Security and Challenges using Clouds Computing in Healthcare Management System

Chamandeep Kaur, Hanan Mohammed Mourad, Sayyada Sara Banu

MCA (PhD), Computer Science, Lecturer Jazan University, Jizan, Saudi Arabia

ABSTRACT

Today's IT world is progressively used in healthcare with the goal to improve and develop the medical services and to reduce costs. Records are very delicate that should not be made available to unauthorized people for protecting patient's information security. In this context cloud computing became trend of information technology which allows more efficient computing by centralizing data storage and processing data online to prevent cyber gaps that pose an adverse impact on the security and privacy of patients' electronic health records. In these situations, security challenges of the wireless networks need to be carefully understood and considered. Cloud computing as part of Healthcare IT reliability, security, privacy, data portability and integration are some of the significant challenges and barriers to implementation that are responsible for its slow adoption in the Kingdom of Saudi Arabia.

KEYWORDS: Cloud Computing, Healthcare, Security, Challenges

1. INTRODUCTION

In the recent century, Information Technology has created the ability to electronically store and transfer health information to improve the quality of health care and increase the effectiveness and efficiency of health care services organization (Zhang et al., 2010, pp. 268-275; Mehraeen et al., 2016, p. 47) [1]. Cloud computing is one of the most decade technologies in the globe. The applications of Cloud computing are speedily increasing in our daily life. Cloud computing technology plays an important role in academic and industry organizations. Today the application of cloud computing is so widespread that it is being used even in the health care industry [2]. Additionally, the cloud computing can provide on demand dynamically scalable virtualized cloud resources via the web of internet. Indeed, the cloud computing has not only changed the way of providing cloud services but influenced the way of application development, which helps companies to save IT resources during the lifecycle and shorten application development time.

2. Cloud Computing

Cloud computing is supported by two basic technologies, virtualization and grid computing (Sultan, 2014). Virtualization is a method or act of creating something virtually rather than in its actual or physical form, which simplifies interaction among different systems (Sultan, 2014). Grid computing, a network or collection of multiple computers dispersed geographically with significant computational power, facilitates virtualization [5]. Cloud computing involves delivering hosted services over the Internet. These services are: **Software-as-a-Service (SaaS):** It allows users to run applications remotely from the cloud. **Infrastructure-as-a-Service (IaaS):** It refers to computing resources as a service. This includes virtualized computers with guaranteed processing power and reserved bandwidth for storage and Internet access [6]. Amazon EC2 is an example of IaaS, where virtual servers can be set up and configured over a web-based interface within minutes [7-9]. **Platform-as-a-Service (PaaS):** It is like IaaS, but also includes operating systems and required services for an application. A well-known example is the Google Apps Engine [10-12]. **Data-Storage-as-a-Service (dSaaS)**: It provides storage that the user is used including bandwidth requirements for the storage.
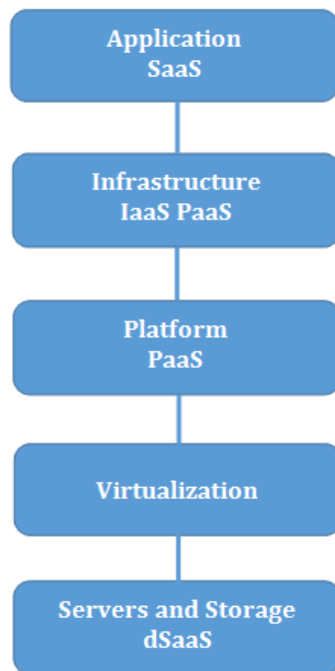
Fig. 1 Layered architecture of Cloud Computing (adapted from Cloud Computing Fundamentals)

2.1. Types of Cloud Computing

2.1.1. Public Cloud: Its provides amenities and set-up to the public. Resources are shared by billions of people simultaneously. Microsoft, Google, Amazon are its examples.

2.1.2. Private Cloud: Dedicated to one organization or business. Using private cloud storage allows them to control highly sensitive data. Medical offices, banks and other organisations are using to secure medical records, employment information etc.

2.1.3. Hybrid Cloud: It is a more complex cloud combination of private and public cloud. For example of a hybrid cloud solution is an organization that wants to keep confidential information secured on their private cloud, but make more general, customer-facing content on a public cloud.

Fig. 2 Connectivity between different clouds (adapted from Comparing Public, Private, And Hybrid Cloud Computing Options)

3. Cloud Computing in Health Care:

In current era cloud computing technologies are increasing with multiple opportunities and enhancement day by day in the health care industries. It is accompanying with greater recovery, availability and transfer of medical records on easy, direct and ubiquitous access to medical records. Hospitals are currently challenged with large amounts of medical data which constantly rising due to high-tech developments and which are to be archived in a long term, even after completing the patient's treatment Healthcare applications and medical data are supposed to be hosted and provisioned from the cloud computing environment (Basu et al., 2012; Ekonomou et al., 2011). Cloud computing could even enable central storage for medical data (Li et al., 2011b, 2012; Shini et al., 2012).
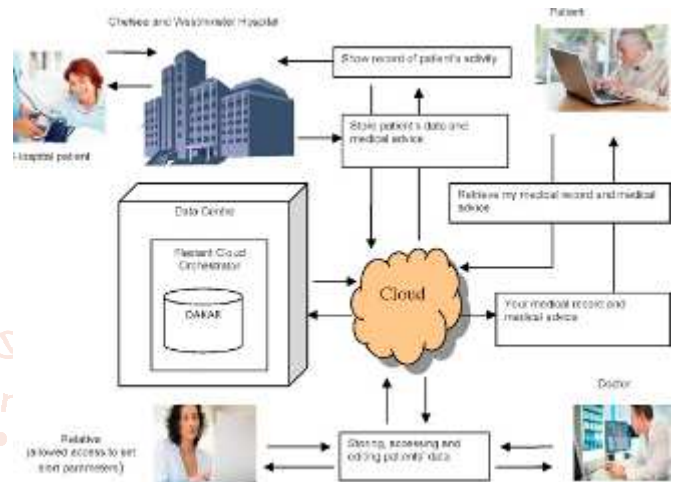

