INTERNATIONAL TELECOMMUNICATION UNION

CCITT

E.490

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

TRAFFIC MEASUREMENT AND EVALUATION – GENERAL SURVEY

Recommendation E.490

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation E.490 was prepared by Study Group II and was approved under the Resolution No. 2 procedure on the 16th of June 1992.

CCITT NOTE

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

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TRAFFIC MEASUREMENT AND EVALUATION – GENERAL SURVEY

1 Introduction

For planning and operating telecommunication networks it is important to have a good knowledge of the traffic in the network. The size of the traffic streams, how they vary with time of the day, week and year, and their distribution in the network are examples of data that are necessary to plan and operate different parts of the network in a way that gives the lowest network cost at the preplanned grade of service.

2 Scope

This Recommendation is aimed at forming a framework for the following Recommendations on traffic measurement and evaluation. The objective is also to give a general understanding of the use of traffic measurements, thus to give some guidance on the E-Series Recommendations on application of traffic data in planning and operating a telecommunication network.

3 Use of traffic measurement

The planning and operation of a telecommunication network is here regarded as a number of loops which all include traffic measurement and network actions based on the measurements. The loops have been classified according to the time scale for using measured traffic data for network actions (see Figure 1/E.490).

In the figure, three different loops can be seen.

In the loop, with a time scale of minutes or seconds, traffic data must be measured continuously and reported and analysed in near real time to serve as a basis for network traffic management actions such as temporary reroutings.

In the loop which takes weeks, days or hours to go through, there is also a strong demand on continuous measurements so faults disturbing traffic could be discovered and correlated, and appropriate maintenance or engineering actions could be taken.

In the loop which has the longest time perspective (years, months) traffic measurements are used to make traffic forecasts as a basis for network extensions and long-term network configuration. For these engineering applications a mean traffic intensity value, representing high traffic periods of the day and year, is generally used.

The box "traffic measurement" should be understood to contain all kinds of recorded traffic parameters necessary for the activities in all loops. However, it must be pointed out that very often the same parameter could be used for all three loops. It is the reporting interval and analysis which differ.

It should be noted that the figure for gaining a general overview is somewhat simplified, e.g. can forecasting appear as an activity in all loops.

There are other factors, other than the use of traffic measurement, which have a heavy impact on network planning and reconfiguration. The most important of such factors are:

– marketing activities;

– tariff policy;

– commercial agreements;

– strategical objectives.

