www.ijecs.in
International Journal Of Engineering And Computer Science ISSN: 2319-7242
Volume 6 Issue 1 Jan. 2017, Page No. 19945-19950
Index Copernicus Value (2015): 58.10, DOI: 10.18535/ijecs/v6i1.16

Energy consumption of High Power MANET Using LVC

K.Santhya, Dr.N. Sasirekha,

Research Schollar Computer Science,

Rathinam College Of Arts And Science, Eachnari, Coimbatore.

Santhya1990.K@Gmail.Com

Associate Professor,

Vidyasagar College Of Arts And Science, Udumalpet, Tirupur.

N_Sasirekh@Yahoo.Co.In

Abstract

A mobile ad hoc network (MANET) is a self-configuring, infrastructure-less network of mobile devices which is connected without any wires. In MANET the node can move in any direction independently.The main challenge in building a MANET is equipping each device to continuously maintain the information needed and to properly route traffic. So, these networks may operate by themselves or may be connected to the larger Internet. They may contain one or multiple and different transceivers between the nodes. Finally in a highly dynamic, autonomous topology. Vehicular Ad-hoc Networks (VANETs) are used cars and cars and roadside equipment. MANETS can be used for facilitating the collection of sensor data for data mining for a variety of applications such as air pollution monitoring and different types of architectures can be used for such applications.

Keywords: LVC,LRPH,MANET,RREQ,VANET.

I.INTRODUCTION

MANET is one of the wireless adhoc network which is in top of link layer in networking environment .It is a self forming, point to point network. Through the development of various technologies like laptops and 802.11 wifi wireless networking MANET become more famous. It will deliver good service, quality and best connectivity to the user .When mobility is added with time varying connectivity without affecting the users quality of service then it will become difficult for the developers.

Networking is also known as MANET, or Mobile Ad hoc Networking systems. A MANET system is a set of mobile devices which need to provide the functions like streaming voice, sending data and video between pairs of devices which are used as relays to avoid the need for infrastructure [1].The Figure1 specifies workings of MANET.

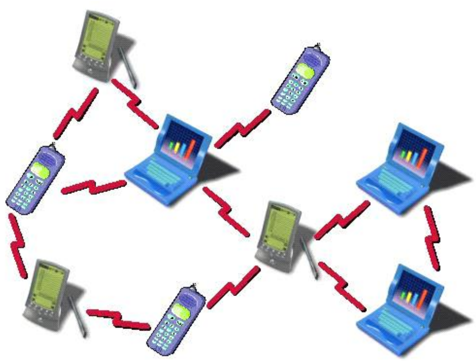

Figure.1 Nodes Connected in MANET

II. Characteristics of MANET

In MANET, each and every node will act as both host and router. This is autonomous in behaviour.

Figure.2 VANET

Multi-hop radio relaying- When a source node and destination node for a message or data is out of the radio range, the MANETs are capable of multi-hop routing. There is distributed nature of operation for routing, host configuration and specially for security. Here a centralized firewall is absent. These nodes can join or leave the network anytime, it will make the network topology more dynamic in nature. Mobile nodes are characterized with less memory, power and light weight features. The stability reliability, efficiency and capacity of wireless links are often inferior when compared to wired links. Figure.2 shows types of manet.This shows the link between the bandwidth of wireless links. Mobile and spontaneous behavior will result in demanding minimum human intervention to configure the network. All nodes have unique features with similar responsibilities and capabilities and so it forms a completely symmetric environment. High user density and large level of user mobility. Nodal connectivity is intermittent [2].

