

# **REVIEW OF SOLUTIONS FOR ELASTIC DATA TRANSMISSION IN HETEROGENEOUS COMPUTER NETWORKS**

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The use of a large number of different network devices is a pattern within Industry 5.0. Increasing volumes of data lead to congestion in existing networks. The work is devoted to the review of solutions to the problem of elastic data transmission in heterogeneous networks and ways to avoid this kind of congestion.

The rapid development of the next industrial revolution and the emergence of the concept of Industry 5.0 have led to the fact that the data streams that circulate on the Internet are often unable to adapt to all their infrastructural features. Consequently, the stack of 4G networks and high-speed fiber optic links is a prime example of this challenge.

Due to the fact that elastic traffic (video, voice, IP-telephony) in low-speed segments of heterogeneous networks formed from the above stacks occupies a monopoly position, the fast transfer of elastic traffic (offline content files) is out of the question. At the same time, there is an urgent need to transmit high quality multimedia to users of wireless, including mobile networks [1]. Providers of data transmission services strive in every possible way to normalize data flows, which directly affects the level of services provided.

Thus, the task of analyzing the existing solutions for elastic data transmission in heterogeneous computer networks with minimal losses of inelastic traffic in the service packages of providers is relevant.

So, let us analyze the main approaches to minimize delays in elastic traffic transmission. First, in order to ensure acceptable quality of multimedia data transmission, applications and sites impose strict conditions and restrictions for data transport, introducing criterion base for authorized users, unauthorized, but such who make up the core audience and users who are new. Among the sub-criteria that affect this are: time delay value and packet loss rate [2].

The disadvantage of this approach is the need to accumulate a lot of information about users, which is quite veiled in the field of international law.

The second solution is based on the principles of buffering and intermediate storage of data on the nodes. This solution is well-proven and used on Tier-2 routers.

The peculiarity of the solution is the use of infrastructure for buffering as opposed to destroying data packets that overflow the internal buffers of the network nodes.

Thus, a virtual superstructure is created, which allows with less speed, but still achieve the maximum of the target function to serve users, while in the first case, such users received denial of service [3-5].

However, the disadvantage of this solution is that several vendors monopolize the services of such a data transmission solution, and private solutions offer the use of virtualization technologies, which introduce additional delays in elastic traffic transmission processes.

Thus, the analysis of the main solutions for the problem of elastic data transmission in heterogeneous computer networks shows the effectiveness of combined approaches.

As further work in this area it is necessary to consider such issues:

- the relevance of creating combined models based on the existing approach;
- assessment of the degree of heterogeneity of computer networks;
- assessment of the security performance of virtual networks for elastic data transmission;
- analysis of technical solutions into which the developed approaches can be integrated.

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