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Application of Blockchain Technology in e-LoA Technopreneurship Journal

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Abstract

LoA or Letter of Acceptance is a statement received. LoA is usually used as a statement of scholarship acceptance or even journal acceptance. In addition, the current issuance of LoA is still conventional, using paper as the access medium. This is certainly inefficient. In addition, the issuance of LoAs that can be accessed through the Platform also has certain problems. Many parties doubt the security of the LoA issued through the Platform, whether confidentiality is really maintained or not. To solve this problem, e-LoA (electronic LoA) was implemented using blockchain technology on the Technopreneurship Journal Platform. With the use of blockchain technology on this Platform, LoA data cannot be changed, duplicated or deleted. So that it can improve security and support transparency in the issuance and access of LoA. e-LoA issued through the Platform also makes it easier for parties to access and download a verified LoA.

Keywords : Blockchain, e-LoA, Platform

1. Introduction

Letter of Acceptance or commonly referred to as LoA is a statement that has been received, this LoA is applied to the Technopreneurship Journal as a statement of receipt of a journal that has been submitted by the author. At present the LoA for managing and issuing LoA is still conventional, which requires paper as an access medium. Of course this is very ineffective and inefficient. So the e-LoA (electronic LoA) that owners can access online through the Platform is implemented, but there are many security problems when testing the system.

Based on these problems, it is necessary to use a decentralized publishing and access system for LoA. One of the technologies in implementing the verification system in a decentralized and transparent manner is blockcert. Blockcert was built using blockchain technology that provides transparency and accountability [1]. The first blockchain was introduced in 2008 by a person or group of people known as Satoshi Nakamoto. Then the following year was implemented by Nakamoto as a core component of bitcoin (bitcoin core), which is used as a public ledger blockchain for all transactions that occur in open networks [2]. In addition, the application of blockchain technology that is equipped with cryptography can

guarantee the coherence of stored records as well as maintaining the confidentiality of LoA owners [3]. Based on this, e-LoA (Electronic Letter of Acceptance) was applied using blockchain technology.

2. Literature Study

2.1 BlockChain

Blockchain technology in Indonesia is currently included in the early stage (early stage) because its application is still relatively small. Even so there have been several software businesses that have collaborated with related institutions and agencies to develop this technology, they have also joined the Indonesian Blockchain Association (ABI). Great potential for industry, education, economy, health, agriculture, trade and other sectors is still very wide open [4].

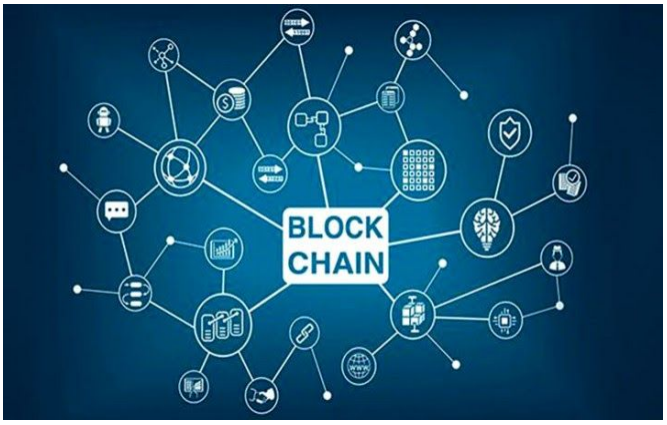

Figure 1. Illustration of Blockchain

2.1 Formula/Algorithm [optional]

The development of blockchain technology is very relevant and can even be said to have surpassed bitcoin with blockchain 1.0. Until now the development of the blockchain has reached the blockchain 2.0 and blockchain 3.0 discussed in Melanie Swan's book "Blockchain Blueprint For a New Economy" [5]:

1. Blockchain 1.0 is a cryptocurrency deployment in cash-related applications, such as money transfers, money transfers and digital payment systems.
2. Blockchain 2.0 is a contract, the entire list of economic, market and financial applications uses a broader blockchain compared to simple cash transactions: stocks, bonds, futures, loans, mortgages, ownership, smart property and smart contracts.
3. Blockchain 3.0 is a blockchain application outside of currency, finance and markets. But in the fields of government, health, science, literacy, culture and art.

2.1.1 Benefits and Advantages of Blockchain

According to Alexander Grech and Anthony in his book entitled "Blockchain in Education" the benefits and benefits obtained when implementing blockchain technology, namely [6]:

1. Self-sovereignty, for users to identify and control simultaneously the storage and management of personal data.
2. Trust (Trust), for infrastructure can provide confidence in operational transactions such as payments or certificates.

3. Transparency & Provenance, for users to conduct transactions with the knowledge of each party that has the capacity to carry out such transactions.
4. Immutability, as an archive to be written and stored permanently, without the possibility of being changed.
5. Disintermediation (elimination of intermediaries), the elimination of the need for central control authority over transaction management and archival storage.
6. Collaboration, the ability of parties to deal directly without requiring third party mediation.

2.2 Distributed Database and Decentralized System

Distributed database is a storage method where storage devices are not installed on a computer, but rather several computers. Some of these computers can be connected to a storage device or several different storage devices, which are connected through a network. This method makes the database more transparent [7].

