INCITEST 2020

The 3rd International Conference on Informatics, Engineering, Sciences & Technology

UNIVERSITAS KOMPUTER INDONESIA
UNIKOM

"Humanized Technology : The Digital To Win Competition"

PROCEEDING

UNIKOM International Conference on Informatics, Engineering, Sciences & Technology (INCITEST) 2020

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Preface

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PREFACE

It is our great honor and pleasure to introduce the Proceedings of the 3rd International Conference on Informatics, Engineering, Science, and Technology (INCITEST 2020). The event is valuable and meaningful since it brings together scientists, engineers, researchers, practitioners, students, and civil society organization representatives to nurture research networks between universities and industries. With its main theme on "Humanized Technology, the Digital Journey to Win Competition", this event is expected to serve as a platform of gathering for anyone interested in exploring potential solutions and answering issues and challenges to enter the 5.0 society. Amid the worldwide spread of the novel coronavirus (COVID-19) and the uncertainty surrounding the end of this pandemic, there are several issues we should describe as follows:

1. Universitas Komputer Indonesia (UNIKOM) as the organizer of INCITEST 2020 will hold the conference on 11th June 2020 in an online or virtual format. The organizing committee will manage the conference from our campus which is located in Bandung, West Java Province, Indonesia.

2. In this correlation, we should adhere to the regulation of the government of West Java Province and the government of the Republic of Indonesia which currently is implementing Large-Scale Social Restrictions to reduce the risk of virus transmission. Therefore, the online conference is considered the best way we can do to serve our participants concerning the fact that people safety is second to none. In this condition, there is no specific date deemed safe to which we could postpone the conference until either worldwide travel or crowd-gathering is safe again. We have all put so much effort in preparing the papers, organizing the event, as well as conducting the review process, working on the program, and everything surrounding it that we feel very motivated to pull this through

3. The conference is divided into two sessions: plenary and parallel sessions. In the plenary session, we will use zoom as the media. Besides, to assure the dissemination of the conference to all participants, we will also broadcast the plenary session live using Open Broadcaster Software (OBS) connected to

YouTube live streaming and IG TV. Moreover, we will use live chat on YouTube and Google forms for the discussion session.

4. The plenary session will be chaired by one moderator who will not only be critically summarizing the keynote presentations but also handling participants' enthusiasm in asking any possible questions. In doing so, the participants will be following the conference at their respective personal corners through YouTube live streaming and IG TV.

5. The plenary session will be presented by our keynote speakers in online format (via Zoom) from each country such as Prof. Abdulkareem from Malaysia, Prof. Yuto Lim from Japan, and Irfan Dwi Sumitra, Ph.D. from Indonesia. Each keynote has 45 minutes duration including the discussion session.

6. Following the success of INCITEST 2018 and 2019, the enthusiastic responses to the call-for-papers in the third INCITEST were increasing. More than 450 papers were submitted to the organizing committee from both local and foreign participants. A peer-review process has been conducted to all the articles based on their originality and quality, resulting in 347 accepted papers to be presented.

7. Of 347 accepted papers, 216 of them will be presented via Zoom in the duration of 10 minutes for each paper. Additionally, 129 papers will be displayed in the poster session (the link of the posters will be available on the INCITEST website).

8. The parallel session will be divided into 10 classes; each class will be participated by around 21 to 22 presenters. A parallel session chair will manage the presentation time and discussion session in each class. Each presenter should present their paper within 5 minutes via Zoom. 5 minutes after the presentation will be given to each of them for the discussion session.

We hope that with the above arrangement, we can serve our participants in the best way we could. The conference's success is also due to the hard work of all involved parties. Therefore, the organizing committee would like to express appreciation to all supporters, sponsors, and participants for a great contribution to

the conference's success.   Many thanks go as well to all of the reviewers who helped us maintain the quality of manuscripts included in the Proceedings published by IOP. We also express our sincere thanks to the members of the organizing team for their hard work.

