Overview of Blockchain and its applications

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Abstract

"Bitcoin" We heard a lot of this name, not long ago, all of our ears passed the term Bitcoin, and perhaps at that time, none of us cared about the matter, so we did not enter a currency that we do not know anything about and no clear features of it or its dealings! And suspicions revolve around it being nothing but a scam! Then, the matter turned into an anticipation of the prices of this currency, whose price jumped by a crazy leap, to become those who fought the purchase of cheaply from the rich, but what is the secret in these digital currencies, and what is the mechanism that allowed them to continue, here comes the role of "Blockchain". Here we will learn about the definition of Blockchain technology, how it works, what its applications are, its advantages and disadvantages, especially from technologies that will fundamentally change our transactions in the future.

1. Introduction

In 2009, Satoshi Nakamoto a nickname for an unknown person or group of people presented a paper clarifying the concept of digital currency, built on the principles of block technology, and since then the business sector has turned upside down.

But despite the increasing popularity of this technology, there is still confused by some who were unable to understand the complexities of its mechanism of action and were unable to take advantage of its great advantages and the opportunities it creates. Networks based on this technology, decentralized applications, and distributed records have become the basis for much of our digital life and have stimulated many stagnant areas of technology.

"blockchain" is the data stored and kept through a decentralized network of computers. This unreliable technology can radically change the current world we know by redefining how we handle information and how values are transmitted

This technology is about a new generation of transnational applications that build confidence, accountability ,and transparency, and contribute to business process simplification, and the uses of this technology go beyond the well-known design pattern for which they are known; Bitcoin, through blockchain, we can re-imagine core business transactions, and open the door to new patterns of digital transactions. This technology has the potential to significantly reduce the cost and complexity of business operations, facilitates the establishment of effective business networks without the need for a central control point, and this emerging technology holds promise for a range of business applications.

2. Blockchain components
Consists of four main items:

a. Block:
The construction unit represents the chain. Which is a collection of operations that are intended to be executed within the chain. Feature of this technique is that the information is stored in the form of blocks and then sequentially linked to each other called the growing blocks so that each block contains a certain amount of activities and information and doesn't exceed the specified amount until the activity in it is complete. After that, A new block is linked to it to prevent any fake transactions or entries that lead to the chain stopping or preventing it from recording and ending transactions.

b. Information
Information is the subprocess that occurs in one block or a single command that is done in a single block. It is represented by another information and command, by the same block.

   c.   **Hash**

Blockchain digital signature. The block is connected together by segmentation as if it were the backbone of the chain. A hash is just the result of the encryption of information. a set of digital information is entered into an encryption system in which we obtain a unique code for the information that we encrypted. This code changes as we change the information entered any change inevitably leads to a different code! This process is called "HASHING." this code works on: Distinguishing the chain from others, each chain has a distinct code for it - defining and distinguishing each block inside the chain through a special hash, each information inside the block has a distinct hash and linking the blocks With each other**.** so that every block is connected to previous and subsequent margin to walk in only one direction.

   d. Timestamp:

    The time when an operation is performed inside the chain.

3.   **Working principle of blockchain**

The Blockchain system operates according to three main principles.

   a.   **Open ledger**

It depends on the principle of open registry (open ledger) and decentralization, or what is known as the third party, which allows the participants to see what is happening in the entire system while preserving the personal identity by giving customers two keys:

The first kay is privet in which there are true details about the person's identity, and another public key is a code attached to the personal key. So that no one can really know the identity of a person. But everyone can see some details like the conversion history and the amount of money.

   b.   **Distributed database**

The second principle in this system is that it depends on a distributed database among all the users involved and any process that occurs will be distributed to the entire system and this feature prevents piracy because that requires hackers to piracy all participants in the system, which is impossible to happen.

   c.   **Mining**

The third principle, which is mining, to ensure the validity of the transaction before completing it when entering an order in the block. A kind of coded digital puzzle is released and must be solved to obtain hashes. Here the job of prospectors around the world searches for the correct hash for this process through calculation procedures, of course, according to special applications and once you get the correct hash the transaction is completed and the block is formed and joins the chain. The transaction is completed once its authentication is confirmed and the miners wins an e-currency for the service.

