

## Chapter 3

# Blockchain-Enabled Smart Healthcare Systems Using IoT

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### **ABSTRACT**

*A healthcare system is the medical platform through which patients get better treatment. Several hospitals and doctors are linked together through this platform in a hierarchy and treat the patient easily. In view of the COVID-19 pandemic, it is a very challenging task to treat the patients physically; therefore, there is a need to redevelop the healthcare system to fulfill the modern demand. The state of the art of this scheme is to provide remote treatment facilities and build a secure online system. Blockchain technology combined with IoT provides the solution through its vital features of transparency, immutability, decentralization, and trust-less environment. IoT devices capture the patient health status and process it and send to blockchain; therefore, information sharing between devices, hospitals, and doctors are at risk and need to provide security. Using key management scheme in smart contract to ensure integrity of data, this scheme provides better treatment at cheap cost as well as efficiency and security compared to traditional healthcare systems.*

### **INTRODUCTION**

Healthcare system is the common platform to provide better treatment facility to the patient. Through this common platform authority can manage the patient

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record and provide treatment facility. In this system many hospital are connected in a hierarchy and when need to refer the patient for treatment, authority can share the stored patient treatment information to another hospital for better treatment even store information for further treatment. Due to huge population growth the health sector is suffered from modern problem create a socio economic problem. Even less number of hospital and limited resource cause many problems to keep proper functioning of healthcare system and still many ruler areas contain no hospital facility (Budida et al., 2017). In view of covid pandemic doctor treat the patient in online mode to keep safe the other people from pandemic and patient has no need to came hospital while patient has not severe condition and it is very challenging task to doctor treat the patient physically therefore future trend using Blockchain and IoT device can resolve these issue. Doctor can remotely access the patient health status with the help of IoT device capture the data from patient body and this will also helpful to remote area people (Chamola et al., 2020). While online mode of treatment the record of patient is most important and need to store long period of time, even many hospital are connected to common platform if needed for better treatment doctor can share the patient information to other place, IoT device time to time keep record the patient health status like temperature, heartbeat, oxygen level, blood pressure, etc. and update the patient record automatically leads to generate huge data and need to proper faster storage and maintenance therefore security and transparency of data are one of aspect (De Aguiar et al., 2020). In traditional system many serious problems like centralized database used to maintain the record, no proper authentication mechanisms is available for participating entity, less number of transaction, and suffer from many cryptographic attack. The Blockchain technology provides the solution of above mention problem through its features in term of transparency, decentralization, immutable and trust less environment. When multiple party seemingly belonging across the world and need to share data, transfer value without trusting each other this was major problem in the modern world and it is happily resolve with Blockchain technology (Dwivedi et al., 2021). Blockchain is the share ledger which store the data whereas Decentralized feature support fault tolerance because data is not store at single point. Immutable feature ensure that no one can change the single character store inside. Every participating entity can view the transaction at any point of time to make system transparent. IoT is the light computing device which is capturing the data, proses it and deliver over internet therefore IoT make system smarter and reduce human effort (Lockl et al., 2020). Using IoT device to make more smart healthcare system and getting more reliable and continent treatment facility. The state of the art of this chapter is we present a Blockchain based secure information sharing in smart health care system with smart contract and consensus mechanism. The key management technique ensures that only

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