Chapter 3
Fog Computing and Its Role in the Internet of Things

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ABSTRACT
Fog computing extends the cloud computing paradigm to the edge of the network, thus enabling a new breed of applications and services. Defining characteristics of the Fog are 1) low latency and location awareness, 2) widespread geographical distribution, 3) mobility, 4) very large number of nodes, 5) predominant role of wireless access, 6) strong presence of streaming and real time applications, and 7) heterogeneity. In this chapter, the authors argue that the above characteristics make the Fog the appropriate platform for a number of critical internet of things (IoT) services and applications, namely connected vehicle, smart grid, smart cities, and in general, wireless sensors and actuators networks (WSANs).

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INTRODUCTION

An emerging wave of Internet deployments, most notably the Internet of Things (IoTs), requires mobility support and geo-distribution in addition to location awareness and low latency. We argue that a new platform is needed to meet these requirements; a platform we call Fog Computing or Fog because the fog is a cloud close to the ground. We also claim that rather than cannibalizing Cloud Computing, Fog Computing enables a new breed of applications and services, and that there is a fruitful interplay between the Cloud and the Fog, particularly when it comes to data management and analytics. The Internet of Things (IoT) is generating an unprecedented volume and variety of data. But by the time the data makes its way to the cloud for analysis, the opportunity to act on it might be gone.

Fog Computing

Fog computing also known as edge computing which provides elastic resources and services to the end users at the edge of network. Fog computing is an extension of cloud computing not its replacement. As the number of devices connected to internet has been increasing. In future the world would be full of sensor, it would provide the massive amount of data and storing these data in the cloud and retrieving is difficult. Hence fog can be used. Fog computing is an effective replacement of cloud computing for Internet of Things. It reduces the latency and overcomes the security issues in sending data to the cloud.

Cloud, Fog, and Edge: Overview

Fog Computing extends a substantial amount of data storage, computing, communication, and networking of cloud computing near to the end devices. Due to close integration with the front-end intelligence enabled end devices, fog computing enhances the overall system efficiency, after that improving the performance of critical cyber-physical systems. An important key difference is that cloud computing tries to optimize resource in a global view, whereas fog computing organizes and manages the local virtual cluster. Edge computing and fog computing terms are interchangeably used in both academia and industry. Although the main objectives of edge computing and fog computing are same, i.e., to reduce end-to-end delay and lower network congestion, however, they differ how they process and handle the data and where the intelligence and computing power are placed. The main idea of
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