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**Source:** SA5 (Telecom Management)  
**Title:** CR 32297 Charging Data Record (CDR) file format and transfer  
**Document for:** Approval  
**Agenda Item:** 7.5.3

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Doc-1st-Level	Spec_#	CR_#	R	Phase	Subject	Cat	Ver-Cur	Doc-2nd-Level	Workitem
SP-050272	32.297	0001	1	Rel-6	Corrections, alignments and additions to complete remaining technical gaps	C	6.0.0	S5-054453	CH

## CHANGE REQUEST

⌘ 32.297 CR 0001 ⌘ rev 1 ⌘ Current version: 6.0.0 ⌘

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

**Proposed change affects:** UICC apps ☐ ME ☐ Radio Access Network ☐ Core Network ☒

**Title:** ⌘ Corrections, alignments and additions to complete remaining technical gaps

**Source:** ⌘ SA5 (karl-heinz.nenner@t-mobile.net)

**Work item code:** ⌘ CH

**Date:** ⌘ 25/05/2005

**Category:** ⌘ C

**Release:** ⌘ 6

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:

- Ph2** (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)
- Rel-7** (Release 7)

**Reason for change:** ⌘ Version 6.0.0 of TS 32.297 contains a number of gaps and open issues as documented in the TS submission sheet.

**Summary of change:** ⌘

- Corrections / alignments in scope (cat F).
- Corrections / alignments in references (cat F).
- Corrections / alignments in definitions, symbols and abbreviations (cat F).
- Corrections / alignments in architecture considerations (cat F).
- Corrections / alignments / clarifications in "CDR File Transfer Principles and Scenarios" (clause 5) and its subclauses (cat F).
- Added requirement to indicate lost CDRs in CDR files (cat C).
- Included specific CDR header.
- Corrections / alignments / clarifications in "CDR file format specification" (clause 6) and its subclauses (cat F).
- Changed rules that govern the inclusion of CDRs in specific CDR files, including needed adaptations of CDR file header (cat C).
- Corrected CDR file header and encoding of some of its parameters (cat F).
- Included new lost CDR indication in CDR file header (cat C).
- Included missing CDR routing filter in CDR file header (cat F).
- Added detailed description of CDR file header parameters (cat F).
- Added detailed description of CDR header and parameters (cat C).
- Addition of "Bibliography" annex (cat F) and consequent renumbering of "change history" annex.

**Consequences if not approved:** ⌘ Incomplete and not implementable specification.  
Errors in charging.

**Clauses affected:** ⌘ 1, 2, 3, 4, 5, 5.x, 6, 6.x, Annexes

**Other specs affected:** ⌘

Y	N
X	

Other core specifications ⌘  
Test specifications  
O&M Specifications

**Other comments:** ⌘

Change in clause 1

# 1 Scope

The present document is part of a series of documents specifying charging functionality and charging management in GSM/UMTS networks. The GSM/UMTS core network charging architecture and principles are specified in 3GPP TS 32.240 [1] which provides an umbrella for other charging management documents that specify:

- the content of the CDRs per domain ~~and~~/subsystem / [service](#) (offline charging);
- the content of real-time charging messages per domain / subsystem / [service](#) (online charging);
- the functionality of online and offline charging for those domains / ~~and~~ subsystems / [services](#);
- the interfaces that are used in the charging framework to transfer the charging information (i.e. CDRs or charging events).

The complete document structure for these TSs is defined in 3GPP TS 32.240 [1].

The present document specifies the mechanisms used to transfer ~~the~~ CDR [files](#) from the network to the operator's billing domain (e.g. the billing system or a mediation device). This includes the file transfer procedures and the layout of the CDR files, as well as file meta information and the encoding of the CDRs within the files.

The CDR types that can be transported in these files are specified in the respective [“middle tier” domain/subsystem/service](#) charging TSs, i.e. 3GPP TS 32.250~~x-140~~ - 3GPP TS 32.297~~x~~. A definition of the parameters, abstract syntax and encoding rules for these CDR types ~~are~~ [is](#) specified in 3GPP TS 32.298 [51].

Note that the present document, dealing with CDRs, is consequently only concerned with offline charging. A definition of [the corresponding](#) 3GPP online charging functionality and applications can be found in 3GPP TS 32.299 [50] ~~for the network side, and 3GPP TS 32.296 [53] for the billing domain side.~~ [Furthermore, 3GPP TS 32.296 \[53\] specifies the OCS internal charging applications and interfaces.](#)

All ~~reference~~ [terms, definitions and](#) abbreviations, ~~definitions, descriptions, principles and requirements,~~ used in the present document, that are common across 3GPP TSs, are defined in the 3GPP Vocabulary, 3GPP TR 21.905 [100].

Those that are common across charging management in GSM/UMTS domains, [services](#) or subsystems are provided in the umbrella document 3GPP TS 32.240 [1] and are copied into clause 3 of the present document for ease of reading.

Finally, those items that are specific to the present document are defined exclusively in the present document.

[Furthermore, requirements that govern the charging work are specified in 3GPP TS 22.115 \[102\].](#)

End Change in clause 1

## Change in clause 2

## 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*.

### ~~a)~~ ~~The 3GPP charging specifications~~

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

[2]-[9] Void.

[10] 3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".

~~[11] 3GPP TS 32.251: "Telecommunication management; Charging management; Charging data description for the Packet Switched (PS) domain".~~

~~[12] 3GPP TS 32.252: "Telecommunication management; Charging management; Wireless Local Area Network (WLAN) charging".~~

[1~~3~~]-[~~4~~29] Void.

~~[20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".~~

~~[21]-[29] Void.~~

[30] 3GPP TS 32.270: "Telecommunication management; Charging management; Multimedia Messaging Service (MMS) charging".

~~[31] 3GPP TS 32.271: "Telecommunication management; Charging management; Location Services (LCS) charging".~~

[3~~1~~]-[49] Void.

[50] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application".

[51] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) encoding rules description".

[52] Void.

[53] 3GPP TS 32.296: "Telecommunication management; Charging management; Online Charging System (OCS) applications and interfaces".

[54] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".

[55]-[~~6~~99] Void.

### ~~b)~~ ~~other charging specifications~~

~~[70] ITU T Recommendation D.93: "Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)".~~

~~[71] [99] Void.~~

**~~e) Common 3GPP specifications~~**

[100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

~~[101] 3GPP TS 22.101: "Service aspects; Service principles".~~

[101~~2~~] 3GPP TS 22.115 "Service aspects; Charging and billing".

~~[103] 3GPP TS 23.002: "Network architecture".~~

~~[104] 3GPP TS 23.003: "Numbering, addressing and identification".~~

~~[105] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".~~

[102~~6~~]-[199] Void.

**~~d) other Domain and Service specific 3GPP / ETSI specifications~~**

[200] 3GPP TS 23.078: "Customized Applications for Mobile network Enhanced Logic (CAMEL); Stage 2".

