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Document for:	**Information**
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3GPP TSG-SA5 (Telecom Management)   **S5-030323**
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Presentation of Technical Specification to TSG SA

Presentation to:	**TSG SA Meeting #20**
Document for presentation:	**TS 32.297, Version 1.0.0**
Presented for:	**Information**
Abstract of document:	This is a draft Technical Specification on the interface "Bx" between the Network Elements that are involved in charging and the billing domain.
Changes since last presentation to TSG-SA Meeting #19:	
	New

Work done against the WID contained in SP-030047 (Charging Management: Work Item ID: CH).

Outstanding Issues:

- o This early draft TS is based on various contributions that have been agreed upon in SWG-B:
  - the charging architecture issues related to the Bx interface,
  - stage 2 descriptions ("principles") of this interface, e.g. local file handling,
  - file format considerations,
  - file opening and closure triggers,
  - file management;
  - stage 3 description of file format and contents,
  - file naming,
  - file headers,
  - etc.
- o At present, only the information pertaining t file and header formats, and file contents is included, due to time constraints. However, the missing items are well understood and mainly agreed within the group.

Contentious Issues:
One major item of discussion is the handling of files with respect to Charging Data Record (CDRs) from different 3GPP releases in case the node that generates the files will need to handle CDRs from different Network Elements (NEs) that may be using different standards releases.

3GPP TS 32.297 V1.0.0 (2003-06)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Service and System Aspects;
Telecommunication management;
Charging Management;
Charging interface description to the billing domain
(Release 6)

Keywords
billing, charging, management

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document provides the principles, protocol requirements and the format specifications of charging data files transferred from the different domains and subsystems of the core network to the billing domain of the wireless network operator. This transfer mode of charging data files applies only to offline charging.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[2]   3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".

[3]   3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".

[4]   3GPP TS 32.252: "Telecommunication management; Charging management; Wireless Local Area Network (WLAN) charging".

[5]   3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[6]   3GPP TS 32.270: "Telecommunication management; Charging management; Multimedia Messaging Service (MMS) charging".

[7]   3GPP TS 32.271: "Telecommunication management; Charging management; Location Services (LCS) charging".

[8]   3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) encoding rules description (Release 6)".

[9]   Void.

Editor Note: Ensure that the Release 6 document names are consistent with their final names.

[10]   IETF RFC 959 (1985): "File Transfer Protocol".

Bibliography

[100]   3GPP TS 32.005: "Telecommunication Management; Charging and billing; 3G call and event data for the Circuit Switched (CS) domain (Release 1999)".

[101]   3GPP TS 32.205: "Telecommunication management; Charging management; Charging data description for the Circuit Switched (CS) domain (Releases 4 and 5)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.240 [1] and the following apply:

Billing Domain (BD): part of the operator network, which is outside the core network, that receives and processes charging information from the core network charging functions
It includes functions that can provide billing mediation and billing end applications.

charging function: entity inside the core network domain or subsystem that is involved in charging for that domain or subsystem

Charging Gateway Function (CGF): charging function that provides features such as the non-volatile storage of CDRs and CDR files, and the transfer of these files to the Billing Domain

> Editor Note: This name is already used in PS for its charging function. A note needs to be added that this definition of Charging Gateway Function is an extension of the definition of the CGF in Rel-4/5 3GPP TS 32.215. It should not contradict previous use of this term.

3.2 Symbols

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

Bc	The Interface between the Circuit Switched charging function and the BD
Bi	The Interface between the IMS charging function and the BD
Bp	The Interface between the Packet Switched charging function and the BD
Bm	The Interface between the MMS charging function and the BD
Bw	The Interface between the WLAN charging function and the BD
Bx	The Interface between a 3G core network charging function and the BD

NOTE: The x indicates any (generic) domain or subsystem.

