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File Hierarchy Attribute Using Cipher Text-Policy in Cloud Computing

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ABSTRACT

Ciphertext-policy attribute-based encryption (CP-ABE) has been a preferred encryption technology to solve the challenging problem of secure data sharing in cloud computing. The shared data files generally have the characteristic of multilevel hierarchy, particularly in the area of healthcare and the military. However, the hierarchy structure of shared files has not been explored in CP-ABE. In this paper, an efficient file hierarchy attribute-based encryption scheme is proposed in cloud computing. The layered access structures are integrated into a single access structure, and then, the hierarchical files are encrypted with the integrated access structure. The ciphertext components related to attributes could be shared by the files. Therefore, both ciphertext storage and time cost of encryption are saved.

Moreover, the proposed scheme is proved to be secure under the standard assumption. Experimental simulation shows that the proposed scheme is highly efficient in terms of encryption and decryption. With the number of the files increasing, the advantages of our scheme become more and more conspicuous.

INTRODUCTION

With the burgeoning of network technology and mobile terminal, online data sharing has become a new "pet", such as Facebook, MySpace, and Badoo. Meanwhile, cloud computing is one of the most promising application platforms to solve the explosive expanding of data sharing. In cloud computing, to protect data from leaking, users need to encrypt their data before being shared. Access control is paramount as it is the first line of defense that prevents unauthorized access to the shared data. Recently, attribute-based encryption (ABE) has been attracted much more attentions since it can keep data privacy and realize fine-grained, one-to-many, and noninteractive access control. Ciphertext-policy attribute based encryption (CP-ABE) is one of feasible schemes which has much more flexibility and is more suitable for general applications

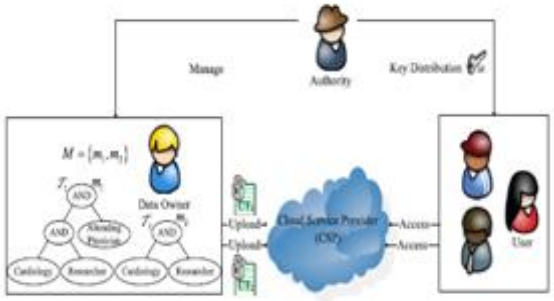

Fig. 1. An example of secure data sharing in cloud computing.

In cloud computing, as illustrated in Fig. 1, authority accepts the user enrollment and creates some parameters. Cloud service provider (CSP) is the manager of cloud servers and provides multiple services for client. Data owner encrypts and uploads the generated ciphertext to CSP. User downloads and decrypts the interested ciphertext from CSP. The shared files usually have hierarchical structure. That is, a group of files are divided into a number of hierarchy subgroups located at different access levels. If the files in the same hierarchical structure could be encrypted by an integrated access structure, the storage cost of ciphertext and time cost of encryption could be saved.

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EXISTING SYSTEM:

- Sahai and Waters proposed fuzzy Identity-Based Encryption (IBE) in 2005,which was the prototype of ABE. Latterly, a variant of ABE named CP-ABE was proposed.
- Since Gentry and Silverberg proposed the first notion of hierarchical encryption scheme, many hierarchical CP-ABE schemes have been proposed. For example, Wang et al. proposed a hierarchical ABE scheme by combining the hierarchical IBE and CP-ABE.
- Wan et al. proposed hierarchical ABE scheme. Later, Zou gave ahierarchical ABE scheme, while the length of secret key is linear with the order of the attribute set. A ciphertextpolicy hierarchical ABE scheme with short ciphertext is also studied.
- In these schemes, the parent authorization domain governs its child authorization domains and a top-level authorization domain creates secret key of the next-level domain. The work of key creation is distributed on multiple authorization domains and the burden of key authority center is lightened.

DISADVANTAGES OF EXISTING SYSTEM:

- In Existing System time and cost for encryption is high.
- No any special multiple hierarchical files are used.
- Decryption system time and computation cost are very high.

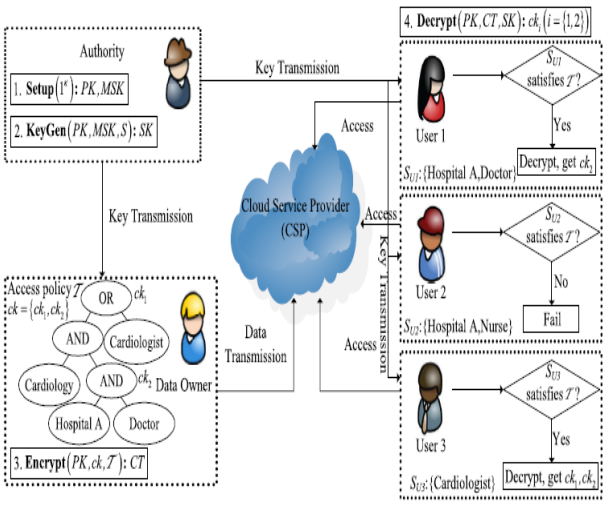
PROPOSED SYSTEM:

