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CRYPTOGRAPHIC CLOUD STORAGE WITH KEY AGGREGATE SEARCHABLE ENCRYPTION

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Abstract - *The shared data in cloud servers contains users" sensitive information such as personal profile, financial data, and health records needs to be well protected. Cloud storage has emerged as a promising solution providing ubiquitous, convenient, and on-demand access to large amounts of data shared over the Internet.. However, while enjoying the convenience of sharing data via cloud storage, users are increasingly concerned about inadvertent data leaks in the cloud. The capability of sharing encrypted data with different users via public cloud storage may greatly ease security concerns over data leaks in the cloud. A key challenge to designing encryption schemes lies in the efficient management of encryption keys.. The implied need of secure communication, storage, and complexity clearly renders the approach impractical. In this, we address this practical problem, which is largely neglected in the literature, by proposing the concept of key aggregate searchable encryption (KASE) and instantiating the concept through a concrete KASE scheme.*

Key Words: **Searchable Encryption, Data Sharing, Cloud Storage, Data Privacy**

1. INTRODUCTION

Today, millions of users are sharing personal data, such as photos and videos, with their friends through social network applications based on cloud storage on a daily basis. Business users are also being attracted by cloud storage due to its numerous benefits, including lower cost, greater agility, and better resource utilization. Data leaks, caused by a malicious adversary or a misbehaving cloud operator, can usually lead to serious breaches of personal privacy or business secrets (e.g., the recent high profile incident of celebrity photos being leaked in iCloud).

To address users' concerns over potential data leaks in cloud storage, a common approach is for the data owner to encrypt all the data before uploading them to the cloud, such that later the encrypted data may be retrieved and decrypted by those who have the decryption keys. Such cloud storage is often called the cryptographic cloud storage. However, the encryption of data makes it challenging for users to search and then selectively retrieve only the data containing given keywords. A common solution is to employ a searchable encryption (SE) scheme in which the data owner is required to encrypt potential keywords and upload them to the cloud together with encrypted data, such that, for retrieving data matching a keyword, the user will send the corresponding keyword trapdoor to the cloud for performing search over the encrypted data. Although combining a searchable encryption scheme with cryptographic cloud storage can achieve the basic security requirements of cloud storage, implementing such a system for large scale applications involving millions of users and billions of files may still be hindered by practical issues involving the efficient management of encryption keys. The proposed KASE scheme applies to any cloud storage that supports the searchable group data sharing functionality, which means any user may selectively share a group of selected files with a group of selected users, while allowing the latter to perform keyword search over the former. To support searchable group data sharing the main requirements for efficient key management are twofold.

2. LITERATURE REVIEW

2.1 Multi-user Searchable Encryption

There is a literature on searchable encryption, including SSE schemes [5]–[8] and PEKS schemes [9]–[15]. In contrast to those existing work, in the context of cloud storage, keyword search under the multi-tenancy setting is a common scenario. In such a scenario, the data owner would like to share a document with a group of authorized users and each user who has the access right can provide a trapdoor to perform the keyword search over shared document, namely, the "multi-user searchable encryption" (MUSE) scenario. Some recent work [6], [13]–[15], [19] focus to such a MUSE scenario, although they all adopt single key combined with access control to achieve the goal.

2.2 Multi-Key Searchable Encryption

In the case of a multi-user application, considering that the number of trapdoors is proportional to number of documents to search over (if the user provides to the server a keyword trapdoor under every key with which a matching document might be encrypted), Popa [20] firstly introduces

the concept of multi-key searchable encryption (MKSE) & puts forward the first feasible scheme in 2013.

2.3 Key-aggregate Encryption for Data Sharing

Data sharing systems based upon cloud storage have attracted much attention recently [1]–[4]. In particular, [4] consider how to reduce the number of distributed data encryption keys.

3. ARCHITECTURE OF PROPOSED SYSTEM

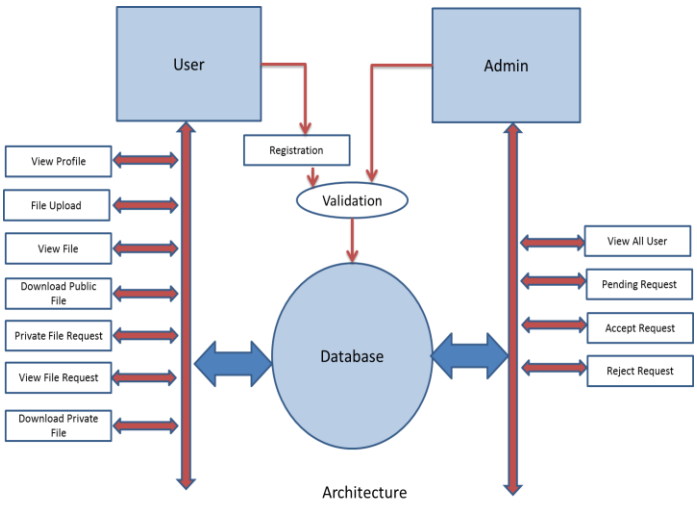

Fig. 1 Architecture Diagram

System setup When an organization submits a request, cloud will create a database containing four tables. Moreover, it assigns an administrator account manager. Then, the data sharing system will work under the control of manager. To generate system parameters params, manager runs the algorithm KASE.Setup and updates the field parameters.

User registration When adding a new member, manager assigns UserID, UserName, and password and then stores the necessary information into the table user.

User login Like most popular data sharing products (e.g., Dropbox and citrix), our system relies on a password verification for authenticating users. To further improve the security, multi-factor authentication or digital signatures may be used when available.

