International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 3, Issue 01, January 2016
Available at http://internationaljournalofresearch.org

An Energy Efficient Reliable Data Routing Protocol for MANET

Yogendra Kumar Tripathi[1]& Dr. Pankaj Kumar [2]

Department of Computer Science and Engineering SRMGPC, Lucknow
yogendra_59@ymail.com[1]; pk79jan@gmail.com[2]

Abstract:
The aim of this paper is to evaluate the performance of an energy aware routing protocol, called EE-AODV (Energy Constraint on AODV) which derives from the AODV protocol and which is based on the local decisions of intermediate stations to maintain the connectivity of the network as long as possible. The results obtained using the Network Simulator NS-2 demonstrates how small changes in the principle of the AODV protocol can efficiently balance the energy consumption between nodes, which increases the network lifetime. The performance parameters is energy consumption. The simulation result of new protocol is compared with AODV protocol and it is obtained using Network Simulator NS-2 (Version 2.35) [6].The performance parameters is energy consumption. The simulation result shows that energy consumption is reduced up to 12%-16% with CBR traffic.

Keywords: Ad hoc networks; Energy Consumption; AODV

1. INTRODUCTION

A mobile ad hoc network is a collection of autonomous mobile nodes that communicate with each other in the absence of any fixed infrastructure [1][2]. In this type of network, each node is likely to take part in the routing process and to retransmit the packages of a node which is not able to reach its destination.

Indeed, when a destination node is out of reach of the source node, the connectivity between the two stations is maintained by the intermediate stations, which means that every node belonging to the chosen route must stay in active mode until the communication is concluded. Therefore, the energy constraint is a critical issue for such a network, and a lot of works have focused on how to optimize the energy consumption and keep the same level of network efficiency. These works was principally interested on the routing layer, and tried to propose optimized routing protocols that take into consideration the energy constraint.

2. SIMULATION ENVIRONMENT

The simulation of EE-AODV and AODV is done using NS-2 simulator version 2.35 [6].

2.1 Simulation Model: The wireless network consists of 30 numbers of nodes which are distributed randomly in a grid area of 1000m X 1000m with 10 numbers of connections. The initial energy of each node is taken as 100 J with transmission and receiving power consumption is 1.35W and 1.15W respectively. The data packet size is of 512 bytes. The simulation time is 600sec. The simulation model [1] with parameters is listed in table 1.

2.2 Traffic Model: The traffic model used is CBR (Constant Bit Rate). CBR Model generates traffic at a constant rate of 64packets/second.

Table 1: Simulation Parameters

Parameters	Value
Simulator	NS-2 (Version ns-2.35)
Grid Area	1000 x 1000 m
Transmission Range	200 m
Pause	50, 100, 200, 300, 400
Mobility	1, 8,16, 24, 32 m/s
Sending Rate	32 kbps
Packet Type	CBR

International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 3, Issue 01, January 2016
Available at http://internationaljournalofresearch.org

Packet Size	512 Bytes
Number of Nodes	30
Simulation Time	600 sec

Table 2: Parameter for Energy Model

Parameter	Value
Network Interface	WirelessPhy
MAC Type	802.11
Channel	Wireless Channel
Propogation	TwoRayGround
Antenna	Omni Antenna
Radio Frequency	281.8mW (≈250m)
Initial Energy	100 Joule
Idle Power	10.0w
Receiving Power	1.35w
Transmission Power	1.15w
Sleep Power	8.0 w

