

## Of an 80 Gbps Passive Optical Network Using Time and Wavelength Division Multiplexing

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**Abstract :** Internet Service Providers are driving endless demands for higher bandwidth and data throughput as new services and applications require higher bandwidth. Users want immediate and accurate data delivery. This article focuses on converting old conventional networks into passive optical networks based on time division and wavelength division multiplexing. The main focus of this research is to use a hybrid of time-division multiplexing and wavelength-division multiplexing to improve network efficiency and performance. In this paper, we design an 80 Gbps Passive Optical Network (PON), which meets the need of the Next Generation PON Stage 2 (NGPON2) proposed in this paper. The hybrid of the Time and Wavelength division multiplexing (TWDM) is said to be the best solution for the implementation of NGPON2, according to Full-Service Access Network (FSAN). To co-exist with or replace the current PON technologies, many wavelengths of the TWDM can be implemented simultaneously. By utilizing 8 pairs of wavelengths that are multiplexed and then transmitted over optical fiber for 40 Kms and on the receiving side, they are distributed among 256 users, which shows that the solution is reliable for implementation with an acceptable data rate. From the results, it can be concluded that the overall performance, Quality Factor, and bandwidth of the network are increased, and the Bit Error rate is minimized by the integration of this approach.

**Keywords :** bit error rate, fiber to the home, passive optical network, time and wavelength division multiplexing

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