Data uploading User upload file like PDF file, word file, Text File ,image etc. Uploading file contain file, File name, file description. File may be public file or private file. While uploading file public key and private key generated automatically by using function Randomize string and Randomize number. One user send file to all other user by simply share file as public for no authority ner can encrypt the keys using his/her private key and store them into the table.

Keyword Search User views all uploaded file by other user and itself. It display information of file name, file description, share as public or private and name of user those are uploaded a file. User can search the specific file just simply search the name of file. User download public file without authentication of owner of file, but user need private key while downloading private file.

Data retrieving File request contain the information of requested file by user. It contain user name, file name, public key of file and message. User can only request file which are private because it need private key for download.

4. RESULT AND DISCUSSION

In this work, we design a secure data sharing scheme, for dynamic group in an untrusted cloud. A user is able to share data with others in the group without revealing identity privacy to cloud. Additionally, It supports efficient user revocation and new user joining. More specially, an efficient user revocation can be achieved through a public revocation list without updating the private keys of remaining users, and new users can directly retrive files stored in the cloud before their participation. With this the storage overhead and the encryption computation cost are constant.

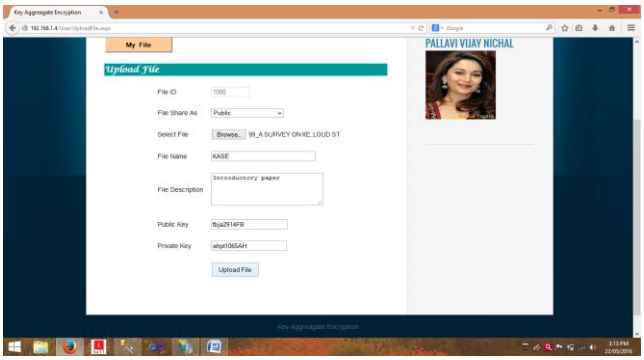

Fig.2 Generation of public/private key

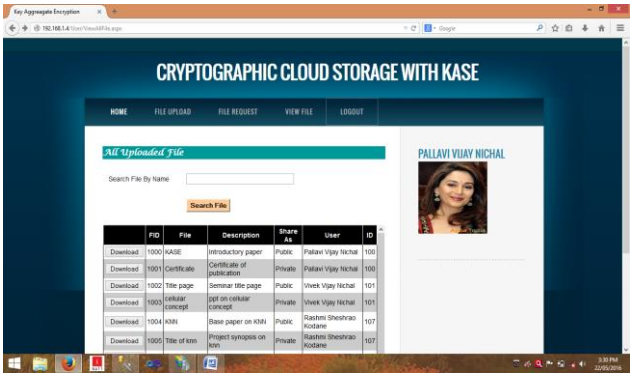

Fig. 3 Searching files from storage with keyword

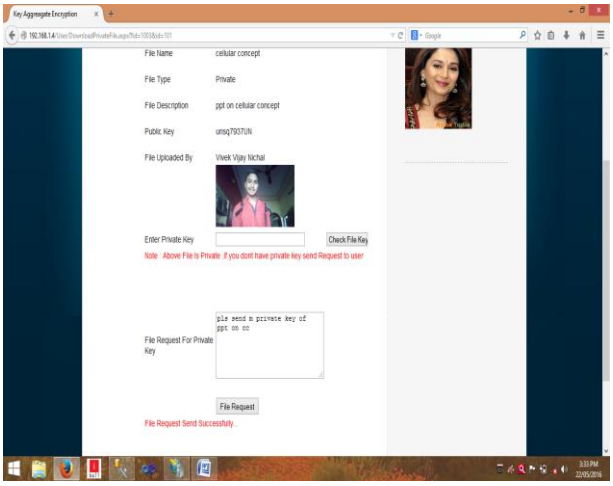

Fig. 4 Requestig for private key towards owner of file

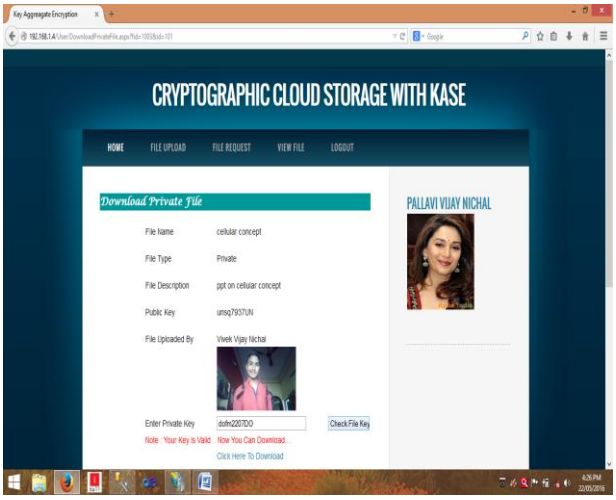

Fig 5 Ready for downloading desire file

5. CONCLUSION AND FUTURE SCOPE

Considering practical problem of privacy preserving data sharing system based on public cloud storage which requires a data owner to distribute large number of keys to users to enable them to access his/her documents, for the first time we propose concept of key-aggregate searchable encryption (KASE) and construct a KASE scheme. Both analysis and evaluation result confirm that our work can provide an effective solution to building practical data sharing system based on public cloud storage. However, if a user wants to query over documents shared by multiple owners, he have to generate multiple trapdoors to the cloud. How to reduce number of trapdoors under multi-owners setting is a future work.

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