

An adaptive delayed acknowledgment strategy to improve TCP performance in multi-hop wireless networks.

ABSTRACT

In multi-hop wireless networks, transmission control protocol (TCP) suffers from performance deterioration due to poor wireless channel characteristics. Earlier studies have shown that the small TCP acknowledgments consume as much wireless resources as the long TCP data packets. Moreover, generating an acknowledgment (ACK) for each incoming data packet reduces the performance of TCP. The main factor affecting TCP performance in multi-hop wireless networks is the contention and collision between ACK and data packets that share the same path. Thus, lowering the number of ACKs using the delayed acknowledgment option defined in IETF RFC 1122 will improve TCP performance. However, large cumulative ACKs will induce packet loss due to retransmission time-out at the sender side of TCP. Motivated by this understanding, we propose a new TCP receiver with an adaptive delayed ACK strategy to improve TCP performance in multi-hop wireless networks. Extensive simulations have been done to prove and evaluate our strategy over different topologies. The simulation results demonstrate that our strategy can improve TCP performance significantly.

Keyword: TCP; Multi-hop wireless network; Delayed ACK.