

A Survey on Secure Web Based Medical Data Transmission for eHealth

Madhuri Kethari

*Department of Computer Engineering
DYPIET, Pune, Maharashtra, India*

Prof. Latika Desai

*Department of Computer Engineering
DYPIET, Pune, Maharashtra, India*

Abstract: Nowadays, in most of the healthcare organizations, the rate of generating medical data has increased tremendously. The medical data can be anything related to the healthcare institutions and here we are focusing on patient's medical file consisting of reporting images, family history, and the cause for disease which plays a vital role for medical doctors to diagnosis and also for future medical staff education. In order to store and retrieve all these medical data on a private storage system has become a bottleneck. An alternate for this is to store medical data on a Cloud Computing (CC) which is the latest trend of research. In this article, we present an overview of how these medical data can be stored and retrieved from cloud computing.

Keywords: Medical imaging, Cloud Computing, Security.

I. INTRODUCTION

In today's digital market, as we all are aware that everything is going digital. So why not the medical images should be the same. Initially all the images taken were on film based which does not give necessary information for an efficient medical diagnosis. For this reason, we need to convert the analog form of image into digital form which can be considered as a preprocessing for medical image processing. Moreover, the images in analog form will give only information with respect to time, whereas the image in digital form will give us more and meaning information with respect to frequency i.e., anything that changes with time.

Let us now give a brief introduction to cloud computing.[1] [2] [3] Cloud computing was introduced by the *Aamir Shahzad* in the year 1960s with his work on ARPANET to connect people and data from anywhere to anytime. The term *cloud* refers to a network or internet. The cloud is nothing but something which is present at remote location. Cloud computing (CC) is a distributed computing on internet or delivering the computing services over the internet. Cloud computing is nothing more than sharing of resources, software, and information connected to computers and other devices as a utility over a network. All these are the various ways in which we can define cloud computing.

Mobile cloud computing is the form of combining mobile devices and cloud computing to create a new infrastructure for storing massive amounts of data. Increased broadband coverage 3Gnd 4G along with Wi-Fi wireless networking provides better connectivity for mobile devices. The process of storing and retrieving medical data to and from cloud and mobile cloud computing has been the topic of interest. So, let us now briefly discuss about the related work and research challenges for the same. Fig1 shows the cloud based medical data storage between hospitals and physicians at remote locations. In such a scenario, proper authentication is needed to prevent from unauthorized access to healthcare systems. Privacy and Security are the major concerns that need to be considered in dealing cloud computing.



Figure 1. Cloud based medical data storage.

II. BACKGROUND

The medical data stored in healthcare organizations is the most significant data than any other data. It is not enough to store all these data at one private institution or an organization. There is a need to transfer this kind of data from one end to other end for remote medical diagnosis and also for future medical staff education. [9] [10] [11] In early days, the hospitals used to maintain paper-based record commonly known as traditional systems. In this kind of storage systems, always there is a chance of information loss; also more investment is necessary for backup and recovery. To overcome such drawbacks, nowadays many of the hospitals go for maintaining electronic based medical record which provides fast and efficient access for the users.

The comparison of traditional (also known as paper based) and electronic based systems is summarized briefly. *Cost*: More in paper based systems to maintain records and less in electronic based as it requires less man power. *Security*: There is a loss of record in paper based systems due to human error or disaster such as fire or flood. In electronic based systems, they are vulnerable to unauthorized access to individuals, when the efficient security systems are not in proper place. *Reliability and Accuracy*: Difficult to read and understand records in paper based and also professionals find an insufficient space to update these kinds of records. Electronic based systems on the other hand, all records written in a standardized format which leads less confusion for both the end users. To overcome all these kind of issues, most of the healthcare organizations go for the cloud based storage systems. In such a scenario, security becomes the major challenge for transmission of medical data from one user to the other user.

III. RESEARCH CHALLENGES

Nowadays in many health care organizations, the rate of storing dynamic medical data in cloud based storage systems has been increased tremendously.[16] Hospitals and professionals buy or lease storage capacity from providers to store all sorts of data in the cloud. Some of the research challenges that need to be focused are discussed here.

3.1 Privacy and Security-

Providing data security and privacy for the medical records is a major challenge because it's all about the patient sensitive information relating to his medical health checkup routines. Further, there are more issues regarding security attacks. The most common attacks for security are active attacks and passive attacks. In active attacks, the attackers not only modify the contents of data but also system resources, whereas, in passive attacks the attackers only modify the contents of the data leaving the system resources untouched. Furthermore there are again various security services and security mechanisms that need to be focused when storing patient's sensitive information which includes name, address, and personal account number and so on.

3.2 Data Confidentiality -

The other major challenge is the data confidentiality. The data stored on cloud should be of high confidential such that the most important information will be shared only for the authorized individuals and not for everyone. The leak of data will however leave a negative impact on patients, which as a result degrades the fame of the organizations.

3.3 Integrity-

This kind of the challenge is nothing but the data integrity. The data so far stored on cloud will be modified only by the authenticate users and not by all others. In general, data integrity means only the authorized users have access to modify the contents of the data stored on cloud and thus preventing it from the unauthorized access.

3.4 Availability-

Assures that system work promptly and service is not denied to authorized users. This means that the system is available all the time only to the authorized users and not to the unauthorized users.

IV.CONCLUSION

In this paper we discussed about the need to store medical data on cloud based storage system. There are various storage mediums existing in the healthcare industries and we selected the advanced method of storing the data on cloud computing. This medical data can also be transmitted from one end to the other end by using cloud computing. The future scope of this study is to focus on the security issues in transmitting medical data on cloud computing.

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