Volume 6, Issue 5, May 2016 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Packet Delivery Function (PDF) Performance of Routing Protocol AODV Behavior of Network Simulator

Surekha Lanka*
BSc, MSc, MTech (PhD) Computer Science &
Himalayan University, Andhra Pradesh, India

Sidra Ehsan
MS (CS), Computer Science &
King Abdul Aziz University

Abstract*— An Ad-hoc network is the mutual participation of a collection of mobile nodes without the required intercession of any kind of cluster access point or subsist infrastructure.The best research aspects of MANET are secure and suitable routing. In this paper, we are implementing the AODV routing protocol in ns2. So used routing protocol AODV is selected to demonstrate the implementation procedures. Which includes evaluation of performance of the AODV protocol depending on various input parameters. The main purpose of our study is to increase the possibility of establishing a routing path with less RREQ messages than the other protocol.

Keywords*— MANET, access point, mobility, Ad-hoc network, protocol, TCL, dynamic, route discovery, simulation, mobility, random waypoint, pause time, ratio.

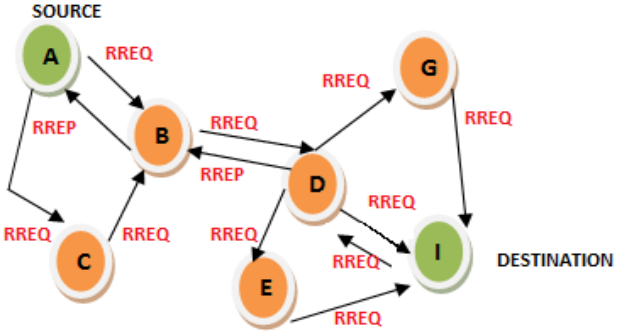
I. INTRODUCTION TO ADHOC NETWORKS

An ad hoc network is a network that is composed of individual devices communicating with each other directly. The term implies spontaneous construction because these networks often bypass the hardware central access point such as a router. Many Adhoc networks are local area networks where computers or other devices are enabled to send data directly to one another rather than going through a centralized access point [1]. This network accepts initial, quality in high and subscription of unpublished addressing to all forms of Adhoc networks. An Adhoc network is a concept of unfamiliar users, those have use a prototype router to send signals of wireless to the individual computers are only seen small urban or business networks.

However, the ad hoc network is being used quite a bit in new types of wireless engineering, although until recently it was a rather esoteric idea. For example, a mobile ad hoc network involves mobile devices communicating directly with one another. Another type of ad hoc network, the vehicular ad hoc network, involves placing communication devices in cars. Both of these are examples of ad hoc networks that use a large collection of individual devices to freely communicate without a kind of top-down or hierarchical communication structure [2].

