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Efficient and Secure Data Sharing for Dynamic Groups in Cloud Environment

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Abstract:
Storing data on remote cloud storage makes the maintenance affordable by data owners. The reliability and trustworthiness of these remote storage locations is the main concern for data owners and cloud service providers. When multiple Group members and Group managers are involved, the aspects of membership and data sharing need to be addressed. From cloud computing, users can attain an effective and economical approach of scheme for data sharing among group members in the cloud. It is an advantage of low maintenance and little management cost. Meanwhile, we provide security guarantees for the sharing data files since they are outsourced. A secure communication channel for existing schemes channel is a strong assumption and is difficult for practice. In this paper, we propose a secure data sharing scheme for dynamic members. First, we propose a secure way for key distribution without any secure communication channels. Second, our scheme can achieve fine-grained access control, any user in the group can use the source in the cloud and revoked users cannot access the cloud again. Third, we can protect the scheme from collusion attack, which means that revoked users cannot get the original data.

Keywords:
Cloud computing, encryption, Group Manager, Dynamic Groups, Data Sharing, Collusion attack.

Introduction:

Cloud computing is one of the greatest platforms which provide storage of data in very lesser cost and available for all time over the internet Cloud computing is Internet-based computing, whereby shared resources, software and information are provided to computers and devices on demand. In this several trends are opening up the era of Cloud Computing, which are an Internet-based development and use of computer technology. Cloud Computing means more than simply saving on Information Technology implementation costs. Cloud Computing offers enormous opportunity for new innovation, and even disruption of entire industries. So Cloud computing is the long dreamed vision of computing as a utility, where data owners can remotely store their data in the cloud to enjoy on-demand high-quality applications and services from a shared pool of configurable computing resources. Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand. It describes a new supplement, consumption, and delivery model for IT services based on the Internet.

It has been envisioned as the next generation information technology (IT) architecture for enterprises, due to its wide range of unprecedented advantages in the IT history: on-demand self-service, ubiquitous network access, location independent resource pooling, rapid resource elasticity, usage-based pricing and transference of risk. As a disruptive technology with profound implications, Cloud Computing is transforming the very nature of how businesses use information technology. One fundamental aspect of this paradigm shifting is that data is being centralized or outsourced to the Cloud. From users' perspective, including both individuals and IT enterprises, storing data remotely to the cloud in a flexible on-demand manner brings appealing

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benefits: relief of the burden for storage management, universal data access with location independence, and avoidance of capital expenditure on hardware, software, and personnel maintenances, etc. To protect the integrity of data in the cloud, a number of mechanisms have been proposed. In these mechanisms, a signature is attached to each block in data, and the integrity of data relies on the correctness of all the signatures. ne of the most significant and common features of these mechanisms is to allow a public verifier to efficiently check data integrity in the cloud without downloading the entire data, referred to as public auditing (or denoted as Provable Data Possession).

This public verifier could be a client who would like to utilize cloud data for particular purposes (e.g., search, computation, data mining, etc.) or a thirdparty auditor (TPA) who is able to provide verification services on data integrity to users. Most of the previous Works focus on auditing the integrity of personal data. Different from these works, several recent works focus on how to preserve identity privacy from public verifiers when auditing the integrity of shared data. Unfortunately, none of the above mechanisms, considers the efficiency of user revocation when auditing the correctness of shared data in the cloud. With shared data, once a user modifies a block, she also needs to compute a new signature for the modified block.

Due to the modifications from different users, different blocks are signed by different users. For security reasons, when a user leaves the group or misbehaves, this user must be revoked from the group. As a result, this revoked user should no longer be able to access and modify shared data, and the signatures generated by this revoked user are no longer valid to the group. Therefore, although the content of shared data is not changed during user revocation, the blocks, which were previously signed by the revoked user, still need to be re-signed by an existing user in the group. As a result, the integrity of the entire data can still be verified with the public keys of existing users only.

Cloud Computing is recognized as an alternative to traditional Information Technology (IT) due to its intrinsic resource-sharing and low-maintenance characteristics. In this cloud computing, the cloud service providers (CSPs), such as Amazon, are able to deliver various services to cloud computing users with the help of powerful datacenters. By migrating the local data management systems into cloud servers, users can enjoy high-quality services and save significant investments on their local infrastructures, and one of the most fundamental services offered by cloud providers is data storage. Let us consider a practical data application.

A company allows its staffs in the same group or department to store and share files in the cloud. Specifically, the cloud servers managed by cloud providers are not fully trusted by users while the data files stored in the cloud may be sensitive and confidential, such as business plans. To preserve data privacy, a basic solution is to encrypting data files, and then uploads the encrypted data into the cloud. Unfortunately, designing an efficient and secure data sharing scheme for groups in the cloud is not an easy task due to the following challenging issues. Many privacy techniques for data sharing on remote storage machines have been recommended. In these models, the data owners store the encrypted data on untreated remote storage. After that they will share the respective decryption keys with the authorized users.