[200~~1~~]-[3~~2~~99] Void

**~~e) Relevant ITU Recommendations~~**

~~[300] [399] Void.~~

**~~f) Relevant IETF RFCs~~**

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

[401]-[499] Void.

**~~g) Network Management related specifications~~**

[500] 3GPP TS 32.341: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Requirements".

[501] 3GPP TS 32.342: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Information Service (IS)".

[502] 3GPP TS 32.343: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)".

[503] 3GPP TS 32.344: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Common Management Information Protocol (CMIP) Solution Set (SS)".

End Change in clause 2

Change in clause 3

## 3 Definitions, ~~symbols abbreviations~~ and ~~abbreviations symbols~~

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in [3GPP TR 21.905 \[100\]](#), 3GPP TS 32.240 [1] and the following apply:

**Billing Domain** (~~BD~~): part of the operator network, which is outside the [telecommunication](#) ~~core~~-network, that receives and processes charging information from the core network charging functions

~~. It includes functions that can provide billing mediation and billing or other (e.g. statistical) end applications. It is only applicable to offline charging (see "Online Charging System" for equivalent functionality in online charging) It includes functions that can provide billing mediation and billing end applications.~~

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

**CDR field Categories**: defined in the ~~present middle tier charging TSs~~ [document](#). CDR fields may be operator provisionable and ~~They~~ are divided into the following categories:

- **Mandatory** (**M**): field that shall [always](#) be present in the CDR.
- **Conditional** (**C**): field that shall be present in a CDR if certain conditions are met.
- **Operator Provisionable: Mandatory** (**O<sub>M</sub>**): ~~field that, if provisioned by the operator, shall always be present in the CDR~~ [A field that operators have provisioned to be included in the CDR for all conditions.](#)
- **Operator Provisionable: Conditional** (**O<sub>C</sub>**): ~~A field that, if provisioned by the operator, shall be present in a CDR if certain conditions are met~~ [field that operators have provisioned to be included in the CDR if certain conditions are met.](#)

**charging**: [function within the telecommunications network and the associated OCS/BD components whereby information related to a chargeable event is collected, formatted, transferred and evaluated in order to make it possible to determine usage for which the charged party may be billed \(offline charging\) or the subscriber's account balance may be debited / credited \(online charging\)](#) ~~function whereby information related to a chargeable event is formatted and transferred in order to make it possible to determine usage for which the charged party may be billed~~

**Charging Data Record (CDR)**: [formatted collection of information about one or more chargeable event\(s\) \(e.g. time of call set-up, duration of the call, amount of data transferred, etc\) for use in billing and accounting. For each party to be charged for parts of or all charges of the chargeable event\(s\) a separate CDR shall be generated, i.e. more than one CDR may be generated for a single chargeable event, e.g. because of its long duration, or because more than one charged party is to be charged](#) ~~record generated by a network element for the purpose of billing a subscriber for the provided service~~

~~It includes fields identifying the user, the session and the network elements as well as information on the network resources and services used to support a subscriber session. In the traditional circuit domain, CDR has been used to denote "Call Detail Record", which is subsumed by "Charging Data Record" hereafter.~~

**charging function**: [entity inside the core network domain, subsystem or service that is involved in charging for that domain, subsystem or service.](#)

**circuit switched domain**: domain within [GSM / UMTS](#) in which information is transferred in circuit [switched](#) mode.

**domain**: part of [the 3GPP tele](#) communication network that provides [network resources](#) ~~services~~ using a certain [bearer](#) technology.

**GPRS**: [packet switched bearer and radio services for GSM and UMTS systems](#) ~~Packet Services for GSM and UMTS systems~~

**middle tier (charging) TS:** [term](#) used for the 3GPP charging TSs that specify the domain / subsystem / service specific, online and offline, charging functionality.

These are all the TSs in the numbering range from 3GPP TS 32.250 ~~[10]~~ to 3GPP TS 32.279~~1~~~~[31]~~, e.g. 3GPP TS 32.250 [10] for the CS domain, or 3GPP TS 32.270 [30] for the MMS service. Currently, there is only one "tier 1" [charging](#) TS in 3GPP, which is TS 32.240 [1] that specifies the charging architecture and principles. Finally, there are a number of top tier [charging](#) TSs in the 32.29x numbering range ([50] ff) that specify common charging aspects such as parameter definitions, encoding rules, the common [billing domain](#) ~~BD~~ interface or common charging applications.

**near real-time:** near real-time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 minute.

**offline charging:** charging mechanism where charging information **does not** affect, in real-time, the service rendered

**online charging:** charging mechanism where charging information **can** affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with session/service control is required.

**packet switched domain:** domain within [the](#) GSM ~~and~~ [UMTS-core networks](#) in which data is transferred in packet switched mode. Corresponds to the term "GPRS".

**real-time:** real-time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 second.

## 3.2 Abbreviations

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

3G	3 <sup>rd</sup> Generation
BD	Billing Domain
CDF	Charging Data Function
CDR	Charging Data Record
CGF	Charging Gateway Function
CS	Circuit Switched
CTF	Charging Trigger Function
FTP	File Transfer Protocol
GMLC	Gateway MLC
IMS	IP Multimedia Subsystem
MLC	Mobile Location Center
MMS	Multimedia Messaging Service
OAM&P	Operation, Administration, Maintenance and Provisioning
OCS	Online Charging System
PS	Packet Switched
UTC	Universal Time Coordinated
WLAN	Wireless Local Area Network

## 3.23 Symbols

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

Bc	Reference point for the CDR file transfer from the Circuit Switched CGF to the BD.
<a href="#">Bg</a>	<a href="#">Reference point for the CDR file transfer from the GPRS CGF to the BD.</a>
Bi	Reference point for the CDR file transfer from the IMS CGF to the BD.
Bl	Reference point for the CDR file transfer from the GMLC CGF to the BD.
<a href="#">Bm</a>	<a href="#">Reference point for the CDR file transfer from the MMS CGF to the BD.</a>
<a href="#">Bmb</a>	<a href="#">Reference point for the CDR file transfer from the MBMS CGF to the BD.</a>
<a href="#">Bo</a>	<a href="#">Reference point for the CDR file transfer from the OCF CGF to the BD.</a>
<del>Bp</del>	<del>Reference point for the CDR file transfer from the Packet Switched domain, i.e. the GPRS CGF, to the BD.</del>
<a href="#">Bp</a>	<a href="#">Reference point for the CDR file transfer from the PoC CGF to the BD.</a>
<del>Bm</del>	<del>Reference point for the CDR file transfer from the MMS CGF to the BD.</del>

Bs	<a href="#">Reference point for the CDR file transfer for CAMEL services to the BD, i.e. from the SCF CGF to the BD.</a>
Bw	<a href="#">Reference point for the CDR file transfer from the I-WLAN CGF to the BD.</a>
Bx	<a href="#">Reference point for CDR file transfer between any (generic) 3G domain, subsystem or service CGF and the BD</a> <del>The reference point between any (generic) 3G domain, subsystem or service CGF and the BD.</del>
Ga	<a href="#">Reference point for CDR transfer between a CDF and the CGF.</a>
Rf	Offline Charging Reference Point between the CTF within a 3G network entity and the CDF.

