

REVIEW ON BLOCK CHAIN TECHNOLOGY

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ABSTRACT:

Block-chain technology is a type of digital ledger that enables participants in a decentralised network to securely store and exchange data. It is composed of a network of linked blocks, each with a distinct digital signature that together provide an immutable and transparent record of all transactions. With the ability to provide trust and transparency across a variety of industries, from finance and healthcare to supply chain management and voting systems, this cutting-edge technology has the potential to completely transform the way we conduct business. Block-chain technology has the potential to upend established processes and encourage innovation in the digital era by reducing fraud and boosting efficiency.

Keywords:

Blockchain technology, Decentralization, Cryptocurrency, Smart contracts, Distributed ledger, Blockchain security, Consensus mechanisms, Blockchain applications, Digital identity, Blockchain scalability

I. INTRODUCTION

A revolutionary innovation, blockchain technology has the potential to fundamentally alter how we manage data and conduct business in the digital age. It is a secure, decentralised digital ledger that stores data across a network of computers, tracks transactions, removes the need for middlemen, and creates an unalterable, transparent record of all activity. Blockchain technology has drawn a lot of interest as a powerful tool for a variety of applications, including finance, healthcare, supply chain management, and more, since its initial debut as the underlying technology for the virtual currency Bitcoin in 2008. In this era of digital transformation, block-chain technology offers unrivalled benefits, such as better security, increased efficiency, and greater transparency. As a result, it has emerged as one of the most intriguing and dynamically changing areas of technological innovation, with a rising number of businesses and organisations investigating its potential to promote growth and transformation.

Block Chain Technology

a. What is block chain?

Block-chain is an implementation method of recording information that makes it hard or almost impenetrable for the system to be manipulated or hacked. A Block-chain is a collection of accounts or distributed ledger that replicates transactions across the inter-connected network of computers taking part in the blockchain network.



Fig.1:block chain

b. How Does Block Chain Works?

Blockchain technology is applicable to all advanced and high-level resource trades that occur on the internet. On the internet, all businesses are resolving to the fund foundations as the certain third-party agency way to intervene and supervise all electronic exchanges that take place in the network. These third-party bodies are responsible for defending and approving exchanges. In online interactions that require intervening by connecting exchanges, a certain level of deception or concealing is unavoidable. As a result, the cost of these transactions is extremely high.

Bitcoin which uses block chain technology on the other hand utilizes disciplined and thorough proofs instead of just the trust of the two partakers to undertake a transfer or an exchange. Each exchange is protected by a processed signature. Each exchange is transmitted to the collector's "general society key" that has been meticulously stamped with the sender's "private key." Keeping in mind the main purpose of burning through money, digital cash businessman must demonstrate accountability for "private key." The component accepting the advanced money confirms the processed signature - thus accountability for "private key" - on the exchange utilising "the sender's general population key." When checked, each exchange is broadcast to every hub within the Bitcoin prepare and is then documented in an open record.

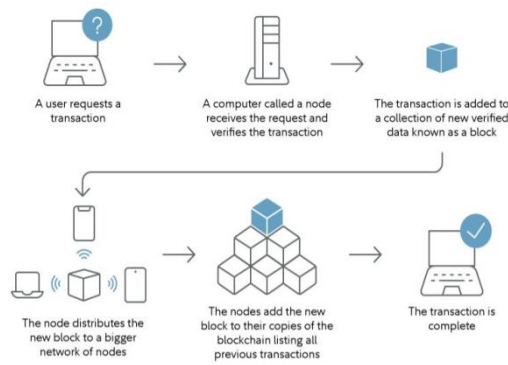


fig.2:block chain works

The Bitcoin system's use of blockchain technology has revolutionized the way financial transactions are conducted. By eliminating the need for a centralized authority to oversee transactions, the Bitcoin system allows for greater transparency, security, and efficiency in the exchange of value.

One of the key features of the Bitcoin system is its use of a decentralized ledger. Unlike traditional financial systems, where a central authority maintains a ledger of all transactions, the Bitcoin ledger is distributed across the entire network of users. This means that no single entity can control or manipulate the ledger, making it more secure and resistant to fraud.

