Presentation Assessment of Routing Protocols in MANETS

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Abstract

In wireless ad hoc networks mobile stations or nodes are permitted to move everywhere. The transmission range of the lumps is secure in mobile ad hoc networks (MANETs) however the network topology vagaries in a dissimilar fashion. Due to dynamic nature of network topology some of the network links are demolished while some new links are recognised. The routing protocols established for wired networks cannot be used professionally for wireless networks. For wireless ad hoc grids there are a few new routing protocols appropriate for the energetically changing ad hoc wireless situation. In this paper we associate the performance of two on-demand routing protocols that is AODV and DSR in terms of QoS parameters such as throughput, minimum, maximum & average delay and packet delivery ratio. We accomplished widespread simulations using NS-2 simulator using both conventional TCP and TCP Vegas traffic sources.

Keywords - *AODV, DSR, MANET routing protocols, TCP & TCP Vegas.*

I. INTRODUCTION

Mobile networks are confidential as infrastructure networks and Mobile ad hoc networks(MANETs). In infrastructure mobile network, nodes have base stations or wired access points within their broadcast range. In contrast, MANETs are independent self-organized networks deprived of provision of infrastructure. Mobile stations in MANETs are free to move around. Since of the fixed transmission range of mobile terminals, the network topology changes energetically consequential in network establishment and breaking of some existing network links. For wired networks, routing protocols were developed with the supposition that the topology is static. Consequently such routing protocols may not serve professionally in case of wireless ad hoc net works. Thus new routing protocols are established for the dynamically changing ad hoc wireless environment. The routing protocols of wireless ad hoc networks fall into two category,

(1) Table-driven
(2) On-demand

A. Table driven routing protocol preserve consistent, up-to-date steering evidence from each node to all other nodes of the network. Every network node therefore preserves one or more routing table which stores the routes to all the other network nodes. When variations in topology occur, the related material is sent to all network nodes in order to deliver up-to-date routing information. Table driven routing protocol have the weakness of increased signalling traffic and power consumption as the routing information is distributed to all the network nodes.

B. On-demand routing protocol trails a diverse approach. A route is recognised only when there is a need to for a network connection. When a source node X needs an assembly to destination Y, it invokes a routing discovery protocol to treasure a route connecting it to Y. Once the route creation is done, nodes X & Y and all the transitional nodes store the information concerning the route from X to Y in their routing tables. The route is maintained until the destination is unreachable or the route is no longer needed. On-demand routing protocols have lower power ingesting and less control signalling however, it has long end-to-end connection delay as the connection is established only upon the group of a network connection required. In wireless ad hoc complexes routing protocols are developed assuming that all stations have identical capabilities and employ the capability to perform routing related tasks such as route discovery/establishment and route conservation in the network.

Numerous performance estimation of routing protocols in MANETs has been accomplished using CBR traffic. Biradar, S.R. et al [10] have analyzed the AODV and DSR protocol using Group flexibility model and CBR traffic sources. Conferring to DSR performs better in high mobility and DSR gives better average delay. Rathy R.K. et al [11] matched to AODV and DSR routing protocols under random way point flexibility model with TCP and CBR traffic sources. Conferring to AODV outperforms DSR in high mobility and/or high load conditions. Harminder S.B. et al[12] investigated the recital of AODV and DSR routing protocolunder group mobility models. According to [12] DSR gives better results in TCP traffic andunder restricted bandwidth condition. In this paper we have investigated the routine of on-demand routing protocols such as Adhoc on demand distance vector (AODV) and Dynamic source routing (DSR) routing protocols in the situation of Random Mobility Model using both conservative TCP and TCPVegas traffic sources. The objective of the work is to appreciate the working mechanisms and to explore which routing protocol gives better performance when TCP and TCP Vegas are used as the traffic source.

II. DESCRIPTION OF ROUTING PROTOCOLS

A. Ad hoc on demand distance vector (AODV)

Ad hoc on demand distance vector (AODV) routing protocol generates routes on-demand. In AODV, a route is fashioned only when entreated by a network connection and information regarding this route is deposited only in the routing tables of those nodes that are present in the path of the route. The procedure of route formation is as follows. Assume that node X wants to set up a connection with node Y. Node X initiates a path discovery process in energy to establish a route to node Y by broadcasting a Route Request (RREQ) packet to its immediate neighbours. Each RREQ packet is familiar through an arrangement of the transmitting node's IP address and a broadcast ID. The latter is used to identify different RREQ broadcasts by the same node and is incremented for each RREQ broadcast. Additionally, each RREQ packet carries a categorization number which allows intermediate nodes to reply to route requests only with up-to-date route information. Upon reception of an RREQ packet by a node, the material is forwarded to the immediate neighbours of the node and the procedure endures until the RREQ is received either by node Y or by a node that has recently established a route to node Y. If succeeding copies of the same RREQ are received by a node, these are discarded.

