

ARCHITECTURE OF OVERLAY NETWORK WITH NESTED VPN TUNNELING

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The development of algorithms and methods for optimizing packet transmission in overlay networks has recently become relevant. The reason for this is the constantly increasing size and number of overlay networks. This is conditioned by the global concept of anonymizing traffic on computer networks, which leads to increased load in transmission channels, complexity of data packet structures, especially in low-speed networks, their stacks.

The main disadvantage of existing transmission management systems in the overlay networks is the inability to optimally distribute traffic among all available network resources due to the decentralized nature of management in the overlay network. On the other hand, there are methods of optimal control that allow to achieve high performance of the network [1], but they use a centralized management approach, and therefore it is impossible to implement such solutions specifically for overlay networks, especially when targeting local network fragments if overlays are represented by anonymous network segments.

The purpose of the report is to develop an overlay network architecture that uses nested tunneling to organize direct data transmission between end users.

The report provides an example of such an architecture and analyzes the performance of an overlay network with multi-layer tunnel architecture. The data obtained show that a minimal delay can be obtained if the software modules on the SaaS platform are used as VPN routers of the overlay network [2]. The use of an overlay network architecture when a server (PaaS) is virtualized and SaaS routers are deployed on its base allows for greater fault-tolerance due to the instantaneous recovery of a single module from the templates of virtual structures. Thus, it is shown that the application of the overlay network with nested VPN tunneling allows creating fault-tolerant traffic transport solutions in virtual networks.

References

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2. V. Tkachov, M. Bondarenko, O. Ulyanov and O. Reznichenko, *Overlay Network Infrastructure for Remote Control of Radio Astronomy Observatory, 2019 IEEE International Conference on Advanced Trends in Information Theory (ATIT)*, Kyiv, Ukraine, 2019, pp. 161-165. DOI: 10.1109/ATIT49449.2019.9030494