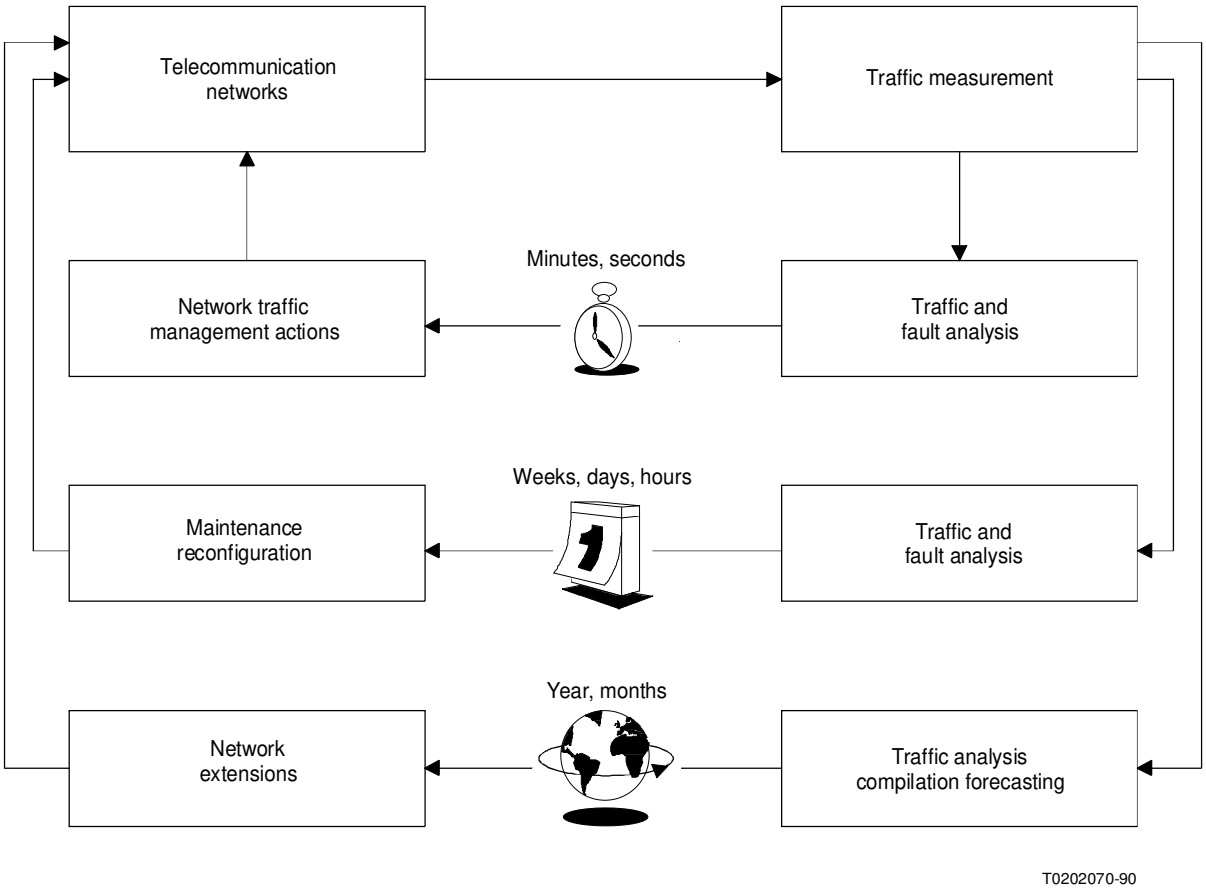

FIGURE 1/E.490

Use of traffic measurements in planning and operating telecommunication networks

Traffic measurement can serve other activities than those connected with the planning and operation of the network itself, such as marketing, setting of tariffs and revenue analysis. This use of traffic measurement is not taken up here.

4 Measurement principles and evaluation

Measurement methods and evaluation procedures for traffic data to be used mainly for long-term network planning (loop in Figure 1/E.490 with the time scale of year, months) are given in Recommendation E.500. Methods and applications of traffic measurements on a destination basis are handled in Recommendation E.491.

The traffic measurement requirements for digital telecommunications exchanges are accounted for in Recommendation E.502. The requirements relate to all three loops in Figure 1/E.490, and are based on a traffic measurement model as defined in this Recommendation.

Measurements of the performance of common channel signalling networks are recommended in E.505.

Administration of scheduling and ordering of traffic measurements and control of traffic data collection is handled in Recommendation E.504.

Models and procedures for analysis of recorded traffic data are to be found in Recommendation E.503.

Procedures for estimating offered traffic in a network from observed traffic data are given in Recommendation E.501. In Recommendation E.523, standard daily traffic profiles are given, to be used in lack of measurements.

For traffic measurement principles and calculation procedures for the near real time perspective, reference is made to the E.410-Series Recommendations on network traffic management. Up to now, for the medium time scale (weeks, days, hours) no specific Recommendations have been developed. However, it should be observed that representative traffic values for this time scale should be statistically consistent with the traffic values for long-term network planning.

5 Applications of traffic measurement

For use of traffic measurements for forecasting purposes, reference is made to Recommendations E.506 to E.508. Applications of traffic measurements in engineering network extensions are handled in the E.510- and E.520-Series Recommendations. Use of traffic measurement for network management actions is handled in the E.410-Series Recommendations.

Use of traffic measurement has been classified according to the time frame for using observed traffic data for network actions. It should be pointed out that in Recommendation E.503 another type of classifying is used, namely according to the measurement basis (objects), e.g. circuit groups.

Note – Although the Recommendations mentioned here are developed on the experiences of public switched telephone network (PSTN), they may also apply to other switched networks.