DOI: 10.18535/ijecs/v6i1.16

III. RELATED WORK

The design and construction of algorithms for a mobile ad hoc network should be more dynamic. Comparing to the performance of the following routing protocols LRPH,AODV,DOA,DSR are studied and compared based on control overhead,packet delivery,end to end delay of the ad hoc network [10]. A lightweight hierarchical routing model, Way Point Routing (WPR), in which a number of intermediate nodes on a route are selected as waypoints and the route is divided into segments by the waypoints. Waypoints, including the source and the destination, run a high-level intersegment routing protocol, while the nodes on each segment run a low-level intrasegment routing protocol. One distinct advantage of our model is that when a node on the route moves out or fails, instead of discarding the wholeoriginal route and discovering a new route from the source to the destination, only the two waypoint nodes of the broken segment haveto find a new segment. In addition, our model is lightweight because it maintains a hierarchy only for nodes on active routes.[3]On theother hand, existing hierarchical routing protocols such as CGSR and ZRP maintain hierarchies for the entire network. We present aninstantiation of WPR, where we use DSR as the intersegment routing protocol and AODV as the intrasegment routing protocol. This instantiation is termed DSR over AODV (DOA) routing protocol. Thus, DSR and AODV—two well-known on-demand routing protocolsfor MANETs—are combined into one hierarchical routing protocol and become two special cases of our protocol. Furthermore, wepresent two novel techniques for DOA: one is an efficient loop detection method and the other is a multitarget route discovery. We presented an instantiation of WPR termed DSR over AODV (DOA). In DOA, DSR is used for intersegmentrouting and AODV is used for intrasegment routing. This is the first work to combine DSR and AODV, two well-known on-demand routing protocols, in a hierarchical manner. We also presented two novel techniques for route maintenance in DOA: a multitarget route discovery and an efficient loopdetection method. We conducted extensive simulations toevaluate the performance of DOA. We compared DOA with AODV and DSR. Simulation results show that DOA scales well for networks with more than 1,000 nodes, routing overhead is significantly reduced, while other metrics are better or comparable to AODV and DSR.

IV. LRPH MOBILE Ad Hoc NETWORKS

To get the best network performance and to address the issues of high-power nodes, proposed an LRPH MANETs. There are two core components they are first and second core components. The first component (Component A) is the LVC algorithm that is used to find the unidirectional link and to build the hierarchical structure [6].The second component (Component B) is mainly for routing, including the route discovery and maintenance. Here first list the network model and definitions. Then present the two components in detail.

Network Model

In network model there are basically two types of nodes in the networks: B-nodes and general nodes (G-nodes). B-nodes means the high power nodes and a transmission range is large . When the nodes is with low power and a small transmission range it is Gnodes. [4]The numbers of B-nodes and G-nodes are d represented as *NB* and *NG*, respectively. Because of the complexity and high-cost of B-nodes, we assume that *NB* _ *NG*. We assume that each node is equipped with one IEEE802.11b radio using a single channel.

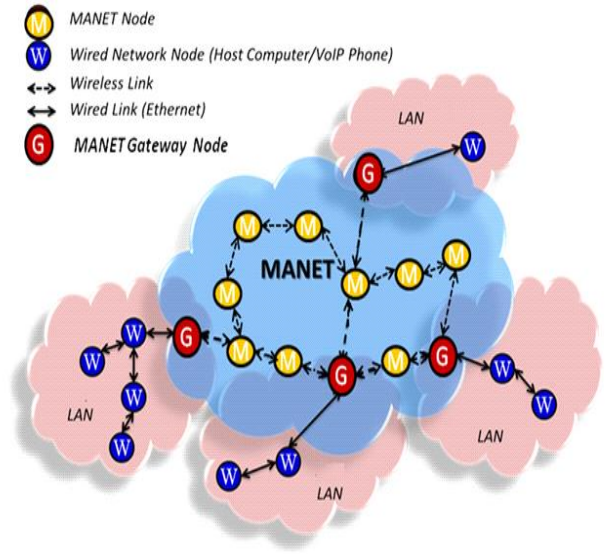

Figure.3 MANET Gateway Node

Gnode and Bnode is shown in Figure.3 The transmission ranges of B-nodes and G-nodes are *RB* and *RG*, respectively. To reflect the dynamic nature of MANETs in practice, we assume that transmission ranges may be deviated by 10 percentage from values. So, unidirectional links may exist not only in the link between B-nodes and G-nodes but in the link between two homogeneous nodes as well.[8] The state of G-nodes in the networks are as follows:

Definition 1–*G*isolated*:* *G* isolated is represented as a G-node that is not covered by any B-node.

