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Application of NGN and NG-SDH Technologies

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Abstract

The article provides information on the applications of development of NGN and NG-SDH (New Generation Synchronous Digital Hierarchy) technologies. The article covered the possibilities of using this technology, the main strategies for the development of modern broadcasting systems. Reader can find main directions and purposes of applications of this technology out. Why Telecommunication area needs to improve traditional SDH technology? There is a comparison table of traditional SDH and NG SDH technologies. The transport network revolution, which began with WDM technology, and a number of other ancillary technologies are shown. The issue of economic evaluation of the mentioned technologies was also touched upon.

Keywords: communication, information, NGN, SDH, telecommunications, network.

Introduction

World telecommunications has undergone many scientific and technological revolutions. Its first revolution was entirely technological in nature and was associated with the transition from the principle of analog transmission and switching to the principle of number. A century has passed since this revolution, which began all over the world in the 1960s, and in the 1990s led to the emergence of completely new technologies. Its main features are that until the last moment it did not cover the whole society and was applied only in the telecommunications sector (Verdiyev & Məmmədov, 2018).

The second revolution in telecommunications is due to the emergence of mobile communication systems. What distinguishes it from the first revolution is that it covers the entire human civilization. The idea that any two people can communicate with each other anywhere, at any time, mobile communication has become one of the intangible values of society. Such deep support from the population did not lead

to a stormy new revolution. As a result, the percentage of "mobilization" of communication networks in many European countries today significantly exceeds the coverage of "classic" services of wired communication (Verdiyev & Məmmədov, 2018).

The third revolution, which has just begun and is growing rapidly, is the transition to a global information society (GIC). This revolution is radically different from the previous two revolutions, it not only covers the whole society, but also changes the foundations of its structures, in general, changes directions, values and so on. For example, information resources are strategic in parallel with the process of AIDS transition to the global information society, mercury, oil and gas resources. The sphere of communications is not the basis for business development, their economic model and production models are more virtualized (Məmmədov, 2022).

Main directions and purposes

One of the directions of application of new virtual technologies in life is to provide the population with the widest possible access to the information resources of society and the whole world civilization. Thus, it is necessary to modernize all modern communication systems. A new revolution is emerging in the practice of the world and the country, which is called the New Generation Network (NGN) (Zingerenko, 2013).

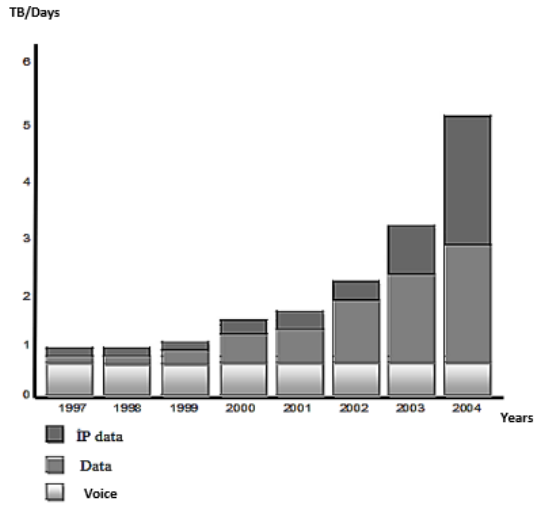

Figure 1. One of the qualitative assessments of the development of three traffic groups in networks

The NGN revolution is based on a shift in priority from voice traffic, data traffic from switching channels, and packet switching. Indeed, the share of data transmission traffic is currently growing dynamically and is gradually dominating in modern communication systems (*Ivanov, 1999*). Evaluation of qualitative and quantitative indicators shows that the dynamics of growth of voice traffic is stable on average worldwide. In this case, the level of voice traffic remains unchanged. On the contrary, the share of data traffic, and especially the share of IP traffic, is growing significantly. From 2003 to 2004, data traffic was preferred in European networks, and from 2004 the share of IP traffic exceeded the share of voice traffic (José, 2005).

Comparison of traditional SDH and NG SDH

This table (Table 1) consist comparison of main functions of Traditional and New Generation SDH technologies (José, 2005):

Table 1. Main functions of Traditional and New Generation SDH technologies

Functions	**Traditional SDH**	**NG-SDH**
Basic appointments	To provide the first network channel between two points	Provide a corridor for IP traffic between the two points
Network channel settings	Standard channel at PDH E1, E3 and E4 level	nxVC-12 capacity corridor
Ability to release	Registration	Registration
Input interface settings	PDH interfaces in accordance with G.703 recommendations	Different interfaces, maximum 10/100/1000 Base T

Conclusion

As a result, the NGN revolution is ideologically grounded and sets new requirements for next-generation SDH systems: NGSDH technology must support packet traffic transmission and be maximally adapted to all levels of packet traffic transmission, primarily IP traffic (José, 2001).

If NGSDH allows you to connect different segments of access networks, then it can fully claim its place among NGN transport networks. The advantages of this system arise when the following three conditions are met:

1. The NGSDH system is already deployed and used by the operator to solve classic SDH problems. The solution is only viable if it optimizes the use of existing SDH transport;

2. The NGSDH system has sufficient spare capacity to create a corridor of the required width;

3. The NGSDH system itself successfully connects to the segments via the Ethernet / GE interface (ITU-T Rec. G.703).

One of the main requirements of NGN's transport networks is the transmission of different types traffics. Sources of such traffic are ESCON (Optical Fiber Channel Interface), FICON (Channel Sequence of Data Transmission), DVB (Digital Video Broadcasting), Ethernet, RPR, as well as leased channel (Private Lines) technologies (ITU-T Rec. G.783). All of these technologies are interrelated with NGSDH at the channel level or MAC level. This is equivalent to the channel level of NGN networks. These technologies transmit traffic consisting of various applications.[10]

For these applications, the NGSDH system must form interconnected channels with fixed or variable throughput. Thus, the network layer functions are defined in the NGSDH model. At the bottom of the model is the level of the transmission system. Thus, the network layer functions are defined in the NGSDH model (ITU-T Rec. G.781).

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