Information Security System Using Blockchain Technology Implementation

Tomy Saputra[1][@], Eko Setiawan[2]
[1]Universitas Pelita Harapan | tsaputra@uph.edu
[2]Universitas Pelita Harapan | esetiawan@uph.edu
[@]Correspondence Author

Abstrak
Di era digital saat ini, keamanan informasi merupakan hal yang sangat penting untuk diperhatikan. Ada banyak cara untuk menjaga keamanan informasi, namun masih banyak celah yang dapat dimanfaatkan oleh pihak yang tidak bertanggung jawab. Teknologi Blockchain memberikan solusi dengan menyediakan sistem keamanan informasi yang kuat dan handal. Teknologi Blockchain dapat digunakan untuk memastikan integritas dan validitas data yang disimpan. Hal ini dapat dilakukan dengan menyimpan data dalam blok-blok yang terhubung satu sama lain dan menggunakan enkripsi untuk menjaga privasi. Selain itu, sistem desentralisasi yang ada pada teknologi blockchain menyulitkan pihak yang tidak bertanggung jawab untuk mengubah atau menghapusnya. Penerapan teknologi blockchain pada sistem keamanan informasi dapat dilakukan di berbagai sektor, seperti perbankan, perdagangan, dan pemerintahan. Di sektor perbankan, teknologi blockchain dapat digunakan untuk menjaga integritas data transaksi dan memastikan transaksi benar-benar valid. Di bidang perdagangan, teknologi blockchain dapat digunakan untuk memastikan bahwa barang yang diperdagangkan adalah asli dan memiliki sumber yang dapat diverifikasi. Di sektor pemerintahan, teknologi blockchain dapat digunakan untuk menyimpan dan memverifikasi data pemilu, serta memastikan hasil pemilu benar-benar valid dan representatif.
Kata kunci: era digital, keamanan informasi, teknologi Blokchain

Abstract
In today's digital era, information security is a very important thing to pay attention to. There are many methods to maintain information security, but there are still many vulnerabilities that can be exploited by irresponsible parties. Blockchain technology provides a solution by providing a strong and reliable information security system. Blockchain technology can be used to ensure the integrity and validity of stored data. This can be done by storing data in blocks that are connected to one another and using encryption to maintain privacy. In addition, the decentralized system that exists in blockchain technology makes it difficult for irresponsible parties to change or delete it. The application of blockchain technology to information security systems can be carried out in various sectors, such as banking, commerce, and government. In the banking sector, blockchain technology can be used to maintain the integrity of transaction data and ensure that transactions are truly valid. In the trade sector,

blockchain technology can be used to ensure that the goods being traded are genuine and have a verifiable source. In the government sector, blockchain technology can be used to store and verify election data, and ensure that election results are truly valid and representative.

Keywords: digital era, Information security, Blokchain technology

Introduction

The application of blockchain technology to information security systems is one of the most promising innovations in the world of technology. Information security is very important for every individual or organization, especially in today's digital era where information is very easy to steal or misuse (GULEN & KARAAGAC, 2024). Blockchain technology has the potential to increase the level of information security by leveraging the principles of decentralization and transparency inherent in this technology. In this article, we will discuss the application of blockchain technology to information security systems and how this technology can increase the level of information security.(Wu et al., 2023)

Apart from that, it will also discuss some of the challenges faced in implementing blockchain technology in information security systems and how this technology can be applied to various sectors, such as finance, health, and others (Abdelwahed & Al-AZAKI, 2024). Through this article, it is hoped that it can provide insight and understanding about the application of blockchain technology to information security systems and how this technology can help increase the level of information security in today's digital era (Hovorushchenko et al., 2023). Blockchain technology is a technology that is currently developing and widely applied in various fields. Initially, this technology was invented to run the digital currency Bitcoin(L. Li et al., 2024), but since then it has been widely used for other applications such as smart contracts, digital identities, and more (D. Li et al., 2024). In recent years, blockchain technology has begun to be applied to information security systems to improve data integrity, privacy and reliability.(Ferreira et al., 2023)

The application of blockchain technology to information security systems brings several important benefits, such as providing strong information security solutions, ensuring data integrity, enabling anonymity for users, making data and transactions transparent, and ensuring reliability in data storage (M et al., 2024). Therefore, it is very important to discuss how blockchain technology can be used to strengthen information security systems and ensure user privacy.(Kouhizadeh et al., 2023)

Research methods

The application of Blockchain Technology to Information Security Systems will use a qualitative approach by conducting literature studies and analysis of various sources of literature related to blockchain technology and information security systems. This method will assist in understanding and evaluating the implementation of blockchain technology in information security systems.

Results

1. *Information Security*
    Blockchain can be used to strengthen information security systems by storing data in blocks that are related to each other, thereby making it difficult to branch or in easier language, data cannot be edited.(Tao et al., 2023)

2. *Data Integrity*
    Blockchain ensures data integrity by validating each new transaction before it is entered into the network, thereby making data unable to be edited without the consent of all nodes in the network.(Altulyan et al., 2023)

3. *Anonymity*
    Blockchain enables anonymity for users by storing their identity in the form of a digital address that cannot be traced back to their original identity.(Shen et al., 2023)

4. *Transparency*
    Blockchain makes data and transactions transparent because data is stored in a distributed network and can be accessed by anyone with access to the network.(Baudet & Medina, 2023)

5. *Reliability*
    Blockchain has high reliability because data is stored in a distributed network, so that if one node is damaged, the data can still be accessed through other nodes. Based on the research results, it can be concluded that blockchain technology has the potential to strengthen information security systems by increasing data integrity, providing anonymity for users, making transactions and data transparent, and ensuring reliability in data storage.(Zheng et al., 2023)

Discussion

1. Information Security: Blockchain offers a robust information security solution by storing data in related blocks that validate each other. This makes data difficult to branch or edit without the approval of all nodes in the network. Therefore, blockchain technology can help protect sensitive information from cyber attacks or hacking.