When a node forwards a RREQ packet to its neighbours, it archives in its routing table the address of the neighbour node where the first copy of the RREQ was received. This helps the nodes to establish a reverse path, which will be used to transmit the response to the RREQ. AODV chainsonly the use of symmetric links. A timer starts consecutively when the route is not used. If the time rexceeds the value of the 'lifetime', then the route entry is deleted. Routes may alteration due to the movement of a node within the path of the route. In such a case, the upstream national of this node generates a 'link disappointment notification message' which advisesabout the deletion of the part of the route and forwards this to its upstream neighbour. Thepractise continues until the source node is notified about the deletion of the route part initiated by the movement of the node. Upon reception of the 'link failure notification message' the source node can pledge discovery of a route to the destination node.

B. Dynamic Source Routing (DSR)

Dynamic Source Routing (DSR) uses source routing rather than hop-by-hop routing. Thus, in DSR every packet to be directed carries in its header the well-ordered list of network nodes that establish the route over which the packet is to be transmitted. Thus, intermediate nodes do not need to maintain routing information as the contents of the packet itself are sufficient to route the packet. This fact abolishes the need for the periodic route announcement and neighbour uncovering packets that are engaged in other protocols. The above in DSR is large as each packet must contain the whole sequence of nodes containing the route.DSR comprise the procedures of route discovery and route conservation. A source node wishing to set up an assembly to another node initiates the route discovery process by propagation a RREQ packet. This packet is established by neighbouring nodes which in turn advancing it to their own neighbours. A node forwards a RREQ message only if it has not yet been seen by this node and if the nodes discourse is not part of route. The RREQ packet initiates a route reply packet(RREP) upon response of the RREQ packet either by the destination node or by an intermediate node that knows a route to the destination. Upon arrival of the RREQ message either to the destination or to an intermediate node that recognizes a route to the destination, the packet contains the sequence of nodes that constitute the route.

This information is piggybacked on to the RREP message and accordingly made available at the source node. DSR supports both symmetric and asymmetric links. Thus, the RREP message can be either carried over the same path with original RREQ, or the destination node might inductee its own route discovery towards the source node and piggyback the RREP message in its RREQ. In order to limit the overhead of these control messages, each node sustains a cache comprising routes that were either used by these nodes or overheard. As a result of route request by a confident node, all the possible routes that are learned are deposited in the cache. Thus, a RREQ process may result in a quantity of routes being stored in the source node's cache.

III. SIMULATION SETUP

We have used network simulator version 2 for the evaluation of our work. The NS-2simulator software was established at the University of California at Berkeley and the Virtual Inter Network tested (VINT) project fall 1997. We have used Ubuntu 9.04 Linux environment. Our simulation setup is a network with haphazardly placed nodes within an areaof 1315m * 572m. We have chosen a wireless channel with a two-way ground propagation model with a radio broadcast model of 250m and interference range of 550m. The node's speed is varied from 0 to 25m/s generated by uniform distribution. The simulation execution time is 100s. We have replicated the scenario with both the conventional TCP and TCP Vegas traffic sources. The aim of our simulation is to evaluate the concert differences of the two on-demand routing protocols and equate it with both TCP and TCP Vegas.

A. Performance metrics

Manet routing protocols can be estimated by a number of quantifiable metrics described byRFC2501. We have used the succeeding metrics for appraising the performance of the two routing protocols (AODV & DSR).

1) Packet Delivery Fraction

It is the ratio of the number of packets customary by the destination to the number of data packets generated by the source.

2) Minimum Delay

It is defined as the minimum time taken for a data packet to be transmitted across a MANET from source to destination.

3) Maximum Delay

It is defined as the maximum time taken for a data packet to be communicated across a MANET from a source to destination.

4) Average end-to-end delay

It is defined as the average time taken by the data packets to proliferate from source to destination across a MANET. This embraces all possible delays caused by shielding during routing discovery latency, queuing at the interface queue, and retransmission delays at the MAC, broadcast and transfer times.

5) Throughput

It is the rate of magnificently transmitted data packets per second in the network during the simulation.

