ABSTRACT

TCP is one of the most popular protocols used in the Internet. In order to detect the capacity of a TCP connection, the TCP Reno algorithm increases the transmit packets that are not acknowledged during a round trip time when there is no loss packet during the last round trip time. However, when a lost packet was detected by the TCP Reno transmitter, the TCP Reno algorithm will decrease the congestion window by half. This behavior results in the performance degradation of a TCP Reno connection periodically. In order to improve the performance of TCP Reno, this thesis proposes a congestion window control algorithm based on the fuzzy theory, which is termed Fuzzy Reno. Fuzzy Reno modifies the operations of slow start and congestion avoidance phases. In the slow start phase, Fuzzy Reno calculates the slow start threshold with the round trip time and the arrival times of ACK packets. In congestion avoidance phase, Fuzzy Reno adopts the fuzzy theory to control the congestion window. Two parameters are as the inputs of fuzzy machine. One is the ratio of the difference between the congestion window and the slow start threshold, the other is the difference between the last two round trip times. The simulation results show that our proposed Fuzzy Reno algorithm can increase the throughput faster than that of TCP Reno and Vegas algorithms in the slow start phase. It also maintains a stable congestion window size which is almost the same as that of TCP Vegas. Therefore, Fuzzy Reno outperforms the other TCP algorithm. Meanwhile, the Fuzzy Reno algorithm can distribute the bandwidth to multiple TCP connections fairly.

Keywords : TCP Reno、Congestion control、Congestion Window、Fuzzy Theory


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