Technical Specification Group Services and System Aspects
Meeting #16, Marco Island, Florida, 10-13 June 2002

TSGS#16(02)0289

Source: **SA5 (Telecom Management)**

Title: **4 Rel-5 CRs 32.215 (PS charging)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-Level	Spec	CR	R	Phase	Subject	Cat	Ver Cur	Ver New	Doc-2nd-Level	Workitem
SP-020289	32.215	007	-	Rel-5	Addition of real-time delivery of Charging Data Records (CDRs) to the Billing System	B	5.0.0	5.1.0	S5-024020	OAM-CH
SP-020289	32.215	008	-	Rel-5	Alignment of CDRs' IPv4 versus IPv6 address usage with architectural principles	F	5.0.0	5.1.0	S5-024024	OAM-CH
SP-020289	32.215	012	-	Rel-5	Addition of an "IMS signaling PDP context" flag into G-CDR	B	5.0.0	5.1.0	S5-024164	OAM-CH
SP-020289	32.215	011	-	Rel-5	Addition of external charging identifier into G-CDR	B	5.0.0	5.1.0	S5-024163	OAM-CH

3GPP TSG-SA5 (Telecom Management) **S5-024020**
Meeting #27, Cork, IRELAND, 2 - 5 April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.215** **CR** **007** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Addition of real-time delivery of Charging Data Records (CDRs) to the Billing System
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	05/04/2002
Category:	⌘	**B**
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)*

Reason for change:	⌘	Alignment of 32.215 with 22.115. To allow faster (=near real-time) CDR transfer towards the Billing System (BS) if desired, to enhance e.g. the hot-billing capabilities. This facility supports the real-time transfer of CDRs according to the requirements laid down in TS 22.115.
Summary of change:	⌘	It is proposed to allow a real-time interface, such as the existing Ga interface conventions, to be optionally used towards the BS.
Consequences if not approved:	⌘	Real-time CDR transfer to the BS is not possible if only file transfer protocols are allowed towards the BS.

Clauses affected:	⌘	7.6.1, 7.6.2
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

7.6 CGF - BS Protocol Interface

7.6.1 The transfer protocols at CGF - BS interface

The present document gives several recommendations for the main protocol layers for the Charging Gateway Functionality - Billing System (BS) interface protocol stack. These recommendations are not strictly specified features, since there are a lot of variations among the existing Billing Systems.

As a minimum, all implementations shall support a file based bulk interface for the transfer of CDRs from the CGF to the billing system. The recommendations are FTAM protocol over X.25 or TCP/IP, and FTP over TCP/IP.

In addition, implementations may support a transaction based, (near) real-time CDR transfer from the CGF to the billing system, e.g. by applying the Ga protocol interface conventions towards the billing system.

7.6.2 The format of the CDRs at CGF - BS interface

The contents of the CDRs sent between the CGF and the Billing System (BS) are defined by the ASN.1 language clause 6, Charging Data Record Structure. In addition, other CDR contents or formats are possible if the CGF and the BS provide processing functionality for the CDRs.

3GPP TSG-SA5 (Telecom Management) **S5-024164**
Meeting #28, Sophia Antipolis, FRANCE, 20 - 24 May 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.215** **CR** **012** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Addition of an "IMS signaling PDP context" flag into G-CDR
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	24/05/2002
Category:	⌘	**B**
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)

Reason for change:	⌘	For GPRS-IMS inter-working it is required to derive from a PDP context CDR (G-CDR) if the PDP context is used for IMS SIP signaling or not.
Summary of change:	⌘	An "IMS signaling PDP context" flag is added to the G-CDR definition.
Consequences if not approved:	⌘	Billing processes may not determine if a PDP context was used for IMS signaling or not, thus disallowing an operator to define appropriate rating for an IMS signaling PDP context (e.g. set to "charge-free").

Clauses affected:	⌘	4.3, 5.15-5.39, 6.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
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.

4.3 Charging data in GGSN (G-CDR)

If the collection of CDR data is enabled then the GGSN data specified in Table 2 shall be available for each PDP context. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in Clause 5.

Table 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
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 categorise traffic volumes, such as per tariff period. Initial and subsequently changed QoS and corresponding data values are 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 Signaling Context	O_C	Included if the PDP context is used for IMS signaling

5.15 IMS Signaling Context

Indicates if the PDP context is used for IMS signaling. It is only present if the PDP context is an IMS signaling PDP context. A PDP context for IMS signaling is determined via the "IM CN Subsystem Signaling Flag" conveyed via the "Activate PDP context request" message from the MS to the network (refer to TS 24.008)

