ISSN:2231-0711
P.Ezhilarasi et al | IJCSET(www.ijcset.net) | August 2015 | Vol 5, Issue 8, 316-320

Maximizing the Network Lifetime using Energy Power Aware Routing Protocol

P.Ezhilarasi
(M.Phil Schoar)
M. Phil Computer Science
Bharathidasan University
Trichy, Tamilnadu

M.Lalli
(Assistant Professor)
M. Phil Computer Science
Bharathidasan University
Trichy, Tamilnadu

***Abstract*-This thesis is to study of MANET consumed by the energy level performance maximizing the network life time of communication networks. We know that MANET is self-configuring network and does not have any infrastructure.The mobile devices connected without wires and to form a various routing path over the communication.The mobile devices operated in energy.so, the energy lifetime of node is very important for MANET.The energy consumption problem is one of the major issue for MANET.In this research to analyzed three routing protocols (DSR,MTPR, and EPAR) performed in energy of power consumption.DSR works as to select the shortest path.The intermediate route address along with source to destination decreasing the throuput.Then it does not support Multicasting.The MTPR isto select the minimum transmission power routing protocol.This approach used for simple energy metric,along with the route of total energy forward the information.It reduced the overall transmission power consumed per packet.This two routing protocols DSR,MTPR not scalable for large networks.Then to increase the mean delay,lack of connectivity,packet loss are the problems of protocols.We propose that a new power aware routing protocolEPAR.It increasing the network lifetime selected the path that largest packet capacity in the smallest residual packet transmission capacity.EPAR handled the high mobility of nodes in network topology.In this paper to analyzed the performance of energy consumption problem for three routing protocols(DSR,MTPR,EPAR).The important objective of EPAR is the remaining energies of all the nodes and prolong the network lifetime.To increasing the network lifetime and to reached the high packet delivery ratio.In high load networks reduced the total energy consumption and decreasing the mean delay.Then to achieving a good packet delivery ratio.**

Key Words: Wireless network, MANET DSR, MTPR, EPAR, Energy Consumption.

INTRODUCTION

This thesis is study of wireless network has become popular one compared to during the previous decades. The wireless networks based on independently two typesinfrastructure and infrastructure less networks. The terminals are established and maintained by the centralized controllers over the communication networks. Example of cellular networks and wireless local networks (IEEE 802.11).The advanced variation commonly referred as to wireless adhoc network.It is organized in adhoc manner, terminals are used to established the connection themselves and communicate with each other in a multihop manner the help of without any fixed infrastructure.An adhoc networks to makes the infrastructure less property and certainly deployed in a given area and to provide the robust operation.This approach is used for many applications such as emergency services,disaster recovery, wireless sensor networks and home networking.The communication between the people from to anywhere at any time exchanging information. In MANET,a group of mobile nodes forming the networks and it does not have any centralized administration.The mobile nodes are operated by the energy power and battery lifetime of mobile node is very important.

The researchers consider the power-aware development by using different efficient protocols in MANETs. In MANET each of the mobile node performs the routing function for establishment process among different mobile nodes “death”. Even a few of the mobile nodes power consumption problem might cause disconnect of services in the entire MANETs. So each of mobile nodes of battery is driven. Thus they affected from several energy problems. The mobile nodes are moving in any direction and the link between them is broken. The MANET environment has two major reasons for link breakage problem.

I. The energy exhaustion is dying for the nodes.
II. Node is moving for any direction out of the radio range for its neighboring node

ARCHITECTURE DIAGRAM OF THESIS

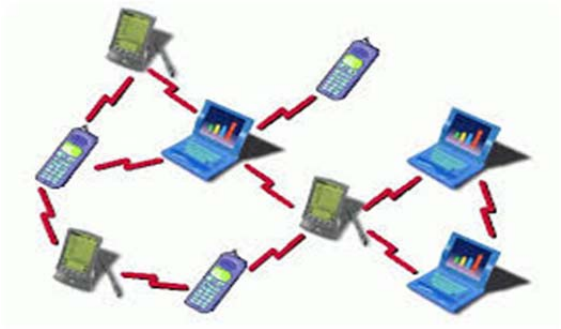

Figure 1: Mobile Ad hoc Network

CHARACTERISTICS OF MANET

1) Distributed Operation

The network operation does not have any background network and central controlled by the network of mobile nodes are distributed.In MANET nodes are works together and communicated between themselves.Each node

transmit of requirement to implement the function of routing and security.

