Innovative Facet of Block Chain Technology in Defining Global Financial Application

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Abstract

The current abstract is focused on developing a sophisticated mathematical combination of cryptograph activated new pattern in the world of economics, which off late is being promoted as crypto currency. The most popular well know crypto currency is Bitcoin. The crypto currency is associated with key factors such as P2P (peer-to-peer) network or internet, decentralized authority and anonymous identity of the user.

These key factors play a significant role in exchanging financial transaction. Another noteworthy and hidden stimulating factor in all these financial transactions is the crypto currency algorithm. The cryptographic hashing algorithm is foremost fuel of all the transactions in the Bitcoin. Every process of bitcoin transaction is verified by bitcoin Miner. The significant job executed by bitcoin mining is to verify all the transaction and store the transaction in the public ledger which is refereed as the Block chain. The inclusive effects of the block chain can keep a track record of all the previous financial transactions details. One of the trustworthy aspects of the Block chain technology is the use of a new accounting method called Distributed Ledger Technology (DLT). In addition to this, the block chain uses merkle tree data structure in the bitcoin application or for that reason in any other crypto currency application. Merkle tree data structure is useful for securing block chain transaction in the encrypted format.

It is a strong prediction and to some extent an established identity that the block chain technology will play a vital role in all the business transaction particularly in the financial sectors like banking, investment, accounting and auditing. Other sectors could be benefited as a result of this technology are logistics and supply chain management. Top software legends like IBM is in the process of organizing knowledge oriented workshops pertaining to IBM Block chain Platform Starter Plans in SIBOS conferences. SIBOS is annual banking and financial conference which is organized by SWIFT around the globe.

Hence, this research article will critically evaluate the role of block chain technology in understanding the role of merkle tree data structure in the block chain technology and the factors influencing the applications of Block chain technology in the financial world. This paper would also highlight cryptographic hashing algorithm and at the same time explain the merits and demerits of crypto currency in the financial world.

Keywords: Crypto currency, Distributed Ledger Technology(DLT), Bitcoin, Markel tree, Block Chain, Hashing Algorithm

Introduction

Another name of Merkle tree is hash tree which is patented by Ralph Merkle in 1979. A Merkle tree is based on hash-based data structure, which generates the hash list and hash chain. Hash based data structure is origin for digital signature concepts. In the technology era Digital Signature is one of the key feature of replacement of tradition paper based documents with ink signature. The Digital Signature enhanced the technology into another step as electronic versions of documents such as budgets, public and private law and electronic student transcript. No other option for developing countries and also developing countries to accept digital signature as legal significant due to more secured and efficient authenticated data structure of message verification. Merkle trees based technology is a gateway of releasing foremost new trend in software world like Bitcoin in cryptocurrency, Ethereum application and Apache Cassandra using NoSQL in cloud data storage in distributed database environment. Block chain means list of records or blocks. All the blocks are chained together using Cryptography. In Financial terminology the blockchain is a public ledger which is keeping all cryptography based transaction. Merkle Trees rules are used in several cryptographic functions for secured and efficient data transaction in network based nodes.

