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THE BLOCKCHAIN TECHNOLOGY: NEW FUTURE OF COMPUTATION

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ABSTRACT

Blockchain has various advantages like decentralization, persistency, secrecy and auditability. There is a wide range of blockchain applications going from digital currency, monetary administrations, hazard the board, web of things (IoT) to public and social administrations. Albeit various investigations center around utilizing the blockchain innovation in different application angles, there is no complete overview on the blockchain innovation in both mechanical and application viewpoints. To fill this hole, a thorough overview on the blockchain innovation. Specifically, this paper gives the blockchain scientific categorization, presents commonplace blockchain agreement calculations, surveys blockchain applications and examines specialized difficulties just as late advances in handling the difficulties. In addition, this paper likewise brings up the future headings in the blockchain innovation.

Keywords: Blockchain, Bitcoin, Cryptocurrency, IoT, Internet of Things, Ethereum.

1. INTRODUCTION

Recently, crypto currency has pulled in broad considerations from both industry and the scholarly world. Bitcoin that is frequently called the primary digital money has delighted in a gigantic accomplishment with the capital market arriving at 10 billion dollars in 2016 (Coindesk, 2016).

The blockchain is the center system for the Bitcoin. Blockchain was first proposed in 2008 and executed in 2009 (Nakamoto, 2008). Blockchain could be viewed as a public record, in which all dedicated exchanges are put away in a chain of squares.

This chain constantly develops when new squares are added to it. The blockchain innovation has the key attributes, like decentralization, persistency, anonymity and auditability. Blockchain can work in a decentralized climate, which is empowered by coordinating a few center advances like cryptocurrency hash, computerized signature (in view of topsy-turvy cryptography) and appropriated agreement instrument. With blockchain innovation, an exchange can happen in a decentralized design. Therefore, blockchain can significantly save the cost and improve the productivity. Despite the fact that Bitcoin is the most well-known application blockchain application, blockchain can be applied into assorted applications a long ways past cryptographic forms of money. Since it permits installments to be done with no bank or any middle person, blockchain can be utilized in different monetary administrations like computerized resources, settlement and online installment (Peters et al., 2015; Foroglou and Tsilidou, 2015). Furthermore, blockchain innovation is getting perhaps the most encouraging advancements for the up and coming age of web collaboration frameworks, like brilliant agreements (Kosba et al., 2016), public administrations (Akins et al., 2013), web of things (IoT) (Zhang and Wen, 2015), notoriety frameworks (Sharples and Domingue, 2015) and security administrations (Noyes, 2016).

2. BLOCKCHAIN ARCHITECTURE

The blockchain is a succession of squares, which holds a total rundown of exchange records like customary public record (Lee KuoChuen, 2015). Figure 1 shows an illustration of a blockchain. Each square focuses to the promptly past block by means of a reference that is basically a hash estimation of the past block called parent block. It is important that uncle blocks (offspring of the square's precursors) hashes would likewise be put away in ethereumblockchain (Buterin, 2014). The main square of a blockchain is called beginning square which has no parent block.

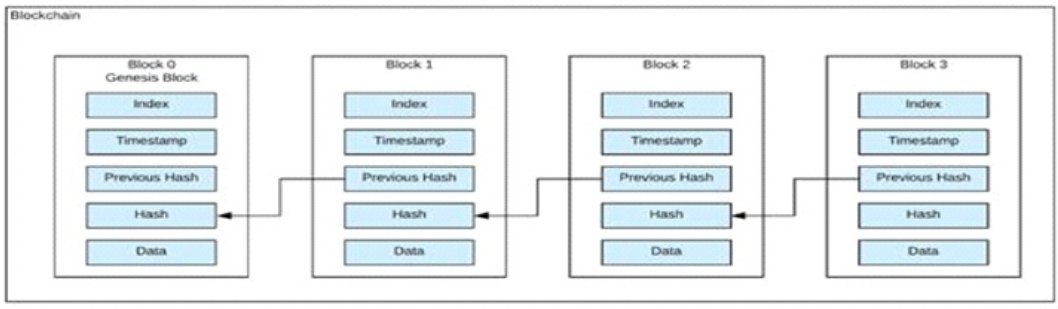

Figure 1: an example of blockchain which consists of a continuous sequence of blocks

