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ODDÍL 11. INFORMAČNÍ TECHNOLOGIE

*§11.1 NFT AS A NEW METHOD OF DATA MANAGEMENT (**Krestyanpol L.,** Lesya Ukrainka Volyn National University)*

Introduction. Blockchain is a decentralized distributed ledger that tracks transactions with digital assets. These assets can be anything - real estate, money, land, or intangibles. For example, patents, copyrights, and branding. The technology reduces risks and costs for all market participants. In addition, a huge number of payments are made quickly enough.

Usually, transactions in commercial banks, money transfer services, credit processing centers, and other third-party services take at least a day and charge a fee.

Moreover, banks have weekends and holidays, which is not always convenient for customers. When sending money through the blockchain, users have no geographical or time restrictions.

Transactions take only a few seconds, and transaction confirmation takes from a few minutes to several hours. All payments in the blockchain are irreversible, so confirmations are important to protect against online fraud.

The transparency of the network allows for complex interbank and stock exchange settlements, financial calculations in international holdings, as well as open e-voting, e-notary, and confirmation of copyright for digital content.

The development of blockchain has reduced barriers for investors to enter financial markets and generally made banking services more accessible. Still, about 1.7 billion people in the world cannot freely make any payments [1].

With the advent of cryptocurrencies, what was considered an experimental technology at the beginning of the decade is now an

opportunity to obtain affordable financial products and services. Digital assets can be managed from a computer or smartphone.

Modern business is a big data business. Entrepreneurs' activities involve a large amount of data. The success of transactions and other operations depends on the speed of money payments and transfers.

Blockchain perfectly meets this need as well. Network participants get shared access to information in an immutable ledger through smart contracts (a set of rules in the blockchain network), and transactions are executed quickly and securely [2].

In addition, smart contracts define the conditions for the transfer of corporate bonds and can set the criteria for insurance payments. Businesses can benefit from this approach.

Despite widespread digitalization, the financial sector is still constrained by outdated approaches to work. Financial service fees are not getting smaller, and high losses are incurred on conversion.

If the international financial infrastructure fully switches to the blockchain, the entire global economy will feel a powerful impetus for development. Blockchain technology will help to radically change banking processes: make them faster, more transparent and cheaper with a high level of security.

Anatomy of the blockchain.

A blockchain is a structured database, a "chain of blocks" where each block is linked to the previous one. A block contains a set of records (information). Each new block with information is added to the end of the chain. Thus, a kind of "register" of data is created, in which data is entered in a strict sequence. The number of blocks is unlimited. A block can contain any information: about actions, people, objects, transactions, serial numbers, loans issued, etc. In other words, a blockchain is a distributed public ledger based on modern cryptographic algorithms that contains a database of all previously performed transactions, which is decentralized and contained in public sources of the Network (Fig. 1).
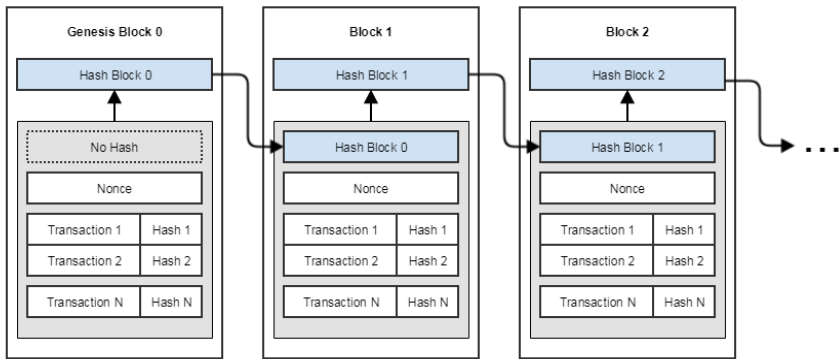
Fig. 1. *Blockchain structure*

It is a structured system with certain rules for building chains of transactions and access to information. Facts stored in the blockchain cannot be lost. They remain there forever. In addition, the blockchain stores not only the final state but also all previous states. Therefore, anyone can check the correctness of the final state by recalculating the facts from the very beginning.

