



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**E.175**

**TELEPHONE NETWORK AND ISDN**

**OPERATION, NUMBERING, ROUTING AND MOBILE  
SERVICE**

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**MODELS FOR INTERNATIONAL NETWORK  
PLANNING**

**ITU-T Recommendation E.175**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation E.175 was published in Fascicle II.2 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.

## **MODELS FOR INTERNATIONAL NETWORK PLANNING**

### **1 Introduction**

Network planning plays an important role in the overall responsibility to provide telecommunications and due consideration has to be given to a number of relevant factors, e.g. technical, economic and operational. International planning involves, by definition, a number of Administrations which may have different national objectives and may operate under different economic constraints. It is apparent, therefore, that these differences must be reconciled if cooperative planning is to be achieved. This Recommendation describes a possible method for concerned Administrations to organize a procedure to implement this cooperative network planning process.

### **2 Basic purpose of an international network planning model**

Network planning involves a number of defined planning activities such as forecasting, routing, circuit number calculation and other relevant traffic engineering issues, all of which are interactive in the planning process. The basic purpose of an international network planning model should be to organize all these activities in implementing an orderly overall planning process. The model should assist Administrations in making timely decisions on questions concerning facility selection, circuit routing, etc. This would enable Administrations to perform efficient long-term planning and thus avoid being restricted to a limited number of planning options which, while optimum in the short term, may lead to an expensive network in the long run.

Where such a model produces results consistent with the national objectives of the Administrations involved, it will provide a valuable aid to network planning. Nevertheless, it must be recognized that no model can be appropriate in all cases and final decisions on network plans can only be made on the basis of the preferences of the interested parties.

### **3 General layout of an international network planning model**

Annex A gives a possible method on how to organize the international planning process. The method is presented in the form of a flowchart with a number of interactive "planning steps". Each step includes one or more activities, which may require separate consideration. To further assist Administrations in the implementation of the planning process, reference is given below to the most relevant CCITT Recommendations and/or other documentation which should be taken into account.

- Recommendation E.170: Traffic routing (steps II, III).
- Recommendation E.171: International routing plan (steps II, III).
- Recommendation E.501: Estimation of traffic offered to international circuit groups (step III).
- Recommendation E.506: Forecasting international telephone traffic (step II).
- Recommendation E.510: Determination of the number of circuits in manual operation (step III).
- Recommendation E.520: Number of circuits to be provided in automatic and/or semiautomatic operation, without overflow facilities (step III).
- Recommendation E.521: Calculation of the number of circuits in a group carrying overflow traffic (step III).
- Recommendation E.522: Number of circuits in a high-usage group (step III).
- Recommendation E.540–E.543 on grade of service (step III).
- Series D Recommendations: Accounting rules (step II).
- Supplement No. 4 to Series E Recommendations: Use of computers for network planning and circuit group dimensioning (step I).
- GAS 3 Manual: *General Network Planning*, Chapter II: General survey of network planning concepts (step I).
- *Ibid*, Chapter VIII: Economic aspects of network planning (steps I, II, III, IV).
- *Ibid*, Chapter IX: Forecasting for network plans (step II).
- *Ibid*, Chapter X: Network dimensioning and optimization (steps I, II, III).

- *Ibid*, Chapter XI: Computer aids to network planning (step I).

## ANNEX A

(to Recommendation E.175)

### **Flowchart of the international planning process**

#### *Step I – Agree on study methods*

A meeting of the interested parties is required to agree on the methods by which the planning study is to be conducted. These methods could include such factors as:

- manual or computer model study;
- type of computer model;
- study period;
- cost of capital;
- method of financial comparison (e.g. present value);
- other economic parameters;
- types of input information required;
- form of results to be provided.

#### *Step II – Gather required input information*

The interested parties should then obtain the input information agreed to in Step I for their respective Administrations. This information could include items such as:

- traffic forecasts (bilateral);
- administration preferences:
  - a) routing,
  - b) diversity,
  - c) satellite/cable mix,
  - d) restoration;
- ownership in existing facilities;
- facility exhaust dates;
- new facilities;
  - a) capacity,
  - b) costs,
  - c) availability,
- quality of service requirements.

#### *Step III – Route traffic on proposed network*

If a manual process is being used, the routing of traffic could then be performed by a study group selected by the interested parties. These traffic loads on the various facilities in the network would then be used in the selection of the appropriate facilities (Step IV) that would either be loaded (in the case of existing facilities), or that would have to be constructed in the study period.

In the case of a computer modelling process, the Steps III and IV could either be separate or merged, depending on the model chosen.

