iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** I **Month of publication:** January 2022

DOI: https://doi.org/10.22214/ijraset.2022.39833

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue I Jan 2022- Available at www.ijraset.com

Review on Blockchain Technology

Dhansri Sudhir Bawankule[1], Rushikesh Bharatrao Adhau[2], Shyamli Rajesh Deotale[3], Kiran Laxman Pandhare[4], Prof. Priyanka Vikrant Shirbhate[5]
[12, 3, 4]*Students,* [5]*Assistant Professor, Department of Computer Engineering, Government College of Engineering Yavatmal, Maharashtra, India*
Dr. Babasaheb Ambedkar Technological University, Lonere

Abstract: Blockchain is a technology that has the potential to cause big changes in our corporate environment and will have a significant influence over the next few decades. It has the potential to alter our perception of business operations and revolutionise our economy. Blockchain is a decentralised and distributed ledger system that, since it cannot be tampered with or faked, attempts to assure transparency, data security, and integrity.
Only a few studies have looked at the usage of Blockchain Technology in other contexts or sectors, with the majority of current Blockchain Technology research focusing on its use for cryptocurrencies like Bitcoin. Blockchain technology is more than simply bitcoin; it may be used in government, finance and banking, accounting, and business process managementAs a result, the goal of this study is to examine and investigate the advantages and drawbacks of Blockchain Technology for current and future applications. As a consequence, a large number of published studies were thoroughly assessed and analysed based on their contributions to the Blockchain body of knowledge.
Keywords: Blockchain Technology, Bitcoin, Cryptocurrency, Digital currency

I. INTRODUCTION

Blockchain technology is a new computer system that allows for the digital recording and storage of information across numerous computers or nodes. The so-called "Ledger," which is comparable to a relational database Walport, is one of the most significant aspects of Blockchain (2016). A blockchain is a list of encrypted digital records or transactions, each of which is referred to as a block. Each block is then "chained" to the following block in a linear, chronological fashion using a cryptographic signature (Bogart & Rice 2015).

The blocks include a replica of the most recent transactions since the previous block was added (Bogart & Rice 2015). As a result, the shared block, or ledger, is linked to all participants who utilise their computers in a network to check or confirm transactions, eliminating the need for a third-party (Christidis, & Devetsikiotis, 2016; Porru, et. al., 2017).

Blockchain technology is being utilised to encrypt and share data in novel and innovative ways. The absence of a central instance in a dispersed network necessitates a fundamental change to direct interactions between non-intermediaries or intermediary services (Tapscott & Tapscott 2016).

As a result, Blockchain can only be updated by consensus among system members, and a transaction can never be amended or erased (Fanning & Centers 2016). Its distributed database can't be hacked, manipulated, or interrupted like a standard, centralised database with a user-controlled access scheme.

In other words, once data is uploaded to a Blockchain, no one, not even a system administrator, can change or erase anything from the ledger. Since each data block is time stamped and chronologically connected using a cryptographic signature, Walport (2016). Blockchain technology may be used in practically any form of transaction involving value, including money, products, property ownership, medical data, and even voting.

In a blockchain project, there is no need for data transfer; all necessary transaction data will be recorded on the ledger and status will be inferred from it. There is no single point of failure in Blockchain since it is a distributed system with no central control point or authority (Glaser& Bezzenberger 2015; Tapscott & Tapscott 2016) and it is not managed by a single control centre as there may be with a system administration. As a result, there would potentially be no need for an IT specialist to oversee security on a blockchain database in a company.

Regardless of these possibilities, it is critical to remember that Blockchain is a very young technology. As a result, there are just a few cases where the technology has been used Aru (2017). Bitcoins, the most successful use of Blockchain Technology, are a proven example that has shown to be a feasible way in building confidence in a trust-less ecosystem with no central authority.

©IJRASET: All Rights are Reserved

II. LITERATURE REVIEW

A. Concept of Blockchain

Blockchain technology is the concept or protocol that supports the blockchain's operation. Blockchain technology enables cryptocurrencies (digital currency secured by cryptography), such as Bitcoin, in the same way that the internet enables email. Apart from cryptocurrency, the blockchain is an immutable (unchangeable) distributed digital ledger (a digital record of transactions or data held in various locations on a computer network) with a wide range of applications. Two essential blockchain qualities are immutability and distributedness. Because the ledger is immutable, you can always rely on it to be correct. The blockchain's decentralised nature protects it against network threats.On the ledger, each transaction or record is recorded in a "block." Blocks on the Bitcoin blockchain, for example, typically include more than 500 Bitcoin transactions.A block's information is dependent on and related to the information in previous blocks, forming a chain of transactions across time. As a result, the term blockchain was coined.