This prevent the cloud service providers and intruders to access the encrypted data, as they don't have the decrypting keys. However the new data owner registration in the above said models reveals the identity of the new data owner to the others in the group. The new data owner has to take permission from other data owners in the group before generating a decrypting key.

RELATED WORK

S. Kamara et al. proposed a security for customers to store and share their sensitive data in the cryptographic cloud storage. It provides a basic encryption and decryption for providing the security.

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HoIver, the revocation operation is a sure performance killer in the cryptographic access control system. To optimize the revocation procedure, they present a new efficient revocation scheme which is efficient, secure, and unassisted. In this scheme, the original data are first divided into a number of slices, and then published to the cloud storage. When a revocation occurs, the data owner needs only to retrieve one slice, and re-encrypt and re-publish it. Thus, the revocation process is accelerated by affecting only one slice instead of the whole data. They have applied the efficient revocation scheme to the cipher text-policy attribute-based encryption based cryptographic cloud storage. The security analysis shows that the scheme is computationally secure.

E. Goh et al. presented a SiRiUS, a secure file system designed to be layered over insecure network and P2P file systems such as NFS, CIFS, Ocean Store, and Yahoo! Briefcase. SiRiUS assumes the network storage is untrusted and provides its own read-write cryptographic access control for file level sharing. Key management and revocation is simple with minimal out-of-band communication. File system freshness guarantees are supported by SiRiUS using hash tree constructions. SiRiUS contains a novel method of performing file random access in a cryptographic file system without the use of a block server. Extensions to SiRiUS include large scale group sharing using the NNL key revocation construction.

Our implementation of SiRiUS performs Ill relative to the underlying file system despite using cryptographic operations. SiRiUS contains a novel method of performing file random access in a cryptographic file system without the use of a block server. Using cryptographic operations implementation of Sirius also possible. It only uses the own read write cryptographic access control. File level sharing are only done by using cryptographic access. A.Fiat et al. proposed a system on multicast communication framework, various types of security threat occurs. As a result construction of secure group communication that protects users from intrusion and eavesdropping are very important.

In this paper, They propose an efficient key distribution method for a secure group communication over multicast communication framework. In this method, They use IP multicast mechanism to shortest rekeying time to minimize adverse effect on communication. In addition, They introduce proxy mechanism for replies from group members to the group manager to reduce traffic generated by rekeying. They define a new type of batching technique for rekeying in which new key is generated for both leaving and joining member. The rekeying assumption waits for 30 sec so that number time's key generation will be reduced.

M. Armbrust et al. presented a security one of the most often-cited objections to cloud computing; analysts and skeptical companies ask “who would trust their essential data „out there‟ somewhere?” There are also requirements for auditability, in the sense of Sarbanes-Oxley azon spying on the contents of virtual machine memory; it‟s easy to imagine a hard disk being disposed of without being wiped, or a permissions bug making data visible improperly. There‟s an obvious defense, namely user-level encryption of storage. This is already common for high-value data outside the cloud, and both tools and expertise are readily available. This approach was successfully used by TC3, a healthcare company with access to sensitive patient records and healthcare claims, whe

n moving their HIPAA-compliant application to AWS. Similarly, auditability could be added as an additional layer beyond the reach of the virtualized guest OS, providing facilities arguably more secure than those built into the applications themselves and centralizing the software responsibilities related to confidentiality and auditability into a single logical layer. Such a new feature reinforces the Cloud Computing perspective of changing our focus from specific hardware to the virtualized capabilities being provided D. Boneh et al. focused on a Hierarchical Identity Based Encryption (HIBE) system where the ciphertext consists of just three group elements and decryption requires only two bilinear map computations, regardless of the hierarchy depth.

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Encryption is as efficient as in other HIBE systems. They prove that the scheme is selective-ID secure in the standard model and fully secure in the random oracle model. The system has a number of applications: it gives very efficient forward secure public key and identity based cryptosystems (with short ciphertexts), it converts the NNL broadcast encryption system into an efficient public key broadcast system, and it provides an efficient mechanism for encrypting to the future. The system also supports limited delegation where users can be given restricted private keys that only allow delegation to bounded depth. The HIBE system can be modified to support sublinear size private keys at the cost of some ciphertext expansion.

EXISTING SYSTEM:

- Kallahalla et al presented a cryptographic storage system that enables secure data sharing on untrustworthy servers based on the techniques that dividing files into file groups and encrypting each file group with a file-block key.
- Yu et al exploited and combined techniques of key policy attribute-based encryption, proxy re-encryption and lazy re-encryption to achieve fine-grained data access control without disclosing data contents.

DISADVANTAGES OF EXISTING SYSTEM:

- The file-block keys need to be updated and distributed for a user revocation; therefore, the system had a heavy key distribution overhead.
- The complexities of user participation and revocation in these schemes are linearly increasing with the number of data owners and the revoked users.
- The single-owner manner may hinder the implementation of applications, where any member in the group can use the cloud service to store and share data files with others.

