

Multimedia Content Storage Issues in Cloud Computing: An overview

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Abstract— Cloud computing is an emerging technology aimed at providing various computing and storage services over the Internet. It generally incorporates infrastructure, platform, and software as services. Cloud computing is a recent trend in IT that moves computing and data away from desktop into large data centers. With the development Internet multimedia computing has emerged as a technology to generate, edit, process, and search media contents, such as images, video, audio, graphics, and so on. Multimedia processing in a cloud imposes great challenges like

Multimedia and service heterogeneity, QoS heterogeneity, Network heterogeneity, Device heterogeneity, Security, Power Consumption. Security is one of the most important issue because of opaqueness nature of cloud.
Keywords: Cloud computing, multimedia, security, storage, QoS.

1 INTRODUCTION

1.1 Cloud Computing

Cloud computing is a virtualization technology that uses the internet and central remote servers to offer the sharing of resources that include infrastructures, software, applications and business processes to the market environment to fulfil the elastic demand. The technology uses the Internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with

internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth. Various cloud computing characteristics are on demand self services, Resource Pooling, Rapid Elasticity, Measured Service. Various advantages of cloud computing are Easy Management, Cost Reduction, Uninterrupted Services, Disaster Management, Green Computing.

1.2 Multimedia Cloud Computing:

For multimedia applications and services over the Internet and mobile wireless networks, there are strong demands for cloud computing.

In this new cloud-based multimedia-computing paradigm, users store and process their multimedia application data in the cloud in a distributed manner, eliminating full installation of the media application software on the users' computer or device and thus alleviating the burden of multimedia software maintenance and upgrade as well as sparing the computation of user devices and saving the battery of mobile phones.

Rapid advances in broadband communication and high speed package switching network systems have made effective multimedia data transmission and storage increasingly important. Moreover multimedia mails, orchestrated presentations, high-quality audio and video, collaborative multimedia documents and other rich media applications can be stored in the cloud data storage server, and utilized by an increasing number of cloud users.

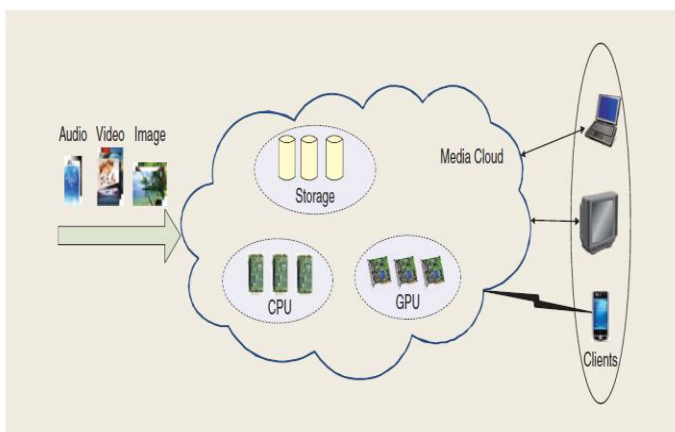


Fig: 1 – Fundamental Concept of Multimedia Cloud Computing

2.LITERAURE REVIEW

A number of studies showing the need of security in the Multimedia file storage in cloud computing.

Wenwu Zhu et.al [4] presented the fundamental concept and a framework of multimedia cloud computing. They addressed multimedia cloud computing from multimedia-aware cloud and cloud-aware multimedia perspectives.

Jiann-Liang Chen [5] proposed a novel IP Multimedia Subsystem (IMS) framework with cloud computing architecture for use in high quality multimedia applications. The IMS supports heterogeneous networking with Quality-of-Service (QoS) policy. This architecture enables users to access high-quality multimedia applications via Android-based appliances.

Tamleek Ali [6] proposed a framework for the use of cloud computing for secure dissemination of protected multimedia content as well as documents and rich media. They have leveraged the UCON model for enforcing fine-grained continuous usage control constraints on objects residing in the cloud.

Hang Yuan [7] provides a comprehensive overview of the techniques and approaches in the fields of energy efficiency for data centers and large-scale multimedia services.

Chun-Ting Huang [9] conduct a depth survey on recent multimedia storage security research activities in association with cloud computing. After an overview of the cloud storage system

and its security problem, they focus on four hot research topics. They are data integrity, data confidentiality, access control, and data manipulation in the encrypted domain.

Neha Jain [10] presented a data security system in cloud computing using DES algorithm.

N. Saravanan et.al[11] presented a data security system in cloud computing using RSA algorithm. They have implemented RSA algorithm in google App engine using cloud SQL.

M. Sudha, Dr.Bandaru Rama Krishna Rao [12] implement a simple Data Protection framework which performs authentication, verification and encrypted data transfer, thus maintaining data confidentiality.

3 CHALLENGES IN MULTIMEDIA CLOUD COMPUTING

Multimedia processing in a cloud imposes great challenges. Several fundamental challenges for multimedia computing in the cloud are highlighted as follows.

