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SECURE DATA AND EFFICIENT CP-ABE FOR MULTI SERVER CLOUD STORAGE

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Abstract: Computing ability and storage space need of these devices are ever-increasing enormously, it demands the secure way of storing the data in cost efficient model. Cloud Computing has many advantages inherent in it, but yet there are several risks and constraint exists, for e.g. protection, data access control, efficiency, bandwidth, etc a novel remote data integrity checking model: CP-ABE,IDP (identity-based proxy) in multi-cloud storage. To analyze the efficiency of various well known cryptographic algorithms such as Identity-based cryptography, Proxy public key cryptography, these symmetric algorithms were implemented on cloud background and through the results derived from real time implementation of these algorithms on various handheld procedure, it is shown that which cryptographic technique can provide efficient and reliable security mechanism for information access control and security of user's outsourced information in cloud computing. Recently , fog server based three-layer architecture has been presented for secure storage employing multiple clouds. The essential techniques used are Hash-Solomon code and customized hash algorithm in order to attain the goal. Implementation loss of smaller portion of data to cloud server and failed to provide better modification detection and data recoverability. This project proposes a novel fog-centric secure cloud storage scheme to protect data against unauthorized access, modification, and destruction. To prevent illegitimate access, the proposed scheme employs a new technique Or-Combination to conceal data. Moreover, Block-Management outsources the outcomes of Or-Combination to prevent malicious retrieval and to ensure better recoverability in case of data loss. Simultaneously, this proposes a technique based on hash algorithm in order to facilitate modification detection with higher probability. It also explains a robustness of the proposed scheme through security analysis.

Index Terms - Data security, Cryptographic techniques; Identity-based cryptography, Proxy public key cryptographic-ABE

I. INTRODUCTION

Cloud Computing is an emerging knowledge and its popularity is increasing drastically day-by-day. Already a huge total of population has accepted it for their various personal and commercial uses and the counting is still incrementing. Normally Cloud storage services users to distantly outsource their data and have the benefit of on-demand high quality cloud application with no trouble of having local hardware and software tools. Although the advantages are understandable, such a overhaul is also taking up users 'physical control' of their outsourced information, which unavoidably creates new security threats towards the accuracy of the information in cloud. To start working on data access control, initially a study is necessary to find out effectiveness of cryptographic algorithms so that data operations on could be fast and consistent. computing ability from cloud computing technology and Internet convenience jointly is making a new surge, which is cloud computing for organizations.

Cloud computing comes with many advantages such as, due to high resource availability on cloud servers, member need not worry to have very high arrangement devices with them for efficiency and power performance also CSPs provide possessions in rental basis and are much more economical than buying expensive hardware. As user need to pay as per procedure and range of hardware chosen so it is scalable and user can limit their resources to make it under their budget. The most excellent part here is its global availability due to data storage on server side and accessibility over internet.

Key supervision is another vast area of research and still studies are going on to make key management more secured and resourceful. Let us in brief have a discussion regarding the security problems that take place with key management on devices with outsourcing information on cloud server. Common security problems in key management are

- ✓ Effectiveness in operations
- ✓ Strong protection of cryptographic algorithms
- ✓ Keys being fetch
- ✓ Keys being susceptible to hack or cooperation
- ✓ Supervision of all keys
- ✓ Requires to calculate linearly to manage many keys
- ✓ Permitting approved members access to their information

II. LITERATURE SURVEY

In [1] authors introduced a model for AES that allows a client that has outsourced data at an untrusted cloud to verify that the server possesses the unique data without downloading it. This model generates a probabilistic proof of possession through example random set of blocks from the server, which significantly reduces cost. The data owner maintain a constant amount of data to verify the proof. The request/response protocol transmits a little, constant amount of data, which reduces network statement. Thus, the AES model for remote information integrity checking supports the large information sets in widely-distributed storage scheme. The key component of this scheme is the homomorphism verifiable tags.

In [2] authors introduce the proficient and secured outsourced information is addressed either by public key cryptography or requiring the member to outsource its data in encrypted form called EPDP (Efficient-PDP). This technique is based completely on symmetric key cryptography and not require any bulk encryption. It allows dynamic data that efficiently support operation, such as block updation, deletion . Two different approaches PDP and POR have been proposed. The POR is a public key based technique allowing any verifier to query the server and obtain an interactive proof of information possession.