### 3.3 Abbreviations

[For the purposes of the present document, the following abbreviations apply:](#)

3G	<a href="#">3<sup>rd</sup> Generation</a>
bcd	<a href="#">binary coded decimal</a>
BD	<a href="#">Billing Domain</a>
CAMEL	<a href="#">Customised Applications for Mobile network Enhanced Logic</a>
CDF	<a href="#">Charging Data Function</a>
CDR	<a href="#">Charging Data Record</a>
CGF	<a href="#">Charging Gateway Function</a>
CS	<a href="#">Circuit Switched</a>
CTF	<a href="#">Charging Trigger Function</a>
FTP	<a href="#">File Transfer Protocol</a>
GMLC	<a href="#">Gateway MLC</a>
GPRS	<a href="#">General Packet Radio Service</a>
IMS	<a href="#">IP Multimedia Subsystem</a>
IP	<a href="#">Internet Protocol</a>
I-WLAN	<a href="#">Interworking WLAN</a>
LAN	<a href="#">Local Area Network</a>
MBMS	<a href="#">Multimedia Broadcast/Multicast Service</a>
MLC	<a href="#">Mobile Location Center</a>
MMS	<a href="#">Multimedia Messaging Service</a>
OAM&P	<a href="#">Operation, Administration, Maintenance and Provisioning</a>
OCF	<a href="#">Online Charging Function</a>
OCS	<a href="#">Online Charging System</a>
PoC	<a href="#">Push-to-talk over Cellular</a>
PS	<a href="#">Packet Switched</a>
SCF	<a href="#">Service Control Function</a>
UTC	<a href="#">Universal Time Coordinated</a>
WLAN	<a href="#">Wireless LAN</a>

End Change in clause 3

Change in clause 4

## 4 Architecture considerations

"Bx" is a common designator ~~of~~ for the [reference points](#) ~~interfaces~~ from the network to the billing domain (BD) that are intended for the transport of CDR files. The letter "[x](#)" indicates the different 3GPP network domain, subsystem or service, where

- c represents Circuit Switched (CS),
- ~~p~~[g](#) represents Packet Switched ([GPRS](#)),
- i represents IP Multimedia Subsystem (IMS),
- l represents Location Service ([LCS](#)),



m represents Multimedia Messaging Service (MMS),

mb represents Multimedia Broadcast/Multicast Service (MBMS).

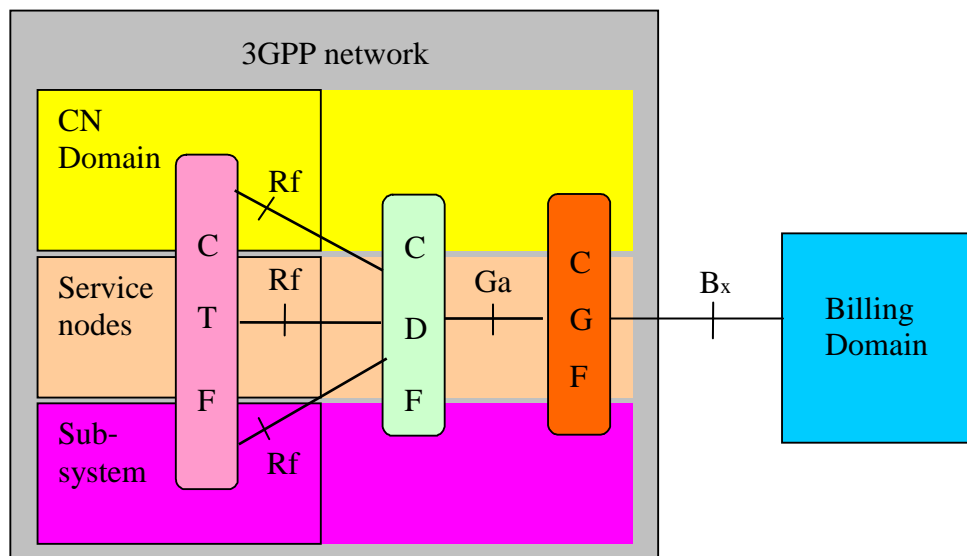
o represents the Online Charging System (OCS), ~~and~~

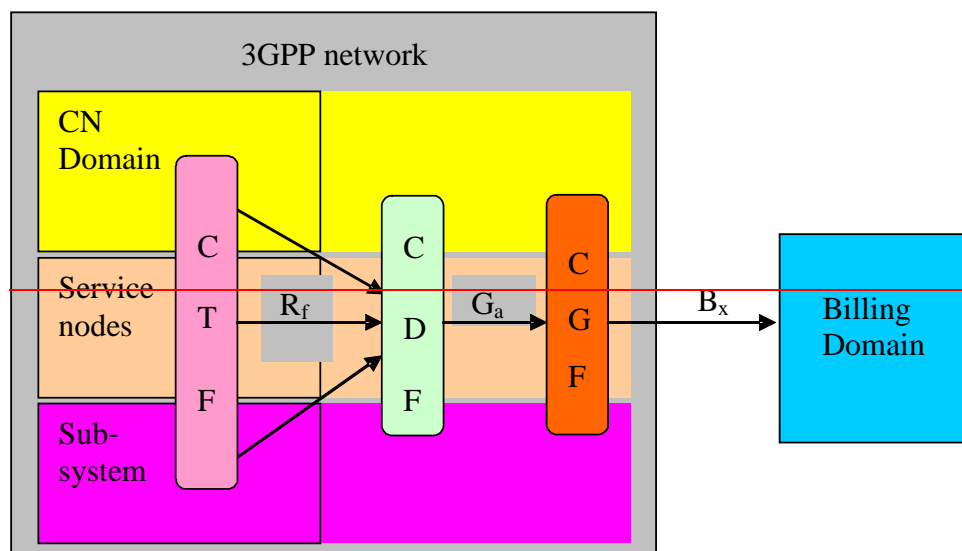
p represents the PoC service.

s represents the CAMEL SCF, and

w represents interworking Wireless LAN (I-WLAN).

By definition, dealing with CDR files only implies that Bx is solely related to offline charging. The following figure depicts the position of the Bx reference point within the overall 3GPP offline charging architecture.





**CTF:** Charging Trigger Function  
**CDF:** Charging Data Function  
**CGF:** Charging Gateway Function  
**BD:** Billing Domain. This may also be a billing system/ billing mediation device.

**Figure 4.1: Logical ubiquitous offline charging architecture**

As illustrated in the above figure, the CGF in each network domain, service or subsystem is relevant for the network side of the Bx ~~reference point interface and~~ is connected with the BD that forms the receiving end of the Bx reference point. ~~On the billing domain side, by its nature of dealing with CDRs, Bx addresses only the offline charging part.~~ Further details of ~~this part of~~ the Billing Domain, i.e. beyond terminating Bx, are outside the scope of 3GPP standardization. Refer to 3GPP TS 32.240 [1] for the complete description of the 3GPP charging architecture.

