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Combined Method of Routing Multimedia Data in Computer Networks

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Abstract: Analysis of the methods of multimedia data shows that is no one of the known routing algorithms can not provide the cheapest and best solution for multicast transmission to all types and sizes of networks and the size and types of multicast groups. The main improvement is especially noticeable in the small size of multicast groups. This occurs because the **CCET** and **CSPT** give different and not optimal solutions in most cases, a small-size multicast group; only in these cases is largely a hybrid nature of the proposed heuristics plays an important role.
When the size of the network, there is greater agreement between the results obtained and reviewed by a hybrid heuristics.

Keywords: Multimedia data, protocol, routing, multicast, algorithm, effectively.

I. INTRODUCTION

Analysis of the methods of multimedia data shows that is no one of the known routing algorithms can not provide the cheapest and best solution for multicast transmission to all types and sizes of networks and the size and types of multicast groups. They either have too much time complexity, or generate an optimal solution only for certain types of network topologies and / or variants of multicast groups [1, 2].

For practical application of the routing algorithm should possess the following properties:

a. Small time complexity, since the calculation of paths to be made in "real time" when configuring the connection as part of the distributed calculation of paths as the user's data passes through the network
b. Narrow range of effectiveness of the solutions to minimize the appearance of expensive multicast solutions.
c. Low coefficient of variability of the effectiveness of solutions depending on the topology of the network / multi ca st group.
d. Minimal or no reconfiguration of multicast tree when connecting / disconnecting to a group of nodes, as this could affect the already established paths and the quality of the data stream. Switching paths in the tree, multicast delivery can change the sequence of arrival of packets and / or increase the time of delivery.

II. THE PROBLEM AND SOLUTIONS

Heuristics **CST _c** mainly generates a good solution, but has a rather large time complexity, which makes it not very suitable for wide practical application. Also, since it is based on the algorithm of Floyd, integration with other heuristics built largely on Dijkstra's algorithm becomes difficult.

Heuristics and **CCET** and **CSPT** generate the bulk of their most efficient multicast solutions in different ranges of multicast group sizes and network topologies [3, 4].

It is proposed to combine heuristics and **CCET** and **CSPT** for the algorithm with acceptable time complexity and produces better solutions than the algorithm Dijkstra **SPT**. But to ensure maximum efficiency, it is proposed to include in the combination of the third method - pure Dijkstra's algorithm **SPT**. We propose the following procedure is a hybrid implementation of heuristics:

a. Runs a modified version of heuristics **CCET**, which also gives the result of the Dijkstra's algorithm **SPT** (which runs on the first step of the implementation of heuristics **CCET**)
b. Performing the first step **CSPT** heuristics for the cheapest wood to the maximum possible number of nodes in such a way as not to exceed the limit on the delay.
c. If not all nodes have been achieved in the previous step, combined Dijkstra shortest-path tree for these nodes to the tree of the cheapest ways. The resulting solution does not exceed the limit on the delay. This is the last step heuristics **CSPT**.
d. Calculate the cost of the decision heuristics **CCET**
e. Calculate the cost of **SPT** tree derived from Dijkstra's algorithm
f. Calculate the value of the minimum cost tree **CSPT** with additional ways of **SPT** Dijkstra.
g. Chosen the cheapest of the proposed tree.

III. THE TIME COMPLEXITY OF A NEW PROCEDURE FOR ROUTING

The time complexity of the proposed heuristics is mainly determined by the level of the time complexity of heuristic **CCET**. The first stage of this function has a time complexity of order as Dijkstra's algorithm, O $(\mathbf{n^2})$. The next stage of the algorithm has time complexity O **(max**

(N, | E |) [8], where **N** - number of nodes and E - the set of edges in the final node to the source tree. The values of N and **|E|** depend on the network topology of multicast source node and restrictions on the delay. By increasing the density of edges in the network or restrictions on the delay also increases the value of **N**, and **|E|**. In practice, the optimal upper limit can be placed on the boundary values of N, and **|E|**. Since all the combined methods are based on Dijkstra's algorithm, performance these parts of the algorithm can be combined in time (to parallel). Therefore, in general, the time complexity of the algorithm does not exceed the time complexity of the algorithm, and has only a slight increase in execution time associated with parallel computing process and the final stage of selecting the best solution among the obtained[3,7].

IV. RESEARCHED METHODS AND RESULTS OF THE ROUTING PROCEDURE

Algorithm for conducting research about the effectively of performance must simultaneously take into account the parameters heuristics value of result and time delays.

To conduct research necessary to generate some network model, which will apply these heuristics?

