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Technical Specification

**User Group;
Quality of ICT Services;
Requirements and Method for checking Metering and
Billing systems**

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Foreword

This Technical Specification (TS) has been produced by ETSI User Group (USER).

The standardization work described in the present document was funded by the European Commission, Enterprise and Industry Directorate-General, as part of the 2009 ICT Standardisation Work Programme and executed by ETSI.

The present document has been produced within the ETSI Special Committee USER GROUP (USER) by the Specialist Task Force (STF) 375. Several documents provided by European Telecommunications regulatory bodies have been used to develop the present document. They are detailed in TR 102 847 [i.5].

Introduction

A significant difference rate between theoretical and actual bills has been identified by independent observers. in the current metering and billing systems used by the Service Providers.

Several Service Providers, Administrations and Users Associations have intended to reduce this difference rate in implementing rules in order to make users more confident in the reliability of their bills.

Nevertheless, due to the complexity of this issue and in absence of any available formal standard in this area, the current practices are hindered by significant limitations. The purpose of the present document is to fulfil the gaps of the current practices in order to provide a reference that can be used for a continuous and trustworthy checking of metering and billing systems. Such a checking process is expected to contribute to a continuous quality improvement process.

The present document can be used to assess conformance by suitable internal and external parties.

1 Scope

The present document has been prepared to provide a model for designing and operating the checking of metering and billing processes and systems of Service Providers (SP). It does not provide any model for designing and operating metering and billing process systems.

The goal of this specification is to define a standardized checking process that could be implemented by any stakeholder and is auditable by a third-party, leading to trustworthy performance indicators about the integrity of billing issued by a Service Provider.

Because the checking process of this technical specification is end-to-end (i.e. using a "black box" approach from the actual Electronic Communications generation to the verifying of its billing), it is intended that these requirements are applicable to any kind of services offered by the Service Providers.

2 References

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

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ISO/IEC 17065: "Conformity assessment -- Requirements for certification bodies certifying products, processes and services".
- [2] CENELEC EN 45011: "General requirements for bodies operating product certification systems".

NOTE: Should become obsolete in 2012 and then replaced by ISO/IEC 17065.

- [3] BIPM: "The International System of Units", 8th edition.

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI EG 202 057-2: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 2: Voice telephony, Group 3 fax, modem data services and SMS".
- [i.2] ETSI EG 202 057-3: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 3: QoS parameters specific to Public Land Mobile Networks (PLMN)".
- [i.3] ETSI EG 202 057-4: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 4: Internet access".
- [i.4] ETSI EG 202 765-4: "Speech and multimedia Transmission Quality (STQ); QoS and network performance metrics and measurement methods; Part 4: Indicators for supervision of Multiplay services".
- [i.5] ETSI TR 102 847: "User Group; Standardization and regulation references in the Metering and Billing area".
- [i.6] ETSI EG 202 765-2: "Speech Processing, Transmission and Quality Aspects (STQ); QoS and network performance metrics and measurement methods Part 2: Transmission Quality Indicator combining Voice Quality Metrics".
- [i.7] ETSI TS 102 846: "User Group; Conformity assessment; Requirements for bodies providing audit and certification for metering and billing systems".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

automated robot: remotely operated machine that is able to generate Electronic Communications according to a predefined plan and to report about the exact execution of these Electronic Communications with an appropriate level of accuracy and traceability

NOTE: Its main functions are:

- Electronic Communication planning;
- Electronic Communication execution; and
- Electronic Communication logging.

billing: activity, within a Service Provider, which aims at charging a customer either by producing an invoice or by decreasing a prepaid account

NOTE: Billing usually involves three main types of activity:

- Guiding is the allocation of a specific event to a specific customer;
- Rating is the computation of a price of an event according to a rate plan; and
- Charging is the imputation of the financial charge to the Customer.

billing error rate: within a set of Electronic Communications, the ratio of the total number of Electronic Communications having breached at least one of the billing integrity principles divided by the total number of electronic communications in the set

billing integrity principles: principles that must be fulfilled to state that the billing activity of a Service Provider is correct

NOTE: According to the present document there are 5 billing correctness principles (see clause 4).

billing and metering checking process: process used to prove that a Service Provider billing activity complies with the billing integrity principles

NOTE: The proof described in the present document is based on a statistical approach, the definition of a Stratified Sample of Electronic Communications (SSEC) and an end-to-end checking that is based on a "black box" approach.

billed quantity valuation methods: set of mathematic methods allowing to transform raw quantities into a billed quantities

Call Detail Record (CDR): formatted collection of information about a chargeable event (e.g. time of call set-up, duration of the call, amount of data transferred, etc.) for use in billing and accounting

continuous basis: approach that takes into consideration the constantly evolving nature of communications networks

NOTE: Because metering and billing processes and systems evolve on a continuous basis (incidence and update), the verification of billing has to evolve accordingly and to check the billing integrity on a similar way. "Continuous basis" excludes "one shot audit approach" where verification is performed once per period (typically once per year).

customer: user who is responsible for payment for the Electronic Communication services

electronic communication: service that help people communicate

NOTE: Electronic Communication types includes but are not limited to voice call, video call, conference call, email, SMS, MMS, USSD, web access, instant messaging, content download, TV broadcasting, etc. Electronic communications may involve one or several interconnected networks. An Electronic Communication may lead to billing of a financial charge to a Customer of the Service Provider.

