Blockchain: Wheels of the New Internet

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Abstract: **We are on the threshold of Internet revolution. Blockchain will be backbone of this new generation of Internet or Internet 3.0. Internet as we know for now i.e Internet 2.0 is highly flawed because of it's centralized nature. Due to centralization, few tech giants control most the Internet. Insufficient Authentication Controls, Cross Site Scripting, Phishing attacks, information leaks, security breaches, etc are some of the major shortcomings of current Internet. Blockchain powered internet endeavours to outstrip this shortfalls via it's decentralized, neutral, auditable and transnational nature. A blockchain is basically a time-stamped series of entrenched records of data. This data is superintended by bunch of computers which is not administered by a single entity. Blockchain, it's future and it's applications has started becoming more apparent after the introduction of technology in field of cryptocurrency. Blockchain has proven to have numerous applications in fields of finance, health, data storage, privacy and security, supply chain monitoring, real estate and education. Currently, interoperability and scaling are major milestones needed to be overcome by this wheels of the new internet. This paper attempts to explain the newfangled technology, explore it's architecture, recent advancements and applications. At the end, we made an attempt to conclude our findings and research data.**

Keywords— Blockchain Technology, Decentralized, Cryptography

I. INTRODUCTION

The concept of blockchain is gaining popularity due to its advantages over traditional methods we use today in many fields where network connection or security is important. In a blockchain based application all records ie. Data are licked with each other using cryptography.

A blockchain-like protocol was first proposed by David Chaum in his 1982 dissertation "Computer Systems Established, Maintained, and Trusted by Mutually Suspicious Groups."
In today's day and age we all relay on internet for a lot of things, having a more secure, encrypted, reliable internet is a benefit for all. The blockchain technology has characteristics, like decentralization, immutability, and transparency it helps for achieving greater growth potential in various fields.

The internet as we know today is decentralized but still many aspects in system depends on large centralized databases. The traditional Internet service has three groups: users, big corporations and the centralized database. Using blockchain based applications and services truly decentralizes every aspect in the system.

Parts of Blockchain:

1.Node - user in the blockchain based system
2.Transaction - building block of a blockchain based system.
3.Block - structure of data to keep tranctions in well distributed fashion
4.Chain - sequence of blocks in required order

Key Characteristics of Blockchain:

A. **Decentralization**
B. **Persistency**
C. **Anonymity**
D. **Auditability**

Applications:
The maximum attention given by media and news towards this technology is about development of cryptocurrencies. There are also blockchain-based applications in industry and the public sector like crowdfunding, tracking of goods in supply chains.
Here are a few more applications:

a) **Decentralized naming systems**
b) **Decentralized Email**
c) **Blockchain for the Internet-of-Things (IoT)**
d) **Blockchain-based Content Distribution**
e) **Distributed Cloud Storage**
f) **Cybersecurity**
g) **Finance**

II. PROPOSED METHODOLOGY

This paper is an analytic research on how Blockchain technology can aid the development of new era of internet and amenity provided by the net. We observed from various research papers and from web that the wave of this blockchain technology will potentially have a large impact in every edge of the industry. This technology has great transformative potential in the future. The recent trend of the technology being adopted by various industries has been rescued via Journals and research papers.

Blocks of Blockchain:

Every block in a blockchain contains hash value of previous block, data or information of transaction, and it's own hash value. Hash uniquely identifies information present in a block and is assigned on basis of data in block. If, someone tries to change data in one block, the hash value for that block will also change thus, modification of hash value of next block and will also be required. So, entire blockchain would be needed to alter which is practically impossible because of extremely high computation needs.
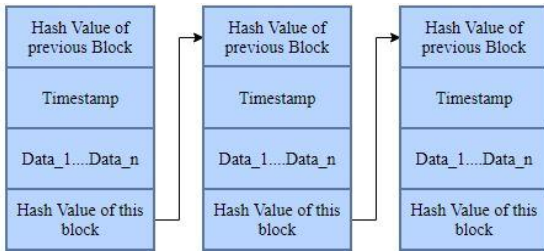
FIGURE 1. Structure of the Blocks in blockchain and how a block is linked to another block through hash value.

The algorithm for the process can be outlined as follows:
Step 1: Start.

Step 2: New Transaction is requested.

Step 3: Creation of a new block representing this transaction.

Step 4: This block is then sent over to each and every node across the network.

Step 5: The nodes in the network checks accuracy of the transaction or in other word validates the transaction.

Step 6: After validation, the newly created block with transaction data is added into the existing blockchain structure.

Step 7: Process is completed. Exit.

