Chapter 14
Learning With Software-Defined Area

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ABSTRACT

The idea of software-defined networking (SDN) is a paradigm shift in computer networking. There are various advantages of SDN (e.g., network automation, fostering innovation in network using software, minimizing the CAPEX and OPEX cost with minimizing the power consumption in the network). SDN is one of the recently developed network-driven methodologies where the core of all lower-level services is operated by one centralized device. Developers tried to develop such approaches to make it easy for an administrator to control information flow from one node to another node. To obtain these services, lower-level static architecture is decoupled for the higher level. This chapter introduces a new approach that is based on complex network processing and forecasting for an event.

INTRODUCTION

Computer networking is one of the most emerging areas for researchers to introduce newly updated techniques for data communication. The process of data communication may be between various entities with help of communicating devices. As number of applications and entities increases inside a network, complexity of information flow increases. This information flow passes through numerous number of interconnecting
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devices and networks. In networking, for information transfer mainly packet forwarding technique is used with applications of various numbers of complex protocols. This is the responsibility of the network administrator that modelling of infrastructure, processing of information and customizing all the processing must be tuned in a systematic manner. In most of cases, they have to deal such environment in a manual way but transferring such high level of networking policies into a lower level configuration commands are not an easy task. So there are lot of problems may rise with optimized results, network infrastructure management and performance retrieval index tuning.

To overcome such problems concept of “Programming in Networking” is developed. One of the main aims to introduce programmable “network concept” is that to facilitate multiple methodologies like management, functioning and controlling. Software Defined Networking (SDN) merges all those concepts, theories which are used to convert all described service manual to automation. This automation is achieved by decoupling networking hardware with control choices. It insures high index value corresponding to network performance evolution and management. Theoretically SDN is quite simple but at the time of implementation it creates lot of challenges. Networking technologies have evolved with a slower pace compared to other communication technologies for a long time and the hardware devices, i.e. switches, hub and routers have been developed by manufacturers traditionally. To communicate with the hardware devices, each vendor designed own firmware due to this the progress of innovations in the computer network area was not so speedy. In today’s network architecture basically there are three logical planes defined as 1) Control plane 2) data plane 3) management plane. Generally, hardware related with network has been developed in tightly coupled control and data planes. Therefore, traditional networks are also known as “inside the box” paradigm. Such kinds of architecture considerably increase the cost of network administration and management with significant increments in the complexity. So, the market leaders and networking researchers joined the hands in order to rethink the design of traditional networks and proposals for a new networking paradigm, namely programmable networks (Campbell et al., 1999), have emerged (e.g., active networks (Defense Advanced Research Projects Agency, 1997) and Open Signaling (Campbell et al., 1999). SDN is not a revolutionary proposal but it is a reshaping of earlier proposals investigated several years ago, mainly programmable networks and control–data plane separation projects (Yan et al., 2007). The objectives of SDN are to disconnect the control plane from the data plane. SDN is very often linked to the OpenFlow protocol (McKeown et al. 2008). After the advancement SDN also enables creating a global view of the network and offers a system-wide programming interface for controlling network devices.
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