SECURITY BASED AUDITING IN CLOUD PANEL

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ABSTRACT

With cloud computing, users can remotely store their data into the cloud and use on-demand high-quality applications. Data outsourcing: users are relieved from the burden of data storage and maintenance When users put their data (of large size) on the cloud, the data integrity protection is challenging enabling public audit for cloud data storage security is important Users can ask an external audit party to check the integrity of their outsourced data. Purpose of developing data security for data possession at un-trusted cloud storage servers we are often limited by the resources at the cloud server as well as at the client. Given that the data sizes are large and are stored at remote servers, accessing the entire file can be expensive in input output costs to the storage server. Also transmitting the file across the network to the client can consume heavy bandwidths. Since growth in storage capacity has far outpaced the growth in data access as well as network bandwidth, accessing and transmitting the entire archive even occasionally greatly limits the scalability of the network resources. Furthermore, the input output to establish the data proof interferes with the on-demand bandwidth of the server used for normal storage and retrieving purpose. The Third Party Auditor is a respective person to manage the remote data in a global manner.

Keywords: ***Cloud computing, Third party auditor (TPA), Data privacy, Data centers, Cloud service providers (CSP).***

1. INTRODUCTION

Cloud computing has been envisioned as the next generation architecture of IT enterprise, due to its long list 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 into the Cloud. From users' perspective, including both individuals and enterprises, storing data remotely into the cloud in a flexible on-demand manner brings appealing benefits: relief of the burden for storage management, universal data access with independent geographical locations, and avoidance of capital expenditure on hardware, software, and personnel maintenances, etc . While these advantages of using clouds are unarguable, due to the opaqueness of the Cloud as separate administrative entities, the internal operation details of cloud service providers (CSP) may not be known by cloud users data outsourcing is also relinquishing user's ultimate control over the fate of their data.

As a result, the correctness of the data in the cloud is being put at risk due to the following reasons. First of all, although the infrastructures under the cloud are much more powerful and reliable than personal computing devices, they are still facing the broad range of both internal and external threats for data integrity. Examples of outages and security breaches of noteworthy cloud services appear from time to time. Secondly, for the benefits of their own, there do exist various motivations for cloud service providers to behave unfaithfully. Towards the cloud users regarding the status of their outsourced data. Examples include cloud service providers, for monetary reasons, reclaiming storage by discarding data that has not been or is rarely accessed or even hiding data loss incidents so as to maintain a reputation. In short, although outsourcing data into the cloud is economically attractive for the cost and complexity of long-term large-scale data storage, it does not offer any guarantee on data integrity and availability. This problem, if not properly addressed, may impede the successful deployment of the cloud architecture.

As users no longer physically possess the storage of their data, traditional cryptographic primitives for the purpose of data security protection cannot be directly adopted. Thus, how to efficiently verify the correctness of outsourced cloud data without the local copy of data files becomes a big challenge for data storage security in cloud computing. Note that simply downloading the data for its integrity verification is not a practical solution due to the expensiveness in I/O cost and transmitting the file across the network. Besides, it is often insufficient to detect the data corruption when accessing the data, as it might be too late for recover the data loss or damage. In this paper, we propose an effective and flexible distributed scheme with explicit dynamic data support to ensure the correctness of users' data in the cloud. We rely on erasure correcting code in the file distribution preparation to provide redundancies and guarantee the data dependability.

Considering the large size of the outsourced data and the user's constrained resource capability, the ability to audit the correctness of the data in a cloud environment can be formidable and expensive for the cloud users. Therefore, to fully ensure the data security and save the cloud users' computation resources, it is of critical importance to enable public auditability for cloud data storage so that the users may resort to a third party auditor (TPA), who has expertise and capabilities that the users do not, to audit the outsourced data when needed. Based on the audit result, TPA could release an audit report, which would not only help users to evaluate the risk of their subscribed cloud data services, but also be beneficial for the cloud service provider to improve their cloud based service platform . In a word, enabling public risk auditing protocols will play an important role for this nascent cloud.

