

A Systematic Review of Blockchain-based Services for Security Upgradation of a Smart City

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Abstract

The concept of smart city has gained popularity in recent years. The elementary concept refers to promoting the uninterrupted sharing of data and services within and across communities by the application of emerging technologies. Smart cities strive for cost reduction, optimal use of resources and the development of a more sustainable environment. Considerable advances in modern technologies such as IoT and wireless communication have enabled sharing of data between remote devices which are geared with open data, hence a smart city is susceptible to a number of security threats. It is important to identify these threats, analyze IoT data to improve privacy and security and identify the corresponding consequences. Blockchain has emerged as a promising solution to resolve these challenges. Blockchain is a peer-to-peer shared database technology that cannot be modified once a transaction is recorded and validated. This study explores the contribution of blockchain to smart cities in terms of decentralized security, immutability, transparency and privacy to provide intelligent, customized and context-aware services to smart city dwellers. A brief overview of this novel technology has been given along with its deployment in a smart city setting, the open issues discussed and prospective scope of blockchain application has been presented.

Keywords: Smart City, Blockchain, IoT, Decentralization, Security.

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1. Introduction

Smart City is defined as an urbanized area with information and communication technology (ICT) central to its framework. In order to enhance the quality of life, smart cities provide various novel and specialized services to their citizens. A smart city must include state-of-the-art technology, essentially the Internet of Things (IoT), to offer these services in compliance with privacy and security (Verma, A. et al., 2019). Moreover, smart city policies have gained significant attention and support lately. It is apparent that these policies favor urban economic growth (Caragliu and Del Bo, 2018). Smart City literature highlights the need for a local context in which large-scale funding in cutting-edge technologies is fully exploited (Caragliu et al., 2011).

The notion of smart city has evolved significantly over the last decade with the emergence of the Internet of Things (IoT) as a new trend in promoting sustainability. The World Urbanization Prospects Report (United Nations, 2018) reports that 55% of the global population resides in urban areas, a percentage that is expected to rise to 68% by 2050. Moreover, it is estimated that by 2050, approximately 2.5 billion people will be additionally led to urban areas as a result of the steady transfer of people from rural to urban areas. The increasing congestion, carbon dioxide concentration, greenhouse gas emissions and waste disposal in the urban areas will gradually affect living conditions of the people. Consequently, the consolidation of billions of devices and services under a smart framework is imperative in the near future, ranging from user devices to smart travel, business, buildings, hospitals, energy and ecosystem.

