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APPENDIX I

(to Recommendation Q.764)

Contents of the interface elements between

the ISDN user part and the SCCP

These interface elements are defined in SCCP Recommendations (Q.711-Q.716) and are included here for information.

I.1 *Contents of the REQUEST type 1*

The REQUEST type 1 interface element may contain the following parameters:

— connection identification (for further study);

— receipt confirmation selection;

— expedited data selection;

— quality of service parameter set.

I.2 *Contents of the REQUEST type 2*

The REQUEST type 2 interface element may contain the following parameters:

— network indicator (for further study);

— protocol class;

— credit;

— connection identification (for further study);

— source local reference;

— originating signalling point code;

— reply request;

— refusal indicator.

I.3 *Contents of the REPLY*

The REPLY interface element may contain the following parameters:

— source local reference;

— protocol class;

— credit;

— connection identification (for further study).

Recommendation Q.766

PERFORMANCE OBJECTIVES IN THE INTEGRATED SERVICES DIGITAL NETWORK APPLICATION

1 Introduction

This Recommendation gives the requirements of the Integrated Services Digital Network (ISDN) application call control service supported by Signalling System No. 7.

In Recommendation Q.706, the Message Transfer Part performance is described. The Message Transfer Part supports the ISDN application of Signalling System No. 7 and provision of a signalling network to support the ISDN application must take account of the performance of the Message Transfer Part and the requirements of the ISDN application. For example, taking account of the message transfer times in Recommendation Q.706 and the requirements for message transfer times between two ISDN exchanges, a figure may be derived for the total permissible number of signalling links in tandem for a particular call.

2 Signalling availability

2.1 *Signalling route set availability*

The availability of a signalling route set is determined by the availability of the individual components of the signalling network (signalling links and the signalling points) and by the structure of a signalling network.

The availability of a signalling route set should not be less than 0.99998, corresponding to a downtime of 10 minutes per year for a user signalling relation.

2.2 *Signalling network availability*

The availability of the signalling network should be sufficiently high as to meet the signalling route set downtime objectives stated in § 2.1. The signalling network architecture selected will strongly influence the availability. In general, the greater the number of link sets in tandem in a signalling route set the more redundant signalling paths that will be needed to meet the availability objective for the signalling route set or user signalling relation.

3 Signalling dependability

3.1 *General*

The ISDN application is different from other applications, such as telephony and data, in that there may be multiple paths involved for any given ISDN call. There may be several circuits (e.g. telephone conferencing) for either telephony or data and non-circuit related connections for access to data bases or for terminal-to-terminal control. This diverse set of uses may require closer control of the signalling network resources than might be required for other more simple applications.

3.1.1 *Probability of false operation*

By means of error detection (see Recommendation Q.703) as well as transmission fault indication (see Recommendations G.732 [1] and G.733 [2], it is ensured that, overall, not more than one in 10^8 of all signal units transmitted is accepted that, due to errors, will cause false operation.

3.2 *Probability of signalling malfunction*

Unsuccessful calls may be caused by undetected errors, loss of messages, or messages delivered out of sequence (during emergency situations within the signalling network) and may result in:

— incomplete call set-up,

— misrouted calls (e.g. connection of wrong numbers),

— calls routed correctly but mishandled (e.g. false clearing),

— inability to access a data base.

Considering the above conditions and the performance for the Message Transfer Part, no more than 2 in 10^5 (provisional value) of all ISDN calls should be unsuccessful due to signalling malfunction.

Note — No more than 1 in 10^5 of all ISDN *circuit connections* should be unsuccessful due to signalling malfunction.

4 Signalling delay

4.1 *Functional reference points and transfer time components*

Figure ccitt-35600, (M), p.

4.2 *Delays*

4.2.1 **cross-office transfer time, T↓c↓u**

$T_{c\backslash du}$ is the period which starts when the last bit of the signal unit leaves the incoming signalling data link and ends when the last bit of the signal unit enters the outgoing signalling data link for the first time. It therefore includes the queuing delay in the absence of disturbances but not the additional queuing delay caused by retransmission.

4.2.2 **user handling time, T↓h↓u**

$T_{h\backslash du}$ is the period which starts when the last bit of the message has entered the upper layer functions and ends when the last bit of the derived message has left the upper layer functions.

4.2.3 *Objectives for cross-office transfer time, $T_{c\backslash du}$*

The figures in Table 1/Q.766 are the objectives for the cross-office transfer time $T_{c\backslash du}$ for the ISDN signalling points in the signalling network. These figures are related to a signalling bit rate of 64 kbit/s.

H.T. [T1.766]

TABLE 1/Q.766 | u1)

lw(60p) | lw(60p) | lw(30p) | lw(30p) .

Tableau 1/Q.766 [T1.766], p.

A processing intensive message is one that arrives at an exchange and requires detailed examination (and possibly modification) before it is transmitted to the next exchange.

A simple message is one that requires little or no examination or modification (typically only label translation) before it is transmitted to the next exchange.

4.3 *Effect of retransmission*

As a consequence of correction by retransmission, not more than one in 10^4 signals should be delayed more than 300 ms as a long-term average. This requirement refers to each signalling link.

This requirement is laid down in order to ensure satisfactory answer delays.

5 Signalling system limitations

5.1 *Labelling potential*

5.1.1 *Signalling points*

The label of the Signalling System No. 7 for the ISDN application provides the potential to identify 16 | 84 signalling points.

5.1.2 *Number of circuits in a user signalling relation*

There may be up to 4096 circuits (4096 channels in each direction) for each user signalling relation.

5.1.3 *Number of SCCP connections in a user signalling relation*

There may be up to 2^{24} SCCP connections available at an ISDN signalling point. All of these may be available for any given user signalling relation, but must be shared over all signalling relations.

5.2 *Number of ISDN call identities at a signalling point*

There may be up to 2^{24} (value for further study) simultaneous ISDN calls at a signalling point with the 2^{24} call identities available. The use of ISDN call identities is for further study.

References

[1] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s* , Rec. G.732.

[2] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 1544 kbit/s* , Rec. G.733.

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