II. LITERATURE SURVEY

2.1. TPA Review: Using Third Party Auditor for Cloud Data Security

Cloud data security is a major concern for the client while using the cloud services provided by the service provider. To resolve those issues, a third party can be used as an auditor. In this paper, we have analyses various mechanisms to ensure reliable data storage using cloud services. It mainly focuses on the way of providing computing resources in form of service rather than a product and utilities are provided to users over internet. The main goal of cloud computing concept is to secure and protect the data which come under the property of users. In the cloud, application and services move to centralized huge data center and services and management of this data may not be trustworthy, into cloud environment the computing resources are under control of service provider and the third-party-auditor ensures the data integrity over out sourced data. Third-party-auditor not

only read but also may be change the data. When two or more users are using data any time then consistency of data is more important because unauthorized person can use data and it can change or modify data or delete the data. Third Party Auditor can be used to ensure the security and integrity of data. Ashish Bhagat and Ravi Kant Sahu, which can be concluded As., Third party auditor can be a trusted third party to resolve the conflicts between the cloud service provider and the client. The third party auditor [2] ensures data integrity over out sourced data and proposed digital signature method to protect the privacy and integrity and integrity of outsourced data in cloud environment. TPA check the integrity of data on cloud on the behalf of users, in this solve the previous problem in Enabling public verifiability and data dynamics for storage security in cloud computing and privacy-preserving audit and extraction of digital contents.

2.2 Proof of Retrivability: Third Party Auditor privacy techniques

This keynote paper: there are more and more development for higher security process and benefit when using cloud computing services. Reducing cost, maintaining scale, and high availability are essential for the business to continuation for any techniques or technology. This paper mainly focuses on the survey of privacy techniques that has been proposed for the data integrity like POR (Proof of Retrivability), Dynamic- third Part Auditor (D-TPA), Cloud Economics etc in the cloud environment for the security. The main scheme [4], to support third-party auditing, where users can safely delegate the integrity checking tasks to third-party auditors (TPA) and are worry-free to use the cloud storage services. Vijayaraghavan U, Madonna Arieth R, Geethanjali which can be concluded at, according that TPA techniques are very useful for the integrity checking.TPA supports fully dynamic operation so it is possible to verify data in case of modification or deletion .This techniques can be manipulated to reduce the security overhead of the client as well as to minimize the computational of the storage server. The TPA [5] first selects fewer bits of the entire file and preprocesses the data. This fewer bits constitute metadata. This Meta data is encrypted and appended to the file and sent to the cloud. Then whenever the client needs to verify the data correctness and availability it challenges the cloud through TPA and the data it got is correct, then integrity is ensured. This scheme can be extended for data updating, deletion and insertion at the client side. This involves modification of fewer bits at the client side.

2.3 Cloud Storage: Efficient integrity checking Techniques

This paper presents an enhanced method for securing the TPA by using Keyed Hash Message Authentication Code (HMAC). Users store their data conscientiously in the cloud and return back when it is needed. But there is no assurance for the data stored in the cloud is secure and not changed by the cloud or Third Party Auditor (TPA).Users should be able to assist the TPA to overcome the integrity problems in cloud. Security in cloud can be implemented remotely by client where the data centres and protocols in the security objectives of the service provider are: i) confidentiality for securing the data access and transfer ii) auditability for checking whether the security aspect of applications has been tampered or not. One of the major problem affecting the cloud computing is the integrity of the cloud data. The threads of the data can overcome by using the assistance of a TPA.

Introducing a model for checking the integrity over the cloud computing with the support of TPA using Digital Signature Technique. The checking is performed over two parts: the cloud service provider (CSP) and TPA without giving any secure data. Users rely on the cloud server (CS) for cloud data storage and maintenance.

They may interact with the CS to access and update their stored data for various applications. The Third Party Auditor (TPA) eliminates the auditing of client to check where his data is stored in the cloud. Since the services in cloud computing are not limited to data backup ,so the dynamic support of data such as block modification, insertion and deletion is significant[7]. The main task is to guarantee that the TPA should not learn any knowledge about the content of data stored on cloud server during the auditing process, can be achieved by using the homomorphic non-linear authenticator and random masking.

In cloud storage [10], users will no longer posses the local copy of the outsourced data after storing the data. So the client should verify the integrity of the data stored in the remote entrusted server. To overcome these problems a remote integrity checking protocol. This protocol is suitable for providing integrity protection of cloud data. It also supports data insertion, modification, and deletion at the block level with the support of public verifiability. The efficient integrity techniques can be concluded as users store their data and no longer posses the data locally. In the distributed cloud servers, the correctness and availability of the data files being stored. One of the key issues is to effectively detect any unauthorized data modification and corruption. The Third Party Auditing allows to save the time and computation resources with reduced online burden of users. Security for the TPA can be provided by HMAC along with homomorphic tokens and erasure coded data.