Note that the OCS can also generate CDRs and transfer them to the BD across the Bo reference point (not depicted in figure 4.1). Refer to 3GPP TS 32.296 [53] for further information on the OCS.

Furthermore the GSM SCF, defined in CAMEL, can also generate CDRs and transfer them to the BD across the Bs reference point (not depicted in figure 4.1). Refer to 3GPP TS 23.078 [200] for further information on CAMEL.

End Change in clause 4

## Change in clause 5

## 5 CDR File Transfer Principles and Scenarios

This clause contains specifications for the principles and scenarios covering the CDR file transfer interface from the network to the Billing Domain. These specifications apply to all domains, subsystems and services [that are](#) listed in clause 4, [including the OCS Bo and the GSM SCF's Bs interface](#). Alternatively, in the CS domain (i.e. for Bc), the file transfer mechanism specified in 3GPP TS 32.250 [10] may be used. Consequently, for Bc it is up to implementation choice to provide either the legacy interface, the interface specified in the present document, or both.

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

- Local CDR and CDR file handling;
- File format [principles](#);
- File Transport and protocol;
- File ~~transfer~~ [port](#) modes and session management.

Other interface principles such as security and performance are dependent on vendor implementation and operator's network design and are not covered by the present document.

### 5.1 Local CDR and CDR file handling

#### 5.1.1 CDR processing

As depicted in figure 4.1. above, the CGF collects CDRs from the CDF. If the CDF and the CGF are separate entities, then the standard Ga interface as specified in 3GPP TS 32.295 [54] is used [to transfer the CDRs from the CDF to the CGF](#). If CDF and CGF are integrated, then a proprietary, [internal](#) mechanism is used ~~to transfer the CDRs from the CDF to the CGF~~. The possibilities of separate or integrated CDF and CGF are specified per domain, subsystem and service in the respective "middle tier" charging TS, [i.e. those e.g. in 3GPP TS 32.250 \[10\] for the CS domain, 3GPP TS 32.251 \[11\] for the PS domain, etc. The references clause of the present document lists all the related reference TSs in the 3GPP TS 32.250 \[10\] through \[49\] reference number range, and in TS 32.296 \[53\] for the OCS.](#)

In any case, CDRs are transferred, in near real time, from the CDF to the CGF as soon as they have been closed by the CDF. Refer to 3GPP TS 32.295 [54] for further details. Once received by the CGF, the CDRs may undergo semantical and/or syntactical sanity checks ~~before storing them on the file~~, however, these [checks](#) are not ~~further~~ specified [further](#) within the present document.

If the CGF determines that a CDR is not well formatted, or otherwise incorrect, then the defective CDR parameter(s) shall be filled with an appropriate "replacement" indicator within the limits of the syntax allowed for the parameter. If the error renders the complete CDR unusable (i.e. the above replacement of erroneous parameters is not possible), then [no](#) further action of the CGF [can be performed regarding this CDR is ffs](#). An example of a case where the erroneous parameter cannot be replaced is when the "CDR type" attribute of a CDR received by the CGF is corrupted. Details of this function are implementation specific.

CDRs that have been processed by the CGF without error, or where errors have been corrected by the CGF as described above, are considered "acceptable" by the CGF. CDRs that have non-recoverable errors are not considered "acceptable" by the CGF. The "acceptable" CDRs are immediately placed into a CDR file by the CGF. The CDRs that are not "acceptable" should be properly reflected in an error log and appropriate alarms should be generated, after which they may be destroyed. [Furthermore, to the extent possible, the number of lost CDRs and the fact that CDRs were lost, shall be indicated in the CDR file.](#)

It is acknowledged that the processing of a CDR between being received until it is placed on the CDR file, will take a small amount of time. Hence, where the present document mandates the "immediate" treatment of CDRs received by the CGF, it is to be interpreted such that it is not allowed to postpone the processing of any received CDRs for any reason. In technical terms, "immediate" shall be interpreted as

- The system shall be capable of complying with near real time requirements as specified in subclause 3.1.

- The system should be capable of complying, as closely as possible, with real time requirements as specified in subclause 3.1.

Once a CDR has been stored on the appropriate file, the CGF may destroy any other reference to that CDR.

### 5.1.2 CDR ~~routing~~routeing

In the default mode of operation, the CGF manages a single ("default") file for the storage of all "acceptable" CDRs. However, the CGF may also route CDRs to different files that are kept open concurrently, i.e. additional files may be configured by OAM&P commands together with associated CDR ~~routing~~routeing filters. While the CGF will store only those CDRs matching the associated ~~routing~~routeing filter on each of the additional files, the default file is used to store all CDRs that do not match any of the ~~routing~~routeing filters configured for the additional files.

The CDR ~~routing~~routeing function shall apply CDR parameters and CDR origin to decide into which file to place the CDR. The file name shall, within the limits of the file naming conventions, contain an indication of the CDR ~~routing~~routeing filter applied.

As a minimum, each CGF implementation shall support the CDR type and the sending CDF as a selection criteria for CDR ~~routing~~routeing. It shall then be possible to include in a file only the following CDRs:

- CDRs of a single type;
- CDRs of a set of specified types (e.g. only IMS CDR types);
- CDRs originated by a single CDF;
- CDRs originated by a set of CDFs;
- Any combination of the above.

Further details of the CDR ~~routing~~routeing function, such as

- the maximum number of simultaneously open CDR files;
- the order in which the ~~routing~~routeing filters are evaluated;
- the way CDR filters can be configured by OAM&P;

are implementation specific. In order to avoid arbitrary ~~routing~~routeing of CDRs, operators should assure that the ~~routing~~routeing filters assigned per file, do not overlap with each other.

The term "matching CDR" is used in the present document to denote a CDR that matches the ~~routing~~routeing criteria filter of a given CDR file.

### 5.1.3 Local CDR file management

For the default case, plus each of the additional CDR ~~routing~~routeing criteria-filters that may be set up on the CGF (cf. subclause 5.1.2 above), the CGF provides a non-interrupted chain of CDR files. As described above, each CDR is immediately stored in the appropriate file after being received and determined "acceptable" by the CGF.

Several conditions may govern the closure of a CDR file by the CGF:

- A configurable file size limit;
- A configurable file closure time;
- A configurable file lifetime ("interval");
- A configurable number of CDRs within the file;
- CDR release, version or encoding change;
- Manual OAM&P actions;

- System defined reasons (e.g. file system full).

