Chapter 15

Bhumika Paharia  
National Institute of Technology Kurukshetra, India

Kriti Bhushan  
National Institute of Technology Kurukshetra, India

ABSTRACT

Fog computing is an extension to cloud computing that inhibits its limitations and enhances its amenities. Being similar to cloud computing, it has some more fascinating features that escalate the overall performance of the system. It faces many new disputes besides those already inherited from cloud computing. Fog computing is actually a paradigm that provides services at the network’s edge as it serves the end-users with data, applications, storing, and computing capabilities. Fog computing is a new breed in services and applications to the end-users by enabling the above features, hence making its security and privacy aspects much more challenging than the cloud computing. Further, in this chapter, the basic concepts of fog computing are discussed with its applications as a high lighting feature. In addition, discussion about the attacks that could setback the advantages of fog computing and some defense mechanisms to overcome the effects of these attack have been discussed, giving a comprehensive study of fog computing.

INTRODUCTION

This section basically enlightens the concepts of fog computing with its characteristics enhancing and properties. Then the need of fog computing and how it can affect the overall performance of the network are discussed. Then, the history discussing the origin, background, and working of Fog computing are discussed. The next two sections provide the comparison of fog computing with cloud and edge computing respectively. Further some examples, advantages and disadvantages of fog computing are discussed in next sub-sections.

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Fog Computing

Cloud computing is used to store large data files on a platform so that no space is occupied on smart devices (phones, desktops etc.); however, can access the data when needed (Xiao et al, 2013). Cloud computing being a traditional concept needs some advancements to handle the growing needs of technology hence fog computing came into picture.

Fog computing extends cloud computing and provides services to the network’s edge. It reduces cloud’s workload as well as services. It is a distributed platform for services like estimate, store, and network resources (Stojenovic et al, 2014). Fog computing, also referred as edge computing, is a mechanism which instead of performing centralized computing conducts computing st network’s edge making it distributed computing (Banafa, 2014).

In figure 1, shows the fog layer residing in between cloud and end devices. Fog layer (intermediate servers) reside between the network’s edge (smart devices) and the cloud layer (global servers). The concentration on fog computing is done in a way that data processing should be local on smart devices instead of sending them to the cloud (Stojmenovic et al, 2014)

Rather than authenticating channels for storage and utilization on cloud, it probably can be understood as some resources and processes placed at network’s edge. It comprises of many fog nodes which inhibits some processing and storage abilities (Choo et al, 2018; Osanaiye et al, 2017). It can be helpful for deployment of Cloud of Things (CoT), IoT and support applications which have real-time demand and lower latency (Roopaei et al, 2017). Seldom difference between the two terms fog computing and edge computing is they rely on the infrastructure and “things” in the network respectively (Shi et al, 2016).

According to (Xiao et al, 2016), in hypothetical data transmission, users upload their data directly to the cloud server. In traditional cloud storage, as a result of separate management and ownership of data, the Cloud Server Provider (CSP) replaces user from managing data. This user is no longer able access the physical storage of its data. It overcomes the limitations of cloud either because of its infrastructure or technical faults, by extending it towards network’s edge (Banafa et al, 2014).

Figure 1. Intermediate fog layer