

3GPP SA5 Overview

CH part

2 July 2010

A GLOBAL INITIATIVE

Topics



-  General
-  Charging Architecture
-  Charging Interfaces
-  Work Items
-  Information

Motivation for 3GPP



Vendor Business Paradigm

- Sell equipment to support Operator business
- Purpose of the equipment is to build telecom networks

- Build and operate a (mobile) telecom network
- Purpose of the network is to provide end user services

Operator Business Paradigm

- Uses – *and will be billed for* - the end user services

Customer

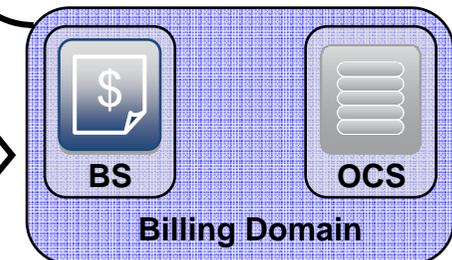
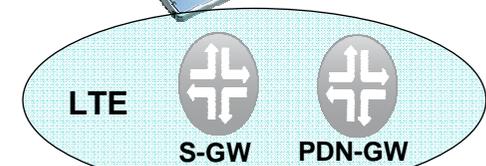
 **Charging** is the central enabler for the end user billing or interoperation

- ⇒ there will be no equipment sold, no network built and no service offered unless the service can be billed
- ⇒ charging is at the core of the business for vendors and operators alike!

The key terms in 3GPP



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Accounting: process

- of apportioning charges between the Home Environment, Serving Network and Subscriber;
- that receives the collected accounting metrics and determines the occurrence of chargeable events

Charging: a function within the telecommunications network and the associated **Online Charging System / Billing System** 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.

Billing: function whereby CDRs generated by the **Charging Function(s)** are transformed into bills requiring payment.

Statistic

Setting the scene for charging in 3GPP



- Charging Levels
- Bearer, Subsystem and Service charging

- Charging Methods
- Online versus Offline charging

- Billing Arrangement for Charging
- Pre- versus post-paid, Inter-operator

Charging Levels



Application Level

- Charging for the IMS-Applications to come (e.g. MMTel, ...)
- AS conducts session-/event charging specific to the application
- IMS Bearer Traffic allows for charging concepts (e.g. Talk Bursts)

Subsystem Level

- Charging of SIP-initiated Sessions and Media Components
- CSCF conducts time-based IMS session or event charging
- Screening of SIP allows for detection of **SIP-based** P2P-Services

Transport Level

- Charging of data traffic at Access Network (i.e. PS Bearers)
- PCC conducts time-/ volume-based session charging
- Traffic Filtering allows for charging of selected applications

Charging Methods



Offline Charging:

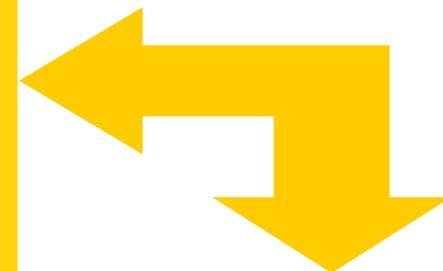
Charging mechanism where charging information **does not** affect, in real-time, the service rendered. The final result of this charging mechanism is the forwarding of CDR files to the Billing Domain.



RECORDING

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 bearer/session/service control is required. The mechanism comprises the execution of credit control and subscriber account balance management on the Online Charging System.

