

# Chapter 10

## Blockchain–Enabled 6G Security Architecture for Smart Cities: A Decentralized and Resilient Approach

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### ABSTRACT

*The next 6G technology is expected to change the face of smart cities by offering greater connectivity, faster and higher data transfer rates. A major advantage of using blockchain with 6G networks is the availability of a distributed immutable database to record transactions and data exchange. In the context of smart cities, this feature is very important to ensure the security of data transfer process through many IoT devices and systems. Through implementation of a system in which data*

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*cannot be altered or deleted, blockchain increases the credibility and accountability of smart city management. The integration of blockchains with IoT devices especially in the smart cities is therefore helpful. IoT devices which are the foundation for smart cities are prone to cyber threats and malwares. The real-time anomaly detection and the pattern features analysis in machine learning algorithms help to identify the possible risks to safety in no time. Integrated with blockchains, these frameworks help in enhancing intrusion detection, privacy and silence.*

## **1. INTRODUCTION**

The current trends in growth such as the rapid urbanization and the need for optimum utilization of resources have created the smart cities. These cities adopt smart technologies including; the internet of things, Artificial intelligence, and cloud computing in urban planning, infrastructure, and public service delivery (Bhushan et al., 2020). However, the incorporation of these technologies has also brought about new risks or challenges in security because even as these technologies are integrated, their security cannot be solved by the normal security technologies (Wong et al., 2020). Blockchain technology has been regarded as one of the most efficient solutions for managing and ensuring security in smart city context. Blockchain characteristics like decentralisation, the ledger's inalterability, and visibility are well suited to the millions of devices and channels in smart cities. This chapter provides an overview to the blockchain-enabled 6G security architecture for smart cities as a paradigm to achieve decentralized and robust security of the key infrastructures and services.

Waving the potential of 6G, the future wireless communication technology, the proposed architecture aims at increasing the security level and performance of smart city applications. Due to the development of 6G with its added features such as higher bandwidth, lower latency, and better energy efficiency of network the voluminous data and the real-time nature of smart city applications become feasible (Wong et al., 2020). If this architecture is incorporated with the help of the blockchain technology with 6G, then the following advantages will be possible. Further, it will contribute to First, the decentralization of blockchain can help to avoid critical failure points and make the smart city's structure more secure. Second, the indestructibility and openness of records in blockchain can improve the data and or transaction trail and reduce uncertainties existing in a smart city.

The architecture comprises of different elements that include identity, data protection and sharing, and self-governing structures on the block chain. Essentially, the identity management system is based on the blockchain system to provide optimized and secure digital identify for each connected device, user, and service in the smart city. The secure data sharing and storage module includes the elements

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