulfilled";
- “CDR decoding error“;
- "Request already fulfilled";
- "Request related to possibly duplicated packet already fulfilled".

The cause value “CDR decoding error” is optional, primarily intended to inform the CDR generating node that the receiving node can not decode the CDR. Thus, special features in the receiving node that are based on information within the CDR would not be operable. This message could alert the operator of a remote generating node of incompetibe CDR encoding. It is Optional and no action or resonse is required.

…

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CHANGE REQUEST

⌘ **32.015** **CR** **CR-Num** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	**Trigger for RNC volume report**
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	**02/03/2001**
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)*

Reason for change:	⌘	PDP Preservation Procedure will release all the RABs associated with an MS, as specified in 23.060. It shall therefore trigger the RNC volume report to SGSN. This fact is omitted from subclause 5.3 and may lead to an error of interpreting the situations when unsent data are reported of by the RNC to the 3G-SGSN.
Summary of change:	⌘	PDP Preservation Procedure should also be mentioned as a trigger for RNC volume report to SGSN.
Consequences if not approved:	⌘	May lead to inaccurate charging.

Clauses affected:	⌘	5.3a
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

5.3a Volume counting in RNC

The 3G-SGSN counts all downlink data sent to the RNC over Iu interface. Any discarded data between MS and RNC causes inaccurate charging, as the 3G-SGSN cannot account for this and subsequently causing overcharging. Additionally any buffered data in the RNC at RAB release or forwarded to another SGSN during handover is possible counted again i.e. twice, which causes overcharging.

To avoid inaccurate charging at the 3G-SGSN, the 3G-SGSN will always instruct the RNC at RAB set-up to count the unsent downlink data towards the MS.

The reporting of unsent data by the RNC to the 3G-SGSN will only occur at RAB release. Examples when this occurs are at termination of the PDP context, handover, or PDP Context Preservation. (See TS 23.060).

The 3G-SGSN shall not use the optional 'Data Volume Request' message to RNC in any situation, as this shall cause a significant performance impact to both the RNC and 3G-SGSN.

When 3G-SGSN receives a report of unsent data volume from the RNC at RAB release. The 3G-SGSN shall report this value to the 'RNC Unsent Downlink Volume' field in the S-CDR.

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CHANGE REQUEST

⌘ **32.015** **CR** **025** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	**Correction of parameter 'Served PDP Address'**
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	**02/03/2001**
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)

Reason for change:	⌘	It is not possible to define a mandatory parameter 'Served PDP Address' in the case when PDP type PPP is used.
Summary of change:	⌘	Correction to the condition for parameter 'Served PDP Address' in S- and G-SDR
Consequences if not approved:	⌘	ASN.1 encoding errors will result when a mandatory parameter is missing.

Clauses affected:	⌘	6.1.1, 6.1.2, 6.1.6.31 and 8.1
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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 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~~M~~	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 SNDCP 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.

6.1.2 GPRS charging data in GGSN (G-CDR)

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

Table 6: GPRS GGSN PDP context data

Field		Description
Record Type	M	GPRS GGSN PDP context record.
Network initiated PDP context	C	Present if this is a network initiated PDP context.
Served IMSI	M	IMSI of the served party (if Anonymous Access Indicator is FALSE or not supplied).
Served MSISDN	O	The primary MSISDN of the subscriber.
GGSN Address	M	The 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	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, or IHOSS:OSP
Served PDP Address	C~~M~~	PDP address, i.e. IPv4 or IPv6
Dynamic Address Flag	C	Indicates whether served PDP address is dynamic, which is allocated during PDP context activation.
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 tariff period. Initial and subsequently changed QoS and corresponding data values are listed. In GSM, data volumes are in octets above the GTP 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 this record was opened.
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	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	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 retrieved from subscriber's data as described in subclause 6.1.6.5.