2. Data Integrity: Blockchain ensures data integrity by validating each new transaction before it is entered into the network. This makes the data cannot be edited without the consent of all nodes in the network, thereby ensuring that the data stored is accurate and reliable.

3. Anonymity: Blockchain enables anonymity for users by storing their identity in the form of a digital address that cannot be traced back to their original identity. This makes blockchain technology suitable for applications that require privacy such as online payments or transfers of funds .

4. Transparency: Blockchain makes data and transactions transparent because data is stored in a distributed network and can be accessed by anyone with access to the network. This helps reduce the risk of abuse or fraud, thereby ensuring that the data and transactions stored are accurate and reliable.

5. Reliability: Blockchain has high reliability because the data is stored in a distributed network, so that if one of the nodes goes down, the data can still be accessed via other

nodes. This ensures that data remains available and accessible even if there is an interruption at one of the nodes in the network.

Conclusion

The application of blockchain technology to information security systems provides a strong and reliable solution for maintaining data integrity and privacy. The decentralized system that exists in blockchain technology makes it difficult for irresponsible parties to modify or delete it, thus providing better security for its users. Blockchain is a technology that has the potential to strengthen information security systems. The advantages of blockchain such as transparency, immutability and equitable distribution make this technology suitable for use in the field of information security.

Overall, the application of blockchain technology to information security systems can increase the level of security and ensure data integrity, but it should be noted that this technology still has a number of things that need to be improved before being widely implemented. Therefore, the application of blockchain technology must be carried out carefully and carefully in order to provide optimal results for information security systems.

References

Abdelwahed, M., & Al-AZAKI, D. Z. (2024). Axes of transformation towards Blockchain technology in Islamic financial institutions. *ARID International Journal of Informetrics*. https://doi.org/10.36772/arid.aijssh.2024.6112

Altulyan, M., Yao, L., Kanhere, S., & Huang, C. (2023). A blockchain framework data integrity enhanced recommender system. *Computational Intelligence*, *39*(1). https://doi.org/10.1111/coin.12548

Baudet, C., & Medina, M. J. (2023). The Paradoxes of Trust and Transparency of Blockchain Technologies. *Journal of Global Information Management*, *31*(5). https://doi.org/10.4018/JGIM.321111

Ferreira, I. A., Palazzo, G., & Carvalho, H. (2023). Implications of the blockchain technology adoption by additive symbiotic networks. *Cleaner Logistics and Supply Chain*, *6*. https://doi.org/10.1016/j.clscn.2023.100095

GULEN, K. G., & KARAAGAC, A. (2024). AGRICULTURAL FOOD SUPPLY CHAIN WITH BLOCKCHAIN TECHNOLOGY: A REVIEW ON TURKEY. *Journal of Global Strategic Management*. https://doi.org/10.20460/jgsm.2023.314

Hovorushchenko, T., Moskalenko, A., & Osyadlyi, V. (2023). Methods of medical data management based on blockchain technologies. *Journal of Reliable Intelligent Environments*, *9*(1). https://doi.org/10.1007/s40860-022-00178-1

Kouhizadeh, M., Zhu, Q., & Sarkis, J. (2023). Circular economy performance measurements and blockchain technology: an examination of relationships. *International Journal of Logistics Management*, *34*(3). https://doi.org/10.1108/IJLM-04-2022-0145

Li, D., Han, D., Weng, T. H., Zheng, Z., Li, H., & Li, K. C. (2024). On Stablecoin: Ecosystem, architecture, mechanism and applicability as payment method. *Computer Standards and Interfaces*, *87*. https://doi.org/10.1016/j.csi.2023.103747

Li, L., Ouyang, Y., Zheng, J., & Ye, F. (2024). A hierarchical structure model for blockchain technology adoption. *International Journal of Management and Decision Making*, *1*(1). https://doi.org/10.1504/ijmdm.2024.10051017

M, M., Baptist, L. J., T, S., & K, H. (2024). Utilizing Blockchain Technology to Provide Safety for Smart Home Networks. *International Journal of Electronic Security and Digital Forensics*, *1*(1). https://doi.org/10.1504/ijesdf.2024.10052831

Shen, M., Che, Z., Zhu, L. H., Xu, K., Gao, F., Yu, C. C., & Wu, Y. (2023). Anonymity in Blockchain Digital Currency Transactions: Protection And Confrontation. *Jisuanji Xuebao/Chinese Journal of Computers*, *46*(1). https://doi.org/10.11897/SP.J.1016.2023.00125

Tao, X., Das, M., Zheng, C., Liu, Y., Wong, P. K. Y., Xu, Y., Liu, H., Gong, X., & Cheng, J. C. P. (2023). Enhancing BIM security in emergency construction projects using lightweight blockchain-as-a-service. *Automation in Construction*, *150*. https://doi.org/10.1016/j.autcon.2023.104846

Wu, X. Y., Fan, Z. P., & Cao, B. B. (2023). An analysis of strategies for adopting blockchain technology in the fresh product supply chain. *International Journal of Production Research*, *61*(11). https://doi.org/10.1080/00207543.2021.1894497

Zheng, P., Zheng, Z., & Chen, L. (2023). Selecting reliable blockchain peers via hybrid blockchain reliability prediction. *IET Software*. https://doi.org/10.1049/sfw2.12118