When a CDR file is closed, the next matching CDR shall be placed in the next file in the chain. The exact time when this next CDR file is physically generated, i.e.:

- immediately after the previous file has been closed (i.e. the earliest possible time),
- when the next matching CDR arrives (i.e. the latest possible time),
- anytime in between,

is implementation specific. ~~For example a CDR file may reside in temporary, internal storage while collecting CDRs, until it is triggered to close.~~ However, each CDR file must contain ~~the CDRs contained in the file are~~ all "acceptable" matching CDRs received and processed by the CGF between the closure of the previous file and the configured file closure trigger of the current file, as specified above. In any case, a file must be generated and closed upon the occurrence of the file closure trigger, i.e. an empty file (containing no CDRs) if no matching CDRs arrived since the closure of the last file in the chain. Upon file closure, the CDR file is immediately available for transfer to the BD.

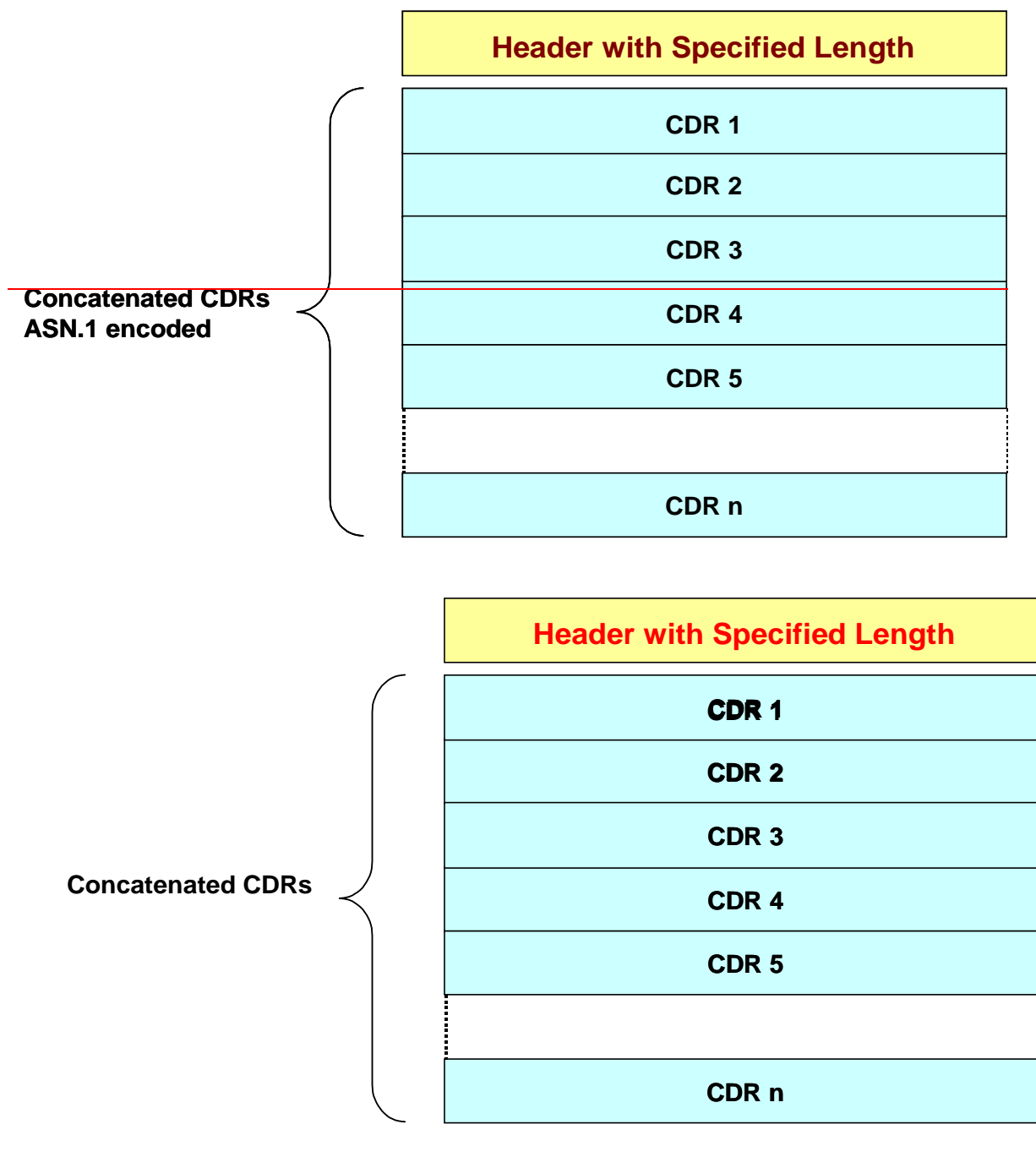
CDR files may be removed from the CGF in one of the following ways:

- By the BD issuing corresponding commands provided by the file transfer protocol;
- By the CGF application once the file has been transferred;
- Due to CGF file system storage limitation or configurable file age limits;
- OAM&P action.

In order to avoid loss of CDRs, Operators should manage the system in a way that the "system defined" file closure triggers mentioned above do not occur.

## 5.2 File format principles

The CDR file format is depicted below.



**Figure 5.2.1: CDR File Format**

The CDR files contain a variable length header section followed by a variable sized CDR data section. The CDR data section contains zero or more concatenated CDRs. ~~All~~ Each CDRs in a file ~~are~~ includes a header indicating of the CDR length, same data record format, release, version and encoding scheme.

~~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.

Clause 6 of the present document specifies the file format applying the above principles at bit level detail.

## 5.3 File Transport and protocol~~Protocols for charging data files transfer~~

Two mechanisms are defined for the transport of CDR files from the CGF to the BD:

- A basic transport mechanism is defined in subclause 5.3.1 and must be supported by all CGF implementations;
- The use of the File Transfer IRP as described in subclause 5.3.2 may additionally be supported by the CGF as an implementation option.

### 5.3.1 Basic file transport mechanism

The following stipulations govern the choice and usage of file transport protocol for this transport mechanism.

- The default protocol for CDR file transport is FTP (RFC 959 [400]).
- The use of other protocols is optional, however FTP must always be supported.
- 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.
- All standard FTP commands specified in RFC 959 [400] shall be supported by the CGF.

All further requirements specified within the present document with reference to the operation of the file transfer protocol in this mechanism (cf. clause 6), are solely related to FTP as the transfer protocol, as no assumptions can be made as to the ways of working of ~~the~~ optional other protocols. However, additional protocols shall be implemented such that, to the extent possible, the same logic is applied as described in the present document for FTP.

### 5.3.2 Use of File Transfer IRP

The File Transfer IRP is specified in 3GPP TSs 32.341 [500], 32.342 [501], 32.343 [502] and 32.344 [503]. The support of the solution sets (CORBA, CMIP or both) is left to implementation choice. Otherwise, the CGF implementation of the IRP shall comply with the above TSs, i.e. there are no further additions or limitations with regard to the use of the IRP in charging.

## 5.4 File transfer~~port~~ modes and session management

### 5.4.1 Basic file transfer mechanism

Files can be transferred to the BD in one, or both, of the following modes. Detailed FTP file transfer and session management procedures are specified in clause 6.