1) Blockchain, digital currency, cryptocurrency and Bitcoin:

The phrases blockchain, cryptocurrency, and Bitcoin, as well as digital money, are commonly conflated, and they're sometimes incorrectly used interchangeably.

Despite the fact that they're all based on distributed ledger technology, they're all separate entities.

a) Digital money refers to any type of currency that is exclusively available in digital or electronic form and exchanged without the use of an intermediary.

b) Blockchain is the technology that creates a decentralised digital ledger that enables safe, immutable transfers between numerous parties. This encompasses both government-issued and central-bank-issued digital money, as well as cryptocurrencies. Digital money, electronic money, electronic currency, and cyber cash are all terms used to describe digital currency.

c) A digital asset that may be exchanged on a blockchain network is known as cryptocurrency. It is a type of digital money. It is not issued by the government. Consider cryptocurrencies to be private entity or group-issued tokens that may be used to pay for products offered by others on the blockchain network. CoinMarketCap, a market research website, identified 4,993 openly traded cryptocurrencies as of May 2021. Bitcoin was the first cryptocurrency, and it is still the most well-known.

B. How does Blockchain works?

Blockchain consists of three important concepts: blocks, nodes and miners.

Blocks: Every chain is made up of a number of blocks, each of which has three basic components: The data stored within the block. A 32-bit whole number is referred to as a nonce. When a block is built, a nonce is produced at random, and a block header hash is created. The nonce is coupled with a hash, which is a 256-bit integer. It must begin with a large number of zeros (i.e., be extremely small). A nonce creates the cryptographic hash when the first block of a chain is created. Unless it is mined, the data in the block is regarded signed and irrevocably linked to the nonce and hash.

Miners: The technique through which miners add new blocks to the chain is known as mining. Every block on a blockchain has its own nonce and hash, but it also refers to the hash of the block before it in the chain, making block mining challenging, especially on large chains. Miners use specialised software to tackle the challenging mathematical problem of obtaining a valid hash using a nonce. Because the nonce is only 32 bits long and the hash is 256 bits long, there are around four billion nonce-hash combinations to search through before finding the right one.

When this happens, miners are said to have discovered the "golden nonce," and their block is added to the chain. Any change to a block earlier in the chain demands re-mining not only that block, but all following blocks as well. This is why it is so difficult to manipulate blockchain technology. Because discovering golden nonces takes a long time and a lot of computer resources, think of it as "safety in arithmetic." When a block is successfully mined, it is acknowledged by all nodes in the network, and the miner is rewarded economically.

Nodes: Decentralisation is one of the most essential principles in blockchain technology. The entire chain cannot be owned by a single computer or entity. Instead, the nodes that link to the chain form a distributed ledger. Any type of technical equipment that saves copies of the blockchain and keeps the network running is referred to as a node. Every node has its own copy of the blockchain, and in order for the chain to be updated, trusted, and verified, the network must algorithmically approve every freshly mined block. Due to the transparency of blockchains, any transaction in the ledger can be easily inspected and analysed. Each participant is given a one-of-a-kind alphanumeric identification number that is used to keep track of their transactions. The integrity of the blockchain is preserved, and users' trust is developed, by combining public data with a system of checks and balances.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue I Jan 2022- Available at www.ijraset.com

C. How Are Blockchains Used?

The goal of blockchain is to make it possible to record and distribute digital data without the capacity to change it. A blockchain, in this sense, serves as the foundation for immutable ledgers, or transaction records that cannot be modified, deleted, or destroyed. Because of this, blockchains are also known as distributed ledger technology (DLT). The blockchain concept was first published as a research project in 1991, and it was not widely used until 2009, when Bitcoin became the first widely used cryptocurrency. In the years thereafter, the use of blockchains has increased due to the advent of multiple cryptocurrencies, decentralised finance (DeFi) apps, non-fungible tokens (NFTs), and smart contracts.

D. Blockchain Platform

Users and developers can utilise a blockchain platform to build new uses for an existing blockchain infrastructure. Ethereum, for example, has a native cryptocurrency called ether (ETH). However, the Ethereum blockchain also enables for the construction of smart contracts, programmable tokens, and non-fungible tokens, which are utilised in initial coin offerings (ICOs) (NFTs). All of this is implemented on top of the Ethereum architecture and is protected by Ethereum nodes.