PROPOSED SYSTEM:

- ❖ In this paper, we propose a secure data sharing scheme, which can achieve secure key distribution and data sharing for dynamic group.
- ❖ We provide a secure way for key distribution without any secure communication channels. The users can securely obtain their private keys from group manager without any Certificate Authorities due to the verification for the public key of the user.
- ❖ Our scheme can achieve fine-grained access control, with the help of the group user list, any user in the group can use the source in the cloud and revoked users cannot access the cloud again after they are revoked.
- ❖ We propose a secure data sharing scheme which can be protected from collusion attack. The revoked users can not be able to get the original data files once they are revoked even if they conspire with the untrusted cloud. Our scheme can achieve secure user revocation with the help of polynomial function.
- ❖ Our scheme is able to support dynamic groups efficiently, when a new user joins in the group or a user is revoked from the group, the private keys of the other users do not need to be recomputed and updated.
- ❖ We provide security analysis to prove the security of our scheme.

ADVANTAGES OF PROPOSED SYSTEM:

- ✓ The computation cost is irrelevant to the number of revoked users in RBAC scheme. The reason is that no matter how many users are revoked, the operations for members to decrypt the data files almost remain the same.
- ✓ The cost is irrelevant to the number of the revoked users. The reason is that the computation cost of the cloud for file upload in our scheme consists of two verifications for signature, which is irrelevant to the number of the revoked users. The reason for the small

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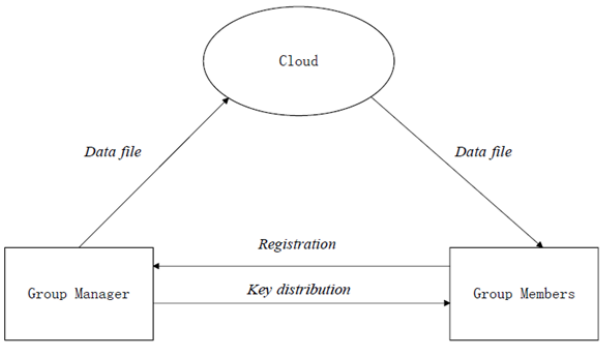
computation cost of the cloud in the phase of file upload in RBAC scheme is that the verifications between communication entities are not concerned in this scheme.

- ✓ In our scheme, the users can securely obtain their private keys from group manager Certificate Authorities and secure communication channels. Also, our scheme is able to support dynamic groups efficiently, when a new user joins in the group or a user is revoked from the group, the private keys of the other users do not need to be recomputed and updated.

SYSTEM ARCHITECTURE:



IMPLEMENTATION

MODULES:

1.Cloud Module
2.Group Manager Module
3.Group Member Module
4.File Security Module
5.Group Signature Module
6. User Revocation Module.

MODULES

1. Cloud Module :

In this module, we create a local Cloud and provide priced abundant storage services. The users can upload their data in the cloud. We develop this module, where the cloud storage can be made secure.

However, the cloud is not fully trusted by users since the CSPs are very likely to be outside of the cloud users' trusted domain. Similar to we assume that the cloud server is honest but curious. That is, the cloud server will not maliciously delete or modify user data due to the protection of data auditing schemes, but will try to learn the content of the stored data and the identities of cloud users.

2. Group Manager Module:

Group manager takes charge of followings,

1. System parameters generation,
2. User registration,
3. User revocation, and
4. Revealing the real identity of a dispute data owner.

Therefore, we assume that the group manager is fully trusted by the other parties. The Group manager is the admin. The group manager has the logs of each and every process in the cloud. The group manager is responsible for user registration and also user revocation too.

3. Group Member Module :

Group members are a set of registered users that will store their private data into the cloud server and Share them with others in the group. Note that, the group membership is dynamically changed, due to the staff resignation and new employee participation in the company. The group member has the ownership of changing the files in the group. Whoever in the group can view the files which are uploaded in their group and also modify it.

4. File Security Module :

1. Encrypting the data file. 2. File stored in the cloud can be deleted by either the group manager or the data owner. (i.e., the member who uploaded the file into the server).

5. Group Signature Module:

A group signature scheme allows any member of the group to sign messages while keeping the identity secret from verifiers. Besides, the designated group

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manager can reveal the identity of the signature's originator when a dispute occurs, which is denoted as traceability.

CONCLUSION:

In this paper, we design and Implement a secure anti-collusion data sharing scheme for dynamic groups in the cloud. In our scheme, the users can securely obtain their private keys from group manager Certificate Authorities and secure communication channels. Also, our scheme is able to support dynamic groups efficiently, when a new user joins in the group or a user is revoked from the group, the private keys of the other users do not need to be recomputed and updated. Moreover, our scheme can achieve secure user revocation; the revoked users can not be able to get the original data files once they are revoked even if they conspire with the untrusted cloud.

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