An Overview on Blockchain

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ABSTRACT- Blockchain is a decentralized technology. When it comes to resolving business issues, it wields considerable power. Every transaction on the blockchain is encrypted, and each transaction is linked to a previous transaction or record. Blockchain transactions are validated by algorithms running on nodes. A single entity cannot start a transaction. Eventually, blockchain provides transparency by allowing any participant to view transactions at any moment. Smart contracts provide secure transactions, minimizing the risk of third-party interruptions. Ethereum is a decentralized platform based on smart contracts. It enables developers to create markets that transfer money according to the instructions given years ago. Blockchain is distinguished by two key characteristics: immutability and decentralization. Deals are completed faster; Transactions and authentication are completed in a matter of seconds, and much more.

KEYWORDS- Blockchain, Cryptocurrency, Ledger, Network, Transaction.

I. INTRODUCTION

Blockchain technology holds great promise for a wide range of infrastructures and applications. Technology improves resource management while ensuring secure and efficient communication [1]. When parties use blockchain to conduct financial transactions, trust is increased as it reduces the risk of fraud and automatically creates a record of operations. Performing spontaneous background checks on each system problem. Due to its decentralized nature, blockchain promotes trust and reduces risk when entering into commercial transactions with an unknown person [2].

Today, everyone uses sophisticated technology to communicate through the internet. Voice calls, video calls, texts, and images are all sent via the internet straight from sender to recipient. Between the sender and the receiver, a trusted third party must be maintained for this transaction [3]. When it comes to transaction money in the traditional system, individuals have relied on a third party to conduct the transaction. However, in the case of blockchain, full transaction security will be provided. Every transaction should be documented in a block that will serve as a record sheet. A block is added to the blockchain as a permanent database whenever a transaction is completed. When a block is completed, it is either added to another block or replaced with a new block. Every block includes a hash of the previous block. [4].

A. Key Elements of Blockchain Technology

1) Decentralization

Decentralization is not to be confused with centralization. It provides greater security and flexibility than any centralized application. Decentralization has been chosen by many companies because of the need for quick decision-making.[5]. In a centralized environment, everything is done in the same place. A distributed environment is created when a decentralized environment is used in multiple locations. It has the ability to deliver both innovation and efficiency. Efficiency is related to cost and time savings and should result in better results. New ideas or concepts are created through innovation. That ought to be a new perk. Figure 1 shows the different network comparisons.
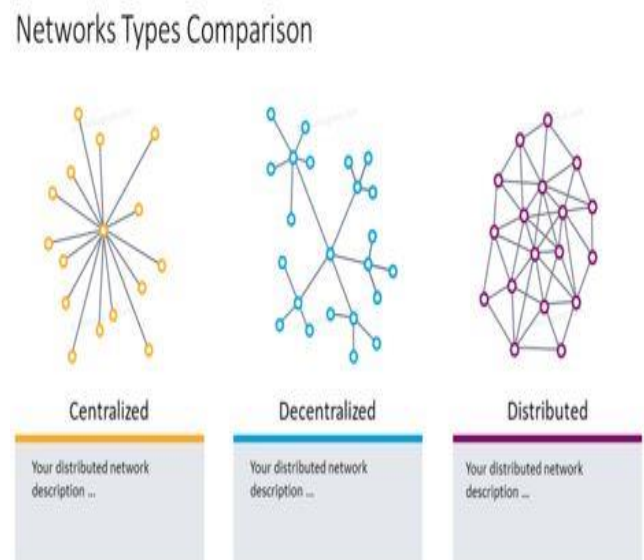

Figure 1: Illustrates the network comparison[6]

2) Trust

In Blockchain technology, each block contains information about the block before it. It will present an authentication method during the transaction. There is no interaction with outside parties. A public ledger will be used instead. All transactions should be automatically recorded in this ledger [7].