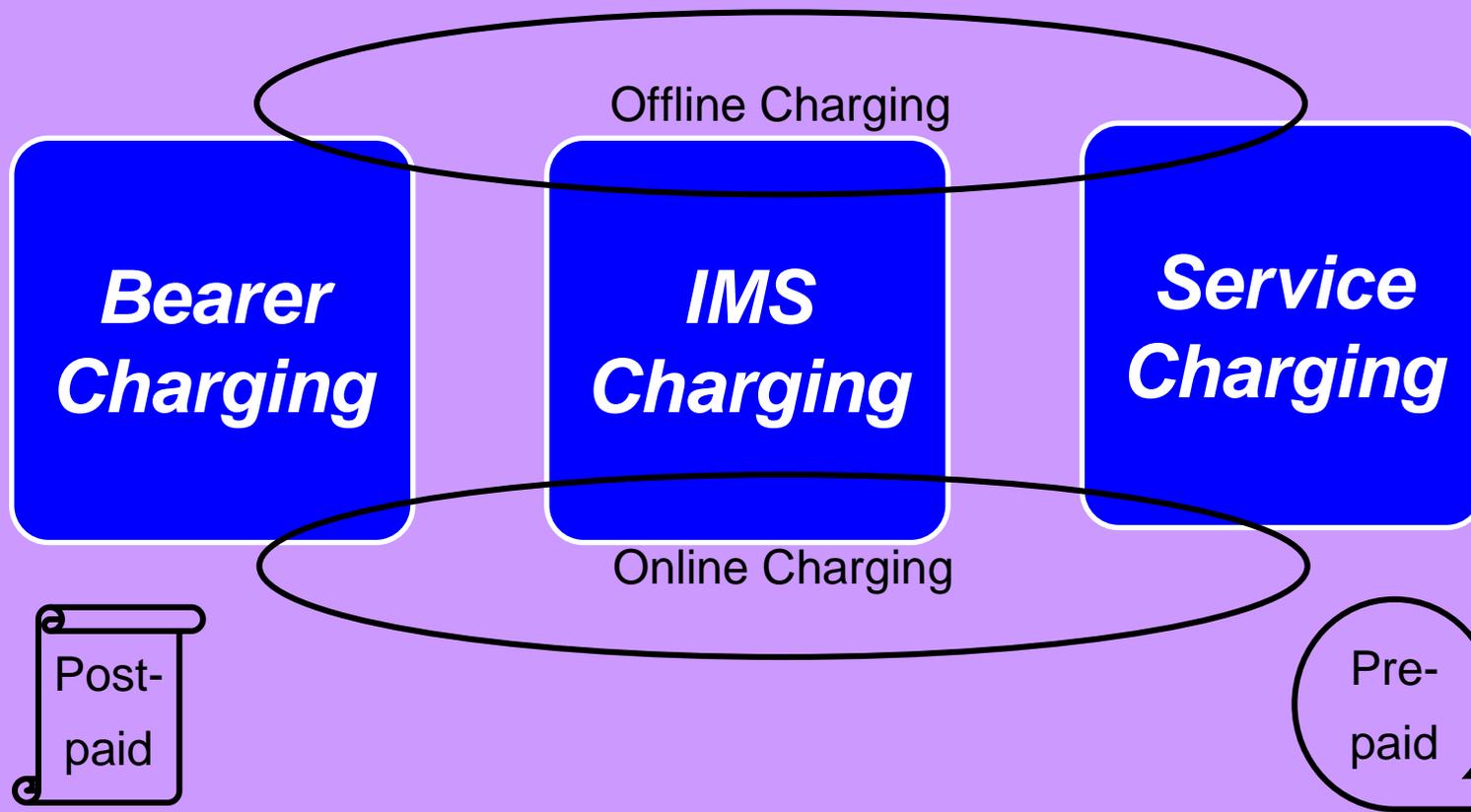


SUPERVISION

First synergy



Generic Charging Principles and Functions



Topics



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History of 3GPP Charging Management



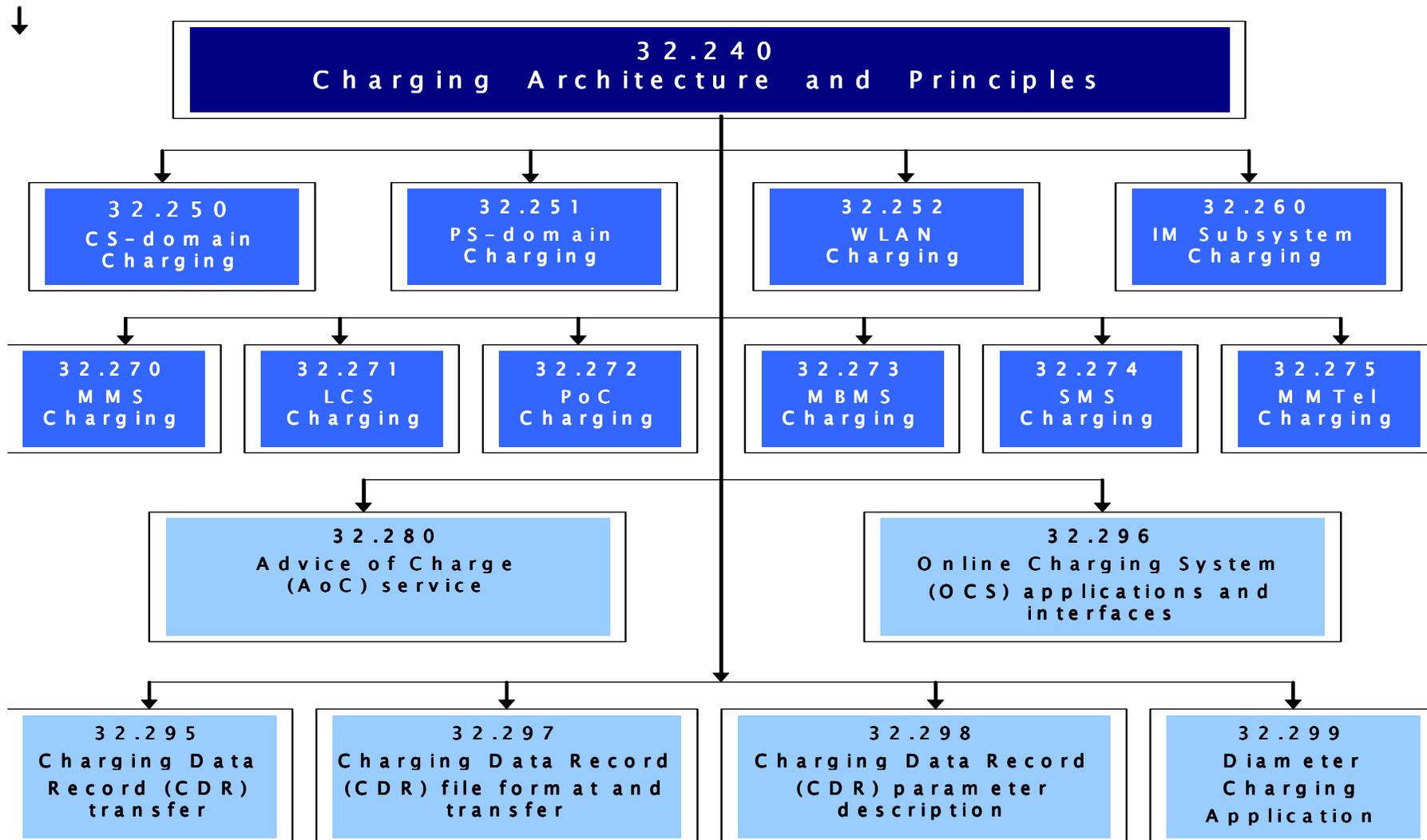
-  R99/Rel-4: CS and PS Charging
-  Rel-5 : IMS and MMS Charging
-  Rel-6/7 : Charging Architecture and Interfaces, WLAN, PoC, MBMS Charging
-  Rel-8 : EPC, SMS and MMTel Offline Charging, AoC service support
-  Rel-9 : MMTel Online Charging

