

Performance of Modified OLSR Routing Protocols

The following is an analysis of the relative performance of a mobile ad-hoc network which implements modified versions of the OLSR protocol. In each experiment an altered version of the protocol is tested against the original in a standardised ns3 simulation environment. The simulation will see 50 nodes in a 1500x1500 area travel by the random waypoint mobility model at 1, 10 and 20 meters per second. This will be tested for 10, 20 and 30 nodes as sources of CBR traffic. The following sections represent the four modifications made to the code.

Full 1-Hop MPR Sets

This protocol includes all 1-hop neighbours in the MPR set of each node. This was done by removing all of the conditional statements during the MPR set construction stage in the OLSR protocol. Instead all neighbours are added. The relative results are shown in appendices 1.1, 1.2, and 1.3 for node mobility speeds 1, 10 and 20 meters per second. This modification has resulted in slightly improved performance for all source node quantities and node speeds.

Halved MPR Sets

This protocol includes only half of the calculated members of a node's MPR set by random choice. This was done by removing random MPR members from the completed set until it reaches the desired size. The relative results are shown in appendices 2.1, 2.2, and 2.3 for node mobility speeds 1, 10 and 20 meters per second. This modification has resulted in reduced performance for all source node quantities and node speeds, with the performance gap closing as node speed increases.

Halved TC Messages

This protocol includes only half of a node's MPR set in the topology control messages by random choice. This was done by removing random elements from the completed tables in the topology control messages until it reaches the desired size. The relative results are shown in appendices 3.1, 3.2, and 3.3 for node mobility speeds 1, 10 and 20 meters per second. This modification has resulted in significantly reduced performance for all source node quantities and node speeds.

Non Bi-Directional Links

This protocol allows for the inclusion of nodes in the MPR set without bi-directional links. This was done by removing the conditional statement which checks if a tuple is bi-directional, allowing nodes with one way links to be added to MPR sets. The relative results are shown in appendices 4.1, 4.2, and 4.3 for node mobility speeds 1, 10 and 20 meters per second. This modification has resulted in no significant change in performance for all source node quantities and node speeds.