In [3] authors expected the POR method permits back-up examination to produce a concise proof that a client can retrieve a file F, that is, that the archive retain and dependably transmits file data sufficient for the user to recover F in its whole. A POR is a kind of cryptographic evidence of knowledge (POK), but one specially designed to handle a big file F. To discover POR protocols, in which the message expenses, memory accesses for the proven, and storage necessities of the member are small parameters fundamentally independent of the length of F. The goal of a POR is to achieve these checks without client having to regain the files themselves. A POR can also provide service with quality assurances.

In [4] authors introduce the problem of ensure the integrity of data storage. In particular, to think about the job of allow a third party auditor, on behalf of the consumer to verify the integrity of the energetic information stored in the cloud server. The introduction of third party auditor reduces the participation of the client through the auditing of whether their data in the cloud is certainly intact, which can be essential in achieving financial system of scale for Cloud Computing.

In [6] authors careful the cloud data storage space protection, which has always been an important aspect of ensures the accuracy of member data in the cloud, it is denote ineffective and flexible scattered confirmation scheme with two elements. By utilize the homomorphism token with flexible distributed verification achieves the storage space correctness and data error localization. Unlike the the popular past works, this system further

support safe and efficient dynamic operation son data blocks, including: information insert, update, delete and append.

III.METHODOLOGY

3.1 EXISTING SYSTEM

The formal system model and security model are existing models. In the PDP (Packet Data Protocol) model, the verifier can check remote data integrity with a high probability. Based on the ERSA, they designed two provably secure EPDP schemes. EPDP allow a verifier to verify the remote data integrity without retrieving or downloading the whole data. The verify only maintains small metadata to perform the integrity checking. EPDP is an exciting remote data integrity checking representation. In POR (*Partially-Ordered Ranks),* the verifier can check the remote data integrity and retrieve the remote data at any time. On some case the customer may delegate the remote data integrity checking task to the third party. It results in the third party auditing in cloud computing

DISADVANTAGES

- Does not provide efficiency in remote data integrity checking.
- More expensive.
- The existing system provides less flexibility.

3.2 PROPOSED SYSTEM

A fog-centric secure cloud storage method to protect data aligned with unauthorized access, modification, and destruction. The proposed scheme employs a new technique Xor-Combination to conceal data. Block-Management outsources the outcomes of Xor-Combination to prevent malicious retrieval and to ensure better recoverability in case of data loss. The proposed CP-ABE realize private verification, delegated verification and public verification

Advantages

- The distributed cloud storage is indispensable.
- Efficient and Flexible.

3.3 CRYPTOGRAPHIC APPROACH

The encryption algorithm is most frequently used technique to protect data within cloud environment. The data related to a customer can be categorized as public data and private data. The public data is sharable among trusted clients that provide an open environment for cooperation. In this paper propose a suitable method that cryptographic algorithms with different key length are used in various environment. The number of devices such as smart phones and smart pads grows rapidly recently. These two keys are the same or easy to deduce each other. The representatives of symmetric cryptosystem are *Identity-based cryptography, Proxy public key cryptography, CP-ABE***.** For an asymmetric cryptosystem, the receiver possesses private key. and public key .

SECURITY MODEL FOR CP-ABE

Setup. The challengers run the Setup algorithm and give the community constraint, PK to the opponent
Phase 1. The adversary makes repeated private keys corresponding to sets of attributes S1, . . . , Sq1 .
Challenge. The adversary submits two equal length messages M0 and M1. In addition the adversary gives a challenge access structure A∗ such that none of the sets S1, . . . , Sq1 from Phase 1 satisfy
the access structure. The challenger flips a random coin b, and encrypts Mb under A. The ciphertext CT* is given to the adversary.

Proposed solution consists of 4 phases, Setup Phase, Key Generation Phase, Encryption Phase and Decryption Phase.

Set Up:

The setup algorithm chooses a group F of prime order p and a generator g .

Step 1: A trust ability generate a tuple F=[p,F,F1,g Î F, e] ← Gen(1k) .