#### 5.4.1.1 Push mode

In this transfer mode the CDR files are written from the CGF to the BD filestore at a time and/or frequency controlled by the CGF. I.e. ~~T~~he CGF *pushes* the files to the BD. This implies that the CGF operates in client mode and the BD in server mode. If the CGF generates concurrent CDR files based on the CDR ~~routing~~routeing function specified in subclause 5.1.2, then it shall be able to send the different files to different BD systems, i.e. the BD address is part of the CDR ~~file routing~~routeing filter.

As a minimum, the following events shall be capable of triggering a file push in the CGF:

- A (configured number of) new CDR file(s) has become available for transmission;
- The CDR file / files has / have exceeded a configurable (total) size limit;
- A configurable, regular time interval has elapsed;
- The CGF filestore utilization has exceeded a configurable level.

If the file transfer fails, the CGF should properly reflect this in an error log and generate appropriate alarms. Possible measures to handle file transfer failures are discussed in clause 6.

Security measures, e.g. the mutual identification / verification of the peer systems, are outside the scope of the present document.

## 5.4.1.2 Pull mode

In this transfer mode the BD reads the CDR files that are available in the appropriate CGF directories. The time and/or frequency of the file transfer is controlled by the BD. I.e. the BD *pulls* the files from the CGF. This implies that the CGF operates in server mode and the BD in client mode.

In this mode, the BD may request the files from the CGF at any point in time at the discretion of the BD, i.e. the CGF cannot make any assumptions of the time or frequency of the file pull to occur. If the file transfer fails, any further action is up to the BD, however, the CGF should properly reflect this in an error log and generate appropriate alarms. Possible measures to handle file transfer failures are discussed in clause 6.

Security measures, e.g. the mutual identification / verification of the peer systems, are outside the scope of the present document.

## 5.4.2 Use of File Transfer IRP

File transfer modes and session management using the optional File Transfer IRP are governed by 3GPP TSs 32.341 [500], 32.342 [501], 32.343 [502] and 32.344 [503].

End Change in clause 5

Change in clause 6

# 6 CDR file format specification

This clause provides detail specifications for the CDR file format. These specifications apply to all domains, subsystems and services listed in clause 4. Alternatively, in the CS domain (i.e. for Bc), the file transfer mechanism specified in 3GPP TS 32.250 [10] may be used. Consequently, for Bc it is up to implementation choice to provide either the legacy interface, the interface specified in the present document, or both.

The file format specification in this clause is divided into the following categories:

- File format conventions;
- File naming and directory conventions;
- Detailed ~~FTP~~ file transfer and session management procedures.
- Error handling

Only the basic file transfer mechanism is covered in the present document. Refer to 3GPP TSs 32.341 [500], 32.342 [501], 32.343 [502] and 32.344 [503] for the corresponding details when using the optional File Transfer IRP.

## 6.1 File format conventions

The file format shall apply the following conventions.

- The CDR files contain a variable length file header immediately followed by a variable number (zero or more) of concatenated CDRs which are ~~encoded-structured~~ according to the CDR format specified in the middle tier ~~an appropriate~~ charging TSs, ~~3GPP TS 32.250 [10] to [49].~~
- ~~All the CDRs in the file are encoded in the appropriate Abstract Syntax Notation One (ASN.1) and~~ The syntax and encoding rules for the CDRs are ~~encoding rules as~~ specified in ~~the appropriate~~ 3GPP TS 32.298 [51].



c) Each CDR is immediately preceded by a fixed length plain text header.

~~e) 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 fields and CDR header fields are in Network byte order (Big Endian).

e) The file Hheader contains fields specified in subclause 6.1.1 ~~ying the length of the header and the length of the file in total.~~

f) The CDR header contains fields specified in subclause 6.1.2.

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

The CDR file is named based on a the naming convention specified in clause 6.2.

### 6.1.1 CDR Ffile header format

~~The file header contains the following fields:~~

- ~~—Total file length in octets—including the length field itself.~~
- ~~—File Header length in octets—the fixed length of the file header plus the length of the Private Extension (if present).~~
- ~~—Data Record format as defined in 3GPP TS 32.298 [51].~~
- ~~—Application & Release identifiers as defined in 3GPP TS 32.298 [51].~~
- ~~—CDR Version as defined in 3GPP TS 32.298 [51].~~
- ~~—The UTC timestamp when the file was created.~~
- ~~—The UTC timestamp when the last CDR was appended to the file—set to zero if the file contains no CDRs.~~
- ~~—Number of data records in the file.~~
- ~~—File Sequence Number. This field includes a unique number created by this node. The number is allocated sequentially for each CDR file. The number is unique within a node. It should match the sequence number used in the file name (If present).~~
- ~~—File Closure reason (see subclause 6.3.1).~~
- ~~—Length of the IP Address of the file generating node. For IPv6 the value is decimal 20. For IPv4 the value is decimal 4.~~
- ~~—IP address of the network node that generated the file. Fixed length field of 20 octets. For IPv4 addresses, the unused trailing octets are set to zero.~~
- ~~—Length of the Private extensions field. Set to zero (0) if no private extensions are present.~~
- ~~—CDR routing / filtering indication.~~
- ~~—Private extension (Optional).~~

The exact format of the CDR file header is given in figure 6.1 below.

Bits								
Octets	8	7	6	5	4	3	2	1
1..4	File length <del>in octets (including file header and CDR payload length)</del>							
5..8	Header length <del>in bytes (Octets 1 to 53 and the length of any private extensions)</del>							
9*	<a href="#">High Release Identifier</a> <del>Data Record Format</del>			<a href="#">High Version Identifier</a>				
10	<a href="#">Low Release Identifier</a>			<a href="#">Low Version Identifier</a>				
10*	<del>Application ID</del> <a href="#">Release ID</a>							
11*	<del>CDR Version</del>							
11..145	File opening timestamp <del>(UTC)</del>							
156..189	Timestamp when last CDR was appended to file <del>(UTC) (Zero if the file contains no CDRs)</del>							
2019..223	Number of <del>CDRs</del> <a href="#">data records</a> in file							
234..276	File sequence number							
278	File Closure Trigger Reason <del>(See below)</del>							
29	<del>Length of IP Address of Node that generated file</del>							
3028..479	IP Address of Node that generated file <del>(20 octets, padded for IPv4)</del>							
48	<a href="#">Lost CDR indicator</a>							
5049..503	<del>Length of Private Extension field</del>				<a href="#">Length of CDR routing filter</a>			
51..xy	<a href="#">CDR routing filter</a>							
54..xy+1..xy+2	<a href="#">Length of Private Extension</a>				<del>CDR routing filter</del>			
xxy+3..n	Private Extensions <del>(optional)</del>							

NOTE: ~~Fields indicated with an asterisk (\*) are the same formats and contain the same ranges of values as those defined in 3GPP TS 32.240 [1] and 3GPP TS 32.298 [51].~~

**Figure 6.12: Format of CDR File Header** ~~(Shaded area represents the fixed part of the file header)~~

The following subclauses specify the contents and encoding of the CDR file header fields. Unless otherwise specified in the subclauses below, all parameters are mandatory and shall always be included in a CDR file header.