Finally, our continuing success of this conference series can be one of indicator that we have through our right pathway to realign technology with the best interests of humanity. We hope this first time experience of the online conference in the 3rd INCITEST will bring fruitful outcomes as well as give the participants great experience in an online conference.

Thank you

Best Regards,

Dr. Poni Sukaesih Kurniati, S.IP, M.Si.
The Chief of the Conference

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List of Committees of INCITEST 2020

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Peer review statement

All papers published in this volume of *IOP Conference Series: Materials Science and Engineering* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

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Development of Enterprise Resource Planning using Blockchain

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Development of Enterprise Resource Planning using Blockchain

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Abstract. The purpose of this research is to examine the possibility of using blockchain as a medium to operate ERP. The method used in this research is descriptive qualitative method to present a complete picture of the situation related to some of the variable situations examined. The results of this study are ways to identify whether blockhain is suitable for implementation with ERP. This research was conducted by discussing the performance, the level of resource used, and the effects caused if blockchain is used as a medium for the operation of ERP.

1. Introduction

Enterprise Resource Planning (ERP) can be defined as the implementation of standard software modules for core business processes, usually combined with bespoke customization for competitive differentiation. The aim is to provide broad integration and depth of function in various multi-functional and often multi-national organizations. For many organizations, such development can begin with a single pilot project, or in a business function. However, the potential for expansion into the integration of all companies remains a key factor in ERP implementation [1]. Blockchain is the technology that underlies Bitcoin and other cryptocurrency, which is managed by decentralized computer networks. Blockchain is considered an open ledger where all online transactions are recorded and everyone is allowed to connect, to send or verify transactions. In other words, Blockchain is a digital accounting record system that records every transaction in accordance with a set of mathematical rules to prevent illegal interference. Research on the impact of cryptocurrency, decentralized ledgers, and Blockchain has shown that they are potentially powerful tools to minimize costs and bring major changes to the financial sector in the long run [2]. The ERP system is an evolution of the MRP II system, which was designed with the aim of managing production facility orders, production plans, and inventory. ERP systems work by integrating inventory data with financial data, sales, and human resources, so that it can help organizations to determine product prices, produce financial reports, as well as manage human resources, materials, and money [3]. An ERP system with the principle of "One customer, One system" is the proof that the Legacy and ERP architecture remains until it is last converted to SAP, it is done to extend the cost and complexity of the reengineering effort, focusing on data integrity and control of changes during customer conversion as a key to success conversion, while the initial business team structure and resulting business requirements have an impact on mass adjustments and slowing down on initial projects. Thus, major changes to the business model can use ERP systems on each project [4]. Whereas Sustainable Enterprise Resource planning is a corporate system with the incorporation of important entities of sustainable value owned by the company into a centralized system, where the information system is massive, and its distribution requires a large investment of money and time. Good

plans, abundant resources, and good commitment are needed to achieve success in implementing this system [5].

Success factors in implementing ERP systems focus on characterizing the context of the implementing company and the influence of the relative importance of Critical Success Factor (CSF). The successful use of ERP also considers the ranking, modeling or assessment of CSF risks in ERP implementation explicitly by considering it internally or externally for an organization [6]. ERP learning is expected to provide various skills for users and those who study it, such as ERP Technical Knowledge, Technology Management Knowledge, Business Functional Knowledge, Interpersonal Skills, as well as Team Knowledge and Skills to assist in determining the level of benefits of ERP programs to meet industry needs [7]. ERP can be used to determine company policy; this is because there is a direct effect specifically designed for using ERP except for the effect of facilitating conditions on actual use [8]. Understanding the concept of ERP can be done while working or by using a turn-based simulation game on students, so students can simulate running their business with real-life ERP (mySAP ERP). This simulation requires the students to analyze transactional data as a consideration for making business decisions and ensuring the benefits of their operations [9,10]. Preferences and temporal dynamics in information processing can be measured by looking at the response of the use of ERP systems to the company's profit and loss (valence), by showing that the valence information to be processed [11].