2.1 BLOCK

A block consists of the block header and the block body. In particular, the block header includes:

1. Block version: indicates which set of block validation rules to follow.
2. Parent block hash: a 256-bit hash value that points to the previous block.
3. Merkle tree root hash: the hash value of all the transactions in the block.
4. Timestamp: current timestamp as seconds since 1970-01-01T00:00 UTC.
5. nBits: current hashing target in a compact format.
6. Nonce: a 4-byte field, which usually starts with 0 and increases for every hash calculation.

2.2 DIGITAL SIGNATURE

Each user owns a pair of private key and public key. The private key is used to sign the transactions. The digital signed transactions are spread throughout the whole network and then are accessed by public keys, which are visible to everyone in the network.

2.3 KEY CHARACTERISTICS OF BLOCKCHAIN

In summary, blockchain has following key characteristics:

2.3.1 Decentralization- In ordinary incorporated exchange frameworks, every exchange should be approved through the focal confided in organization (e.g., the national bank) unavoidably coming about the expense and the exhibition bottlenecks at the focal workers. In an unexpected way, an exchange in the blockchain organization can be directed between any two friends (P2P) without the verification by the focal office. As such, blockchain can altogether lessen the worker costs (counting the advancement cost and the activity cost) and moderate the presentation bottlenecks at the focal worker.

2.3.2 Persistency- Since every one of the exchanges spreading across the organization should be affirmed and recorded in blocks dispersed in the entire organization, it is almost difficult to alter. Moreover, each communicated square would be approved by different hubs and exchanges would be checked. So any misrepresentation could be distinguished without any problem.

2.3.3 Anonymity- Every client can collaborate with the blockchain network with a produced address. Further, a client could create numerous delivers to stay away from character openness.

There could be not, at this point any focal gathering keeping clients' hidden data. This system safeguards a specific measure of security on the exchanges remembered for the blockchain. Note that blockchain can't ensure the ideal security protection because of the inherent requirement

2.3.4 Auditability- Since every one of the exchanges on the blockchain is approved and recorded with a timestamp, clients can undoubtedly confirm and follow the past records through getting to any hub in the dispersed organization. In Bitcoinblockchain, every exchange could be followed to past exchanges iteratively. It improves the detectability and the straightforwardness of the information put away in the blockchain.

3. APPLICATIONS OF BLOCKCHAIN

There is a diverse of applications of blockchain technology. In this section, we summariseseveral typical applications of blockchain.

3.1 Financial administrations- The crisis of blockchain frameworks like Bitcoin (Nakamoto, 2008 and Hyperledger, 2015) colossally affects customary monetary and business administrations. Peters et al. (Peters and Panayi, 2015) examined that blockchain can possibly upset the universe of banking. Blockchain innovation could be applied to numerous spaces including clearing and settlement of monetary resources and so on In addition, Morini (2016) showed that there are genuine business cases like collateralisation of monetary subsidiaries that could use blockchain to decrease expenses and dangers. Blockchain has likewise grabbed huge eye according to enormous programming organizations: Microsoft Azure (purplish blue, 2016) and (ibm, 2016) are starting to offer Blockchain-as-a-Service.

3.2 Internet of things (IoT)- Internet of things (IoT), quite possibly the most encouraging data and correspondence advancements (ICT), is increase as of late. IoT is proposed to incorporate the things (likewise named keen articles) into the web and furnishes clients with different administrations (Atzori et al., 2010; Miorandi et al., 2012). The normal executioner utilizations of IoT incorporate the calculated administration with Radio-Frequency Identification (RFID) innovation (ISO, 2013), keen homes (Dixon et al., 2012), e-wellbeing (Habib et al., 2015), shrewd lattices (Fan et al., 2013), Maritime Industry (Wang et al., 2015), and so on

3.3 Land Registration- One of the normal blockchain applications in broad daylight administrations is the land enlistment (NRI, 2015), in which the land data, for example, the actual status and related rights can be enrolled and plugged on blockchains. Furthermore, any progressions made on the land, like the exchange of land or the foundation of a home loan can be recorded and overseen on blockchains therefore improve the productivity of public administrations.