Fig.3 making use of cloud computing in healthcare provision: opportunities and challenges

4. Cloud Computing Security and Challenges in Health Care:

Data security refers to shielding information as well as the systems and hardware tangled in the practise, storing and broadcasting the data. The core challenges contain lack of belief in data security and privacy by users, risk management, organizational inertia, loss of governance, and indefinite provider's obedience. It can be enabled using some policy, training and alertness programs, and technology (Whitman and Mattord, 2013). The healthcare area needs to improve security and secrecy levels, in order to achieve the requirements. The thing is less technical and more ethical and legal. For example, the network that link the systems in a cloud has to be protected. Web based virtual infrastructure is a huge system with great potential for data security holes. Cyber attacks and lack of knowledge of authorized users are the important risks in the healthcare management system. Hackers use various methods to change integrity, confidentiality, information accessibility which is dangerous for information security (Safa et al., 2015).

5. Conclusion:

Cloud computing is a innovative technology, which every association adapting it to ease the flexibility of their trades in terms exchange, data storage, renovate to upgrade their cost-effectiveness, interoperability and ability. Cloud computing can empower timely delivery of medical records to anywhere they are needed. However, as a outcome of individuals concerns about potential privacy fissures and mismanagements of their health information, acceptance of cloud computing in healthcare might be at risk. This study was intended to highlight the cloud computing security issues and challenges in hospital management system. For the development of technology, and henceforth strong

evolution of worldwide economy, it is enormously significant to firm out any challenges and issues that can reason for road-blocks in this new era of computing.

References

[1] Hans Löhr Horst Görtz, Ahmad-Reza Sadeghi Horst Görtz, Marcel Winandy Horst. Securing the E-health cloud.

[2] Emna Chikhaoui, Jawahitha Sarabdeen and Rehana Parveen. Privacy and Security Issues in the Use of Clouds in e-Health in the Kingdom of Saudi Arabia. Vol. 2017 (2017), Article ID 369309, 18 pages.

[3] Fawaz Alharbi, Anthony Atkins, Clare Stanier. Understanding the determinants of Cloud Computing adoption in Saudi healthcare organisations. October 2016, Volume 2, Issue 3, pp 155–171

[4] Qusay Kanaan Kadhim, Robiah Yusof, Hamid Sadeq Mahdi, Sayed Samer Ali Al-shami, Siti Rahayu Selamat. A Review Study on Cloud Computing Issues. IOP Conf. Series: Journal of Physics: Conf. Series 1018 (2018) 012006.

[5] Linda Barthelus, Northern Virginia Community College. Adopting cloud computing within the healthcare industry: opportunity or risk? Volume 4, Issue 1, 2016.

[6] Borko Furht, Armando Escalante. Handbook of Cloud Computing ISBN 978-1-4419-6523-3 e-ISBN 978-1-4419-6524-0 DOI 10.1007/978-1-4419-6524-0

[7] Sumit Goyal Member, IDA, New Delhi, India. Public vs Private vs Hybrid vs Community - Cloud Computing: A Critical Review. DOI: 10.5815/ijcnis.2014.03.03

[8] (2012) Aws. Amazon website. [Online]. Available: http://aws.amazon.com/ec2/.

[9] J. Hurwitz, R. Bloor, M. Kaufman and F. Halper, —Cloud computing for dummies, Wiley Publishing, Inc., Indianapolis, Indiana, 2010.

[10] G. Reese, —Cloud Application Architectures, O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472, 2009.

[11] L. M. Vaquero, L. Rodero-Merino, J. Caceres and M. Lindner, —A break in the clouds: towards a cloud definition, ACM SIGCOMM Computer Communication Review, 39(1), 50-55, 2008.

[12] T. Mather, S. Kumaraswamy and S. Latif, —Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472, 2009.

[13] Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper. Comparing Public, Private, And Hybrid Cloud Computing Options.

[14] G. Nikhita Reddy, G. J. Ugander Reddy. Study of Cloud Computing in HealthCare Industry. Volume 4, Issue 9, September-2013.

[15] Vorgelegt Von, Tatiana Ermakova. Security and Acceptance of Cloud Computing in Healthcare. August 2015.

[16] Gunther Eysenbach, - Opportunities and Challenges of Cloud Computing to Improve Health Care Services

[17] Vorgelegt Vonm, - Security and Acceptance of cloud computing in healthcare, 21 August 2015.

[18] Oana-Sorina Lupşe, Mihaela Marcella Vida, Lăcrămioara Stoicu-Tivadar - Cloud Computing and Interoperability in Healthcare Information Systems 19 January 2015.

[19] Safa, N.S., ookhak,et al., - Information security conscious care behaviour formation in organizations. Computer & Security, 2015.05.012

[20] Jaydip Sen - Security and Privacy Privacy Issues in Cloud Computing.