IV.SIMULATION RESULTS

Here we contemporary a comparative analysis of the presentation metrics of both the on-demand routing protocols AODV and DSR with both TCP and TCP Vegas traffic sources for dissimilar node speeds 5,10,15,20 & 25m/s.

A. Packet Delivery Fraction

In case of TCP traffic source at low node rapidity i.e., from 0 to 15m/s DSR performs better than AODV. But as the speed increases to 20m/s both DSR and AODV completes equally under all supposed load condition. With TCP Vegas, DSR gives more PDF than AODV at both low as well as high node velocities (Fig1). At low velocities AODV is akin to DSR but the ratio decreases as the speed of node increases. Thus we determine that AODV with TCP Vegas is analogous to DSR at low speeds of node but at high node speeds DSR performs better.

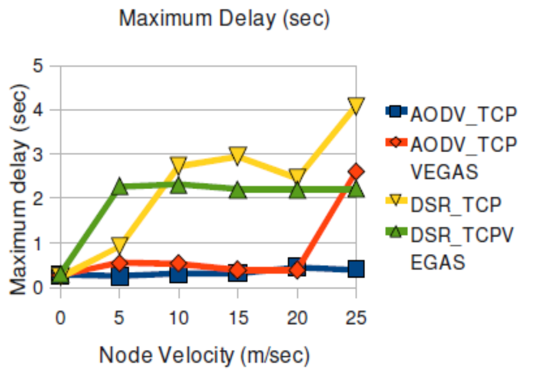

Fig 1. Maximum Delay

B. Average Delay

In case of conservative TCP, AODV gives almost continual and least delay at all the node velocities while delay of DSR increases with the node velocity. In case of TCP Vegas also, AODV gives less delay than DSR. Thus the moderate end-to-end delay is least for AODV routing protocol with TCP Vegas traffic source.

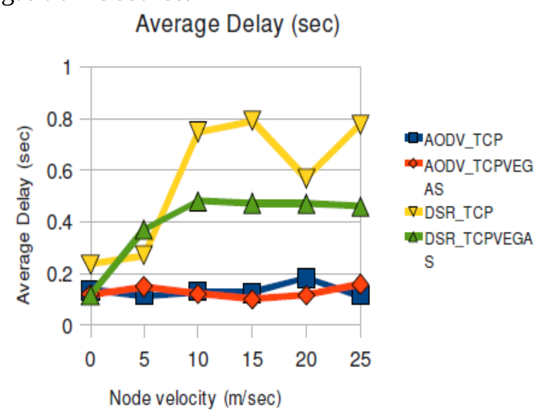

Fig 2.Average Delay

C. Throughput

In case of TCP traffic source, at 0m/s both DSR and AODV gives equal and supreme throughput. At 10m/s AODV gives fewer throughputs than DSR but as the speed increases AODV outperforms DSR. With TCP Vegas traffic source, at 0m/s DSR gives more throughput than AODV but as the speed increases throughput of DSR decreases.

Thus, AODV performs better than DSR as the speed increases. At low node velocities, AODV with both TCP&TCP Vegas performs equally. But at higher speeds, AODV with conventional TCP gives better quantity concert than with TCP Vegas.

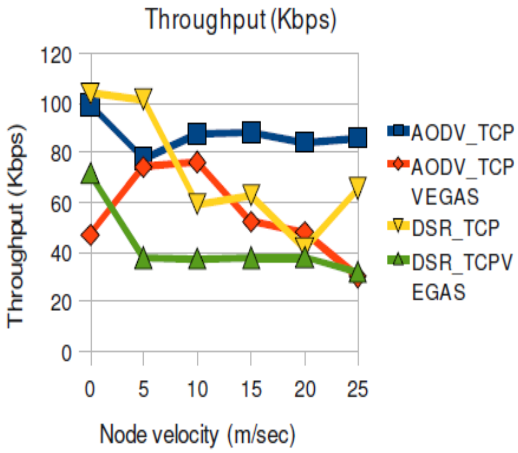

Fig 3. Throughput

V. CONCLUSION

We have gauged the two routing protocols AODV and DSR using both TCP & TCP Vegas traffic sources. Based on the consequences we conclude that, both AODV and DSR gives almost same packet delivery fraction at low node paces but as the velocity of the node increases DSR gives better PDF with TCP Vegas. Delay is maximum for DSR and least for AODV with TCP Vegas. Average end-to-end delay of AODV is less than DSR. Through put of AODV is better than that of DSR. Thus, AODV with TCP Vegas traffic source outperforms DSR.

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