Multi-Authority: Using ABE to Control Cloud Data Access of User Multi-Authority

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Abstract — Attribute-based Encryption is one of the most suitable schemes for data access control in public clouds for it can ensures data owners direct control over data and provide a fine-grained access control service. To handle these security problems, various schemes based on the Attribute-Based Encryption have been proposed recently. Attribute-based Encryption (ABE) is a cryptographic conducting tool to guarantee data owner's direct control over their data in public cloud storage. ABE is an encryption method used by the user to store the data in the cloud. ABE is a public-key based one to many encryption methodologies which allows users to encrypt and decrypt data based on user attributes. In this paper we studied various schemes of ABE like KP-ABE, CP-ABE, Anony Control and Anony Control-F, also we analyzed how data access privilege and data sharing can be controlled by using various schemes of ABE. In this Manage cloud data access opportunity and anonymity with fully anonymous with secure status, a semi anonymous privilege control system AnonyControl to address not only the data privacy, but also the user identity privacy in prevailing access control systems are accessible. AnonyControl decentralizes the central authority to bound the identity leakage and so attains semi anonymity. Here, the privileges of all processes on the cloud data can be accomplished in a fine-grained manner. Successively, the AnonyControl-F, which fully prevents the identity leakage and achieve the full anonymity is presented.

Keywords — Attributes-Based Encryption, data storage, Multi-Authority, cloud computing.

1. INTRODUCTION

Cloud computing is a revolutionary computing technique, by which computing resources are provided dynamically via Internet and the data storage and computation are outsourced to someone or some party in a cloud. Till now, there are many ABE schemes proposed, which can be divided into two categories; Key Policy Attribute based Encryption (KP-ABE) as well as Ciphertext Policy Attribute-based Encryption (CPABE). In KP-ABE schemes, decrypt keys are combined with access structures and in ciphertexts it is labeled with special attribute sets, for attribute management and key distribution an authority is responsible. The authority may be the human resource department in a company, the registration office in a university, etc. The data owner defines the access policies and encrypts the data according to the defined policies. Every user will be issued a secret key reflecting its attributes. A user can decrypt the data whenever its attributes match the access policies. Access control methods ensure that authorized user access data of the system. Access control is a policy or procedure that allows, denies or restricts access to system. It also monitors and record all attempts made to access a system. Access Control can also identify unauthorized users attempting to access a system. It is a mechanism which is very much important for protection in computer security. The Cloud storage is a very important service in cloud computing. The Cloud Storage offers services for data owners to host their data over cloud environment. A big challenge to data access control scheme is data hosting and data access services. Because data owners do not completely trust the cloud servers also they can no longer rely on servers to do access control, so the data access control becomes a challenging issue in cloud storage systems. Therefore the decentralized data access control scheme is introduced. To achieve secure data transaction in cloud, suitable cryptography method is used. The data owner must after encryption of the file, store to the cloud. If a third person downloads the file, they can view the record if they had the key which is used to decrypt the encrypted file. To overcome the problem Cloud computing is one of the emerging technologies, which contains huge open distributed system. It is important to protect the data and privacy of user. Now a day's cloud computing is an intelligently developed technology to store data from number of client. Cloud computing allows users to remotely store their data over cloud. Remote backup system is the progressive technique which minimizes the cost of implementing more memory in an organization. It helps government agencies and enterprises to reduce financial overhead of data management. They can extract their data backups remotely to third party cloud storage providers than maintaining their own data centres. An individual or an organization does not require purchasing the storage devices. Instead they can store their data to the cloud and archive data to avoid information loss in case of system failure like hardware or software

failures. Cloud storage is more flexible, but security and privacy are available for the outsourced data becomes a serious concern.

2. LITERATURE SURVEY

Mr. ParjanyaC.A and Mr. Prasanna Kumar describe the concept of Advance Secure Multi-Owner Data Sharing for Dynamic Groups in the Cloud in March 2014. They were presented the new framework for MONA. In this method further presented how to manage the risks like failure of group manager by increasing the number of backup group manager, hanging of group manager in case number of requests more by sharing the workload in multiple group managers. This method claims required efficiency, scalability and most importantly reliability. Extensive analyses show that proposed scheme satisfies the desired security requirements and guarantees efficiency as well. Here it also show that how user gets extra time even after the time out this also one of the advantage of proposed schema.

