INTERNATIONAL TELECOMMUNICATION UNION

ITU-T X.131

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

PUBLIC DATA NETWORKS
NETWORK ASPECTS

CALL BLOCKING IN PUBLIC DATA NETWORKS WHEN PROVIDING INTERNATIONAL SYNCHRONOUS CIRCUIT-SWITCHED DATA SERVICES

ITU-T Recommendation X.131

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation X.131 was published in Fascicle VIII.3 of the *Blue Book*. This file is an extract from the *Blue Book.* While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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 X.131

CALL BLOCKING IN PUBLIC DATA NETWORKS WHEN PROVIDING INTERNATIONAL SYNCHRONOUS CIRCUIT-SWITCHED DATA SERVICES

(Former X.132, Geneva, 1980; amended at Malaga-Torremolinos, 1984)

The CCITT,

considering

(a) that Recommendation X.1 specifies the user classes of service applicable to networks offering public data services;

(b) that Recommendation X.2 specifies the international user services and facilities to be offered by public data networks;

(c) that Recommendations X.21 and X.21 *bis* define the DTE/DCE interface for circuit switched services;

(d) that Recommendation X.60 specifies the common channel signalling for synchronous data networks;

(e) that Recommendation X.71 specifies the channel associated signalling for synchronous data networks;

(f) that Recommendation X.92 specifies the hypothetical reference connections for public data networks;

(g) that Recommendation X.110 specifies the routing plan to be applied in the international portions of public data networks;

(h) that Recommendation X.213 specifies the OSI Network Layer service;

(i) that Recommendation X.140 specifies the user-oriented quality of service parameters applicable to data services,

unanimously declares

that when public data networks provide international synchronous circuit-switched data services, according to Recommendations X.21 and X.21 *bis,* the values of call blocking probability specified in this Recommendation shall be taken as provisional, worst-case values that should not be exceeded under the conditions specified therein.

Introductory note - Design objectives that take into account both user needs and network costs are for further study.

1 Introduction

1.1 Quality of service in circuit-switched public data networks has been considered in five basic areas as follows:

i) call processing delays (Recommendation X.130);

ii) failures due to congestion (blocking) (Recommendation X.131);

iii) failures due to malfunction;

iv) loss of service; and

v) transmission performance (including throughput).

This Recommendation specifies the objectives for ii) above. Each of the other areas of circuit-switching quality of service identified above will be the subject of a separate Recommendation in the X-series.

1.2 In telecommunication networks it is necessary, for economic reasons, to limit the resources provided for carrying the offered traffic. This limitation may affect the quality of service to the user of circuit-switched services in two different ways: by call processing delays and by blocking. Both of these aspects, that are consequences of the finite traffic handling capacity of the network, constitute the grade of service. Grade of service together with malfunction, loss of service and transmission performance constitute the quality of service.

1.3 In this Recommendation the values for the network blocking are quoted for two types of connection according to Recommendation X.92 as follows:

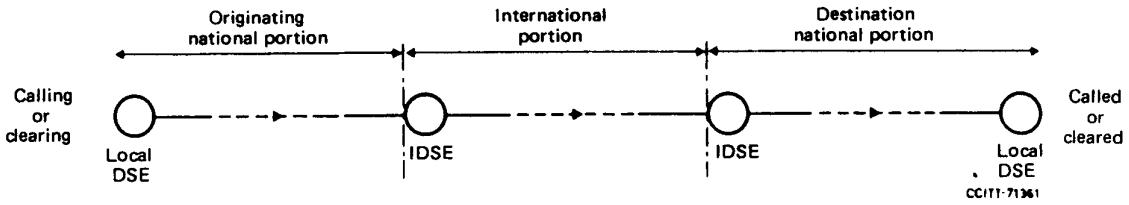
Type 1: Typical terrestrial interconnection of moderate length with no satellite circuits either in the national or international portions. (International portion: 1000 km.)

Type 2: Long distance international connection with a satellite circuit in one national portion and two satellite circuits in the international portion. (International portion: 160 000 km.)

Where appropriate, values are also specified separately for the following network portions:

- originating national network,
- international portion,
- destination national network.

The boundaries for these portions are shown in Figure 1 /X.131.



Note 1 – A DSE may also function as an IDSE.
Note 2 – Arrows indicate direction of call set-up or clear-down.

FIGURE 1/X.131

National/international boundaries for call set-up and clear-down functions

For the present, the values apply also to other normal routing options within the international portion.

Following the allocation of a blocking allowance to the international portion of an international transit connection, it will be necessary to further apportion the allowance to individual transit networks and/or their component parts within the international portion. The means by which useful and realistic constraints can be applied, consistent with maintaining the maximum possible freedom for each involved Administration in the design and implementation of its own network, is for further study.

1.4 The values for blocking probability established in this Recommendation are to be considered as design objectives in network planning together with the forecast traffic for the planned period. The actual blocking performance that will be obtained will depend on the accuracy of the traffic estimations. Normally the actual blocking performance will not coincide with the one used as a basis for planning. Furthermore, if the network is planned for the traffic forecast

at the end of the period considered, the actual blocking performance of the network may be better than the design value, worsening gradually to the end of the planning period as traffic increases.

The non-coincidence of busy hours in originating and destination national networks as well as in the international network will improve the overall blocking performance with respect to the sum of the nominal blocking probabilities of the constituent parts of the connection.

1.5 The blocking probabilities are specified under conditions of normal busy hour load. Blocking probabilities for higher loadings are for further study.

1.6 Blocking probabilities are defined for a basic call which does not include any optional user facilities, e.g. those defined in Recommendation X.21.

1.7 Recommendation X.21 permits the following blocking situations:

i) non-reception of *proceed to select;*

ii) non-connection of call.

Item i) is considered to be a national matter and consequently the specification of its value is not appropriate to this Recommendation. Objectives for item ii) are contained in § 2 of this Recommendation.

1.8 The quality of service implications of regional or national satellite systems using demand assignment for resource allocation require further study.

2 Probability of non-connection due to congestion (blocking probability)

Probability of non-connection due to congestion is the probability that a calling DTE does not receive the *ready for data* signal but does receive a *network congestion* signal within 20 seconds after transmission of the *end of selection* signal (or within 60 seconds when manual answering is permitted at the called DTE).

2.1 *Overall probability of non-connection due to congestion*

The overall probability of non-connection due to congestion for an end-to-end connection seen from the customer point of view should not exceed the following values:

Connection type 1: 13%

Connection type 2: 15%

See Introductory note to this Recommendation.

2.2 *Network portion probability of non-connection due to congestion*

The contribution of each network portion to overall probability of non-connection due to congestion should not exceed the values shown in Table 1/X.131.

TABLE 1/X.131

Contributions to network probability of non-connection due to congestion

Original national portion	Destination national portion	International portion	
		Connection type	
		1	2
5%	5%	3%	5%

Note - See introductory note to this Recommendation.