2.4 Data Sharing: Efficient Distributed Accountability in Cloud

In this approach, we propose a Third party auditor(TPA) between data owner and cloud service provider(CSP) which reduce the burden of data owner to audit the data in the cloud and it also make the data owner free from worrying about the data lose in cloud storage . The JAR programmable capability which is used to create both dynamic and traveling object. When any access is made to the user's data will be trigger the authentication and automated logging control to JARs. A distributed auditing mechanism is used to control the users. The data owner will create the logger component in JAR file along with store the data items. The JAR file contains outer JAR and Inner JAR. The major accountability of JAR is to hold the authentication of entities and it requires accessing the data that are stored in the JAR file. Every Inner JAR consists of encrypted data and class files to recover the log file, the log file for every encrypted item. It supports four types of actions, i.e., perform has one of the following four values: view, download, timed access, and Location-based access.

We describe the encryption of the log file avoids the unauthorized change to the file by attackers. The log harmonizer is to hold the log file corruption and the logger send the error correction information in to the log harmonizer. To guarantee trustworthiness of the logs, every record is signed by the entity accessing the content. Every log harmonizer is in charge of copies of the logger components contains the similar set of data items. They can be accessed by the data owner or other authorized stakeholders at any time for auditing purposes with the aid of the log harmonizer. In this paper, we can conclude that the third party auditor to audit, not only audit the data but also enforce strong back-end protection if needed. Moreover, one of the main features of our work is that it enables the third party auditor to audit even those copies of its data that were made without his knowledge.

2.5. Controlling Data in the Cloud: Outsourcing Computation data without Outsourcing Control

In this paper, we characterize the problems and their impact on adoption. In our vision, integrity of the cloud infrastructure is ensured through the use of Trusted Computing. Potential vulnerabilities in the hypervisor or VM technology used by cloud vendors are a potential problem in multi-tenant architectures. The cloud user must protect the infrastructure used to connect and interact with the cloud, a task complicated by the cloud being outside the firewall in many cases. The enterprise authentication and authorization framework does not naturally extend into the cloud. The legal implications of data and applications being held by a third party are complex and not well understood. There is also a potential lack of control and transparency when a third party holds the data. The cloud can be implementation independent, but in reality regulatory compliance requires transparency into the cloud.

The rise of cloud computing has created enormous data sets that can be monetized by applications such as advertising. Google, for instance, leverages its cloud infrastructure to collect and analyse consumer data for its advertising network. This development has potential security implications, both in terms of data leaks, and in terms of the number of sources of data. Information-centric security is a natural extension of the trend toward finer, stronger, and more usable data protection. A capability encodes a search query, and the cloud can use this capability to decide which documents match the search query, without learning any additional information. UC Berkeley says “Cloud Computing is likely to have the same impact on software that foundries have had on the hardware industry.” We can conclude how to maintain security in the face of such attacks. Namely, the new threats require new constructions to maintain and improve security. Among these are tools to control and understand privacy leaks, perform authentication, and guarantee availability in the face of cloud denial-of-service attacks.

2.6 Secure and Scalable data in Cloud Computing

To keep sensitive user data confidential against untrusted servers, existing solutions usually apply cryptographic methods by disclosing data decryption keys only to authorized users. 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 untrusted cloud servers without disclosing the underlying data contents. We achieve this goal by exploiting and uniquely combining techniques of attribute-based encryption (ABE), proxy re-encryption, and lazy re-encryption. User secret keys are defined to reflect their access structures so that a user is able to decrypt a ciphertext if and only if the data file attributes satisfy his access structure. Such a design also brings about the efficiency benefit, as compared to previous works, in that, 1) the complexity of encryption is just related the number of attributes associated to the data file, and is independent to the number of users in the system; and 2) data file creation/deletion and new user grant operations just affect current file/user without involving system-wide data file update or re-keying [11]. We assume that the system is composed of the following parties: the Data Owner, many Data Consumers, many Cloud Servers, and a Third Party Auditor if necessary. To access data files shared by the data owner, Data Consumers, or *users* for brevity, download data files of their interest from Cloud Servers and then decrypt [10]. Moreover, this scheme can enable the data owner to delegate most of computation overhead to powerful cloud servers. Confidentiality of user access privilege and user secret key

accountability can be achieved. Formal security proofs show that our proposed scheme is secure under standard cryptographic models.