Definition 2–*G*member*:* *G* member is represented as a G-node whose bidirectional neighbors (BNs) are covered by its cluster head.[15]

Definition 3–*G*gateway*:* *G* gateway is represented as a G-node whose BNs are not covered by its cluster head.

V.LVC Algorithm

des (B-node or Gnode) is the failure of MANETS. BN disUnidirectional links that exist between two neighboring nocovery methodology is mainly used in LVC, Loose Virtual Coupling so unidirectional links in the network can be discovered using a BN discovery methodology.[5] Bidirectional links are discovered by sending a neighbor discovery packet (BND from end to end a node to all its neighbors.[3] This packet is used by nodes to create a bidirectional neighbor table BN Adding nodes is shown in Figure 4.

The following are the Steps to discover Bidirectional links [9]

Step 1: From the Single hop each node sends BND packet to all its neighboring nodes.

Step 2: Using these packets it will create an aware node (AN) table AN = NBRB(gi) ∩ NGRG(gi) and Wait for some time and collect all BND packets from neighbor nodes.

Step 3: Next, again send the BND table to all neighboring nodes, now with node's AN table as well.

DOI: 10.18535/ijecs/v6i1.16

Step 4: The nodes check whether its own information is present in the BND packet from neighbor node. If yes the node is added to the BN table.

2) LVC : Design of a novel LVC algorithm for making the most of the benefits of B-nodes,

In LVC, a B-node is chosen as the cluster head and establishes a loose coupling relationship with G-nodes. There are two features come into view in LVC.

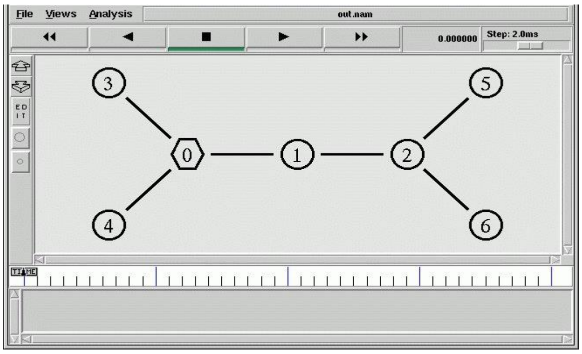

Figure.4 Adding nodes

The loose clustering avoids heavy transparency caused by modernizing and maintaining the cluster when the density of B-nodes is small it is the first feature of LVC. LRPH protocol can be adaptive to the compactness of B-nodes, even when all G-nodes are in the Gisolated state. local aware topology (LAT) were build by all the nodes and control packets during building LVC by exchanging the table[7].The basic step is building a local aware topology table (LAT).

Step 1: G-nodes send G-node initialization packets (GI) to all B-nodes in its AN table. The packet will have the information on its Bidirectional links. [14]

Step 2: Each B-node once receiving the GI packets will add the BN to LAT. The B-node then sends B-node initialization (BI) packets to all G-nodes in its coverage area.

Step 3: Once G-node receives the BI packet, it updates the LAT table.

Step 4: A G-node will declare it as a member to cluster head by sending cluster member, register (CMR) packet to cluster head.

Step 5: Cluster head declare (CHD) packet and updates it in LAT, Cluster head replies using CHD. Cluster head maintains the LAT for each member G-node. 3) Cluster Head selection Each G-node, Gi selects the B-node which has the shortest distance (by any shortest path algorithms) to node Gi Using LAT table G-nodes can easily find out the B-node nearest to it. B node is shown in Figure.5

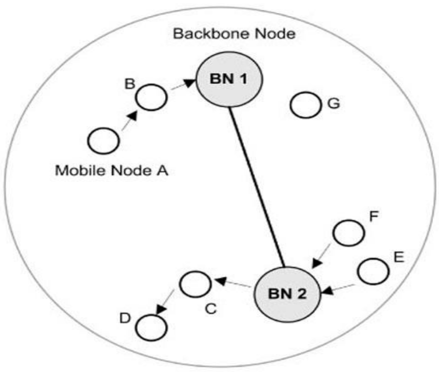

Figure.5 Backbone Node

Routing Components in LRPH

To find the best route with less interference and reducing the chance of failure during transmission.