Requirements & Architecture Specifications

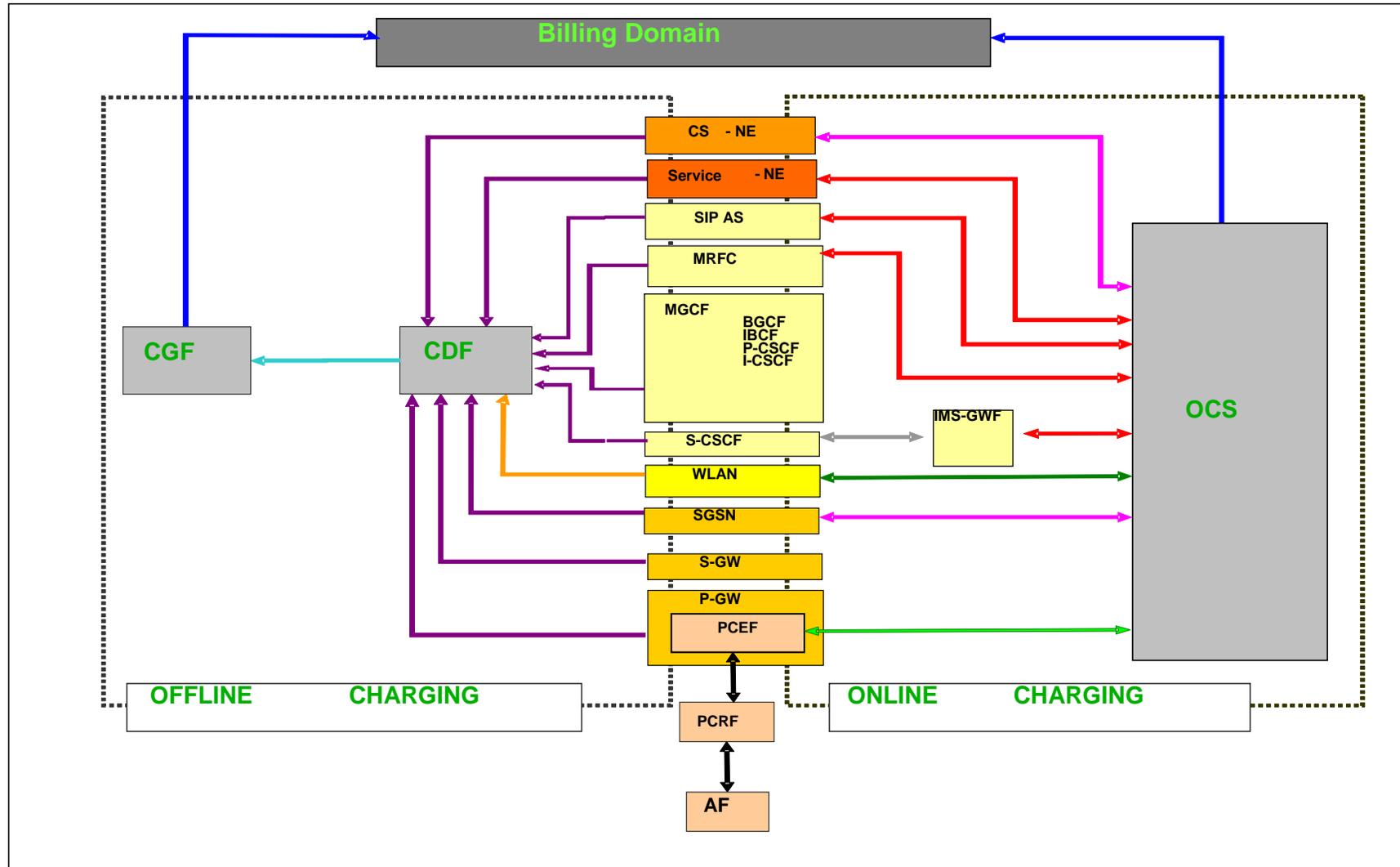


- 📶 TS 22.115 Service aspects; Charging and billing
- 📶 TS 32.240 Charging Architecture
- 📶 TS 32.250 – 260 Bearer Charging (CS,PS, WLAN and IMS)
- 📶 TS 32.270 – 275 Service Charging (MMS, LCS, PoC, MBMS, SMS, MMTel)
