

A Survey on Blockchain Handling Huge Digital Information

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Abstract

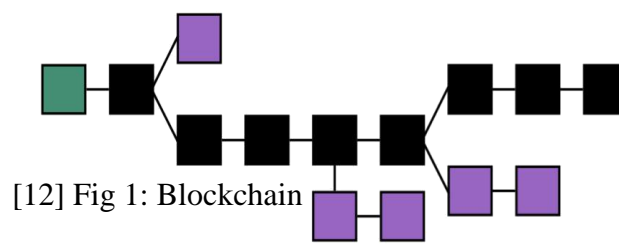
Blockchain is grouping list of records, called blocks, which are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, data and nonce. It is resistant to modification of data. By allowing digital information to be distributed but not copied, blockchain technology created the backbone of new type of internet. This paper deals with applications of blockchain in various domains such as Education, Biomedical, IOT, Supply chain and more. A peer to peer network manages the blockchain communication and validation using protocols when it is used as a distributed ledger. In a distributed environment, when a block is to be added to the chain it requires the permission from half of the nodes in the system. Even though blocks are not completely unalterable they are considered as the role model for a secure distributed system with Byzantine fault tolerance.

Keywords - blockchain, survey, application of blockchain.

I. INTRODUCTION

A blockchain is a concept to store data digitally. In recent years, there is a lot of buzz on blockchain. Many have described this as a most disruptive technology of the decade. A blockchain, is also called distributed ledger. With a blockchain, many people can write entries into a record of information, and a community of user can control how the record information is amended and updated.

[12] Fig 1: Blockchain



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II. KEY CONCEPTS

A. Distributed Ledger

Ledger is a principal book or computer file for recording and totaling economic transaction. There is no centralized data storage. It relatedly shared across multiplesites and more. Blockchain is a form of distributed ledger. Thus each participate in the blockchain network can access records that are shared across it and can own an copy of it. Any changes or update made to the records are reflected and copied to all the participants in the network in a fraction of second. Changes and update means adding a new block to the existing blocks of data saying the x changes to y in so on so time this is because once the data entered in a ledger it becomes an immutable database.

B. Consensus

Consensus can be defined as achieving agreement on a single value over a distributed system. Thus achieving consensus in blockchain states that either a single value or a new block is added only if it is agreed by all the participants in the network. In blockchain systems do not trust each other this is because of Byzantine agreement problem. Consensus therefore should tolerate Byzantine failure.

C. Cryptography

Cryptography refers to secure communication by means of encryption and decryption. This means information can be viewed by authorized person only. [13] “In blockchain cryptography is primarily used for two purposes one is securing identity of the sender of transaction and second is ensuring past records cannot be tampered with. Blockchain uses public key cryptography which is better than symmetric key cryptography”.

D. Smart Contracts

“In 1994, Nick Szabo, a legal scholar, and cryptographer, realized that the decentralized ledger could be used for smart contracts, otherwise called self-executing contracts, blockchain contracts, or

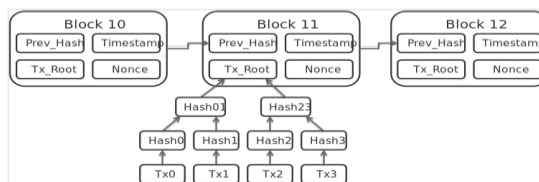
digital contracts” [10]. This contract will avoid the middle man between any two parties.

III. SURVEY ON BLOCKCHAIN

A. Bitcoin

Drastic growth of Blockchain is largely due to the success of Bitcoin. Bitcoin is a type of cryptocurrency which operates independently of a central bank. This solves the problem of double spending. To solve the problem is double sending “peer-to-peer network using proof-of-work to record a

public history of transactions that quickly becomes computationally impractical for an attacker to change if honest nodes control a majority of CPU power”[11]. The transaction in blockchain network is anonymous to the entire world.



