Chapter 7
Security and Privacy Issues in IoT:
A Platform for Fog Computing

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ABSTRACT

Security and privacy issues are the challenging areas in the field of internet of things (IoT) and fog computing. IoT and fog has become an involving technology allowing major changes in the field of information systems and communication systems. This chapter provides the introduction of IoT and fog technology with a brief explanation of how fog is overcoming the challenges of cloud computing. Thereafter, the authors discuss the different security and privacy issues and its related solutions. Furthermore, they present six different case studies which will help the reader to understand the platform of IoT in fog.

INTRODUCTION

Internet of Things (IoT) is on the cutting edge of Technology, connecting humans, devices and systems intelligently. It is a network of connected physical objects that are reachable through the Internet. The 'Thing' in the IoT could range from a "Smart Home" to a "Connected Inhaler", that is assigned a unique address and has

the potential to fetch and handover the data collected, over a network without any assistance, making our lives more easier. IoT enables a device to represent itself digitally over the internet and gets connected to its surrounding devices triggering interaction among various such connected devices.

The word "Internet of Things (IoT)" was coined by Kevin Ashton in 1999 and is defined as the network of physical nodes with other items embedded with it like software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. IoT integrates the real world with the computer-based systems precisely and efficiently, reducing the human intervention.

Though the term "Internet of Things" is two decades old, it is in limelight since 2010 as there has been an exponential growth in the number of devices connected to the internet. Starting from a 'Connected Home' having remotes, smart refrigerator, security keypads to the present-day mobile-controlled devices, smart-temperature learning device (thermostats), connected fitness tracker we have seen our lives evolving around the internet. Medical field is tremendously improving by the application of IoT as it aims to empower people to lead a healthier life by wearing connected devices. The impact of IoT is challengingly growing in the Agriculture, Poultry and Animal Husbandry fields.

There is an exciting future in the field of IoT. Growth of Artificial Intelligence and Machine Learning will result in a new range of connecting devices in the coming decade with improvised technologies. Concepts like "Monitoring and Reporting" will ensure clean and safe surroundings with smart traffic systems resulting in lessening the accident numbers, ensuring security. Applications of IoT to Plants and Animals sector will lead to a smarter way of growing, processing and storing food. Smart Home would automatically manage our most standard house activities and its energy consumption.

The evolution of IoT has started with remote computing infrastructures like data centers and moved on to the recent Cloud Computing environment to meet the demands of enormous data that the devices generate by making use of virtual storage applications in turn it will take off to "fog computing" in the coming days. Fog Computing features a cloud on the edge of the device where data is generated resulting in reducing the access time to the cloud.

Boon of IoT would be Machine to Machine (M2M) Communication leading to an automation of daily tasks which in turn provide a controlled, efficient, timely, and a better quality of life. Setback of IoT would be technology taking over our lives, lesser employment of menial staff, risk of losing privacy, any failure or bug in the software will result in serious consequences.

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