



Modernization of Local Telecommunication Systems Based on NGN Technology

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ABSTRACT

This article describes in detail the local telecommunications systems and their ongoing reforms, as well as the process of modernization of the system based on NGN technology.

Keywords:

Computer, information, information and communication, technology, telecommunications, modernization, NGN technology, network.

Extensive work is being carried out in our country to develop and modernize computer and information technologies, telecommunications and data networks, Internet services, to bring them up to world standards and, on this basis, to move towards a "Global Information Society". Building an information society based on information and communication technologies has become one of the important directions of economic and social policy of Uzbekistan. Extensive work is being carried out in the country's telecommunications networks to ensure the reliability and stability of trunk and intra-zone telecommunications networks, optimize the network based on consumer requirements, improve the quality of services and further improve network management. The introduction of modern information technologies into the life of our country is one of the priorities of the government aimed at solving the problem of increasing the efficiency

of social production and development. On May 10, 2012, the Resolution of the President of the Republic of Uzbekistan No. PP-1754 "On the Program of Development of the Service Sector in the Republic of Uzbekistan for 2012-2016" was adopted. The resolution provides for further improvement of the structure of the service sector, the rapid development and replenishment of the market with modern services in demand, as well as the provision of various social and economic services to the population of the regions. Improving the quality of public services and expanding access to them.

In 2012-2016, the Uzbek Agency for Communication and Information plans to provide the population with the following new services:

1. Interactive television services (IPTV);
2. Video telephony services, etc.

The rapid development of the telecommunications sector in Uzbekistan is the

design of the network on the basis of FTTx technologies provided by the segment of high-tech services, ie video calling, data transmission, telephone conversations, Internet access and IPTV services. related to the provision of services. Therefore, the development of the telecommunications sector is based on two trends: extensive (meeting the demand for telephone installation) and intensive (introduction of new markets and modern services).

On March 21, 2012, the Resolution of the President of the Republic of Uzbekistan No. PP-1730 "On measures for further introduction and development of modern information and communication technologies" was adopted. In order to ensure the widespread use of modern information and communication technologies in the construction of the state and society, the main tasks for the further introduction and development of information and communication technologies are identified:

Ensuring the formation of the National Information System based on the gradual integration of information systems of government agencies, as well as legal entities and individuals;

Creation of information systems to automate the activities of government agencies, which will increase the efficiency and quality of their functions;

Expanding and improving the quality of the list of interactive public services provided by government agencies to businesses and the public, ensuring the wide use of relevant information resources, including in rural areas;

Improving the management system in the field of information and communication technologies, taking into account the state of development of information resources, technologies and systems, including information security systems;

Ensuring information security of the national information system, protection of its information systems and resources.

Relevance of the dissertation:

Based on the above tasks, the development of telecommunications networks, modernization of telecommunication networks on the basis of

fiber-optic cables and the design of these networks on the basis of new digital stations is one of the most pressing issues today.

Over the past 15 years, as a result of the development of information and communication technologies, our country is achieving high results in the field of communications. As a result of modernization of telecommunication networks, application of modern technologies, installation of new digital equipment, their optimization, Uzbekistan's rapid involvement in the process of global information integration is observed. The use of NGN technology in the communication networks of the republic brings the quality of communication to a level that meets the requirements of world standards. A network based on NGN technology (ie NGN network) is a universal network capable of transmitting any type of data (audio, video, image, television frame, etc.) on the basis of packet switching with high quality, without losses and at high speed. The NGN network is able to provide all the services needed for different data paths, that is, the quality of service (QoS-Quality of Service). Theoretically, the NGN network is a multiservice that combines the existing public telephone network (UFTT-PSTN), data transmission network (MUT), telecommunication network (EAT) into a single integrated system. network. The main purpose of building an NGN network is to introduce a wide range of services. Examples include:

Telephone service (local, long distance, international telephone);

Data transmission service (dedicated data channel, virtual private networks transmitting data);

Telematics service ("e-mail", "voice mail", "IP telephony", "audioconferencing", "videoconferencing");

Mobile telecommunication service;

Provider service ("electronic supermarket", "distance learning").

