Chapter 3
Challenges in Integrating Cloud and IoT in Healthcare Systems

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ABSTRACT

Cloud computing and IoT are two great technologies which have the potential to reform the healthcare industry and enhance the systems that are in place to offer the best care to the frustrated patients, to manage a large number of data and to change the working processes. This chapter explained the role of cloud and IoT in healthcare domain and shifted focus to the key issues and challenges such as data security and privacy or, IoT and cloud integration and standardization and the issues with the big data management and analytics. Patient's personal information is quite high and it is critical to protect the data of patients in contemporary healthcare. Additionally, establishing connectivity between IoT devices and Clouds, programs possess certain limitations pertaining to various encoding and data transmission

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methodologies. Finally, the chapter about the challenge of managing and understanding big data ends with the assertion that it can only be done if a big-cloud structure and expensive sophisticated analytical methods are used to extract useful information out of it.

1. OVERVIEW OF CLOUD AND IOT TECHNOLOGIES IN HEALTHCARE

Cloud computing in healthcare means that the data contained in the healthcare sector, which is actually processed through servers and personal computers, will be transferred and processed through remote servers that are connected to the internet. It also creates opportunities allowing to harness computing power of the associated clinics and hospitals, as well as large storage capacities, thus improving the scalability and productivity. Cloud computing plays an important role by providing support to a number of other applications in the healthcare industry such as the EHRs, telemedicine, and data analytics, which enable its clients process large amounts of data in real time for enhancing patient care. This paper will demonstrate that the potential benefits of cloud computing are numerous, although one of the most critical is cost reduction. The cloud option actually means that the number of requirements for maintaining local hardware and infrastructure in healthcare organizations will be significantly lower, as these are still expensive in terms of maintenance and frequent upgrades (Dang et al., 2019). These attributes are favorable given that the cloud based service's cost structure is only requires service providers to pay for particular services at particular instances, and or when on particular service volume.

Another major benefit accruable to cloud computing is the scalability of cloud services. It is not a problem for healthcare providers to increase or decrease the IT resources to fit the current needs, be it linked to the increased number of patients, or due to the necessity to process vast amounts of data, generated during medical imaging procedures. Such flexibility is important in maintaining healthcare systems in order to improve the delivery of services and the value to patients. When discussing the Internet of Things (IoT) in the context of the healthcare industry, it is worth describing IoT as the entire network of devices that gather, transfer, and process the collected data. These include wearable fitness and sports gadgets, smart watches, remote patient monitoring systems and connected medical devices. Through IoT healthcare devices, patients can be remotely monitored and any change in their health status can be passed on to the necessary authorities immediately. IoT has great potential in transforming the healthcare sector since it helps in providing better treatment, improving organizational efficiency, and cutting the costs of healthcare through effective advanced disease control and prevention.