Another important aspect of the Bitcoin system is its use of cryptography to ensure the authenticity and integrity of transactions. Each transaction is verified and encrypted using complex mathematical algorithms, making it virtually impossible to alter or counterfeit. This high level of security makes the Bitcoin system an attractive option for those looking to conduct secure and anonymous transactions.

Despite its many benefits, the Bitcoin system is not without its challenges. One of the most pressing issues facing the system is scalability. As the number of transactions processed by the network continues to grow, the system has become increasingly congested, leading to longer processing times and higher fees.

To address this issue, the Bitcoin community is actively exploring a range of solutions, including the development of new protocols and technologies that can improve the speed and efficiency of the network. Some of these solutions include the use of off-chain transactions, sharding, and layer-two scaling solutions like the Lightning Network. Overall, the Bitcoin system represents a significant step forward in the evolution of financial systems. While it is still early days for this technology, the potential benefits it offers are vast, and it is likely to continue to play an increasingly important role in the global economy in the years to come.

c. How does a transaction get into the blockchain?

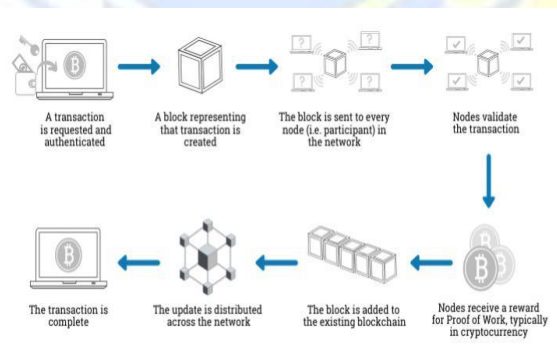


Fig.3:transaction into blockchain

d. Why nobody can hack a blockchain

Hacking Blockchain is impossible because of the following reasons.

1. Decentralized Open-Source Protocols
2. Quantum Computing
3. Hashing Algorithm

Decentralized and Open-Source Protocols

The blockchains that underlie the majority of cryptocurrencies are publicly accessible and open-source peer-to-peer (P2P) systems, allowing anyone with the necessary hardware and expertise to investigate them.

Quantum Computing

A further explanation for the difficulty of hacking a blockchain is that if a block in the middle of the chain is re-hashed.

Hashing Algorithm

Each transaction is called a block, A collection of multiple blocks, each representing a transaction, forms a blockchain.

e. Block-chain technology applied in a marketplace

Block-chain technology can be applied in a marketplace such as Amazon. Block-chain technology provides a decentralized and secure way of recording transactions, which can improve transparency and trust in the marketplace.

Reduced fraud, increased efficiency, and lower transaction costs. Some potential applications of blockchain in an e-commerce marketplace like Amazon include supply chain management, product authentication, and decentralized marketplace

II. LITERATURE SURVEY

As blockchain research expands, the technology has been used to create a number of information systems. There are numerous chances to investigate how blockchain technology might be applied to creating new systems as needed. The conditions of blockchain research in terms of technology and its application are outlined in this study. A systematic literature review (SLR), one of the approaches utilised in this paper to answer problems by following the findings of prior studies, was conducted. In SLR, the issue you wish to investigate is sometimes referred to as a research topic (RQ). By tracing prior research papers that have been indexed in reputable journal databases like IEEE Xplore, Springerlink, Scopus, and ScienceDirect, the defined RQ relates to the topic and clarifies each question. The conclusion reached after synthesising 41 publications is that blockchain technology can be employed in a wide range of applications, including financial services, electronic voting, and digital forensics. Applications that employ blockchain technology frequently concentrate primarily on developing the particular blockchain technology that best meets their requirements. Some developers optimise the blockchain contract's constituent parts, while others work to improve the data structure of the blockchain. Other information systems can still employ blockchain technology with a lot of room to grow.

III. MATERIALS AND METHODS

There are several methods of blockchain, including public, private, and consortium blockchains. Public blockchains are open to anyone, and all transactions are visible to all participants. Private blockchains, on the other hand, are only accessible to specific individuals or organizations, and transactions are not visible to the public. Consortium blockchains are a hybrid of public and private blockchains, where a group of organizations work together to maintain the blockchain. Additionally, there are different consensus algorithms used in blockchain, such as proof-of-work, proof-of-stake, and delegated proof-of-stake. These algorithms are used to verify transactions and maintain the integrity of the blockchain. Overall, blockchain technology provides a secure and transparent method of recording transactions, and the different methods and algorithms allow for flexibility and customization to meet the needs of various industries and use cases.

a. Existing Systems

In many cases, existing systems can be improved by incorporating blockchain technology. One example is in the supply chain management industry, where blockchain can be used to track the movement of goods from one party to another. By using blockchain, all parties involved in the supply chain can have access to the same data, eliminating the need for intermediaries and reducing the risk of fraud and errors.

