A Possible Approach to Increasing of the Telecommunication Network's Capacity

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Abstract – **In this work an approach to increase of the telecommunication network's capacity by constructing all-optical fragments of data networks is offered.**

Keywords – **All- Optical Network, Optical signals' switching system, Information blocks' switching.**

I. Introduction

A continuous process of the move to the next generation networks (NGN) and the emergence of new infocommunication services lead to increased bandwidth requirements of telecommunication network (TN). Creation of all-optical networks are one of the possible ways to solve this problem.

II. Main Part

The main task to be solved in constructing of all-optical networks is to implement switching of packets, frames or cells without optoelectronic conversion of the information signal.

A distinctive feature of switching systems that implement the technology labels multiplexing is the presence of buffer memory for temporary storage of information blocks.

However, at present, considering the economical inexpediency and the complexity of the technical implementation of optical random access memory, one of current trends is searching for other alternative switching methods that allow switching of the computer networks' streams based on spatial optical signals' switching systems [1,2].

One of possible ways to solve this problem is to apply the concept of information blocks' switching, which is based on establishing of dedicated channel through the network for a time necessary to the information block's transmission (for a few milliseconds).

HDWDM channels are to be used as the communication lines in network architecture based on optical information blocks' switching. Since terabit volumes of information can not be processed electronically, the system of spatial optical signals' switching that implement switching of optical signals without converting it into electrical form is to be used on the switching nodes (SN) [3]. Absence of optical buffers in the SN is the principal feature of the network architecture based on information blocks' switching.

Edge input node (EIN) is responsible for the information blocks' assembly, routing, signal messages' transfer, allocation of the wavelength for transmission and planning of queues at the border of the optical network.

A switching node is the main network's node. It providing functions of signals messages' processing, planning and realization of optical signals' switching. Finally, edge output node (EON) implement message segmentation and navigation to a higher level of open systems interconnection network model.

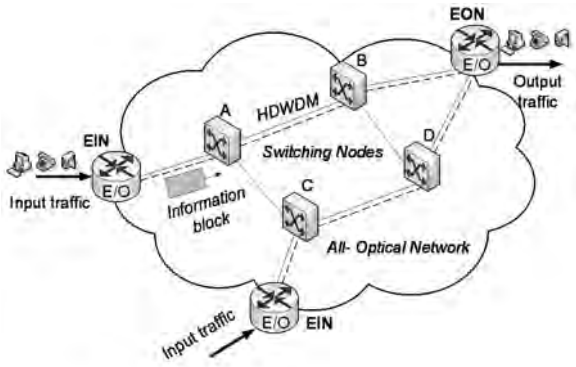

Fig.1 All-optical fragment of TN architecture

Formula 1 describes the general delay of message's transfer along the all-optical network:

$$T = t_{at} + n\delta + t_{sw} + t_b + \sum_{ij \in R}^{n} t_d^{ij}, \qquad (1)$$

where t_{at} – assembling time of information block,

n – number of SN participated in connection's installing,

δ – time spent on control message handling,

……..t_{sw} – switching time of optical switching element,

t_b – time spent on message transfer,

t_d^{ij} – time of distribution of optical signal between switching nodes.

III. Conclusion

The introduced network model with optical information blocks' switching permits to increase telecommunication network's bandwidth by using of all-optical information signal's switching technologies.

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