2) *Multi hop routing*
In MANET a node tries to sending the information for another nodes via the more than one intermediate nodes.

3) *Autonomous terminal*
Each one of the mobile node is an independent node and to act as a function both a host and a router.

4) *Dynamic topology*
Nodes are moving in any direction at different speed.The network topology may be changed in any time randomly. In MANET nodes are established dynamic representation of routing among themselves travel around in own network.

5) *Light-weight terminals*
Nodes of the MANET mostly mobile with lesscapability, low stage and small memory size.

6) *Shared physical medium*
The medium of wireless communication access to any object with the appropriate equipment and acceptable resources. The channel is could not be restricted.

SECURITY GOALS OF MANET

In MANET all the nodes are performed in self-configuring manner.The processing of network segment such as routing and packet forwarding performed themselves.These reasons are very challenging to securing a mobile ad-hoc network.The Goals of mobile ad-hoc network are as follows

1) *Availability*
Availability means the resources are manageable to authorized parties at suitable times. Availability relates together to data and to services. It certifies the survivability of network facility despite denial of service attack.

2) *Confidentiality*
Confidentiality certifies that computer - interconnected resources are accessed only by authorized parties. The Security of information which is exchanging from end to end a MANET. It must be secure in contrast to any expose attack like eavesdropping illegal person reading of message.

3) *Integrity*
Integrity means that resources can be changed only by authorized parties or only in authorized way. Integrity declares that a message being transmitted is never despoiled.

4) *Authentication*
Authentication is basically promise that accomplices in communication are authenticated and not impersonators. The recourses of network should be performed by the authentic nodes. This property allocates various access rights to various types of users. For example a network organization can be accomplished by network manager only.

ADVANTAGES OF MANET

The advantages of an Ad-Hoc network include the following:

- They make available access to data and services irrespective of topographical location.
- Independence from crucial network management. It is a Self–configuring network, nodes are also act as routers. A smaller amount as compared to wired network.
- Scalable for provide accommodations the adding of new nodes.
- Developed for Flexibility.

RELATED WORKS

In this paper [3]**Hussein, Abu Salem.A.H., &Yousef .A.O.,** Clustering has been proved to be a promising approach for mimicking the operation of the mounted infrastructure and managing the resources in multi-hop networks This paper has conferred a versatile Weight primarily based clump rule in Mobile unintentional Networks. it\'s the pliability of assignment completely different weights and takes into consideration a combined metrics to create clusters mechanically. Limiting the amount of nodes within a cluster permits proscribing the amount of nodes catered by a cluster head so it does not degrade the waterproof functioning. For a hard and fast cluster head election theme, a cluster head with affected energy might drain its battery quickly thanks to significant utilization. So as to unfold the energy usage over the network and deliver the goods a more robust load reconciliation among cluster heads, election of the cluster heads could also be a helpful strategy; the rule is dead only if there is a requirement. Also, if a node is moving removed from the cluster head, then the rule is versatile and low-cost enough to be applied iteratively because the network configuration changes.

In this paper [4]**, D., Garcia-Luna-Aceves, J. J., Obraczka, K., Cano, J.-C., and Manzoni, P,** proposed a replacement metric, the drain rate, to be wont to predict the period of nodes in keeping with current traffic conditions. Combined with the worth of the remaining battery capability, this metric is employed to determine whether or not or not a node is a part of an energetic route. we tend to represented a mechanism, referred to as the Minimum Drain Rate (MDR) that may be utilized in any of the prevailing MANET routing protocols as a route institution criterion. This metric is sweet at reflective the present dissipation of energy while not considering different traffic measurements, like queue length and therefore the variety of connections passing through the nodes.

In this paper [6**] MohdIzuanMohdSaad**, Most routing protocols in MANET adopt the popular Random Waypoint model for its simplicity and quality for theoretical study and analysis. Recently, many entity, cluster and situation primarily based quality models and frameworks are projected to model rather more realistic and sensible movements of mobile nodes in real eventualities. During this work, develop a sensible quality model that acknowledges associate orbital pattern within the social science movement of mobile users, and then propose a

unique Orbit primarily based Routing (OBR) protocol, that leverages the underlying orbital quality to accurately verify a collection of doubtless regions containing any node within the MANET. By forming distributed location info among acquaintances and using a ascendable geographic routing to forward packets among nodes, OBR emerges as a transparent selection for MANET routing within the face of sensible quality.

