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Research Article

SECURE DATA SHARING IN CLOUD USING KEY AGGREGATE CRYPTOSYSTEM

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ABSTRACT

Secure data sharing in the cloud is a critical concern to ensure the confidentiality and integrity of sensitive information stored in cloud environments. Key Aggregate Cryptosystem (KAC) is an emerging cryptographic technique that enables efficient and secure data sharing among multiple users in the cloud. This study focuses on the application of KAC for secure data sharing in cloud environments. The proposed approach utilizes a hierarchical key management scheme to generate and distribute encryption keys, allowing authorized users to access and decrypt shared data. The KAC framework ensures fine-grained access control and reduces the computational overhead associated with traditional encryption schemes. The study evaluates the security and performance aspects of the proposed approach through simulation and analysis, demonstrating its effectiveness in secure data sharing in the cloud.

KEYWORDS

Secure data sharing, cloud computing, key aggregate cryptosystem, encryption, access control, confidentiality, integrity, hierarchical key management, fine-grained access control, computational overhead, security, performance.

INTRODUCTION

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With the increasing adoption of cloud computing, secure data sharing has become a crucial requirement to protect sensitive information stored in cloud environments. Traditional encryption schemes may not be efficient or scalable for large-scale data sharing scenarios. Key Aggregate Cryptosystem (KAC) has emerged as a promising cryptographic technique that enables secure and efficient data sharing among multiple users in the cloud. This study focuses on the application of KAC for secure data sharing in cloud environments, addressing the challenges associated with confidentiality, integrity, and access control.

The key objective of this study is to propose a secure data sharing approach using the Key Aggregate Cryptosystem, leveraging its advantages such as fine-grained access control and reduced computational overhead. The proposed approach utilizes a hierarchical key management scheme to generate and distribute encryption keys, allowing authorized users to access and decrypt shared data. By employing the KAC framework, the study aims to provide a secure and efficient solution for data sharing in cloud environments, mitigating the risks associated with unauthorized access and data breaches.

METHOD

The study employs a systematic research methodology to investigate and evaluate the secure data sharing approach using the Key Aggregate Cryptosystem. The methodology encompasses the following steps:

Literature Review: A comprehensive review of existing literature is conducted to gather insights into cloud computing, data sharing challenges, encryption techniques, and key aggregate cryptosystem approaches. This step establishes the foundation for the proposed research.

Problem Identification and Formulation: The specific challenges and requirements for secure data sharing in cloud environments are identified and formulated. This includes considerations such as confidentiality, integrity, access control, and computational overhead.

Design and Implementation of the Proposed Approach: Based on the identified challenges and requirements, a secure data sharing approach using the Key Aggregate Cryptosystem is designed. This involves the development of a hierarchical key management scheme, encryption algorithms, and access control mechanisms. The approach aims to ensure fine-grained access control while minimizing computational overhead.

Simulation and Analysis: The proposed approach is implemented and evaluated through simulations and analyses. The performance metrics such as encryption/decryption time, key generation and distribution time, and storage overhead are measured and compared with existing encryption schemes. The security aspects, including confidentiality and integrity of shared data, are also assessed.

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Evaluation and Discussion: The results obtained from the simulation and analysis are evaluated and discussed in the context of secure data sharing in cloud environments. The advantages, limitations, and potential areas for improvement of the proposed approach are identified and addressed.

Conclusion and Future Work: The study concludes by summarizing the findings and contributions of the proposed approach. Future research directions and potential enhancements are suggested to further improve the secure data sharing in cloud using the Key Aggregate Cryptosystem.

By following this research methodology, the study aims to provide a comprehensive understanding of the secure data sharing approach using the Key Aggregate Cryptosystem and its effectiveness in addressing the challenges of confidentiality, integrity, and access control in cloud environments.

RESULTS

The proposed secure data sharing approach using the Key Aggregate Cryptosystem (KAC) was implemented and evaluated. Through simulations and analyses, the performance and security aspects of the approach were assessed.

The results showed that the KAC-based approach provided efficient and fine-grained access control for secure data sharing in cloud environments. The encryption and decryption processes demonstrated faster execution times compared to traditional encryption schemes. The hierarchical key management scheme allowed for the generation and distribution of encryption keys in a scalable manner, enabling authorized users to access and decrypt shared data. The approach effectively addressed the challenges of confidentiality, integrity, and access control in data sharing scenarios.

DISCUSSION

The results highlight the advantages of using the Key Aggregate Cryptosystem for secure data sharing in cloud environments. The fine-grained access control provided by the approach ensures that only authorized users can access specific data, enhancing data privacy and security. The reduced computational overhead compared to traditional encryption schemes contributes to efficient data sharing, particularly in large-scale scenarios.

The hierarchical key management scheme enables the generation and distribution of encryption keys in a hierarchical manner, reducing the key management complexity and ensuring efficient access control. The approach offers flexibility in defining access policies and managing user privileges, further enhancing the security and control of shared data.

The discussion also considers the limitations of the proposed approach. While the KAC-based approach offers advantages in terms of access control and computational efficiency, it may require additional computational resources for key generation and management. Additionally,

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the approach assumes a trusted cloud environment where the cloud service provider implements appropriate security measures.

CONCLUSION

In conclusion, the proposed secure data sharing approach using the Key Aggregate Cryptosystem demonstrates its effectiveness in addressing the challenges of confidentiality, integrity, and access control in cloud environments. The approach offers fine-grained access control, reduced computational overhead, and efficient encryption and decryption processes.

By leveraging the advantages of the Key Aggregate Cryptosystem, the proposed approach provides a secure and efficient solution for data sharing in cloud environments. It offers flexibility in access control policies and enables scalable key management. The findings of this study contribute to the understanding of secure data sharing techniques in cloud computing and highlight the potential of the Key Aggregate Cryptosystem in addressing data security challenges.

Future work may focus on further optimizing the performance of the approach, considering scalability for larger datasets and investigating additional security measures to enhance the overall security of the system. Continued research and development in this area will contribute to the advancement of secure data sharing practices in cloud environments, ensuring the confidentiality and integrity of shared data.

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