Decentralized system is a system design that consists of several computers called nodes in a network and has the responsibility to set its own tasks to achieve the targets of the central system. Each node can have its own system and perform certain functions to contribute to the universal system (main system) [8].

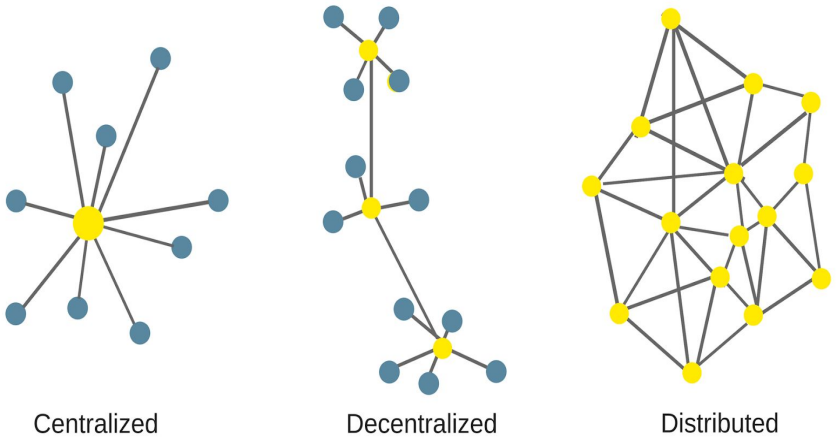

Figure 1. Illustration of Difference between Centralized, Decentralized and Distributed Systems

2.3 Blockcert

Blockcert is an open standard used to publish and verify official documents designed based on blockchain technology. This digital recording is registered in the blockchain, signed in cryptography, temper-proof, and shareable. The purpose of creating a blockcert is to invite each individual to innovate in owning and sharing official documents of their own [9].

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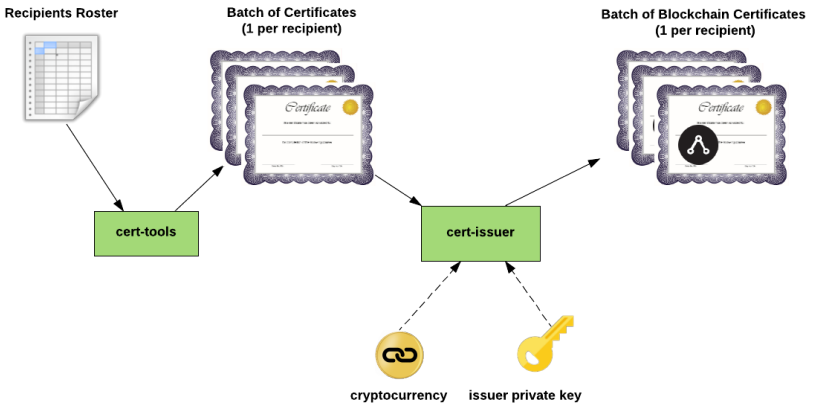

Figure 3. Blockcert illustration

3. Findings

The e-LoA scheme design with Blockchain technology uses 2 (two) stages, namely the LoA issuance stage and the document security verification stage. The first stage is the LoA publishing stage as a statement of receipt of a journal to be published by the Technopreneurship Journal on its Platform. Following are the stages of publishing LoA on the Technopreneurship Journal Platform:

1. The Technopreneurship Journal publishes e-LoA on the Platform
2. The e-LoA is added by the author's public key (blockchain address) as the party entitled to receive the LoA
3. The e-LoA is processed so that it can be included in the blockchain technology
4. The author can download the law of attraction and save it

The second stage is the verification stage of the security of documents downloaded and stored by interested parties. This is to ensure information and security [10], [11] because security and privacy are important in guaranteeing and maintaining the author's trust to submit a journal to the Technopreneurship Journal [12], [13], [14], [15] , [16], [17]. The process is as follows:

1. Only the names and emails of the authors listed in the Technopreneurship Journal article can download and store e-LoA
2. The downloader will be asked to verify via email, the verification email is only sent to the emails listed in the article on the Technopreneurship Journal Platform
3. The system verifies to the blockchain to find out the safety and accuracy of e-LoA recipients

The advantages of applying blockchain technology to e-LoA systems:

a. Security
   e-LoAs that are successfully published on the Technopreneurship Journal Platform can only be downloaded and saved by the authors listed in the article. Each e-LoA is only correlated with one private key [18] owned by the author of the article

b. Data Integrity

The use of blockchain technology [19], [20] in e-LoA can protect and prevent stored data from changing and duplicating data

c. Autonomy
Data records are distributed in a decentralized way so that the blockchain nodes have data records. Decentralized data storage reduces the risk of server downtime and data loss.

4. Conclusion

Berikut adalah kesimpulan yang di dapat dari penerapan teknologi blockchain pada e-LoA:

1. Teknologi blockchain dapat membantu sistem keamanan dokumen e-LoA, yang hanya bisa diunduh dan disimpan oleh penulis tertera di artikel
2. Teknologi blockchain dapat membantu sistem e-LoA dalam menyimpan e-LoA yang tidak bisa diubah, di gandakan dan dihapus
3. Teknologi blockchain dapat melakukan verifikasi kebenaran dari pengunduh e-LoA

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