3) Transparent

The information stored in a blockchain is both visible and immutable. As a result, blockchains are regarded as reliable.

a. Security Features of Blockchain

- Use ledger: A ledger must be used in a blockchain to record every transaction. This laser cannot be replaced. Data that has already been saved cannot be changed or deleted. This ledger is a blockchain-based decentralized application. As a result, no one has access to the transactions or sensitive data stored in this ledger. People can only read information through bookkeeping.
- Blockchain is another type of security feature. Each block in the blockchain must have a hash value. The previous hash concatenates these blocks. If an attacker intervenes to recover the data the hash will be changed. This will affect the whole chain. As a result, sensitive data or information will be better protected.
- A decentralized application is blockchain technology. Peer-to-peer communication will be facilitated primarily. As a result, each network node is considered a computer. Thousands of nodes must replicate the distributed ledger. This is the point at which the transaction must be verified. The transaction cannot be completed if a node does not agree to this. As a result, the event will be canceled. This will help to keep fraudulent transactions to a minimum.

b. Application of Blockchain Technology

1) Blockchain for health care industry

In today's world, patients are wary about disclosing medical information to strangers. In this instance, the patient may utilize this technology to keep all of his or her information safe from prying eyes. This blockchain may be accessed via a website or a mobile application. In a blockchain, every user has two keys. There are two types of keys: private and public. Only those who use this may make a transaction. There are two people named Alice and Bob, for example[8]. Alice wants to send Bob some confidential information. As a result, Alice uses her private key to sign a digital signature. That is to say, the private key is always used as a password. Then, using her public key, she will hash the data and create an address. The digital signature is then validated by Bob. They will make a transaction if it is validated. Potions information may be secured from prying eyes by using these types of security measures.

2) Electronic medical records

Patients may use blockchain technology to manage their electronic medical records. Patients should not have access to their medical records in most healthcare institutions. Patients are growing more dissatisfied with the confidentiality of their medical data. All of this can be prevented thanks to blockchain technology. Blockchain should deal with various frameworks for managing authentication, secrecy, and responsibility while dealing with electronic medical records. It is mostly utilized while dealing with sensitive information. Blockchain will function as a decentralized application for online electronic records. All applications should be completed in a centralized environment. However, in a decentralized system, the application needs to be carried out in many locations[9].

Some difficulties and constraints should be mitigated by using electronic medical records. During the deployment of the individually controlled system, this system will encounter several significant difficulties. That is, personal records would take the role of provider or hospital records. To complement the current data, a portion of the individually controlled records would be downloaded into the institutional record[10].

3) Blockchain to protect personal data

There has been a significant rise in the number of reported incidents of security problems involving users' personal data. As a result, the data is in the control of a third party, who will gather all personal information. Blockchain abolishes the need for a third party and allows transactions to be made directly between two parties. In our environment, the quantity of data has lately increased. The biggest online social network, Facebook, has amassed 300 petabytes of personal data. Personal or sensitive information should never be left in the hands of a third party. They are being attacked and abused. Users do not have to trust any third parties because of blockchain. Users are recognized as the proprietors of their personal data on the blockchain. Blockchain should be governed by its own set of regulations. It's referred to as a smart contract. The gateway keeper should establish certain rules before beginning a transaction, which will be expressed as a contract. It'll allow for peer-to-peer communication. Bitcoin has shown in the financial world that it can be trusted and that computation can be done in a decentralized network[11]. Blockchain is primarily intended for use with bitcoin, digital money.

4) Bitcoin

Bitcoin was created in 2008 as a novel method to transfer money over the internet. Bitcoin was created in 2011 by Vitalik Buterin, a programmer. Bitcoin is a kind of digital money that is generated and stored digitally. It's a decentralized application. This has direct control over digital money transfers. Bitcoin's value has risen in recent months. One of the major problems that Bitcoin aims to address is the distributed tracking and confirmation of transactions. It will save the whole transaction history. Blockchain was created primarily for the purpose of transacting this digital money. Who can filter the recent history if the user wants it? Before proceeding with a transaction, the rules and regulations will be established in the form of a smart contract. Only two people may conduct a transaction, and the sender must first provide a digital signature. This digital sign verifies the transaction. If this sign is genuine, the transaction will continue, implying that bitcoin will be exchanged.

- *Smart Contract:* A crypto contract is another name for a smart contract. Nick Szabo suggested smart contracts for the first time in 1994. It is computer software that regulates the transmission of digital money directly. Blockchain technology is used to store these contracts. A decentralized system is a smart contract. It was split into two groups. It is unnecessary to pay a middleman. It will help you save time and avoid confrontation. In smart contracts, ledger is utilized. It's a decentralized program.

- *Contract Management:* Blockchain technology in contract management provides a solution for firms to verify contract information which can be very useful for all types of organizations and businesses, including the technical and construction sectors. Contract management using blockchain technology will thus allow businesses to improve their supply chain performance, evaluate suppliers and achieve greater value and shorter lead times. Morrison appears in the film Morrison (2016).

