

Development of an Accounting Informatization Model Through Cloud Data Integrity Verification: A Systems Approach

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ABSTRACT

This manuscript explores the application of cloud data integrity verification algorithms to improve accounting informatization in enterprises. The proposed method enhances financial management by streamlining the verification of cloud-based financial data, addressing challenges related to data accuracy and security. A multi-user parallel verification algorithm is introduced, reducing verification load and improving the detection of damaged data blocks compared to traditional methods. After 100 rounds of testing, the proposed method outperformed data mining (DM) and artificial intelligence (AI) algorithms, identifying 127 damaged data blocks, versus 110 and 118, respectively. The findings show that increased verification rounds lead to better identification of damaged data, demonstrating the algorithm's superior performance.

KEYWORDS

Cloud Data Integrity Verification, Accounting, Informatization Model

INTRODUCTION

With the rapid advancement of accounting informatization driven by computerization and the rise of the sharing economy, financial management has been significantly transformed. Many large- and medium-sized enterprises have adopted financial sharing models, enhancing management efficiency, innovating enterprise practices, reducing operating costs, and elevating overall management standards (S. Wang et al., 2019). Accounting informatization plays a critical role in the digital transformation of enterprises, particularly small- and medium-sized enterprises (SMEs). However, compared to larger firms, Chinese SMEs face challenges such as insufficient funding for accounting informatization, low emphasis on digital integration, incomplete internal management systems, and a lack of skilled professionals (Li et al., 2020). Given the importance of accounting informatization in supporting national economic growth, many countries have introduced policies to promote its development, which has helped establish a solid foundation for competition in the global market. Cloud storage offers several advantages, including low costs, scalability, massive storage, and convenient access. As more individuals and enterprises move their data to the cloud, users can significantly reduce storage,

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management, and maintenance costs. However, a key challenge is the lack of direct control over stored data, which raises concerns about data integrity and privacy (Song et al., 2022; Yan et al., 2018). Accounting informatization, driven by cloud computing, uses information and network technology to process, store, and transmit accounting data. This enhances financial management by facilitating the rapid exchange of accounting information between government departments, financial institutions, and businesses, significantly improving operational efficiency (Wei et al., 2020; Xu et al., 2021).

The integration of cloud data integrity verification algorithms into accounting informatization systems allows financial personnel to input bills and financial data into digital systems more efficiently. This technology reduces the time required to prepare financial statements, enabling timely access to accurate financial information for decision making (Yu et al., 2015). Accounting information systems built on cloud integrity verification algorithms use networked software modules to construct tailored information models for different types of users, ensuring real-time sharing and targeted utilization of accounting data (X. P. Zhao & Jiang, 2020). However, concerns about potential data tampering and loss in cloud storage systems remain. Therefore, it is essential for cloud providers to detect anomalies early to mitigate such risks and maintain data integrity (Khedr et al., 2019).

Incorporating cloud data integrity verification algorithms into financial management processes expands traditional accounting management practices, addressing both the management of financial personnel and the digital systems they rely on. As businesses become more digitized, these systems must evolve to handle increasing complexity while mitigating risks. Measures should be taken to ensure that cloud-based financial management systems not only enhance efficiency but also protect data integrity and maximize enterprise value. S. Wang et al. (2019) highlighted that accounting informatization improves the timely transmission of fund usage information, enhancing oversight and reducing operational costs. It was also noted that accounting informatization lightens the workload for accountants, even with increased business volume (Y. Wang, 2019). Yinghao et al. (2019) emphasized the role of centralized accounting in unifying fund management, improving the efficiency of financial oversight. Lin et al. (2017) discussed the role of centralized accounting databases in enabling quantitative analysis through advanced statistical methods. Yinghao et al. (2019) supported the importance of centralized accounting in managing multiple departments' financial transactions. Khedr et al. (2019) argued that traditional financial management is no longer adequate for modern enterprises, requiring new financial management approaches. X. P. Zhao and Jiang (2020) pointed out that centralized accounting reforms are critical for improving financial supervision and maintaining financial autonomy. Chen and Xiao-Hong (2017) concluded that audit departments could improve their real-time audit efficiency through cloud-based accounting systems. Chen (2021) emphasized that accounting informatization enables quicker preparation of financial statements, providing timely data for decision making. Finally, Wang (2023) noted that centralized accounting optimizes resource allocation and maximizes organizational benefits by integrating accounting services and financial supervision.

Before the advent of accounting informatization, enterprises took considerable time to set financial goals, as the process required comprehensive evaluation and information collection, often delaying decision making. Traditional financial accounting methods struggled to meet the evolving demands of modern enterprise decision making. This paper studies accounting informatization based on cloud data integrity verification, addressing the increasing concern over data integrity and privacy in cloud storage, where even minor data damage can result in significant losses. The proposed innovations include a verification of grouping and merging results to assess cloud storage correctness and the development of a system audit model that enables users to access a dynamic resource pool on a "pay as you go" basis while efficiently verifying data integrity. Cloud service providers, often not fully trusted, may conceal data loss to protect their reputation, highlighting the need for secure integrity checks. Compared to traditional financial management, cloud data integrity verification brings three major changes: a shift in financial organizational structure, a transformation in how financial work is performed through financial sharing in networked environments, and increased visibility of accounting

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