ISSN:0975-9646

K. Narasimha raju et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (3) , 2014, 3186 - 3189

Performance Evaluation of Feasible Placement Model in AODV for Mobile Ad Hoc Networks

K. Narasimha raju[#], S.P.Setty[*]

[#]*CS&SE Department, Andhra University*
Visakhapatnam, Andhra Pradesh, India

[*]*CS&SE Department*
Visakhapatnam, Andhra Pradesh, India

***Abstract*— In this paper, the feasible approach for placing mobile nodes in Mobile Ad Hoc Networks is evaluated with AODV. Simulation results reveals that the performance of proposed "feasible placement model" for the mobile nodes yields better results than the existing random placement model.**

***Keywords*— AODV, MANETs, Node Placement Models, Feasible Placement Model, Performance Metrics.**

I. INTRODUCTION

The dynamic nature of the mobile nodes in a Mobile Ad Hoc Network [1][2][3] causes link breakages. The initial position of the nodes plays a vital role in the performance of the network. The rest of the paper is organized as follows: Random Placement Model" is illustrated in section 2, Feasible Placement Model is described in section 3, AODV routing protocol is illustrated in section 4, simulation environment is presented in section 5, and results are presented in section 6 and finally concluded with section 7.

II. RANDOM PLACEMENT MODEL

The placement models [4][5] determines the position of the mobile nodes at the early stage. In this model, the nodes are distributed randomly and are placed within the physical terrain as shown in the figure 1. It is commonly used model in the experiments.

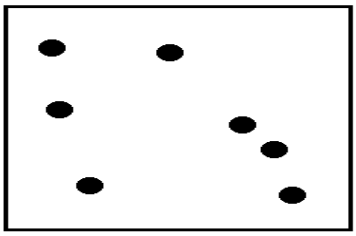

Figure 1: Random Placement Model

III. FEASIBLE PLACEMENT MODEL

The initial position of the mobile nodes in the terrain region plays a major role in the performance of the network. In the proposed model, the mobile nodes are placed at the centre of its hexagon. The generation of hexagons follows a layered pattern as shown in the figure 2.

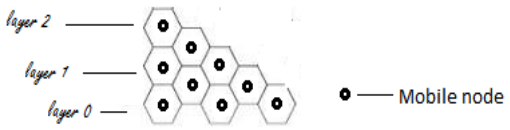

Figure 2: Feasible Placement Model

IV. AD HOC ON DEMAND DISTANCE VECTOR (AODV)

The reactive nature of the AODV [6][7] is a significant factor distinguishing from other protocols. In AODV, whenever a source node requires a path information about a destination node, it is established through the broadcast method of route request (RREQ) packets. The confirmation of route is done through RREP packets from the destination to the source node. RERR packets are designed to intimate the link failure to the nodes.

V. SIMULATION ENVIRONMENT

Wireless Network Simulation software namely NS2 [11], GloMoSim[12] and Qualnet[13] etc., plays an important role to evaluate the network performance. Glomodim-2.03 is used in this simulation process. The performance[8][9][10] of the feasible placement model is evaluated by conducting various simulations in varying network size, varying pause time and varying propagation Models. The simulation parameters used in the experiments are elaborated in the table 1, table 2 and table 3.

Table I SIMULATION PARAMETERS VARYING NETWORK SIZE

Routing Protocols	AODV
Simulation Time	360s
Area (sq.m)	1000x1000
Propagation Model	Two Ray
Traffic	CBR
Packet Size	512 bytes
Nodes	27,54,81,108
Antenna Type	Omni directional
Transmission range	250m
Receiver range	250m
Pause time	0 sec
Minimum speed	1 m/s
Node Placement Model	Random, Feasible
Mobility Model	RandomWaypoint

