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Blockchain Technology: Overview, Blockchain Codes, Working Principles, Pros and Cons on Current Payment Methods

S. Manikandan[1]* P. Dhana Lakshmi[2] V. Vaitheeshwaran[3]

[1] Assistant Professor / IT, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India

[2] Associate Professor / CSSE, Sree Vidyanikethan Engineering College, A. Rangampet , Chittor

[3] Research Scholar, Department of Computer Science and Engineering, MATS School of Engineering and Information Technology, Aarang, Raipur, Chhattisgarh

Abstract – Blockchain technology is as a decentralized, distributed ledger that stores, records and analyze the source of digital information and assets. Blockchain is a Distributed Ledger Technology (DLT), it makes the history of any unalterable digital information and transparent through the use of cryptographic techniques in decentralized hashing method. Example Google Doc is a application of blockchain technology. We create a document and share it with a group of people, the document is distributed instead of copied or transferred. This creates a chain in decentralized distributed chain and any one can access the same time. Any other person is locked out awaiting changes from another party, while all modifications to the documents are being recorded in real-time, making changes completely transparent.

1. Digital Information and Assets are not copied or transferred. It is distributed

2. The digital asset is decentralized, allowing full real-time access.

3. Which creates trust based on transparent ledger

4. All the changes preserve integrity of the document

Blockchain is revolutionary technology and provide promising to avoid risk, stamps and fraud level services. It brings transparency in a scalable way for multiple uses.

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1. WHAT ARE BLOCKS?

Block is consist of data and hash value. The combination of blocks are called chain. The block is mentioned as follows.

1. The datais in the block. 32 bit whole number is nonce.
2. The nonce is generated randomly when the block is created. It created block header has value.
3. The hash is 256-bit number, start with zeros and combined with nonce.
4. The first block of chain is created means the nonce generated using cryptography hash function. The data is in the block and considered for extending chain blocks.
5. Miner is used to create new block and extend the chain
6. Each block has its unique nonce and hash function, which has the previous reference values and extend the chain into large

Miner is created by using special software like IBM tools, AWS Alexa, etc. It is pure mathematical logic and generated based on hash values. Nonce is a 32-bit value and hash is 256-bit values. The combination of nonce and hash is used for extending blocks based on reference values.

The changes are made in any block means miner can update the status and chain requires for re-mining operation. The changed blocks are updated and manipulate based on computing power and hash value. The block is successfully mined means changes are accepted by all the nodes and rewarded.

2. BLOCK NODES:

Decentralization is the important feature of block chain. This process is done by using block nodes. The distributed ledger is created by using extending nodes and carry the chain by using reference. Nodes are electronic device like key generated paired device. It maintains copies of block chain and keep the network operations. The cryptographic hash function is applied in each node and block is updated, trusted and verified. It is transparent process and every action in ledger can be easily checked and viewed. The alphanumeric value is the identifier and shown in all the transaction. The public information is check and balance methods and it helps maintain the integrity and creates the trust among the user. The following figure shows that the scalability process via trust and technology. Here, some user requires the transaction. The requested transaction is broadcasted via p2p using nodes. The hash function is applied and generate blocks. Each block is connected using reference values of hash and miner results. That is called chain codes. The verified transaction can involve cryptocurrency process – stores, records and collect digital assets. Here there is no need of physical documents and complete decentralized process.

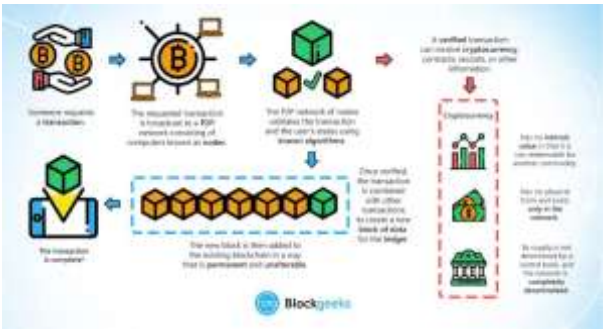


Figure 1: Block Chain - Overview

3. BLOCKCHAIN APPLICATIONS

Blockchain has multiple and endless applications and used by all transaction industries. The digital ledger technology is applied to track fraud in finance, securely share patient medical records in all transaction process. The following are the major concerns in blockchain model by industries.

Table 1 – Major areas of Block Chain Models

01.	Fighting Online Censorship with Decentralized Domains - Domain names that live on the blockchain are one solution to fighting censorship and protecting free speech.
02.	Blockchain-as-a-service companies making the DLT more accessible
03.	Blockchain-as-a-Service is the next big thing in tech. Here are 19 companies leading the way from welfare payments to law enforcement, blockchain is tackling some of government's biggest issues

4. CHAIN CODES

Blocks are digital piece of information and consist of three parts

1. Blocks store information about transactions like the date, time, and dollar amount of your most recent purchase from Amazon. (Note: This Amazon example is for illustrative purchases; Amazon retail does not work on a blockchain principle as of this writing)

2. Blocks store information about who is participating in transactions. A block for your splurge purchase from Amazon would record your name along with Amazon.com, Inc. Instead of using your actual name, your purchase is recorded without any identifying information using a unique “digital signature,” sort of like a username.

3. Blocks store information that distinguishes them from other blocks. Much like you and I have names to distinguish us from one another, each block stores a unique code called a “hash” that allows us to tell it apart from every other block. Hashes are cryptographic codes created by special algorithms. Let’s say you made your splurge purchase on Amazon, but while it’s in transit, you decide you just can’t resist and need a second one. Even though the details of your new transaction would look nearly identical to your earlier purchase, we can still tell the blocks apart because of their unique codes.