II. WORKING OF AODV

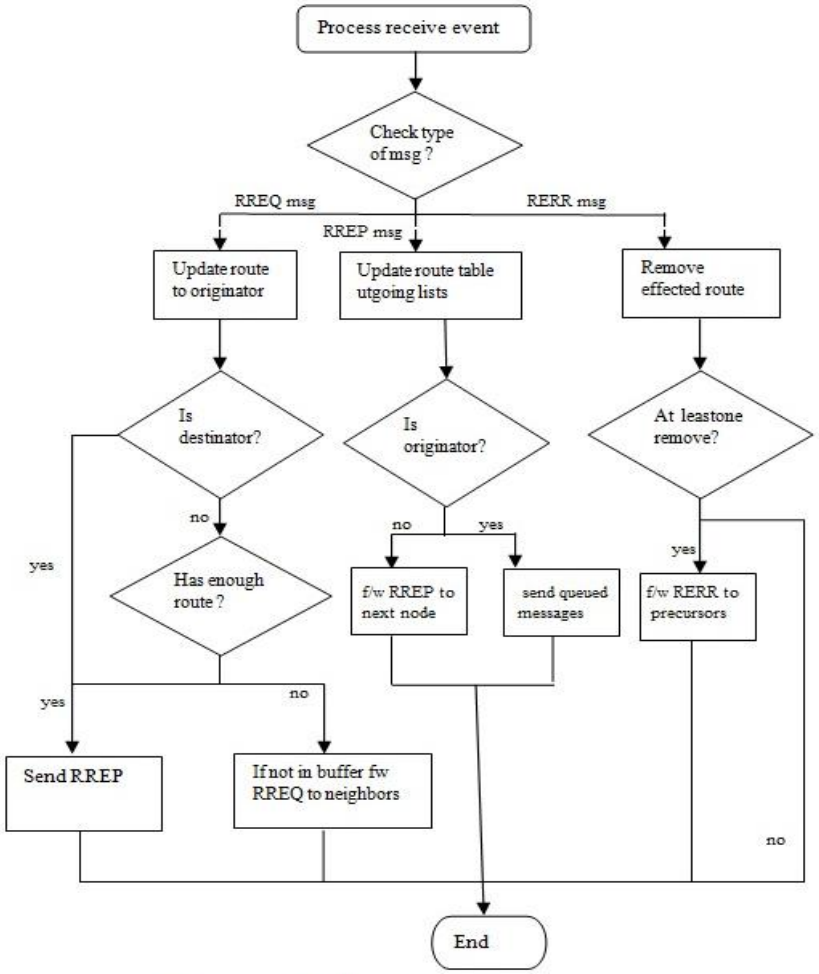
To find the route AODV Routing protocol uses an on-demand approach, a route is constructed only when it is demanded by a source node for transmitting data packets. It employs destination sequence numbers to identify the most recent path. AODV offers quick adaptation to dynamic link conditions, low processing and memory overhead, low memory utilization, and determines unicast routes to destinations within an Ad - hoc network [3]. This algorithm is the purpose of the self-starting dynamic network as demanded by the users to use effective Ad - hoc network. AODV supplies a loop free route to repairing broken links. Because global periodic routing advertisements do not require by AODV protocol.This protocol consists of two phases route discovery and route maintenance. The technique of route discovery depends on the active established route. So the protocol of ADOV initiates route through RREQ when the destination node doesn't have any kind of route from the source node[4]. This node starts receiving the packets and updates the information for the source node and maintains information for the source node in the routing table by quick setup via backward pointer.RREQ which existing Internet protocol of the source node and destination node.



AODV ROUTE DISCOVERY PROCESS

The broadcasts RREQ of the source node packets to initiating path discovery for its neighbors. Broadcast ID [5], [6], [9]. Once RREQ receives, it sends back a RREP packet to the destination, otherwise the packet of broadcasts RREQ again checks path for further to its neighbors. It so obviously it sets up path reversal the nodes back from source to destination . As RREP is circulated back to the source, nodes set up forward pointer to the destination [6]. For desired destination, a single route table entry. Destination address, the path along next hop, the number of destinations hops were maintained by a node. If a node chooses a new node out of different routes then both the routes will be discovered at the same time, then the route will be preferred to emphasize hops.

Flow chart summarizes the action of an AODV node when processing the message



Flow chart of AODV node when processing the message.

III. AODV ON NS2

For our simulations, we have used the NS-2.31 Network Simulator. Which is especially favored in the community of ad hoc networking. Ns-2.31allin one package [7] is used to analyze the impact of mobility and performance of AODV. The simulations incorporated the values of common technological specification of IEEE 802.11b wireless networks with a physical layer specification as indicated in Table 1. Here simulation is performed under the operating system window using Cygwin [9]. The mobility and scenario field of communication are created and simulation TCL(Tool Command Language) code is written to maintain and setup component of wireless simulation. Now the TCl script is compiled and run to generate a trace file which records traffic and node movement. Which consists of all the major list events such as number of packets transmitted, packets received, packets dropped, source and destination during the simulation. The data of traced will be stored in an output file for the post processing. These files are formulated using AWK in control to extract the information needed to evaluate the performance metrics. The output will be plotted using excel to represent graphically metrics of performances.