- 📶 TS32.280 AoC service
- 📶 TS 32.296 Online Charging System Architecture and Interfaces
- 📶 TS 32.295 – 299 Charging Interfaces (FTP/IRP/IPDR, GTP', ASN.1, Diameter)

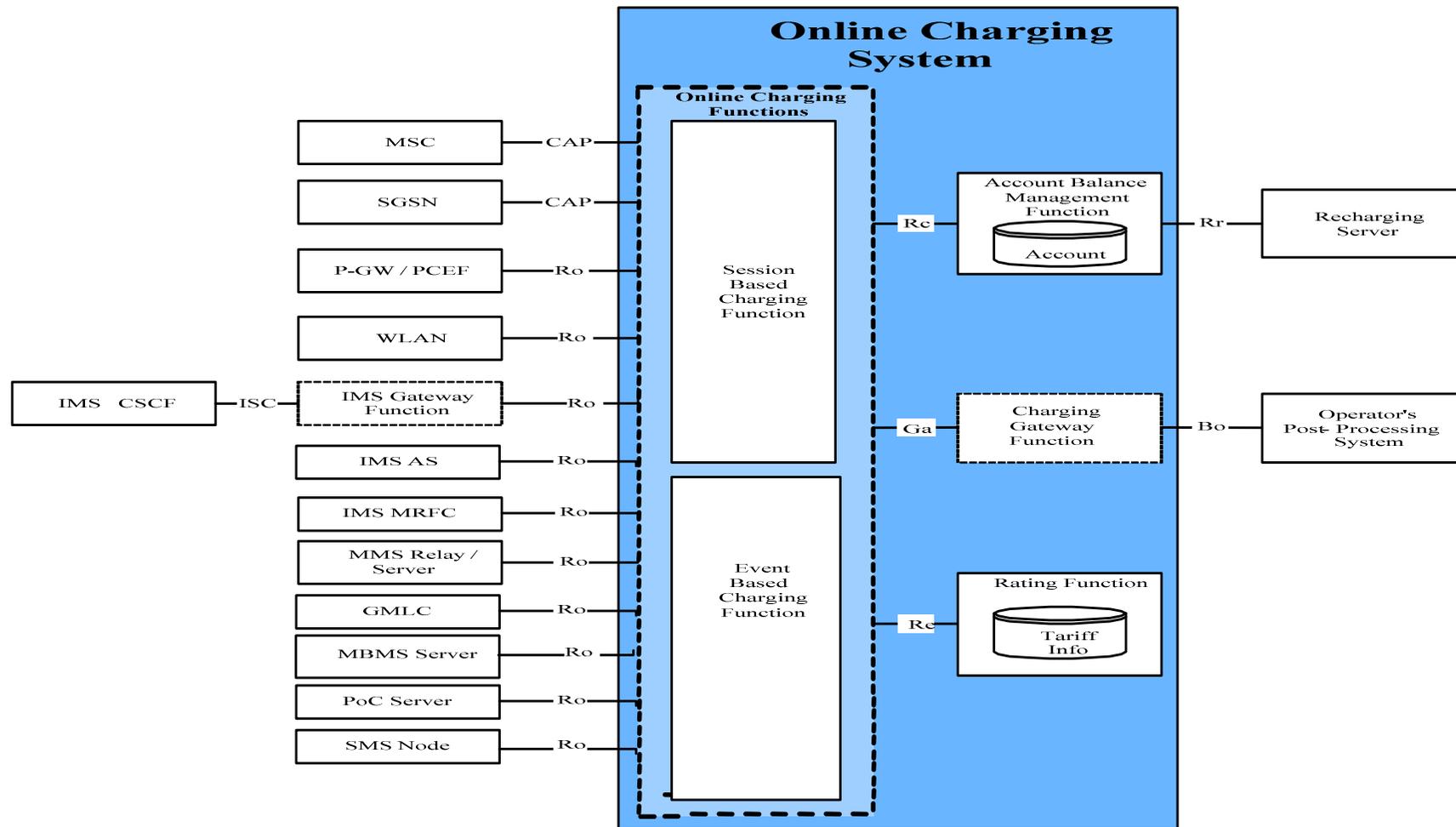
Specification hierarchy (32.240)



