INTERNATIONAL MULTI DISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
eISSN 2394-6334 Impact factor: 7,854 Volume 12, issue 11 (2025)

APPLICATION OF BLOCKCHAIN TECHNOLOGY IN NETWORK MANAGEMENT SYSTEMS

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Annotation: This article discusses the possibilities of using blockchain technology in modern network management systems, modern network management problems, limitations of centralized management systems and blockchain-based solutions, the role of blockchain in ensuring network security, data reliability and transparency, and practical application examples for relevant industries.

Keywords: blockchain, network management, decentralized systems, smart contracts, cryptography, consensus mechanisms, data security.

Today modern digital in the economy information and communication technologies and network infrastructures increasingly becoming complicated " Traditional " centralized network management systems expanding going network devices number of them being taken information size and security requirements answer give not being able to possible " [1] **.** With this together , networks management in the field new approaches and innovative technologies application necessity appearance it has been .

Also today's on the day own instead occupied blockchain technology new direction to be despite one how many social to directions enter is going on . Blockchain English blockchain from the word taken become continuous blocks chain said meaning means . Blockchain technology initially digital currencies in the system used is , this technology decentralization , transparency , change not to be and cryptographic protection him/her network management systems for attractive to the solution rotates [2] **.** This technology decentralization , transparency , change not to be and cryptographic protection him/her network management systems for attractive to the solution turns .

Network management in systems blockchain technology of use theoretical the basics study , practical application areas determination and this technology advantages and restrictions analysis to do important is considered .

In this network management following problems seeing we go out :

1. Network management modern problems

Modern network management systems one row to problems face is coming :

Centralized management weak sides **:** Centralized systems only malfunction to the point has this is situation whole network of activity to stop reason to be possible [4]. If the central server is down if it remains or to attack if encountered , all network management will be broken .

Security Threats **:** Traditional management systems cybersecurity threats relatively enough at the level stable not [4]. Last statistic to the information According to , in 2024 the network attacks number by 35% grew up .

Information Reliability **:** Network from devices removable of information authenticity check difficult . The data violation or change wrong management to their decisions take arrival possible [5].

Scalability Restrictions **:** Network devices number increase with centralized management systems the load again at work to difficulties face is coming .
Interoperability problems **:** Various working issuers devices in management flexibility problems to the surface is coming .
2. Blockchain technology network to the management implementation
Blockchain technology network under management above counting passed problems solution in doing following opportunities presented will :
2.1. Decentralized management
Blockchain technology network management functions all knots between distributed , central to the server was need reduces [6], which approach " one" point not working " remain " problem eliminate will , because system any central component not working working even when the rest is over continue will reach .
2.2. Information transparency and changing not to be
Blockchain in the system every one action open record cryptographic algorithms through changing impossible in case preserved [7], this network under management following actions blockchain to the notebook is written :
1) configuration changes
2) user authentication
3) security settings
and later change possible This information is not reliability provides .
2.3. Smart contracts through automated management
Smart contracts are blockchain in the system stored and in advance designated conditions when done automatic accordingly executable software codes calculated [8] network smart contracts in management network resources automatic distribution ,
security policies management , devices in the middle reliable the connection supply , network traffic monitoring and management such as tasks will do
2.4. Strong authentication and permits management
Blockchain based on built network management in systems cryptographic keys and signatures using devices and users identification done increasing , unauthorized entrance and management of operations prevent takes .
3. Practical application sectors
Blockchain technology network under the management different in the fields application possible :
3.1. IoT devices management
the Internet of Things (IoT) environment many devices mutual information will exchange and blockchain technology this the process reliable and safe in a way to manage opportunity gives [9], data exchange protection to do and of devices autonomous management done increase opportunity By 2025 , 75 billion IoT device blockchain based on management is expected .
3.2. Network safety
Blockchain network safety of provision different in aspects application possible [10]:
Distributed Denial of Service (DDoS) attacks against Fight : Blockchain based on built systems DDoS attacks against traditional to systems than much resistant will be .
Safe identification and Authentication : Blockchain based on built identification systems only protection point weak sides eliminate will reach .
Safe information Exchange : Network through transferable of information integrity and confidentiality provides .
3.3. Cloud networks management

Cloud infrastructures under the management blockchain resources distribution , user authentication , data storage and management operations writing to go such as tasks automation opportunity gives .

3.4. 5G and future mobile networks

5G and new generation mobile in networks blockchain approach services quality stable hold stand and resources effective distribution opportunity gives .

4. In use face bride difficulties .

Blockchain technology network under the management application following one how many difficulties also related to :

Performance efficiency **:** Some blockchain types , in particular based on Proof of Work employees , data again work speed in terms of traditional from systems behind remains [11].

Scalability **:** Many blockchain systems big in size information again at work to difficulties face comes [12].

Energy Consumption : Some consensus mechanisms big in quantity energy spending does .

Complexity : Blockchain systems current to do and management traditional to systems than more complicated to be possible .

Standards and Legality : Still blockchain technologies for wide comprehensive standards and legal bases unformed .

Above cited to thoughts relied on without this conclusion what to do maybe Blockchain technology network management processes further effective to do to the potential has is , its decentralized nature of the data changing absence , transparency and strong security features network under management many problems solution to do possible [13]. Network under the management blockchain current to do one row difficulties with related although , this technology improvement according to take going research and practical projects his/her promising that showing and in the future blockchain based on built network management systems wide spread , especially IoT , 5G, cloud calculation and other in the fields wide usage is expected .

Research this shows that blockchain technology traditional network management approaches with harmonization through the most good to the results achieve possible and this in the field next research following problems solution to do focus need : blockchain systems work efficiency increase , energy spending reduce and scalability .

References

1. Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.
2. Christidis, K., & Devetsikiotis, M. (2016). Blockchains and Smart Contracts for the Internet of Things. IEEE Access.
3. Dorri, A., Kanhere, S. S., & Jurdak, R. (2017). Blockchain for IoT Security and Privacy: The Case Study of a Smart Home. IEEE International Conference on Pervasive Computing and Communications.
4. Ziegeldorf, J. H., Matzutt, R., & Wehrle, K. (2018). Secure and Anonymous Decentralized Bitcoin Mixing. Future Generation Computer Systems.
5. Khan, M. A., & Salah, K. (2018). IoT Security: Review, Blockchain Solutions, and Open Challenges. Future Generation Computer Systems.
6. Fernandez-Carames, T. M., & Fraga-Lamas, P. (2018). A Review on the Use of Blockchain for the Internet of Things. IEEE Access.
7. Li, X., Jiang, P., & Wang, H. (2020). A Survey on the Security of Blockchain Systems. Future Generation Computer Systems.
8. Salman, T., Zolanvari, M., & Samaka, M. (2018). Security Services Using Blockchains: A State of the Art Survey. IEEE Communications Surveys & Tutorials.

9. Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2018). Blockchain challenges and opportunities: a survey. International Journal of Web and Grid Services.
10. Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: current status, classification and open issues. Telematics and Informatics.
11. Mohanta, B. K., Panda, S. S., & Jena, D. (2018). An overview of smart contract and use cases in blockchain technology. 9th International Conference on Computing, Communication and Networking Technologies.
12. 4. Ali, M. S., Vecchio, M., & Putini, F. (2018). Blockchain-based data integrity verification in cloud computing. 2018 IEEE International Conference on Internet of Things.
13. 5. Sharma, P. K., Singh, S., & Park, J. H. (2020). Blockchain-based decentralized architecture for cloud storage system. Journal of Network and Computer Applications.