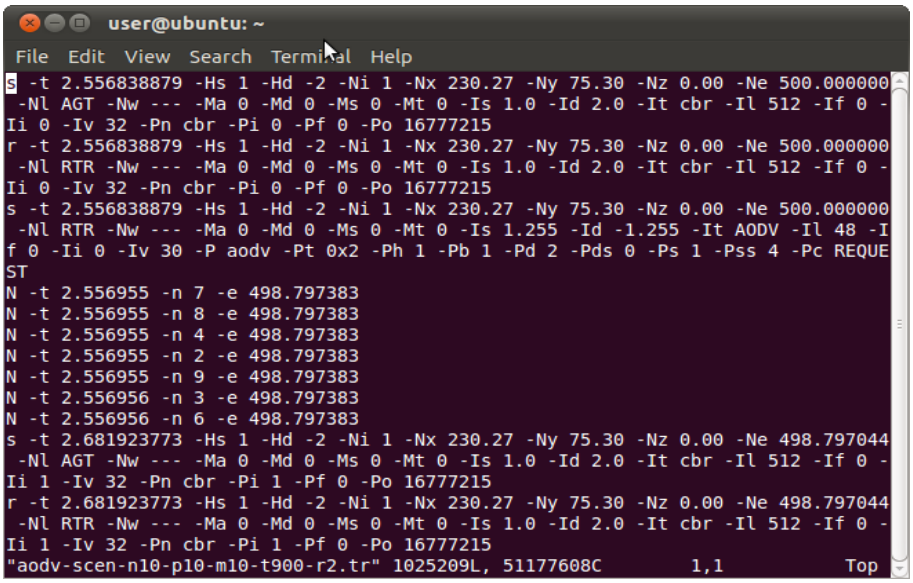
A mobile ad hoc network is generated as follows: there are 50 nodes in the network and they are confined to rectangular area 1000 m by 1000 m. Node movement is modeled by the Random Waypoint mobility model [7]. In this model it rests for some pause time, when the node arrives at its randomly chosen destination, so it chooses a new destination and begins moving once again. The pause times vary between 0 and 10 seconds. The node transmission range is 250 m.

Simulator	**NS-2.35 on Ubuntu 10.10**
Examined protocol	AODV
Simulation duration	900s
Simulation area	1000M*1000M

Antenna model	Omni directional
Interface queue size	50 packets
Mobility model	Random way point
Communication model	Constant bit rate
Data payload	512 bytes
Packet rate	4packets/s
Transmission range	250m
Maximum speed	10 meters per second
Pause time	10 seconds
Control packet size	84 bytes
Channel bandwidth (data)	11Mbps
Channel bandwidth (control)	1Mbps

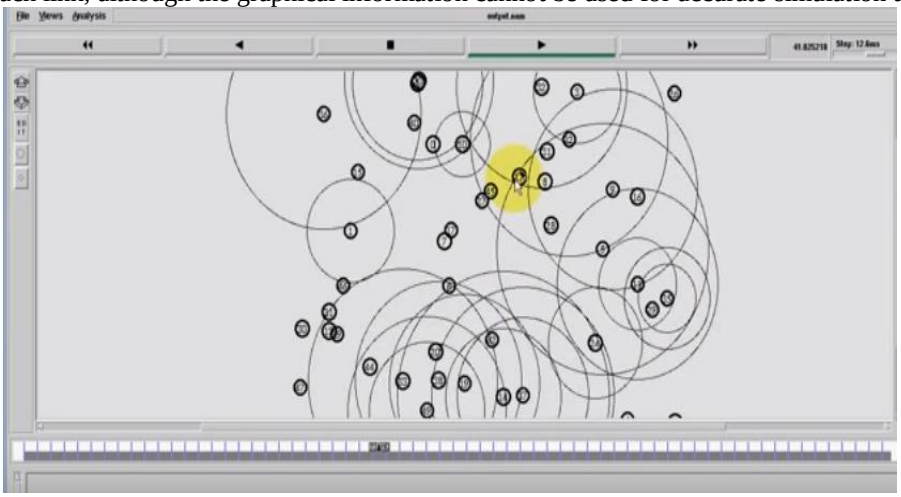
The network scenario for different pause times are generated. Each simulation is run for 200 seconds and models a network of 50 nodes. The propagation model is the Two way ground model. The bandwidth is 2 Mb/s, the data packet size is 512 bytes and packets are sent at a rate of 4 per second by each source. We have evaluated AODV routing protocol performance.

We created a validation module by the scenario of 50 nodes using the Script TCL. The script of awk is only runs on the trace file which is procured after the simulation in the Unix Kernel. That trace file records movements of traffic and nodes.