This study aims to identify the performance of ERP use using blockchain rules, as a step to eliminate one of the problems of using ERP, namely the procurement and maintenance costs of the server, because the server as a resource must be measured, directed, and used properly so that it will be a determining factor of development and success the company. The method used in this research is descriptive qualitative method to present a complete picture of the situation related to some of the variable situations examined.

2. Method

This research used descriptive method to find out the variables related to ERP and blockchain as well as network diagrams to provide an overview of the integration between ERP and Blockchain systems with test data transmission rates using sample data. Examples of these data are executed on the blockchain network owned by Stellar

3. Results and Discussion

As a first step in testing ERP applications using Blockchain, a network diagram to illustrate the outline of the scheme to be used can be seen in Figure 1.
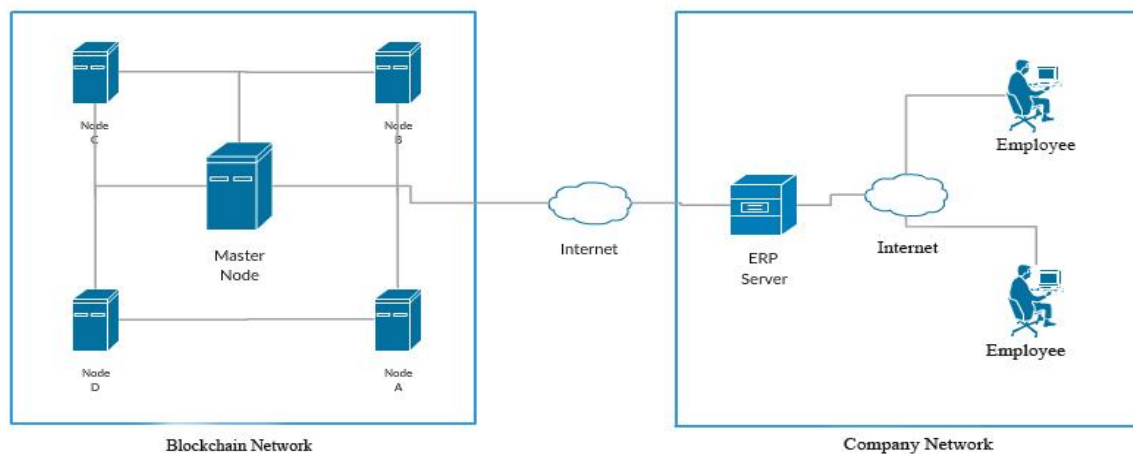
Figure 1. Network Diagram of ERP and Blockchain Integration

From the diagram above, the combination of ERP systems with Blockchain still requires a server that is a bridge between ERP interfaces and ERP data stored on the Blockchain network. For example,

an employee registers a new company asset, then the asset data is distributed through the company's intranet network, it then be forwarded to the ERP server, the ERP server store the new data by forwarding the data to one of the nodes on the Blockchain network, then the node will distribute the copies of data to other nodes (the activity is called confirmation). After the confirmation process is complete, the hash / data identity will be returned to the ERP server as a note if the stored data is going to be read again.

If an employee wanted to to retrieve data from the blockchain network, in this case a list of assets owned by the company, ERP server use a hash / data identity as a reference for what data that is gooing to be retrieved. Then, the ERP server fetch the data to the blockchain network to get data that matches the hash / identity of the requested data. After the data is retrieved, the ERP server will transmit the data into an interface that can be understood by employees.

Next is a step-by-step on how to store the data. The first step is to encrypt and save the data on the blockchain network, the data is encrypted in the form of strings or text using Archfour algorithm (See Figure 2).