Step 2: For each attribute ai where 1 ≤i ≤n, the authority generates random value {ai,t Î *p Z } 1 ≤t ≤ni and computes {T i,t = *i t a g* , } 1 ≤t ≤ni

Step 3: Compute Y = e(g,g)α where α Î *p Z*

Step 4: The public key PK consists of [Y,p,F,F1 ,e ,{{T i,t } 1 ≤t ≤ni }1 ≤i ≤n]

The master key Mk is [α, {{ai,t Î *p Z* } 1 ≤t ≤ni} 1 ≤i ≤n]

3.4 System Model and Security Model of ID-PUIC

The system model and security model of IDP protocol. An IDP protocol consists of four different entities which are described below:

1) Original Client: an entity, which has massive data to be uploaded to PCS by the delegated proxy, can perform the remote data integrity checking.

2) PCS (Public Cloud Server): an entity, which is managed by cloud service supplier, has important storage space and computation resource to maintain the clients' data.

3) Proxy: an entity, which is authorized to process the Original Client's data and upload them, is selected and authorized by Original Client. When Proxy satisfies the warrant m! Which is signed and issued by Original-Client, it can process and upload the original client's data; otherwise, it can not perform the procedure.

4) *KGC* (Key Generation Center): an entity, when receiving an identity, it generates the private key which corresponds to the received identity.

An efficient ID-DPDP protocol. It is built from bilinear pairings which will be briefly reviewed below. Let F_1 and F_2 be two cyclic multiplicative groups with the same prime order q. Let e : F1 × F1 → F2 be a bilinear map which satisfies the subsequent property:

1) Bilinearity: ∀g1, g2, g3 ∈ F1 and a, b ∈ Zq

$$e(g1, g2g3) = e(g2g3, g1) = e(g2, g1)e(g3, g1)$$
$$e(g1^a, g2^b) = e(g1, g2)^{ab}$$

2) Non-degeneracy: $\exists_{g4, g5} \in$ F1 such that e(g4, g5) 6=1F2 .

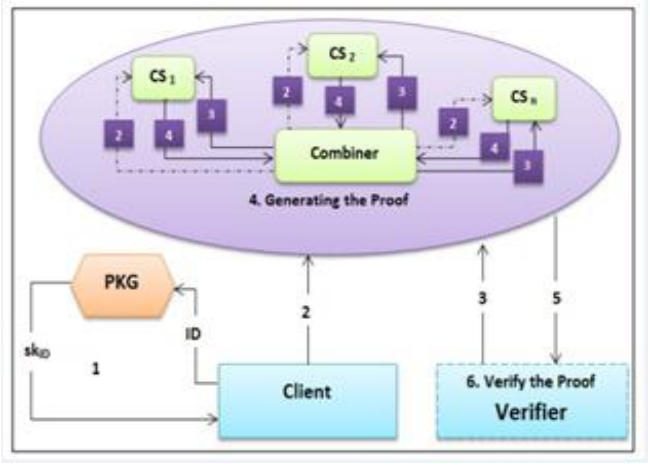

Fig .1 Architecture

3.5 System Model and Security Model of Proxy Public Key Cryptography

The proxy public key cryptography system model and security definition are presented in this section. An proxy public key cryptography protocol comprises four different entities which are illustrated in Figure 1. We describe them below:

1) *Client*: an entity, which has massive data to be stored on the multi-cloud for maintenance and computation, can be either individual consumer or corporation.

2) *CS* (Cloud Server): an entity, which is managed by cloud service provider, has significant storage space and computation resource to maintain the clients' data.

3) *Combiner*: an entity, which receives the storage request and distributes the block-tag pairs to the corresponding cloud servers. When receiving the challenge, it splits the challenge and distributes them to the different cloud servers. When receiving the responses from the cloud servers, it combines them and sends the combined response to the verifier.

4) *PKG* (Private Key Generator): an entity, when receiving the identity, it outputs the corresponding private key.

