

ABSTRACT

Land is one of the needs in supporting human life and well-being. The increase of population in Indonesia has led to an increase in the people's need for land ownership. Even though the government has made regulations regarding the installation of land boundary markers, there are still several conflicts over land grabbing that are carried out by revoking or removing the land boundary markers that have been installed.

In this research, the author designs a prototype of the boundary monitoring system based on Internet of Things and website using Long-Range (LoRa) module. LoRa or LoRWAN is a Low-Power Wide-Area Network (LPWAN) technology. In this monitoring system, there is a GPS module on the LoRa end-device to detect the coordinates of the boundary markers location. Data from the LoRa end-device at the boundary are sent to the LoRa Gateway, and then forwarded to the The Things Network (TTN) platform server. Then the data are stored in the Firebase database. To facilitate monitoring, the website that has been designed will display data from the database.

There are three tests to determine the performance of the system, QoS performance, GPS accuracy, and current consumption of the end-device LoRa used on land boundary marker. From the QoS test results at a distance of 500 m, the lowest delay is obtained on SF7 with a value of 0,751 seconds while the highest delay is obtained on SF12 with a value of 2,514 seconds, and the highest percentage of packet loss is obtained on SF7 with a value of 26,67%. The L80 GPS accuracy value on the LoRa end-device obtained from the test is 1,329096 m. The LoRa end-device with the SF7 configuration has the lowest current consumption with a value of 11,31 mA, while the highest current consumption is in the SF12 configuration with a value of 207,65 mA.

Keywords: Boundary marker, Internet of Things (IoT), LoRa, GPS, Website