TABLE II
SIMULATION PARAMETERS VARYING PAUSE TIME

Routing Protocols	AODV
Simulation Time	360s
Area (sq.m)	1000x1000
Propagation Model	Two Ray
Traffic	CBR
Packet Size	512 bytes
Nodes	81
Antenna Type	Omni directional
Transmission range	250m
Receiver range	250m
Pause time(sec)	0 ,60,120,180,240,300,360
Minimum speed	1 m/s
Node Placement Model	Random, Feasible
Mobility Model	RandomWaypoint

TABLE III
SIMULATION PARAMETERS VARYING PROPAGATION MODELS

Routing Protocols	AODV
Simulation Time	360s
Area (sq.m)	1000x1000
Propagation Model	Two Ray, Free space
Traffic	CBR
Packet Size	512 bytes
Nodes	27,54,81,108
Antenna Type	Omni directional
Transmission range	250m
Receiver range	250m
Pause time	0
Minimum speed	1 m/s
Node Placement Model	Random, Feasible
Mobility Model	RandomWaypoint

VI. RESULTS

The performance of feasible placement model and random placement models are analysed in the metrics namely Average Jitter Average end-end delay , Average Throughput and Packet delivery ratio.

Average Jitter is the delay variation between two successive packets received. Figure 3 , Figure 7 and Figure 11 shows the Average Jitter(sec) for AODV in Random Vs Feasible Placement Model under various network sizes, various pause time and various propagation Models respectively.

Average End-to-End delay describes the data packets travelling time from the particular sender to a particular receiving node.Figure 4 , Figure 8 and Figure 12 shows the Average end-to-end delay(sec) for AODV in Random Vs Feasible Placement Model under various network sizes, various pause time and various propagation Models respectively.

Average Throughput describes the total amount of data received by the particular receiver during the entire simulation period of time.Figure 5 , Figure 9 and Figure 13 shows the Average throughput(bps) for AODV in Random Vs Feasible Placement Model under various network sizes, various pause time and various propagation Models respectively.

Packet Delivery Ratio represents the ratio of the number of data packets delivered from the source node to a particular receiving node. Figure 6 , Figure 10 and Figure 14 shows the packet delivery ratio for AODV in Random Vs Feasible Placement Model under various network sizes, various pause time and various propagation Models respectively.

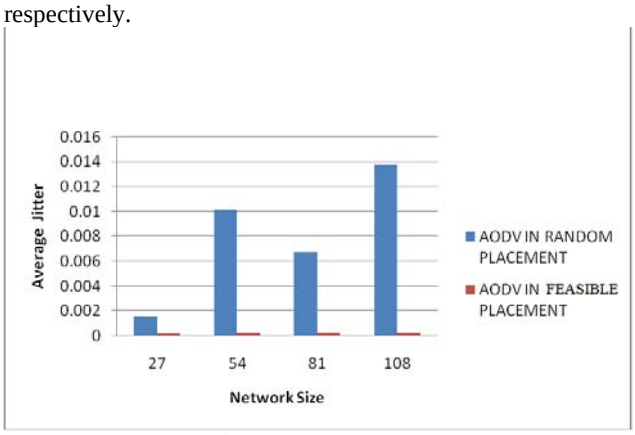

Figure 3: Average Jitter for AODV in Random Vs Feasible Placement Model In various network sizes

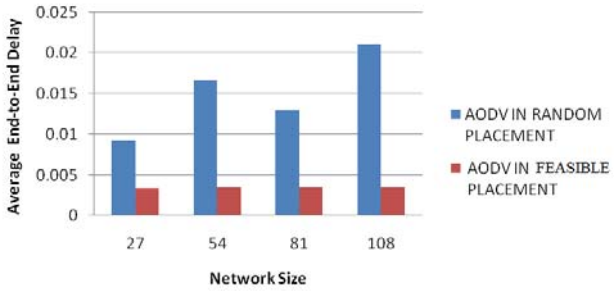

Figure 4: Average End-to-End Delay for AODV in Random Vs Feasible Placement Model In various network sizes