- In this study, an efficient encryption scheme based on layered model of the access structure is proposed in cloud computing, which is named file hierarchy CP-ABE scheme (or FH-CP- ABE, for short). FH-CP- ABE extends typical CP-ABE with a hierarchical structure of access policy, so as to achieve simple, flexible and fine-grained access control.
- The contributions of our scheme are three aspects.
- Firstly, we propose the layered model of access structure to solve the problem of multiple hierarchical files sharing. The files are encrypted with one integrated access structure.
- Secondly, we also formally prove the security of FH-CP- ABE scheme that can successfully resist chosen plaintext attacks (CPA) under the Decisional Bilinear Diffie-Hellman (DBDH) assumption.
- Thirdly, we conduct and implement comprehensive experiment for FH-CP-ABE scheme, and the simulation results show that FH-CP- ABE has low storage cost and computation complexity in terms of encryption and decryption.

ADVANTAGES OF PROPOSED SYSTEM:

- CP-ABE feasible schemes which has much more flexibility and is more suitable for general applications
- Multiple hierarchical files sharing are resolved using layered model of access structure.
- In proposed system both ciphertext storage and time cost of encryption are saved.

SYSTEM ARCHITECTURE:



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MODULE DESCRIPTION

System Model

- In the first module, we develop the System Model to implement our proposed system. Our System model consists of Admin, users, data owners, and Cloud Servers. Admin provides the accessibility to Data-owners. Initially Data-owner needs to register and admin approves the each data owner request. The respective Password and login credentials will be sent to the Email ID of Data owner.
- In Users sub-module, 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.
- In data owners sub-module, the proposed scheme should allow new data owners to enter this system without affecting other data owners or data users, i.e., the scheme should support data owner scalability in a plug-and-play model.
- In Cloud Server sub-module of system model, the owner sends the encrypted data to the cloud server through Admin. 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

Data User Authentication

To prevent attackers from pretending to be legal data users performing searches and launching statistical attacks based on the search result, data users must be authenticated before the administration server re-encrypts trapdoors for data users. Traditional authentication methods often follow three steps. First, data requester and data authenticator share a secret key, say, k0. Second, the requester encrypts his personally identifiable information d0 using k0 and sends the encrypted data (d0)k0 to the authenticator. Third, the authenticator decrypts the received data with k0 and authenticates the decrypted data.

The key point of a successful authentication is to provide both the dynamically changing secret keys and the historical data of the corresponding data user.

Illegal Search Detection

- In our scheme, the authentication process is protected by the dynamic secret key and the historical information. We assume that an attacker has successfully eavesdropped the secret key. Then he has to construct the authentication data; if the attacker has not successfully eavesdropped the historical data, e.g., the request counter, the last request time, he cannot construct the correct authentication data. Therefore this illegal action will soon be detected by the administration server.
- Further, if the attacker has successfully eavesdropped all data of Uj , the attacker can correctly construct the authentication data and pretend himself to be Uj without being detected by the administration server. However, once the legal data user Uj performs his search, since the secret key on the administration server side has changed, there will be contradictory secret keys between the administration server and the legal data user. Therefore, the data user and administration server will soon detect this illegal action.

Search over Multi-owner

The proposed scheme should allow multi-keyword search over encrypted files which would be encrypted with different keys for different data owners. It also needs to allow the cloud server to rank the search results among different data owners and return the top-

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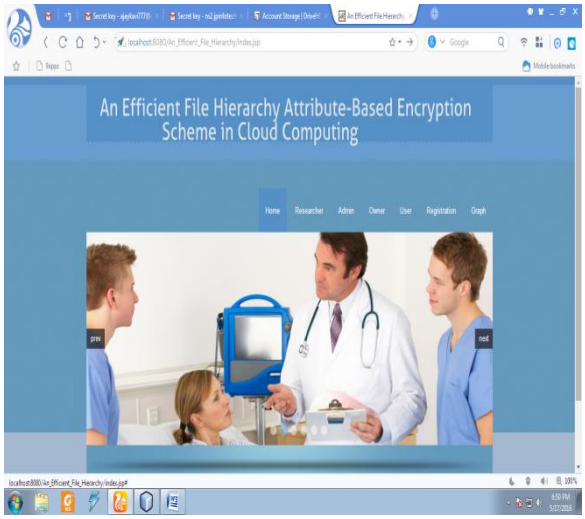
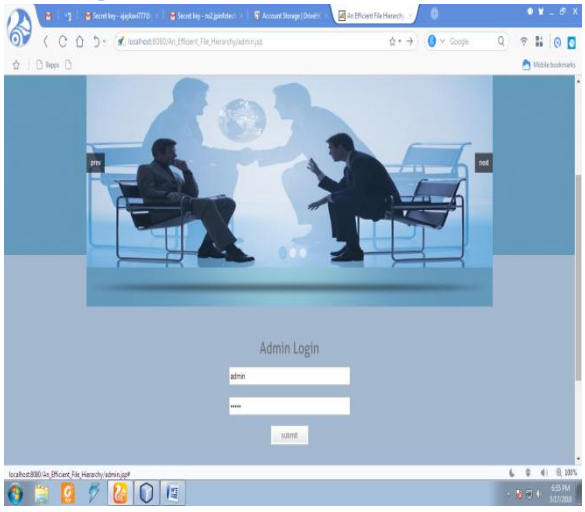
k results. The cloud server stores all encrypted files and keywords of different data owners. The administration server will also store a secret data on the cloud server. Upon receiving a query request, the cloud will search over the data of all these data owners. The cloud processes the search request in two steps. First, the cloud matches the queried keywords from all keywords stored on it, and it gets a candidate file set. Second, the cloud ranks files in the candidate file set and finds the most top-k relevant files. Finally, we apply the proposed scheme to encode the relevance scores and obtain the top-k search results.

