

The evolution of Ethernet Passive Optical Network (EPON) and future trends

FelixObite^a; Edward TamunoiyowunaJaja^b; GeoffreyIjeomah^c; Kabiru IbrahimJahun^d

^a Department of Physics, Faculty of Physical Science, Ahmadu Bello University, P.M.B. 1044, Zaria, Nigeria

^b Department of Electrical & Electronic Engineering Technology, Port Harcourt Polytechnic, Rumuola, 500272, Port Harcourt, Nigeria

^c Faculty of Electrical & Electronics Engineering, Universiti Malaysia Pahang, 26300 Pahang, Malaysia

^d Department of Computer & Communications Engineering, Abubakar Tafawa Balewa University, P.M.B. 0248, Bauchi, Nigeria

ABSTRACT

The tremendous Internet traffic growth has confirmed that the telecommunications backbone is moving aggressively from a time division multiplexing (TDM) orientation to a focus on Ethernet solution. Ethernet PON, which presents the convergence of low-cost Ethernet and fiber infrastructures, has taken over the market initially dominated by Digital Subscriber Line (DSL) and cable modems. It is a new technology that is simple, inexpensive, and scalable, having the ability to deliver massive data services to end-users over a single network. This paper reviewed the evolution of Ethernet Passive Optical Network (EPON), with focus on the current development process of the future high-data-rate access networks such as Next-Generation Passive Optical Network Stage 2 (NG-PON2), Wavelength Division Multiplexing (WDM) PON, and Orthogonal Frequency Division Multiplexing (OFDM) PON. In addition, the recently concluded 100 Gb Ethernet Passive Optical Network (100G-EPON) is reviewed with the aim of highlighting the recent developments in the field. With this comprehensive and up-to-date review, we equip network operators and interested practitioners to focus on common priorities and timelines. Another goal of this study is to identify technical remedies for future investigation.

KEYWORDS:

Ethernet PON; Optical line terminal; Optical network unit; WDM PON; OFDM PON