IV. AFTER SIMULATION

All Specifically a simulation is finished, Network Simulator (NS- 2.35) produces one or more text-based output files which contain detailed simulation data, if it specified to do in the input Tcl script. Simulation analysis can be used by data or as an input to a graphical a simulation display tool called NAM (Network Animator), which has a graphical user interface similar to the CD player existing with different operations like play, fast forward, rewind, pause and so on, and also has a display speed controller.Moreover, it can graphically present information such as throughput and number ofpacket drops at each link, although the graphical information cannot be used for accurate simulation analysis.



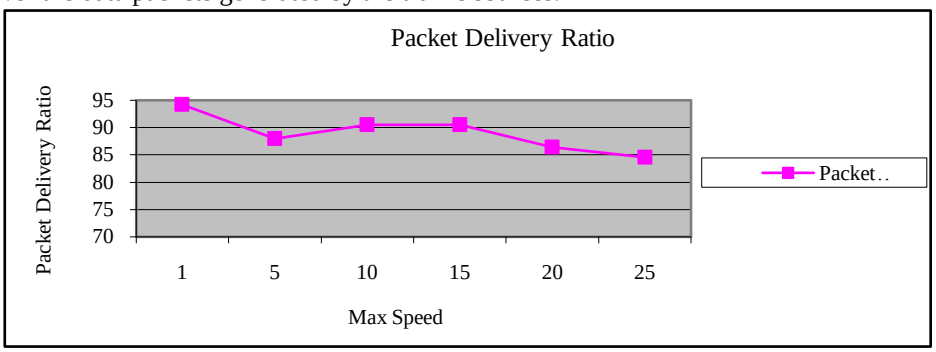
V. SIMULATION RESULTS AND ANALYSIS

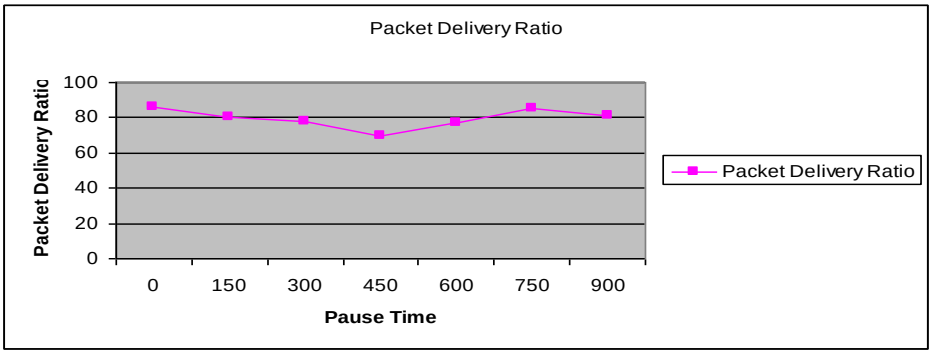
The performance is measured on the major basis of parameters like PDF (packet delivery function). PDF is defined as the total number of packets sending dividing by the total number of packets receiving by CBR sources.