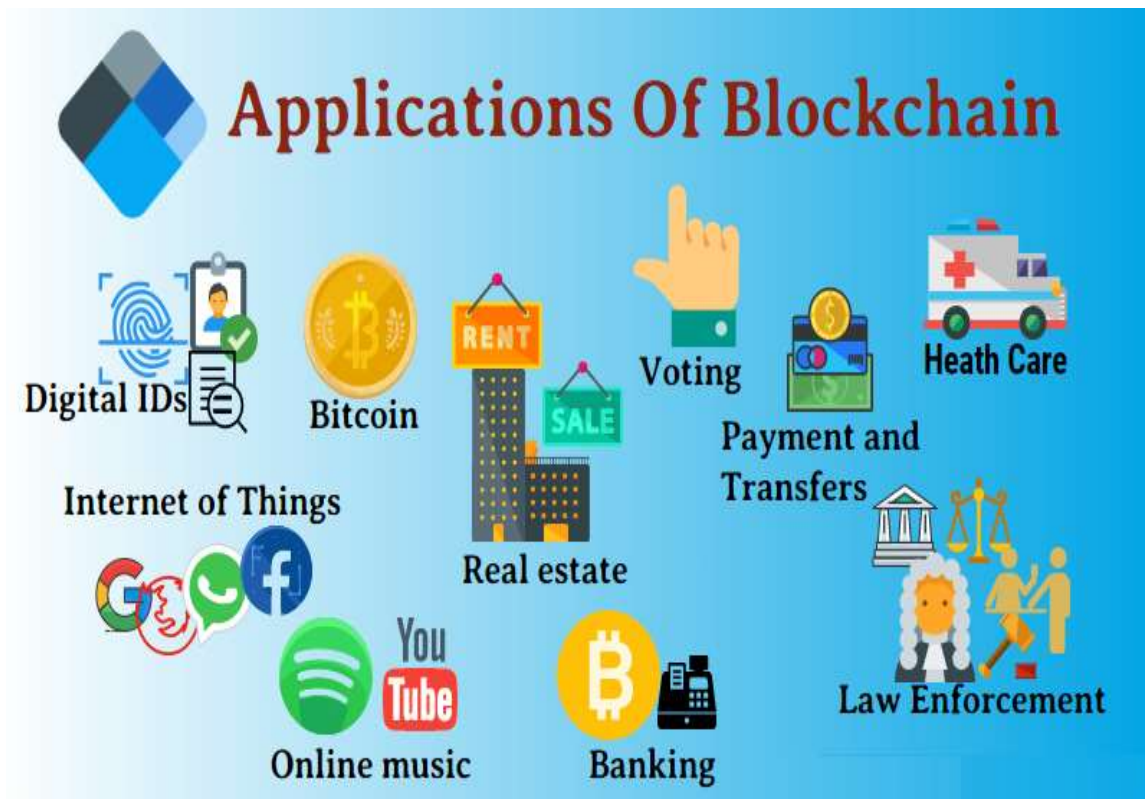**4.**   **Application of blockchain technology**

Fig.1.Application of blockchain

Blockchain technology can be used in many operations other than cash transfer, as the applications that adopt the blockchain protocol are varied as an operating platform and do not need to create databases or central management, such as:

- **Metadisk storage**
  Participants can share and store their files and also retrieve them at a nominal cost in a decentralized network where data is stored in the structure of the organized transaction log and not in the databases distributed in the data centers as is the case in most current information systems solutions, and each party maintains a device that contains an updated copy of the transaction log For all participants, decentralized storage can act as an alternative to disaster recovery centers.

- **Smart contracts:**
  Contracts can be created and coded, and the contract implementation can be followed up flexibly and automatically (canceling the role of brokers and brokers).

- **Connecting government**
  Agencies in the joint data between them (a network between government agencies with a common relationship), and making activities related to integrity and transparency available to the public of the beneficiaries.

- **Governmental services**:
  Such as documentation of birth and death events, marriage, documentation of the private property, certificates, licenses, and other government services.

- **Business sector:**
  Companies, and banks: canceling the use of a central administration to verify the validity and storage of transactions, reduces the cost of fees for services and inter-transactions (cash transfer/purchase or sale transactions) and makes the deal directly between the parties peer-to-peer and ensures the validity of the agreements between the parties involved.

- **Health:**
  Patient records (or an individual's health history) can be standardized and a Blockchain network

established between hospitals to exchange or view patients 'health history and make it available in emergency situations, or blood volunteer records.

- **Safe electronic voting:**
  Allows users to vote for one-time encrypted electronic voting from anywhere and it can be downloaded to mobile devices and connected to the GPS where it gives each user a single voting fingerprint vote token, issuing a digital ID to the citizen to conduct a vote or conduct government service on government networks from anywhere.