- *Entertainment:* The use of blockchain in combination with smart contracts enables the transparent transfer of royalties to all parties involved in the music and film industries in real-time distributions.

- *Insurances:* Insurance is a new market for blockchain technology, with the industry spending more than $2 billion each year on fraud and compliance. The application of Blockchain Technology in the insurance value chain has a lot of promise. Smart Contracts can automate the sale of certain insurance policies. Blockchain has the ability to reduce human mistakes, carelessness, and fraud, as well as verify consumer and policy legitimacy.

- *Healthcare:* The healthcare industry has already begun to use Blockchain technology. In the medical industry, smart contracts may be used to maintain track of payers, providers, and medication manufacturers. Providers of healthcare may create Smart Contracts for any payer or supplier, which are then saved in their electronic records.

5) Ledger

In a blockchain, a ledger is a decentralized program that is allocated to each user. When you finish a transaction, it will be immediately entered into the ledger. There are two people named A and B, for example. Person A is required to pay person B 100 rupees. In this blockchain, there is another individual. They also keep their ledger. This information will be updated in all ledgers automatically. Person A said that B should only get ten rupees. After that, there will be a voting system. This voting method may demonstrate that person A's assertion is untrue. As a result, it will be rejected. All cryptocurrency transactions should be recorded on this public ledger. There is no centralized data store or an administrator.

c. Advantages of Blockchain Technology

- Security: A digital record of the occurrence of all transactions is added to all participant's ledgers with a unique 64-digit alpha-numeric signature.
- Data integrity and Immutability: Blockchain stores data in a way that makes it difficult to hack so once a transaction record is added to the ledger it is removed only after settlement.
- High Accessibility and intelligibility: As of controlled web, Information should be accurate, safe, well timed and available in blockchain technology.
- Responsibility: As blockchain is an activity that is controlled by several local officers. So there is no single point of failure involved.
- Processing Time: By using blockchain technology one can reduce the processing time of a record or transaction from days to minutes.
- Automation: Blockchain uses smart contracts which are essentially a global computer where the results of every computation can be seen by anyone.

1) Challenges of Blockchain technology

- Cost issues: Cost issues are the main drawback of Blockchain Technology as initially, the users of Blockchain Technology have to pay for the transactions and the computational power.
- Wasted Resources: Blockchain technology requires large amounts of energy which results in wastage of resources.
- Integration concerns: Blockchain technology provides solutions that require significant changes to existing legacy systems to be implemented.
- Immaturity: Currently, Blockchain technology is a process that represents the cryptocurrency and the organizational transformation which includes the changes in strategy, process, methods and culture.

II. DISCUSSION

Over a few decades, Cryptocurrency had been a trending topic that provides immense technological powers that have attracted trillions of valued investments on a large scale. According to the "Global cryptocurrencies benchmarking study" have said that the value market of digital currency had increased more than 3 times early in 2016, nearly reaching 25 billion USD in March 2017. Blockchain is a technology that enables the existence of cryptocurrency (among another thing). In this paper, the Authors explained about blockchain and its properties and cryptocurrency. As another technology, everything has positive and negative and the same goes for Blockchain technology as already discussed above. In the future aspect, Big deals will be done in Cryptocurrency but talking about India, cryptocurrency have a long way as currently, there are UPI systems in India and maybe in the future, deal will be done in digital currency in India also.

III. CONCLUSION

Blockchain technology offers a high value and promising future in addressing data integrity issues, enhancing transparency, avoiding fraud, and establishing trust and privacy. Blockchain technology has the potential to revolutionize industries such as e-government, healthcare accounting, finance, business process management, entertainment, insurance, trading platforms, the internet of things, and law firms and many others.

As a result, depending on the region or industry in which it is used, Blockchain Technology has a great potential for bringing new solutions, since economic efficiency and social advantages may be reached via technological innovation and applications. However, adopting Blockchain Technology at businesses across a variety of sectors may be prohibitively expensive. Organizations must spend a considerable amount of money to migrate or move old systems. Organizations will have to build a single platform to enable such hybrid application architecture, combining Blockchain and traditional systems, at this early stage of Blockchain adoption. As a result, they must get a better knowledge of Blockchain Technology, including its value, possibilities, and dangers. As a consequence, just a few cases of the technology being used with these systems have been documented.

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