Blockchain Technology the New Internet

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Abstract: The blockchain is generally defined as publicly disclosed and linked ledger of online transactions that are performed in peer to peer network. Also, all the transactions executed in this public ledger are verified by the majority of the participants. Blockchain has brought a different approach to the data sharing and management. It has come up with the solutions to a number of problems that the digital world has been facing since long. Blockchain technology is highly efficient to transform a number of industries such as financial and non-financial ones.

This paper explores the blockchain technology as a thing like an internet i.e. the future of Internet and explains its numerous scopes in different sectors for both the personal and professional purposes. But firstly, we will come across the basics of this technology, how did it come into existence and what’s its current status. We will also study what can be the positive and negative impacts of using blockchain technology. And at last, we will explain the challenges along with the opportunities this latest technology brings in the digital world.

Keywords: Blockchain Technology

Introduction

It has been very difficult and troublesome to manage huge data from big industries with the advancement of technology. But whenever there is a problem, there are experts to find out the solutions. And the solution for data management issues is that Blockchain Technology; it not only helps us to face the problems of data management but also handles the data security and sharing issues. This technology is growing with a number of opportunities in both the financial and non-financial sectors. It allows companies and individuals to perform and execute transactions on a network without the involvement of any third party.

Blockchain technology provides a platform for transactions such that once the information is entered, it can never be deleted from the blockchain. In this way, blockchain technology can be described as a permanent storage area of the records. Every record of the transactions stored in a blockchain can be verified at any moment whether the transaction has been performed recently or a long time ago. The well-known digital currency bitcoin is the most popular and widely used application that makes use of the blockchain technology [6].

Although the Bitcoin is somehow controversial [6] due to the execution of big transactions without the interference of the third party i.e. even government but the blockchain technology has been working efficiently till date. The blockchain technology is aimed to develop a decentralized and democratic open digital economy from the existing centralized one. The blockchain technology comes up with a wide scope and opportunities, and it is just the beginning of innovation in this field.

History of Blockchain Technology

The concept of Blockchain Technology was first reported in the year 2008 when a group of researchers or a mysterious individual researcher published a paper entitled “: A Peer-To-Peer Electronic Cash System” [2] [6]. This paper was published with the name Satoshi Nakamoto and he just disappeared in the year 2009. The real identity of Satoshi Nakamoto is still unrevealed; no one even knows whether he was his real name. In his paper, he described a peer-to-peer system for electronic cash through which people could make instant online
transactions directly from sender to receiver without any involvement of any third party such as government or financial institutions [2].

The term Blockchain was the fundamental integral of the digital currency in his published paper. Bitcoin, the widely accepted cryptocurrency was the first recognition of the blockchain technology [7] [11]. This technology has replaced the transactions executed through a trusted centralized entity with the networks of exchange that uses cryptography. Bitcoin digital currency was the very first application built on the concept of Blockchain technology. Satoshi Nakamoto described Bitcoin and explained how it could be used to make payments digitally between any two entities or parties without the requirement of a third-party [1]. Bitcoin is responsible for maintaining a global market of anonymous transactions worth multibillion-dollar without the control and interference of government [2].

The author of the first paper on bitcoin and blockchain technology didn’t want to reveal his identity to the world, and thus he is anonymous till now and no one knows Satoshi Nakamoto. After few months, an open source program was released with the block of 50 coins, implementing this blockchain technology. Being open source, it could be installed by anyone to become the part of bitcoin peer-to-peer network to perform transactions [2]. Since then, the bitcoin is gaining more and more popularity, and thus the blockchain technology.

**What is Blockchain?**

The blockchain is the emerging technology that has gained popularity within few years. Although the technology can appear confusing and complex for the first time but it is quite simple at the conceptual level. A blockchain is basically a medium to perform data management that allows people to create and share the public ledger of transactions within a distributed network. The participants of the network are able to add data records to this ledger using a private key or public key cryptography [12]. In the blockchain, there is no role of the third party to identify and manage data or participants. Blockchain can bring revolution in everyone’s life and simply can change the world if adopted widely [1].

Every record in the online ledger of blockchain is known as the block. Whenever a user adds a new record in the blockchain ledger, it is added at the end of the blockchain [7]. When the new record is verified and validated by the majority of the network participants, the record is approved and it is added to the blockchain. This whole process is known as the consensus mechanism.

