

Chapter 93

Smart Healthcare Administration Over Cloud

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ABSTRACT

Cloud computing is an emerging technology that is expected to support internet-scale critical applications, which could be essential to the healthcare sector. Its scalability, resilience, adaptability, connectivity, cost reduction, and high-performance features have high potential to lift the efficiency and quality of healthcare. With the widespread application of healthcare information and communication technology, constructing a stable and sustainable data sharing circumstance has attracted rapidly growing attention in both academic research area and the healthcare industry. Cloud computing is one of long dreamed visions of healthcare cloud (HC), which matches the need of healthcare workers, information sharing directly to various health providers over the internet, regardless of their location and the amount of data. This chapter proposes a cloud model for health information sharing and integration in HC and looks into the arising challenges in healthcare.

INTRODUCTION

With the development in healthcare and economic fields, more number of medical records are generated. There is an urgent need and demand to improve the levels and standards of modern health-care records management by using innovative technology. The objective of this paper is to introduce the concept of Cloud Computing and discuss the challenges of applying Healthcare Cloud (HC) to improve the Health Information Science research. With the new concept of Cloud Computing emerging in recent years, more and more interests have been sparked from a variety organizations and individual users, as they increasingly intend to take advantage of web applications to share a huge amount of public and private data and information in a more affordable way and reliable IT architecture.

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More specifically, the medical and health information system based on the cloud computing is desired, in order to realize the sharing of medical data and health information, coordination of clinical service, along with the effective and cost-containment clinical information system infrastructure via the implementation of a distributed and high-integrated platform.

Mobile devices are growing in terms of utilization in our daily life to voice conversations and video chatting with others. Especially the smart phones became an important tool in our daily activities in e-commerce, IT industries. Even though mobile device is capable of enough to handle high end applications but still suffering with limited resources such as short battery lifetime, storage and processor. These changes help users to make environment where all devices share resources to run application efficiently.

The conventional computing only deals with the compute and process computation tasks. The modern technologies got birth to satisfy user requirements; Big data, networking, cloud computing, fog computing, mobile cloud computing, IOT, the user will always require modern infrastructure to achieve increasing demand on both mobility and connectivity (Goswami, 2013). Among many technologies mobile cloud computing became a popular model (Zimmerman, 1999). Mobile computing allows many devices interacting with other mobile devices through network technologies (Wi-Fi and 4G). The mobile devices have many advantages like portability and mobility features. The mobile computing is integrated with cloud computing technology in order to form new technology called as MCC (Bahwaireth, Lo'ai, Tawalbeh, Benkhelifa, Jararweh, & Tawalbeh, 2016). The MCC can overcome the limitations of mobile device. In the case of implementing real MCC model, we have to take into account few challenges which cause troubles while establishing MCC environment. Mobile devices are limited by storage, battery lifetime, processing, and video streaming, augmented reality application. We should consider another important challenge in the mobility of device are moving from one network environment to another network environment. This affects quality of performance and connectivity with remote cloud (Qi, & Gani, 2012). The MCC can avoid limitations of mobile device by offloading computational task into remote cloud which requires more processing power locally. In result the remote cloud will process it with less power consumption (Benkhelifa, Welsh, Tawalbeh, Jaraweh, & Basalamah, 2015). MCC is considered as new trend among many new technologies in coming years. Generally the mobile devices connecting to cloud computing via various network technologies such as 3G and 4G. These technologies cause high cost, limited bandwidth and connectivity problems as shown in Figure 1. The important issue is nothing but security. Providing security to data from attackers over wire or wireless channel (Moh'd, Aslam, Marzi, & Tawalbeh, 2010) is a big challenge in both cloud and mobile cloud computing. The user always expects his data need to be safe and not to be affected by attackers (Tawalbeh, & Eardley, 2010). There are many encryption techniques to protect data from attackers (Tawalbeh, Jararweh, & Mohammad, 2012; Tawalbeh, Tenca, Park, & Koc, 2004].

Since health informatics seek new ways of driving health information science research forward, for example, international research collaboration, growing demands are now placed on computer networks to provide hardware and software resources and pave a new avenue to share sensitive and private medical data from different geographic locations. This new model of service (Cloud Computing) offers tremendous opportunities for the collaborative health information science research purpose; unfortunately, it has also introduced a set of new and unfamiliar challenges, such as lack of interoperability, standardization, privacy, network security and culture resistance. In this paper, we will identify the challenges of applying healthcare cloud in the health information research and discuss potential approaches to conquer those barriers, such as audit, disaster recovery, legal, regulatory and compliance.

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