

ABSTRACT

The development of telecommunications technology is currently very rapid, so the need for information is very important and has become a primary need for the Indonesian people. One effort to maintain device performance is by monitoring temperature and humidity, especially on devices located in BTS shelters. High heat and unstable voltage inside the shelter can cause damage to the device, thereby disrupting the communication process during transmission. The ideal temperature for telecommunications devices in BTS shelters ranges from 22°C to 26°C. This study aims to design a BTS room monitoring system based on NodeMCU ESP32 to improve time efficiency and system reliability. This system allows for periodic monitoring of room temperature to remain within predetermined limits. In addition, the system is also equipped with an INA219 sensor to detect voltage and current on the device, as well as an MC-38 sensor to monitor the condition of the shelter door (open or closed). The obtained parameters show an average room temperature of 30°C, humidity 72%, voltage 1.70 V, current 20 mA, power 8 W, and the door accuracy level reaches 80%. For QoS obtained from the morning delay of 900 ms is a bad value, during the day it is 300 ms a good value, and in the afternoon 0 ms is very good, while the average packet loss reaches 53% which is a very bad condition for a distance of 10 to 100 meters. With the integration of Internet of Things (IoT) technology, this system is expected to not only provide practical solutions, but also improve the performance and security of the BTS shelter room as a whole. Thus, this research contributes to the development of an effective and efficient monitoring system for temperature, humidity, voltage, and security in BTS shelters.

Keywords : *Internet of Things (IoT), Quality of Service (QoS), NodeMCU ESP32, Sensor, Shelter BTS*