In either case of manual or computer processing, some iteration of Steps III and IV is usually required in the process, i.e., the loading of circuits on the various links of the network depends on the costs of these facilities, while the facilities selected (and therefore their costs) depend on the number of circuits loaded on them.

*Step IV – Select new facilities*

The selection process used by the study group should reflect the operational, technical and commercial requirements of the interested parties. Facilities should be dimensioned so as to result in the lowest practical network cost consistent with the preferences of the individual parties. Also (as stated in Step III) it is possible that the facilities chosen could result in costings that could make the rerouting of circuits advantageous.

Steps III and IV should be repeated as necessary to obtain consistent results between routing and facility selection.

*Step V – Allocate costs by potential participants*

Network costs should then be broken down by potential participants. These costs should be broken into:

- capital costs by facility;
- maintenance costs by facility;
- extension costs;
- satellite space segment related costs.

Special participant reports could be required as determined in Step I.

*Step VI – Check results with potential participants*

At this point, the special study group should present results to the potential participants. If results are agreeable to this body, then the process could proceed. If, however, the results are not agreeable, then the process should return to Step II to reflect the problems and concerns of the participants. It is possible that more than one alternative network solution may be requested by the participants.

*Step VII – Obtain agreement on final plan*

If the results in Step VI are agreeable to the potential participants, then the process can continue to the signing of commitments for any new facilities required by the study.

*Step VIII – Implement early period facilities*

The process of providing the facilities required in the early part of the study period can then begin, leaving the new construction required in the later study period for further reconsideration as conditions warrant.

*Step IX – Restudy area as conditions warrant*

The network plan should be restudied periodically as new information becomes available. This could include changes in economic conditions, traffic forecasts, costs, new technologies, or political conditions.

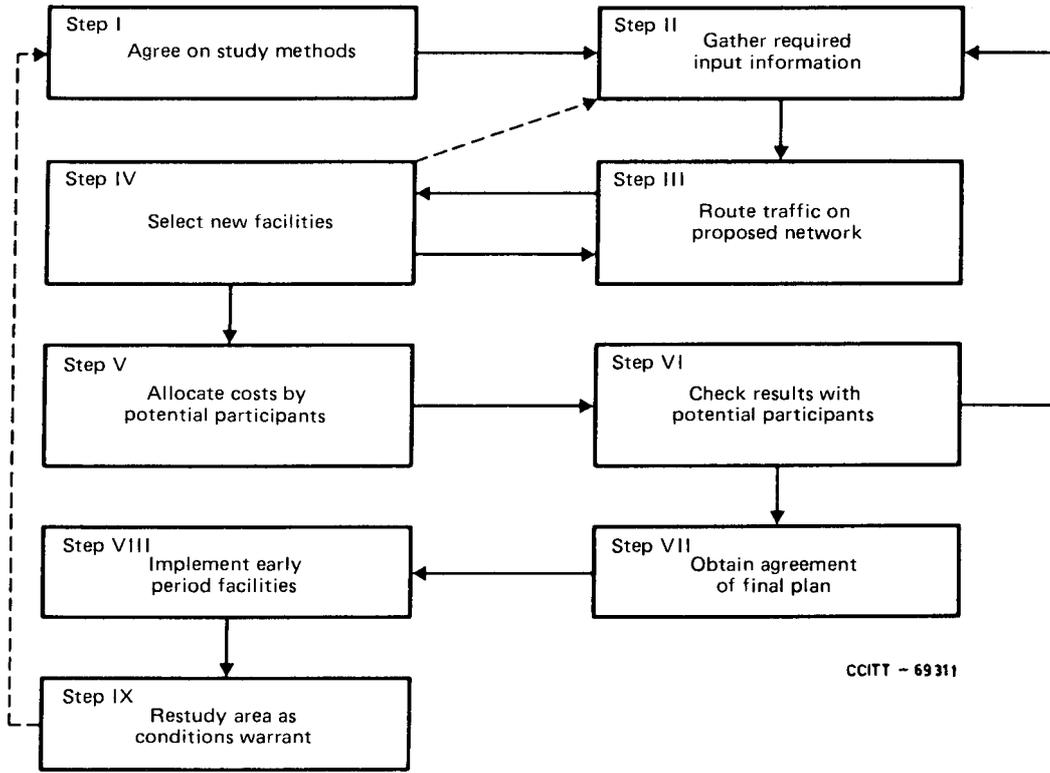


FIGURE A-1/E.175  
Flowchart of the international planning process