

Bypass AODV: Improving Performance of Ad Hoc On-Demand Distance Vector (AODV) Routing Protocol in Wireless Ad Hoc Networks

ABSTRACT

Bypass-AODV, a local recovery protocol, is proposed to enhance the performance of AODV routing protocol by overcoming several inherited problems such as unnecessary error recovery invocations, newly non-optimal reconstructed routes, high packet drop ratios, and high routing overheads. Bypass-AODV uses cross-layer MAC-notification to identify mobility-related link break, and then setup a bypass between the broken-link end nodes via an alternative node while keeps on the rest of the route. Therefore, Bypass-AODV enhances resource utilization by avoiding unnecessary error recovery cycles and consequently increases the network throughput. On the other hand, Bypass-AODV enhances route reliability; it avoids dropping packets by transmitting them over the constructed bypass. The simulation results show that when running 1-TCP connection, Bypass-AODV performs better than AODV. In particular, this behavior is rapidly changed with increasing the physical distance between the TCP connection end nodes beyond 2 hops. For example, when number of hops is equal to 6, goodput is enhanced by more than 100% compared to AODV for a 1-TCP connection and about 24% for multiple TCP connections. Further, the ratio of packet drop is reduced from 16% to 2%. Moreover, considering the hop count, the Bypass-AODV shows less sensitivity to the ongoing number of TCP connections.