"Key-Policy Attribute-Based Encryption with Equality Test in Cloud Computing"

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Abstract
Privacy of data is an important concept while we upload, download data on the cloud. The term cloud computing is adopted widely in daily life and industrial production. Many individuals and companiesare motivated to outsource their data and services to clouds. When user wants to put or save his/her confidential data on cloud he/she encrypts the sensitive data under an access policy and also build a secure index for the set of keywords. The concept of Public- key encryption with keyword search (PEKS)is convenient for users to use the data without compromising privacy. Concept of Public- key encryption with keyword search (PEKS)is convenient for users to use the data without leaking privacy. Public key encryption algorithm supports plaintext equality test and user-specified authorization. Here public key encryption with equality test is concatenated with key- policy attribute-based encryption (KP-ABE) to present key-policy attribute-based encryption with equality test (KP- ABEwET). Key policy attribute based encryption is an important cryptographic primitive for user's outsourced data. This system gives us clear view for preserving the information confidentiality of user with the concept of Equality test and public key encryption.
The concept of Diffie Hellman algorithm is used for key exchange in public network.

Keywords: Cloud computing, Encryption,Public key encryption, Equality test, Attribute based encryption

Introduction

The concept of public key encryption is widely used in the case of providing security. It is the scheme where largenumber of values used to encrypt the data. So this concept is useful while storing user confidential data or information. Key policy attribute base encryption is the scheme where plaintext and cipher text terms areused. While cipher text term is used by sender with set of descriptive attribute set while private key is issued by trusted party. This scheme is suitable for structured organization which follows rules about who may read the document. The recommended system uses the term equality test to check whether two cipher texts contain same text after decryption. To provide more accurate encrypted data attribute based encryption is used. So with the help of key policy attribute based encryption is a scheme we can store sensitive data on cloud safely.

To provide more security to our data here we use policy based encryption. It means setof rules which are used to design emails and to encrypt any email based on predefined conditions. With the help this concept key policy attribute based encryption enable sender to decrypt the message under the set of some rules and attributes. Private key is the concept of encryption mechanism that specifies the key in which cipher text can hold will be allowed to decrypt the messages. Equality test of strings is the termused to check two strings or data entered by user. By using the concept of equality test we can check two different cipher text contains the same message.

The concept of public key encryption search can perform keyword searches over cipher texts without decrypting them. Data confidentiality and privacy is a set of rules that protects a certain type of information byplacing some restrictions on it. It is an essential requirement for cloud storage sincethe cloud service provider, which stores the data, is normally unauthorized to access its content.

KP-ABE is the mechanism which uses users'secret keys generated based on an accesstree that defines the privileges scope of the concerned user and data are encrypted over aset of attributes.

Cipher text policy attribute-based encryption is the mechanism associated with the access policy and the encrypting party determines the policy under which the data can be decrypted, while the secret key is associated with a set of attributes.

Diffie-Hellman key exchange policy:

The Diffie–Hellman is a key exchange protocol which enables the two parties communicating over public network to establish a secret connection without being transmitted over the Internet. Diffie Hellmanenables the two to use a public key to encrypt and decrypt their conversation or data using symmetric cryptography.

This channel is used by the systems to exchange a private key. This private key is then used to do symmetric encryption between the two systems.

The Diffie-Hellman algorithm was one of the earliest known asymmetric keyimplementations. The Diffie-Hellman algorithm is mostly used for key exchange.

Literature Survey

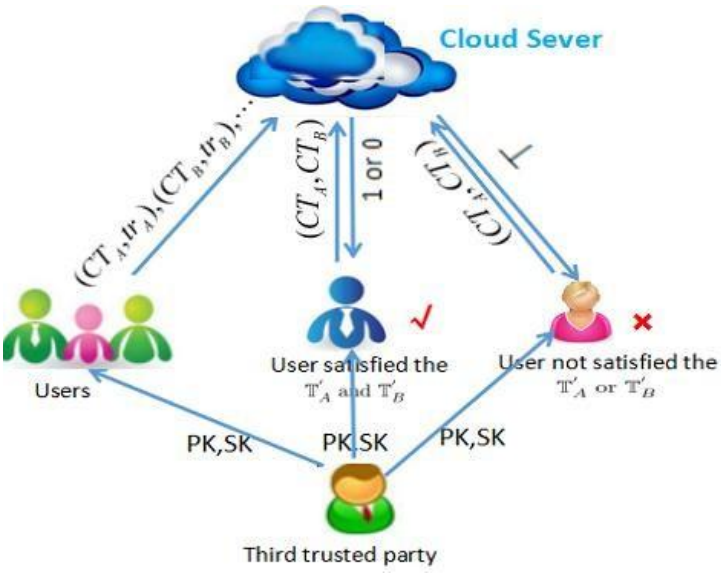
D. Boneh G. D. Crescenzo, R. Ostrovsky, and G. Persiano proposed key-policyattribute-based encryption (KP-ABE) in 2004. They said that the underlying cryptosystem combines the secret key and the access structure.
Bethen court et al. proposed cipher text policy attribute-based encryption (CP-ABE) in 2007, which combines the cipher text and the access structure.
New cryptosystem called public key encryption with equality test (PKE-ET) has been introduced in 2010. This proposed system can test whether two cipher texts contain the same plaintexts without decryption.
Amit Sahai stated that a user's private key will be associated with an arbitrary number of attributes expressed as strings. When a party encrypts a message in our system, theyspecify an associated access structure over attributes. A user will only be able to decrypt a cipher text if that user's attributes pass through the cipher text's access structure.
Yang et al presented a new cryptosystem called public key encryption with equality test (PKEwET). His proposed system can test whether two cipher texts contain the same plaintexts without decryption. However, this scheme allows anyone to perform such a test.Sahai, and B. Waters Proposed a key-policy attribute-based encryption (KP-ABE) scheme. It is the modified form of classical model of ABE. Exploring KP-ABE scheme, attribute policies are associated with keys and data is associated with attributes. The keys only associated with the policy that is to be satisfied by the attributes that are associating the data can decrypt the data.To protect data, confidential information, data security and privacy and different encryption technique in keyword search Changji Wang, Wentao Li, Yuan Li, and Xilei proposed the system A Cipher text Policy Attribute Based Encryption Scheme Supporting Keyword Search Function to support the system.
The sender uses the public key to perform the encryption, but the private key is kept secret from the receiver. This is also known as asymmetric key algorithm.
To define and construct a mechanism that enable user to provide a key to the gateway that enables the gateway to test whether the keyword in the email without learninganything else to test whether the word is a keyword in the email without learning anything else about the email. This mechanism of Public Key Encryption with keyword Search proposed by Giovanni Di Crescenzo.Public key encryption is a scheme is a public key encryption technique that is designed for one-to-many communications. In this scheme, data is associated with the attributes for which a public key is defined for each. In cryptography, plaintext is usually ordinary readable text before it is encrypted into cipher text, or readable text after it is decrypted. Data input to or output from encryption algorithms is not always plaintext.