3GPP Charging Architecture (32.240)



Online Charging Architecture (32.296)



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Principles of Charging Data Collection

The function



- **Charging Trigger Function (CTF)**
 - Collects „Metrics“ from the core system, based on system specific triggers (e.g. signalling events)
 - Formats these metrics into charging events
 - forwards charging events to the CDF via Rf reference point (IETF Diameter Base Protocol)
- **Charging Data Function (CDF)**
 - Collects charging events and formats them into CDRs according to system specific rules
 - Forwards CDRs to CGF via Ga reference point
- **Charging Gateway Function (CGF)**
 - Provides non-volatile CDR file store
 - Uses Bx reference point for CDR file transfer to Billing Domain
- **Billing System/Domain**
 - Receives CDR files from CGF
 - No further standardisation in 3GPP



TAP3 in GSMA

Principles of Charging Interfaces



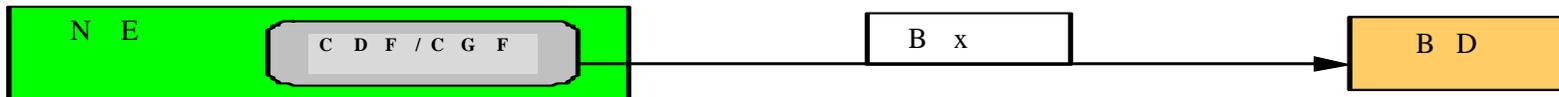
- CTF(Offline) -> CDF : Charging Events
- CDF → CGF: Charging Records = 1..n Charging Events
- CGF -> BS : Charging Data Files = 1..m Charging Records

- CTF(Online) -> OCS : Charging Events

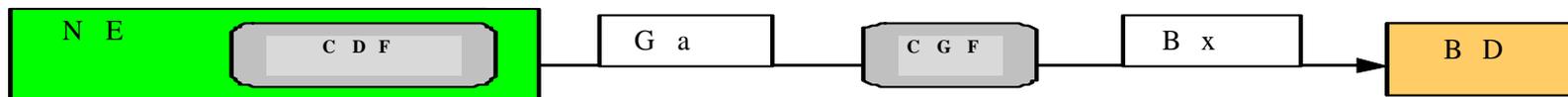
The logical options for Charging Functions



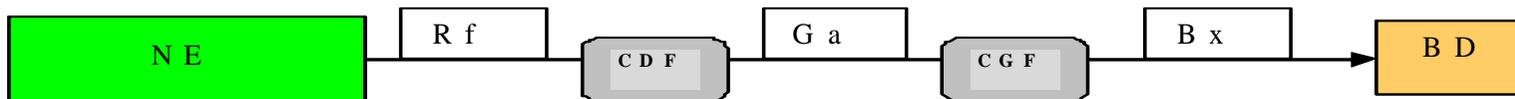
CDF and CGF integrated in the NE



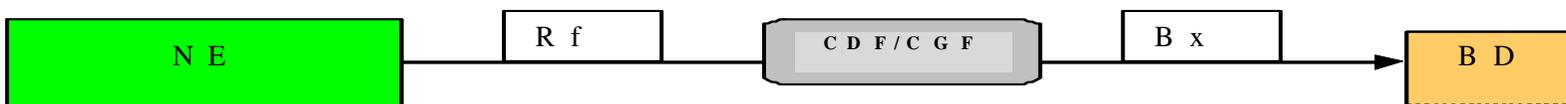
CDF integrated in the NE, CGF in a separate physical element