It is discussed how to communicate and how a route is found between two nodes [9].In route cache all the routes will be there if the route has already been used in previous communications, so there is no need to discover the new route. If the destination node D is in LAT table, the route can be directly obtained from the table. In the discovered route ,B-NODES will be avoided. If the destination node D is not in the LAT table the source node S sends Route Request Packet (RREQ). The destination node D sends back the route response packet (RREP). Discovering neighbor nodes is shown in Figure.6.

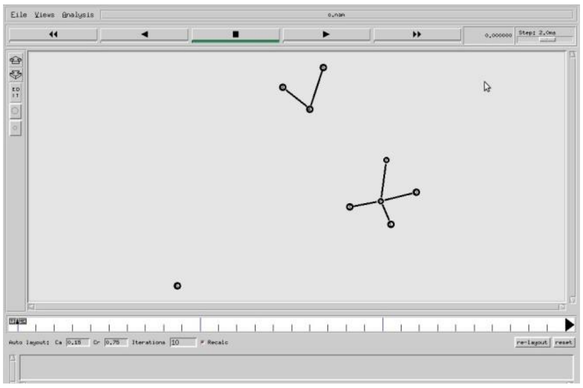

Figure.6 Discovering neighbour nodes

Steps in Route Discovery

Step 1: It is avoided when the RREQ packet is a duplicate packet,. If its is false proceed to step 2.

Step 2: If the destination node, ni is available in route cache or LAT table, then the path is discovered, If its is false proceed to step3.

Step 3 :The sequence of nodes discovered is appended and broadcast when the node is a B-node.

Step 4: If the node is a G-node and in its next hop cluster head is present, it forwards the packet to the cluster head. [15]The cluster head replaces B-nodes present in the discovered route with an alternate route avoiding B-nodes. Also, the G-nodes are replaced to improve the average Link duration.

Step 5: The next beginning broadcasts the packet to Gateway nodes that are under transmission ranges of other nodes.[10]

Step 6: If G-node, except gateway node, receives a RREQ packet from the cluster head it discards the packet. RREQ is shown in Figure.7 and route discovered is shown in Figure.8.

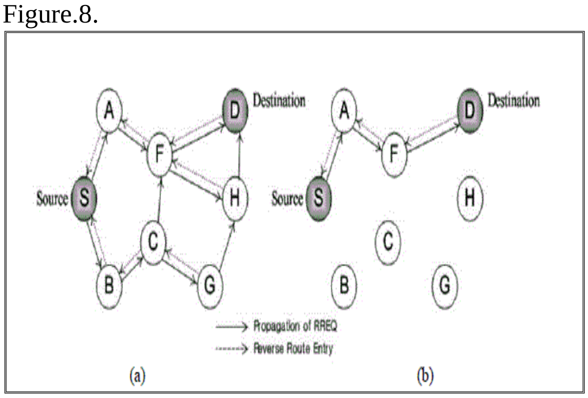

Figure.7 RREQ

DOI: 10.18535/ijecs/v6i1.16

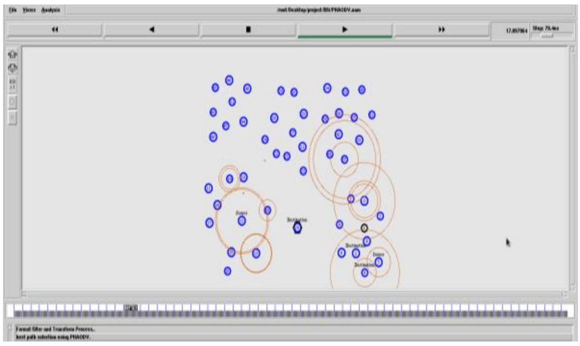

Figure.8 Route discovered

VI. GENERATION OF GRAPH

A hierarchical structure is established. In particular, all B-nodes build the LAT based on the received CMR packets, and all G-nodes build LAT based on the received CHD packets.