Merkle Tree

Merkle tree is a binary tree data structure. Figure 1 showing Merkle tree Structure. It is using bottom-up process for constructing the tree structure. Therefore while constructing merkle tree leaves nodes are even. Each leaf storing transaction id details i.e 2 is transaction id as per figure 1. Suppose if the number of transactions is odd, the last hash will be duplicated once to create an even number of leaf nodes. Usually SHA-2 cryptographic hash function to be used in hashing the blocks. [7] Consecutive blocks are hashed till there is only one node at the top i.e. root node of the merkle tree. It is possible to download any one of the branch within merkle tree for verification A Merkle tree keeps all the transaction summary in the block header by producing a digital Signature of the entire set of transactions. [1] Which is useful for user to check secure verification transaction in the large data transaction content of the block.
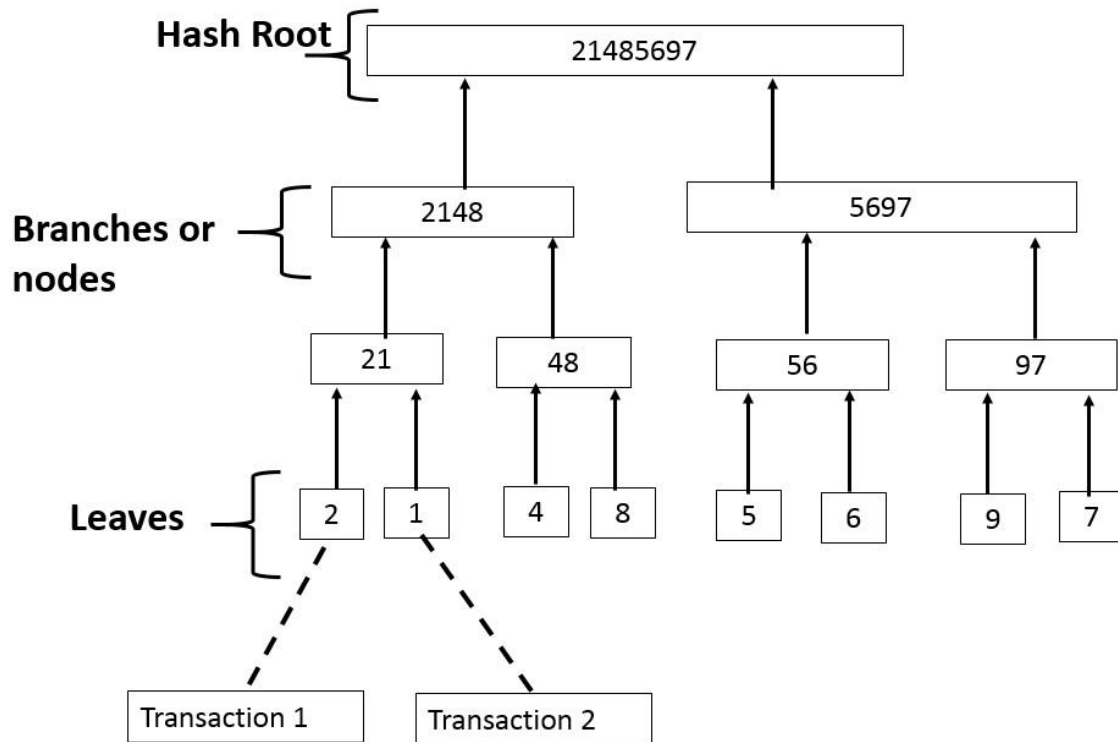
Figure 1- Merkle Tree Structure

Block Chain Technology

Block is digitized record or transaction. These transactions are storing in the large network nodes. Each transaction details are chain together and secured by cryptography is called blockchain [2]. Merkle tree is fundamental part of blockchain technology. Merkle tree structure ensure the secure verification of transaction in blockchain storage. In the financial world, blockchain is public distributed ledger keeps all the cryptocurrency transaction details in nodes. Especially in the financial environment the middlemen or intermediaries plays huge role in transaction [3]. This blockchain technology completely eliminates the intermediaries role, because each transaction is updated concurrently all the related nodes. Therefore, the transaction entries are keeping in the public ledger called Distributed Ledger Technology (DLT). So, both buyers and sellers can know the accuracy and consistency of the secured authenticated transaction without any intermediaries. This is revaluation leads the new concept in the financial market as cryptocurrency. The well-known trigger of cryptocurrency is Bitcoin.
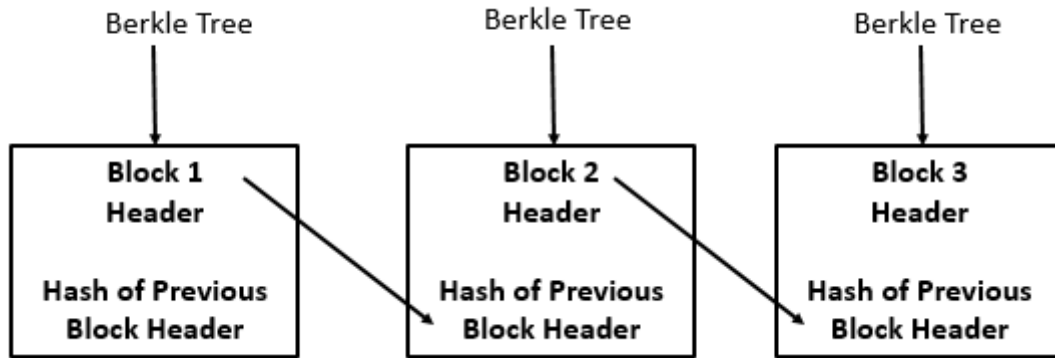
Figure 2 Block chain Structure

In block chain, every block header is storing the merkle root. Each block header stores the previous block header for ensuring any transaction can't allow to modify the block record transaction and proceeding blocks, this is called consensus rule [4]. The consensus rule is applying validation to maintain when several nodes storing the same blocks in the block chain.

Distributed Ledger Technology (DLT)

A ledger is a book where it will keep track of all the financial transactions. This master documentation is vital for understanding entire financial inflow of the transaction. A Distributed ledger is called shared ledger or public ledger. In the technology notions it is known as distributed database storage which keeps all the financial transaction is secured by cryptographic signatures.