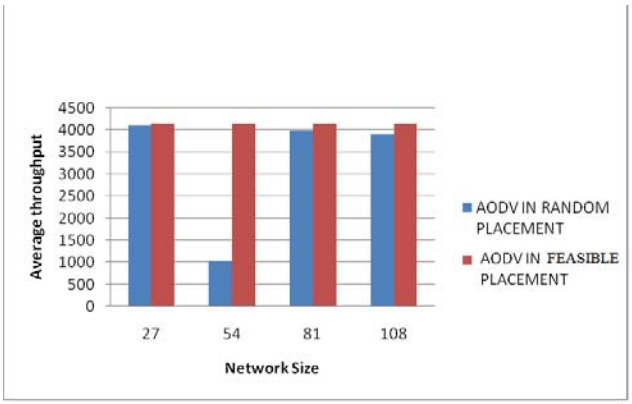

Figure 5: Average throughput for AODV in Random Vs Feasible Placement Model In various network sizes

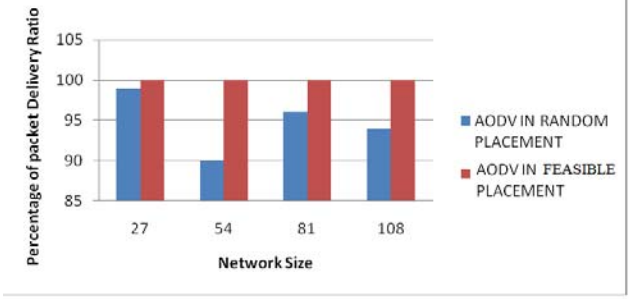

Figure 6: Percentage of packet delivery ratio for AODV in Random Vs Feasible Placement Model In various network sizes

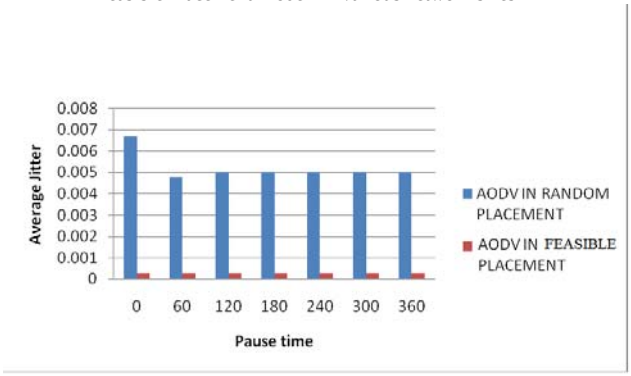

Figure 7: Average jitter for AODV in Random Vs Feasible Placement Model In various pause time

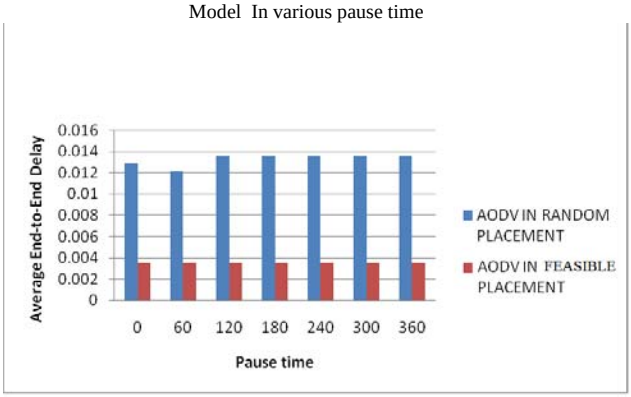

Figure 8: Average End-to-End Delay for AODV in Random Vs Feasible Placement Model In various pause time

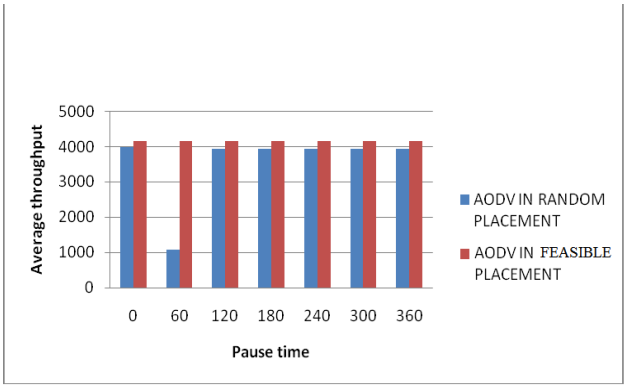

Figure 9: Average throughput for AODV in Random Vs Feasible Placement Model In various pause time