1) *Multimedia and service heterogeneity*: As there exist different types of multimedia and services, such as voice over IP (VoIP), video conferencing, photo sharing and editing, multimedia streaming, image search, image-based rendering, video transcoding and adaptation, and multimedia content delivery, the cloud shall support different types of multimedia and multimedia services for millions of users simultaneously.

2) *QoS heterogeneity*: As different multimedia services have different QoS requirements, the cloud shall provide QoS provisioning and support for various types of multimedia services to meet different multimedia QoS requirements.

3) *Network heterogeneity*: As different networks, such as Internet, wireless local area network (LAN), and third generation wireless network, have different network characteristics, such as bandwidth, delay, and jitter, the cloud shall adapt multimedia contents for optimal delivery to various types of devices with different network bandwidths and latencies.

4) *Device heterogeneity*: As different types of devices, such as TVs, personal computers (PCs), and mobile phones, have different capabilities for multimedia processing, the cloud shall have multimedia adaptation capability to fit different types of devices, including CPU, GPU, display, memory, storage, and power.

5) *Security*: As data is stored on the cloud and because of opaqueness nature of cloud, anyone can access the data on the cloud .Therefore security remains an important issue. As a result, security must be imposed on data by using encryption strategies to achieve secured data storage and access.

6) *Power Consumption*: The expanding scale and density of data centers has made their power consumption an imperative issue.. Moreover, a recent phenomenon has been the astounding increase in multimedia data traffic

over the Internet, which in turn is exerting a new burden on the energy resources.

4.OVERVIEW OF MULTIMEDIA STORAGE AND ITS SECURITY

The multimedia storage system in a cloud computing center is a cooperation storage service that contains multiple devices and application domains to reduce the operational cost at the client-end and boost overall system efficiency. The basic architecture of a cloud storage system is composed by a storage resource pool, including the distributed file system, the Service Level Agreements (SLA), and service interfaces. The architecture can be decomposed into five layers based on their logical function boundaries. This layered model shows the delivery flow of stored data in a cloud server.

Service Interface

Storage overlay

Metadata management

Storage management

Network and storage
infrastructure

5. SECURITY ISSUES IN CLOUD COMPUTING:

There are different network issues occur in cloud computing some of which are discussed below:

1 Denial of Service:

When hackers overflows a network server or web server with frequent request of services to damage the network server could not legitimate client regular requests. For example a hacker hijacks the web server that could stop the functionality of the web server from providing the services.

2 Man in the Middle Attack:

This is another issue of network security that will happen if secure socket layer (SSL) is not properly configured, then all the data communication between two parties could be hack by the middle party.

3 Network Sniffing:

Another type of attack is network sniffer, it is a more critical issue of network security in which unencrypted data are hacked through network. For example an attacker can hack passwords that are not properly encrypted during communication.

4 Cross Site Scripting: It is a type of attack in which user enters right URL of a website and hacker on the other site redirect the user to its own website and hack its credentials. For example user entered the URL in address bar and attacker redirects the user to hacker site and then he will obtain the sensitive data of the user

5 Browser Security:

As a client sent the request to the server by web browser the web browser have to make use of SSL to encrypt the credentials to authenticate the user. SSL support point to point communication means if there is third party, intermediary host can decrypt the data. If hacker installs sniffing packages on intermediary host, the attacker may get the credentials of the user and use in these credentials in the cloud system as a valid user.

6 Cloud Malware Injection Attack:

Cloud Malware Injection Attack tries to damage a spiteful service, application or virtual machine. An interloper is obligatory to generate his personal spiteful application, service or virtual machine request and put it into the cloud structure. Once the spiteful software is entered into the cloud structure, the attacker care for the spiteful software as legitimate request. If successful user ask for the spiteful service then malicious is implemented. Attacker upload virus program in to the cloud structure. Once cloud structure care for as a legitimate service the virus is implemented which spoils the cloud structure. In this case hardware damages and attacker aim is to damage the user.

However, a serious security issue arises in association with the expanding storage data center of the cloud server, which stores multimedia files of users such as personal

photos and videos. Therefore enhancing the security for multimedia data storage in a cloud center, known as cloud storage security, has become a popular research problem. There are various solutions proposed to ensure cloud storage security, including certification, authority, audit and encryption in last several years. As mentioned in X.800 , security services can be generally classified into five categories: 1) authentication, 2) access control, 3) data confidentiality, 4) data integrity, and 5) non-repudiation.

6.CONCLUSION AND FUTURE SCOPE

It is essential for the cloud storage to be equipped with storage security solutions so that the whole cloud storage system is reliable and trustworthy. In this work, a brief survey on a set of recently published papers is conducted and described some challenges in multimedia cloud computing. Overall, it is felt that the multimedia cloud storage security is the most important issue because of opaqueness nature of cloud .Various cloud storage security solutions have been developed rapidly in recent years, there have not yet a widely accepted model for the implementation. A combination of hybrid cryptographic algorithms and roll based access control can enhance security Besides the system design, the cloud storage security system should be flexible enough so that it can be improved by new cryptographic algorithms.

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