

## ABSTRACT

Currently the development of communication systems in Indonesia is one of them fiber optic media, it has begun to be implemented especially on internet networks. In the internet network, optical fiber is used as a transmission medium that has advantages in data transfer speeds and large bandwidth. That depends on the quality level of the fiber optic network infrastructure itself. Of course this technology can benefit customers in terms of data transfer requirements and capacity. However, the many factors that cause loss in fiber-optic networks are a problem to date, such as attenuation and distortion.

In this final project, a simulation of the FTTH (Fiber To The Home) Margahayu Raya Area network has been carried out using the Optisystem. In this case the network simulation is done by using the Mach Zehnder Interferometer method. The method aims to improve the quality of infrastructure in transmitting FTTH network data with the output represented using the Bit Error Rate (BER) and Q-factor parameters or quality factors. Therefore, the main purpose of optical signal transmission is to achieve the desired BER value between two points or nodes in the network.

From the results of FTTH network simulation using improved BER service quality and prior to the increase, the analysis obtained shows that the BER and Q-factor values are different. Simulation without using the Mach-Zehnder Interferometer has a BER value of  $8,08635 \times 10^{-92}$  and a Q-factor value of 20,2883. While the simulation using the Mach Zehnder Interferometer has a BER value of  $2,23554 \times 10^{-93}$  and a Q-factor value of 20,4641. Although the value of BER and Q-factor obtained from the design of both meet the standards, namely the minimum BER value of  $10^{-9}$  and  $Q\text{-factor} > 6$ , but the design with the use of the Mach Zehnder Interferometer has greater value. This shows that the quality of FTTH Margahayu Raya Area network fiber optic service with an increase in BER and Q-factor has been successful.

**Keywords :** Fiber Optic, BER, Q-factor, Mach Zehnder Interferometer.