3.3 Abbreviations

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

BD	Billing Domain
CCF	Charging Collection Function
CDR	Charging Data Record
CGF	Charging Gateway Function
CS	Circuit Switched
GMSC	Gateway MSC
IMS	IP Multimedia Subsystem
MMS	Multimedia Messaging Service
MSC	Mobile Switching Center
OCS	Online Charging System
PS	Packet Switched
WLAN	Wireless Local Area Network

4 Architecture considerations

The Bx is a common designator of the interfaces from the core network to the Billing Domain (BD) intended for transport of CDR files. The letter **x** indicates the different core network domain or subsystem, where **c** represents Circuit Switched (CS), **p** represents Packet Switched (PS), **i** represents IP Multimedia Subsystem (IMS), **m** represents Multimedia Messaging Service (MMS), **o** represents the Online Charging System (OCS) and **w** represents Wireless LAN (WLAN). For the CS Domain the earlier specifications in 3GPP TS 32.005 [100] and 3GPP TS 32.205 [101] may also apply for Release 6 in addition this specifications. For all other domains and subsystems only these specifications apply in Release 6.

Editor Note: Need rewording of the CS specifications.

The charging gateway function in each domain and subsystem is relevant for this interface, as illustrated in 3GPP TS 32.240 [1]. CDR transport that is considered for the Bx interface is intended only for offline, post processing of the CDRs.

Editor note: for the use of "gateway " see note in definition subclause (3.1).

5 Principles for the Bx interface

This clause contains stage 2 specifications for the interface to the Billing Domain.

The principles in this clause are divided into the following categories:

- Local CDR file handling;

- File format;

- File Transport and protocol;

- File management procedures and modes.

Other interface principles such as security and performance are dependent on operator's implementation and are not covered by the standards.

Editor Note: Remove sentence above to clause 6?

5.1 Local file handling

Editor Note: 3GPP TS 32.240 specifies the charging chain. This clause describes the principles and requirements of the CDRs file generation operation and File Opening and closure triggers. Triggers can be time, size of file, number of CDRs, operator intervention.

5.2 File format principles
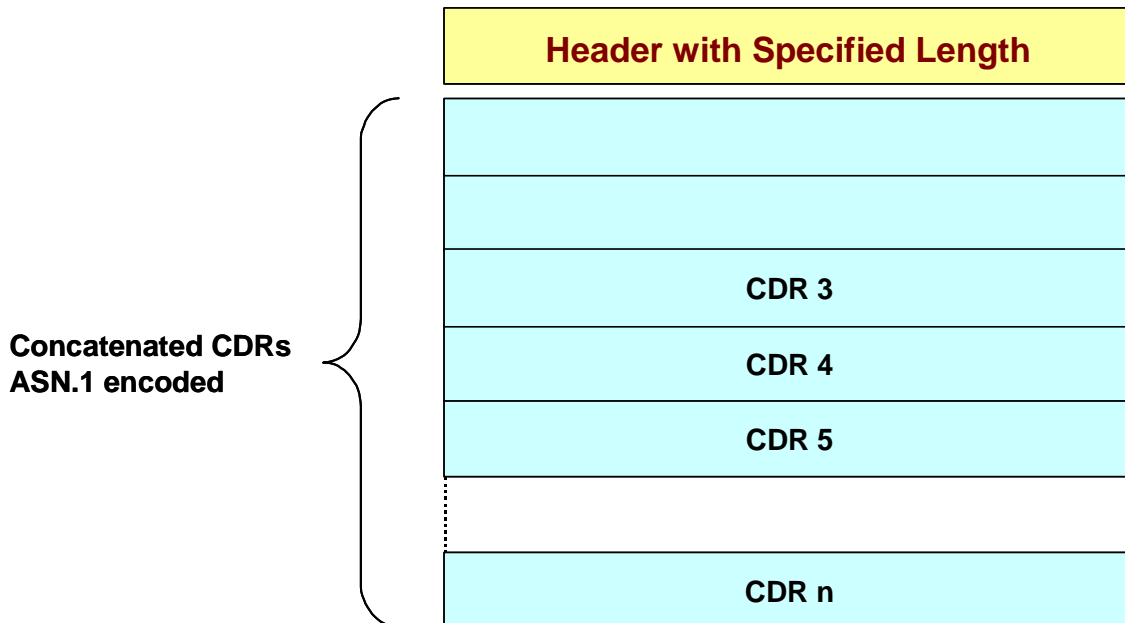
The CDR file format is depicted below.

Header with Specified Length

CDR 3

CDR 4

CDR 5

CDR n

Concatenated CDRs
ASN.1 encoded

Figure 5.2.1: CDR File Format

It has a fixed length header size (not encoded), **n** number of concatenated CDRs, and a fixed length trailer (not encoded). Any number of CDRs can be contained in a CDR file (i.e. n ≥ 0).