Matthew Pirretti and Brent Waters introduce a novel secure information management architecture based on emerging attribute-based encryption (ABE) primitives also they propose cryptographic optimizations in Secure Attribute Based Systems in 2007. A performance analysis of ABE system and example applications demonstrates the ability to reduce cryptographic costs by as much as 98% over previously proposed constructions. Through this, demonstrates that the attribute system is an efficient solution for securely managing information in large, loosely-coupled, distributed systems. Decryption decrypts a ciphertext encrypted by the Encryption. This process begins with the decrypting party verifying that they have the required attributes. The party performing decryption will then use their attributes to decrypt the decrypt the ciphertext in order to obtain the AES and HMAC key.

Junbeom Hur, Dong Kun Noh introduces the concept of Attribute-Based Access Control with Efficient Revocation in Data Outsourcing Systems in May 16, 2012. The attribute based crypto-systems were introduced such as Ciphertext-Policy Attribute-Base Encryption (CP-ABE) with an addition of two new functions. The first function is KEKGen(U)) which is used to generate keys to encrypt attributes for groups. The other extra function is the ReEncrypt(CT;G) which is a reencryption that takes the ciphertext and re-encrypt it so that a user in Group G can only access it.

3. EXISTING SYSTEM

- Various techniques have been proposed to protect the data contents privacy via access control. Identity-based encryption (IBE) was first introduced by Shamir, in which the sender of a message can specify an identity such that only a receiver with matching identity can decrypt it.
- Few years later, Fuzzy Identity-Based Encryption is proposed, which is also known as Attribute-Based Encryption (ABE).
- The work by Lewko *et al.* and Muller *et al.* are the most similar ones to ours in that they also tried to decentralize the central authority in the CP-ABE into multiple ones.
- Lewko *et al.* use a LSSS matrix as an access structure, but their scheme only converts the AND, OR gates to the LSSS matrix, which limits their encryption policy to boolean formula, while we inherit the flexibility of the access tree having threshold gates.
- Muller *et al.* also supports only Disjunctive Normal Form (DNF) in their encryption policy.

DISADVANTAGES OF EXISTING SYSTEM:

- The identity is authenticated based on his information for the purpose of access control (or privilege control in this paper).
- Preferably, any authority or server alone should not know any client's personal information.
- The users in the same system must have their private keys re-issued so as to gain access to the re-encrypted files, and this process causes considerable problems in implementation.

4. PRPOSED SYSTEM

In this Project, we show how *AnonyControl-F* extends the User Revocation algorithm with a hierarchical structure to improve scalability and flexibility while at the same time inherits the feature of fine-grained access control. Second, we demonstrate how to implement a full-fledged access control scheme for cloud computing. The scheme provides full support for hierarchical user grant, file creation, file deletion, and user revocation in cloud computing. Third, we formally prove the security of the proposed scheme based on the security Cloud computing is an emerging computing paradigm in which resources of the computing infrastructure are provided as services over the Internet. As promising as it is, this paradigm also brings forth many new challenges for data security and access control when users outsource sensitive data for sharing on cloud servers, which are not within the same trusted domain as data owners. To keep sensitive user data confidential against un-trusted servers, existing solutions usually apply cryptographic methods by disclosing data decryption keys only to authorized users. However, in doing so, these solutions inevitably introduce a heavy computation overhead on the data owner for key distribution and data management when fine grained data access control is desired, and thus do not scale well. The

problem of simultaneously achieving fine-grainedness, scalability, and data confidentiality of access control actually still remains unresolved. This paper addresses this challenging open issue by, on one hand, defining and enforcing access policies based on data attributes, and, on the other hand, allowing the data owner to delegate most of the computation tasks involved in fine grained data access control to un-trusted cloud servers without disclosing the underlying data contents.