III. SYSTEM DESIGN

3.1 System Architecture

Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system the above consideration are taken into account for developing the proposed system.

The major part of the project development sector considers and fully survey all the required needs for developing the project. For every project Literature survey is the most important sector in software development process. Before developing the tools and the associated designing it is necessary to determine and survey the time factor, resource requirement, man power, economy, and company strength. Once these things are satisfied and fully surveyed, then the next step is to determine about the software specifications in the respective system such as what type of operating system the project would require, and what are all the necessary software are needed to proceed with the next step such as developing the tools, and the associated operations. As storage-outsourcing services and resource-sharing networks have become popular, the problem of efficiently proving the integrity of data stored at untrusted servers has received increased attention. In the provable data possession (PDP) model, the client preprocesses the data and then sends it to an untrusted server for storage, while keeping a small amount of Meta data. The client later asks the server to prove that the stored data has not been tampered with or deleted. The integrity of the cloud infrastructure is ensured through the use of Trusted Computing. In addition, we advocate the seamless extension of control from the enterprise into the cloud through the powerful combination of high-assurance remote server integrity, and cryptographic protocols supporting computation on cipher text. With our approach, content is protected in a manner consistent with policies, whether in the enterprise or the cloud.

1. Database
2. Data Owner
3. Management Server
4. Database Server
5. Third Party Auditor(TPA)
6. Application User

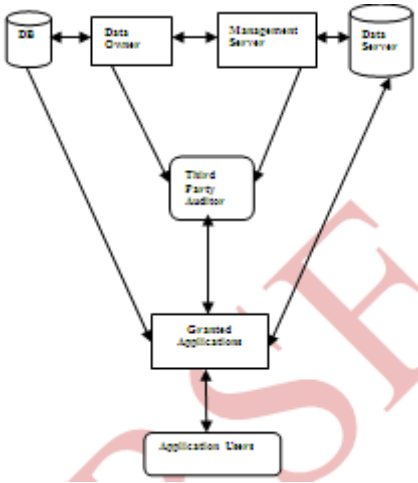

Fig.1 System Architecture

3.1.1 Database

A database is a system intended to organize, store, and retrieve large amounts of data easily. It consists of an organized collection of data for one or more uses, typically in digital form. One way of classifying databases involves the type of their contents, for example: bibliographic, document-text, statistical. Digital databases are managed using database management systems, which store database contents, allowing data creation and maintenance, and search and other access. Database architecture consists of three levels like External, Conceptual and Internal. The external level defines how users understand the organization of the data. A single database can have any number of views at the external level. The internal level defines how the data is physically stored and processed by the computing system. Internal architecture is concerned with cost, performance, scalability and other operational matters. The conceptual is a level of indirection between internal and external. It provides a common view of the database that is uncomplicated by details of how the data is stored or managed, and that can unify the various external views into a coherent whole.

3.1.2 Data Owner

Data owner refers to both the possession of and responsibility for information. Data Owner implies power as well as control. The control of information includes not just the ability to access, create, modify, package, derive benefit from, sell or remove data, but also the right to assign these access privileges to others.

3.1.3 Management Server

Management Server is the maintenance of web servers. When you have a fully managed server, your web host is responsible for some or all server maintenance. If your server is not fully managed, you are responsible for maintaining it or for hiring someone to maintain it for you.

3.1.4 Database Server

It is a computer program that provides database services to other computer programs or computers, as defined by the client–server model. The term may also refer to a computer dedicated to running such a program. Database management systems frequently provide database server functionality, and some DBMSs (e.g., MySQL) rely exclusively on the client–server model for database access. Such a server is accessed either through a "front end" running on the user's computer which displays requested data or the "back end" which runs on the server and handles tasks such as data analysis and storage.

3.1.5 Third Party Auditor (TPA)

In this module, Auditor views the all user data and verifying data. Auditor directly views all user data without key. Admin provided the permission to auditor. After auditing data, store to the cloud. In the cloud, application and services move to centralized huge data center and services and management of this data may not be trustworthy, into cloud environment the computing resources are under control of service provider and the third party auditor ensures the data integrity over out sourced data. Third party auditor not only read but also may be change the data. Therefore a mechanism should be provided to solve the problem. . TPA checks the integrity of data on cloud on the behalf of users, and it provides the reasonable way for users to check the validity of data in cloud.