Figure 2. Data Encryption Using the Arcfour Algorithm

Encrypted data is then be stored on the blockchain network; in this case, Stellar's Blockchain is used with the interface / UI of stellarport.io (See Figure 3).
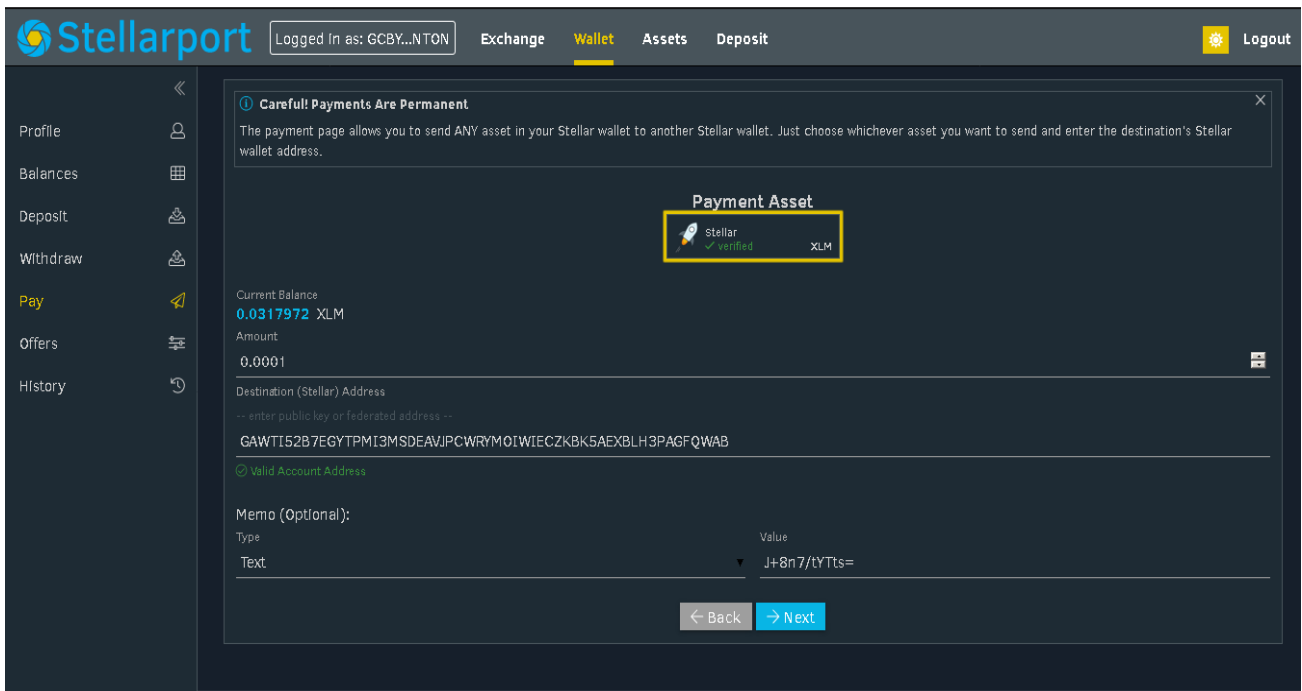
Figure 3. Form Save Data to the Blockchain Network

An identity called a hash appears after storing the data, the hash that appears from the sample transaction that the writer exemplifies is "*b5015f850fb0b06beab4149c057a262e9a8386e14ebc4b49a771490030850277*", hash is used as a reference for retrieving data stored in the network.

To read the data that was stored before, Stellar's Blockchain is still used to test the data. For data retrieval, the tools provided by the blockchain owner namely Stellar Laboratory can be used. First of all, enter the hash before the proof of storage transaction data. After executing the data, an encrypted data is received, the data then be decrypted again in the ERP server because the ERP server stores the keys and hashes of the data. The example can be seen in Figure 4.

Figure 4. Description Data

4. Conclusion

It can be concluded that the development of ERP using Blockchain can be realized and it can make a new breakthrough for all industries that use ERP as a software to manage the company's management.

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