6.1.6.31 Served PDP Address

This field contains the PDP address of the served IMSI. This is a network layer address i.e. of type IP version 4, IP version 6. The address for each PDP type is allocated either temporarily or permanently (see "Dynamic Address Flag" field in subclause 6.1.6.10~~6~~). This parameter must be present except when both the PDP type is PPP and dynamic PDP address assignment is used.

8.1 ASN.1 definitions for CDR information

```
GGSNPDPRecord   ::= SET
{
    recordType              [0] CallEventRecordType,
    networkInitiation       [1] NetworkInitiatedPDPContext OPTIONAL,
    servedIMSI              [3] IMSI,
    ggsnAddress             [4] GSNAddress,
    chargingID              [5] ChargingID,
    sgsnAddress             [6] SEQUENCE OF GSNAddress,
    accessPointNameNI       [7] AccessPointNameNI,
    pdpType                 [8] PDPType,
    servedPDPAddress        [9] PDPAddress OPTIONAL,
    dynamicAddressFlag      [11] DynamicAddressFlag OPTIONAL,
    listOfTrafficVolumes    [12] SEQUENCE OF ChangeOfCharCondition,
    recordOpeningTime       [13] TimeStamp,
    duration                [14] CallDuration,
    causeForRecClosing      [15] CauseForRecClosing,
    diagnostics             [16] Diagnostics OPTIONAL,
    recordSequenceNumber    [17] INTEGER OPTIONAL,
    nodeID                  [18] NodeID OPTIONAL,
    recordExtensions        [19] ManagementExtensions OPTIONAL,
    localSequenceNumber     [20] LocalSequenceNumber OPTIONAL,
    apnSelectionMode        [21] APNSelectionMode OPTIONAL,
    servedMSISDN            [22] MSISDN OPTIONAL,
    chargingCharacteristics [23] ChargingCharacteristics OPTIONAL
}
SGSNPDPRecord   ::= SET
{
    recordType              [0] CallEventRecordType,
    networkInitiation       [1] NetworkInitiatedPDPContext OPTIONAL,
    servedIMSI              [3] IMSI,
    servedIMEI              [4] IMEI OPTIONAL,
    sgsnAddress             [5] GSNAddress,
    msNetworkCapability     [6] MSNetworkCapability OPTIONAL,
    routingArea             [7] RoutingAreaCode OPTIONAL,
    locationAreaCode        [8] LocationAreaCode OPTIONAL,
    cellIdentifier          [9] CellId OPTIONAL,
    chargingID              [10] ChargingID,
    ggsnAddressUsed         [11] GSNAddress,
    accessPointNameNI       [12] AccessPointNameNI,
    pdpType                 [13] PDPType,
    servedPDPAddress        [14] PDPAddress OPTIONAL,
    listOfTrafficVolumes    [15] SEQUENCE OF ChangeOfCharCondition,
    recordOpeningTime       [16] TimeStamp,
    duration                [17] CallDuration,
    sgsnChange              [18] SGSNChange OPTIONAL,
    causeForRecClosing      [19] CauseForRecClosing,
    diagnostics             [20] Diagnostics OPTIONAL,
    recordSequenceNumber    [21] INTEGER OPTIONAL,
    nodeID                  [22] NodeID OPTIONAL,
    recordExtensions        [23] ManagementExtensions OPTIONAL,
    localSequenceNumber     [24] LocalSequenceNumber OPTIONAL,
    apnSelectionMode        [25] APNSelectionMode OPTIONAL,
    accessPointNameOI       [26] AccessPointNameOI,
    servedMSISDN            [27] MSISDN OPTIONAL,
    chargingCharacteristics [28] ChargingCharacteristics OPTIONAL,
    systemType              [29] SystemType OPTIONAL,
    cAMELInformationPDP     [30] CAMELInformationPDP OPTIONAL,
    rNCUnsentDownlinkVolume [31] DataVolumeGPRS OPTIONAL
}
```