

Blockchain Technology

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ABSTRACT

A blockchain is a growing list of records called blocks, which are linked using cryptography. This paper introduces typical blockchain consensus algorithms, reviews blockchain applications and discusses technical challenges as well as recent advances in tackling the challenges. Moreover, this paper also points out the future directions in the blockchain technology.

Keywords: Blockchain Technology, Transaction, Block

1. INTRODUCTION

Blockchain being relatively a new technology. Blockchain is the technology behind Bitcoin crypto-currency system. Blockchain was first proposed in 2008 and implemented in 2009. Blockchain could be regarded as a public ledger, in which all committed transactions are stored in a chain of blocks. This chain continuously grows when new blocks are appended to it. Although Bitcoin is the most famous application blockchain application, blockchain can be applied into diverse applications far beyond cryptocurrencies. Since it allows payments to be finished without any bank or any intermediary, blockchain can be used in various financial services such as digital assets, remittance and online payment. Starting from the early work in this field. Different types of usage of Blockchain and other digital ledger techniques, their challenges, applications, security and privacy issues were investigated.

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2. Literature Survey

The application of the Blockchain concept and technology has grown beyond its use for Bitcoin generation and transactions. Our study includes future of blockchain, challenges of blockchain, technology fundamentals of blockchain with example. Our study included some limitations of blockchain like usability, security, wasted resources etc. The Blockchain has been especially identified to be suitable in developing nations where ensuring trust is of a major concern thus the invention of the Blockchain can be seen to be a vital and much needed additional component of the Internet that was lacking in security and trust before.

3. Technology Fundamentals of Blockchain

A Blockchain comprises of two different components, as follows:

1. Transaction: A transaction, in a Blockchain, represents the action triggered by the participant.
2. Block: A block, in a Blockchain, is a collection of data recording the transaction and other associated details such as the correct sequence, timestamp of creation, etc. The Blockchain can either be public or private, depending on the scope of its use

4. How Blockchain transactions takes place, using a step-by-step example.

Bob is going to transfer some money to Alice. Once the monetary transaction is initiated and hence triggered by Bob, it is represented as a "transaction" and broadcast to all the involved parties in the networks. The transaction now

has to get "approval" as being indeed "valid" by the Blockchain eco-system. Transactions once approved as valid along with the hash of the succeeding block are then fed into a new "block" and communicated to all the participating nodes to be subsequently appended to the existing chain of blocks in the Blockchain digital ledger.

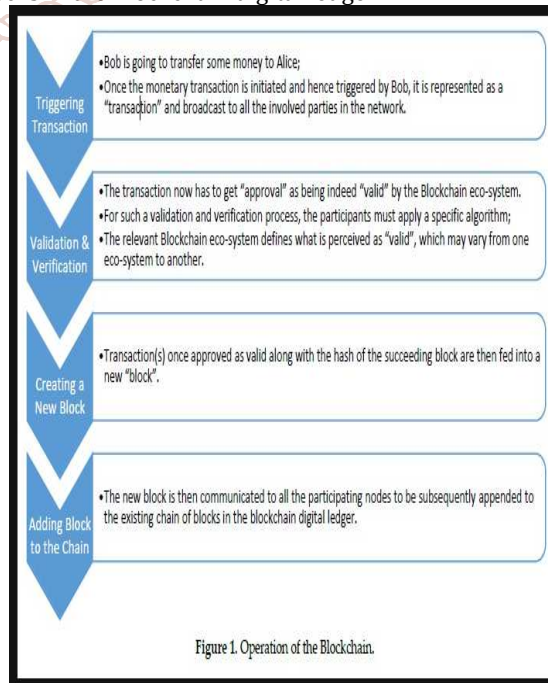


Figure 1. Operation of the Blockchain.

5. Limitations

- **Security:** The current Blockchain has a possibility of a 51% attack. In a 51% attack a single entity would have full control of the majority of the network's mining hash-rate and would be able to manipulate Blockchain. To overcome this issue, more research on security is necessary.
- **Wasted resources:** Mining Bitcoin wastes huge amounts of energy (\$15million/day). The waste in Bitcoin is caused by the Proof-of-Work effort. There are some alternatives in industry fields, such as proof-of-stake. With Proof-of-Work, the probability of mining a block depends on the work done by the miner. The issue with wasted resources needs to be solved to have more efficient mining in Blockchain.
- **Usability:** The Bitcoin API for developing services is difficult to use. There is a need to develop a more developer-friendly API for Blockchain.

6. Blockchain for International Development

According to MERL Tech DC 2018 conference held on Sept. 7, 2018 and led a session related to the creation of a learning agenda to help MERL practitioners gauge the value of blockchain technology for development programming.

As a trio of monitoring, evaluation, research, and learning (MERL) practitioners in international development, we are keenly aware of the quickly growing interest in blockchain technology. Blockchain is a type of distributed database that creates a nearly unalterable record of cryptographically secure peer-to-peer transactions without a central, trusted administrator. While it was originally designed for digital financial transactions, it is also being applied to a wide variety of interventions, including land registries, humanitarian aid disbursement in refugee camps, and evidence-driven education subsidies. International development actors, including government agencies, multilateral organizations, and think tanks, are looking at blockchain to improve effectiveness or efficiency in their work.

7. Some blockchain predictions for 2019

[Resource-Google]

1. According to Deloitte's 2018 Global Blockchain Survey, companies are starting to move from proof-of-concept projects to real-world applications. There will be a

particular focus on discovering not just where blockchain could fit, but to find places where it is the best fit.

2. 2019 should see blockchain adoption on a broader scale as an increasing number are seeing that such technology will provide benefits for their companies as well. As the question moves from 'What is blockchain?' to 'How can we use blockchain technology?', we can expect more businesses to enter the blockchain space.
3. 2019 will be a year where the industry will shift its focus toward the real-world problems that blockchain technology could solve, with the goal of making "incremental and necessary changes to operations".
4. In 2019 we will see a growing number of new projects and new platforms continue to emerge. Developers and the innovative projects they work on will continue to advance blockchain capabilities, by creating ground breaking proofs-of-concept and building and achieving product-market use cases. In 2019 we will see a growing number of new projects and new platforms continue to emerge. Developers and the innovative projects they work on will continue to advance blockchain capabilities, by creating ground breaking proofs-of-concept and building and achieving product-market use cases.

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