Chapter 49
Blockchain Technology Integration in IoT and Applications

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ABSTRACT

The Internet of Things (IoT) pictures an entire connected world, where things or devices are proficient to exchange a few measured data words and interrelate with additional things. This turns for a feasible digital demonstration of the existent world. Nonetheless, nearly all IoT things are simple to mistreat or compromise. Moreover, IoT devices are restricted in computation, power, and storage, so they are more vulnerable to bugs and attacks than endpoint devices like smartphones, tablets, and computers. Blockchain has remarkable interest from academics and industry because of its salient features including reduced dependencies on third parties, cryptographic security, immutability, decentralized nature, distributed nature, and anonymity. In the current scenario, blockchain with its features provides an anonymous framework for IoT. This chapter produces comprehensive knowledge of IoTs, Blockchain knowledge, security issues, Blockchain integration with IoT (BIoT), consensus, mining, message validation mechanisms, challenges, a solution, and future directions.

INTRODUCTION

The standard of Internet of Things (IoT) positioned solid way for a world where several days by day things interrelated and cooperate with the intrinsic atmosphere in order to gather knowledge for routine secure tasks. IoT is expanding its appliances at fast face some reports already predicated that IoT connectable devices (smartphones, laptops, tablets, etc.) will grow to 30 billion by 2020-22 moreover machine to machine connectivity also grow from 800 million to 3 billion, all of them allied with wide-ranging applications similar to healthcare management, transportation, smart society, justification, and automated robots. In support of trustworthy with broad network intensification, it is compulsory to fabricate ap-

propriate IoT protocols, architectures those can provide IoT services. At present IoT hang on centralized server-client prototype through Internet, but present prototype may not work in future because of rapidly growing devices usages, to overcome this fresh paradigm/prototype to be planned. Such as exposure entails, stuck between supplementary things, vigor against attacks, faultless authentication, data privacy and security, straightforward deployment and self-maintenance. These above-mentioned features obtain as a result of Blockchain (BC) the skill back-of-the Bitcoin crypto-currency scheme, studied to fascinating as well as critical for ensuring security and privacy for diverse applications in many domains-including the internet of things (Tiago et al., 2018; Mahadi et al., 2018; Ana Reyna et al., 2018).

Abstractly blockchain technology is a distributed database that holds proceedings of transactions which were collective among participated entities; every transaction is well-established by agreement of greater part of a group member, creating forged transactions unable to pass shared conformation. If one time a blockchain shaped and when established, it cannot be altered or modified. Blockchain technologies proficient to track, synchronize complete transactions and accumulate records/data from an outsized quantity of devices which make possible construction of applications that are entailing no central based cloud.

The hurried development of blockchain technology and blockchain involved appliances have begun to revolutionize the digital world's finances as well as financial services. At present, the appliances of blockchain raise from a financial transaction or insurance claim to issues in share trades and corporate bonds. In presumption, any-person any-place can utilize blockchain technology to broadcast information/ data steadfastly. Blockchain technology is kind of distributed ledger knowledge that efficiently removes the central data point rather than most commonly used supply chains data structures. Here, distributed ledger knowledge/technology is the heart of blockchain mechanism, which offers validation method via a network of computers that make possible peer to peer transactions devoid-of the requirement for mediator/centralized authority to inform and maintain the information generated at the time of transactions. Each and every transaction in blockchain technology validated through a group of validated transaction operations, then after added as a new block to a previously existed chain of transaction operations, because of this reason it named as Block-chain. Once a transaction fixed, added to chain transaction it cannot be altered, deleted or modified. Notably there are two most successful blockchain networks available – public or permissionless blockchain networks – Each user can individually access and perform much like open-source network, permission blockchain networks – specific individuals or organizations use to conduct transaction operations (Deepak et al., 2018; Ana Reyna et al., 2018; Tiago et al., 2018).

Internet of Things (IoT) is one of the emerging topics in recent time in terms of technical, social and financial consequences. From the past decades, there is a significant development in the fields of wireless communication technology, information, and communication systems, industrial designs, and electromechanical systems encourage to progress new technology named as the Internet of things. The most important intention IoTs is to connect all or any devices to the internet or other connected devices. Internet of things is collection network of home appliances, physical devices, vehicular networks and other devices fixed with sensors, electronics, actuators moreover network connectivity which make-possibility for mentioned objects to gather/accumulate and exchange information/data. IoT works as a massive network of interconnected things, people those can collect and share resources about the way they are utilized and about the surrounding environment to them. Here each and everything/device typically identified with its corresponding computing system, however, is able to interoperate within the existing internet infrastructure (Deepak et al., 2018; Ana Reyna et al., 2018; Clemence et al., 2018).

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