INTERNATIONAL TELECOMMUNICATION UNION

CCITT

E.425

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

(10/92)

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

INTERNAL AUTOMATIC OBSERVATIONS

Recommendation E.425

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.425 was revised by Study Group II and was approved under the Resolution No. 2 procedure on the 30th of October 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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Recommendation E.425

INTERNAL AUTOMATIC OBSERVATIONS[1)]

(revised 1992)

1 Definitions

1.1 essential information (of internal automatic observations)

The answer seizure ratio (ASR) (see § 1.3) or answer bid ratio (ABR) (see § 1.4), whichever is appropriate in terms of attempts, completed attempts and percentage completed.

1.2 supplementary information (of internal automatic observations)

Information on signalling faults, subscriber behaviour and the network.

1.3 answer seizure ratio (ASR)

ASR gives the relationship between the number of seizures that result in an answer signal and the total number of seizures. This is a direct measure of the effectiveness of the service being offered and is usually expressed as a percentage as follows:

$$\text{ASR} = \frac{\text{Seizures resulting in answer signal}}{\text{Total seizures}} \times 100$$

Measurement of ASR may be made on a route or on a destination code basis.

1.4 answer bid ratio (ABR)

Gives the relationship between the number of bids that result in an answer signal and the total number of bids.

$$\text{ABR} = \frac{\text{Bids resulting in answer signal}}{\text{Total bids}} \times 100$$

ABR is expressed as a percentage and is a direct measure of the effectiveness of traffic from the point of measurement. It is similar to ASR except that it includes bids that do not result in a seizure.

2 Merits of internal automatic observations

The advantage of internal monitoring is that a large volume of records can be collected. The large volume of data obtained from an internal observation system allows day-to-day evaluation of network performance. Daily analysis of this information has proven invaluable in trouble detection, and, coupled with a good maintenance response, is instrumental in providing the best possible Quality of Service.[2)] The disadvantage is that this method does not have the capability of detecting tones or speech and therefore cannot present a complete representation of all call dispositions.

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1) This Recommendation also applies in case external monitoring equipment is used when a route is monitored constantly for all or a large (statistical significance) number of calls. Refer to Recommendation E.421, § 2.4.

2) Using these techniques one can improve the quality of service even when no distinction can be made between ring no answer, subscriber busy (or congestion indicated by congestion tone) and recorded announcement.

To overcome this disadvantage Administrations are advised to use Recommendation E.422 as well to supplement the data obtained from internal automatic observations.

3 Time of observations

The results of the ASR, ABR daily profile should be recorded. This data can be hourly, in groups of hours, or a total day.

4 Exchange of the results of observations

4.1 The essential information[3)] should be exchanged monthly (preferably by facsimile or telex) to all network analyses points of those Administrations who are interested (the analyses points can then make comparisons between different streams going to the same destination). If information on ASR or ABR can be supplied separately for direct routes and indirect routes via transit countries, this should also be exchanged as being essential information, including the name of the transit country involved.

4.2 With respect to supplementary data such as: signalling faults, failures due to calling subscriber, failures due to called subscriber and failures due to the network, a quarterly exchange of information is appropriate. Because different formats will be required, mail seems the most likely means to be used for exchanging supplementary data.

4.3 Besides the monthly and quarterly exchange of information, a direct contact on all aspects should be made (by telephone) as soon as action is required to prevent a persistent drop in the Quality of Service.

5 Classes of calls

The distinction between classes of calls (such as operator-operator, subscriber-subscriber and operator-subscriber) is considered useful in identifying problems relating to the Quality of Service. This can only be done if the language digit[4)] and some of the subsequent digits are analyzed.

6 Destination analysis from service observation data

Consideration should be given to include the dialled digits, as observed by the monitoring equipment, in the exchange of information, especially for the sake of destination analyses (see Recommendation E.420, Annex A).

7 Details about supplementary information for Signalling System No. 5

7.1 *Signalling faults*

- faulty signals;
- time-outs, the main item in this category being no proceed-to-send signal;
- busy flash. (Since busy flash is applied in many situations, including failures due to calling and called subscriber and the network, it is considered useful to distinguish between busy flash received within 0-15 seconds, 15-30 seconds and after 30 seconds when making destination analysis.)

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3) The Administration supplying the data must indicate whether the ASR or ABR is used.

4) The language or discrimination digit is inserted automatically, or by the operator, between the country code (see Recommendation E.161) and the national (significant) number.

7.2 *Ineffective calls associated with the calling subscriber*

Premature release, to distinguish between release before or after having received ringing tone; equipment which can detect audible signals is required.

7.3 *Ineffective calls associated with the called subscriber*

Ringing tone no answer cannot be detected without equipment which can detect audible signals.

7.4 *Network*

Here only the busy flash can be detected without equipment which can detect audible signals.

8 Equipment impact

8.1 Administrations are recommended to consider inclusion of appropriate facilities in existing and new exchanges to record all or some of the following phases:

a) Calls switched to speech position, then:
   1) answered;
   2) unanswered, but released by calling party;
   3) timed out awaiting answer;
   4) a call failure signal (busy flash or equivalent) received;
   5) timed out after clearback signal;
   6) faulty signal received after answer.

b) Calls failing to switch to speech position:
   1) clear forward signal received;
   2) insufficient digits received;
   3) congestion on international circuits;
   4) faulty signals received into exchange;
   5) signalling fault into next exchange;
   6) time out while signalling to next exchange;
   7) congestion signal received from next exchange;
   8) vacant number received;
   9) busy subscriber signal received;
   10) line out of order signal received;
   11) transferred subscriber signalreceived.

As a minimum requirement one should be capable of determining the answer seizure ratio (ASR) or the answer bid ratio (ABR). This recording can be done by off-line processing of call records if they contain some more information than the information already required for international accounting.

8.2 Another way to assemble date on the Quality of Service (QOS) on outgoing circuit groups is through event counters. Five event counters already give a reasonable amount of information, three of them being common to the Signalling Systems No. 5, No. 6 and R2: seizure, answer and busy signals[5)].

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5) In case the event counting is used to analyze the quality of service to a particular destination, the counting should be done separately for each signalling system.

Signalling System No. 5

The number of:

- seizing signals sent;
- end-of-pulsing (ST) signals sent;
- proceed-to-send signals received;
- busy flash signals received;
- answer signals received.

Signalling System No. 6

The number of:

- initial address messages (IAM) sent;
- congestion (switching-equipment; circuit groups; national network) signals, call-failure signals and confusion signals received;
- address-complete (subscriber-free, charge; subscriber-free, no charge; subscriber-free, coinbox; charge; no charge; coinbox) signals received;
- subscriber busy signals received;
- answer (charge; no charge) signals received.

Signalling System R2

The number of:

- seizing signals sent;
- congestion [national network (A4 or B4); international exchange (A15)] signals received;
- address complete (charge; subscriber's line free, charge; subscriber's line free, no charge) signals received;
- subscriber line busy signals received;
- answer signals received.