Distributed ledger technology (DLT) can fundamentally change the financial sector technology and also did revolution of record storing all the transaction. Distributed ledger is using blockchain technology. It is cryptographically secured, fast and decentralized, there is no central administrator to control the transaction.

Centralized financial system have threat of cyber-attack. These all distributed transactions are in the public witnesses, so making a cyber-attack is very difficult. Once the information is stored in the distributed ledger, it becomes an immutable database and is governed by the consensus rules of the network. Distributed ledger are very difficult to attack because all the distributed copies need to be attack simultaneously for an attack to be successful. Using block chain technology each block header is storing the previous block header information and also all the related transaction nodes are keeping the copy of the transaction. Therefore, DLT technique is used in the Bitcoin cryptocurrency. Distributed ledger technology has great prospective to transform the way governments, institutions, and corporate financial transition work. With the help of Distributed ledger technology governments can collect the tax, issues the passports, land record land registries maintenance, licenses as well as voting procedures. Therefore, recently Dubai like most business oriented countries are keen interest towards block chain technology usage in their future perspective business transaction. DLT could

increase the efficiency of transaction with lower remittance costs, and increases the access to finance for many other consumers, who are currently outside the traditional financial system [10].

Blockchain Technology Application

Blockchain technology applications are software applications are client and server based applications that are stored mostly on cloud computing platforms and that run on multiple systems simultaneously. The systems run on the same network and communicate with each other in an effort to complete a specific task or command.

Now a days many companies in the financial sector are constantly seeking new ways to incorporate ÐApps into their work processes through the blockchain technology. Blockchain technology is very much useful to implementing and improving transparency in the financial transactions which is very much needed and required in of financial regulators.

In 2016 onwards, Google is also working on blockchain-related technology to support its cloud based storage for reassuring protection of customer's information.

World technology leading like IBM engaged 400 Blockchain and Linux based hyper ledger Project, instead of distributed ledger they named as hyper ledger. In the Hyper ledger providing authenticated network with known identities to do transaction. The Bitcoin cryptocurrency is banned by several countries, therefore IBM blockchain alternative for no need of cryptocurrency transaction in their projects [5].

In the Gulf region, the business supreme like Dubai government already join venture with IBM and ConsenSys to streamline ID verification for save the time to start new business registration. In addition it also keen in digitizing and tracking all public health records, civil contract details and other asset transaction [6].

Future scope

Blockchain technology become widely popular due to usage of Bitcoin. On the other hand in past five years countries who banned bitcoin list is continuously increasing. In 2013, the Thailand is a first country banned Bitcoin after that Russia, China, Bangladesh, Vietnam, Sweden, Ecuador, Bolivia and recently India. Even though Bitcoin is banned but technology of blockchain growth is vice versa. The usage of blockchain market in the globe wide is continuously increasing as per given predication of analysis of from 2016 to 2021 shown in figure 3 [9].
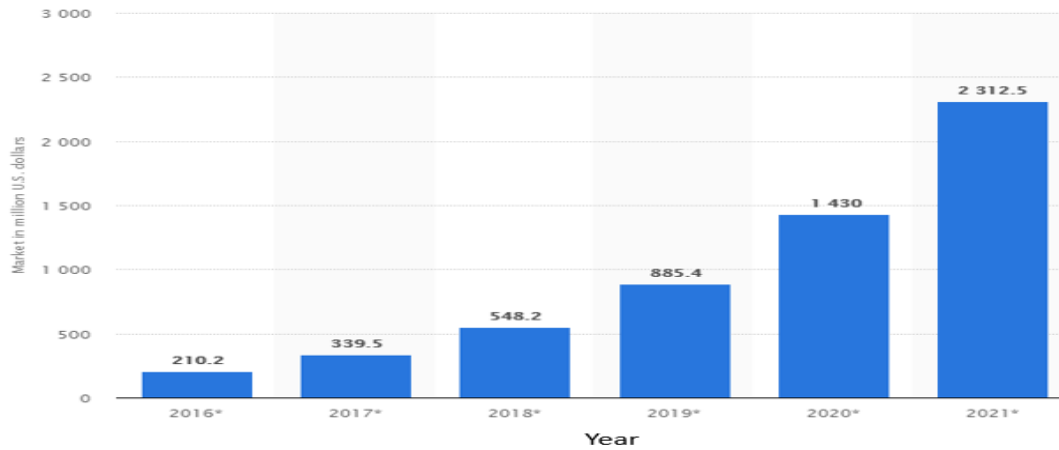
Figure 3- Prediction analysis of worldwide blockchain Market from 2016 to 2021

