

Blockchain Technology As An Alternative Method Of Payment Transaction Proof

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Abstract.

Today, the development of information technology allows all needs in the payment system to conduct safely and reliably with the support of blockchain technology. Blockchain technology is currently a concept getting more attention in financial technology (Fintech). This technology combines several computer technologies, including distributed data storage, point-to-point transmission, consensus mechanisms, and encryption algorithms often referred to as cryptography. Currently, various payment methods are available, Direct payment methods via the website, credit cards, automatic debit (Autopay), Mobile / Internet Banking, Non-bank, E-commerce, and E-wallet. All of the above payment systems still require a third party as a guarantor for the transactions made. Another problem that arises is a notification of bill dues to consumers, using conventional media in letters, emails, and notices of short message service (SMS), which allows consumers to miss the given deadline. It could cause the service to terminate. Blockchain technology is currently still considered an innovation that disrupts the world of banking and the internet. However, because this technology is a breakthrough major in data storage and information transmission, it will fundamentally change the global financial and economic operating model towards new technologies and industrial transformation in the financial industry. Current consumer bill payment methods use conventional banking systems, and notification systems for payment deadlines are less efficient; we propose a payment system with blockchain technology and the internet of things (IoT) to solve the current problem.

Keywords: Blockchain technology, financial technology, distributed data storage

I. INTRODUCTION

Blockchain is a technology proposed by Satoshi Nakamoto that enables direct (peer-to-peer) transactions without any trusted third parties. [1,9]. Chung Chen, Bambang Irawan this research is A Smart Contract to Facilitate Goods Purchasing Based on Online Hagggle. This study describes web applications as an online bargaining tool for product purchasing decisions [2,8]. Every transaction can be triggered automatically on blockchain technology with the option of using smart contracts. With smart contracts, the level of security on the web becomes higher because it is resistant to interference. In this research, Ye Quo, Chen Liang is Blockchain Application And Outlook in the Banking Industry [3]. Blockchain technology can revolutionize the technology that underlies payment clearing and credit to inform banks systems, change, and increase the efficiency of these methods to be more secure. Obstacles faced in the application of blockchain technology today are regulations or rules that do not yet exist.

Haya R. Hasan, Khaled Salah, in his research entitled Blockchain Based-Proof of Delivery of Physical Assets With Single and Multiple Transporters [4,10]. Blockchain-based solution for proof of delivery (PoD) traded physical assets. The author uses the features of the Ethereum Blockchain to automate payments and uses logs for reliable traceability and transparency. In this study, a working solution implements for several Transporters and single Transporters, with a penalty mechanism and incentives for all participants to behave honestly. The solution eliminates trusted third parties and utilizes Smart Contracts as Escrow to automatically complete payments and other needs. In a distributed ledger system, there is no single control point or a central administrator. If any data fails or stops functioning, a different data location could maintain data and details in the general ledger. In a distributed ledger system, a peer-to-peer network use for nodes worldwide to communicate with each other. Distributed ledger technology could scale economies as it allows transactions to conduct simultaneously as agreement, settlement, and reporting [5].

II. METHODS

The analytical method developed by the proposed system for proof of consumer payment is the PIECES (Performance, Information, Economic, Control Efficiency, Service) method. With PIECES, could identify multiple causes of problems clearly and more precisely. The following is an analysis of the weaknesses of the current system using the PIECES method list in table.1 until table. 6 :

1. Performance analysis.

Table 1. Performance analysis.

No	Factor	Analysis Results
1	Throughput	Using a third party as an example of a bank, the payment time between the consumer and the running system is not real-time.
2	Response Time	It still depends on the performance of the third-party system. If a third party has a problem, it will cause a delay in payment.

2. Information analysis.

Table 2. Information analysis.

No	Factor	Analysis Results
1	Accuracy	According to the bill and payment amount, the information displayed on the consumers' payment system is now entirely accurate.
2	Time Speed	The Consumer bill payment process is less efficient because it still requires manual input for consumers who do not have a credit card or savings on a third party to the payment system.

3. Economy analysis

Table 3. Economy analysis

No	Factor	Analysis Results
1	Loss Cost	A running payment system requires an admin fee to a third party for each transaction.

4. Control analysis

Table 4. Control analysis

No	Factor	Analysis Results
1	Data Security	From the analysis of the current system, the results obtained are deficiencies with the security of consumer data because third parties could use the data.

