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Controllable and Trustworthy Blockchain-based Cloud Data Management

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Abstract

In recent years, there have been efforts to deploy blockchain in a broad range of applications and in different domains, such as the critical infrastructure sectors. Generally, blockchain can be leveraged to establish a fair and transparent data sharing environment where unauthorized modification to the data can be audited and traced. There are, however, known limitations of blockchain-based solutions. For example, a significant weakened networking control capability due to the distributed nature of blockchain-based solutions. In addition, decisions recorded on a blockchain cannot be changed and there is the risk of majority attack (also known as 51% attack). Seeking to mitigate these limitations, in this paper we propose a *controllable blockchain data management* (CBDM) model that can be deployed in a cloud environment. We then evaluate its security and performance, in order to demonstrate utility.

Keywords: Blockchain, data management, trustworthiness, cloud computing, privacy-preserving

1. Introduction

The recent trend in blockchain is probably due to the success and popularity of bitcoin. The interest in blockchain is also evidenced by the increasing number of blockchain-based solutions in a broad range of fields [1, 2, 3, 4, 5]. This is not surprising, for example due to its capability to provide a transparent data usage and sharing environment [6, 7]. Specifically, a blockchain system is

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