

Chapter 15

Real-Time Problems to Be Solved by the Combination of IoT, Big Data, and Cloud Technologies

Shaila S. G.

Dayananda Sagar University, India

Monish L.

Dayananda Sagar University, India

Rajlaxmi Patil

Dayananda Sagar University, India

ABSTRACT

With the advancement of computation power and internet revolution, IoT, big data, and cloud computing have become the most prevalent technologies in present time. Convergence of these three technologies has led to the development of new opportunities and applications which solve the real time problems in the most efficient way. Though cloud computing and big data have an inherent connection between them, IoT plays a major role of a data source unit. With the explosion of data, cloud computing is playing a significant role in the storage and management. However, the main concern that accompanies IoT are the issues related to privacy, security, power efficiency, computational complexities, etc. Misinterpretation of data and security limitations are the bottlenecks of big data whereas the limitations of cloud computing involve network connection dependency, limited features, technical issues, and security. The chapter considers use cases to address their real time problems and discusses about how to solve these issues by combining these technologies.

INTRODUCTION

Nowadays, people are into IoT era, wherein, things around us generates data. The increase in the usage of IoT devices have proportionally increased the generation of data. As a solution to support the storage and processing of this data, cloud has been chosen. IoT, turns out to be a network of things also referred to as physical objects that are embedded with electronics, sensors and software. It involves network connectivity for receiving and transmitting the data from one node to other node or to the controller. In the IoT network, every node will have a unique identifier, embedded system and the ability to transfer data over the network. On the other side, the data collected from IoT components will be voluminous and referred as Big Data. Data sets grow rapidly due to the availability of large number of less expensive IoT devices such as mobile devices, software logs, RFID and sensors. Day to day the velocity at which data is created, collected and analysed is increasing. It is related to three key words: volume, variety and velocity. The generated data can be structured or unstructured or semi-structured. Structured and unstructured data require advanced analytical techniques to be processed. Storing and processing such a huge data is not an easy task. Thus, Cloud has emerged as a supporting platform that stores and provides access to the shared pool of resources based on the users demand and convenience. Cloud provides services in three major categories such as Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). At the base of the stack, IaaS provides virtual hardware, networking and storage to the end users. PaaS is the core that acts as a middleware by providing abstract environment where applications are deployed. SaaS provides on demand services to the users and also the applications.

Combining these technologies together will securely connect and retrieve data from any device around us. This supports leading technologies like Wireless Sensor Networks (WSN) and Radio Frequency Devices (RFID). Wireless sensor protocols and RFID integrate IoT data into the enterprise applications which create a platform for Big Data analytics in the cloud which is cost effective and scalable. Automatic lifecycle management that involve day to day life activities involve a wide variety of data. The convergence of these three technologies gives the convenience platform for storing and analysing. The intermediate layer between the IoT and its applications is cloud, cloud hides all the necessary functionalities and complexity to implement it. Data analysis, data integration and data sharing is made easier after the convergence of these technologies. Cloud APIs can be used to access the data stored in the cloud from anywhere. Secured access and protected storage are guaranteed by the cloud.

LITERATURE SURVEY

Yu Liu et al (2015), proposed an approach in medical monitoring system to deliver an application that runs based on the IoT and Cloud Computing technology based on the hospital information system. Zainab Alansari et al (2018) faced lots of Challenges during IoT and Big Data Integration. Different data analysis, Business intelligence and analytical applications that are emerging today help the industries and organizations in transforming their business to improve their quality and scale their productivity. Real-time processing of the data from multiple sources are used collectively to enhance the intelligence of the smart things by Priya et al. IoT and Bigdata can be integrated to provide service to the organizations and individuals, it facilitates the organization by providing a better business model to compete in the real world. An IoT-Cloud Based Solution for Real-Time and Batch Processing of Big Data is proposed by Nada Chendeb Taher et al, considering Healthcare application. Here, healthcare management is built

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