

METAHEURISTICS FOR THE SERVERS LOAD BALANCING PROBLEM¹

I.A. Davydov, A.A. Melnikov, A.A. Panin

Novosibirsk State University

Corresponding author: Andrey Melnikov

e-mail: melnikov@math.nsc.ru

We consider the following problem arising in the optimization of cloud hosting. Heterogeneous Internet sites collected in structures called discs. The discs are distributed between the available set of servers. User inquiries to the site create a certain load on the server that stores the disc with this site. The load is characterized with a number of parameters and changes over time. Time is assumed to be discrete. The value of total load produced by all sites of each disc is known at each moment of time and for each parameter.

If the server's load exceeds known threshold value for some parameter, the server fails to handle requests in time. To avoid the overload discs can be moved from one server to another. Such movement requires some computational costs, which we call overheads. Overheads for ejection of the disc from the server and insertion of the disc to the server are known. The problem is to change known initial distribution of the discs so as to minimize total overload throughout the planning period with respect to overhead constraints.

To our knowledge, the first time the problem was considered in [1], where it is shown that the problem is NP-hard. To solve it the heuristic algorithm based on the linear relaxation is proposed in [1] as well. In this work we propose and compare three approaches based on ideas of stochastic local search, genetic algorithm, and variable neighborhood search. Computational experiments with randomly generated instances show, that proposed methods are significantly outperform proposed in [1] one in terms of accuracy and speed.

REFERENCES

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