

Study on TCP congestion window control algorithm to improve TCP performance in heterogeneous network

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ABSTRACT

Recently, the TCP performance in the heterogeneous network has become a focus of the study. In traditional wired networks, the transmission error rate is very low. Therefore, the packet loss resulting in the transmission performance degradation is due to the network congestion. However, the Internet today is no longer just connected with the wired networks. Both the wired and wireless links may exist in a TCP connection. In wireless links due to interference or noise of the wireless transmission channel, the bit error rate (BER) is much higher than the wired links. The higher BER results in the increase of the packet loss. If the TCP algorithm still assumes the packet loss is due to the network congestion and reduces the congestion windows, the performance of TCP connection will be serious degradation. Therefore, this thesis proposed an algorithm to detect the network congestion and BER. The proposed algorithm records the TCP packet sending time and the corresponding ACK packet received time to calculate a parameter which is defined as the RTT ratio. With the RTT ratio, the proposed algorithm determines the reason of packet loss, and adjust the TCP congestion window and slow start threshold according to the determination. The NS2 simulation results show that the proposed algorithm performs much better than the TCP Reno in a high BER environment at the cost of little degradation of performance in a small BER environment.

Keywords : TCP Reno、Congestion control、Congestion Windows、RTT

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