Route Maintenance Procedure

When a middle node on the route detects the link failure through the BN table, the route maintenance is activated. First, a route error (RERR) packet is created and sent to the source node along the reverse route. When any middle node (including the source node) along the route receives the RERR packet, the route with the broken link will be removed from the routing cache. When the source node receives the RERR packet, a new round of route discovery procedure will be activated. The difference is that LRPH forwards data packets through bidirectional links and improves transmission efficiency. The system performs the heuristic algorithm named as HRP. The Group algorithm is a grid-based clustering algorithm. In this algorithm one of the clusters (called the primary node), dynamically, and randomly builds the RP. The RPs are arranged in a grid-like manner.[8] The routing will be effective with the consideration of mobile sink scheduling as well as maximum node coverage using the scheduling scheme.Communication case is shown in Figure.9.

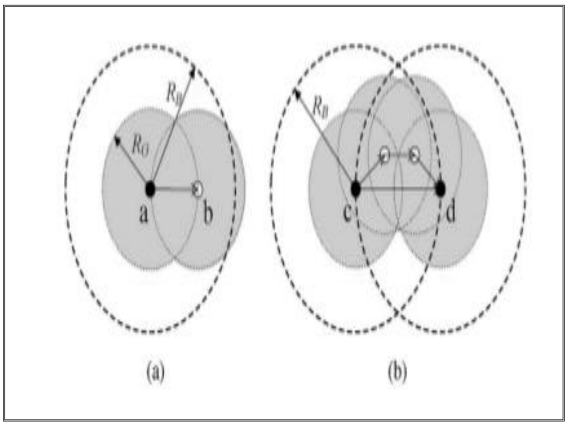

Figure.9: Communication Cases

(a) Communication between a B-node and a G-node

(b)Communication between two B-nodes.

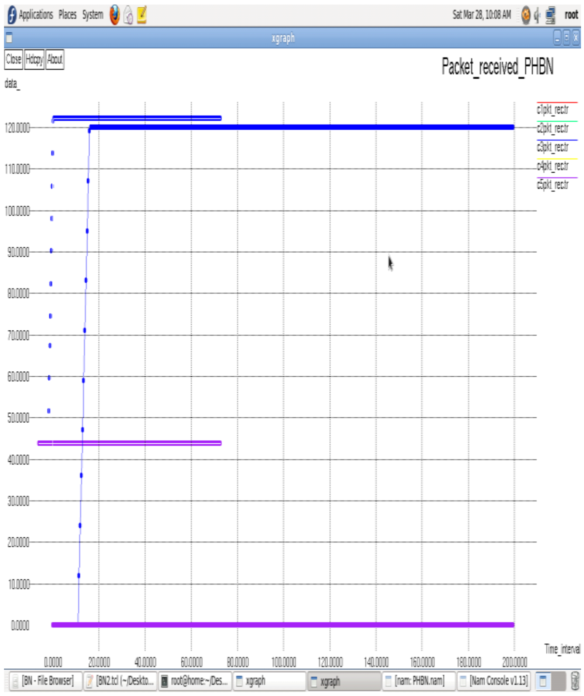

Figure. 10 : Packets received by each nodes.

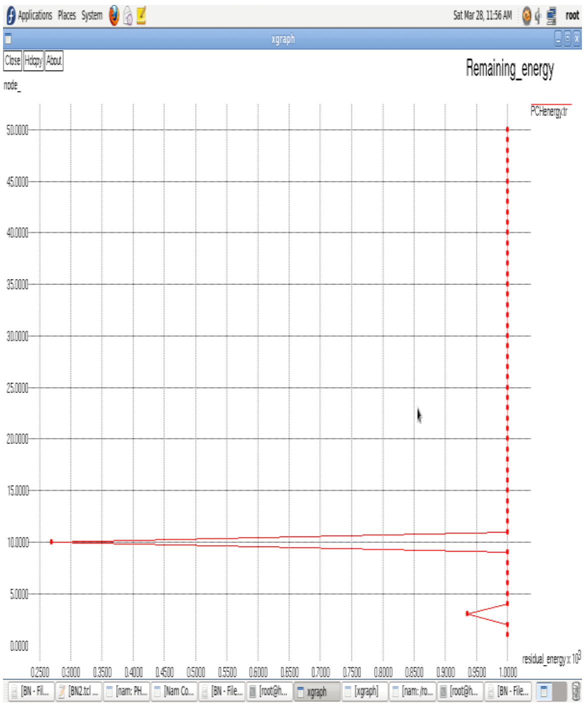

Figure 11 : Energy consumption for each nodes.