E. Pros and Cons of Blockchain

Despite its intricacy, blockchain's potential as a decentralised record-keeping system is practically limitless. Blockchain technology may have benefits beyond those listed above, ranging from increased user privacy and security to reduced processing fees and fewer mistakes. However, there are certain drawbacks.

PROS	CONS
• Increased accuracy by eliminating the need for human verification. • Cost savings by obviating the need for third-party verification. • Decentralization makes tampering more difficult. • Transactions are safe, secure, and quick. • Technology that is transparent.	• Bitcoin mining has a significant technological expense. • Transactions per second are low. • Use in illegal operations, such as on the dark web, in the past. • Regulation differs by jurisdiction and is in flux. • Data storage constraints.

III. BLOCKCHAIN IMPLIMENTATION

A. Healthcare

Healthcare providers may use blockchain to maintain their patients' medical records in a safe manner. When a medical record is created and signed, it may be stored on the blockchain, giving patients confirmation and assurance that the record cannot be altered. These personal health records might be encrypted and saved on the blockchain using a private key, guaranteeing that only specific people have access to them.

B. Property Records

If you've ever visited your local Recorder's Office, you know how inefficient and time-consuming the process of documenting property rights can be. A physical deed is still required to be presented to a government employee at the local recording office, where it is manually put into the county's central database and public index. Property claims must be reconciled with the public index in the event of a property dispute.This procedure is not only costly and time-consuming, but it is also prone to human mistake, with each inaccuracy reducing the efficiency of property ownership monitoring. Scanning papers and hunting down actual files in a local recording office might be obsolete thanks to blockchain. Property owners may trust that their deed is accurate and permanently documented if it is kept and validated on the blockchain.It can be virtually hard to show title of a property in war-torn nations or locations with little to no government or banking infrastructure, and certainly no Recorder's Office. If a group of individuals living in such a region is able to use blockchain, then property ownership may be traced in a transparent and straightforward manner.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

C. Smart Contracts

A smart contract is a piece of computer code that may be incorporated in the blockchain to assist with contract facilitation, verification, or negotiation. For smart contracts to work, users must agree to a set of conditions. The provisions of the agreement are automatically carried out whenever those circumstances are satisfied.A smart contract is a piece of computer code that may be included in the blockchain to help facilitate, verify, or negotiate a contract. For smart contracts to operate, users must agree to a set of conditions.

Whenever such conditions are met, the agreement's obligations are immediately carried out. Let's imagine a potential tenant wants to use a smart contract to lease an apartment. When the renter pays the security deposit, the landlord agrees to provide the tenant the apartment's door code. Both the renter and the landlord would transmit their sections of the agreement to the smart contract, which would keep track of and automatically swap the security deposit door code on the lease's expiration date.

D. Supply Chains

Suppliers may utilise blockchain to track the sources of materials they acquire, similar to the IBM Food Trust example. Companies would be able to validate not just their own products, but also labels such as "Organic," "Local," and "Fair Trade." According to Forbes, the food industry is increasingly utilising blockchain to track the route and safety of food along the farm-to-user journey.

E. Voting

As previously said, blockchain might be utilised to aid in the development of a modern voting system. Voting using blockchain has the power to eliminate election fraud and improve voter turnout, as proved in the November 2018 midterm elections in West Virginia. The use of blockchain in this manner would make tampering with votes very impossible. The blockchain technology will also ensure electoral openness by lowering the number of people required to run an election and giving officials with near-instant results. There would be no need for recounts, and there would be no serious risk that the election would be tainted by fraud.

IV. DISTRIBUTED LEDGER VS BLOCKCHAIN TECHNOLOGY

Because of bitcoin and other cryptocurrencies, blockchain is becoming more popular. Many conventional centralised organisations, like as governments and banks, are becoming interested in blockchain technology.The distributed ledger technology is a new phrase that is making waves in the bitcoin world. Many individuals, however, mix up distributed ledgers and blockchain, and vice versa.

To assist you better grasp the DLT vs blockchain technology comparison, we've outlined some of the distinctive properties of blockchain and distributed ledgers.

