Chapter 11
Extending IoTs Into the Cloud-Based Platform for Examining Amazon Web Services

Jagdeep Kaur
The NorthCap University, India

Meghna Sharma
The NorthCap University, India

ABSTRACT

The public cloud Amazon Web Service (AWS) provides a wide range of services like computation, networking, analytics, development and management tools, application services, mobile services, and management of Internet-of-Things (IoT) devices. The Amazon Web Services (AWS) IoT is an excellent IoT cloud platform and is exclusively responsible for connecting devices into various fields like healthcare, biology, municipal setup, smart homes, marketing, industrial, agriculture, education, automotive, etc. This chapter highlights many other initiatives promoted by AWS IoT. The main motive of this chapter is to present how AWS IoT works. The chapter starts with the design principles of AWS IoT services. Further, the authors present a detailed description of the AWS IoT components (e.g., Device SDK, Message Broker, Rule Engine, Security and Identity Service, Thing Registry, Thing Shadow, and Thing Shadow Service). The chapter concludes with a description of various challenges faced by AWS IoT and future research directions.

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INTRODUCTION

Internet-of-things (IoT) consists of internetworking of physical devices, objects embedded with sensors, actuators, software, electronics, network connectivity that allow these objects to collect and exchange data. This term was first used by (Ashton, 2011) to connect RFID and supply-chain through internet. Over the past few years due to various factors like cheap sensors, cheap bandwidth, cheap processing, smartphones, ubiquitous wireless computing, big data etc. IoT has emerged as the most promising technology to connect the different devices. It is helping to achieve the goal of smart homes and smart cities. Few examples of IoT based applications are:

- **Hydroponic System:** It is used for automated watering the plants and taking care of all the needs of plants for optimal growth.
- **Smart Waste Management System:** It takes care of full garbage bins and unattended garbage. It sets up the right route and timely schedule.
- **Smart Sprinkler Control:** With the help of smartphone the sprinkler can be controlled from anywhere.
- **Blood Pressure Monitor:** With a wearable cuff and health mate app one can hassle free monitor his/her blood pressure.
- **Fitness Tracker Devices:** Many wearable devices like FitBit, Jawbone allows to monitor physical activities, sleep pattern etc.
- **Smart Homes:** With the help of devices like Nest Thermostat to regulate temperature according to surroundings and Amazon echo to control light, music and other house hold appliances with the voice control.

This tremendous increase in the IoT devices is draining the computing resources required to maintain the connectivity and data collection required by these devices. The data generated by these devices is putting strain on internet infrastructure. The industry is working in different ways to solve this data problem. The cloud computing provides a right solution to this problem. The IoT and Cloud computing are two complementary technologies. The large amount of data generated by IoT can be easily managed by Cloud computing.

Since 2005, when the cloud computing has emerged it has changed our life style and work style (Armbrust, 2010). Cloud computing is supported by various processing engines like Apache spark(Zaharia, 2010), Apache Hadoop (Shvachko, 2010), Google File System (Ghemawat, 2003)etc.The cloud computing can be categorized into different types like public cloud, private cloud, hybrid cloud, Software as Service (SasS), Infrastructure as Service (IasS) and Platform as Service (PasS). The public cloud are owned by companies and they provide access to users over public network. The private cloud is like the public cloud except that there is a