ABSTRACT

Ad Hoc Network is a collection of wireless mobile nodes, dynamically forming a temporary network without the use of existing infrastructure or centralized control administration. In such a dynamic network, routing is a challenging problem and the protocol should quickly adapt to the changing environment of the network. Mobility is an important factor which influences the performance of ad hoc routing protocols. So the performance of the routing protocols is subject to the traveling pattern of the mobile nodes. Different routing protocols are designed for certain mobility models of the mobile nodes in the ad hoc network and the performance of the protocols have to be evaluated under different mobility patterns. Beside field tests, computer simulations are an interesting alternative concerning costs, scalability, etc. Results of simulative performance evaluation strongly depend on the mobility models used. Since tactical networks consist of, or, at least, contain mobile devices, the mobility model used has a decisive impact.

In common performance evaluations mainly simple mobility models are used with less number of protocols. This research analyzes the performance of the Ad hoc routing protocols such as Ad-Hoc On Demand Distance Vector Routing (AODV), Destination - Sequenced Distance Vector (DSDV), Dynamic Source Routing (DSR) and Temporally - Ordered Routing Algorithm (TORA) using Network Simulator Version no. 2 (ns-2). The simulation is carried out with 50 nodes. Network traffic scenarios one with 10 connections and other with 20 connections are considered. The simulation area is 400 x 400 and 600 x 1000 meters and the mobility speeds fixed are 10 m/s and 20 m/s. The performance of the above routing protocols
was analyzed in Random Waypoint, Random Walk and Random Direction Mobility Models. The packet delivery ratio and the end-to-end delay for varying number of sources has been evaluated with respect to the parameters such as node speed, Network Traffic and Node Density. The comparative study pointed out the relative strengths and weakness of those proactive and reactive routing protocols.

The simulation result shows that in Random Waypoint mobility model the AODV protocol provides better results for high/low speed, sparse/dense, high/low traffic. In Random Walk mobility model, the AODV performs better than DSR, TORA and DSDV in low and high mobility conditions. In low mobility conditions, DSDV produces better results than TORA and DSR. In Random Direction mobility model AODV protocol produces better results than DSDV, TORA and DSR. When the network size is large, DSDV produces better results than TORA and DSR. It has been concluded that the AODV protocol in Random Waypoint mobility model performs well compared to the other protocols in other mobility models.