STUDY OF THE MODEL OF ENSURING THE RELIABILITY OF THE NGN NETWORK

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Annotation
The NGN concept involves building a network based on the principle of functional separation achieved through functional network elements spaced on the network. The following article is devoted to the study of the model of ensuring the reliability of the NGN network.

Key words: NGN (NextGenerationNetwork), IP traffic, voice package.

The heterogeneity of traffic in NGN (Next Generation Network) networks raises the question of a differential approach to providing various applications with network resources. So, when transmitting data, as a rule, the transmission delay and its variation are not critical, which cannot be said about the reliability of the transmission. In the case of voice transmission, the characteristics of the delay (and primarily its variation) are most important and, to a lesser extent, reliability. Traditionally, IP traffic is transmitted using the “best effort” method - “with maximum effort”. The network tries to process incoming traffic as quickly as possible, but does not give any guarantees regarding the result of its efforts. Neither NGN checks to ensure data flow on network resources nor prioritization is guaranteed.

In other words, no matter what type of traffic the information packets are (voice, video, FTP, etc.), they are processed on a first-come-first-served basis. Obviously, this model is not suitable for traffic with specific requirements for delay, performance or data transmission reliability. Transition to new applications on packet-switched networks requires its own transmission quality assurance mechanism. In such an NGN network structure, voice packets must differ from data packets, and this difference must be recorded by network nodes. Although the reasons for providing quality of service in NGN networks are interrelated, four main components can be distinguished, the values of which can be determined independently. These parameters can currently be controlled by NGN network equipment, and they are most often included in agreements between the service provider and the client on a given SLA (Service Level Agreement).

In this contract, the service provider and the consumer define: - traffic quality of service parameters that are of interest to the consumer and that the provider agrees to support - for example, average throughput, maximum delays and delay variations, maximum data loss rate, service availability factor, maximum service recovery time after failure, - methods for measuring these parameters; -determination of service charge. The payment system can be quite complex, especially if the agreement provides for several levels of quality of service, which are paid at different rates; - Sanctions for violation of the provider's obligations to ensure the proper quality of service, as well as for the deviation of the user's traffic parameters from the agreed values.

These sanctions can be expressed in the form of fines, or in another form, for example, in the form of providing a service for some time free of charge or at a reduced rate; - like any contract, an SLA agreement by mutual agreement between the provider and the client may include a large number of various additional articles. For example, an article that stipulates the conditions for the transition to better service or service with different levels of quality depending on the day of the week or time of day; - the agreement may also include rules for “conditioning” user traffic, that is, processing traffic that goes beyond the agreed limits. Also, the “conditioning” rules can determine the conditions for dropping or marking violating packets (marked packets will not always be dropped by the network, but only when network devices experience congestion). Many service providers offer standard SLAs to their customers.

Model contracts make life easier for service providers, as they can be implemented without the means of guaranteed maintenance of quality of service. It is only required to maintain a roughly constant Bandwidth Headroom and offer in the SLA those QoS parameters that the working network demonstrates.To provide different users with an individual level of quality of service, this approach does not work, and in this case it is required to implement various QoS control mechanisms in the network, such as RSVP, DiffServ.

NGNs are multi-service communication networks, the core of which is core IP networks that support full or partial integration of voice, data and multimedia services. NGN uses an open, integrated network architecture. With a variety of service functions, the NGN can support a variety of services, such as voice, data, and multimedia services, or integrated services. According to the U-SYS solution proposed by Huawei, NGN contains four planes: the boundary access plane, the basic switching plane, the network control plane, and the service control plane. The network architecture is shown in the diagram (see graphic section, sheet 2).

The NGN network allows to provide a number of modern digital services through one subscriber line, including interactive television (ip-tv), high-speed Internet access, from 1G to 10G, high-quality telephone communication, and additional services, including such as: » (create a virtual notebook); - "Child's call" - connection with the specified number occurs after picking up the handset, if no other number is dialed within 5 seconds; - "Temporary prohibition of some types of outgoing and incoming communications"; - "Wake-up call service (up to 10 entries)"; - "Do Not Disturb" service; - "Forwarding incoming calls when the subscriber is busy or no answer"; - "Notification of a new call (incoming call indication)" indicating the number of the caller, i.e. caller ID; - "Conference with three subscribers"; - CLIP during "Call waiting" (additionally, the "Call waiting" service must be activated); - "Trace of malicious calls".