Abstract

Software-Defined Networking (SDN) is a new networking scheme in network technologies in which the data plane and network plane are separated. It can be considered as an umbrella including numerous sorts of network topologies, such as linear, minimal, tree, datacenter topologies and several others, proposed principally to solve problems of diverse nature of applications and different demands for resource management and performance. Where traditional networks would utilize a specific machine, for example, a firewall or load balancer, a Software-Defined Networking conveys an application that uses the controller (like OpenDaylight, Floodlight, OVS, etc.) to oversee information plane conduct. SDN can be implemented on Mininet emulator or NS3 simulator, which are both Linux basis but can also be implemented on other operating systems.

One of important tools in network simulation is Fast Network Simulation Setup (FNSS); which is very useful toolchain that provides the ability of parsing different topologies from datasets or
generating them artificially and implement a complete simulation scenario. FNSS supports different programming languages and network simulators using suitable APIs in the target simulator.

In this paper, we proposed a solution to increase the performance of datacenter network topology implemented in python programming language on FNSS toolchain with Mininet emulator. The proposed solution is based on Linear Least Squares method to set different capacities to links based on average delays. This solution has been implemented and tested on two types of SND controllers which are OVS controller and Floodlight controller. Thus, a comparison based on these results has raised between these two controllers. In general, we choose video streaming application played on VLC media player to evaluate our solution. The results show that, as an average, the bandwidth increased from 953Kbps- 1.3Mbps between two hosts to 8.7Mbps- 13.9Mbps according to iperf command. The delay has been reduced in 89.6% in OVS controller and in 87.16% in Floodlight controller.

References


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Index Terms

Computer Science  Networks

Keywords

Software-Defined Networking (SDN), Fast Network Simulation Setup (FNSS), resource management, OVS Controller, Floodlight Controller, Mininet, Least Square Solution, Datacenter topology.