

# A Survey on Integrity Checking for Outsourced Data in Cloud using TPA

Kaustubh Shinde

Student, Dept of Computer Science & Engineering  
SKNCOE, Pune, India.

V. V. Jog

Prof, Dept of Computer  
Science & Engineering  
SKNCOE, Pune, India

## ABSTRACT

In today's advent of cloud computing make storage outsourcing becomes rising trend which provides or motivate to focus on the cloud data integrity. Cloud provides various services to users and this makes the Cloud Computing more popular among in the users. Users upload their data to Third Party Auditor to reduce the management such as data, storage etc. The outsourced data may be more confidential or sensitive and that must need to be get secured. No one has known where exactly this outsourced data is resides and thus user's data may be threatened by internal or some external attacks. This can be made easy with the help of public auditing by Third party Auditor, and Auditing is performed on metadata rather than original data such as auditing on the size of the outsourced file which is almost in the encrypted form. In this way Third Party Auditor ensures the data integrity in cloud computing.

## Keywords

Cloud storage, Cloud security, Data integrity, Third Party Auditor (TPA).

## 1. INTRODUCTION

Cloud computing is widely adopted by IT companies and other organization for storing large amount of data, basically the Cloud storage service provide ability to maintains users files in the internet so that users can save several types of files and data such as text, images etc. In cloud computing the data placement and data retrieval is take place through centralize manner and store on the cloud. There are several advantages of cloud storage service firstly it decrease the cost of hardware requirements and secondly it provide location transparency to store data and retrieval of data. Today most of the peoples are uses the benefits cloud computing because of characteristics of the cloud computing i.e. on demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort [10]. Due to high mobility and efficiency of storage and retrieval of data users are getting attracted to access the services of cloud. Cloud computing provides three types of services such as Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS). The SaaS is the highest layer of the cloud stack and provides application software which the user can use. The PaaS is the middle layer of cloud stack or cloud service model and provides the platform for the user to do his operation. The IaaS is the base layer of the cloud service model and provides physical or virtual devices for user. The cloud is available in four-deployment model namely

1. Public cloud
2. Private cloud
3. Community cloud

4. Hybrid cloud

### 1) Public Cloud

If the cloud computing present or resides outside an organization and any one can access it called a public cloud. An example of this type service is Amazon. In this Third party hosts the files.

### 2) Private Cloud

If the cloud computing present or resides inside an organization and the data or files, application accessed through a secure network is known as private cloud.

### 3) Community Cloud:

The different organization share infrastructure with same policy to access the cloud is known as community cloud.

### 4) Hybrid Cloud

The combination of any public, private and community cloud is known as hybrid cloud.

## 1.1 Characteristics of cloud computing [9]

Cloud computing provides five essential characteristics defined by NIST (National Institute of Standards and Technology)

### 1) On-demand self-service

A consumer can be provision to supplied or barrow computing capabilities such as server time and network storage as needed automatically without human interaction with each service.

### 2) Broad network access:

Capabilities are available over the network and accessed through standard mechanism that promotes use of heterogeneous thin or thick client platform. Examples are mobile phone, tablets, workstation etc.

### 3) Resource pooling:

Resource pooling is location independent as user of resource is unaware about from where the resources are coming like location transparency. Default physical and virtual resource dynamically assigned and re-assigned according to consumer demand.

### 4) Rapid elasticity

Capabilities can be dynamically rapid and elastically provisioned of resource whenever needed with fully automated.

### 5) Measured resource:

User will only pay for the service they used. Resource usage can be measured, controlled, and reported by

providing transparency for both the provider and consumer.

## 1.2 Cloud Storage

As cloud computing is popular and in demand similarly cloud storage technology has greater demand. Cloud storage is a virtualized storage areas over a network basis. It provides services on the basis of QoS assured. Cloud storage consist of many resources but yet act as single system. It has greater fault tolerance by redundancy. As the data generated by IT sectors are dramatically growing we can't just update our hardware frequently instead we can adopt for cloud storage which is a better choice.

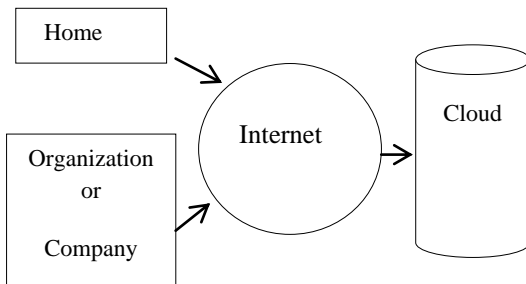


Fig 1:- Sample of Cloud Storage

### Advantages of Cloud Storage:

- 1) We need not buy storage equipment for large storage of data.
- 2) We just have to pay for the amount of storage that we are going to use.
- 3) Cloud storage allows user to access broad range of application and resources immediately, on-demand which are hosted by others.