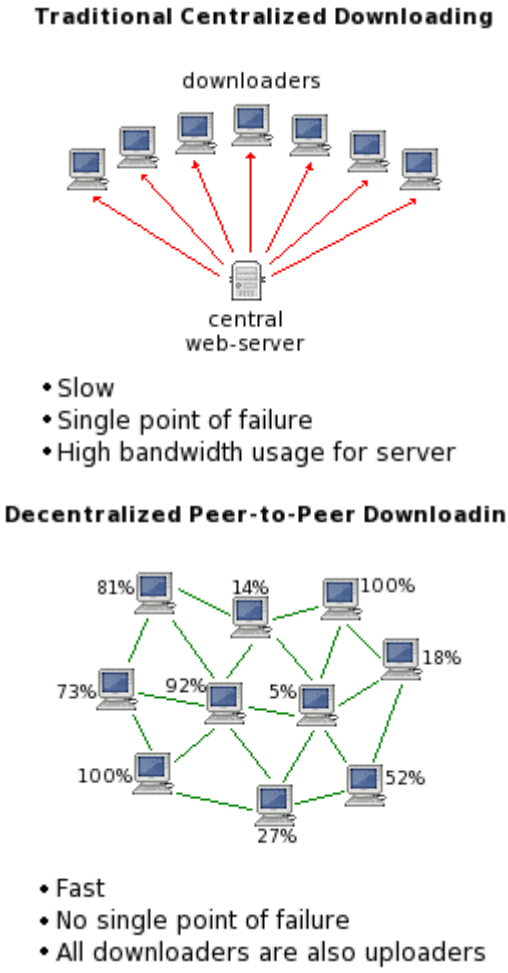


Figure 2: Process of Centralized and P2P model

The above figure shows that the peer-to-peer system is no central authority, and hence if even one of the peers in the network goes out of the race, you still have more peers to download from. Plus, it is not subject to the idealistic standards of a central system, hence it is not prone to censorship.

5. WORKING MODEL:

When a block stores new data it is added to the blockchain. Blockchain, as its name suggests, consists of multiple blocks strung together. In order for a block to be added to the blockchain, however, four things must happen:

1. A transaction must occur. Let's continue with the example of your impulsive Amazon purchase. After hastily clicking through a couple of checkout spark off, you cross against your better judgment and make a buy. As we discussed above, in many cases a block will institution together doubtlessly lots of transactions, so your Amazon buy may be packaged in the block along with other customers' transaction data as properly.

2. That transaction need to be tested. After making that purchase, your transaction ought to be verified. With different public facts of records, just like the Securities Exchange Commission, Wikipedia, or your local library, there's a person in rate of vetting new statistics entries. With blockchain, however, that activity is left up to a community of computer systems. When you make your buy from Amazon, that community of computer systems rushes to check that your transaction happened within the way you said it did. That is, they verify the information of the purchase, along with the transaction's time, greenback amount, and contributors. (More on how this occurs in a 2nd.)

3. That transaction need to be stored in a block. After your transaction has been proven as accurate, it gets the green light. The transaction's dollar amount, your digital signature, and Amazon's virtual signature are all saved in a block. There, the transaction will probably be a part of hundreds, or thousands, of others find it irresistible.

4. That block have to accept a hash. Not not like an angel incomes its wings, as soon as all of a block's transactions had been validated, it have to receive a completely unique, figuring out code called a hash. The block is likewise given the hash of the most current block delivered to the blockchain. Once hashed, the block can be added to the blockchain.

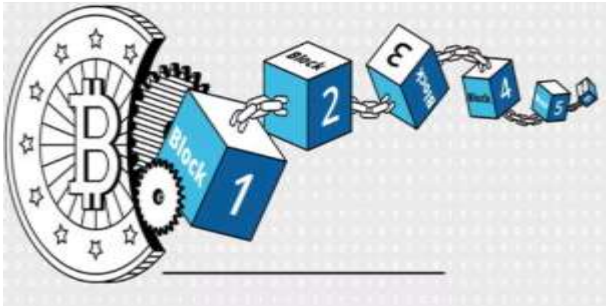


Figure 3: Block Chain Model

Pros and Cons:

For all its complexity, blockchain's potential as a decentralized shape of document-retaining is almost without restrict. From greater user privateness and heightened security to lower processing charges and less mistakes, blockchain generation may very well see packages past the ones mentioned above.

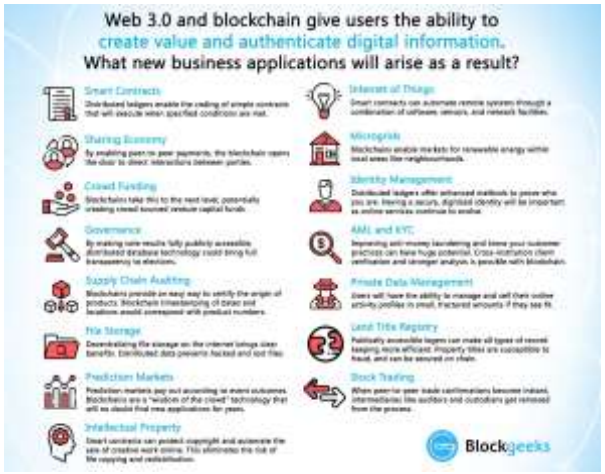
Pros

- Improved accuracy by doing away with human involvement in verification
- Cost reductions by casting off 0.33-birthday celebration verification
- Decentralization makes it tougher to tamper with
- Transactions are at ease, non-public and efficient
- Transparent technology

Cons

- Significant generation fee associated with mining bitcoin
- Low transactions in line with 2d
- History of use in illicit activities
- Susceptibility to being hacked

Current Industry 4.0 Standard:



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Corresponding Author

S. Manikandan*

Assistant Professor / IT, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India

dhanalakshmi.p@vidyanikethan.edu