independent observer: entity is said an Independent Observer if it has two characteristics: independency and externality

NOTE: The independency clause means that the entity has some level of independence from the department in charge of operating the billing within the Service Provider. The externality means that the entity does not have to understand all the complexity of the information systems and network components involved in the billing of a Service Provider.

metering principles: set of non ambiguous principles set by a Service Provider to define and meter the Electronic Communications service it offers to its Customers

prerequisites: list of basic principles and statements and of requirements for the Tariff Information

pricing: set of Billed Quantity Valuation Methods and Unit Prices

publishing mode: mean by which billing information is provided to the customer of the Service Provider

NOTE: Publishing mode may include but are not limited to paper invoice, electronic invoices, web sites, Call Centres, Intelligent Voice Response Units, SMS servers, USSD servers, etc.

Service Provider (SP): organization that provides Electronic Communications services to users and customers

Stratified Sample of Electronic Communications (SSEC): sample of Electronic Communications used to conduct the billing and metering checking process

NOTE: The sample of Electronic Communications is designed according to statistical method so as to provide a reasonable evidence that the billing integrity is fulfilled.

tariff information: set of principles defined by a Service Provider to price the Electronic Communications service it offers to its customers

unambiguous: set of rules is said Unambiguous if it can be understood and checked by a Customer by its own means without requesting to understand the internality of a Service Provider systems and processes

unit price: given price for a unit billed quantity

3.2 Abbreviations

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

APN	Access Point Name
BIPM	Bureau International des Poids et Mesures
CDR	Call Detail Record
DSL	Digital Subscriber Line
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IN	Intelligent Network
MMS	Multimedia Message Service
SIM	Subscriber Identification Module
SMS	Short Message Service
SP	Service Provider
SSEC	Stratified Sample of Electronic Communications
TV	Television
URL	Uniform Resource Locator
URL	Universal Resource Location
USSD	Unstructured Supplementary Service Data
VOIP	Voice over IP
VPLMN	Visited Public Land Mobile Network
VPN	Virtual Private Network

4 Billing Integrity Principles

The present document adopts a process approach for providing evidence measured by an Independent Observer according to a standardized process that a Service Provider complies with the following five billing integrity principles:

- Principle 1: Electronic Communications metering (success status, time, duration, volume) is accurate.
- Principle 2: Unsuccessful Electronic Communications are not billed or are billed at null price.
- Principle 3: Each successful Electronic Communication is charged.
- Principle 4: Billed Electronic Communications are priced in accordance with published Metering Principles and Tariff information (see clauses 6.1 and 6.2).
- Principle 5: Electronic Communication billing information details provided to customers are complete, sufficient, unambiguous and correct whatever the Publishing mode.

According to the present document, evidence of compliance of billing integrity principles is based on the actual generation and verification of the billing of a Stratified Sample of Electronic Communications (SSEC), designed according to a predefined statistical method and performed on a continuous basis by automated robots.

As a result of the billing and metering checking process, billing and metering checking reports are produced on a predefined frequency and archived according to predefined storage policy.

5 Compliance Statement

The present document describes a set of clauses that shall be included in a billing and metering checking process of a Service Provider to claim compliance with the present document.

Compliance shall be verified according to clause 6 (Prerequisites) and clause 7 (Billing and Metering Checking Process steps) of the present document.

The billing and metering checking process itself can be executed by an internal department of the Service Provider (Full Internalization), outsourced to an external provider of monitoring services (Full Outsourcing) or by a combination of both (Mixed Model). The present document does not recommend any special type of organisational model.

The actual validation that the billing and metering checking process of a Service Provider is performed according to the present document shall be performed by a third party according to ISO/IEC 17065 [1] (or until 2012 to EN 45011 [2]) and TS 102 846 [i.7].

It is important to note that this technical specification deals with the checking process of billing and not with the actual systems and process used for performing metering and billing.

6 Prerequisites

Before implementing the billing and metering checking process described in the present document, the two following prerequisites shall be fulfilled:

- Prerequisite 1: Metering Principles.
- Prerequisite 2: Tariff Information.

NOTE: The exact legal status of Metering Principles and Tariff Information depends on the contract agreed between the Customer and the Service Provider (In several cases, such contracts are not in place). The issue of the legal value of the Prerequisite is outside the scope of this technical specification. For the present document, the requirement is limited to the fact that the requested information is publicly available.

6.1 Metering Principles

6.1.1 Definition of Successful and Unsuccessful Status

- [6.1.1.1] The Service Provider shall define methods and principles to define if an Electronic Communication is successful or unsuccessful and whether or not it should lead to a chargeable item.
- [6.1.1.2] The principles of [6.1.1.1] shall be differentiated for every type of Electronic Communication offered by the Service Provider to its customers: voice call, video call, conference call, SMS, MMS, USSD, Web access, Instant Messaging, content download, etc.
- [6.1.1.3] The principles of [6.1.1.1] shall include the case of Electronic Communications spanning over more than one network. If Service Provider has not full management of all involved networks, rules shall be defined, for example based on signalisation exchanged at the interconnect point.