If a route detects a link failure for the node then the node sends a route error packet, RERR in the direction of the source node. [12]It will remove the link from the local cache when all the nodes receive the packet,. Then, the source node starts a new route discovery procedure. Packets received by eachnodes, Energy consumption is shown in Figure.10 and Figure.11

DOI: 10.18535/ijecs/v6i1.16

VII.RESULT AND ANALYSIS

In this set of simulations, we studied the performance of LRPH when the network size varied from 100 nodes to 1,400 nodes. The size and the area were selected so that the node density was approximately constant, which would properly reflect the scalability of routing protocols. For each performance metric, we compared LRPH with DOA DSR and AODV. The Control overhead,packetdelivery are measured in lakhs but it is converted into percentage.The results are shown in Figure .11,12,13

Control Overhead: The main purpose of using hierarchy in MANETs is to reduce the routing overhead. Figure.11 shows the control overhead of LRPH,DOA, DSR, and AODV. We observe that LRPH has much less control overhead than AODV when the network size increases .[15] For networks with 100 nodes, four protocols incur approximately the same amount of control overhead; for networks with 600 nodes, LRPH saves 71 percent control packets compared to AODV; for networks with 1,400 nodes, LRPH saves 80 percent controlpackets compared to AODV. The larger the network size is,the more control packets are saved by LRPH. DSR,DOA incurs slightly less control overhead than LRPH. However, the PDR of LRPH is much less than DOA ,DSR AODV .[18]

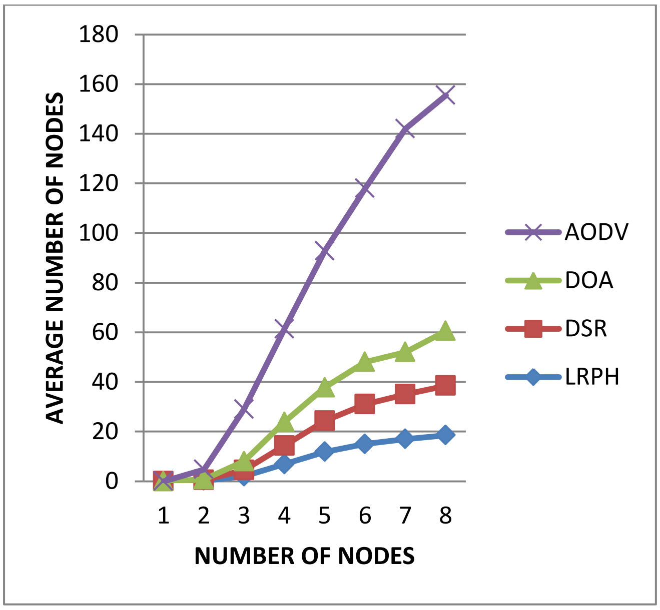

Figure. 11 :Control Overhead

Packet Delivery Ratio. Figure.12 shows the PDRs of LRPH,DOA, DSR, and AODV. For networks with 600 nodes, DSR delivers 50 percent data packets.[17] On theother hand, both DOA , AODV ,LRPH show high PDRs even fornetworks with more than 1,000 nodes. For all network sizesfrom 100 nodes to 1,400 nodes, LRPH consistently deliversabout 2 percent-3 percent more data packets than AODV.LRPH maintains routes hierarchically and repairs abroken route locally. Thus, an active route in LRPH usuallylasts longer and more data packets can be delivered. AODVshows very comparable PDR to LRPH. However, the controloverhead of AODV is significantly higher. DSR,DOA does notscale well because it has higher packet header overhead andkeeps routing information in nondistributed manner.

