International Journal For Technological Research In Engineering
Volume 9, Issue 10, June-2022 *ISSN (Online): 2347 - 4718*

FUTURE OF INTERNET: BLOCKCHAIN

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Abstract: Blockchain is a decentralized way to record information and make it hard to fraud or change without permission. Blockchain works by having all computers in a system hold the same data and update it whenever a new transaction occurs - all while making sure that there. Blockchain can help with the verification and tracking of complex transactions. It allows for secure transactions, helps you save money on compliance costs, and allows for faster data transfer processing. Blockchain technology can also be used to verify and trace the origin of a product. This paper reviews about the blockchain technology, its concepts, process and more.

Keywords: Blockchain, Hashing, Product validation

1. INTRODUCTION

A blockchain is a shared database that can also be considered a digital ledger. It stores sequential sets of data in blocks which are linked to each other through cryptography. A blockchain is an innovation because it ensures the security and accuracy of data, and does not rely on any trusted third party. [1]

A blockchain is a type of database that provides information in blocks, which are groups of information. A newly formed block is added to the chain when filled with data, forming an interconnected group of blocks. [1]

In a blockchain, data is structured into blocks that are strung together. Each block is given a timestamp of when it was added to the chain. The database also structures its data into tables and blocks, but a blockchain is different because the irreversible timeline of data begins with the first block. [1]

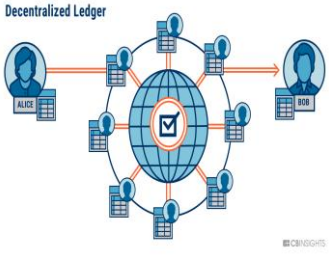

Fig 1. Blockchain

Some of the salient features of blockchain are as follows: -

- Blockchains are a type of database that shares information via cryptography. Unlike other databases, data is stored in blocks rather than individually. [2]
- New data collected gets inserted into the chain, and is inserted in chronological order with past data as it comes in. Blocks are automatically filled with new transactions every five seconds, which makes a permanent record of all transactions that have occurred. [2]
- Blockchain technology is most commonly used as a ledger for transactions. They can be used to store different types of information. [2]
- Blockchain is a decentralized way of understanding Bitcoin. All users retain control due to the collective nature of blockchain. [2]
- These blockchain technologies are immutable and all data is irreversible. Bitcoin is a decentralized blockchain that records and displays transaction data publicly to anyone. [2]

2. CONCEPT OF BLOCKCHAIN TECHNOLOGY

- The data block can store information about anything you want, for example, food temperature. [3]
- The data can show you who or what is being transferred and the status of it. [3]
- Each of the blocks are connected. Blocks of data link to form a chain, each block confirming the time and sequence. They can be secured for that prevention of tampering. [3]
- Transactions are recorded in an ongoing ledger-style database: a blockchain. Blockchain is a tamper-evident system.
- This eradicates the chances of a malicious actor tampering with your transactions. They build trust into the system. [3]

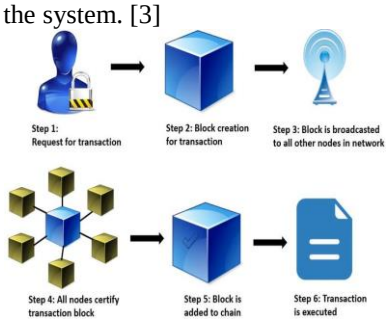

Fig 2. Blockchain Technology Working

Blockchain is a technology that consists of three important components: blocks, nodes and miners. [4]

2.1 Blocks

- Every chain consists of the multiple blocks and each of the block has the three basic elements:
- Block content data
- The nonce which is a collection of 32 bits is used to provide a safeguard against malicious attacks by generating alternate possible solutions to the block, of which only one provides a valid hash. [4]
- The hash is a number created by combining a 256-bit number and a nonce. It must be huge, meaning it should start with many zeros, such as 00000.
- The first link in a chain is used to generate the unique cryptographic hash that never changes with subsequent links. This means the cumulative data will always be valid as long as it is mined, or verified by other nodes [4]

2.2 Miners

- Along with "mining," blockchains also use a process called "minting."
- Mining a block in a blockchain is difficult because of the long chain. A miner needs the hash of the previous block, but also the nonce for that block, and to get one, s/he has to solve an intense mathematical problem. [5]
- When miners find a nonce that generates an accepted hash with just a 32-bit obstacle, they're said to have found the golden nonce and their block is added to the blockchain. [5]
- When a block is mined the blockchain accepts the change and the miner is financially rewarded.

2.3 Nodes

- Blockchain is a type of technology that is decentralized. This means that one person or company cannot control the chain. Instead, it is managed by multiple nodes across different organizations who maintain copies and keep the network functioning. [5]
- After a block has been mined and is mathematically verified, it is then submitted to the network for approval. Blockchains are often transparent, which means everything in the ledger can be easily checked. Although there are participants that have an alphanumeric identification number, everyone in the blockchain has access to their past transactions. [5]
- Creating trust is a barrier for scalability. Blockchain removes trust barriers by drawing from publicly accessible information and then verifying it through an intelligent system. [5]

3. APPLICATIONS OF BLOCKCHAIN

Blockchain can be used in many of the applications and various types of fields.

