Iterative Planning Process

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Introduction

This chapter decribes the iterative procedure used in optimizing and dimensioning telecommunication networks, as well as the individual optimization/dimensioning methods and procedures.

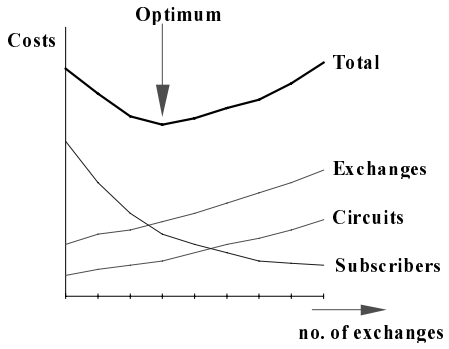
The documentation given here describes applications to network planning derived from Teletraffic Theory and related subjects. It is,however, limited to the mathematical and statistical formulae on which the program is based, without going into the derivation and/or justification of these formulae. The references to publications given at the end of this chapter should supply the necessary additional information.

Iterative procedure

Owing to the complexity and size of the typical telecom network, it is not possible to treat all aspects of the network simultaneously. The problem to be solved has to be divided into a number of suitable **sub-problems**, these to be treated **iteratively** in a certain order. Such sub-problems are eg

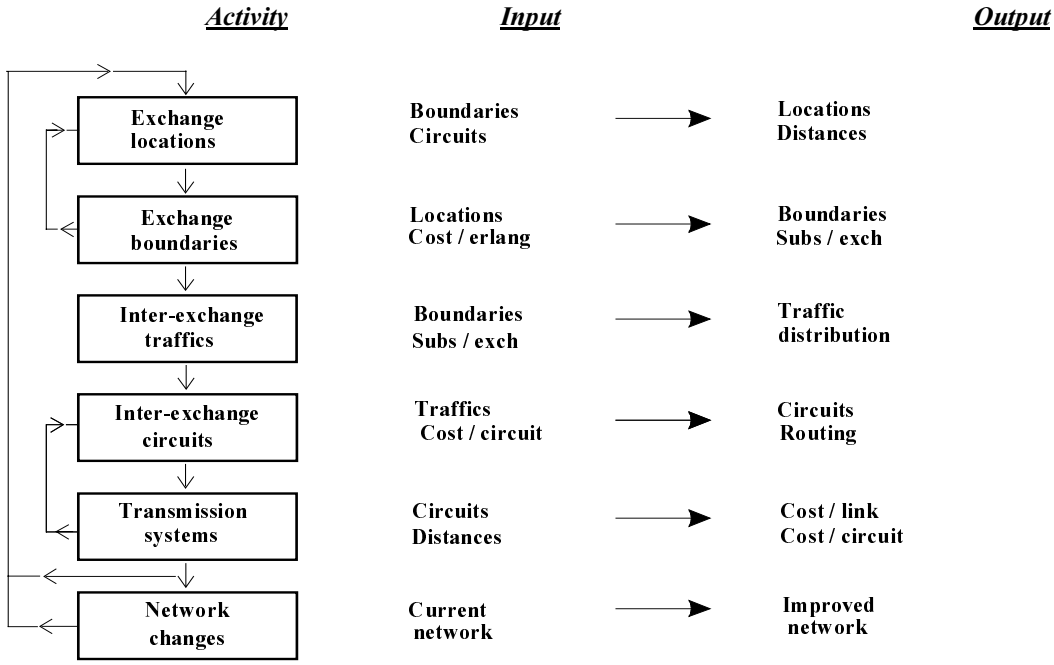
- exchange location optimisation;
- exchange boundaries optimisation;
- traffic calculations;
- inter-exchange circuit optimisation and dimensioning;
- choice of transmission systems.

For the solution of any of these sub-problems, we assume that the rest of the network has been correctly optimized and/or dimensioned. Initially, of course, this will not be the case, and the necessary data will then have to be estimated. Subsequently, the results of the calculations performed in previous steps within an iteration, or in previous iterations, can be used.



The graph above gives an idea of the cost components in a local network, and shows the overall cost of such a network as a function of the number of exchanges.

The following flow chart shows the main steps in the iterative procedure. Details of the methods used for each such steps are given in the various sections of this chapter. Not shown here are the various input and output blocks, and the points at which interaction between planner and program is possible; a certain flexibility in this respect is valuable, and is easy to achieve be inserting the relevant instructions into the program. It is obvious, that for some network planning tasks some of the blocks below are irrelevant.



The "boxes" above show the main calculation and optimisation blocks in the program, and the "arrows" show the sequence of activities to be followed. As there is a very strong interaction between exchange *locations* and *boundaries*, sub-iterations should be carried out until a stable solution has been reached. The same applies to *circuits* and *transmission systems*.

The "Total network cost" as a function of the number of exchanges (see graph on previous page) reflects the best solution for a given number of exchanges. Therefore, before introducing any *new exchanges*, the old configuration should be iterated until a stable solution is reached for the given number of exchanges.