### Disadvantage of Cloud Storage:

- 1) Cloud computing provide the multi-tenancy approach in which same infrastructure is provided to number of client to store or share data on that infra-structure and there are number of data mining algorithms are present to hack that data from that same infrastructure.
- 2) As data is redundant it leads to be hacked by unauthorized users.
- 3) Cloud storage is costly for day users.

## 2. RELATED WORK

In [1] Syed Rizvi, Katie Cover and Abdul Razaque, proposes the auditing task include the checking of cloud data integrity on cloud only after users request for a public verifier. Here the integrity is get checked by a public verifier only after the generation of request for verification from cloud users.

Mithuna. R and Suguna.M [2] shows the Rank test method is the best for check sequence or order over searched results. In this Ranked test method is used to check integrity of the ranked order. The files are stored on cloud in specific order or sequentially and this sequence is to check the integrity of order over the searched result.

Ayad F. Barsoum and M. Anwar Hasan [3] improve the level of availability, scalability and durability with help of making multiple copies. They propose a pairing based provable multi-copy data possession (PB-PMDP) scheme, which provides an evidence to user that all outsourced copies are actually stored

and remains intact. These proved system or scheme is proved to be secure against colluding servers.

Tao jiang, Xiaofeng Chen, and Jianfeng Ma[4] propose secure and efficient shared data integrity auditing for multi-users operation signature, the scheme with secure group user revocation based on vector commitment and verifier local revocation group signature. The scheme is based on group vector commitment and group signature.

Yan Zhu, Gail-joon Ahn, Hongxin Hu, and Stephen S. Yau [5] propose a dynamic audit service for verifying the integrity of an untrusted and outsourced storage. Audit system is based on the techniques such as random sampling, index-hash table, supporting provable updates to outsourced data and timely anomaly detection.

Pragnesh G. Patel and Sanjay M. Shah [6] conclude that cloud users need strong security policy without affecting the advantages of cloud computing. And suggest in future, we can develop more efficient encryption techniques which reduce the size of the key as well as reduce the time need for encryption and decryption.

Vinaya. V and Sumathi. P [7] propose a scheme checks data integrity in the cloud which the customer can employ to check the correctness of his data in the cloud. This can be agreed upon by both the cloud and customer and also can be incorporated in the Service Level Agreement (SLA). Means the audit is takes place according to service level agreement.

M. Xie, H. Wang, J. Yin and X. Menge[8] Suggested various methods for only be effective when the user of the service maintains a copy of some outsourced. Here for ensuring the integrity of data require the maintain original copy to make audit.

## 3. EVALUATION OF SURVEY

Table No 1:- Survey Table

Papers	Technique	Advantage -s	Disadvantages
“Cloud Data Integrity Using a Designated Public Verifier,”	TTP based encryption schema	Checking Integrity of data after users request only	Encryption and Decryption done at TPA.
“Integrity checking over Encrypted Cloud Data”	Ranked test method.	Check data integrity with the ranked order over search result.	Checking data integrity with the ranked order is only on over the searched result
“Integrity verification of Multiple Data copies over Untrusted Cloud Server”	Pairing based provable multi-copy data processing schema (PB-PMDP)	It increases the availability , durability, scalability by making multiple copies of data.	Use of Asymmetric group key arrangement and group signature.

“Public Integrity Auditing for Shared Dynamic Cloud Data with Group User Revocation”	Multi users signature and vector commitment revocation.	Proposes the secure and efficient integrity auditing for group of users, like in circle of users.	Use of Asymmetric group key arrangement and group signature increases the complexity to check integrity.
“Dynamic Audit Services for Outsourced Storages in Cloud.”	Index – hashing method	Propose a dynamic audit service for dynamically added files.	Using Index-hashing method still they require original file for ensuring integrity.
“Survey on data security in cloud computing”	Here author has studied all the available security methods but come to the conclusion that we need a strong security for data storage in cloud.	It is always necessary to encrypt user’s data makes user it more secure. So we more efficient encryption techniques which reduce the size of the key as well as reduce the time needed for encryption and decryption.	Each methods used for Encryption and Decryption has some limitations of key generation or key length and matching of keys and it is time consuming
“Implementation of Effective Third Party Auditing for data Security in Cloud”	Service level agreement (SLA)	Audit is performed only who satisfies the SLA.	It needs to have direct data detection system without any agreement.
“Integrity Auditing of Outsourced Data”	Suggested various methods	These methods only be effective when the verifier of The service maintains a copy of same outsourced	Here requirement of original file is must for provide integrity service.