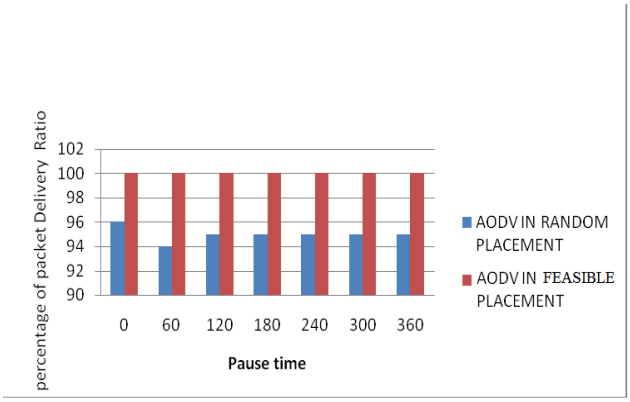

Figure 10: Percentage of packet delivery ratio for AODV in Random Vs Feasible Placement Model In various pause time

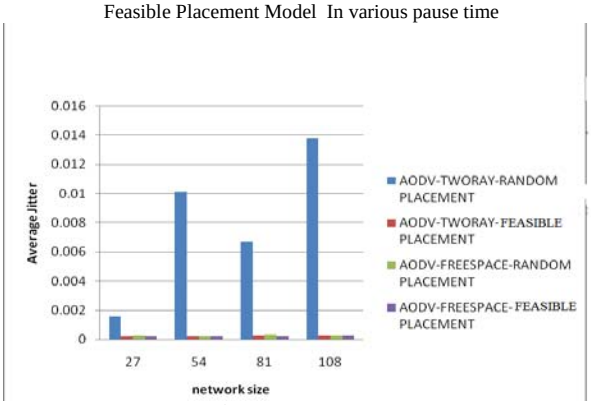

Figure 11: Average jitter for AODV in Random Vs Feasible Placement Model In various propagation models

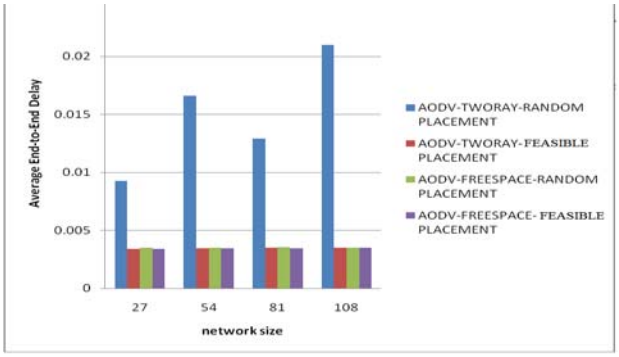

Figure 12: Average End-to-End Delay for AODV in Random Vs Feasible Placement Model In various propagation models

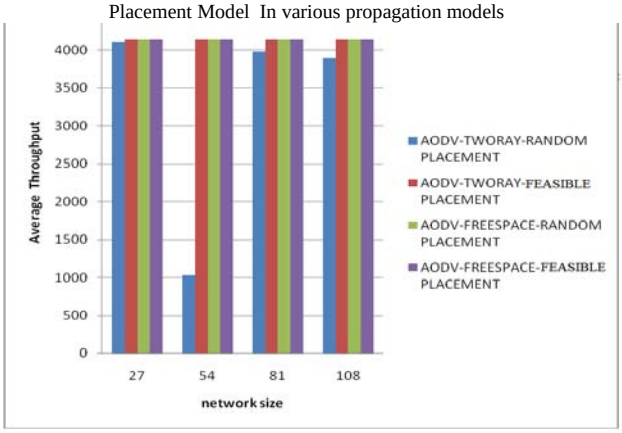

Figure 13: Average throughput for AODV in Random Vs Feasible Placement Model In various propagation models