In this case, the NGN network supports various types of communication devices, such as analog telephones, facsimile machines, IP-telephony terminals, mobile devices, digital network devices and other types of communication components. The advantage of the NGN

network is the availability of (many) services. Difficult issues in the use of the NGN network are its management and security. The creation of the architecture of the NGN network involves the integration of UFTT, Mobile network, Internet resources, IP-telephony system in a single infrastructure. Currently, the NGN network has a four-tier architecture.

Architectural model of NGN network

- Service management level
- Switching control layer
- Transportation levels
- Access level

The service management layer summarizes the logical functions that control services and provides a distributed computing environment that provides:

- ☑ Provision of information and communication services;
- ☑ Service management;
- ☑ Creation and introduction of new services;
- ☑ Ensuring the connection of various types of services.

The switching control layer performs functions such as alarm information processing, call routing, and data flow management. In this case, the software switch SoftSwitch performs the listed functions. There are several SoftSwitches on the network, which communicate with each other using SIP (Session Initiation Protocol) protocols and provide integrated management of embedded management. The transport layer provides data transmission between users. The PDH and SDH transmission systems currently available on our highways play an important role in this. The International Telecommunication Union (ITU-T) has defined the following requirements for transport:

Ensuring real-time loss-free connectivity;
Support for "Cellular", "Point-to-Multiple", "Multi-Point-to-Multiple", "Multi-cell" topological connection;
Ensuring a high level of reliability, scalability, mobility, etc.

The following requirements are set for the transport level:

Ensuring high reliability of devices in the communication node;
Traffic management;

Ensuring scaling;

The transport layer of the NGN network consists of two levels, the access network and the base network.

The access network consists of a subscriber line, access node and transmission systems (PDH / SDH). The base network performs the function of transporting and switching channels. The basic network consists of the following 3 levels of technology:

IP, ATM, MPLS (packet switching);
SDH, Ethernet ... (formatting of tracks);
FOC, DRRL, CC ... (signal transmission medium).

The basic network of NGN includes:

Transit nodes;

The last node connecting subscribers to the multiservice network;

Information, call, connection signal controllers;
Gateways connecting to UFTT, MUT, EAT.

The access layer provides a connection to the network of various means of communication (computer, telephone, facsimile, etc.). It uses the following technologies:

Wireless technology (Wi-Fi);

Cable TV system based technology (DOCSIS, DVB);

Optical fiber technology (PON);

XDSL technology.

NGN network management system:

NGN network management system The main feature of the NGN network is that the routing and transmission of packets and network devices (channels, routers, switches, gateways) are physically and logically separated from the service and call management device.

Logical view of the NGN network This feature of the NGN network distinguishes it from other networks in the world of telecommunications, IP-network, UFTT. We all know that the construction of the NGN network in the country is in full swing. Automatic telephone exchanges (ATS) are installing HUAWEI C & CO8 switching system. In practice, this is a key factor in the gradual transition from UFTT to NGN. The first step in the transition, as we have seen, is to merge existing networks into a single network.

The evolution of the NGN network is divided into 3 stages:

Phase 1. The C & CO8 switching system provides VoIP and IP CENTREX technologies, in which UFTT and NGN networks are interconnected through media gateways.

Interconnection of UFTT and NGN networks
Phase 2. At this stage, the construction of the NGN network begins, which does not use media gateways, but the Soft Switch uses a packet interface using the SIP-T protocol to interconnect UFTT and NGN networks. Connection of UFTT and NGN networks via SIP-T protocol.

Step 3. This is the final stage, as the users of the UFTT network are the users of the NGN network. In this case, the remote modules in the C & CO8 switching system are easily connected to the NGN gateways (AG). RSA / RSI remote modules in the digital C & CO8 switching system can be easily connected not only with AG, but also with input media gateways (AMG). The final stage in the integration of UFTT and NGN networks is the democracy inherent in NGN: any technology that provides traffic and / or services can be considered as a transport technology. Similarly, any technology that provides subscribers access to the resources of the transport network can be considered as subscriber incineration technology. Such a broad interpretation of transport and access technologies has already led to different solutions for both types. The most popular technologies of transport networks: SDH (now NGSDH), ATM, MPLS / IP, Frame Relay, WDM, trunk Ethernet (10 Gigabit Ethernet). Mass access technologies are relatively innumerable, as they cover not only subscriber access technologies to NGN networks, but also traditional subscriber access technologies. These are PDH, ISDN, subscriber Ethernet i, IP, xDSL and VDSL, FTTx / PON, Wi-Fi and WiMAX, WLL, HPNA, CATV and HDTV, Fiber Channel. It also includes telephone channels and traditional modem communication technologies. All of these technologies compete with each other due to the polyvariant nature of the NGN network, while in the same network, different technologies can effectively coexist and interact (in accordance with the principle of convergence). Thus, the new