Another area where blockchain can be used to improve existing systems is in the banking and finance industry. By using blockchain-based systems, banks can reduce the risk of fraud and improve the speed of transactions. Blockchain can also enable faster and cheaper cross-border payments, which is especially important in today's global economy.

In the healthcare industry, blockchain can be used to improve the security and privacy of patient data. By using blockchain, healthcare providers can securely store and share patient data, reducing the risk of data breaches and improving patient outcomes. Blockchain can also be used to track the movement of drugs and medical devices, ensuring that they are not counterfeit or tampered with.

b. What is the difference between Bitcoin and blockchain?

Bitcoin is a decentralized digital currency, distinct from blockchain technology, which has often been erroneously used interchangeably with Bitcoin. The early adoption of blockchain technology for Bitcoin transactions led to the misconception that Bitcoin and blockchain are the same thing. Nonetheless, blockchain technology is versatile and can be employed in numerous other domains beyond cryptocurrency, demonstrating its potential to revolutionize various industries.

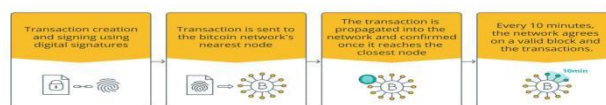


Fig.4:bitcoin and blockchain

c. Utilization of blockchain technology

Simply put, Bitcoin is a fantastic application of the Blockchain. In the field of enlisting sanctionative extraordinary applications, such as securing and verifying definitive reports along with deeds and unique validations, medicinal administrations information, IoT, Cloud, and so on, blockchain is seen to be a completely unique marvel. Tapscott appropriately named Blockchain the "Universal Ledger," noting that it has many new uses outside of accounting for transactions, such as in wise acts, suburbanized and also self-administering affiliations/citizen led associations, etc.

The information structure included in "Data Provenance," or, to put it another way, cloud information, records the history of how any cloud information challenge was organized and the swiftly completed assignments that followed.

From now on, it will be crucial to grant the birthplace of the information the most outrageous level of security in order to ensure its data insurance, sociology, and obligation. Liang pushes a "ProvChain," or, to put it another way, a Blockchain-based system that is certain in cloud information birthplace definition. Such a Blockchain appointment in an extremely cloud environment will offer strong protection against data being altered after participating in a redesigned simplicity and also additional information duty. Also, this increases the availability, consistency, assurance, and finally the estimation of the birthplace information itself.

IV. RESULT AND DISCUSSION

Blockchain technology has the potential to provide numerous benefits across various industries. One of the key results that can be inferred from blockchain technology is increased transparency and accountability. Since blockchain is a decentralized and distributed ledger, every participant on the network can access and view the same information simultaneously. This makes it easier to track and trace transactions and ensures that the data stored on the blockchain is immutable and tamper-proof. Additionally, blockchain technology can provide enhanced security and privacy measures, such as encryption and digital signatures, which can help to protect sensitive information. Furthermore, blockchain can enable faster and more efficient transactions, as intermediaries and middlemen can be eliminated from the process. This can lead to cost savings and increased productivity. Overall, the results that can be inferred by blockchain technology have the potential to revolutionize the way industries operate, leading to greater efficiency, transparency, and security.

Conclusion

To summarize, Blockchain technology is the foundation of Bitcoin's development. Its high level of security and immutable record-keeping make it an attractive innovation for solving current financial and non-financial organization challenges. While the digital currency technology is still in the early stages, blockchain has made significant progress and can now be utilized for transactions. Its characteristics of security, authenticity, traceability, origin, and timestamping have extended its application beyond its original purpose. The Blockchain and its variations have the potential to handle various types of transactions, whether between machines or humans. As the Internet of Things continues to grow, Blockchain technology offers a sense of security. In particular, it has proven effective in developing countries where building trust is crucial.

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