

UNIVERSITY OF SCIENCE AND TECHNOLOGY
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Integrity Checking Mechanisms in Cloud Storage

A Thesis

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Abstract

Cloud Storage Services are becoming more popular and very efficient way for enterprises and individual users to store their data in the cloud storage with no more effort for manage and other related costs. Beside many features of cloud computing, security comes to be a big concern that makes it debatable to users to move their data into One of the basic security issues is data cloud storage. integrity, to check data integrity in cloud storage many techniques have been proposed by researchers.

In this literature review research, a detailed study to the proposed solutions that checking integrity of cloud data is carried out. The research provides an up to date, organized, classified data cloud integrity techniques to make the issue easy for other researchers in this field.

This study showed that there are many techniques proposed by researchers in recent year to face integrity challenge on cloud storage. Most of these techniques focus on remote checking protocols to check integrity of file without downloaded it in user' s machine.

المستخلص

اصبحت خدمات التخزين السحابي اكثر شيوعاً كما اصبحت طريقة فعالة جداً للمؤسسات ومختلف المستخدمين لتخزين بياناتهم على المخازن السحابية بدون بذل اي مجهود لإدارة هذه البيانات وبدون اي تكاليف اخرى تتعلق بهذه البيانات، بجانب المميزات العديدة للحوسبة السحابية ، فإن تأمين البيئة السحابية اصبح هاجس كبير يجعل الأمر مختلف فيه بالنسبة للمستخدمين الذين يريدون نقل بياناتهم الي المخازن السحابية. واحدة من القضايا الأمنية الأساسية هي قضية سلامة البيانات وتكاملتها، ولضمان سلامة البيانات على المخازن السحابية قام الباحثون بإقتراح العديد من التقنيات.

في هذا البحث تمت دراسة تفصيلية للحلول المقترحة والتي تضمن السلامة للبيانات السحابية ، البحث يقدم تصنيف لتقنيات اختبار سلامة البيانات السحابية بطريقة جديدة تجعل القضية سهلة بالنسبة للباحثين الآخرين في هذا المجال. اظهرت هذه الدراسة أن هنالك العديد من التقنيات المقترحة في السنوات الأخيرة لمواجهة تحدي سلامة البيانات السحابية، معظم هذه التقنيات تركز على بروتوكولات الاختبار عن بعد لإختبار سلامة الملف بدون الحاجة الي تنزيله على جهاز المستخدم.



1.1 Introduction

The concept of cloud computing has recently emerged as a model for hosting and delivering services via the internet. Cloud computing has made a big shift in the field of information technology, where this model allows the user to access services and files from anywhere and at anytime. These services provided by a provider called Cloud Services Provider (CSP), which rents out these services to customers (individuals or companies). This rent depending on the type of service required by the client.

Due to the explosive growth of data, one of the most costly things in the field of information technology is the storage space. To meet these needs, cloud storage services are becoming more common. Cloud storage services range from enterprises cloud storage to individuals cloud storage. Cloud storage service providers are providing a huge storage space with a lower cost, with removal the effort required from the user for management and maintenance.

Using cloud storage, data and applications will move from user control to be under third party control. Usually the first concern to use cloud storage is security. To take full advantage of cloud storage services the user needs to feel that his/her data and files are safe when moving to the cloud.

1.2 Problem Statement

Data integrity is the process of keeping the data and ensures accuracy and consistency of user's data on cloud storage. After providing data security, the service provider must provide mechanisms to ensure data integrity. They should also have the ability to tell users about the status of the stored data on the cloud. The CSP should make the user aware of information like what particular data is stored in the cloud storage and the integrity mechanisms used.

Many attacks compromise integrity of data which stored in cloud storage. When any attack or disorder happen for the data, the client is the one who gets affected and his/her important data are lost. Clients will loss trust in a service provider when any corruption happens to their data.

1.3 Research Objectives and Research Questions

This research aims to provide a clear view to data integrity in cloud storage problem. And review solutions that have been proposed to provide data integrity in cloud storage in a novel way. So the questions of this research are:

RQ:

- 1- What is cloud storage integrity and what attacks compromises this integrity?
- 2- What are the solutions that have been proposed to achieve integrity in cloud storage?
- 3- How can we classify the proposed solutions to provide a consist, easy understanding to these solutions?

1.4 Motivation

Because customers data moved to cloud environment and the control of his data has becomes under a third party, customers need to ensure that their data was maintained safely and no any compromised will happen to it.

One of the most concerns of customers is about the integrity of their data that is stored in remote storage. To convince customer about preserving integrity, a deep look to developed solutions that insure integrity is required.

1.5 Research Methodology

This research looks at the integrity issue in cloud storage, and classified the proposed solutions to the integrity problem.

In this survey thesis, the collection of scientific papers is depends on two major factors. The first factor is source of papers, the ACM, IEEE and Google Scholar libraries is used. The second factor is date of published papers, we restrict our search to the last three years from 2013-2016.

A literature review methodology is used to answer the research questions. Chapter (3) gives the details of the research methodology that we followed.

1.6 Research Scope

The scope of this research is limited to the issue of proposed mechanisms to check data integrity on cloud storage.

1.7 Thesis Contribution

The thesis contributions are:

- I. Identifying the integrity issue in cloud storage with the proposed solutions that insure integrity.
- II. Classifying the schemes that have been proposed to achieve integrity in cloud storage.

1.8 Thesis Structure

The remaining contents of the thesis are organized as following:

Chapter 2 contains important aspects of cloud computing, including its definition, essential characteristics, models of cloud services. The chapter also briefly stated the challenges and security issues that faces cloud computing. Chapter 3 presents the research methodology that has been used to conduct this research. Chapter 4 discusses storage security issues including integrity. The proposed integrity solutions that have been proposed and a classification to these proposed schemes. Chapter 5 states the conclusions and recommendations for future work.