3.1.6 Application Users

The Application Users is the highest level in the control structure. It is a view of all the objects you need while you are working. An application keeps track of all your projects while you develop programs. A project is a logical container for a set of files that define a Developer program or portion of a program. A project might contain files representing different tiers of a multi-tier application, for instance, or different subsystems of a complex application. These files can reside in any directory and still be contained within a single project.

IV. MODULES

1. Privacy-Preserving Public Auditing
2. Batch Auditing
3. Data Dynamics
4. Simply Archives
5. Sentinels
6. Verification Phase

4.1 Privacy-Preserving Public Auditing

Homomorphic authenticators are unforgeable verification metadata generated from individual data blocks, which can be securely aggregated in such a way to assure an auditor that a linear combination of data blocks is correctly computed by verifying only the aggregated authenticator. Overview to achieve privacy-preserving public auditing, we propose to uniquely integrate the homomorphic authenticator with random mask technique. In our protocol, the linear combination of sampled blocks in the server's response is masked with randomness generated by a pseudo random function (PRF).

The proposed scheme is as follows:

a. Setup Phase
b. Audit Phase

The TPA to perform the auditing without demanding the local copy of data and thus drastically reduces the communication and computation overhead as compared to the straight forward data auditing approaches. In our protocol, the linear combination of sampled blocks in the server's response is masked with randomness generated by the server. With random masking, the TPA no longer has all the necessary information to build up a correct group of linear equations and therefore cannot derive the user's data content, no matter how many linear combinations of the same set of file blocks can be collected.

4.2 Batch Auditing

With the establishment of privacy-preserving public auditing in Cloud Computing, TPA may concurrently handle multiple auditing delegations upon different users' requests. The individual auditing of these tasks for TPA can be tedious and very inefficient. Batch auditing not only allows TPA to perform the multiple auditing tasks simultaneously, but also greatly reduces the computation cost on the TPA side. Batch auditing reduces the computation overhead. Unlike most prior works, the new scheme further supports secure and efficient dynamic operations on data blocks, including: data update, delete and append. For clustering high dimensional data, hyper graph model is used, where frequent item sets found from association rule algorithm are used as hyper

edges. To achieve accuracy and promptness, user preference and server labelling is also included. To achieve accuracy and promptness, user preference and server labelling is also included.

4.3 Data Dynamics

Hence, supporting data dynamics for privacy preserving public risk auditing is also of paramount importance. Now we show how our main scheme can be adapted to build upon the existing work to support data dynamics, including block level operations of modification, deletion and insertion. We can adopt this technique in our design to achieve privacy preserving public risk auditing with support of data dynamics. The support for data dynamics via the most general forms of data operation, such as block modification, insertion and deletion, is also a significant step toward practicality, since services in cloud computing are not limited to archive or backup data only.

4.4 Simply Archives

This problem tries to obtain and verify a proof that the data that is stored by a user at remote data storage in the cloud (called cloud storage archives or simply archives) is not modified by the archive and thereby the integrity of the data is assured. Cloud archive is not cheating the owner, if cheating, in this context, means that the storage archive might delete some of the data or may modify some of the data. While developing proofs for data possession at untrusted cloud storage servers we are often limited by the resources at the cloud server as well as at the client.

4.5 Sentinels

In this scheme, unlike in the key-hash approach scheme, only a single key can be used irrespective of the size of the file or the number of files whose retrievability it wants to verify. Also the archive needs to access only a small portion of the file F unlike in the key-has scheme which required the archive to process the entire file F for each protocol verification. If the prover has modified or deleted a substantial portion of F, then with high probability it will also have suppressed a number of sentinels.

4.6 Verification Phase

The verifier before storing the file at the archive pre-processes the file and appends some Meta data to the file and stores at the archive. At the time of verification the verifier uses this Meta data to verify the integrity of the data. It is important to note that our proof of data integrity protocol just checks the integrity of data i.e. if the data has been illegally modified or deleted. It does not prevent the archive from modifying the data.

V. CONCLUSION

Innovative approaches for automatically logging any access to the data in the cloud together with an auditing mechanism are proposed. Approach allows the data owner to not only audit his content but also enforce strong back-end protection if needed. Moreover, one of the main features of our work is that it enables the data owner to audit even those copies of its data that were made without his knowledge. In the future, planned to refine our approach to verify the integrity and the authentication of multiple servers.

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