## 6.1.2 ~~Encoding of file header fields~~

### 6.1.1.1 [File length](#)

The “file length” parameter contains a binary encoded decimal (bcd) integer value that identifies the total length of the CDR file in octets, including the file header and the total CDR payload length.

The value with all bits set to “1” is reserved for future extensions (e.g. for CDR files longer than that value) and shall therefore not be used.

### 6.1.1.2 [Header length](#)

The “header length” parameter contains a bcd encoded integer value that identifies the total length of the CDR file header in octets.

The value with all bits set to “1” is reserved for future extensions (e.g. for CDR file headers longer than that value) and shall therefore not be used.

### 6.1.1.3 [High release / version identifier](#)

This field is a copy of octet 3 of the CDR header. It is copied from the CDR where the equation:

$$\text{Release Identifier} * 100 + \text{Version Identifier}$$

yields the highest result of all CDRs in the file. The representation of Release Identifier and Version Identifier in this field is the same as in octet 3 of the CDR header.

### 6.1.1.4 [Low release / version identifier](#)

This field is a copy of octet 3 of the CDR header. It is copied from the CDR where the equation:

$$\text{Release Identifier} * 100 + \text{Version Identifier}$$

yields the lowest result of all CDRs in the file. The representation of Release Identifier and Version Identifier in this field is the same as in octet 3 of the CDR header.

#### 6.1.1.5 File opening timestamp

This parameter indicates the time when the file was opened, according to the following format:

- The first four bits indicate the month (1 .. 12) in bcd representation, according to the CGF's local time zone;
- The next five bits contain the date (1 :: 31) in bcd representation, according to the CGF's local time zone;
- The next five bits contain the hour (0 .. 23) in bcd representation, according to the CGF's local time zone;
- The next six bits contain the minute (0 .. 59) in bcd representation, according to the CGF's local time zone;
- The next bit indicates the sign of the local time differential from UTC (bit set to "1" expresses "+" or bit set to "0" expresses "-" time deviation), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-";
- The next five bits contain the hour (0 .. 23) deviation of the local time towards UTC, according to the CGF's local time zone;
- The next six bits contain the minute (0 .. 59) deviation of the local time towards UTC, according to the CGF's local time zone;

Note that the CDR file name contains detailed date and time information related to file closure (cf. clause 6.2)

#### 6.1.1.6 Last CDR append timestamp

This parameter indicates the time when the last CDR was appended to the file in UTC format. In case of an empty file (i.e. no CDRs included), the value of the parameter corresponds to bcd "0".

#### 6.1.1.7 Number of CDRs in file

This parameter contains a bcd encoded integer that specifies the total number of CDRs that are included in the file.

The value with all bits set to "1" is reserved for future extensions (e.g. for CDR files containing more CDRs than represented by that value) and shall therefore not be used.

#### 6.1.1.8 File sequence number

This parameter is an integer value in bcd encoding that contains a running number of the CDR file generated by the same CGF. The first file of a CGF is indicated by the value "0". When the maximum number of file is reached (all bits set to "1"), the sequence shall be restarted with "0".

#### 6.1.1.92-1 File Closure Trigger Reason

The file closure reason provides a means to determine the reason that the file was closed by the CGF. It is encoded as a single octet as follows.

Normal closure reasons (Decimal values 0 to 127):

- 0 = Normal closure (Undefined normal closure reason).
- 1 = File size limit reached (OA&M configured).
- 2 = File open-time limit reached (OA&M configured).
- 3 = Maximum number of ~~data records~~ CDRs in file ~~limit~~ reached (OA&M configured).
- 4 = File closed by manual intervention.
- 5 = CDR release, version or encoding change ~~Data record format, release or version change.~~

6 to 127 are reserved for future use.

Abnormal closure reasons (Decimal values 128 to 255):

128 = Abnormal file closure (Undefined error closure reason).

129 = File system error.

130 = File system storage exhausted.

131 = File integrity error.

132 to 255 are reserved for future use.

#### 6.1.1.10 Node IP address

This parameter indicates the IP address of the CGF that generated the file. For both IPv4 and IPv6 CGF addresses, the parameter is encoded in IPv6 representation.

#### 6.1.1.11 Lost CDR indicator

This parameter indicates if and how many CDRs were lost during their processing in the CGF (cf. clause 5.1.1). The term “lost” implies that the CDR(s) could not be placed into the destination file due to irrecoverable errors.

Due to the possibility that the irrecoverable CDR errors may have impacted CDR parameters that are relevant for CDR routing, it is possible that the CGF cannot determine for a particular file whether CDRs have been lost. Appropriate indication shall be given according to the following encoding of the “lost CDR indicator”.

- MSB bit “0”, all other bits “0”: no CDRs have been lost;
- MSB bit “0”, all other bits set to a value corresponding to decimal 1 to decimal 126: CGF has identified that a number of CDRs corresponding to the value of the lower 7 bits were lost, while it is unknown whether more CDRs were lost;
- MSB bit “0”, all other bits set to “1”: CGF has identified that 127 or more CDRs were lost, while it is unknown whether more CDRs were lost;
- MSB bit “1”, all other bits “0”: CDRs have been lost but CGF cannot determine the number of lost CDRs;
- MSB bit “1”, all other bits set to a value corresponding to decimal 1 to decimal 126: CGF has calculated the number of lost CDRs as indicated in the value of the lower 7 bits;
- MSB bit “1”, all other bits set to “1”: CGF has calculated the number of lost CDRs to be 127 or more.

#### 6.1.1.12 Length of CDR routing filter

This parameter contains a bcd encoded integer value that specifies the length of the subsequent CDR routing filter in octets. The value excludes the two octets of the “length” parameter itself.

The value of “65535” (all bits set to “1”) is reserved for future extensions (e.g. for CDR routing filters longer than 65534 octets) and shall therefore not be used.

#### 6.1.1.13 CDR routing filter

This parameter indicates the filter that determined the routing of CDRs into this file. Its encoding is vendor specific.

#### 6.1.1.14 Length of private extension

This parameter contains a bcd encoded integer value that specifies the length of the subsequent “private extension” field in octets. It is present only if a private extension field is included in the CDR file header. Its value excludes the two octets of the “length” parameter itself.

The value of “65535” (all bits set to “1”) is reserved for future extensions (e.g. for private extensions longer than 65534 octets) and shall therefore not be used.

#### 6.1.1.15 Private extension

This optional field contains a vendor specific private extension to the CDR file header, if any. Its encoding, if present, is vendor specific.

### 6.1.2 CDR header format

The exact format of the CDR header is given in figure 6.2 below.

