ABSTRACT

In recent years, several congestion control algorithms in the Transmission Control Protocol (TCP) have been proposed to increase the ability of TCP in high-speed and long distance networks. One of TCP implementations, which in MANET (Mobile Ad-Hoc Networking), opened new challenges for TCP algorithms to demonstrate the stability, scalability, and efficiency of the mechanism, because basically, MANET network topology varies according to the mobility and attenuation on wireless media.

This research compared two TCP congestion control algorithm, namely CUBIC TCP and Yeah TCP. CUBIC TCP is used by default in Linux kernel since version 2.6.19, while TCP yeah optionally used in the Linux kernel since version 2.6.22. TCP CUBIC is a loss-based TCP, while Yeah TCP is a delay-based TCP. Both variants of the protocol was implemented with BATMAN at the network layer in a MANET, which were then measured the performance of both TCP on file transfer service in parameters of throughput, jitter, packet received, and retransmission. This implementation was done in two general cases, which were nodes in static conditions, and the nodes in the moving condition. In addition, also investigated the influence of slow start optional modifications to the performance of TCP, which were the limited slow start and appropriate byte counting. The implemented communication hop were one, two, and three hops. There were ten samples per scenario.

The results indicate that Yeah TCP performs throughput superiority of Cubic for 269.25 to 542.49 kbps on static nodes scenario and 160.35 to 264.65 kbps on mobile node scenario. In terms of limited slow start modification, Cubic TCP shows 6% better performance of the whole modifications by throughput difference of 5.74 to 94.44 kbps, while Yeah TCP shows 94% better performance of the whole modifications by throughput difference of 4.07 to 1271 kbps. On the other hand, modification of appropriate byte counting has insignificant impact to both TCP throughput which is indicated by a margin of 0.21 to 265.46 kbps. Increasing number of hops affects both TCP performance, as indicated by the decline in throughput of 2986.43 to 4428.7 kbps. Node mobility affects TCP performance, indicated by decrease in throughput of 922.26 to 1443.08 kbps.

Keywords: BATMAN, TCP, Yeah, CUBIC, MANET, Congestion Control