

Measuring Delay Using Software Defined Networks: Limitations, Challenges, and Suggestions for Openflow

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Abstract : Providing better Quality-of-Service (QoS) to end users has been a challenging problem for researchers and service providers. Building applications relying on best effort network protocols hindered the adoption of guaranteed service parameters and, ultimately, Quality of Service. The introduction of Software Defined Networking (SDN) opened the door for a new paradigm shift towards a more controlled programmable configurable behavior. Openflow has been and still is the main implementation of the SDN vision. To facilitate better QoS for applications, the network must calculate and measure certain parameters. One of those parameters is the delay between the two ends of the connection. Using the power of SDN and the knowledge of application and network behavior, SDN networks can adjust to different conditions and specifications. In this paper, we use the capabilities of SDN to implement multiple algorithms to measure delay end-to-end not only inside the SDN network. The results of applying the algorithms on an emulated environment show that we can get measurements close to the emulated delay. The results also show that depending on the algorithm, load on the network and controller can differ. In addition, the transport layer handshake algorithm performs best among the tested algorithms. Out of the results and implementation, we show the limitations of Openflow and develop suggestions to solve them.

Keywords : software defined networking, quality of service, delay measurement, openflow, mininet

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