A. Structure of the Blocks

The primary contrast between blockchain and distributed ledger systems is their structure. A blockchain is made up of data blocks. This is not, however, the original data format for a distributed ledger. This is because a distributed ledger is just a database that is distributed across several nodes. However, you may represent this data in a variety of ways in each ledger. Furthermore, only once all parties have achieved an agreement will these data be recorded into the ledger. A blockchain is a sort of distributed ledger that is built on a specific set of technologies. After a consensus accepts all of the data, blockchain establishes an immutable ledger of records maintained by a decentralised network. The cryptographic signature and linking of groups of entries in the ledger that creates a chain is a fundamental difference between blockchain and DLT. Furthermore, based on the unique use of blockchain, the public and users have the opportunity to select how a blockchain is organised and administered.

B. The Order of Events

The blocks of blockchain technology are arranged in a certain order. A distributed ledger, on the other hand, does not require a precise data sequence.

C. Work Samples

In the vast majority of instances, blockchains employ the proof of work approach. Other techniques are available, however they frequently use power. Distributed ledgers, on the other hand, do not require this type of consensus, making them more scalable. Blockchain is a subset of distributed ledgers that go beyond the capabilities of traditional DLTs. Proof of work provides a significant contrast between distributed ledger and blockchain.

©IJRASET: All Rights are Reserved

D. Real-World Applications

Implementation is critical when it comes to understanding the differences between blockchain and distributed ledger. Because blockchain is so widely used, it has a plethora of real-world applications, with more being developed all the time. Because so many companies are embracing blockchain technology and progressively incorporating it into their systems, you'll find big brands like Amazon, IBM, and others providing good blockchain as a service solutions. Developers, on the other hand, have just recently started delving into the heart of distributed ledger technology. There are just a few real-world uses for DLTs, despite the fact that there are many distinct types of DLTs in the computer industry. They are, however, still under development, and real-world applications will be available shortly.

E. Tokens

Tokens or currency are not required for distributed ledger technology. Tokens may, however, be necessary to prohibit and detect spam. Anyone may run a node in blockchain technology. Running a full node, on the other hand, demands a huge network, which might be difficult to manage. Token economies are very widespread, and they play a significant part in blockchain technology. On the other side, modern blockchain technology is looking for a way out of the bitcoin shadow.

V. FUTURE SCOPE OF BLOCKCHAIN TECHNOLOGY

A. Application in Digital Advertising
B. Finance implementation
C. Cloud Storage Consolidation
D. Managing the Supply Chain
E. Transforming the Travel Industry
F. Banking and Insurance Implementation
G. Internet of Things (IoT)

VI. CONCLUSION

With so many trials underway in both legacy and new-age firms, stakeholders in all of these industries are eager to incorporate blockchain into their fundamental operations. Not only is distributed ledger technology, particularly Blockchain, transforming the monetary industry, but it is also making the financial system more transparent. Despite the fact that the technology has yet to provide tangible effects in many situations, engineers, developers, and industry stakeholders are ecstatic. The blockchain's future will not be restricted to cryptocurrency. Despite the fact that the crypto industry will increase by several orders of magnitude, blockchain developers will have new chances in several extremely fascinating domains.