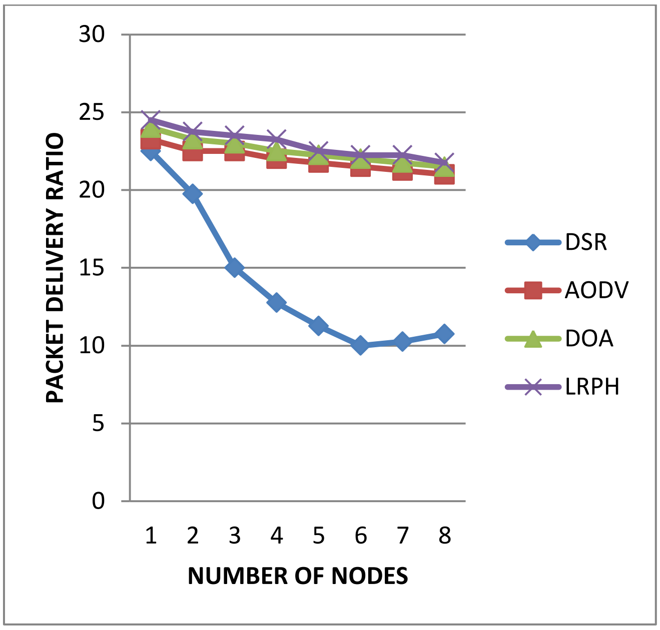

Figure. 12 :Packet Delivery Ratio

End-to-End Delay.: Figure.13 shows the average end-to-enddelay of LRPH, DOA, DSR, and AODV. LRPH exhibits the lowestend-to-end delay most of the time. The end-to-end delay of AODV is very comparable to DOA,DSR,LRPH, while DSR has much higher end-to-end delay than the other three protocols[16]. In LRPH, we expect a smaller end-to-end delay because the route repair mechanism recovers a broken route quicklyand data packets do not have to wait for another round of route discovery before they can be transmitted.

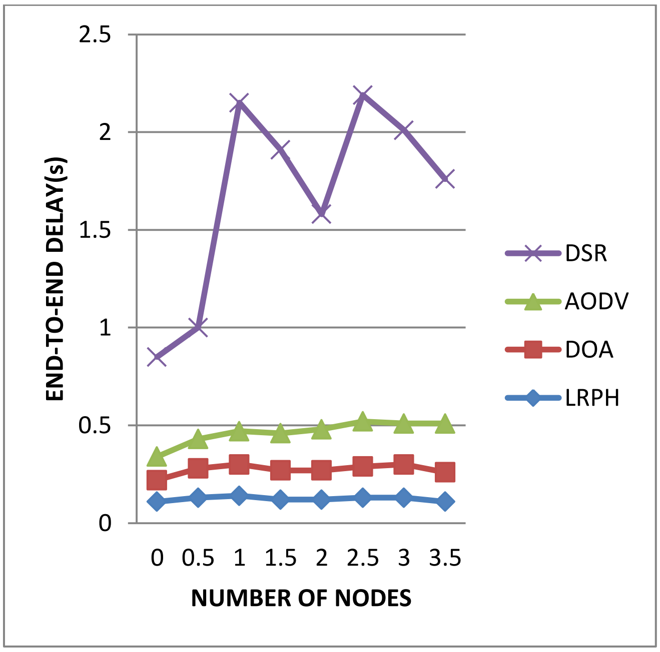

Figure. 13 :End To End Delay

VIII. CONCLUSION

Ad hoc networks can be implemented using various techniques like Bluetooth or WLAN. The definition itself does not imply any restrictions to the implementing devices. Ad Hoc networks need very specialized security

DOI: 10.18535/ijecs/v6i1.16

methods.[13] There is no approach fitting all networks, because the nodes can be any devices. The computer security in the nodes depends on the type of node, and no assumptions on security can be made. In this paper the computer security issues have not been discussed, because the emphasis has been on network security.[14] But with the current MAC layer and routing solutions the true and working ad hoc network is just a dream for now. However, it can be used with relatively small networks and potentially some very nice applications can be realized. Although some peer-to-peer type of solutions work nicely already today, it would be nice to see that some new and innovative solutions would be seen in the arena of ad hoc networks since it is not hard for one to imagine a countless number of nice ad hoc based applications that would make the world at least a bit better place.[11] As the engineering tradeoffs are many and challenging for MANETS, a diverse set of performance issues requires new protocols for network control. To help out researchers to measure the goodness of the network performance, proposed in this paper an outline of protocol performance issues that highlight performance parameters that will help to promote meaningful assessments of protocol performance. Here developed an LVC-based routing protocol named LRPH for power heterogeneous MANETs.