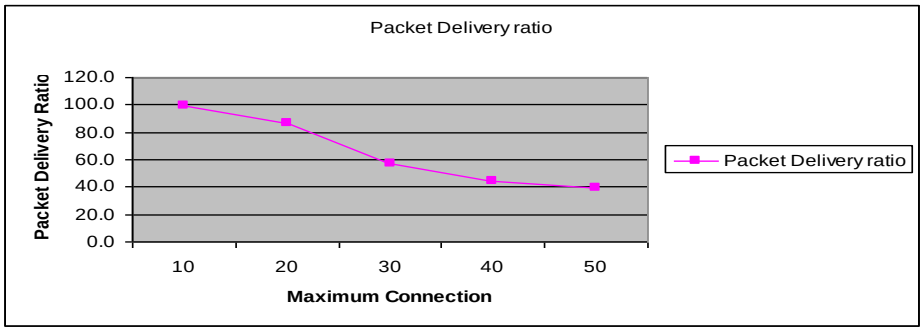
P = Pkt_S / Pkt_R

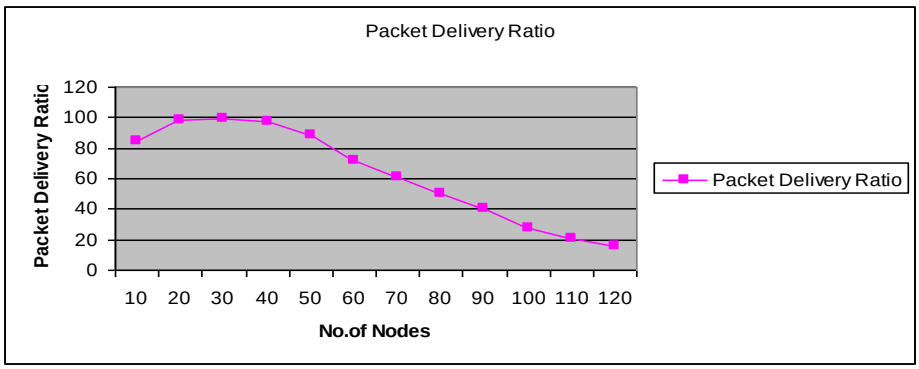
Here the results of PDF which vs. speed, pause time, traffic load and network density .

AODV shows an approximately similar behavior at different levels of speeds, Ratio of the data packets delivered to the destination over the data packets generated by the traffic sources.









VI. CONCLUSION

In this paper, we make the analysis of simulation of the AODV routing protocol is done using performance metrics of PDF. The standard protocol uses the Dijkstra algorithm for computation of routes. So which maintains minimum hop count to determine the effective path. It is observed that AODV protocol performs with satisfactory results of PDF (packet delivery fraction). The procedures protocol implementation is given and analyzation of the trace file and generated figures are shown.

ACKNOWLEDGMENT

My deepest gratitude is to my advisor, Dr. Laila Naseef . I have been amazingly fortunate to have an advisor who gave me the freedom to explore on my own. And also I would like to acknowledge Mr. Premchand Konjetti helped me a lot for the technical part of my paper.

REFERENCES

[1] http://www.journals.elsevier.com/ad-hoc-networks/
[2] https://www.techopedia.com/definition/5868/ad-hoc-network
[3] http://www.ijarcsse.com/docs/papers/June2012/Volume_2_issue_6/V2I600224.pdf
[4] http://www.ijser.in/archives/v3i5/IJSER15134.pdf
[5] E. M. Royer and C. K. Toh, "A Review of Current Routing Protocols Ad Hoc Mobile Wireless Networks", IEEE Personal Communications, April 1999, Volume 6, Number 2, pp: 46-55.
[6] C. E. Perkins and E. M. Royer, "Ad-hoc On-Demand Distance Vector Routing", Proceedings of the second IEEE Workshop on Mobile Computing Systems and Applications, New Orleans, L.A.,1999, pp: 90-100.
[7] The network simulator; NS-2: . http://www.isi.edu/nsnam/ns/
[8] S.A. Gupta and R. K. Saket, "Performance Metric Comparison of AODV and DSDV Routing Protocols in MANETs using NS-2",June 2011, Volume 7, Number 3, pp: 339-350.
[9] Nasri Amir, Schober Robert, Ma Yao. Unified asymptotic analysis of linearly modulated signals in fading, non-Gaussian noise, and interference. IEEE Trans Commun 2008;56(6):980–90.
[10] http://www.engr.mun.ca/~zehua/necec2-zehuawang.pdf
[11] http://www.ijsret.org/pdf/network_coding_to_improve_performance_of_aoad.pdf
[12] http://jist.ece.cornell.edu/docs/040421-swans-aodv.pdf
[13] N.H.Vaidya, "Mobile Ad Hoc Networks Routing, MAC and transport Issues", Proceedings of the IEEE International Conference on Computer Communication INFOCOM, 2004.
[14] M.M. Morshed, F.I.S. Ko, D. Lim, M.H. Rahman, M.R.R. Mazumder, and J. Ghosh, "Performance Evaluation of DSDV and AODV Routing Protocol in Mobile Ad-hoc Networks", Fourth International Conference on New Trends in Information and Service Science, 2010, pp: 399-403.