#### 4. SYSTEM ARCHITECTURE

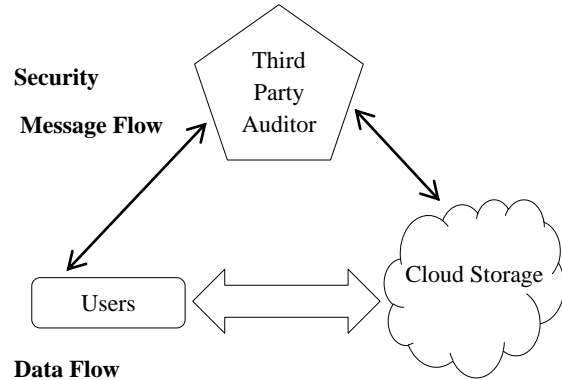


Fig 2:- System Architecture

Cloud storage allows client to store data on cloud. So it is necessary to make ensure that data must be the same as the client was uploaded at last time, for that Auditor is required to compare the data on cloud to its original one to make ensure the integrity of data [11].

#### 5. CONCLUSION

Now a day’s cloud computing facing many problems related to security, data integrity, data access policies, privacy related to identity as well as with data to which it belongs. And simultaneously or in parallel users are get attracted to cloud because of services, elasticity, flexibility and pay per user’s usage of service. Survey shows that cloud computing need the strong security policies as well data integrity ensures without affecting the advantages of cloud services. Specially the auditing task done by Third Party Auditor in public cloud there is huge burden on TPA to audit each and every data or files to ensure the integrity of the data and files on real cloud storage.

#### 6. FUTURE SCOPE

In future there will be more focus on how to reduce the burden of TPA and will enhance the performance of the TPA to perform the fast and more efficient auditing on such huge cloud storage.

#### 7. REFERENCES

- [1] Syed Rizvi, Katie and Abdul, “Cloud Data Integrity Using a Designated Public Verifier,” in 2015 IEEE 17th International Conference on high Performance Computing and Communications (HPCC), International Symposium on Cyberspace Safety and Security (CSS) and International Conference on Embedded Software and System (ICSS).
- [2] Mithuna. Rand Suguna. M, “INTEGRITY CHECKING OVER ENCRYPTED CLOUD DATA,” 2015 3<sup>rd</sup> International Conference on Signal Processing, Communication and Networking (ICSCN).
- [3] Ayad F. Barsoum and M. Anwar Hasan, “Integrity Verification of Multiple Data Copies over Untrusted Cloud Server,” in 2012 12<sup>th</sup> IEEE/ACM International Symposium on Cluster, Cloud and Grid computing.
- [4] Tao Jiang, Xiaofeng Chen and Jianfeng Ma, “Public Integrity Auditing for Shared Dynamic Cloud Data with Group User Revocation,” in IEEE Transaction on computers 2015DOI 10.1109/TC.2015.2389955.

- [5] Yan Zhu, Gail-Joon Ahn, Hongxin Hu, Stephen S. Yau, Ho G. An and Chang-Jun Hu, "Dynamic Audit Services for Outsourced Storages in Clouds," in IEEE Transaction on Services Computing, Vol 6, No2 APRIL- JUNE 2013.
- [6] Mr. Pragnash G. Patel and Sanjay M. Shah, "Survey on data security in cloud computing," International journal of Engg Research and Tech (IJERT), ISSN: 2278-0181, Vol 1, Issue 9, Nov-2012
- [7] Vinaya. V and Sumathi. P, "Implementation of Effective Third Party Auditing for data Security in Cloud," in International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), ISSN:2277 128TX, Vol 3, Issue 5,May-2013.
- [8] M. Xie, H. Wang, J. Yin, and X. Meng, "Integrity Auditing of Outsourced Data ," Proc. 33rd Int'l Conf. Very Large Databases (VLDB), pp. 782-793, 2007.
- [9] The National Institute of Standards and Technology (NIST), Information Technology Laboratory definition of Cloud Computing by Peter Mell and Tim Grance, version 15, October 7, 2009.
- [10] Mell P. and Granc G, "The NIST Definition of Cloud Computing (Draft)," in Proceeding of the National Institute of Standards and Technology, Gaithersburg, pp. 6,2011.
- [11] Salah H. Abbdal, Hai Jin, Deqing Zou and Ali A. Yassen, "Secure Third Party Auditor for Ensuring data Integrity in Cloud Storage," 2014 IEEE 14<sup>th</sup> International Conference on Scalable Computing and Communication and Associated Symposia/ Workshops.