INTERNATIONAL TELECOMMUNICATION UNION

CCITT

E.433

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

BILLING INTEGRITY

Recommendation E.433

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation E.433 was prepared by Study Group II and was approved under the Resolution No. 2 procedure on the 16th of June 1992.

CCITT NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication Administration and a recognized private operating agency.

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BILLING INTEGRITY

1 Considerata

A correct bill is of great importance to the customer and the network provider. The customer expects the bill to correctly reflect his use of the network as well as receiving it in a timely manner. Incorrect bills cause the customer to seek reconciliation, which influences the customers perception of network quality. The network provider incurs expense in handling billing complaints, therefore correct bills satisfy both the customer and network provider.

2 Customer's perception of billing integrity

In general, billing integrity should be regarded as network performance related. However, aspects of the user's or customer's perception must be included to cover all associated Quality of Service (QOS), parameters e.g. marketing aspects.

In certain cases customers may perceive problems with billing which are, in fact, service related. This will be true when the service available does not match the service requested or the network capability used.

Administrations should consider, in such cases, whether this might be due to customer's difficulties, e.g. mis-dialling, the use of terminal equipment which fails to indicate that charging has commenced or fraud action. There may be other examples which warrant further study.

3 Scope

Billing is an area that is very dependent on an Administration's particular structure and commercial objectives.

The billing integrity is not part of serveability performance which describes the response of the network during the establishment, retention and release of a service connection.

It should be noted that the administrative procedures including operator charging functions of billing, are also of major importance. This point, however, is outside the scope of this Recommendation.

The billing integrity can be related to:

- service supplying;
- service use;
- service removal.

The billing error probability, distinguishing between service supplying, service use and service removal, normally refers to the number of customers but, in a case of service use, mainly to the number of completed calls.

The charge for the use of the network is based on tariffs set for its use. It is up to the individual Administration to set the tariffs (see the D-Series Recommendations) and related components/criteria, e.g. call attempts, holding time[1)], conversation time[1)], services provided, traffic volume, time of the year/week/day, origin/destination.

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1) The record of duration may be dependent upon the interval between time stamps and/or techniques applied.

As billing integrity depends heavily upon charging functions of the network, it is felt appropriate to set parameters and take measurements that can be used to monitor and measure the various network components, including network components used by operators, used to convey answer charge signals or data.

4 Charging correctness

An important network related component of billing integrity is the charging correctness.

The charging correctness can be defined as "the probability that the network correctly charges the communication by type, destination, time location and duration".

The complementary estimator of charging correctness is "the probability of call charging error *Pe*", obtained from detailed analysis of observations and complaints by dividing the number of communications with incorrect charging *Na*, by the total communications *Nt*:

$$Pe = Na/Nt$$

The estimator can be split into under and overcharging probabilities:

– the probability that a call will be undercharged – *Pu*,

– the probability that a call will be overcharged – *Po*,

such that $Pe = Po + Pu$.

5 Charging correctness objectives

The charging correctness objective *Pc* is related to the probability of a call charging error *Pe*:

$$Pc = 1 - Pe$$

The objective value for *Pe* parameter, as specified at exchanged level is:

$$Pe \leq 10^{-4}$$ (see Recommendation Q.543)

6 Network parameters affecting charging

The following parameters should be taken into account when considering charging correctness:

a) the charging procedures;

b) the network technology especially at the exchange level;

c) answer charge signal received on unanswered calls;

d) answer charge signal received on recorded announcements or tones for which no charge should be incurred;

e) no answer charge signal received on answered calls;

f) answer sending delay (see Recommendation Q.543) (see Note);

g) timing for start/end of charging (see Recommendation Q.543) (see Note);

h) type of signalling system used.

Note – This may depend on the traffic load at exchanges.

Administrations are encouraged to pay due attention to the above points to ensure that the probability of charging error is reduced.

It should be noted that “charging points” are concepts used in certain networks where analysis and control of charging can be carried out. In principle such “charging points” should be as close to the calling subscriber as possible. However, in most national and international networks using SPC type exchanges, such “charging points” do not exists and the analysis and control of the charging process is performed independently.

7 Tariff/charging administration

The following information is given to assist in the identification of those functions which contribute to the whole procedure, up to sending out a bill to the customer. Due attention needs to be paid to these functions within an Administration to ensure that customers receive the correct bill.

- *Tariff administration* – To set and manipulate tariff in a network component. Tariff data could be centralised within a network, in each exchange or in an operations system. Tariff depends on tariff class (service, origin, destination, period of the day and day class).
- *Charging administration* – To secure charging functionality, to collect various data out of network and provide information for the billing, accounting and service provisioning.
- *Charging function* – Function within a network component that collects and manipulates charging information.
- *Tariffing* – Function to decide the tariff of a used service.
- *Pricing* – Function to decide price of a used service.
- *Billing* – Function to prepare bills to customers, to prompt payments, to obtain revenue, to take care of customer reclaims.
- *Accounting* – Function to share revenues between service providers.