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INTEGRATED SERVICES DIGITAL NETWORK (ISDN) OVERALL NETWORK ASPECTS AND FUNCTIONS

NETWORK PERFORMANCE OBJECTIVES FOR PACKET MODE COMMUNICATION IN AN ISDN

ITU-T Recommendation I.354

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T 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 World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation I.354 was prepared by the ITU-T Study Group XVIII (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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Recommendation I.354**NETWORK PERFORMANCE OBJECTIVES FOR PACKET MODE
COMMUNICATION IN AN ISDN***(Helsinki, 1993)***1 Introduction**

This Recommendation specifies speed, accuracy, and dependability performance parameters and worst-case objectives for packet switched connection types in an ISDN.

The defined parameters and objectives apply to connection establishment, user information transfer, and clearing in switched packet mode calls and to user data transfer in PVCs. Worst case mean and 95% probability values are specified for each virtual connection portion type defined in Table 1. The term "worst case" means that these values should be met during the normal busy hour in the worst performing virtual connection portion used. The busy hour for connection establishment and release and the busy hour for the user information transfer might not be coincident.

NOTE – Cases where the network is in overload condition are not covered by this Recommendation.

This Recommendation does not address the use of circuit mode bearer services to provide access to a PSPDN (case A of Recommendation X.31).

It is recognized that increased integration in the future may allow for a tightening of these specifications.

2 Performance model and reference events

The performance model and reference events (REs) defined in Recommendations X.134 to X.136 apply in this Recommendation with the following interpretations and amendments.

- 1) The correspondence between Recommendations X.135 and X.136¹⁾ portion boundaries and the measurement points (MPs) used in this Recommendation is shown in Table 1. This association places the MPis on the international side of the ISCs.
- 2) The X.134 incoming call RE, 1(X.25), is replaced with the I.353 Setup entry RE, P1b(Q.931), in cases where the called CEQ; either
 - a) subscribes to conditional notification and does not have a B- or D-channel capable of accepting the call connected to the PH; or
 - b) subscribes to unconditional notification.

3 Connection processing delays in ISDN packet switched connections

With the above MP/boundary identifications, the reference events specified in Recommendation X.135 apply to the connection processing parameters defined below, with one exception. That exception occurs only in the case of call set-up delay and is detailed in 3.1.1. The variables X, Y and Z used below are defined in 2.3/X.135, 3.2/X.135 and 5.2/X.135 respectively.

¹⁾ The same performance model applies to both Recommendations X.135 and X.136 though it is only specified in detail in Recommendation X.135.

Two types of national and international portions (A and B defined in Table 1/X.135) are used in this Recommendation. End-to-end connections are built up from combinations of these national and international portions. The concatenation method of the means and 95th percentiles of these national and international portions is given in Annex C/X.135. Annex A contains illustrations of events sequences during call set-up and clearing.

TABLE 1/I.354
MP/boundary correspondence

Rec. I.354	Rec. X.135
MPT ₁	B ₁
MPI ₁	B ₅
MPI ₂	B _{n-2}
MPT ₂	B _n

3.1 Call set-up delay

Call set-up delay is defined first at a single MP, then between a pair of MPs (based on the former definition). Finally end-to-end call set-up delay is defined. Tables 1/X.134 and 2/X.134 define the performance-significant reference events and the resulting states for X.25 and X.75 packets respectively. Table 2 identifies the performance-significant reference events and the resulting states for Q.931 messages.

TABLE 2/I.354
Performance-significant reference event

Measurement point	Performance-significant reference event	
	Starting event code	Ending event code
MPT ₁	2(X.25)	3(X.25)
MPT ₂	1(X.25)	4(X.25)
MPI ₁	1(X.75)	2(X.75)
MPI ₂	1(X.75)	2(X.75)

3.1.1 Call set-up delay definition

call set-up delay at a single MP: Call set-up delay at a single MP (MP_{*i*}²⁾) is defined as the period of time that starts when a *starting reference event* creates an event at MP_{*i*} and ends when the corresponding *ending reference event* returns and creates an event at MP_{*i*}.

2) MP_{*i*} or MP_{*j*} is one of MPT₁, MPT₂, MPI₁ or MPI₂.