



METHOD OF CONGESTION MANAGEMENT AND BALANCED RESOURCE ALLOCATION ON MPLS-TE TELECOMMUNICATION NETWORK ROUTERS

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ABSTRACT

The method of congestion management and balanced resource allocation in telecommunication networks operating on the basis of technology of multi-protocol label switching with support of the concept of Traffic Engineering is considered. The essence of the method is the coordinated solution of the problems of aggregation of packet flows and their distribution according to the queues formed on the router interface, as well as the balanced allocation of interface bandwidth in accordance with the principles of Traffic Engineering queues. These technological tasks were reduced to linear programming optimization problems. The proposed method allows increasing the efficiency of distribution and use of network resources while simplifying the computational complexity of the calculations.

Keywords: Traffic Engineering, Congestion Management, Resource Allocation, bandwidth balancing, Quality of Service

1. INTRODUCTION

It is known that telecommunication networks, which operate on the basis of technology of multi-protocol label switching (MPLS) are increasingly used today. At the same time, the concept of Traffic Engineering technology, whose main idea is to ensure balanced use of heterogeneous network resources such as information (traffic), buffer (queue) and channel (bandwidth), plays an important role in optimizing traffic management tasks in MPLS-networks and improving the quality of service in general [1-4]. In this regard, an actual scientific and applied task is seen as a task that consists of optimizing traffic management processes taking into account the requirements of the Traffic Engineering concept. Due to the fact that traffic management along the selected route is entrusted to the means of queuing and reserving resources on each specific router, it is important to develop and improve mathematical models and queue management methods on MPLS-TE telecommunication network routers.

2. METHOD OF CONGESTION MANAGEMENT AND BALANCED RESOURCE ALLOCATION ON MPLS-TE TELECOMMUNICATION NETWORK ROUTERS

Having analyzed the known solutions in the field of queue management and determining their main disadvantages was proposed the method, the essence of which consisted of a sequential two-stage solution of such interface tasks as

- solving optimization problems of distribution and aggregation of packet flows between queues formed on the router interface;
- solving the problems of allocation and balancing of the interface bandwidth that complies with the principles of the Traffic Engineering Queues concept.

The proposed method was based on the results obtained in [2, 5, 6]. Figure 1 shows the structure of this method.

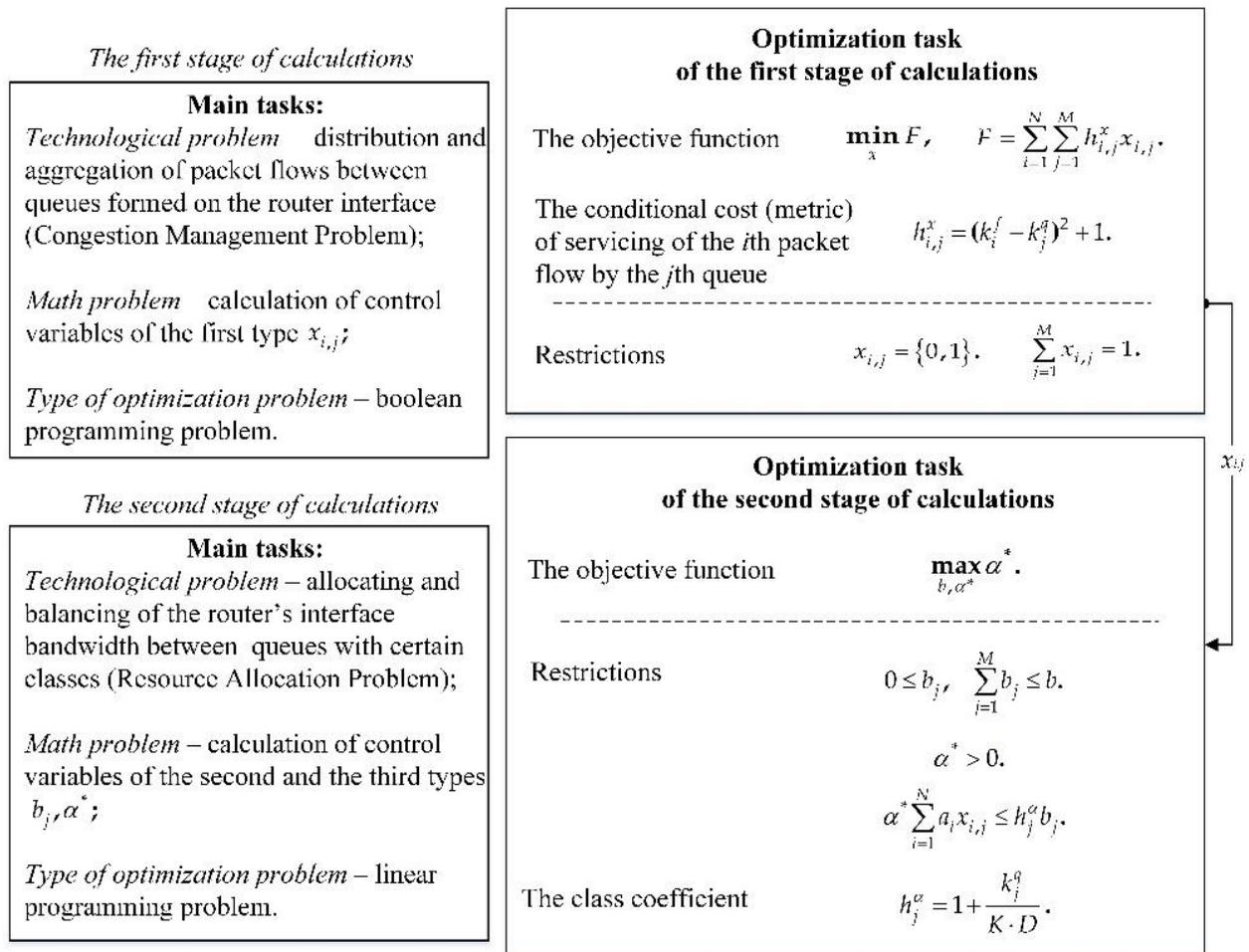


Figure 1. The structure of the method of congestion management and balanced resource allocation on MPLS-TE telecommunication network routers.

3. CONCLUSIONS

According to the results of investigation of the proposed queue management method on a number of numerical examples, it was confirmed its adequacy and effectiveness with respect to the coordinated solution of congestion management and balanced resource allocation tasks which correspond to the principles of the concept of Traffic Engineering.

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