5. RELATED WORK

MODULES (PHASE 1):

1. Attribute Authorities
2. Data Owners
3. Cloud Server
4. Data Consumers

MODULES DESCRIPTION:

Attribute Authorities:
Every AA is an independent attribute authority that is responsible for entitling and revoking user's attributes according to their role or identity in its domain. In our scheme, every attribute is associated with a single AA, but each AA can manage an arbitrary number of attributes. Every AA has full control over the structure and semantics of its attributes. Each AA is responsible for generating a public attribute key for each attribute it manages and a secret key for each user reflecting his/her attributes.

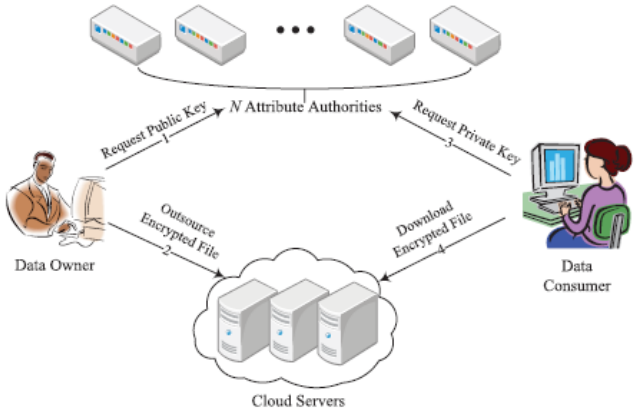
Data Consumers:
Each user has a global identity in the system. A user may be entitled a set of attributes which may come from multiple attribute authorities. The user will receive a secret key associated with its attributes entitled by the corresponding attribute authorities.

Data Owners:
Each owner first divides the data into several components according to the logic granularities and encrypts each data component with different content keys by using symmetric encryption techniques. Then, the owner defines the access policies over attributes from multiple attribute authorities and encrypts the content keys under the policies.

Cloud Server:
Then, the owner sends the encrypted data to the cloud server together with the cipher-texts. They do not rely on the server to do data access control. But, the access control happens inside the cryptography. That is only when the user's attributes satisfy the access policy defined in the cipher text; the user is able to decrypt the ciphertext. Thus, users with different attributes can decrypt different number of content keys and thus obtain different granularities of information from the same data.

MODULES (PHASE 2):

User Revocation Based ABE ALGORITHM:
The concept of **attribute based encryption** is a type of public-key encryption in which the secret key of a user and the ciphertext are dependent about attributes. In a system, the decryption of a cipher text is possible only if the set of attributes of the user key matches the attributes of the cipher text. A crucial security feature of Attribute-Based Encryption is collusion-resistance: An adversary that holds multiple keys should only be able to access data if at least one individual key grants access.
Step 1: Select File attribute1 – say File name
Step 2: Convert the file name to Binary Codes
Step 3: Select File attribute 2 – say file size
Step 4 : Convert the file size to Binary Codes
Step 5: Perform AND Operation of File Attribute 1 and 2
Step 6: Perform OR Operation of File Attribute 1 and 2
Step 7: Result of AND Operation Stored as Secret Key
Step 8: Result of OR Operation Stored as Public Key.



6. CONCLUSION

This paper proposes a semi-anonymous attribute-based privilege control scheme AnonyControl and a fully-anonymous attribute-based privilege control scheme AnonyControl-F to address the user privacy problem in a cloud storage server. Using multiple authorities in the cloud computing system, our proposed schemes achieve not only fine-grained privilege control but also identity anonymity while conducting privilege control based on users' identity information. More importantly, our system can tolerate up to N − 2 authority compromise, which is highly preferable especially in Internet-based cloud computing environment. We also conducted detailed

security and performance analysis which shows that Anony- Control both secure and efficient for cloud storage system. The AnonyControl-F directly inherits the security of the
AnonyControl and thus is equivalently secure as it, but extra communication overhead is incurred during the 1-out-of-n oblivious transfer. One of the promising future works is to introduce the efficient user revocation mechanism on top of our anonymous ABE.

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