

## Chapter 75

# Trust, Privacy, Issues in Cloud-Based Healthcare Services

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### ABSTRACT

*In recent era individuals and organizations are migrating towards the cloud computing services to store and retrieve the data or services. However, they have less confidence on cloud as all the task are handled by the service provider without any involvement of the data owner. Cloud system provides features to the owner, to store their data on some remote locations and allow only authorized users to access the data according to the role, access capability or attribute they possess. Storing the personal health records on cloud server (third party) is a promising model for healthcare services to exchange information with the help of cloud provider. In this chapter, we highlight the various security issues and concerns such as trust, privacy and access control in cloud based healthcare system that needs to be known while storing the patient's information over a cloud system.*

### INTRODUCTION

Utilization of most recent technology such as cloud computing in healthcare services provides a new direction for healthcare organizations to enhance the quality of service delivery, reduce the cost and make it efficient to be used by users belongs to different category. Popularity of healthcare services and cloud computing among users also make an increase in the demand of cloud based healthcare services. In addition, diseases are becoming more complex and new advancements in technology and research have facilitated the emergence of new and more effective diagnoses and treatment techniques (Singh, 2008). In the last few years, healthcare services have achieved many improvements from individual solutions to the organization level solution, and from a single individual system, which provides local and limited resolution to more interconnected ones, which provides incorporated and broad resolution for a particular diagnosis problem. Complexity of cloud based healthcare services also improve from

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passive and reactive system to active and interconnected systems, which mainly focuses on the quality of the system. Use of cloud in healthcare services also introduces the use of advance technology such as improved database system to provide a reliable solution. Cloud computing will also reduce the burden of healthcare services by introduction of service provider who is completely responsible for managing the complex data of different healthcare services and handling all the users queries which reduce the maintenance and operational cost of such a large system, as the same system is required by multiple healthcare organization so the service provider needs to setup one system which can be used by multiple organizations and so the cost can be divided among the organizations. Use of cloud computing also opened a new opportunity window for healthcare services to use and share their data with organizations and users such as researchers, doctors, hospitals, organizations like WHO etc. that will be helpful for introduction of new technique or improve the quality of existing techniques of any healthcare services. But this sharing of patient's data will not come alone, it also introduce the new security challenges that needs to be handled. Strict rules and regulations while sharing of patient's data is necessary to maintain its privacy such as who is going to use the data, what amount of critical information accessed by a particular user etc. Dealing with security and privacy of any confidential data which is shared over the network, introduces several threats such as exposure of patient's sensitive data, selling of the secret information of patient by a service provider to other service provider(s). Once an individual or organization stores the healthcare information over the cloud system they do not have any physical possession on it and cannot figure out that which information is sold or distributed to other users and what are the various securities needs to be concerned by that particular service provider. In this chapter, we understand the various privacy and security issues come into picture when integrate cloud computing with healthcare services and how to maintain trust between different communicating parties to develop an efficient and sound system. In addition, we also discuss the benefits and limitations of cloud based healthcare services with strategic recommendation for the adoption of cloud computing in healthcare services.

## **CLOUD BASED HEALTHCARE SERVICES CHALLENGES/ ISSUES**

Although the cloud based healthcare service provide several benefits to various users such as health-care industry, researchers, medical clinics and doctors, but also come with various challenges of cloud computing and e-healthcare services. These challenges require more attention as the system is storing, transferring and processing the very confidential and sensitive data of different patients. It increases the challenges for data storage and its maintenance because if the system is not secure than no user will store or retrieve the data. Various challenges specific to a cloud based health care system are broadly divided into two categories as (i) Technical (Momtahan, 2007) and (ii) Non- technical (Momtahan, 2007) challenges as shown in Figure 1, which are further summarized below as:

1. **Technical Challenges:** Introduction of new technique in existing technique will never come alone. It also comes with new challenges for its proper adoption and utilization in the existing techniques. Similarly, integration of cloud and healthcare services also come with new challenges, to be solved before adoption of cloud by any individual or organization. Some of the technical challenges as shown in Figure 1, in cloud based healthcare services are summarized as:
  - a. **Availability:** Data and service availability is a crucial requirement for every healthcare service provider as without any data/service availability there is nothing to operate. Cloud based

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