Chapter 5

The Heart and Brain of SDN:
SDN Controllers

Pranav Arora
University of Petroleum and Energy Studies, India

ABSTRACT

The chapter explores the various types and functionalities of controllers present in the field of software-defined networking. It is responsible for providing a bridge between various application interfaces. It enables smart networking and is solely responsible for having an authority over the network. It takes input from one API, processes it, and returns output for the high-level interface or API. They instruct the switch as to what functions to perform and can be of two types: either pure or hybrid. The controller at the central layer performs all the functions of the “evergreen” existing switches. The data plane of the router is solely the foreground for the switch to apply all its powers, while in hybrid switch software-defined networking and existing technologies work hand in hand. An administrator can build up the SDN tools to manage the traffic, whereas the existing network protocols progressively move the various incoming packets onto the network. This engenders hybrid network. Here the existing and SDN technologies or switches, work under the similar conditions.

INTRODUCTION

The need of the present scenario is to give a general overview of the industry-specific as well as open source SDN technologies. As the IT industry is still thriving and is ambiguous of the role of software defined networking in the market, the solutions which are presented by different vendors won’t all be compared. But the discussion holds in stock a great fathomed discussion about various popular SDN controllers

DOI: 10.4018/978-1-5225-3640-6.ch005
like NOX, POX, Flood Light, RYU etc. A closer look would be given to the free side of the market i.e. open source side. Being the vortex of the software defined architecture; the controllers belonging to this category have also developed with a period of time.

BACKGROUND

The rise of this concept was given when the data centers saw that the network devices had to reconfigure. This was a tedious task as they had to manually do it and keep any eye on every device if something goes wrong. The evolution of networks overtime gave birth to software defined networking and network virtualization. The control and data plane of the router are separated and instead of control plane being in charge a controller agent is in charge there in SDN architecture. The controller agents communicate with the SDN controller which in return provide dynamic path allocation to devices depending on the network load. Giving the past, present and future scenarios it is time to focus on the agenda of the chapter. The SDN controllers which form the key component of this macrocosm.

DEFINITION

*A SDN controller is software’s piece in software-defined networking (SDN) that controls or manages the flow control of the network to initiate smart networking. SDN controllers are prepared to function on various protocols, most popular being Open Flow, that allows servers to tell, switches where to send packets.*

Before diving into the basics of what a SDN controller is, what their types are and how do they all differ from each other, the very miniscule thing to look at is what it comes to our mind whenever we hear controller. Yosr, Madi, and Debbabi (2014) specified in the taxonomy of Software defined networking about the role of controllers. We have heard about remote controllers, air conditioner controllers and various others. The problem is we have heard about them but never tried to figure out what is their purpose internally. Here we are not going to talk about Controllers in general but a specific kind of controller that is SDN Controller.

Not to worry if the talk starts to get tech savvy, everything would become vivid as you go on to read the entire unit. Each and every question about this technology will be handled with utmost simplicity and ease as we move into the fathoms.

In this chapter we will look at the following major topics:
Ontologies and Controlled Vocabulary: Comparison of Building Methodologies
www.igi-global.com/chapter/ontologies-controlled-vocabulary/62434?camid=4v1a

Test Driven Decomposition of Legacy Systems into Services
www.igi-global.com/chapter/test-driven-decomposition-legacy-systems/70740?camid=4v1a