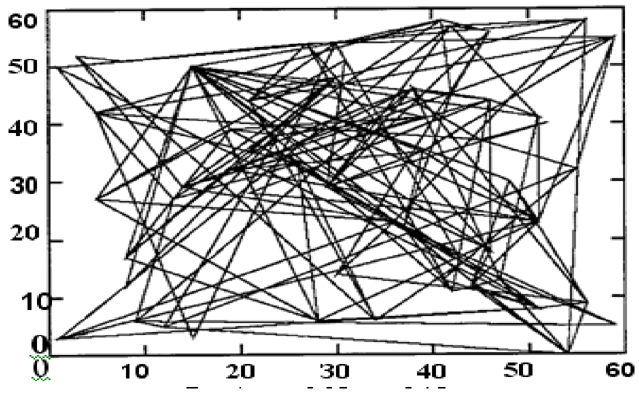

Figure 1. $A = 0.25 \sim 0.15$

It is proposed to use the model Waxman, distributing the nodes randomly on a rectangular grid. The probability of the existence of edges between nodes depends on its length and is defined as follows:

$$P(\{u,v\}) = \beta \exp \frac{-d(u,v)}{L\alpha}$$

where: $d(u,v)$ distance from node u to node u, L - the maximum distance between the two sources, α and β range of parameters (0 .. 1). Small values α increase short edges in relation to long edges, while larger values of β leads to an increase in the degree of nodes. The length of edges used to represent the delay. The processing time of a data packet in the node is ignored. The cost of an edge is chosen randomly from the range [1 .. L]. An example of a network generated based on the model shown in Figure 1.

To build many cluster networks can be used a modified model Doara. In this model, we introduce a factor that depends on the number of nodes in the network to scale the probability of occurrence of edges, included in the network. In this case, the probability function takes in the following form:

$$P(\{u,v\}) = \frac{k\bar{e}}{n} \beta \exp \frac{-d(u,v)}{L\alpha},$$

Where: k is a scaling parameter that depends on the average distance between two randomly selected points, e is the average degree of the vertices and the network n is the number of nodes in the network. Modifying the function of the probability can be obtained many cluster network, and in this case means that the number of connections between clusters are strictly fixed and does not change[5,6].

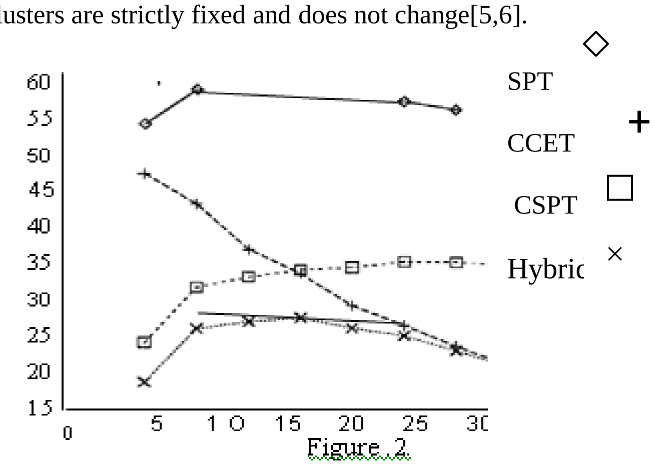

Figure 2. : Comparisons are shown in

V. CONCLUSION

Research conducted by the network model shown above, have shown that in general, a hybrid heuristic exceeds or is equal to the performance indicators of quality of heuristics and **CCET CSPT**, with almost identical time-consuming.

The main improvement is especially noticeable in the small size of multicast groups. This occurs because the **CCET** and **CSPT** give different and not optimal solutions in most cases, a small-size multicast groups, only in these cases is largely a hybrid nature of the proposed heuristics plays an important role.When the size of the network, there is greater agreement between the results obtained and reviewed by a hybrid heuristics.

VI. REFERENCES

[1]. James F. Kurose. "Computer Networking:: A Top-Down Approach", Prentice Hall, 5th Edition, pp.420-450, 2010.

[2]. Natalia Olifer and Victor Olifer, "Computer Networks: Principles, Technologies and Protocols for Network Design", Wiley; pp. 220-240, 3th. Edition, 2006.

[3]. James D. McCabe,. "Network Analysis, Architecture, and Design", Prentice Hall , 4th. Edition, pp.70-80, 2007.

[4]. Barry M Dumas., Morris Schwartz, "Principles of Computer Networks and Communications", Prentice Hal, pp. 300-320, 2008.

[5]. J. Matthews J., Computer Networking: Internet Protocols in Action, Wiley, 2005.

[6]. Chris Sanders, Practical Packet Analysis: Using Wire shark to Solve Real-World Network Problems, No Starch Press.2011.

[7]. Andrew S. Tanenbaum , David J. Wetherall, Computer Networks. Prentice Hall, 5th Edition (2010).