PERFORMANCE OBJECTIVES IN THE ISDN APPLICATION

CONTENTS

FIGURE

TABLE

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 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 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 section 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 CCITT Recommendation G.732[1] and G.733[2], it is ensured that, overall, not more than one in 108 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 (caused by 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 of 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.

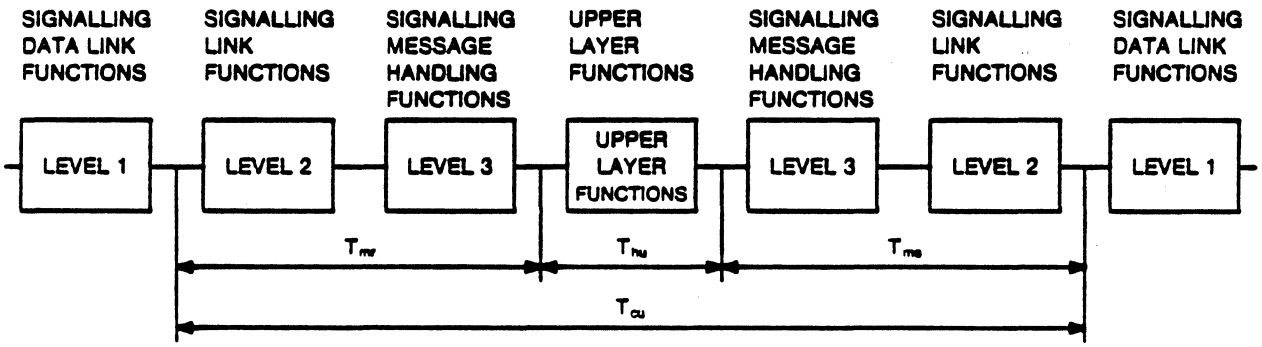

Figure 1/Q.766 - Functional diagram of the cross-office transfer time

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4.2 Delays.

4.2.1 Cross-office transfer time T_{cu}. T_{cu} 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_{hu}. T_{hu} 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_{cu}. The figures in Table 1/Q.766 are the objectives for the cross-office transfer time T_{cu} for the ISDN signalling points in the signalling network. These figures are related to a signalling bit rate of 64 kbit/s.

TABLE 1/Q.766[1]
Cross-office transfer time

Message type	Exchange call attempt loading	Cross-office transfer time T_{cu} (ms)	
		Mean	95%
Simple (e.g., answer)	Normal	110	220
	+ 15%	165	330
	+ 30%	275	550
Processing intensive (e.g., IAM)	Normal	180	360
	+ 15%	270	540
	+ 30%	450	900

[1] Provisional values

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 immediately 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 Labeling potential.

5.1.1 Signalling points. The label of the Signalling System No. 7 for the ISDN application provides the potential to identify 16 777 216 signalling points. *

5.1.2 Number of circuits in a user signalling relation. There may be up to 16 384 circuits (16 384 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 16 777 216 virtual circuits 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 16 777 216 simultaneous ISDN calls at a signalling point with the 16 777 216 call identities available. The use of ISDN call identities is for further study.

[1] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s*, Vol. III, Fascicle III.3, Rec G.732.

[2] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 1544 kbit/s*, Vol. III, Fascicle III.3, Rec G.733.