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ANALYSIS OF INFLUENCE OF LOAD OF THE TRANSPORT RESOURCE OF THE MULTISERVICE NETWORK

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Abstract
The work is devoted to the of design methods and calculation of NGN. Calculation of the transport resource subscriber's gateway is performed and automation of the calculation is presented.

Keywords: network bandwidth, load, next generation network, sluice, traffic, transport resource, Softswitch.

Introduction

In recent years, according to the standard tendencies, there is an integration of telecommunication and information complexes into a uniform info communication complex.

Modern networks of telecommunications are characterized by very narrow specialization, and for each type of telecommunications there is, at least, one network transporting information of this service. Existence of a large number of networks of telecommunications is an important consequence of such narrow specialization, each of which demands own development stages, production and maintenance.

In the conditions of creation of networks of the next generation the role of modern methods and design tools and calculations sharply increases. It is connected with that if mistakes in calculations of capacity of traditional networks are estimated at 7-10%, in networks of the next generation they can make 20-30%. The last justifies additional expenses on theoretical researches and mathematical modeling of networks of the next generation before their design and construction. The international and domestic experience and practice show that the problem of design of networks of the following generation is one of actual problems of construction and development of telecommunications in modern conditions.

In recent years the aspiration of operators of telecommunications to carry out transition to the NGN networks is observed. It is impossible without scientific approach to design of the NGN networks. In this regard questions of designing of the NGN networks are important and actual [1].

In the report an example of the NGN network for which calculation of the minimum necessary transport resource for connection of subscriber locks to a network is made is reviewed.

The concrete method of design is given and the analysis of a transport resource of the design NGN network and as basic data for network design, on the example of the program of calculation of parameters of a network are created is made [2].

The purpose of the task

Multiservice network will help to estimate the necessary capacity of various knots of a small telecommunication network or part of the large network constructed by the principles of NGN at short terms, to analyse the received results, by calculations to choose the most successful option and, based on the drawn conclusions, to choose necessary technology of data transmission and the equipment corresponding to received characteristics [3].

In our case the scheme of the organization of interaction between switchboards is constructed in such a way that in case of break of direct link between any two loading between them productivity of switchboards will be transmitted through the third switchboard without increase in losses, that is transport resource have to pay off proceeding from ensuring reservation.

As the lock realizes functions of a resident lock, a lock of access and a trunking lock of connection of ASC, the general loading arriving on a lock is equal [4]:

$$Y_{AGW} = 0{,}8 * (N_{V5} + N_{PBX}) + 0{,}1 N_{PSTN} + 0{,}2 N_{ISDN}, \text{ Erl} \quad (1)$$

We will assume that we will use G729 and G711 codecs in the ratio 70% and 30% respectively. Then a transport resource which has to be allocated for transfer of a traffic of a package network of definition [4]:

$$V_{GW_{USER}} = k * ((1 - x) * V_{G729} + x * V_{G711}) * Y_{AGW} \quad (2)$$

For calculation of a transport resource of locks necessary for transfer of alarm information for the purpose of service of calls of various types the following volumes of a pass-band are required [2-4]:

$$V_{PSTN} = \frac{(P_{PSTN} * N_{PSTN} * L_{MEGAGO} N_{MEGAGO})}{90}; \quad (3)$$

$$V_{ISDN} = \frac{(P_{ISDN} * N_{ISDN} * L_{IUA} N_{IUA})}{90}; \quad (4)$$

$$V_{V_5} = \frac{(P_{V_5} * N_{V_5} * L_{V_5UA} N_{V_5UA})}{90}. \quad (5)$$

2 scenarios, basic data and results of calculations are considered.

The first scenario will consider the gradual growth of subscriber loading on a subscriber lock of the access, thus all other loadings remain invariable. It will give the chance to estimate as the increase in subscribers influences a necessary transport resource that it is especially important to consider at a network design stage, in the conditions of the continuous growth and development of the NGN networks.

Calculations showed that with a growth of loading by 100 times the necessary transport resource for connection of a lock of access grew by 100 times, which is absolutely logical.