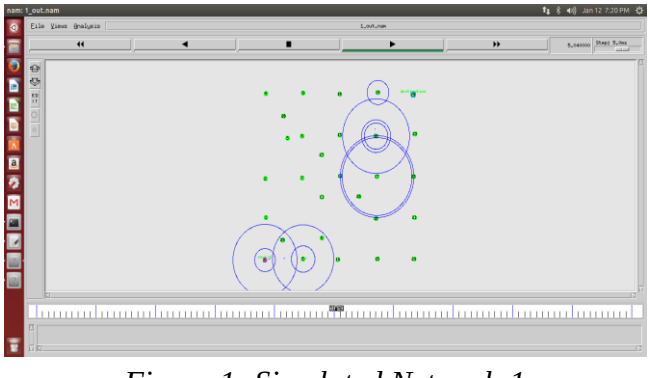

Figure 1: Simulated Network-1

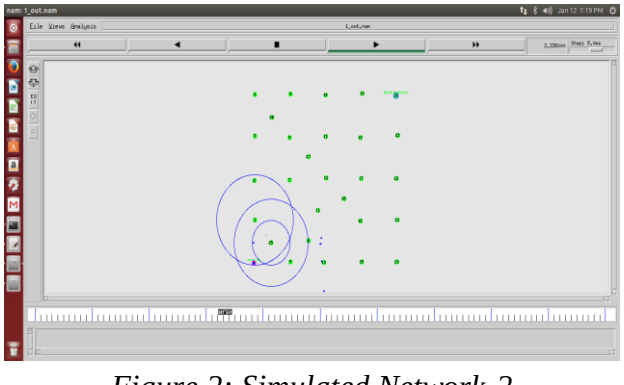

Figure 2: Simulated Network-2

3. RESULTS

The simulation results are shown in the form of graph that represents (i) Energy consumption vs mobility and (ii) Energy consumption vs pause time.

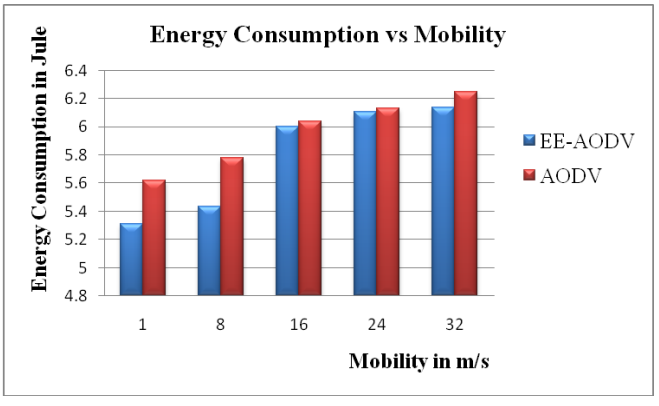

Figure 3: Energy Consumption Vs Speed

Figure 3 and 4 shows the total energy consumed (Joules) due to control packets by varying speed [5] and pause time [4] respectively.

The above simulation results show the advantages of EE-AODV [1] over AODV protocol [5].

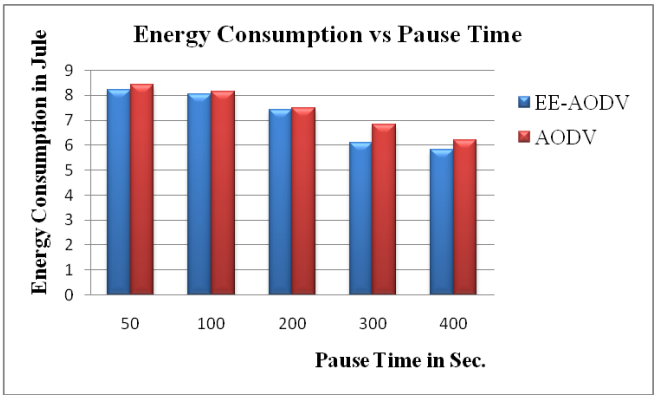

Figure 4: Energy Consumption Vs Pause Time

4. CONCLUSION

Here we conclude that EE-AODV is better than AODV [3][4] with CBR traffic model because:

1. There is 12% to 16% reduction in energy Consumption with CBR traffic.

2. As the mobility increases energy consumption increases.
3. And as we increase the pause time the energy consumption decreases.

6. REFERENCES

[1] Yogendra Tripathi and Pankaj Kumar, "A Survey on Energy Efficient Reliable Data Routing protocol for MANET", in International Journal of Research Volume 02 Issue 12 December 2015.

[2] M. Frikha and F. Ghandour, "Implementation and Performance Evaluation of an Energy Constraint Routing Protocol for MANET", 3rd International Conference of Telecommunications (AICT'07), IEEE,2007.

[3] Elizabeth M. Royer and Charles E. Perkins, *"An Implementation Study of the AODV Routing Protocol"*, Proceedings of the IEEE Wireless Communications and Networking Conference, Chicago, IL, September 2000.

[4] John A. Stine and Gustavo de Veciana, "*A Comprehensive Energy Conservation Solution for Mobile Ad Hoc Networks"*, Department of Electrical & Computer Engineering, The University of Texas, 2002.

[5] Chansu YuBen Lee Hee Yong Youn, "*Energy Efficient Routing Protocols for Mobile Ad Hoc Networks"*, Department of ECE. Cleveland State University, 2003.

[6] Network Simulator, ns-2, http://www.isi.edu/nsnam/-ns/.