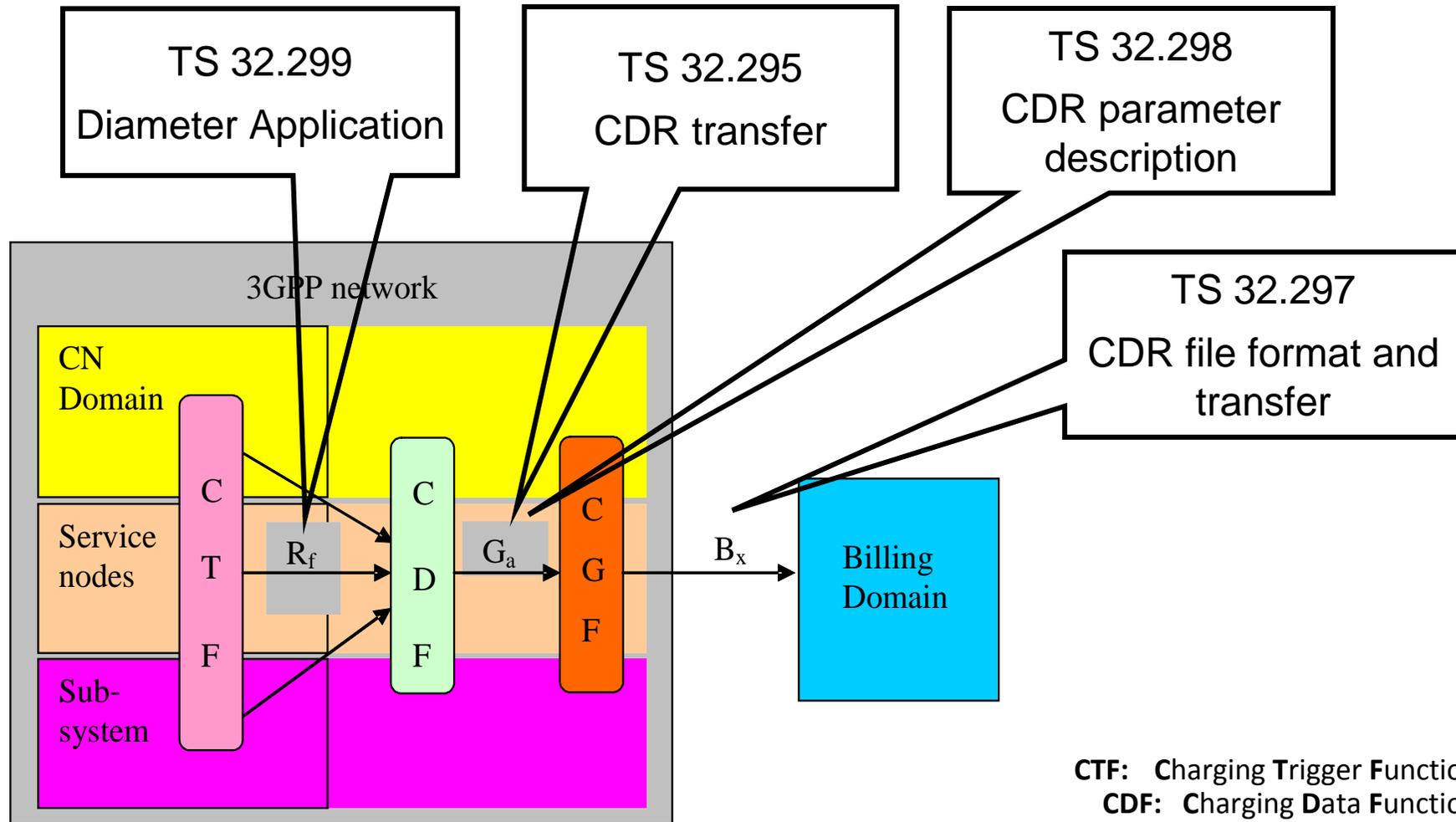
CDF and CGF in two separate physical elements



CDF and CGF in the same separate physical element



Offline Charging Interfaces (32.240)



BD: Billing Domain. This may also be a billing system/ billing mediation device.

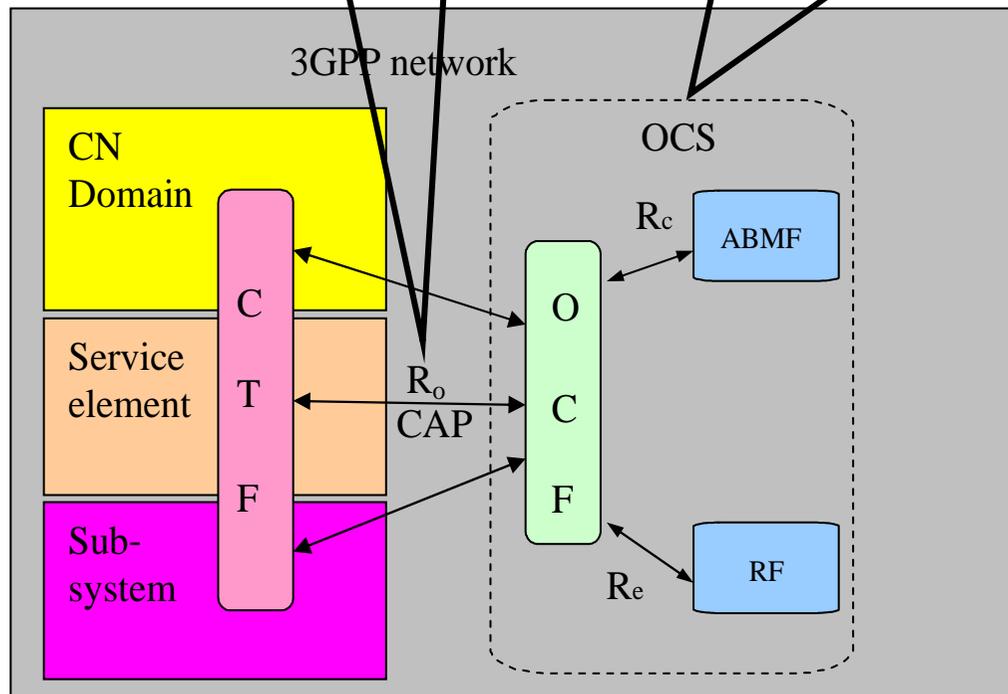
CTF: Charging Trigger Function
CDF: Charging Data Function
CGF: Charging Gateway Function