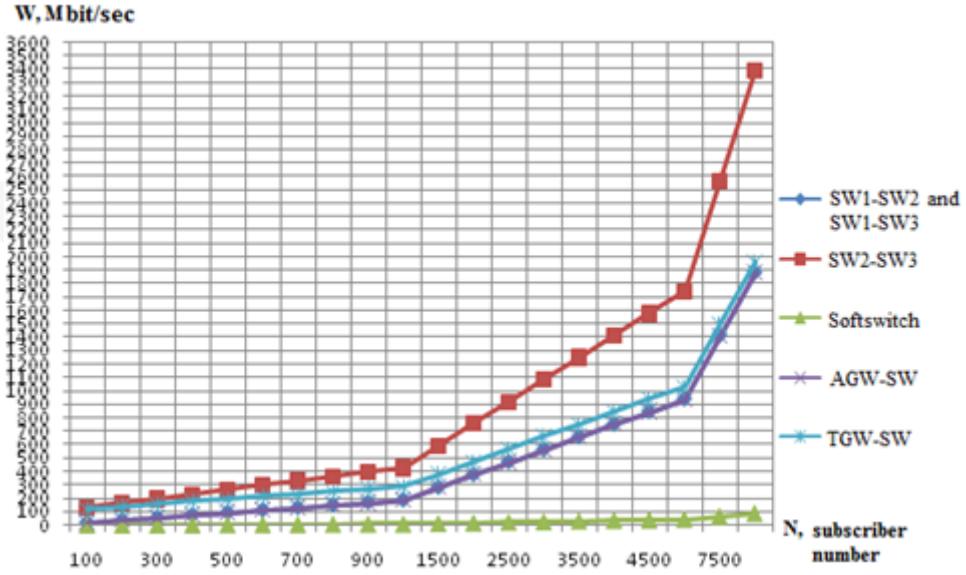

Fig. 2. Dependence of a transport resource of the NGN network on number of subscribers.

Growth of a necessary transport resource for terminal locks made 17 times, though loading from PSTN remained a constant. It occurs because of that subscribers of a package network can interact with subscribers of PSTN, and resources are necessary for this purpose.

Growth of a necessary transport resource on a transport network made 27.7 times.

With growth of number of subscribers of the NGN network loading, which Softswitch has to process, increases. Growth of a transport resource was 73 times. That testifies to active participation of Softswitch in work of a package network. As subscribers of a package network actively consume resources of knots of switching of intellectual services. Here growth by 33 times was noted.

In the second scenario we will gradually increase proceeding loading from PSTN1 by another, thereby increasing load of a data transmission network, and leaving all other loadings to leave without changes.

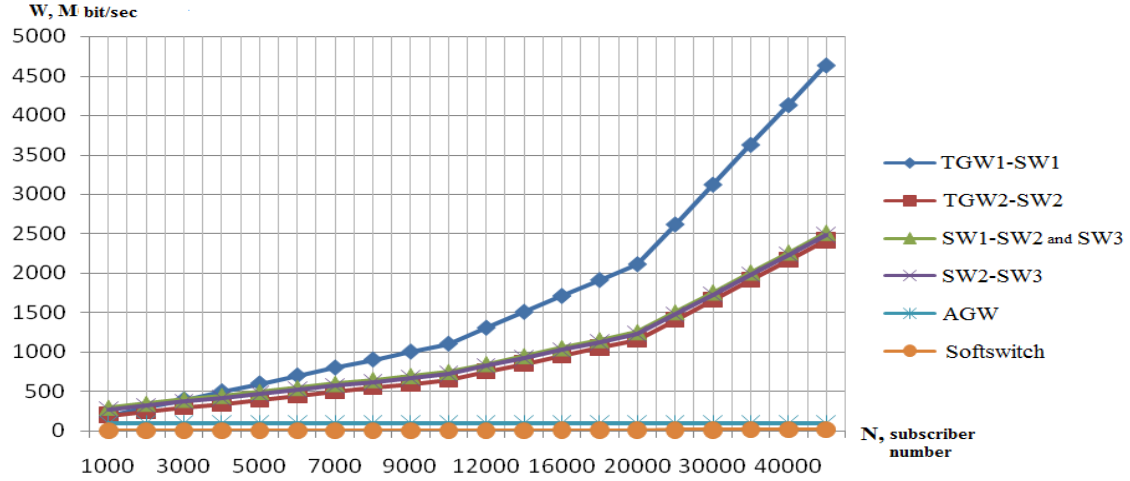

Fig. 3. Dependence of a transport resource on increase in loading on PSTN 1 in PSTN2

From graphic it is visible that with growth of load of PSTN1 by 45 times, the necessary transport resource for connection of a terminal lock 1 to a network grew in 24 times, for connection of terminal locks 2 and 3 - by 12 times. Such result is quite logical as total load of PSTN grew twice more, than by PSTN 2.

Growth of a necessary transport resource for a transport network was 9 times.

Growth of a necessary transport resource for Softswitch made this 3 times that is much less, than in the previous scenario. From where follows that the Softswich resources are consumed more actively by subscribers of a transport network.

The necessary transport resource for connection of subscriber locks remained constant as load of them didn't increase, and loading increased by PSTN1 only in PSTN 2 parties.

Conclusion

In this work we discussed in detail the method of designing the Next Generation Networks. This method is suggested Y. Semenov. To date, this method of design is not the most effective, but the most simple and open to allow for a numerical calculations. According to this method was promoted calculation of the required transport resources subscriber gateway to connect it to the network NGN, as well as automation was performed this calculation. Just 2 scenarios were considered to increase the subscriber base that must be considered when designing the network.

According to the scenarios, the graphs and appropriate conclusions that can help provide redundancy issues in the design of network resources.

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