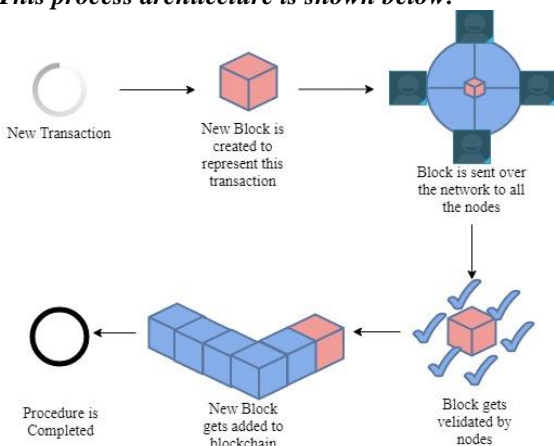*This process architecture is shown below:*

FIGURE 2. Architecture of Transaction process in Blockchain.

III. LITERATURE SURVEY

Since, Blockchain Technology started becoming apparent and gaining momentum since last decade, the studies, reports, experiments and texts about the application of technology is deficient, even so, there exists some potent, gripping and propitious papers, ideas and proposals that we want to bring to the light.

Stephan Leible, Steffen Schlager , Moritz Schubotz and Bela Gipp [2],paper showed an analysis on how blockchain technology can aid expansion and development of open sciences. For this they compared the characteristics of blockchain technology with requirements of open science in order to prove how technology suits as an infrastructure. According to the researchers, since, main purpose of open science is to share knowledge and it's results to a broader group of audience or to everyone. To do so, public blockchain meets the requirements of open science infrastructure rather than a private blockchain. Conclusion was reached by comparing governance models and consensus mechanisms. The decentralised feature of blockchain technology assists the cumulative co-ordinated nature of open sciences. Cryptographic hashing, a consensus mechanism, and decentralization in combination guarantee the immutability of a blockchain[2]. This immutable nature of BT prevents the suppression of data. Most of the projects analysed by researchers showed that BT technology can be used to improve quality of various factors like trustability, workflows, transparency, reproducibility, and collaborations. The others offer specific mechanisms that are promising for improving processes in science[2].

*Tudor Gabriel, Andrei Cornel – Cristian, Madalina Arhip-Calin, Alexandru Zamfirescu[3],*authors analysed through doing comparison between centralized solutions versus decentralized cloud storage solutions using Blockchain technology .It been proposed that introduction of BT in Smart Energy Grid infrastructure will tweak the mechanism by eliminating need of storing information at a central location which can lead to malicious practises like modifying data through unauthorized channels and user privacy disclosure behaviours. Blockchain eliminates the need verify both buyer and seller. The verification of new data block by all the present nodes, replication of information and synchronization among nodes makes system more efficient in long run. The comparison between traditional centralised cloud storage solutions like Amazon Web Services (AWS) and BT based decentralized Ethereum Swarm manifests how BT based Ethereum Swarm overcomes drawbacks like Single point of failure, security breach and limited storage capacity of Amazon Servers. Ethereum Swarm is a solution under development and it is not suitable for production purposes but it represents a building block for the Ethereum blockchain vision together with Contracts to form a decentralized logic, Swarm decentralized storage and Whisper decentralized messaging [3].

Zibin Zheng and Shaoan Xie, Hong-Ning Dai, Xiangping Chen, Huaimin Wang [8], researchers observed that BT have tons of application in fields of Finance, Internet of Things(IOT), Reputation Systems and Public and social services. In financial sector, blockchain has the potential to disrupt the world of banking[8]. The process of exchange of money and updation of accounts can be refined. BT can reduce risks on use of assets to secure a loan. In addition to the evolution of financial and business services, blockchain can help traditional organisations to complete the enterprise transformation smoothly[8]. BT can aid development of

peer to peer financial market. IoT services faces a major security and privacy deterrence issue. With elimination of 3rd party for verification and substantiation, privacy can be improved. Furthermore, due to Autonomous Decentralised Peer-to-Peer Telemetry (ADEPT)[8], a system based on BT, IoT based home appliances would be able to identify operational problems and retrieve software updates on their own[8]. In Public and social services sector the researchers suggest how the process of land registration wherein crucial information such as topography, physical status, related rights to the land can be uploaded on blocks and and any changes to any of these status can be updated accordingly. Since, BT provides transparency, whole process can be more efficient. Again, it's been proposed in paper to award solar energy producers with solarcoin (a digital currency) for generating and using green energy thereby, saving energy and promoting use of green energy. Apart from these, blockchain can be used to secure internet infrastructure such as DNS and identities[8]. Blockchains can also be used for other public services such as marriage registration, patent management and income taxation systems[8].

IV. CONCLUSION

The main motivation of this paper is to highlight the advantages of blockchain over traditional services. In many occasions we have seen how centralized systems work so they get the maximum benefit in any kind of situation. Blockchain based applications remove any power concentration any user or part of system possibly have.

A decentralized system gives everyone part of the system equal access to all resources and that is what we also promote. Blockchain is a emerging technology which will create more secure and reliable services. It is still in its growth period and there is a promising future for the technology.

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