Blockchain works with a complex encryption system (keys). Each block has its own unique key. The impossibility of "breaking the chain," i.e., making changes to a block or adding a block between others, is ensured by the fact that the codes (hashes) of the previous and next blocks are linked to each other and making changes to one block immediately invalidates it and all other blocks that follow it, which is automatically displayed on the screen [3].

A hash is a unique code that changes when user change even one character in the text, is calculated using a complex mathematical formula, and will always be the same for the same information. Therefore, there cannot be two different hashes for exactly the same information (Fig. 2).

continue to resonate through time, enriching the lives of generations to come.

References:

1. Antonopoulos, A. (2020). *Mastering Ethereum: Building Smart Contracts and DApps*. O'Reilly Media.

2. Sandeep Nailwal, "Polygon Litepaper" (PDF). polygon. technology. Polygon Technology. Retrieved 19 August 2022. https://polygon.technology/lightpaper-polygon.pdf.

3. Sandis, C. (2014). *Cultural Heritage Ethics: Between Theory and Practice*. Open Book Publishers.

4. Zuckermann, Ghil'ad (2015). *ENGAGING - A Guide to* Interacting Respectfully and Reciprocally with Aboriginal and Torres *Strait Islander People, and their Arts Practices and Intellectual Property*. Australian Government: Indigenous Culture Support.

5. Ann Marie Sullivan (2016). *Cultural Heritage & New Media: A Future for the Past*. 15 J. MARSHALL REV. INTELL. PROP. L. 604 https://repository.jmls.edu/cgi/viewcontent.cgi? article= 1392&context=ripl

6. Dipanjan Das, Priyanka Bose, Nicola Ruaro, Christopher Kruegel, & Giovanni Vigna. (2022). Understanding Security Issues in the NFT Ecosystem. *In Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security (CCS '22).* Association for Computing Machinery, New York, NY, USA, 667–681. https://doi.org/10.1145/3548606.3559342

7. Bamakan, S.M.H., Nezhadsistani, N., Bodaghi, O. *et al.* (2022). Patents and intellectual property assets as non-fungible tokens; key technologies and challenges. *Sci Rep* 12, 2178. https://doi.org/10.1038/s41598-022-05920-6

8. Abhisek Nayak. (2023). What is Lazy Minting of NFTs? How Does it Work? Electronic resource. URL: https://www.nftically.com/blog/lazy-minting-of-nfts-nftically

9. Dallen J. Timothy, & Gyan P. Nyaupane. (2009). *Cultural heritage and tourism in the developing world : a regional perspective.* Taylor & Francis.

10. Tobias Lütke. (2023) What is a smart contract? Electronic resource. URL: https://www.coinbase.com/learn/crypto-basics/what-is-a-smart-contract

11. Zhu, P., Hu, J., Li, X., & Zhu, Q. (2021). Using blockchain technology to enhance the traceability of original achievements. *IEEE Transactions on Engineering Management.*

12. Zhao L, Zhang J, Jing H, Wu J & Huang Y. (2023). A Blockchain-Based cryptographic interaction method of digital museum collections. *Journal of Cultural Heritage.* 10.1016/ j.culher. 2022.11.001. 59. (69-82). Online publication date: 1-Jan2023. https://linkinghub.elsevier.com/retrieve/pii/S1296207422001923

13. Krestyanpol, L., Novachevskyi, S., & Hranovskyi, M. (2023). Application Of Blockchain Technologies For Preservation And Dissemination Of Cultural Heritage Through Nft. *Information Technology and Society*, (3 (9), 54-62. https://doi.org/10.32689/ maup.it.2023.3.7

14. Krestyanpol, L., & Novachevskyi, S., (2023). Application Of Blockchain Technologies In The Nft Ecosystem. Grail of Science. https://doi.org/10.36074/grail-of-science.15.09.2023.39