Bits								
Octets	8	7	6	5	4	3	2	1
1..2	CDR length							
3	Release Identifier				Version Identifier			
4	Data Record Format				TS number			

**Figure 6.2: Format of CDR Header**

The following subclauses specify the contents and encoding of the CDR header fields.

#### 6.1.2.1 CDR length

This field contains a bcd encoded integer value that specifies the length of the subsequent CDR, excluding the 4 header octets. The value of “65535” (all bits set to “1”) is reserved for future extensions (e.g. for CDRs longer than 65534 octets) and shall therefore not be used.

#### 6.1.2.2 Release Identifier

This field contains a bcd encoded integer value that identifies the 3GPP Release of the Technical Specification indicated in “TS number” (see 6.1.2.5 below). Its value is set / used according to the following rules:

- If “TS number” indicates a Rel-99 3GPP TS (TS 32.005 or TS 32.015), then this parameter shall be ignored;
- If “TS number” indicates a Rel-4 3GPP TS (TS 32.205, TS 32.215 or TS 32.235), then this parameter shall be set to bcd “0”, i.e. all bits set to “0”;
- If “TS number” indicates a Rel-5 3GPP TS (TS 32.205, TS 32.215, TS 32.225 or TS 32.235), then this parameter shall be set to bcd “7”, i.e. all bits set to “1”;
- Otherwise, i.e. for Rel-6 and following, its value corresponds to the 3GPP Release number – 6 (i.e. “0” for Rel-6, and incremented by “1” for each subsequent Release).

#### 6.1.2.3 Version Identifier

This field contains a bcd encoded integer value that identifies the version of the 3GPP Technical Specification indicated in “TS number” (see 6.1.2.5 below). Its value corresponds to the middle digit of the version number of that TS, as indicated on the TS cover sheet.

#### 6.1.2.4 Data Record Format

This field contains a bcd encoded integer value that identifies the CDR encoding according to the following table:

- “1” signifies the use of Basic Encoding Rules (BER);
- “2” signifies the use of unaligned basic Packed Encoding Rules (PER);
- “3” signifies the use of aligned basic Packed Encoding Rules (PER);
- “4” signifies the use of XML Encoding Rules (XER).

### 6.1.2.5 TS number

This field contains a bcd encoded integer value that identifies the number of the TS CDR encoding according to the following table:

- “0” signifies Rel-99 TS 32.005
- “1” signifies Rel-99 TS 32.015
- “2” signifies Rel-4/5 TS 32.205
- “3” signifies Rel-4/5 TS 32.215
- “4” signifies Rel-5 TS 32.225
- “5” signifies Rel-4/5 TS 32.235
- “6” signifies Rel-6 TS 32.250
- “7” signifies Rel-6 TS 32.251
- “8” signifies Rel-6 TS 32.252
- “9” signifies Rel-6 TS 32.260
- “10” signifies Rel-6 TS 32.270
- “11” signifies Rel-6 TS 32.271
- “12” signifies Rel-6 TS 32.272
- “13” signifies Rel-6 TS 32.273

## 6.2 CDR file naming convention

The file naming convention ensures that CDR file names are unique among a large number of CGF nodes over an extended period of time (At least several months). In order to accomplish this requirement, the file name **should** include the following information:

<NodeID> - <RC>.<date> - <time>[.<PI>][.<FE>]

- 1) NodeID. This is the name of the CGF that generated the file. When the CGF is integrated in another node (see 3GPP TS 32.240 [1]), then this parameter contains the NodeID of the node that the CGF is integrated in.
- 2) The RC parameter is a running count, starting with the value of "1". Note that the delimiter preceding this field is made up of an underscore character ( \_ ), followed by a minus character ( - ), followed by another underscore character ( - ).
- 3) The “date” field indicates the date when the CDR file was closed. It is of the form YYYYMMDD, where:
  - YYYY is the year in four-digit notation;
  - MM is the month in two digit notation (01 - 12);
  - DD is the day in two-digit notation (01 - 31).

Note that this field is preceded by a point (.) character as delimiter.
- 4) The “time” field indicates the time when the CDR file was closed. It is of the form HHMMshhmm, where:
  - HH is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23);
  - MM is the two digit minute of the hour (local time);
  - s is the sign of the local time differential from UTC (+ or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-";

- hh is the two-digit number of hours of the local time differential from UTC (00-23);
- mm is the two digit number of minutes of the local time differential from UTC (00-59).

Note that the delimiter preceding this field is made up of an underscore character ( \_ ), followed by a minus character ( - ), followed by another underscore character ( \_ ).

- 5) Optional private information. The content of this field is implementation specific. This field, if present, is preceded by a point ( . ) character delimiter.
- 6) Optional file extension. The content of this field is implementation specific. This field, if present, is preceded by a point ( . ) character delimiter.

Some examples describing file-naming convention (note that the quotation marks do not form part of the file name):

- 1) file name: "CGFNodeId - 1234.20050401 - 2315+0200",  
meaning: file #1234 produced by CGF <CGFNodeId> on April 1, 2005 at 23:15 local time, with a time differential of +2 hours against UTC.
- 2) file name: "CGFNodeId - 44.20051224 - 1700-1130.thankgoditschristmas.abc",  
meaning: file #44 produced by CGF <CGFNodeId> on December 24, 2005 at 17:00 local time, with a time differential of -11:30 hours against UTC, private information "thankgoditschristmas" and extension "abc".
- 3) file name: "CGFNodeId - 44.20051224 - 1700-1130..abc",  
meaning: same file as 2) above but this time without private extension. Note that there are two point characters ( . ) preceding the file extension due to the missing (=empty) private extension.

~~—Generating Node identifier (alpha-numeric characters);~~

~~—Locally generated file Sequence number;~~

~~—Timestamp indicating the time that the file was closed;~~

~~—CDR routing indication;~~

~~—Optional private information;~~

~~—Optional file extension.~~

~~The exact format of the CDR file name is ffs.~~

There shall be a configurable base directory on the CGF which contains one or more subdirectories that contain all CDR files that are ready for transfer to the BD. Further details of ~~T~~the ~~default~~ directory structure on the CGF for the storage of CDR files ~~are is ffs~~implementation specific.

## 6.3 Detailed FTP transfer and session management procedures

The detailed FTP transfer and session management procedures are out of scope of the current 3GPP release. However the following items should be considered in actual implementations.

- FTP client ~~behaviour;~~
- FTP server role;
- File transfer triggers;
- Each of the above in relation to push and pull modes.

## 6.4 Error handling

The detailed error handling on the CGF is out of scope of the current 3GPP release. However the following items should be considered in actual implementations.

- Replacement of invalid CDR parameters;

- Handling [of](#) irrecoverable CDRs;
- System dependent failures (file system full, etc.);
- File transfer failure [in relation to](#)

[Pull mode](#);

[Push mode](#).

End Change in clause 6

## 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	
Mar 2004	S_23	SP-040142	--	--	Submitted to TSG SA#23 for Approval	2.0.0	6.0.0