

ABSTRACT

In general, Internet of Things (IoT) systems use a storage system. However, it is prone to errors that cause the server to go down, so that the data stored in the database cannot be accessed and even vulnerable to loss because there is no backup. Therefore, the authors conducted research by implementing a blockchain database system on smart farming, where data will be stored in a decentralized manner and distributed to all nodes registered on the network. If there is a system failure on one of the nodes, the node will not affect the system on the other nodes.

The creation of a private blockchain system using the Ethereum framework with a Proof of Work (PoW) and Proof of Authority (PoA) consensus. System I is connected to Node I and System II is connected to Node II. The process of sending sensor data to the blockchain via a web server. The ESP8266 NodeMCU is the sender and the two virtual machines are the receiver. This blockchain works to store sensor data and then display it on a website.

The test results show that blockchain with PoA consensus is better than PoW. The results of the mining rate testing process on the PoA blockchain have the highest delay of 15 seconds and the PoW blockchain has no delay limit for the mining rate. The use of PoA ubuntu blockchain system resources is more efficient by 69.55% for CPU and 1.945% for RAM. In the PoA blockchain, the resulting blocks tend to be stable and are not affected by the number of nodes. The setData and getData delay processes on the PoA blockchain are 0.1 seconds faster. In the block validation process delay, the PoA blockchain averages 0.5 milliseconds, while the PoW blockchain averages 10-15 milliseconds.

Keywords : *Blockchain, Internet of Things, Proof of Authority, Proof of Work*