A POX Controller Module to Collect Web Traffic Statistics in SDN Environment

Authors : Wisam H. Muragaa, Kamaruzzaman Seman, Mohd Fadzli Marhusin

Abstract : Software Defined Networking (SDN) is a new norm of networks. It is designed to facilitate the way of managing, measuring, debugging and controlling the network dynamically, and to make it suitable for the modern applications. Generally, measurement methods can be divided into two categories: Active and passive methods. Active measurement method is employed to inject test packets into the network in order to monitor their behaviour (ping tool as an example). Meanwhile the passive measurement method is used to monitor the traffic for the purpose of deriving measurement values. The measurement methods, both active and passive, are useful for the collection of traffic statistics, and monitoring of the network traffic. Although there has been a work focusing on measuring traffic statistics in SDN environment, it was only meant for measuring packets and bytes rates for non-web traffic. In this study, a feasible method will be designed to measure the number of packets and bytes in a certain time, and facilitate obtaining statistics for both web traffic and non-web traffic. Web traffic refers to HTTP requests that use application layer; while non-web traffic refers to ICMP and TCP requests. Thus, this work is going to be more comprehensive than previous works. With a developed module on POX OpenFlow controller, information will be collected from each active flow in the OpenFlow switch, and presented on Command Line Interface (CLI) and wireshark interface. Obviously, statistics that will be displayed on CLI and on wireshark interfaces include type of protocol, number of bytes and number of packets, among others. Besides, this module will show the number of flows added to the switch whenever traffic is generated from and to hosts in the same statistics list. In order to carry out this work effectively, our Python module will send a statistics request message to the switch requesting its current ports and flows statistics in every five seconds; while the switch will reply with the required information in a message called statistics reply message. Thus, POX controller will be notified and updated with any changes could happen in the entire network in a very short time. Therefore, our aim of this study is to prepare a list for the important statistics elements that are collected from the whole network, to be used for any further researches; particularly, those that are dealing with the detection of the network attacks that cause a sudden rise in the number of packets and bytes like Distributed Denial of Service (DDoS).

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