SCREEN SHOTS:

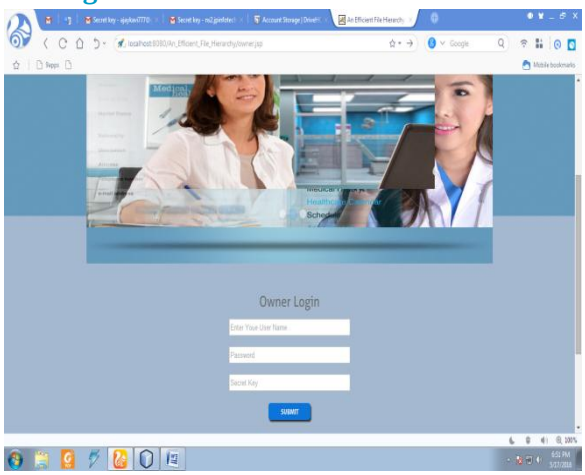
Home:



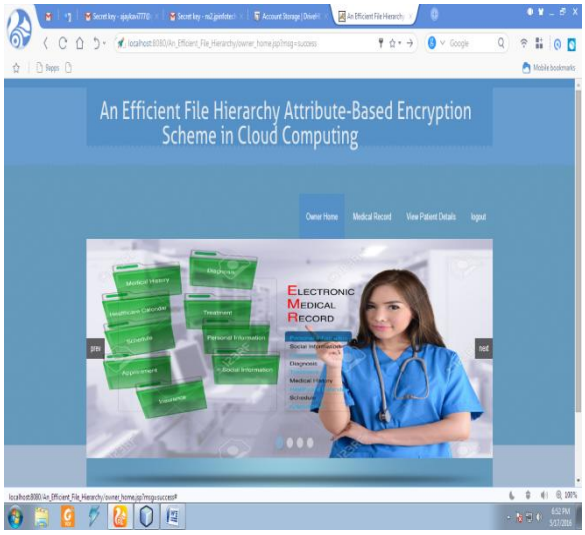
Admin Login



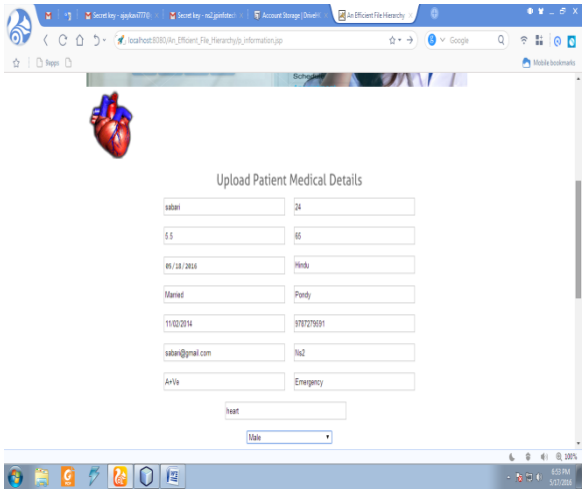
Owner login



Owner Home:



Upload patient medical details



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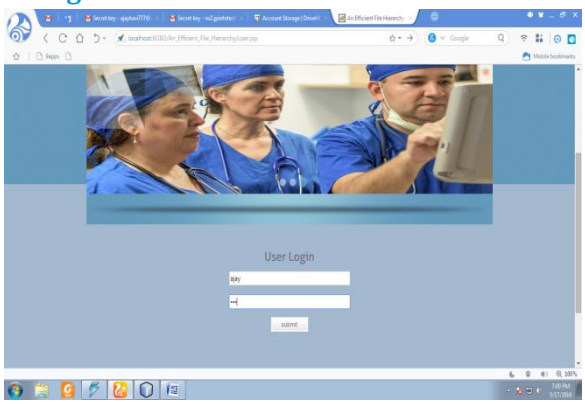
User Login



CONCLUSION

In this paper, we proposed a variant of CP-ABE to efficiently share the hierarchical files in cloud computing. The hierarchical files are encrypted with an integrated access structure and the ciphertext components related to attributes could be shared by the files. Therefore, both ciphertext storage and time cost of encryption are saved. The proposed scheme has an advantage that users can decrypt all authorization files by computing secret key once. Thus, the time cost of decryption is also saved if the user needs to decrypt multiple files. Moreover, the proposed scheme is proved to be secure under DBDH assumption.

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