III. RESULTS AND DISCUSSION

The proposed method has been implemented using ASP.NET Technology. Extensive experiment were conducted to check good organization of symmetric algorithms on mobile background for encryption and decryption of data before outsourcing data to cloud servers. Implemented revealed performance of algorithms i.e. when executed for diverse no. of operations separately. Below the output of algorithm performance which were found in study: . An implemented in their entirety, the underlying database and policy enforcement systems were simulated with parameters chosen according to Table 1. To understand the performance implications of the different approaches, we varied the (i) protocol used, (ii) level of consistency desired, (iii) frequency of master policy updates, (iv) transaction length, and (v) number of servers available. Our experimentation framework consists of three main components a randomized transaction generator, a master policy server that controls the propagation of policy updates, and an array of transaction processing servers. Our experiments were run within a research lab consisting of window Os. These machines were running OSX 10.6.8 and had 1.83 GHz Intel Core Duo processors coupled with 2GB of RAM. All machines were connected to a gigabit Ethernet LAN with average round trip times of 0.35 ms. The Propose a Two-Phase Validation Commit (2PVC) protocol that ensures that a transaction is safe by checking policy, credential, and data consistency during transaction execution. Identifies transactions that are both trusted and conform to the ACID properties of distributed database systems. A transaction is safe by checking policy, credential, and data consistency during transaction execution. Most suitable in various situations.

Structure Model and Security Model Of IDP

Cloud server

It is a CSP in cloud computing. Server uses glassfish server and web services to communicate with mobile applications. Here SOAP is used for connection between client and server. Two types of servers are used

a) Storage server:

Here outsourced information is stored in the form of encrypted files. It is used for storage purpose only no computation is done.

b) Trusted hashing server:

This is THS server used for store log of hash of files for backup. Its computing display place performs both computations as well as storage of hash.

Database:

SQLSERVER is used as a database. Here encrypted user files are stored.

User Registration

This module is designed for new users who visit this project. The new user has to register with the proper details. This system requires a proper user authentication for accessing the features behind in this system. For getting the rights to accessing the features users have to register their identity to this system. Once registered the system will provides the accessibility rights to the users to work in this system.

File Upload

Not all files are straight stored in multiple clouds, but only the files that are verified by the trusted TPA are uploaded. If any corrupted file is loaded, then that file cannot be saved instead they may be deleted by the TPA. The File may be encrypted using the cryptographic key in which is at random generated.

File Division

The Cloud User who has a huge amount of data to be stored in several clouds and has the permissions to access and manipulate stored data. The member's Data is transformed into data blocks of different sizes for improving the efficiency of storage and as well as to improve the security of file.

File verification

Using the cryptographic key the file is encrypted and by using this key the file datas may be decrypted by the third party auditor for the verification process

File download

Only the verified Files can be downloaded by the File member. If the user wants to download their documents, the data stored in multi-cloud is integrated and downloaded.

View All Files

All the Files in the web including verified data and not-verified are viewed by the Administrator.

View File Owners

Registered File Owners are viewed by the Administrator. Admin can have the facility to contact the file owners and can monitor the storage space used by the file owners.

File Deletion

The Uploaded file can be deleted by the File Owner. The protection can be increased if we are making key certification along with the deletion process. One problem can arise is in the case of key remembrance.