In this paper [7] **S.Muthuramalingam et al**., The multi hop packet radio networks also named mobile ad-hoc networks (MANETs) have a dynamic topology due to the mobility of their nodes. A notable amount of energy is utilized every time a signal is sent and received by a mobile node. Many such signals and power are wasted to update the positional information of the nodes in a wireless scenario. Further bandwidth is also wasted by sending control signals rather than using it effectively for data communication. To minimize this utilization, we propose a modified algorithm that uses Weighted Clustering Algorithm (WCA) for cluster formation and Mobility Prediction for cluster maintenance. Clustering is an effective technique for node management in aMANET.

In this paper [1] **VinayRishiwal, S. Verma and S. K. Bajpai**QoS based power aware routing protocol (Q-PAR) is proposed and evaluated that selects an energy stable QoS constrained end to end path. The selected route is energy stable and satisfies the bandwidth constraint of the application. The protocol Q-PAR is divided in to two phases. In the first route discovery phase, the bandwidth and energy constraints are built in into the DSR route discovery mechanism. In the event of an impending link failure, the second phase, a repair mechanism is invoked to search for an energy stable alternate path locally.

EXISTING SYSTEM

Most of the preceding work on routing in wireless ad-hoc networks contracts through the difficult of defining and keeping accurate routes for source to the destination throughout mobility and exchanging topology. It accessible a simple implementation algorithm which guarantees strong connectivity and considering restricted node range. The Shortest path algorithm isused in this powerfully connected strength network.

However, the route may not be the low energy solution due to the probable exclusion of the optimal links at the time of the strength connection network calculation. To improve a self-motivated routing algorithm to forming and keeping connection-oriented sessions this uses the idea of pre-emptive to cope with the random topology changes.

A. Proactive Energy-Aware Routing

Using table-driven routing protocols, each node challenges to keep regular up to date routing data of information to all node in the network. This is completed in response to modifications in the network by taking all node update its routing table and propagate the updates to its near nodes. Thus, it is positive in the sense that when a package requirements to be promoted the route is already known and can be instantly used. In of wired networks, the routing table is created using either link state or distance vector algorithms covering a list of all destinations, the next hop, and the number of hops to every destination.

B. Reactive Energy-Aware Routing

Using on demand driven routing, routes are exposed only when a source node needs them. Route detection and route preservation are two main processes: The route detection progression consist of transfer route request packages from a source to its nearest nodes, which is frontward the request to their neighbor node, and so on. When the route request reached the destination node, it responsible for uni-casting a route reply package back bone to the source node via the neighbor node from which it first acknowledged the route request. When the route request reaches an intermediary node that has a necessarily up to date route, it breaks forwarding and send a route reply information back to the source. The route is maintained and established in each node's inside the structure of data is called a route cache up to the destination becomes unreachable end to end the route. Each node studies the routing paths as period passes not only as a source or an intermediary node but also as an eavesdropping neighbor node. In difference to table driven routing protocols, not all up to date routes are maintained at every node. The example of on demand driven protocols such as Dynamic Source Routing (DSR) and Ad Hoc On-Demand Distance Vector (AODV).

C. DSR Protocol

The dynamic source routing protocol has many advantages, at the same time it does have some disadvantage, which limits to the performance in fixed scenarios. The various problems of DSR are as follows:- DSR does not support multicasting. The data packet header in DSR consists of all the intermediary route address along with source to destination, thus reducing the throughput. In DSR transfer the packets from source into destination throughout route management. Then to increased multiple routing path is available for the communication, but at the same time increases the routing packet load of the network. Present description of DSR does not include any mechanism for route entrance invalidation or route prioritization when faced with a choice of multiple routes. This pointers to stale cache accesses mainly in high mobility.

The DSR is a responsive routing protocol designed especially for use in multi hop ad hoc wireless networks of mobile nodes. In this protocol every source concludes the route to be used in transferring its packets to certain destinations. There are two main divisions called Route Discovery and Route Maintenance. Route Discovery to obtain a routing path a node send a package to destination. Route Maintenance is used to a node detects break in its source route and forming a corrected route. The source node complete hop by hop route to the destination. The protocol permits several routes to the destination and allows every source to select and control the routes used in routing its packages, Load balancing is the example for improved robustness. In high range of mobility DSR protocol is generally designing for mobile ad hoc networks of up to about two hundred nodes.

