

ABSTRACT

The work contains 100 pages, 23 figures, and 1 table, 49 sources have been used.

Urgency

Programming and compliance with technology and technology requirements for our corporate and administrative activities. Modern telecommunication networks contain a large number of branded equipment, usually a very specialized, sharpened for specific operations: one device provides NAT, the other restricts access speeds and traffic, the third believes that it performs parental control and content filtering, which alone is responsible for the function of the firewall. Launching a new version of the software to install the new kit, a mandatory add-on. This, in its turn, children's building, maintenance, logic, installation and manufacturing.

Obviously, it does not contain any optimal developmental models. Extreme temporary and working showcases, and design, and everything you do not need to do so that the briefcase was sent as fast as it is now. The network should have a sketch more hunch and dynamism, alleviate the collapse of any new service, its active role in memorizing subscribers and resources when deactivating parcels. Do not be prepared, do your best to do it the way you would like to be expected when you find yourself in this year.

Reference to academic programs, plans, themes

The master's dissertation was carried out in accordance with the plans of scientific researches of the Telecommunication Department of the Institute of telecommunication systems within the framework of research work.

The purpose and objectives of the study

The aim of the master's thesis is to analyze the viralization and characteristics of virtual network functions, the application of technologies, and the development of a method for the efficient implementation of virtualized functions in the telecommunication network. In accordance with the set goal, in the master's thesis the following interdependent tasks of the research were considered and solved:

1. To analyze the application of virtualization technologies.

2. To explore the features of using virtualized network functions for efficient use of network resources.

3. Explore the problem of deploying and routing virtual network functions.

4. To improve the mathematical model of the allocation of virtual network functions in the development of network model, which will allow predicting the duration of delay in the conditions of the redirection modes.

5. To develop a method for increasing the efficiency of the use of VNF in telecommunication networks, enabling the implementation of proposed and existing models and algorithms.

6. Evaluate the effectiveness of the proposed method.

Object of research

Technology of virtual network functions.

Subject of research

The method of rational location and operation of VNF nodes in telecommunication networks

Research methods

In solving the formulated problem in the master's dissertation methods of system analysis, simulation and synthesis are used. Systems analysis methods are used to decompose the system to study the key properties of individual parts and aggregate the separate parts considered for building a holistic object. To describe the mathematical model of the function of the distribution of user density, methods of probability theory, mathematical statistics were used.

Scientific novelty

In solving the formulated problem in the master's dissertation methods of system analysis, simulation and synthesis are used. Systems analysis methods are used to decompose the system to study the key properties of individual parts and aggregate the separate parts considered for building a holistic object. To describe the mathematical model of the function of the distribution of user density, methods of probability theory, mathematical statistics were used.

1. The method of rational arrangement of virtualized network functions is proposed, which allows to use the group of purposes TE and TE-NFV. The main advantages of this method are revealed.

2. Improved mathematical model for VNF allocation and routing optimization (VNF-PR), including compression / decompression restrictions and two modes of delayed forwarding for TE and NFV purposes. The essence of the model's improvement is that a mathematical-heuristic approach has been developed that allows you to conduct experiments within a reasonable time of execution and evaluate the proposed solution on realistic settings.

3. For the first time, a method has been developed to two objectives are in competition; in fact, to obtain a low utilization, a large number of VNFs must be allocated. We decided to prioritize the objectives. We minimize first the maximal link utilization, and then the NFV cost, which reflects the ISP-oriented vision to improve the user quality of experience (strictly related to link congestion, especially for real-time services).

4. A function was developed to determine the optimal delay value in the fast and standard modes at different cost of communication with VNF nodes.

The practical results

The results of the research, which are given in the master's thesis, can be used by companies in the construction of their own corporate cloud environment, in educational disciplines when considering virtualization technologies, and also by the Institute of telecommunication systems when rebuilding the existing network, taking into account the virtualization technology.

The practical significance of the results obtained in the dissertation is that the developed method, an improved model and algorithm allow:

1. Quantify the effect of the delay of the redirection on the duration of the connectivity of the VNF nodes of the network;
2. Determine the optimal number of required CPUs to achieve near-optimal traffic distribution values;

3. To increase the efficiency of implementation of virtualization functions in the management of the transport level of the network;

4. Increase the effectiveness of VNF implementation by reducing the cost of NFVI nodes.

Publications:

The main provisions and results of the dissertation work were published and approved in the materials of international scientific and technical conferences.

TELECOMMUNICATION NETWORK, NETWORK FUNCTION VIRTUALIZATION, VIRTUALIZED NETWORK FUNCTION.