The important features of blockchain are being described in the following diagram, giving a brief overview.
Blockchain - Overview

Blockchain is a storage system that keeps record of all the digital transactions that are executed by using digital currencies. It is the system of transactions that transfer the digital assets directly in the blockchain wallet without any requirement of a third party like a bank or financial institution. This technology provides you a system where your money directly reaches you without any involvement of banks; and you can instantly use that amount for your personal or business purposes.

It has also been very simple to exchange currencies with this blockchain technology. Here, you can easily change the values of currencies online without any involvement of the mediators. The blockchain is a revolutionary innovation of the internet that can change the whole world; it has cut off the need and demand of

Types of Blockchain –

Generally, the blockchain is referred as a publicly distributed ledger following a consensus mechanism but it is not followed by all the blockchain technologies. The blockchain use case depends upon the followed consensus mechanisms and distributed options. Depending on these, the blockchain can be permissioned (private), permissionless (public) or consortium (hybrid).

Private Blockchain – The blockchain that can be accessed by the known and approved parties or entities, is known as private and permissioned blockchain. These blockchains facilitate users to perform cheaper and faster transactions that are stored permanently in a shared ledger. Only vetted financial operators and banks can approve the transactions being executed in the private blockchains.

The important features of the private, permissioned blockchain are –

- Fast and highly efficient
- Highly secured
- Easy to upgrade
- Designed for private network
- Have high enterprise support
- Lacks critical enterprise features
Some examples of private and permissioned transactions are –

- Eris Industries has developed their own private distributed network using blockchain to share software databases within a network.
- Blockstack is another example of the private and permissioned blockchain. It is aimed to provide back office functionalities of the financial institutions such as settlement, clearance, and others on a private network using permissioned blockchain.

**Public Blockchain** – The blockchain that can be accessed by any of the parties of entities of the peer to peer network either approved or not, is known as public and permissionless blockchain. These blockchains facilitate users to perform transactions in a simple manner. Being permissionless, these transactions can be somehow slow, less efficient and inflexible due to heavy load of transactions. The important features of the public, permissionless blockchain are –

- Slow and less efficient
- Built-in virtual currency
- Simple and inflexible
- Have high community support
- Forked heavily
- Complete and tested
Some examples of public and permissionless transactions are –

- Bitcoin is the most popular example of permissionless and public blockchain where anyone can get access to the information or records stored in the blockchain ledger. Also, any of the entities or parties can add the valid transactions to the end of the ledger and can interact with each other in the distributed network.

- Ethereum is another example of public blockchain that is gaining popularity nowadays. It is a programming language that provides a decentralized platform to run smart contracts and also enables developers to publish distributed applications over the peer to peer network so that all the parties and entities can access it.

Consortium Blockchain - The concept of hybrid blockchain i.e. the combination of both the private and public blockchains has come into existence. It is significantly the third type of the blockchain, known as Consortium blockchain or simply Hybrid blockchain. In this type of blockchain, the user can provide restricted access to the parties of the distributed network. In this, any of the approved or disapproved entities can be given the read or write access of the recent transaction.

This consortium blockchain can be implemented by the firms, organizations or group of peoples who works in collaboration with each other. In this way, they can have a blockchain with the required restricted access to maintain intellectual property rights within a network and thus work to find the solutions in a secret but distributed manner. Thus, the consortium blockchain combines up the advantages of both the private blockchain and the public chain. Many of the financial institutions are implementing hybrid blockchain these days. The important features of the hybrid, consortium blockchain are –

- Fast and efficient
- Highly secured
- Easy to upgrade
- Simple and flexible
- Have high community support
- Have high enterprise support

Why Blockchain?

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The blockchain is the innovative technology, being accepted widely all over the world. It offers its participants a highly secured ledger system across the distributed network [3]. It is an emerging technology that has enough potential to modify supply chain, banking and other networks including transactions. There are several advantages of implementing blockchain technology that makes important to use, which are followings –

**Secure**

The blockchain technology provides a highly secured system of transactions as it does not include involvement of any third party [2]. The blockchain, specifically, constructs an enhanced security level, thus boosts the security of the transaction system [3]. The blockchain technology keeps all the transactions safe from any fraudulent or hacking.

**Flexible**

Although the blockchain technology itself is an open system and public ledger of distributed network, the system is not bounded to be the open or public, if undesirable. The system can be private i.e. permissioned or the hybrid one as required.