Online Charging Interfaces (32.240)



TS 32.299
Diameter Application

TS 32.296
OCS Applications and Interfaces

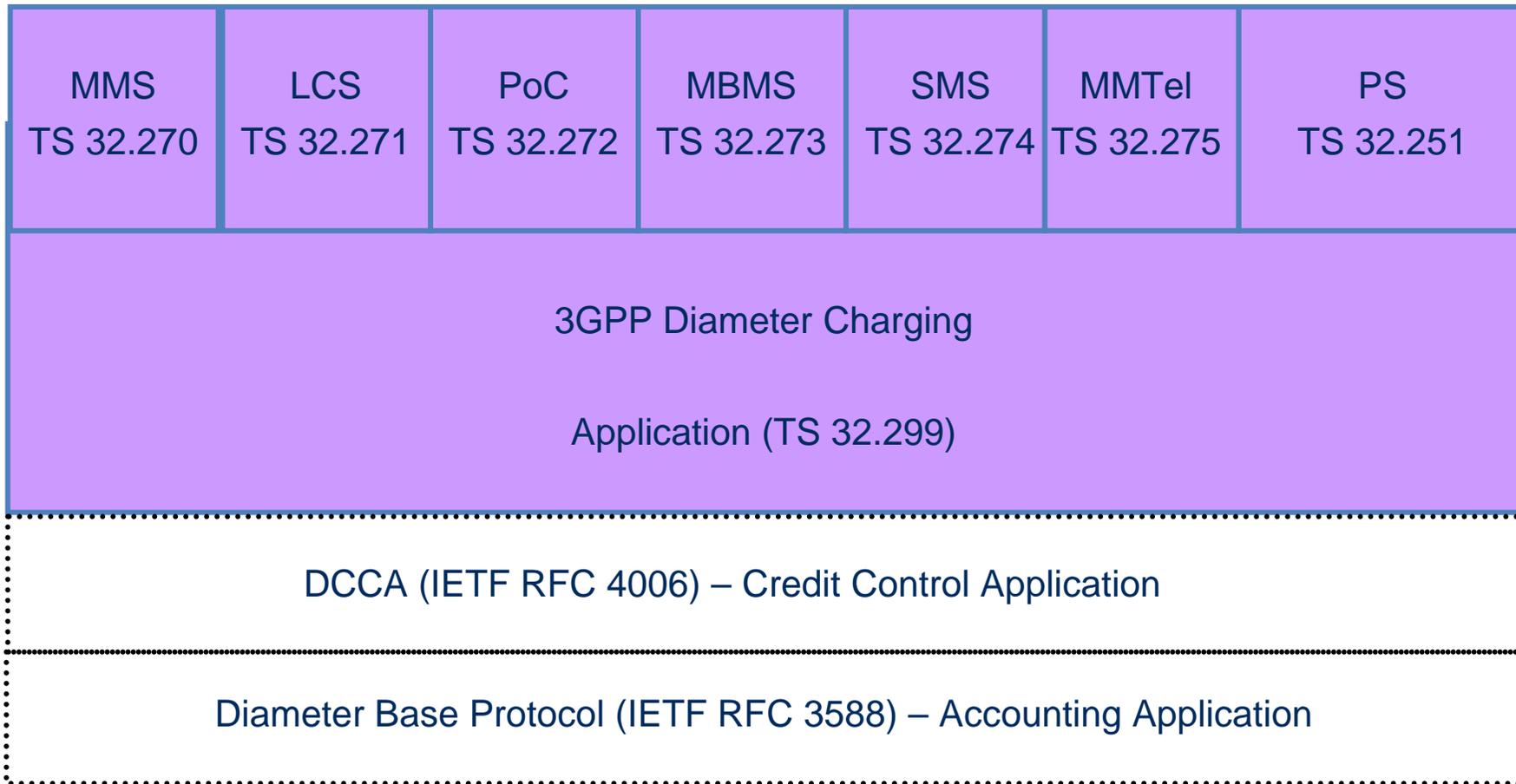


CTF: Charging Trigger Function
OCF: Online Charging Function
ABMF: Account Balance Management Function
RF: Rating Function