generation of communication systems is becoming more diverse and complex. It is difficult to draw a clear line between the transport network and the access system.

The Republic pays special attention to the formation of access to a comprehensive national information system of global information systems and technologies, which in turn is a crucial task for the growth of our country in the XXI century. The development of the national data transmission network continues. The public telephone network is being improved and reconstructed, as well as information resources are being formed. Modern and promising telecommunications services, including the use of electronic documents, e-commerce, remote data management, multimedia, teleconferencing, IP-telephony, are expanding.

The rapid development of the telecommunications sector in Uzbekistan is associated, on the one hand, with the transfer of telephones to homes, and, on the other hand, with the introduction of modern high-tech digital stations in the telecommunications sector. One of the most pressing issues today is the provision of additional services to users with the help of modern digital stations, increasing the number of network users, the introduction of new modern network technologies. This article discusses the principle of operation of digital stations used in telecommunications systems and the modernization of telecommunications networks on the basis of MSAN digital station in the semi-autonomous regions of Nukus. One of the main tasks of the specialists is to provide modern additional services to subscribers using digital telecommunication systems, to develop telecommunication networks, to increase the number of users of these networks and to provide high-speed, secure, high-quality services to users. The advantages of MSAN digital stations in the designated areas of Nukus are:

- ☑ Compactness of structure;
- ☑ Low power consumption;
- ☑ Compactness for users;

OchiqOpen architecture for all new technologies (xDSL, IP, optical networks, wireless networks ...);

☑ Possibility to provide all types of audio, video and information services for subscribers;

☑ Simplicity of maintenance and operation.

MSAN digital station is intended for use in the required urban networks, as well as in rural telephone networks as a separate device and as part of the NGN network. Another advantage of the installation of MSAN switching equipment is the replacement of high-capacity TPP trunk cables operating from underground pipelines with unlimited fiber-optic communication cables, which will free up more than 20 km of existing high-capacity trunk cables. . Modernization of regions on the basis of new digital stations will lead to the widespread introduction of a wide range of services to the population and the expansion of their range, as well as economic development of the telecommunications sector, along with providing a number of benefits to subscribers.

2. <http://www.morion.ru3>.
3. <http://www.informost.ru4>.
4. <http://www.kreff.ru5>.
5. <http://www.niits.ru6>.
6. <http://www.ziyonet.uz7>.
7. <http://www.infocom.ru8>.
8. <http://www.asi.uz68>

References:

1. Kruk B.I. and dr. Telecommunication systems and networks. -M .: Goryachaya liniya - Telekom, 20046.
2. Bolgov I.F. and dr. Electronic - digital switching systems. - M .: Radio i svyaz, 19887.
3. Goldshteyn B.S. Switching systems. - SPb .: BVX - St. Petersburg, 2003
4. Technicheskie opisaniya kommutatsionnyx sistem S-12, DTS, EWSD, NEAX-61E, izdatelstvo firm.
5. Kartashevsiy V.G., Roslyakov A.V. "Digital switching systems for GTS". EKO-TRENDZ, 2008
6. Slepov N.N. Synchronous digital set SDH. -M., 1997.10.
7. Fiber-optic transmission systems and cables. Spravochnik. Pod red. Grodneva I.I. M .: R i S, 1993.
8. Naniy O.E. Osnovy tsifrovyx volokonno opicheskix sistem svyazi. Lightwave Russian Edition, No 1, 2003, p. 48–52.

INTERNET SITES.

1. <http://www.rusoptika.ru2>.