Chapter 46
Conceptual Insights in Blockchain Technology: Security and Applications

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ABSTRACT

The global popularity of digital cryptocurrencies and research in a decentralized system have led to the foundation of blockchain, which is fundamentally a public digital ledger to share information in a trustworthy and secure way. The concept and applications of blockchain have now spread from cryptocurrencies to various other domains, including business process management, smart contracts, IoT, and so on. Cryptocurrency is a mechanism designed to work for the online secure payments system using cryptography. Cryptography maintains confidentiality, integrity, and authentication. Cryptocurrency has come as a novel way of making payments that keep all the transactions secure and safe, which avoids any type of intermediaries such as a bank. This chapter will shed light on the concept of blockchain technology, security, and its applications in various domains.

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INTRODUCTION

The system refers to organisation of different elements which collectively works for a common purpose. In the case of database and computer networking environment, this can be categorised in three basic types as Centralized System, Decentralised System, and Distributed System.

Centralized System: A centralized system has complete reliance on single point which could be turn out to be a complete failure for all associated system if the single point failures occur. Fig. 1 refers to the schematic diagram of centralized system (J. Yli-Huumo, et al., 2016).

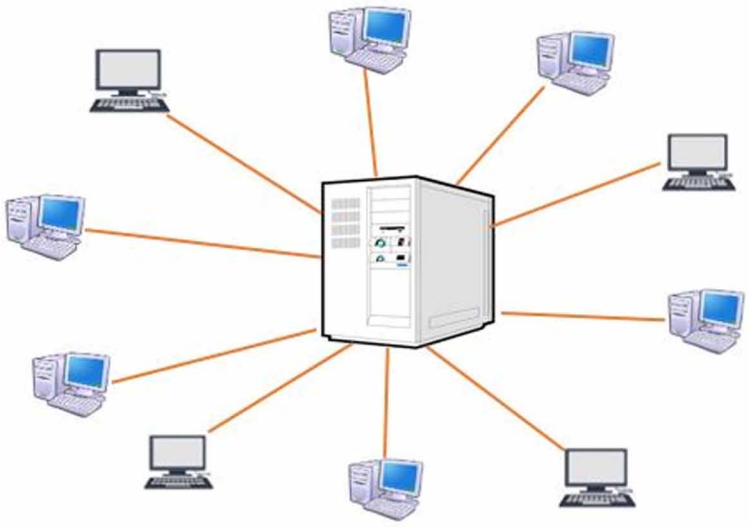
Decentralised System: A decentralised system don't have any central authority in this system each node can take independent decisions. Decentralised system gives freedom for lower level component to compute local information to accomplish global goal (i.e. Transaction). Fig. 2 refers to the schematic diagram of decentralized system.

Distributed System: The distributed system is a network of autonomous components that cooperate, coordinate to achieve a common goal. It help in resource sharing and provide user a view of a single network. They share resources such as software (file, databases, and links), hardware (printer, processor, memory). Fig 3. Refers to the schematic diagram of distributed system (Z. Zheng et al., 2017)

The blockchain is a decentralized computation and information sharing platform that enables multiple authoritative domains, who don't trust each other, to cooperate, coordinate and collaborate in a rational decision making process.

The decentralised system which exists in blockchain system provides consistent database support for every transactions that happens. It is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way (Chen, G., *et* al. 2018).

Figure 1. Centralized System



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