REFERENCES

[1] Gagandeep, Aashima and Pawan Kumar "Analysis of Different Security Attacks in MANETs on Protocol Stack".International Journal of Engineering and Advanced Technology (IJEAT), Volume-1, Issue-5, June 2012

[2] Mohammad Wazid , Rajesh Kumar Singh and R. H. Goudar, "A Survey of Attacks Happened at Different Layers of Mobile Ad-Hoc Network & Some Available Detection Techniques " International Journal of Computer Applications® (IJCA) International Conference on Computer Communication and Networks CSI- COMNET-2011.

[3] Fan-Hsun Tseng, Li-Der Chou and Han-Chieh Chao " A survey of black hole attacks in wireless mobile ad hocnetworks" Human-centric Computing and Information Sciences 2011

[4] Sunil Taneja and Ashwani Kush, "A Survey of Routing Protocols in Mobile Ad-Hoc Networks", InternationalJournal of Innovation, Management and Technology, Vol. 1, No. 3, 279-285, August 2010.

[5] Gary Breed Editorial Director, "Wireless Ad-Hoc Networks: Basic Concepts", High Frequency Electronics,March 2007.

[6]Hongmei Deng, Wei Li, and Dharma P. Agrawal, "Routing Security in Wireless Ad Hoc Networks" IEEE Communications Magazine • October 2002

[7]Mohseni, S.; Hassan, R.; Patel, A.; Razali, R, "Comparative review study of reactive and proactive routingprotocols in MANETs", 4th IEEE International Conference on Digital Ecosystems and Technologies, 304-309,2010.

[8]HumayunBakht, "Survey of Routing Protocols for Mobile Ad-hoc Network", International Journal ofInformation and Communication Technology Research, 258-270, October 2011.

[9]Mohit Kumar and Rashmi Mishra "An Overview of MANET: History, Challenges and Applications", Indian Journal of Computer Science and Engineering (IJCSE), Vol. 3 No. 1 Feb-Mar 2012.

[10]Vishal Sharma, Harsukhpreet Singh, "Performance evaluation of reactive routing protocol in MANET networks using GSM based voice traffic applications", Optik - Int. J. Light Electron Opt. Elsevier, pp. 201-204, June 2012.

[11]Pravin Ghosekar et. al, "Mobile Ad Hoc Networking: Imperative and Challenges" IJCA Special issues on MANETs pp. 153-158, 2010. [12] Md. Golam Kaosar, Tarek R. Sheltami, "Voice transmission over ad hoc network adapting optimum approaches to maximize the performance", Elsevier Computer Communications vol 32, pp. 634–639, 2009.

[13] Abdullah Jamali et. al, "Comparative Analysis of Ad Hoc Networks Routing Protocols for Multimedia Streaming", International Journal of Advanced Computer Sciences and Applications, pp. 978-981, Mar 2009.

[14] Zhan Huawai, Zhou Yun, "Comparison Analysis AODV and OLSR Routing Protocol in Ad Hoc Network", IEEE 6th International Conference on Wireless and Mobile Computing, Networkingtransactions, pp. 978-982, 2008

[15] Ying Ge, "Quality of Service Routing in Ad-Hoc Networks Using OLSR", Proceedings of the 36th Hawaii International Conference on System Sciences (HICSS"03) IEEE, 2002.

[16] DOA: DSR over AODV Routingfor Mobile Ad Hoc N etworks Rendong Bai and Mukesh Singhal, Fellow, IEEE

[17] K.Santhya, Dr.N. Sasirekha,"Power heterogenous Manet using LVC Algorithm"by IJCTT ,2016

[18] Comparative Performance Analysis of DSDV, AODV and DSR Routing Protocols in MANET using NS2
Asma Tuteja1 (M.Tech Student ,M.M.University, Mullana, asmatuteja@yahoo.co.in)Rajneesh Gujral2 (Assoc. Professor, Comp. Sc. Deptt., M.M.University, Mullana,)
Sunil Thalia3 (ME Student, NITTTR, Chandigarh, sunilthalia@rediffmail.com)