



DESIGN OF ACCESS NETWORKS USING GPON TECHNOLOGY

Sarsenbaeva Nazlimkhan

a student of the Faculty of Telecommunication technologies
("Telecommunications")

ARTICLE INFO

Qabul qilindi: 05-april 2023 yil

Ma'qullandi: 10-april 2023 yil

Nashr qilindi: 14-april 2023 yil

KEY WORDS

data network, PON, GPON, technologies, multiservice, new access, optical system.

ABSTRACT

We will describe in this article about GPON technology, disconnection and functions and design using GPON technology. This abbreviation refers to passive optical systems with gigabytes. GigabitPON (GPON) is a technology that involves the construction of broadband multiservice access networks. It provides various services through optical cable with guaranteed quality: Internet, TV and telephony. GPON technology provides for the installation of a cable directly to the apartment or fiber optic.

INTRODUCTION: Growing demand for high speed internet is the primary driver for the new access technologies which enable experiencing true broadband. It leads telecommunication operators to seriously consider the high volume roll-out of optical-fiber based access networks.

They have to renew their access networks that are clearly becoming the bottleneck in terms of bandwidth. Therefore most telecommunication providers are currently withdrawing their legacy copper network, giving way to optical fiber networks. To allow faster connections, the optical fiber gets closer and closer to the subscriber. Fiber to the Home FTTH appears the most suitable choice for a long term objective: if the clients are wholly served by optical fibers, it will be easier to increase the bandwidth in the future. FTTH is future proof solution for providing broadband services such as Video on demand, Online Gaming, HD TV and VoIP.

MATERIALS AND DISCUSSION: GPON FTTH architecture offers converged data and voice services at up to 2.5 Gbps. GPON enables transport of multiple services in their native format, specifically TDM and data. In order to enable easy transition from BPON to GPON, many functions of BPON are reused for GPON. The GPON standards are known as ITU-T Recommendations G.984.1 through G.984.5.

The GPON's uses Generic Framing Procedure (GFP) protocol to provide support for both voice and data oriented services. A big advantage of GPON over other schemes is that interfaces to all the main services are provided and in GFP enabled networks packets belonging to different protocols can be transmitted in their native formats. The voice component can be represented as VOIP service (voice over IP, packet-switched protocol) and can be combined with data component in physical layer simulations. Finally, the video component can be represented as a RF video signal (traditional CATV) or as IPTV signal

that also can be combined with data.

GPON-technology is today the most modern, efficient and promising in a very wide family of passive fiber-optic networks. Based on modern European standards, cable TV operators and ISPs have effective solutions with high-speed access to the internet, stable signal and specific quality of telephoto. GPON technology saves very important optical fibers due to the tree topology of the network architecture and the highest reliability achieved through passive branching elements. But perhaps the main advantage of these Telecommunications innovations lies in the high-speed "last mile".

GPON technology supports modern wave multiplexing techniques, allowing their cable infrastructure to significantly increase network capabilities without upgrading. And the tree topology opens up ample opportunities for flexible management of the bandwidth of customer services. In this case, GPON technology has a sufficiently high data transfer rate, which provides transport transparency for various services: SDH, Ethernet, ATM, etc. Thus, many of the advantages of passive fiber-optic networks and their unique capabilities determine the advantages of these technologies in a number of other telecommunications architectures, especially the high-speed "last mile". This caused the rapid spread of this innovation in the construction of high-speed optical-fiber urban multiservice networks. What is GPON technology and what is its essence?

In itself, it is quite simple. The central point of the provider providing high-speed spinal communication is connected to the subscriber points through the passive optical network of the tree architecture. In this case, special search nodes are formed that accommodate compact passive fragments of an optical type. Their passivity means that they do not need food or service. GPON-equipment, in addition to separators, includes a multi-service hardware-software station platform and subscriber terminals. And one platform can transmit such information to several subscriber devices, which allows you to connect the budget of your power and the speed of the receiving device. The combination of such modern equipment makes it possible in a short time and without additional costs for the expansion of passive fiber-optic networks and the modernization of the cable architecture.

Interestingly, passive fiber-optic networks are not the invention of the days of existing systems. The development of this data transfer technology began in the eighties in the depths of the laboratories of British Telecom. A few years after the start of development, the first tests were carried out, in which many famous European TV shows took part. In the future, this technology is going through many stages of improvement and modernization. The first passive networks of this type were only able to transfer up to 155 Mbit / s. However, at that time it was too much. And so far, in connection with the rapid progress of the Internet and digital television, this technology was really in demand.

CONCLUSION: In conclusion, the meaning of marriage is that in every child of his life, the GPON and his place are great and significant. Knowledge of GPON is required, especially in programming and in the use of technologies. Modern technologies perform modulation/demodulation functions, error avoidance functions, start-stop synchronous modifier, takt and cycle synchronizer, unit item registration, data release functions. Concurrent with the above, modems include digital recording, sound production, conditional call recognition (separation), caller subscriber number identification, remote configuration, unproven access protection, adaptation to transmission conditions provides everything in

that life.

References:

1. David Cleary, Ph.D. Fundamentals of Passive Optical Network (PON) [Электронный ресурс] FTTH Council © 2016 URL: <http://www.ftthcouncil.org/> (дата обращения: 15.04.2016).
2. David Nowak. Dynamic Bandwidth Allocation Algorithms for Differential Services enabled Ethernet Passive Optical Networks with Centralized Admission Control [Электронный ресурс]. Dublin City University © 2016. URL: <http://www.dcu.ie/> (дата обращения: 16.04.2016).
3. Гибадуллин Р.Ф., Новиков А.А., Хевронин Н.В., Перухин М.Ю. Разработка параллельного модуля генерации защищенной картографической базы данных // Вестник Казан. технол. ун-та. – 2016. – № 10. – С.102-105.
4. Гибадуллин Р.Ф., Новиков А.А., Смирнов И.Н., Перухин М.Ю. Управление доступом и защита беспроводной передачи картографической информации // Вестник технол. ун-та. – 2016. – № 8. – С.105-109.
5. Raisecom Technology Datasheet [Электронный ресурс]. Raisecom Technology Co., Ltd © 2016. URL:http://raisecomtech.com.ua/html/Products/GEPON/OLT/iscom5504_100209_en.pdf (дата обращения: 23.12.2016).



INNOVATIVE
ACADEMY