5.15~~5~~6 List of Traffic Data Volumes

<unmodified text>

5.16~~6~~7 Local Record Sequence Number

<unmodified text>

5.18~~7~~7 Message reference

<unmodified text>

5.19~~8~~8 MS Network Capability

<unmodified text>

5.20~~19~~9 Network Initiated PDP Context

<unmodified text>

5.21~~0~~0 Node ID

<unmodified text>

5.22~~1~~1 PDP Type

<unmodified text>

5.23~~2~~2 QoS Requested/QoS Negotiated

<unmodified text>

5.24~~3~~3 Record Extensions

<unmodified text>

5.25~~4~~4 Record Opening Time

<unmodified text>

5.26~~5~~5 Record Sequence Number

<unmodified text>

5.27~~6~~6 Record Type

<unmodified text>

5.28~~7~~7 Recording Entity Number

<unmodified text>

5.2~~9~~8 RNC Unsent Downlink Volume

<unmodified text>

5.30~~29~~ Routing Area Code/Cell Identifier/Change of location

<unmodified text>

5.3~~1~~0 Served IMEI

<unmodified text>

5.3~~2~~1 Served IMSI

<unmodified text>

5.3~~3~~2 Served MSISDN

<unmodified text>

5.3~~4~~3 Served PDP Address

<unmodified text>

5.3~~5~~4 Service Centre Address

<unmodified text>

5.3~~6~~5 SGSN Address

<unmodified text>

5.3~~7~~6 SGSN Change

<unmodified text>

5.3~~8~~7 Short Message Service (SMS) Result

<unmodified text>

5.3~~9~~8 System Type

<unmodified text>

6.1 ASN.1 definitions for CDR information

<unmodified ASN.1>

```
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 OPTIONAL,
    pdpType                     [8] PDPType OPTIONAL,
    servedPDPAddress            [9] PDPAddress OPTIONAL,
    dynamicAddressFlag          [11] DynamicAddressFlag OPTIONAL,
    listOfTrafficVolumes        [12] SEQUENCE OF ChangeOfCharCondition OPTIONAL,
    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,
    chChSelectionMode           [24] ChChSelectionMode OPTIONAL,
    iMSsignalingContext         [25] NULL OPTIONAL
    }
```

<unmodified ASN.1>

3GPP TSG-SA5 (Telecom Management) **S5-024163**
Meeting #28, Sophia Antipolis, FRANCE, 20 - 24 May 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.215** **CR** **011** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Addition of external charging identifier into G-CDR
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	24/05/2002
Category:	⌘	**B**
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)*

Reason for change:	⌘	It is required to include external charging IDs into the G-CDR. For IMS this is the IMS Charging Identifier (ICID).
Summary of change:	⌘	Addition of a charging identifier into the G-CDR, which is received by the GGSN from a none-GPRS, external network entity. Specifically this is defined for the ICID.
Consequences if not approved:	⌘	GPRS Billing problems in case of the IMS being accessed via GPRS.

Clauses affected:	⌘	4.3, 5.14 – 5.39, 6.1
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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.

4.3 Charging data in GGSN (G-CDR)

If the collection of CDR data is enabled then the GGSN data specified in Table 2 shall be available for each PDP context. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in Clause 5.

Table 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
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 categorise traffic volumes, such as per tariff period. Initial and subsequently changed QoS and corresponding data values are 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.
External Charging Identifier	O_C	A Charging Identifier received from a none-GPRS, external network entity

5.14 External Charging Identifier

A Charging Identifier received from a none-GPRS, external network entity.

- When inter-working with IMS the external charging identifier is the ICID (IMS Charging IDentifier) as received from the IMS network by the GGSN.

- If required, Inter-working with other external entities will be subject of specification for further releases.

< 5.x, x>=14 Subsequent sections must be re-ordered: x => x+1 >

6.1 ASN.1 definitions for CDR information

<unmodified ASN.1>

```
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 OPTIONAL,
    pdpType                     [8] PDPType OPTIONAL,
    servedPDPAddress            [9] PDPAddress OPTIONAL,
    dynamicAddressFlag          [11] DynamicAddressFlag OPTIONAL,
    listOfTrafficVolumes        [12] SEQUENCE OF ChangeOfCharCondition OPTIONAL,
    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,
    chChSelectionMode           [24] ChChSelectionMode OPTIONAL,
    externalChargingID          [26] OCTET STRING OPTIONAL
    }
```

3GPP TSG-SA5 (Telecom Management) **S5-024024**
Meeting #27, Cork, IRELAND, 2 - 5 April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.215** **CR** **008** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Alignment of CDRs' IPv4 versus IPv6 address usage with architectural principles
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	24/05/2002
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)

Reason for change:	⌘	It is currently not specified which addresses the GSNs shall include in the CDRs if both IPv4 and IPv6 addresses are available.
Summary of change:	⌘	Adding requirements for the GSNs to always use the IPv4 addresses in the CDRs in cases where both IPv4 and IPv6 addresses are available. The introduction of this rule aligns the GPRS charging specification 32.215 with the architectural principles defined by SA2 and communicated in by SA2 to SA5 in LS S2-020291/S5-020112.
Consequences if not approved:	⌘	Potential contradictory behaviour of different vendors' GSN nodes with respect to the use of IP addresses in CDRs, resulting in charging errors. Misalignment of the GPRS charging TS 32.215 with the GPRS architecture.

Clauses affected:	⌘	5.14, 5.35
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

5.14 GGSN Address Used

These fields are the current serving GGSN IP Address for the Control Plane. If both an IPv4 and an IPv6 address of the GGSN are available, the GSNs shall include the IPv4 address in the CDR.

5.35 SGSN Address

These fields contain one or several IP addresses of SGSN. The IP address of the SGSN can be either control plane address or user plane address.

The S-CDR fields contain single address of current SGSN and GGSN used.

The G-CDR fields contain the address of the current GGSN and a list of SGSNs addresses, which have been connected during the record (SGSN change due to inter SGSN Routing Area update).

The M-CDR fields only contain the address of the current SGSN. It does not provide any information related to active PDP context(s) and thus the connected (used) GGSN(s) cannot be identified.

If both an IPv4 and an IPv6 address of the SGSN are available, the GSNs shall include the IPv4 address in the CDR.