3.4 Free-speech right- Besides, blockchain can be utilized to get web framework like DNS and characters. For instance, (Namecoin, 2014) is a test open-source innovation that improves decentralization, security, restriction obstruction, protection, and speed of DNS and personalities (Namecoin, 2014). It Protects free-discourse rights online by making the web more impervious to control. Blockchains can likewise be utilized for other public administrations like marriage enlistment, patent administration and pay tax collection frameworks (Akins et al., 2013). In the new open administrations incorporated with blockchains, cell phones with advanced mark inserted may supplant seals to be appended on records, which are submitted to managerial offices. Thusly, broad administrative work can be extraordinarily saved.

4. CONCLUSION

The blockchain is highly appraised and endorsed for its decentralised infrastructure and peer-to-peer nature. However, many researches about the blockchain are shielded by Bitcoin. But blockchain could be applied to a variety of fields far beyond Bitcoin. Blockchain has shown its potential for transforming the traditional industry with its key characteristics: decentralisation, persistency, anonymity and auditability. This paper present a comprehensive survey on the blockchain.

REFERENCES

Akins, B.W., Chapman, J.L. and Gordon, J.M. (2013). A Whole New World: Income Tax Considerations of the Bitcoin Economy.

Antshares. (2016). Antshares Digital Assets for Everyone, https://www.antshares.org.

Atzori, L., Iera, A. and Morabito, G. (2010). 'The internet of things: a survey', Computer Networks, Vol. 54, No. 15, pp.2787–2805.

Axon, L. (2015). Privacy-Awareness in Blockchain-based PKI, CDT Technical Paper Series.

Azure (2016). Microsoft Azure: Blockchain as a Service, at https://azure.microsoft.com/enus/solutions/blockchain/

Barcelo, J. (2014). User Privacy in the Public BitcoinBlockchain. Bentov, I., Lee, C., Mizrahi, A. and Rosenfeld, M. (2014) 'Proof of activity: extending Bitcoin's proof of work via proof of stake [extended abstract]', ACM SIGMETRICS Performance EvaluationReview, Vol. 42, No. 3, pp.34–37.

Billah, S. (2015). One Weird Trick to Stop Selfish Miners: Fresh Bitcoins, Solution for the Honest Miner.

Biryukov, A., Khovratovich, D. and Pustogarov, I. (2014) 'Deanonymisation of clients in bitcoin p2p network', Proceedings of the 2014 ACMSIGSAC Conference on Computer and CommunicationsSecurity, New York, NY, USA, pp.15–29.

Bonneau, J., Narayanan, A., Miller, A., Clark, J., Kroll, J.A. and Felten, E.W. (2014). 'Mixcoin: Anonymity for bitcoin with accountable mixes', Proceedings of International Conference on Financial Cryptography and Data Security, Berlin, Heidelberg, pp.486–504.

Bruce, J. (2014). The Mini-Blockchain Scheme, http://cryptonite.info/files/mbc-scheme-rev3.pdfburstcoin (2014) Burstcoin.

Buterin, V. (2014). A Next-Generation Smart Contract and Decentralized Application Platform, White Paper.

Buterin, V. (2015). On Public and Private Blockchains, https://blog.ethereum.org/2015/08/07/onpublic-and-private-blockchains/.

Chepurnoy, A., Larangeira, M. and Ojiganov, A. (2016). A Prunable Blockchain Consensus Protocol based on Non-Interactive Proofs of Past States Retrievability, arXiv preprint arXiv:1603.07926.

Christidis, K. and Devetsikiotis, M. (2016). 'Blockchains and smart contracts for the internet of things', IEEE Access, Vol. 4, pp. 2292–2303.