Chapter 2
Challenges for Convergence of Cloud and IoT in Applications and Edge Computing

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ABSTRACT

Cloud computing and internet of things (IoT) are two disparate technologies that can be united for a common purpose as in an operating profit. The technologies are integral parts of modern sophisticated human life. In the future, it is destined to proliferate boundlessly covering utmost spheres. This chapter describes the challenges faced in adopting the two technologies. Edge computing includes both computing and processing the information are carried at the edge of the IoT devices where vast information gathered instead of relying on the central location. Benefits include avoiding latency issues, improving the performance of the application, and cost effectiveness as it reduces the data volume to be processed in cloud/centralized location. In the advent of IoT devices, edge computing is a vital step in building any of its application which sends and receives enormous information to and from the cloud over the course of operations. Applications such as virtual reality and smart systems are benefited by edge computing as they expect higher rate of response and processing speed. A case study on video surveillance is done in this chapter.

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INTRODUCTION

Cloud Computing and Internet of Things (IOT) are two disparate technologies that can be united for a common purpose as in an operating profit. The two technologies are integral parts of modern sophisticated human life. In future, it is destined to proliferate boundlessly covering utmost spheres. Edge computing for IoT enhances the deployments of IoT devices by processing the data closer to end devices. Non-IoT edge computing is much different when compared to IoT edge. IoT devices possess limited capability with respect to processing and storing the voluminous unstructured data generated by them. The edge environment will in-turn overcome the above limitations and also reduces the cost of the device as it can off-load the computation and storage to edge. Some of the industries that would benefit from edge computing are manufacturing, retail, oil and gas and healthcare. Some of consumer benefits would be in gaming, Augmented Reality / Virtual Reality and healthcare.

SIGNIFICANCE OF CLOUD IN IoT APPLICATIONS

IOT devices used in large scale industrial applications such as software actuators, sensors and other computer devices give rise to enormous data every second. Enterprises face problems is managing aforesaid data. Microsoft Azure and Amazon Web Services (AWS) are the most common platforms that provide a solution to applications by endowing themselves as a Cloud Backend for storage as well as for analysis and computation. This enhances the power of IOT and also simplifies interfacing with mobile and web apps.

COMPARISON BETWEEN IoT AND CLOUD

An inquiry of the essential characteristics of the Cloud and IOT gives an insight on the whole idea of integration (Atlam et al, 2017) as shown in Figure 1. To start with, in terms of Mobility, IOT refers to Pervasive computing (Low Mobility) whereas Cloud refers to ubiquitous Computing (High Mobility). Pervasive Computing includes devices that can be fit in any required place. Ubiquitous Computing can happen anywhere and everywhere irrespective of the location, device and format. IOT mainly uses real physical components such as sensors, RFID tag etc., Cloud is mainly dependent on virtual resources. Processing and storage capacities of IOT is either bounded or nil which conflicts with Cloud having boundless capacities with respect to processor and storage capacity. Internet plays a significant role in both domains, but Cloud uses it to deliver its services and IOT as a seamless point of connection. Though, both IOT and Cloud contributes to Big data but in a different way. IOT serves as a data generator for Big data applications. Cloud serves as one of the best platforms for handling the Big Data.