PROPOSED SYSTEM

To protect energy, there would be decrease the amount of energy expended by all packages traversing from source node to destination node. i.e. we need to identify the total amount of energy the packages expended when it movements from each and every node on the route to the next hop. The energy expended for one package is designed by the equation (1)

$$E_c = \sum_{i=1}^{K} T\, n_i\, n_{i+1} \qquad (1)$$

Where, ni to nk are nodes in the route, then T denotes the energy performance of transferring and delivering a packet over one hop. Then we find the minimum Ec for all packets. The main objective of EPAR is to reduce the difference in the residual energies of every nodes and thereby protract the network lifetime.

Route discovery and Maintenance in Proposed Algorithm

EPAR systems create routing results to improve the performance of energy power oriented evaluation metrics. The path of route selected made exclusively with respects to performance evaluation procedures, independent of the basic ad-hoc routing protocols organized. Therefore the power aware routing systems are manageable from one primary ad hoc routing protocol to another, the experimental comparative qualities and drawbacks keep on effective.

There are two routing objects for minimum entire transmission energy and total operating lifetime of the network can be equally contrary. For example, when a number of minimum power routes share a common node, the battery power of this node will quickly run into exhaustion, restriction the network lifetime. When selecting a path, the DSR operation selects the path with the minimum number of hops. For EPAR, the path is select based on power energy. We calculate the battery power for each path, that is, the lowermost hop energy of the path. The path is then selected by the path with the determined lowermost hop energy. For example, consider the following scenario. There are two paths to select from the first path contains three hops with energy values 22, 18, and 100, and the second path contains four hops with energy values 40, 25, 45, and 90. The battery power for the first path is 18, while the battery power for the second path is 25. Because 25 is greater than 8, the second path would be chosen.

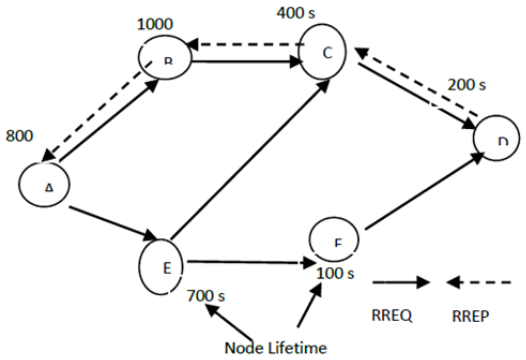

Figure 4: Route Discovery and maintenance process in EPAR.

EPAR algorithm is an on demand source routing protocol that uses battery lifetime prediction. In fig.1, DSR selects the shortest path AEFD or AECD and MTPR selects minimum power route path AEFD. But proposed EPAR selects ABCD only, because that selected path has the maximum lifetime of the network (1000s). It increases the network lifetime of the MANET shown in equation (2). The main objective of this routing protocol is to prolong the service lifetime of MANET with dynamic topology. This protocol helps to the path whose maximum lifetime. We denote our objective function as follow:

$$\text{Max } T_k t = \text{Min } T_i t \qquad (2)$$
$$i \in k$$

Where, Tk(t)=lifetime of path , Ti(t)=predicted lifetime of node i in path .

Our method is a dynamically distributed load balancing method that avoids power-congested nodes and selects paths that are lightly loaded. This helps EPAR achieve minimum difference in energy levels of various nodes in the network and maximized the network lifetime.

CONCLUSION AND FUTURE WORK

This thesis research paper essentially contracts with the difficult of maximized the network lifetime of a MANET, i.e. the time segment during which the network is completely functioning. It accessible for original solution called EPAR which is fundamentally an development on DSR. This study has assessed three power aware ad hoc routing protocols in various network environment taking into consider the network lifetime and packet delivery ratio. Completely to findings display that the energy consumption and throughput in small size networks did not expose any significant variances. On the other hand, for average and large ad hoc networks the DSR worked to be ineffective in this study. In particular, the presentation of EPAR, MTPR and DSR in minimum size of networks was comparable. But in medium and large size networks, the EPAR and MTPR delivered good results and the performance of EPAR in terms of throughput is good in all the developments that have been examined. From the different graphs, can effectively prove that our proposed algorithm reasonably overtakes the traditional energy efficient algorithms in an obvious way.

The EPAR algorithm out performs the original DSR algorithm by 65%.For proposed work, examining the attack, we proposed mechanism called enhanced OLSR (EOLSR) protocol which is a trust based method to protected the OLSR nodes contrary to the attack.