5. Efficiency analysis

Table 5. Efficiency analysis

No	Factor	Analysis Results
1	Technology resources	From the analysis, it could conclude that the current payment system is not efficient.

6. Services analysis

Table 6. Performance

No	Factor	Analysis Results
1	Service	Service to consumers has not been maximized in payments because they still use third-party banks as payment intermediaries.

III. RESULT AND DISCUSSION

In this paper, the proposed framework base on the Ethereum smart contract platform on blockchain technology. Smart contracts use to carry out payments that have been agreed upon between the two parties automatically. The smart contract will be executed automatically according to the agreement chosen by the consumer. To make consumer payments using cryptocurrency stored in the E-wallet account owned by the consumer. The public key and private key will use these two keys between the subscriber and the recipient.

Notation Used In This Paper

To better understanding the transaction flow, we list all the notations first before explaining our proposed solution. The notation list is in Table 7.

Table 7. Notation

Notations	Descriptions
Col	Colateral value
G	Gas, mining costs
P_p	Service pack
Sho_w	Smart contract wallet
C_w	Consumer wallet
R_w	recipient wallet

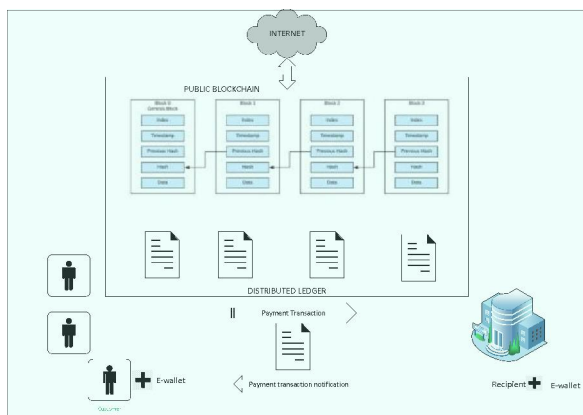


Fig 1. Our System Architecture.

Proposed Line Shop Architecture

In this section, we presented a Payment Transaction Proof (PTP) that has interoperability with the consumer service application and smart contract in the blockchain. PTP comprises the following components:

a) consumer: He/she who buys one or several products and uses those products for their own needs.

b) Recipient: Person or companies that offer and sell products and services online.

This architecture improves the Design Purchasing services online: a two-country generalization of possible influences by Francesca Dall'Olmo Riley [6,11]. And Fraud detections for online businesses: a perspective from blockchain technology proposed by Yuanfeng Cai and Dan Zhu [7,12]. Their system still does not use alternative offers from various service packages offered by internet service providers, where each pack service has a different price and service. PTP architecture is shown in Figure 1. The steps in detail describe as follows:

1. Consumers order products and choose service packages in the consumer service application. It will call the packet order function in a smart contract. If the consumer agrees with defined rules in the smart contract and has enough coin, the consumer might proceed further by sending coin worth as packet product price, gas, collateral to the smart contract wallet.

$$Col + G + P_p \rightarrow Sc_w$$

If successfully done in each step, it will send a notification to all relevant parties.

2. The recipient (company) can proceed to the next step after receiving the notification sent by the system. The consumer service package product will process after the collateral receives into the smart contract wallet.

$$Col + G \rightarrow Sc_w$$

Notifications are sent to each party after the recipient confirms that the smart contract accepts the collateral.

3. PTP sends the service package information that consumers order after the collateral on the smart contract wallet has arrived.

4. The recipient(company) sent the service pack to the consumer. The recipient(company) send to confirm the service pack notification to PTP.

5. In all processes, the smart contract keeps all collateral in the smart contract wallet. The collateral sent will be received by the sender if all operations are successful.

$$Col+G+P_p: C_w \rightarrow SC_w$$

$$SC_w \rightarrow R_w$$

IV. CONCLUSION

From the discussion results in this paper, we propose a PTP system developed with blockchain technology. With the implementation of blockchain technology, the level of security will increase. Proof of validated transactions cannot change because transaction data is stored in a decentralized distributed ledger to ensure tamper-proof logs. The smart contract contains events and declarations. They will update temporarily while the function executed. With the implementation of smart contracts, the agreement that has occurred will not change and will run automatically when the deal trigger occurs.

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