S.NO	YEAR OF PUBLIC-ATION	JOURNAL	TITLE	METHODOLOGY	PRONS	CONS
1	February 28,2018.	IEEE Access	[1]EduCTX : A Blockchain-Based Higher Education Credit Platform	<input type="checkbox"/> European Credit Transfer and Accumulation System (ECTS) <input type="checkbox"/> Prototype-open-source Ark Blockchain Platform	<input type="checkbox"/> Efficient <input type="checkbox"/> Simplified <input type="checkbox"/> Globally Ubiquitous	<input type="checkbox"/> Few nodes <input type="checkbox"/> Protection of private keys
2	2018	International Journal of Engineering & Technology	[2]Blockchain based examination system for effective evaluation and maintenance of examination records	<input type="checkbox"/> Delegated Proof of Stake <input type="checkbox"/> Crypto-economic-incentivization	<input type="checkbox"/> Transparent <input type="checkbox"/> credibility	<input type="checkbox"/> Scalability
3	2018	Computational And Structural Biotechnology Journal	[3] A Blockchain-Based Notarization Service for Biomedical Knowledge Retrieval	<input type="checkbox"/> Notarized Retrieval Services-Ethereum	<input type="checkbox"/> Data Integrity <input type="checkbox"/> Database-Non Repudiation	<input type="checkbox"/> Transaction per second-bounded <input type="checkbox"/> Maximum retrieval-bounded
4	November, 2018	International Research Journal of Engineering and Technology (IRJET)	[4]A Survey on Blockchain Technology and Municipal Corporation System	<input type="checkbox"/> Systematic Mapping Study	<input type="checkbox"/> Transparency <input type="checkbox"/> Enhanced Security <input type="checkbox"/> High Efficiency	<input type="checkbox"/> Huge sensitive data
5	2018	International Journal of Advance Research, Ideas and	[5]Design and implementation of a secure and	<input type="checkbox"/> Python <input type="checkbox"/> Ethereum API	<input type="checkbox"/> Immutability <input type="checkbox"/> Proof of vote <input type="checkbox"/> Data Redundancy	<input type="checkbox"/> Bio metric data storage <input type="checkbox"/> Open source software

		Innovations in Technology	robust voting system based on blockchain			
6	2018	MATEC Web Conf	[6]Supply Chain Management based on Blockchain: A Systematic Mapping Study	<input type="checkbox"/> Systematic Mapping Study	<input type="checkbox"/> Uses of SCM based on blockchain technology	<input type="checkbox"/> Publication bias <input type="checkbox"/> Selection bias <input type="checkbox"/> Imperfection <input type="checkbox"/> Misclassification
7	June 3,2016	IEEE Access	[7]Blockchain and Smart Contracts for the Internet of Things	<input type="checkbox"/> IOT	<input type="checkbox"/> Automate time consuming workflow <input type="checkbox"/> Cost significant	<input type="checkbox"/> Privacy <input type="checkbox"/> Legal enforceability of Smart Contract
8	2017	Asia Pacific Journal of Innovation and Entrepreneurship	[8]Implementation of blockchain based energy trading system	<input type="checkbox"/> Multichain <input type="checkbox"/> Savoir	<input type="checkbox"/> Simple <input type="checkbox"/> Reliable	<input type="checkbox"/> Slow <input type="checkbox"/> Not supported partial transactions
9	2018	Energy Informatics	[9]Design and implementation of a blockchain multi-energy system	<input type="checkbox"/> Zero-intelligence pricing <input type="checkbox"/> Production-invested pricing <input type="checkbox"/> Game-theory pricing	<input type="checkbox"/> User preferred choosing	<input type="checkbox"/> Stable battery power <input type="checkbox"/> More storage

[12] Fig 2: Bitcoin Network Data

IV. CONCLUSION

In this paper we have conducted a comprehensive survey on applications of blockchain. All these application may lead the world to the new edge. Blockchain is the emerging technology with the scope to reach greater extent than any other security services. In future this concept can extended to some more applications military communication, government projects and more.

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