The future solution called EOLSR is an enhancement of the basic OLSR routing protocol, which will be able to identify the presence of malicious nodes in the network. This is to remove any malicious node from giving the false data of information about any normal node that wants to become MTPR. Our result assume that all the nodes are authentic and can contribute in communication i.e., all nodes are certified nodes. our protocol is able to reach routing security with increase in packet delivery ratio and reduced in packet loss rate.

REFERENCES

[1] Vinay Rishiwal, S. Verma and S. K. Bajpai," QoS Based Power Aware Routing in MANETs", International Journal of Computer Theory and Engineering, Vol.1, No.1,pp.47-54, 2009.

[2] Chen Huang, "On Demand Location Aided QoS Routing in Adhoc Networks", IEEE Conference on Parallel Processing, Montreal, pp 502-509, 2004.

[3] Wen-Hwa Lio, Yu-Chee Tseng and Kuei-Ping Shih, "A TDMA Based Bandwidth Reservation Protocol for QoS outing in a Wireless Mobile Adhoc Network", IEEE international Conference on Communications, Vol.5, pp. 3186-3190, 2002.

[4] aydeep Punde, Nikki Pissinou, and Kia Makki, "On Quality of Service Routing in Adhoc Networks, " Proc. 28th Annual IEEE Conference on Local Area Network, pp 276-278, 2003.

[5] Peng-Jun Wan, Gruia Calinescu, Xiangyang Li and Ophir Frieder, "Minimum-Energy Broadcast Routing in Static Ad Hoc Wireless Networks", IEEE INFOCOM, 2001.

[6] S-L. Wu, Y-C Tseng and J-P Sheu,"Intelligent Medium Access for Mobile Ad Hoc Networks with Busy Tones and Power Control", IEEE Journal on Selected Areas in Communications, Vol. 18, No. 9, September 2000.

[7] S.Muthuramalingam et al., "A Dynamic Clustering Algorithm for MANETs by modifying Weighted Clustering Algorithm with Mobility Prediction", International Journal of Computer and Electrical Engineering, Vol. 2, No. 4,pp.709-714, 2010.

[8] Hussein, Abu Salem.A.H., & Yousef .A.O., "A flexible weighted clustering algorithm based on battery power for Mobile Ad hoc Networks", IEEE International Symposium on Industrial Electronics, 2008.

[9] C.K Nagpal, et al. "Impact of variable transmission range on MANET performance", International Journal of Ad hoc, Sensor & Ubiquitous Computing , Vol.2, No.4,pp.59-66, 2011.

[10] Shivashankar, et al. "Study of Routing Protocols for Minimizing Energy Consumption Using Minimum Hop Strategy in MANETS International Journal Of Computing communication and Network Research (IJCCNet Research) Vol. 1. No. 3, pp.10-21, 2012.

[11] Priyanka goyal et al.,"MANET: Vulnerabilities, Challenges, Attacks, Application", IJCEM International Journal of Computational Engineering & Management, Vol. 11, pp.32-37, 2011.

[12] S. Shakkottai, T. S. Rapp port, and P. C. Karlsson, "Cross- layer design for wireless networks", IEEE Communications Mag., vol. 41, pp. 74-49, 2003.

[13] Srivastava V and Motani.M."Cross-layer design: a survey and the road ahead", IEEE Communications Magazine, Vol.43, Issue 12, pp.112- 119, 2005.

[14] Subhankar Mishra et al.," Energy Efficiency In Ad Hoc Networks", International Journal of Ad hoc, Sensor & Ubiquitous Computing, Vol.2, No.1, pp.139-145, 2011.

[15] C. Poongodi and A. M. Natarajan,"Optimized Replication Strategy for Intermittently Connected Mobile Networks", International Journal of Business Data Communications and Networking, 8(1), pp.1-3, 2012.

[16] Shivashankar, et al."Implementing a new algorithm for Analysis of Protocol Efficiency using Stability and Delay Tradeoff in MANET", International Journal of Computers & Technology, Vol. 2. No. 3, pp.11-17.

[17] Kim, D., Garcia-Luna-ACEVES, J. J., OBRACZKA, K., CANO, J.-C., And Manzoni, P, Routing Mechanisms For Mobile Ad Hoc Networks Based On The Energy Drain Rate, Ieee Transactions On Mobile Computing, Vol. 2, No.2, Pp.161 – 173, 2006.

[18] Mohd Izuan Mohd Saad Performance Analysis Of Random-Based Mobility Models In Manet Routing Protocol, European Journal Of Scientific Research, Vol.32, No.4, Pp.444-454, 2009