**Accounting**

The blockchain technology has high accountability; it consists of a very powerful and effective auditing layer i.e. accounting layer.

**Privacy**

The blockchain technology provides a highly private system if demanded. The users can either have private blockchain or the public blockchain according to requirement. The system that implements private blockchain is highly secured and the permission based; but fast and quick.

**Malleable**
The blockchain technology is not so regulated; it is upgradeable and thus reduces the cost of management. The user base and channels can be expanded as per needs and requirements, thus reduces the risks and complexity [9].

**Easy to use**

The blockchain technology, although being the advanced technology, is very easy to use and implement. It provides a simple mechanism that allows users to transfer digital currencies such as bitcoin, altcoin etc. between entities or parties in a secure manner. Not only this, the blockchain technology also enables easy and quick audits of the user’s accounts on distributed network.

Thus, blockchain technology is highly advisable to use as it provides a powerful system of accounting to track ownership, in terms of digital currencies [1]. At present, it is being implemented in different industries including financial and non-financial sectors.

**How does Blockchain Work?**

As we know that the transactions in the blockchain are considered as blocks. Whenever a new transaction is executed, a new block is added at the end of the blockchain. In the blockchain technology, there is an important role of sender and receiver without any involvement of the mediator or third party such as government or any financial institution.

Technically, the blockchain is a considered as a distributed public database that stores the records of all the online transactions. It is different from traditional databases as it does not have a centralized system; instead it is a decentralized and distributed ledger. Whenever a new transaction is performed, it is recorded as a protected block with all the other transactions that has been executed in last ten minutes and simultaneously sent to the whole participants in peer to peer network.

The participants then approve or validate the transaction with majority of their consensus. Then, the validated block of transaction is modified with a header called timestamp; and then added to the end of the linear chain of blocks i.e. blockchain. After that the complete chain is updated continuously so that each participant in the distributed network can have access to the all transactions.

The working of the blockchain can be simply explained with the following example in less technical terms –

- Suppose A is a sender who wants to send the money to B, the receiver.
- The transaction will be represented online in terms of ‘block’.
- The block is then broadcast to the all participants of the distributed network.
- The participants approve that the transaction is valid with the majority of their consensus.
- The block will be then added to the existing blockchain which results in an open and transparent record of online transactions.
- And finally, the money is transferred to B from A.

**Blockchain and Bitcoin**

The blockchain technology and the bitcoin, both are related to each other; in fact, both of them are complementary of each other. Blockchain is the emerging technology that proves the existence of digital currencies whereas the bitcoin is the popularly known digital currency [4]. The blockchain technology was initially invented for the bitcoin cryptocurrency only. The cryptocurrencies bring a number of benefits for the consumers because it provides them peer to peer payment methods. The cryptography based payment options
are faster and cheaper as compared to the traditional payment methods [12]. These cryptocurrency based digital transactions do not require the users to provide their personal details; thus are completely anonymous maintaining high security.

In the present world of technological advancements, the peoples are widely accepting cryptocurrencies and digital transactions as a preferred payment option. Its acceptance is also due to its features such as secure, fast, flexible, private and easy to use. The digital currencies bring numerous opportunities for investments and thus, result in profit. Due to this, the consumers are being encouraged not to use them only for buying services and goods but to trade them. These are the crypto-currencies that give an easy access to the global payment system anytime and anywhere. When the people are dealing with digital currency such as bitcoin using blockchain technology, they can transfer this digital currency without any requirement of bank account or account history [4]. Thus, bitcoin and blockchain both are related as both of these works in pair.

Potential Applications of Blockchain Technology

Blockchain technology has a wide scope and applications in financial as well as non-financial sector. At present it is being used for the execution of transaction, to store land records, to keep record of smart contracts and even for supplying food to hungry peoples. The applications of the blockchain technology are expanding day by day. Also, there have been a number of cryptocurrencies that are implementing this technology; some of them are bitcoin, altcoin, ethereum, peercoin, ripple and many others.

Everyone is familiar with the application of Blockchain in the area of finance as bitcoin – the digital currency. The financial institutions and banks are doing continuous research on innovative Blockchain applications so that they could find some opportunities in this area. The use of Blockchain technology is not limited to the financial sector; but, has endless opportunities in non-financial sectors. This technology can be implemented in maintaining the proof of the existence of health records, legal documents and to make other loyalty payments.