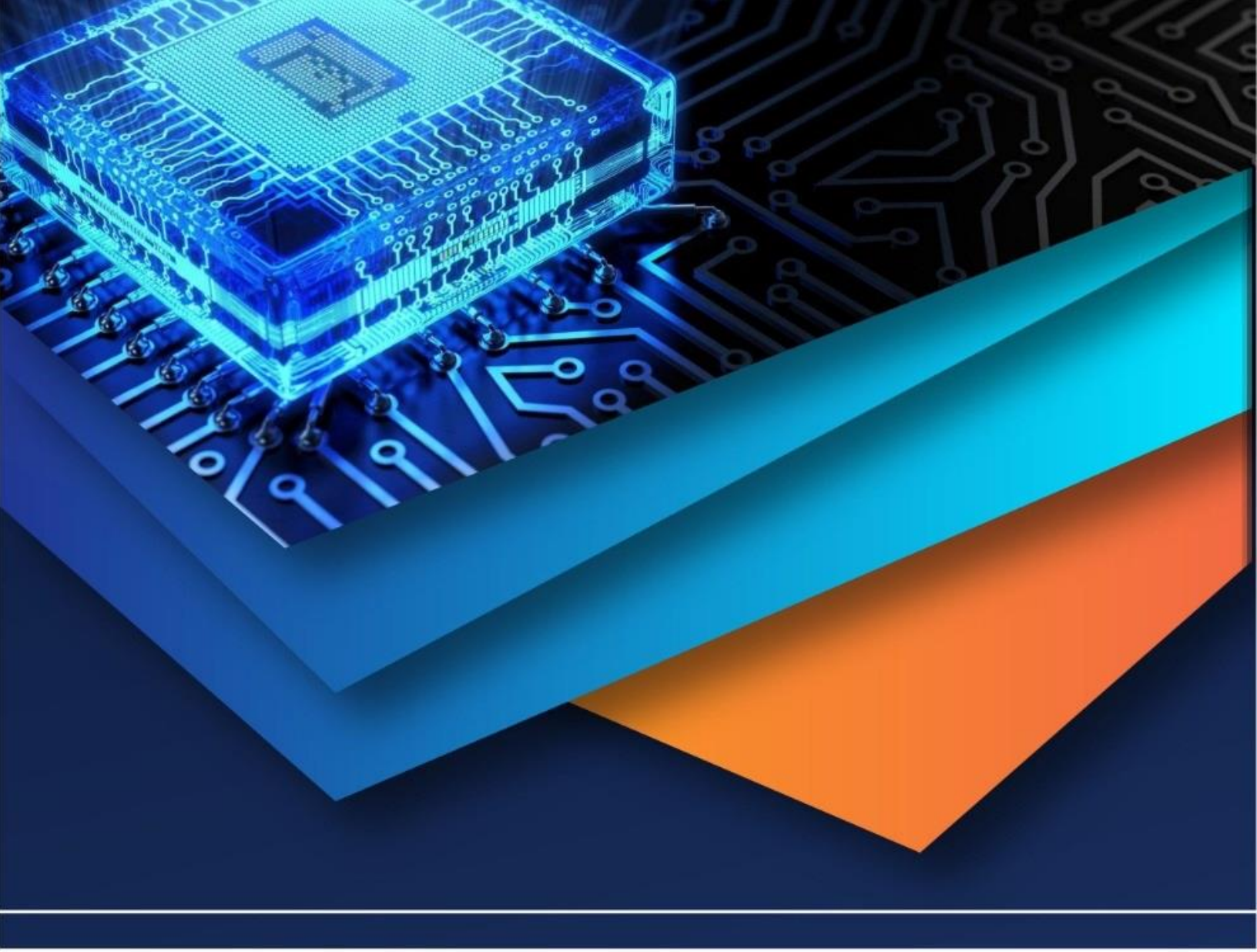
VII. ACKNOWLEDGEMENT

We'd like to extend our deepest appreciation to everyone who helped with the research for this project; without their active participation, the project would not have been completed in the time period given. Prof. Sudesh Bachwani, our esteemed professor has inspired and directed us to accomplish this assignment with total focus and attention.We are also grateful to my project guide Lecturer, who has been really supportive and patient with us during this project and has assisted us in completing it.

REFRENCES

[1] Bellare, Mihir; and Rogaway, Phillip. (September 21, 2005). “Introduction.” In Introduction to Modern Cryptography (p. 10).
[2] DeRose, Chris (26 June 2015). "Why the Bitcoin Blockchain Beats Out Competitors". American Banker. Archived from the original on 30 March 2016. Retrieved 18 June 2016.
[3] Kumar, Randhir; Tripathi, Rakesh (November 2019). "Implementation of Distributed File Storage and Access Framework using IPFS and Blockchain". 2019 Fifth International Conference on Image Information Processing (ICIIP). IEEE: 246–251.
[4] Casey, Michael J. (15 April 2015). "Moneybeat/BitBeat: Blockchains Without Coins Stir Tensions in Bitcoin Community". The Wall Street Journal. Archived from the original on 10 June 2016. Retrieved 18 June 2016.
[5] Burchardi, K.; Harle, N. (20 January 2018). "The blockchain will disrupt the music business and beyond". Wired UK. Archived from the original on 8 May 2018. Retrieved 8 May 2018.
[6] "Blockchain reaction: Tech companies plan for critical mass" (PDF). Ernst & Young. p. 5. Archived (PDF) from the original on 14 November 2016. Retrieved 13 November 2016.
[7] Steve Davies (2018). "PwC's Global Blockchain Survey". Financial Website. SourceMedia. Retrieved 1 February 2021.
[8] Michael Castillo (16 April 2019). "blockchain 50: Billion Dollar Babies". Financial Website. SourceMedia. Retrieved 1 February 2021
[9] Katie Martin (27 September 2016). "CLS dips into blockchain to net new currencies". Financial Times. Archived from the original on 9 November 2016. Retrieved 7 November 2016.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)