- **Circulars:**
  Decisions and instructions among officers: Circulars, a general record of decisions and instructions can be found - through a network of generalizations, decisions, instructions and conditions that exist for all in the network, and those who are present can receive, verify, and accept the correct transaction.

- **Asset management:**
  Real estate registration and marketing: converting assets into digital assets, registering and transferring them between the parties without mediation between users, naming and numbering of lands and properties and making them available to the public, numbering documents, and verifying ownership

- **Real estate offices:**
  Where any participant from anywhere can see the stores that are offered for sale or rent.

- **Employment:**
  Share the professional history of job seekers between all private and public entities.

- **Private networks:**
  It is possible to establish private networks for major institutions, and they have the right to amend and change transactions between them.

- **Open data:**
  Archived documents, regulations and records are made available, and converted into an archive open to the public.

- **Environmental Hazards Record:**
  Register to know the status of the first Powell environmental risks, rapid intervention to address them, critical sites, and deal with them.

- **Internet of Things:**
  Can be implemented with blockchain technology, as it is characterized by fast performance and accuracy.

- **Any activities or transactions that have a public character:**
  That may be beneficial to the public or the government entity wants to circulate to be observers and eager to be aware of it and add data or notes to it.

5. Advantages of Blockchain

- **Blockchain transparency**
  Unlike regular encryption methods that completely block information, it is characterized by blockchain technology that it is possible to frame the existing information anytime and anywhere and is available to all to include a framework of transparency for those interested in it, as this technology is based on the use of encryption to protect information and keep it from being tampered with or forged It does not prevent access to it.

- **Privacy**
  Although the blockchain is an open network for anyone to view transactions that take place through, it contains a great deal of privacy, as the sender of the information can hide his identity or send it with a false identity to protect himself from tracing one of his dealings, and also that he shows his identity If he desires it, this is widely available in the bitcoin blockchain.

- **Distributed**
  The majority of traditional databases rely on storing their data on one server or a few servers, and this leads to their ease of penetration or increase in the percentage of failures and failures, but blockchain technology does not allow this to happen because it depends on storing data in many computers on a distribution network nods, so each node makes a copy of the data, so the disconnection of any node

will not cause any failure of the database and will at the same time maintain security and protect it from attacks

- **Blockchain does not need a medium**
  In traditional financial dealings, the parties usually need an intermediary such as the bank, for example, but a blockchain is characterized by that it does not need an intermediary between the sender and the receiver, and thus provides transaction fees.

- **Safety and stability**
  One of the advantages of the blockchain is that, once the information on it has been recorded, it cannot be tampered with or changed, it can be used in financial transactions to store customer information and not tamper with employees or to hide any suspicious transactions.

6. Disadvantages Blockchain

- **Elimination of intermediary institutions**
  Threatens this system intermediate institutions and jobs in the financial sector and business management, as waiting for dependence on this system will lead to the loss of a large number of jobs as a result of the system provided. Technological developments have changed the demand map skills and jobs in industries, companies and crafts as before, banking and supervisory jobs may be able to maintain their survival if they are able to develop from themselves and absorb this new technology.

- **Absence of accountability systems:**
  Lack of procedures and systems accountability due to lack of a central control authority on this system and its management and therefore can be held accountable in the event of a malfunction of the system or was hacked or operations occurred fraud.

- **Poor audience acceptance:**
  Despite a blockchain system It has been around for more than 10 years, but it is still not widespread, and it was not used clearly except in the exchange of bitcoin, and this is because the system has not yet obtained the general acceptance that allows it to become accustomed to in multiple sectors, this may be due to the technical difficulties of the system and weak acceptance This technique.

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- **Illegal business organization:**
  A technique may be used in the organization of illegal works such as trade drugs, tourists, and human smuggling which threaten peace and Societal interests.

- **Data stolen**
  It can be seized Personal data of individuals upon entry series, and these data may be used for tampering their property, selling it, or damaging their jobs or other risks.

7. Conclusion:

Blockchain technology represents a new revolution in the financial world, and during the past period, it has proven aptitude that it may be able to endure tests and continue to exist, and over time the number of its user's increases and this works in favor of continuing it in the future.

Over time, other uses for it have emerged, such as the ability to create smart contracts, and learn perhaps soon, more uses and applications that make them an essential element in our lives.

In any case, the blockchain is a new technological system and it is not evil and not good, it is only a system that carries a new look for old things.

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