Proposed System

In proposed system we combine the concept of public key encryption, equality test and attribute based encryption. We also provide here security model of our scheme. Key policy attribute based encryption with equality test in cloud computing is an extension for attribute based encryption.
Here user enters into the system with username and password. If user is new then he has to login with some data. Then he has to select appropriate option for performing action like upload data, download data, and view data which he already uploaded. Third Party Auditor is the Authorized person in cloud.TPA has a separate authentication in this system, using that TPA will login in to the system. TPA can view the registered user details and also TPA has authorization to provide key for the users.TPA will see thedetails and provide key
to the users.

Fig 1: Proposed System Architecture

In this system we combine the concept of public key encryption, equality test and attribute based encryption. We also provide here security model of our scheme. Key policy attribute based encryption with equality test in cloud computing is an extension for attribute based encryption.
User want to upload files then he first choose file form location. Then he has to send request to TPA for taking permission from admin, for this task he has to do Equality test. If it matches with the TPA keythen only he can upload documents.
File has been uploaded, then user has to test the file whether it is saved correctly. To test file user has to send request to Admin for testing



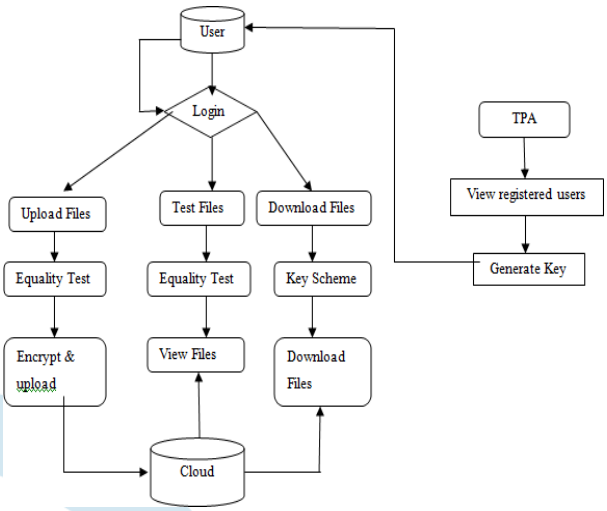


Fig 2: Working of proposed system

file, again equality test has been performed. If it matches then only user can see file material.

To download data from cloud user have to share his key provided at the time of login from admin, if the key matches then only user can download data from cloud.

User has to test the file whether it is saved correctly. To test file user has to send request to Admin for testing file, again equality test has been performed. If it matches then only user can see file material.

Algorithm

Key policy attribute based encryption withequality test scheme consists of six algorithms.

Setup (k): It takes a security parameter kas input, and then it outputs the public parameters pp and pk and the master key mk.

Encrypt (M, pk, S, S`): It takes a message M €'M', public key pk and two sets of attributes S, S` as inputs, and then it outputs the cipher text CT € C.

KeyGen (T, T`, S, S`, pp, mk): This algorithm takes as inputs the master key mk, two access trees T, T`, and two sets of attributes S, S` that satisfy T(S) = 1 and T`(S`) = 1, and it subsequently outputs the private key sk.

Trapdoor(S`, T`, mk): It takes mk, T` and S` as inputs, and it outputs the trapdoor td.

Decrypt (CT, sk, S, S`): It takes as inputsa cipher text CT € C, S, S` and the private key sk, and it outputs the message M if T(S)
= 1 and T` (S`) = 1. Here, CT is encrypted using the sets S and S`.

Test (CT_A, CT_B, td_A, td_B, S`): Suppose that $CT_A$ is a cipher text of the sets of attributes $S_A$ and $S`_A$and that CT_B is a cipher text of the sets of attributes S_B and $S`_B$. This algorithm takes as inputs two cipher texts $CT_A$, $CT_B$, the trapdoors $td_A$, $td_B$ and the set S` of attributes that satisfy $T`_A$ (S `) = 1 and $T`_B$ (S`) = 1, and then it outputs 1 if CT_A and CT_B contain the same message; otherwise, it returns 0.

Conclusion

From all the information we can conclude that new scheme provide fine authorization of data security. This scheme is an extensionfor attribute based encryption to solve the issue of that. Proposed scheme uses Equalitytest to provide more secure way for hiding confidential information. Security model of authorization is proven in this model.

Key policy attribute based encryption with equality test (KPABEwET) is the firstattempt to combine the concept of public key encryption that support equality test with attribute based encryption (ABE).

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