The impact of market indirectly reflects the blockchain wallet users in worldwide from 2015 to first quarterly 2018 also increasingly shown in the below given figure 4 [9].
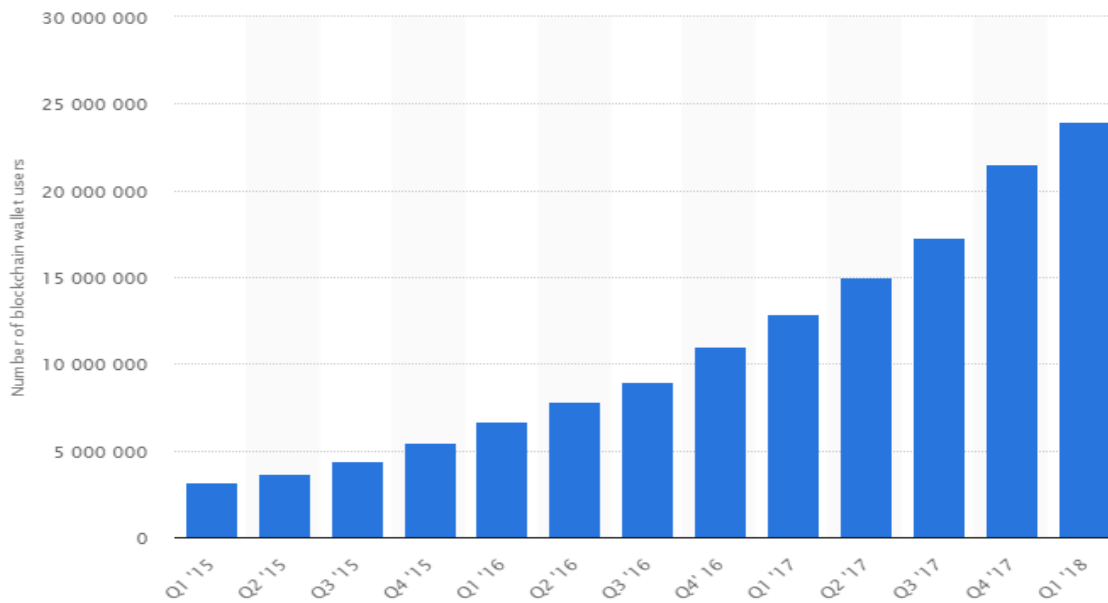

Figure 4. Blockchain Wallet users in worldwide from 2015 to 2018

From 2016 onwards more Indian software startup companies moving towards blockchain technology in various sectors. The below given table shows the brief summary of the Indian startup software industry and their products using block chain technology [8].

As per World Bank as DLT is still emerging, the World Bank Group doesn't have general guidelines and recommendations about its use for international development and implementation. WB is still in discussion with various different financial stockholders. Protection of consumer issues with financial integrity concerns, transaction speed is needed to resolve the new technological issues [11].

Company Name	Solution	Products
Primechain Technologies	banking system collaboration of 27 banks from India and the Middle East, Canada and Singapore	Primechain-KYC, Primechain-CONTRACT, Primechain-LOAN, Primechain API, Primechain-MONEY
Elemential Labs	create a KYC utility by NSE	instant allotment for asset registries, manage royalty payments for media licenses
Sofocle Technologies	enterprise solutions for Smart Contracts, Supply chain, Finance, Insurance, Healthcare, and Manufacturing	helps suppliers avail loan against approved invoices by the manufacturer without paperwork
Cateina Technologies	business process automation	Transactions are guaranteed to be private and encrypted at all times, even when dealing with third-party APIs
KrypC	KrypC has multiple patents in the areas of mobile wallet, digital currency, security and payments solution	KrypC recently released KrypCore, the MVP version of their middleware platform
Signzy Technologies	digital trust solutions based on blockchain and AI	helping customers streamline their identity verification and contract management processes
Accubits Technologies Inc	Accubits is an AI & Blockchain focusing Blockchain-as-a-service platform	iCosys, Reinsurance, BaaS Solutions.

Table 1 – Indian Blockchain Technology Startup Companies Details

In Future the wings of blockchain technology not only open new gateway to financial sector at the same time it will generate new aspects like IOT and Cloud storage and Nano technology in both business world and layman life style.

Conclusion

This paper explained merkle tree concepts and their techniques. The usage of blockchain technology in the secured financial transaction. The vital role of distributed Ledger technology using blockchain technology and how many projects upcoming using this technology in the worldwide. In conclusion the predication analysis shows the optimistic scope of blockchain technology not only in the financial sector and also global level transaction and data storage.

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