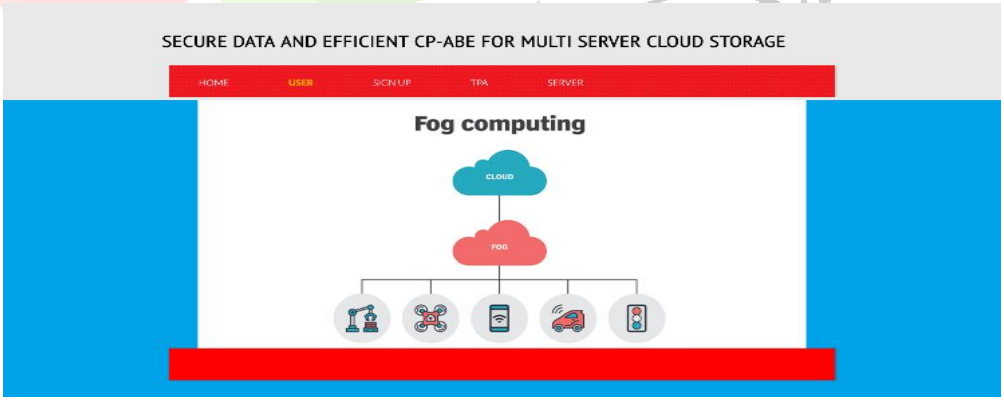

Fig 1 : Home Page

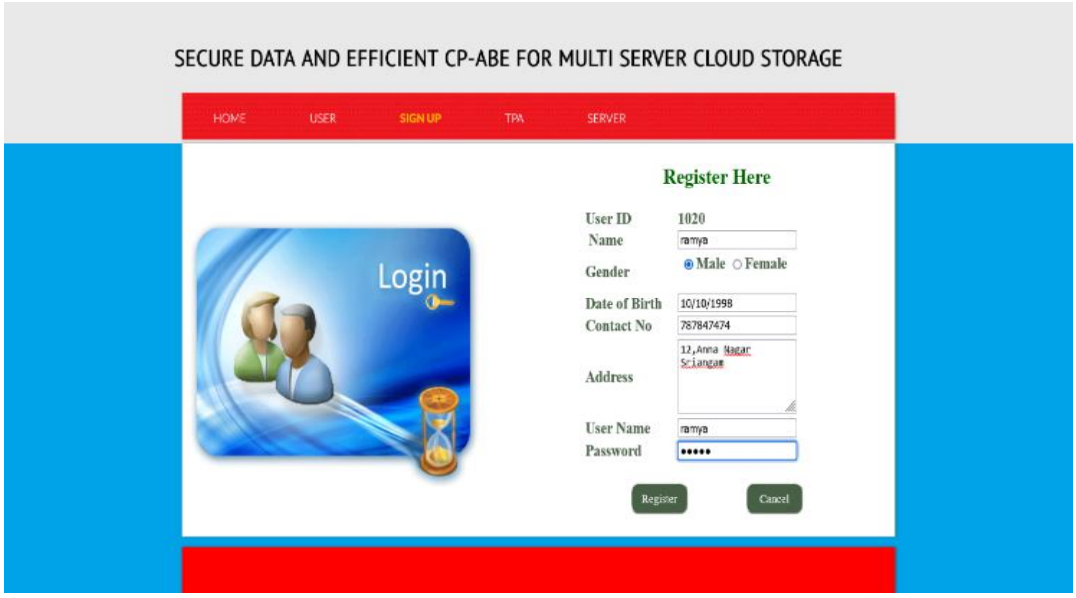

Fig 2 : User Registration

Fig 3 : User Login

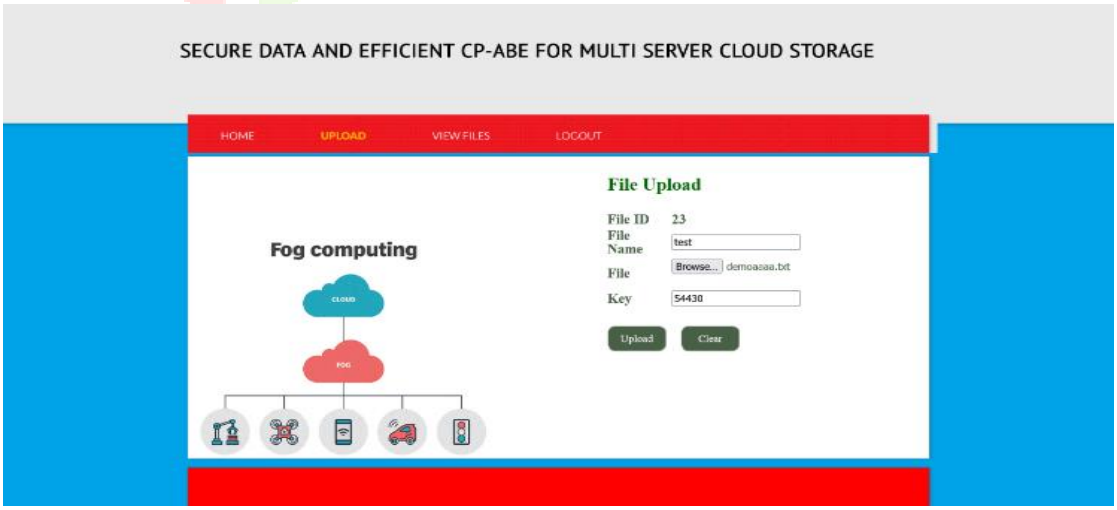

Fig 4: Data Upload

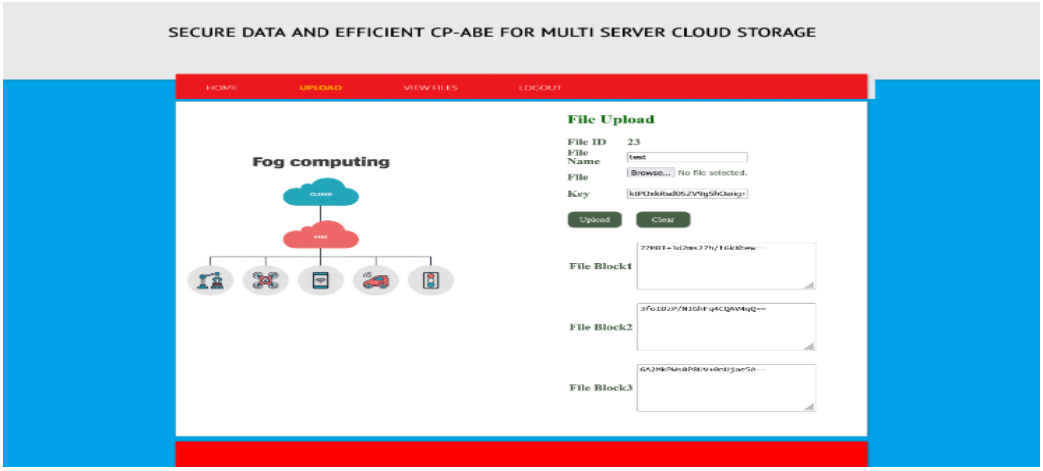

Fig 5: Data Upload

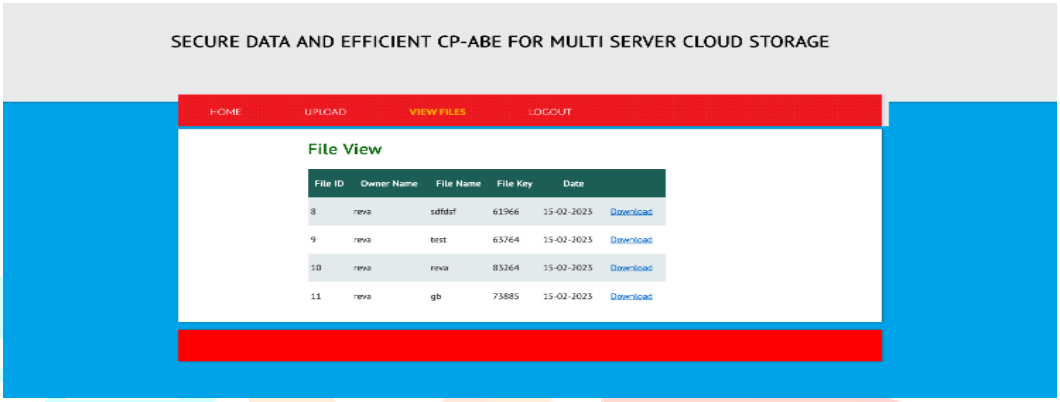

Fig 6: File View

V. CONCLUSION

With the increase of data security is becoming a serious issue for cloud service providers for which fog computing is a paradigm which helps in monitoring the behavior of the user and providing security to the users data. The system was developed only with email provision but we have also implemented this technique. In fog computing presenting a new approach for solving the problem of insider data theft attacks in a cloud using dynamically generated decoy files and also saving storage required for maintaining decoy files in the cloud. This technique in fog can minimize insider attacks in cloud. Cloud provides unprecedented levels of security in the cloud and in social networks.

FUTURE ENHANCEMENT

In our future work, this security system as we explained is applicable only for single cloud ownership system. If the cloud owner has a more than one clouds to operate then our security system will not be applicable for providing security, therefore in the future enhancement we can enhance our existing application to manage a cloud environment which has more than one cloud architecture. A grouping of attempt will be put in return to provision the suitable security to make business on cloud environments.

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