

Chapter 122

A Study on Recent Trends in Cloud-Based Data Processing for IoT Era

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ABSTRACT

Cloud computing has become one of the most important technologies in our day-to-day lives. The computing resources are delivered to the customers based on subscription basis via internet. Big data storage and processing are main application of cloud. Furthermore, the development of internet of things provides the platform for interconnecting devices over internet. This includes everything from mobile phones, washing machines, lamps, headphones, wearable devices, and everything else we never think of. This enables machine-to-machine communication, also applies to the components of the machine. The main objective of this chapter is to give an overview of cloud computing, big data, and internet of things and the advance research topics.

INTRODUCTION

In modern world, cloud has become an important technology for many IT operations and many IT industries adopt this technology to deliver their services to the customer. The standard definition of cloud is defined by American national Institute of Standards and Technology as “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction”. It covers the entire stack from underlying hardware to software services and applications. This categorize cloud

DOI: 10.4018/978-1-7998-5339-8.ch122

service model into IaaS, PaaS and SaaS. Also introduce the concept of everything as a service called as XaaS by Buyya (2013). Hence, cloud provides the platform for manipulating large volumes of data.

Big data is a term used to refer the study and applications of data sets that are very big and complex structure. The traditional data processing application software are not able to process such a huge data set. There are more challenges associated with big data includes data storage, processing, analysis, sharing, querying, updating, security and privacy. There are five Vs associated with big data that is Volume, velocity and Variety by Reichman (2011). Other concepts like Veracity and Value is later attributed with big data.

The term Internet of Things became very popular in recent years, it is the interconnection of computing devices connected via internet. According to Riggins (2015), there are various definitions of Internet of Things exist but it is generally defined RFID group as “the worldwide network of interconnected objects uniquely addressable based on standard communications protocols”. Initially, it was defined by uniquely identifiable, interoperable devices connected via RFID. Later on, Internet of Things is related with more technologies such as sensors, actuators, RFID tags, mobile devices, GPS devices, wearable devices etc.

With a rapid growth in academic and industrial communities, the IOT consists of thousands of connected devices for information gathering, analyzing, managing, decision making and finally collect the information generated by physical devices with respect to real time environment. According to S. P. Mohanty (2016), Yinbiao (2017), Continuum (2017), to achieve the above said factors, there are several technical challenges are involved including big data processing and cloud computing. The sensor devices in the IoT can generate high volume, variety, and volume and velocity data sets. M. Armbrust (2010) said that, the cloud with massive computing power, storage, and scalability handle the challenges brought by IoT big data. The big data processing applications that require cloud for their management includes healthcare, weather forecasting, social media analysis, business analysis etc. When the convergence of cloud, IoT and big data become trending now, how to use the massive computational power and cloud computing platforms for processing big data generated by IoT applications and offering response action to IoT motivates new research directions.

RELATED WORK

Cloud computing is a technology to offer computing resources through subscription or rental basis and it follows pay-per use strategy. Since cloud has elastic infrastructure it needs to be used to process big data applications. Zaslavsky (2013) stated that, the cloud needs to bind to the Internet of Things. Very large Internet of Things based sensor networks use cloud to manage process and store the computational data.

According to Riggins (2015), big data comes from variety of sources in large amount and often have real time data. This can be driven by mobile devices, intelligent sensors, social media tools, health care applications, weather forecasting applications; Internet of Things enabled devices etc. As Riggins (2015) found, Big data classification comprises of data sources, content formats, data stores, data staging, and data processing. Although hadoop has become the platform for big data analytics, hide the complex execution environment. Some of big data handling approaches are data warehouses, batch processing, real time processing and edge computing.

Wang (2015) suggested that, Internet of Things forms a communication network of a large amount of devices include mobile phones, RFID tags, sensors and actuators etc .The data generated from Internet of Things devices has the features such as Heterogeneity, large scale data, strong time and space correla-

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