Editor note: Note that if a file is forced closed and no CDRs are contained and n=0. Need to discuss this issue in subclause 5.3.

The latest version of a CDR that is contained in the file should be identified in the file header. The BD should use a decoder with a version number which is equal or greater of this version to be able to decode all the CDRs in the file.

Editor Note: The sentence above is not yet agreed upon.

5.3 Protocols for charging data files transfer

a)   The default protocol for CDR file transport is FTP.

b)   The use of other protocols is optional, however FTP should always be supported.

c)   The CDR files may be transferred in either push or pull mode on the Bx interface. Further specifications of these transfer modes are provided in subclause 5.4.1 and subclause 5.4.2, respectively.

d)   All standard FTP commands specified in RFC 959 [10] should be supported on both sides of the interface.

5.4 File opening and closure triggers

Editor Note: Software update may require to close a CDR file. How to signal the BD that a file is ready?

5.5 File management and transport modes

Editor note: Add how to handle retransmission, transmission of files out of sequence, recovery from failure.

Files can be transferred to the BD in one, or both, of the following modes.

5.5.1 Push mode

In this transfer mode the CDR files are uploaded from the charging function to the BD at a time and/or frequency controlled by the charging function.

5.5.2 Pull mode

In this transfer mode the BD downloads the CDR files that are available in the appropriate charging function directories. The time and/or frequency of the file transfer is controlled by the BD.

6 Charging data file format specifications

This clause provides Stage 3 specifications for the CDR file name, the header format and the trailer format.

6.1 File format conventions

a) The CDR files contain concatenated CDRs which have a format specified in an appropriate charging TS, [2] to [7].

b) All the CDRs in the file are encoded in the appropriate Abstract Syntax Notation One (ASN.1) and encoding rules as specified in the appropriate 3GPP TS 32.298 [8].

c) All the CDRs in the file are encoded with the same encoding release and they should be decoded with a single version of a decoder.

d) The file header are in Network byte order (Big Endian).

e) The Header MUST have a field specifying its length.

f) The header should contain the following fields:

- Release (as defined in subclause 6.2).

- Version (as defined in subclause 6.2). This field should point out the latest version of the charging TS used to generate a CDR that is contained in the file.

- IP (v6) address of the network node that generated the file (padded if IP v4 address is used).

- The time file generation started (i.e. the time the first CDR was placed in the file).

- Sequence Number.

- Number of CDRs in the file (n).

- The time the file was closed (i.e. the time the last CDR was appended).

- Private extensions.

Editor Note: Indicator for a abnormal closure of the file should be considered. Need to define Version and Release.

g) Fields in the header that are not known at the time the file is opened should be populated after all the CDRs are included and the file is ready to be closed.

h) The CDR file is named based on a naming convention specified in clause 6.1. The file name should include the following information:

- Generating Node identifier (Few alphanumeric characters).

- Standards release (i.e. R99, R04, R05, etc).

- Sequence number.

- Timestamp.

- Private information.

- Compressed file extension.

Editor Note: Do we really need duplicate information in the header and file name?

6.2 CDR file naming convention

6.3 Header format

Editor Note: The release and version definitions need clarifications (currently such definitions are only available for the PS domain. What should be used in different domains?).

Octet	Bits							
	8	7	6	5	4	3	2	1
1	Header Length				Release Identifier			
2	Latest CDR Version Identifier							
3 ... 22	IP(v6) Address of Charging Function (padded for IPv4) (20 octets)							
23	The Time First CDR was Received							
24	The Time Last CDR was Appended							
25	Number of CDRs in File							
26	File Sequence Number (1)							
27	File Sequence Number (2)							
28	Private Extension (1)							
...	...							
last	Private Extension (last)							

Figure 2: Format of CDR File Header

Annex A (informative):
Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Jun 2003	S_20	SP-030273	--	--	Submitted to TSG SA#20 for information	1.0.0	