A Secure and IoT-Enabled Big Data Sharing System Based on Blockchain and distributed hash table

With the increasing deployment of IoT devices, lots of interactions among the physical objects are enabled, which brings improved efficiency, accuracy, and economic benefits while reducing human interventions. The great amount of these devices brings lots of challenges in data storage. How to efficiently store the large-scale IoT data, and how to protect the data are issues of great significance.

In the traditional cloud-based IoT structure, centralized cloud servers collect and control all data, which brings some disadvantage, like cloud servers require very high storage capacity to store IoT data, or sensitive data is very easily leaked from the server. For example, a server may exchange sensitive data with other entities without notifying the data owner. Decentralized structures will properly handle these.

Blockchain provides a convenient distributed platform Data storage and protection. In a blockchain, a group of users, Also known as miners, cooperatively create blocks A public ledger that verifies and records transactions. in a IoT applications such as implantable medical systems and data can be stored in a distributed hash table (DHT), while A pointer to a DHT storage address can be stored in blockchain. When an entity requests data from the DHT, The blockchain will decide if access can be granted or not, i.e. handle the authentication of the requester Replacing trusted blockchain miners by distributed blockchain miners.

(1) Decentralized storage: IoT data is stored off-chain

In a distributed structure, an entity can be easily found The storage address through the blockchain.

(2) There is no centralized trusted server: access to IoT data is

Controlled by most blockchain miners, and No intervention from the trust server is required. Users do not need to worry about unauthorized access his/her data.

blockchain is good on distributed data storage and protection. However, the computing power and the storage of the IoT device is not well. Also, the storage of ledger of the blockchain is limited, and the off-chain storage is vulnerable then the transaction data in on the ledger.

In our research, we decide to build a IoT-Enabled big data sharing system, in which the storage of the IoT data and IoT device is link to the blockchain by smart contract.