

ABSTRACT

In wireless communication the application of MANET has become more inevitable in areas where the wired communication cannot be established immediately. Multicast communication is one of the important communication mechanisms that requires some specific attention when it is devised in MANET. The group management, robustness and scalability are the important issues that still to be addressed more effectively in order to achieve the best performance of multicast routing.

When a data packet is propagated on multicast routing in MANET, the packet is subject to various kinds of propagation loss. The data packet sent by a group leader would be dropped in the mid of the transmission. The lost data packet is to be recovered and make it available to the group member who has not received the packet. The robustness is to be ensured whenever a packet loss occurs. The protocols having been designed so far have not addressed the robustness and recovery of lost packet using minimum control messages. The group leader of the multicast group is to be managed in an efficient manner so that it can withstand for a longer period of time to act as the group leader of the same multicast group. The protocol designed for multicast routing is capable of supporting the number of nodes so the scalability is to be maintained without increasing joining delay and without affecting the packet delivery ratio. The secured scalability is to be achieved. The information about the new group is to be made known to all other existing groups without delay. The protocols designed so far have not addressed the fast secured scalability.

The thesis proposes a new multicast routing protocol for MANET named Mutual Sharing Range Detection Multicast Protocol (MSRDMP). This MSRDMP is a proactive tree based location aware multicast routing protocol. The MSRDMP provides the persistence leader selection algorithm through which effective group management is achieved. The mutual alert message is created using signal to noise ratio and the distance information provided by Global Positioning System (GPS). The group leader and leadership track node of the multicast group are guided by the mutual alert message. The Interim Clear To Send mechanism (ICTS) is employed to recover the lost packet by the group member and ensures the robustness and reliability. The secured scalable algorithm provided by the MSRDMP can allow the legitimate node to join the existing multicast group. The new group construction is easily facilitated by the appendix packet introduced in the proposed protocol MSRDMP.

The proposed protocol is compared with the other existing protocols Robust Scalable Geographic Multicast (RSGM), Scalable Position Based Multicast routing (SPBM) and On-demand Multicast Routing Protocol (ODMRP) under four different scenarios like moving speed, node density, group size and number of groups. The performance parameters such as packet delivery ratio, control overhead, average path length and average joining delay are analysed. The MSRDMP gives 2 % improvement than RSGM and about 15 % improvement than ODMRP and 10% improvement than SPBM on overall average performance.