- Supply Chain: You can use blockchain to keep track of goods that change hands in the supply chain. This makes this technology well suited for tasks such as real-time tracking and structuring of goods, their transport, and how they are distributed. [6]

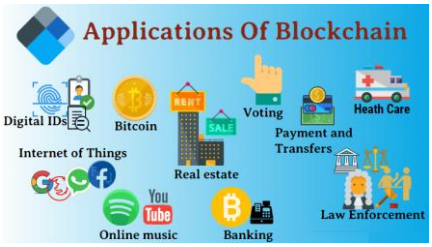

Fig 3. Applications of Blockchain

- Health Care: General information pertaining to a patient's health, such as age and gender can be stored on a blockchain. Medical history that could identify a person, such as immunization records or heartbeat data can't be relayed on the blockchain because it would only apply to that person. Blockchain technology is the answer to connect all the data generated by medical devices. All the information could be stored on a blockchain and then linked to personal records to make people safer. [6]
- Real Estate: Blockchain is a promising avenue for real estate. It supports quick and efficient verification, reduces fraud thanks to encryption, and brings transparency throughout the process. [7]
- Media: With blockchain, media companies will be able to record and store their digital content in a secure system, eliminate fraud in the digital economy, and provide better protection of intellectual property rights. Eluvio, Inc. is a new platform that takes advantage of blockchain technologies to manage and distribute premium video content without the use of content delivery networks. It was recently launched in 2019 and uses blockchain technology to provide quality productions to consumers and business partners. Recently, the platform has been tapped by a media giant for its use in global streaming to web, mobile, and TV everywhere audiences. [7]
- Energy: Blockchain has the potential for many other uses in the energy industry. This includes executing energy supply transactions, but also goes farther than that and includes documenting ownership, emission allowances, and renewable energy certificates. [8]
- Record Management: National, state and local governments are responsible for managing individual records, such as birth and death dates, marital status or property transfers. However, maintaining this data can be difficult, with some of these records only existing in paper form. And sometimes citizens need to go to their local government offices to make changes to their records which is time-consuming, unnecessary and frustrating. Blockchain technology could simplify the recordkeeping of these individuals and make the data far more secure. [8]
- Identity Management: With all the information stored on blockchain, people would only need to provide their basic information - like their date of birth - to verify their identity. [8]
- Voting: Blockchain has the ability to make voting easier and more secure. If a hacker were to access one terminal, they wouldn't be able to reach other

nodes because each vote is associated with an ID. They also would not be able to create a fake ID and affect the integrity of the vote count. [9]

- Taxation: Blockchain technology could be used to make the complex process of filing taxes, which are often prone to human error, much more efficient. [9]
- Non-Profit Organizations: Blockchain can solve problems with charities on transparency and managing their funds. Blockchain technology is a new way of showing that the donations are going to NPOs, rather than other places they may be using it. Blockchain also has the ability to make donating to them more efficient, effective and traceable. [9]
- Cybersecurity: Blockchain is a largely reliable form of technology in terms of cybersecurity because one system crash does not put the whole network at risk. It also provides private encodes which make it difficult to hack. [10]

4. BENEFITS OF BLOCKCHAIN

- With the blockchain, transactions can be approved by a network of thousands of computers. This removes human intervention in the verification process, so less mistakes are made and there is an accurate record. Although a computer can make an error, that error would only be made to one copy, since it needs 51% of the computers to do something wrong in order for it to spread to the rest of the chain. [10]
- Blockchains eliminate the need for a third-party to verify transactions. Instead of paying high fees for a third party to verify transactions, people use Bitcoin, blockchain technology, and other cryptocurrencies as an option. [10]
- A blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value. The blockchain is shared across a network of computers and updated by the tamper-proof Distributed ledger technology. [10]
- Transacting through an authority can take up to a few days to settle. For example, if you deposit a check on Friday evening, your funds don’t show up in your account until Monday morning. This is different from financial institutions that work during business hours only, usually five days a week. Transactions finalized on the blockchain happen 24/7 and in 10 minutes flat, which is extremely time efficient when doing business internationally because it often takes much longer for all parties to confirm payment processing. [10]
- Blockchain networks are decentralized meaning anyone with an internet connection can view a list of the data stored while users cannot access identifying information. Blockchain networks are not anonymous because they are only confidential. [11]
- Blockchain addresses of public transactions are not linked to personal information, but the name of an account holder is. [11]
- A blockchain is a list of records, called blocks, which are linked together and secured using cryptography. Once a block has been recorded and confirmed on the chain, each block after it contains a hash code that will not change when modified. [11]

5. CONCLUSION

Blockchain is a technology that can revolutionize peer-to-peer lending, digital property and business models. As data shows, its application is virtually limitless and the possibilities are just being touched upon. All transactions on blockchain are encrypted and shared with the network of computers. Blockchain ensures authenticity and accountability with it's distributed ledger. The future of the internet is in the Blockchain. The Blockchain will create a repository of information, accessible worldwide and uncensorable. The Blockchain is different and better than any information storage system because it is accessible to anyone and cannot be altered by a human or other entity.

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