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Telephone network management and traffic engineering

Teletraffic implications for international switching and operational procedures resulting from a failure of a transmission facility

ITU-T E.800-series Recommendations – Supplement 5

(Formerly CCITT Recommendations)

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Supplement 5 to ITU-T E.800-series Recommendations

Teletraffic implications for international switching and operational procedures resulting from a failure of a transmission facility

Source

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FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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Supplement 5 to ITU-T E.800-series Recommendations

Teletraffic implications for international switching and operational procedures resulting from a failure of a transmission facility

1 Very considerable changes have occurred in the international network over the past decade. These changes have arisen mainly from:

- the growth in the number of long-distance routes;
- the growth in the number of circuits forming individual long-distance routes;
- the world-wide introduction of international automatic operation;
- technological developments associated with all aspects of the international network: switching unit design, transmission facility design, and routing and operational strategies;
- the integration into the international automatic service of the more isolated geographical areas and of centres having low-capacity international switching units.

2 The resultant multiplicity of circumstances and situations arising within the international network is now such that it is no longer possible to specify one single criterion for initiating corrective action to counter the loss of a transmission facility. Indeed, the failure of the whole, or part, of a transmission facility may manifest itself in a different manner to each of several Administrations affected by the failure.

3 Among the many aspects of international switching and operational procedures which can influence the degree of curtailment of service arising from a transmission-facility failure, i.e. which can reduce the ability of part of the international network to carry its designed traffic load successfully, the following are specifically stressed (their order has no particular significance):

- the introduction of fully automatic international operation, which means that the control of the network, formerly completely operator-controlled, now depends directly on subscribers' habits;
- the number of routes that could be affected by failure and their proportion of the total routes on the switching unit to which they are directly connected: the range can be from one whole route to a few circuits in each of many routes, depending on the method of allocating circuits to transmission facilities;
- the influence of any route, for which no alternative transmission facility exists, on the performance of the international switching unit to which it is connected;
- the effect on the grade of service of the switching unit itself due to the loss of a complete route or routes, or parts of several routes, directly connected to it;
- the methods of limiting the effect of failure on service by action within the switching unit or at preceding international or national switching unit, e.g. by code blocking or recorded announcements;
- the cause of the failure, and thus the possible restoration time, relative to the 24-hour traffic profile;
- the effect of a failure on overflow and automatic alternative routing strategies;
- the use of diversity of international switching units;
- the use of diversity of international transmission facilities.

4 Attention is also drawn to four major factors of maintaining continuity of service:

- reliability,
- diversity,
- network management, and
- any redundancy specifically provided to allow restoration of service.

5 Clearly, no practical transmission facility provided will give 100 per cent reliability, so it is inevitable that the other three factors will be involved to varying degrees in maintaining service. The interaction of these four factors will depend largely on the emphasis placed upon each of them by each Administration, thus reinforcing the view that the degree of corrective action that can be taken will depend considerably upon the investment policy (in materials and equipment) and forward-planning objectives of individual Administrations.

6 With respect to diversity, it is recommended that Administrations give consideration to the provision of an adequate number of paths for a particular route, with an adequate level of independence between the paths. Such independence could reduce the effect of a breakdown or other adverse event by confining it, as far as possible, to only one of the paths used by that route.

7 For the further assistance of Administrations in their study of those teletraffic aspects of international switching and operational procedure which influence the degree of curtailment of service and which arise from a transmission facility failure, these factors are included in Question 23/II related to continuity of service, accepted for study during the 1985-1988 Study Period.

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