

Chapter 9

Block–Chain–Based Security and Privacy in Smart City IoT: Distributed Transactions

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ABSTRACT

The current technology has given arms, hands, and wings to the smart objects-internet of things, which create the centralized data collection and analysis nightmare. Even with the distributed big data-enabled computing, the relevant data filtering for the localized decisions take a long time. To make the IOT data communication smoother and make the devices talk to each other in a coherent way the device data transactions are made to communicate through the block chain, and the applications on the localized destination can take the decisions or complete transaction without the centralized hub communication. This chapter focuses on adding vendor-specific IOT devices to the public or private block chain and the emerging challenges and the possible solutions to make the devices talk to each other and have the decision enablement through the distributed transactions through the block chain technology.

INTRODUCTION

In recent years, there has been large numbers of people moving towards urban living. As forecasted by 2030 more than 60% of the population will reside in an urban environment. The challenges related to increased population in the urban will throw in to the development of the Smart City. The Smart City concept incorporates several multifaceted systems of infrastructure, human activities, technology, public and political structures, financial system and provides collaborations between citizens and government.

DOI: 10.4018/978-1-5225-9199-3.ch009

Smart City provides a smart way to manage components such as transport, health, energy, homes and buildings and the environment. Smart technology allows the officials to observe the city happenings and to interrelate with community and city infrastructure. Smart cities become smarter with the recent advancements in the digital equipment. The data generated by this equipment are primarily by wireless sensor networks. Wireless sensor networks have been deployed in many consumer applications and industrial such as smart home, health monitoring, smart people, smart economy, smart governance, smart parking, smart roads, smart mobility, smart environment, and smart living.

BACKGROUND

Wireless Sensor nodes deployed with different Smart City applications generate large amounts of heterogeneous data. However, it's difficult to connect the WSN and Internet because it lacks of uniform standardization in communication protocols. In the usage of entrenched devices, wireless communication and obtainable internet infrastructure the Internet of things (IoT) connects PC's and other surrounding electronic devices easily. Internet of Things is composed of hundreds of millions of objects that can be identified, sensed and connected based on standardized and interoperable communication protocols. Internet of things allow things and people to be interconnected anytime, anywhere, anything and anyone, ideally using any path/network and any service. These devices transmit the data to the internet through specific protocols to achieve monitoring, management and location tracking. With the support of internet connection, and cloud computing technologies, the IOT system can intelligently process the objects' state, and control for decision-making, separately without human's intervention.

IOT Gateway

The devices adhere to different protocols makes the security mechanism of device to multi chain communication complex. In 2016, the expense for the IOT devices was 120 billion, it is expected to grow by 253 billion by 2021. It indicates the complexity and maintenance cost of the IOT devices in the forthcoming industrial scenarios.

IOT Gateway plays a very important role in interconnecting multiple smart devices together to form network and share resources and information among the equipment with different network protocols. Smart city is interconnected and instrumented with the support of IOT. Performance and reliability of the smart city are improved with broadly scattered, low storage capability and processing capability of IoT devices. So IoT provides more efficient operations based on different aspects, such as energy saving policies, economic considerations, reliability levels, etc. IoT Architecture is shown in figure 1.

IoT devices exchange vast amounts of critical data as well as sensitive information, and hence are appealing targets of various cyber-attacks. These devices spend their available energy in executing application functionality, and supporting security and privacy.

Security Issues in IoT

IoT devices are resource-constrained. Therefore, using the conventional security mechanisms in the smart devices are not easy. The major security constraints of IoT devices are Limitations based on hardware,

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