For example, Honduras government has set up all land records on a public ledger [10] - the Blockchain. Whenever there is a minute change in the ownership, it gets recorded publicly [8]. The secure and transparent features of Blockchain make it suitable for medical records, event recordings, transaction processing, records management and identity management. Now, most of the financial institutions, as well as firms, have adopted Blockchain technology to maintain distributed and secure databases. Blockchain can be used as a notary service to make it easy and inexpensive by attaching some required data with the record of transactions [8]. The Blockchain technology works to obtain the objectives of privacy and anonymity and thus stores the fingerprint of a digital asset without storing the digital asset.

Blockchain Technology is spreading past the budgetary administration industry. At a TechCrunch Disrupt London occasion in December 2015, for instance, Grammy-winning performer Imogen Heap commended its potential for guaranteeing reasonable pay for artists, saying, "The most serious issue for a craftsman at this moment is installment. Blockchain Technology could start up numerous new stages and administrations that would enhance the greater part of our lives." And the top prizewinner at a blockchain hackathon toward the beginning of November 2015 was MedVault, a proof-of-idea that would give patients a chance to utilize the innovation to store their own restorative history safely while making principles to control who can get to it, in a crisis or something else.

The Blockchain has a great application to be used in creating smart digital contracts due to the feature of storing logic with the transaction records. It is also used in supply chain communication and management to provide proof of provenance. The blockchain technology has made the transactions and processes so quick and easy when being used in only a few areas of applications [5]. The use of blockchain to track items, set up records, manage identities and records, process transactions and many others described above can make the world enter into a new era of technology.
Blockchain Technology and Revolution

Blockchain Technology is the revolutionary innovation in the field of online transactions and cryptocurrencies exchange. This technology allows users to perform a large number of transactions such as –

- Instant transfer of the crypto currencies
- Exchange of digital assets
- To perform secure transactions
- Sales of physical assets like property

Blockchain allows participants to use and implement smart digital contracts with its characteristics of storing logic of the transactions with the transaction records. The supply chain management can also be implemented to find the proof of provenance. The Blockchain have the features of security and transparency and thus makes it suitable to keep record of events, medical records, transaction processing, management of records, and identity management.

Some of the examples of smart contracts that can be implemented using Blockchain technology are –

- Payment of rent; rent as a function of revenue
- Payment for web advertisements per click
- Payments for royalty where payment is a function of seats in software license

Blockchain Technology guarantees to robotize a large portion of the current work escalated forms required to settle budgetary exchanges, along these lines expanding the speed at which such exchanges can be led and bringing down exchange costs. For instance, manual procedures of recording exchanges in databases might be supplanted with computerized recording of exchanges in the Blockchain record.

As connected to things exchanges, it is normal that Blockchain Technology can reduce insufficiencies in current frameworks for taking after ownership of effects, together with cases on assets like easements and mineral rights. Therefore, Blockchain Technology should permit speedier settlements of effects deals and rent, and may furthermore impressively cut back title protection costs.

Conclusion

Blockchain technology has brought revolution in the multiple industries whether it is related to finance sector or not, every sector has been affected with this innovative technology. This technology offers participants a distributed and decentralized network for transactions where all the transactions and records are stored permanently; and are also visible to everyone in the network. The most important part is that you don’t need to remember have any bank account details with you to make transactions.

Blockchain is a distributed database arrangement that keeps up a consistently developing track of information records that are affirmed by the existing nodes. The information is recorded in an open record, including data of each exchange finished at any point. Blockchain is a decentralized arrangement which does not require any outsider association in the center. The data about each exchange at any point finished in Blockchain is shared and accessible to all nodes. This property makes the framework more straightforward than concentrated exchanges including an outsider. Furthermore, the nodes in Blockchain are all unknown, which makes it more secure for different nodes to affirm the exchanges. Bitcoin was the primary application that presented
Blockchain innovation. Bitcoin made a decentralized domain for cryptocurrency, where the members can purchase and trade merchandise with advanced cash.

And all the transactions performed remains permanently stored and can never be deleted; so you can get access of them whenever you want. The internet is generally the basis of the blockchain technology but this technology has changed the way how people uses internet. The blockchain technology has enough potential to change the life of everyone and it has just started leaving its impacts. No doubt, the blockchain technology is going to be the new internet of the future.

References