Charging Event Interface Diameter Application



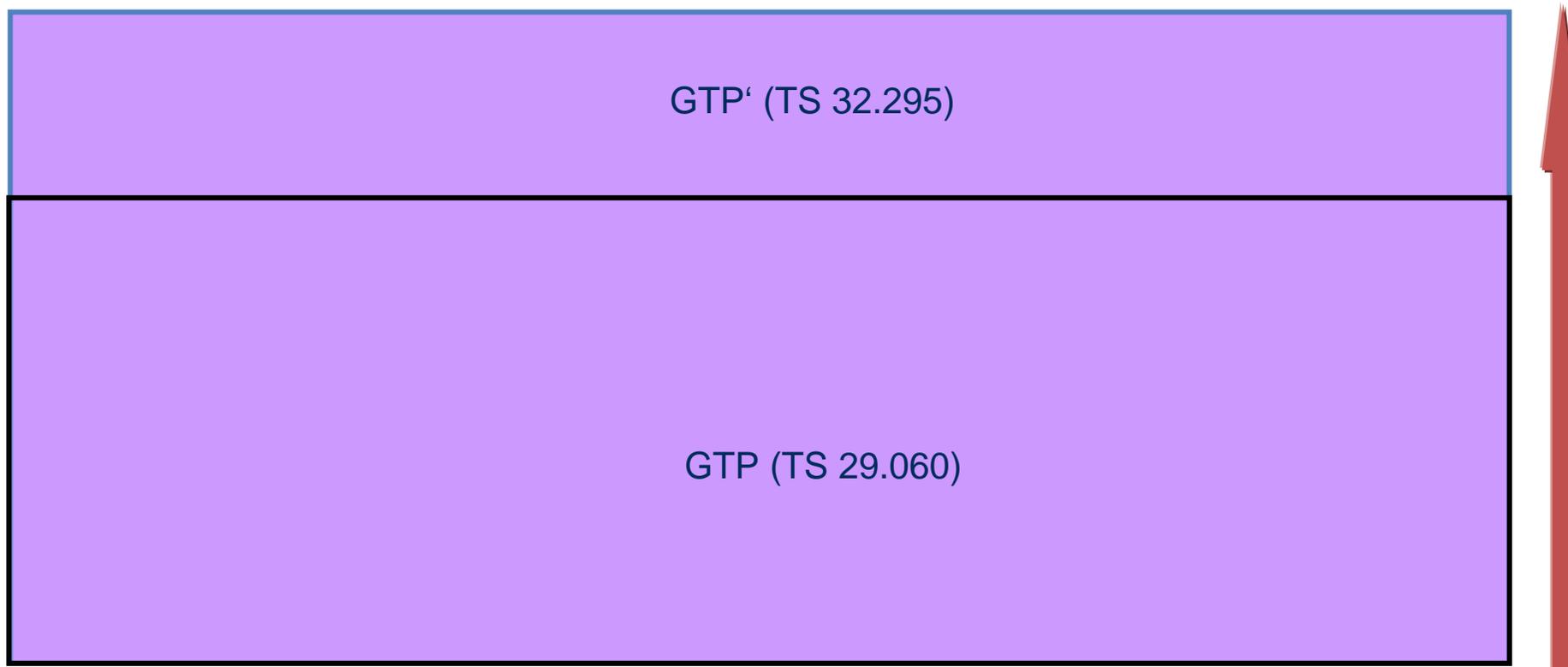
Top-down
view



Charging Data Interface CDR transfer



The CDR transfer (GTP') utilizes the 3GPP GTP protocol



Charging Data File Interface File Transfer



📶 FTP file transport is based on IETF RFC 959

Other options for the CDR file transfer

📶 File Transfer IRP based on 3GPP TS 32.341, TS 32.342, TS 32.343 and TS 32.344

📶 IPDR file transfer based on ATIS IPDR/File Transfer Protocol and IPDR streaming protocol based on IPDR/SP

Charging Interfaces Summary



Charging Event Interface

- **TS 32.299** : Rf – Ro – Wf – Wo – Gy
- Diameter Accounting and Credit Control Application
- **TS 32.296** : Re– Rc – (Rr)
- Diameter based Application

Charging Record Interface

- **TS 32.295** : Ga – Gz
- GTP'

Charging File Interface

- **TS 32.297** : Bx
- FTP / File Transfer IRP / IPDR File Transfer

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Rel-10 CH Work Items

NGN	Feature: AoC service support enhancements
470047	WT: AoC enhancements in Charging
EPS (SA2)	Feature: Local IP Access and Selected Internet IP Traffic Offload
46039	WT: Charging for LIPA_SIPTO
EPS (SA2)	Feature: IP Flow Mobility and seamless WLAN offload
47021	WT: Charging for IFOM
44063	WT: IWLAN mobility charging
47045	WT: Add solutions for Rc reference point

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Charging Interfaces

AoC service support (32.280)

