Chapter 1
A Holistic View on Blockchain and Its Issues

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ABSTRACT

Blockchain, the technology behind most popular cryptocurrency Bitcoin and Ethereum, has attracted wide attention recently. It is the most emerging technology that has changed the financial and non-financial transaction system. It is omnipresent. Currently, this technology is enforcing banks, industries, and countries to adopt it in their financial, industrial, and government section. Earlier, it solved the centralize and double-spending problems successfully. In this chapter, the authors present a study of blockchain security issues and its challenges as well. They divided the whole chapter into two parts. The primer part covers a holistic overview of blockchain followed by the later section that argues about basic operations, 51% attack, scalability issue, Fork, Sharding, Lightening, etc. Finally, they mention an intro about its adaptation (financial or non-financial) in our 24/7 life and collaboration with fields like IoT.

INTRODUCTION

Blockchain is a neoteric technology that promises to shift routine activities from central parties to the actual users (decentral parties). It is seen as significantly for making systems more transparent and decentralised, an innovation through peer-to-peer architecture and cryptographic methods that should make middle intermediaries unnecessary and empowered individuals. All entries in the ledger are immutable. Blockchain advantages force businesses, banks, and various other fields towards decentralization. Also, the potential of blockchain is far beyond and higher than any buzz and it will change society by enabling trust among them.

Decentralization has various positive aspects over centralized and distributed systems. The centralized system has central dependency which affects the overall system if the central hub fails. To get rid of the dependency on single-point failure different nodes are empowered and made self-dependent. These participants or nodes of the system participate and work collectively to share, verify and build trust in the overall system (Yli-Huumo,Ko,Choi, Park, & Scotlander, 2016).

The objective of the research to explore various aspects of blockchain. We have tried to cover holistic view by encompassing vital sections of blockchain like different consensus mechanism, issues, and challenges in detail.

The Chapter is divided into four major sections. first section introduces the basic characters along with the difference with relative terms. Second sections shed light on working, types, and consensus mechanism. Third section issues and challenges in detail. And lastly, issues are mentioned specific to blockchain applications.

1.1. Characteristics of Blockchain

a). **Trust:** One of the main characteristics of blockchain, which is mainly invoked by decentralization architecture of the system. The trust factor means not trusting anyone in the system. It eradicates the role of the third party from the system and only the involved user has the power to move their asset and makes the system transparent. The evolution of the internet has failed to solve the trust factor but blockchain does successfully.

b). **Shared and Public:** In order to ensure transparency, the ledger is kept public. Every stakeholder has a copy of the ledger. Manipulation in the ledger transaction can be easily identified. A change in the single entry will change the hash of not only the current block but also changes the hash of the previous block. For example, in the Banking system, the complete ledger is maintained by banks or government bodies and kept privately. Now due to blockchain this ledger does not involve any bank or government authorities. All entries are kept public and any peer can directly connect to the ledger and check the validity of transactions.

c). **Peer verification:** Firstly, the new user's identity is verified using an authenticated process. Once the node becomes part of the system, it has access to viewing the blockchain. Any transaction initiated is checked and verified by another peer node in the transaction and then only added to the ledger. After all, the participants have been empowered to check the verification of the transaction as the distributed ledger of the system is shared among all.

d). **Immutability:** The transactions or data saved in blockchain remains unaltered and indelible. This feature of blockchain makes the system incredible. Blockchain, instead of relying on the central authority ensures the transaction with the help of peer nodes. The process of verification includes

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