



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

E.550

(03/93)

**TELEPHONE NETWORK AND ISDN
QUALITY OF SERVICE, NETWORK MANAGEMENT
AND TRAFFIC ENGINEERING**

**GRADE-OF-SERVICE AND NEW
PERFORMANCE CRITERIA UNDER
FAILURE CONDITIONS IN INTERNATIONAL
TELEPHONE EXCHANGES**

ITU-T Recommendation E.550

(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 E.550 was revised by the ITU-T Study Group II (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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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 E.550**GRADE-OF-SERVICE AND NEW PERFORMANCE CRITERIA UNDER FAILURE CONDITIONS IN INTERNATIONAL TELEPHONE EXCHANGES***(Modified at Helsinki, 1993)***1 Introduction**

1.1 This Recommendation is confined to failures in a single exchange and their impact on calls within that exchange – network impacts are not covered in these Recommendations.

1.2 This Recommendation from the viewpoint of exchange Grade of Service (GOS) has been established.

1.3 In conformity with Recommendation E.543 for transit exchanges under normal operation, this Recommendation applies primarily to international digital exchanges. However, Administrations may consider these Recommendations for their national networks.

1.4 The GOS seen by a subscriber (blocking and/or delay in establishing calls) is not only affected by the variations in traffic loads but also by the partial or complete faults of network components. The concept of customer-perceived GOS is not restricted to specific fault and restoration conditions. For example, the customer is usually not aware of the fact that a network problem has occurred, and he is unable to distinguish a failure condition from a number of other conditions such as peak traffic demands or equipment shortages due to routine maintenance activity. It is therefore necessary that suitable performance criteria and GOS objectives for international telephone exchanges be formulated that take account of the impact of partial and total failures of the exchange. Further, appropriate definitions, models and measurement and calculation methods need to be developed as part of this activity.

1.5 From the subscriber's point of view, the GOS should not only be defined by the level of unsatisfactory service but also by the duration of the intervals in which the GOS is unsatisfactory and by the frequency with which it occurs. Thus, in its most general form the performance criteria should take into account such factors as: intensity of failures and duration of resulting faults, traffic demand at time of failures, number of subscribers affected by the failures and the distortions in traffic patterns caused by the failures.

However, from a practical viewpoint, it will be desirable to start with simpler criteria that could be gradually developed to account for all the factors mentioned above.

1.6 Total or partial failures within the international part of the network have a much more severe effect than similar failures in the national networks because the failed components in the national networks can be isolated and affected traffic can be rerouted.

Failures in the international part of the network may therefore lead to degraded service in terms of increased blocking delays and even complete denial of service for some time. The purpose of this Recommendation is to set some service objectives for international exchanges so that the subscribers demanding international connections are assured a certain level of service.

It should be noted however that where there are multi-gateway exchanges providing access to and from a country, with diversity of circuits and provision for restoration, the actual GOS will be better than that for the single exchange.

2 General considerations

2.1 The new performance criteria being sought involve concepts from the field of "availability" (intensity of failures and duration of faults) and "traffic congestion" (levels of blocking and/or delay). It is therefore necessary that the terminology, definitions and models considered should be consistent with the appropriate Recommendations on terminology and vocabulary.