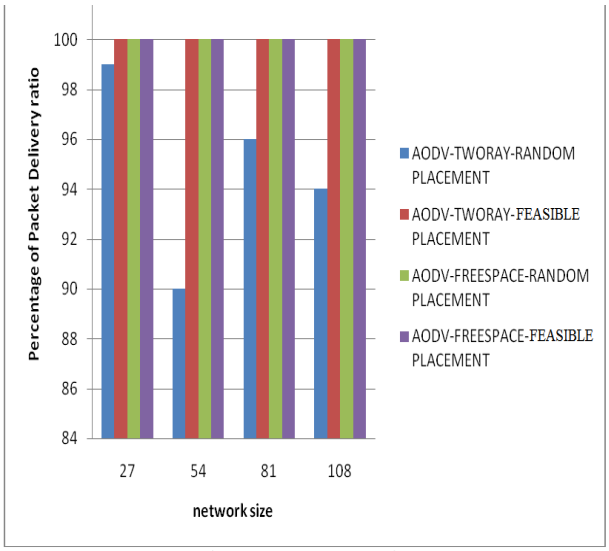

Figure 14: Percentage of packet delivery ratio for AODV in Random Vs Feasible Placement Model In various propagation models

VII. CONCLUSION AND FUTURE SCOPE

The proposed feasible placement model is implemented in various network sizes, various pause timings and various propagation models. From the simulation it is observed that it gives better results in all the experiments. The future scope is the proposed model can be implemented for other routing protocols.

REFERENCES

[1] Perkins C., Ad Hoc Networking, Addison Wesley, 2001

[2] D. P. Agrawal and Q-A Zeng. "Introduction to Wireless and Mobile Systems," Brooks/Cole Publishing, ISBN No. 0534-40851-6, 436 pages, 2003

[3] Iiyas, M., The Hand Book Of Ad Hoc Networks, CRC Press, 2003.

[4] Dr.S.P.Setty et.al, "Performance Evaluation of AODV in Different Environments", International Journal of Engineering Science and Technology, Vol.2(7), 2976-2981, 2010.

[5] Syed Basha shaik," Effect of Placement models on Average jitter in reactive routing protocols ", JEST-M,Vol 1., issue 2, 2012.

[6] C.E. Perkins, E.M. Royer & S. Das, Ad Hoc On Demand Distance Vector (AODV) Routing, *IETF Internet draft*, draft-ietf-manet-aodv-08.txt, March 2001.

[7] Perkins C. and Royer E.M., "Ad-Hoc on-Demand Distance Vector Routing," in Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications, New Orleans, LA, pp. 90-100, February 1999.

[8] S. -J. Lee, M. Gerla and C. -K. Toh, "A Simulation Study of Table-Driven and On-Demand Routing Protocols for Mobile Ad Hoc Networks," *IEEE Network*, Vol. 13, No. 4, pp. 48-54, July-August 1999.

[9] C.-E. Perkins, E.-M. Royer, S.-R. Das, and M.-K. Marina, "Performance comparison of two on-demand routing protocols for ad hoc networks," IEEE Personal Communications, vol. 8, no. 1, pp. 16–28, Feb 2001.

[10] J. Broch, D. Maltz, D. Johnson, Y.-C. Hu, and J. Jetcheva, "A Performance Comparison of Multihop Wireless Ad Hoc Network Routing Protocols", ACM/IEEE Mobile Computing and Networking, Octobre 1998.

[11] Network simulator -2. http://www.isi.edu/nsnam/ns/

[12] GLOMOSIM http://pcl.cs.ucla.edu/projects/glomosim/

[13] QualNet Network Simulator, Available: http://www.scalable-networks.com