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Increased Network Lifespan in MANET with Energy Routing Protocol

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ABSTRACT: Wireless ad-hoc network are being deployed to perform a number of important task. In mobile ad-hoc network perform a major role in communication network. In MANET power aware is important one and to improve the communication energy efficiency at individual nodes. we propose efficient power aware routing (EPAR),and to increases the network lifetime in MANET. EPAR also expected the energy spend in reliably forwarding the data packets over a specific link.using a formulation,EPAR selects the path that has the largest packet capacity at the smallest residual packet transmission capacity. This protocol must be able to handle high mobility of nodes.this paper evaluates three ad-hoc networks routing protocol (DSR,MDSR,EPAR) in different network scales,taking into consideration the power consumption .In this paper we propose an energy efficient power aware routing algorithm and to decrease the end to end delay for the data packets,lower control overhead,increase the packet delivery ratio and also to decrease the energy consumption.

KEYWORDS: MANETs, EPAR, DSR, MDSR.

I. INTRODUCTION

Communication networks has developed in day to day life.there are two type of communication networks,wired and wireless networks most of the application uses the wireless networks.it has become increasingnly famous during past decades.there are two variation of wireless networks.-infrastructure and ifrastructureless networks.exambles include cellular network and wirelees lan(Ieee 802.11).recently refered to as wireless adhoc networks.infrastructulesse property makes to provide robust operation example application

Includes emergency services disaster recovery
Communication has very important for exchanging information between one person to other at any time.MANET is a group of
mobile nodes that form a network which indepently of any centralised administration.therfore mobile devices are battrery operated and extending mobile node life timethese are the important aim of our project.many researches have recently started to consider the network life time for manet.each mobile node in the network perform the routing function for establishing communication.

So mobile nodes are battery driven in MANET.thus they suffer from limited energy level because nodes in networks are moving in one to another at each time, there fore link break occurred between two mobile nodes.the following two major reson can creat link breakage:

1. Node dying due to energy exhaustion.
2. Moving of mobile nodes from its neighboring nodes coverage area

.Application of MANET

Military environments:

- Automated battlefield
- Special operations
- Homeland defense
- Soldiers, tanks, plants

Civilian environments :

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• Disaster Recovery (flood, fire, earthquakes)
• Law enforcement (crowd control)
• Search and rescue in remote areas
• Environment monitoring (sensors)
• Space/planet exploration
• Boats, small aircraft
• Sports stadiums
• Taxi cab network
Commercial:
• Sport events, festivals, conventions
• Patient monitoring
• Ad hoc collaborative computing (Bluetooth)
• Sensors on cars (car navigation safety)
• Vehicle to vehicle communications
• Video games at amusement parks, etc

II. RELATED RESEARCH WORK

In previous work on routing in wirless adhoc networks deals with problem of route discovery and maintaining the correct path to destination during changing network topology.shortestpath algorithm is used in strongly connected the network. Author developed a dynamic routing algorithm finding and maintaining the connection oriented session

A. PROACTIVE ENERGY-AWARE ROUTING

With table-driven routing protocols, each node attempts to maintain consistent routing information to every other node in the network. This is done in response to changes in the network by having each node update its routing table and it produce large overhead.. Thus, it is proactive in the sense that when a packet needs to be forwarded the route is already known and can be immediately used. As is the case for wired networks, the routing table is constructed using either link-state or distance vector algorithms containing a list of all the destinations, the next hop, and the number of hops to each destination.it suitable for high traffic network.

B. REACTIVE ENERGY-AWARE ROUTING

On-demand driven routing, routes are discovered only when a source node desires them. Route discovery and route maintenance are two main procedures: The route discovery process involves send to the route-request packets from a source to its neighbor nodes, which then forward the request to their neighbors, and so on. Once the route-request reaches the destination node, it responds by uni-casting a route-reply packet back to the source node via the neighbor node.
Example:Aodv,dsr

C. DSR protocol:

dsr routing protocol is an on demand routing protocol designed to restrict the bandwidth consumed by control packets in MANET by eliminating the periodic table update required in the table driven approach.which protocol is beaconlessand hence does not required periodic Hello packet transmission.this protocol use a reactive approach.which eliminates the need to periodically floot the network with in the table update messages.inreactive approach such this,route is established only.the intermediate node also utilise the route cache information efficiently to rreduce the control overhead.dsr doesnot support multicasting.

D. EPAR protocol:

The majority of energy efficient routing protocol for MANET tries to reduce the energy consumption by means of an energy efficient routing matrics used in routing table computation.the limitation on the availability of power for operation is a significant bottleneck, given the requirement of probability weight, and size of commercial hand held device. Hence the uses of routing matrix that consider capability of the power source of the network nodes contributes to the efficient utilisation of energy and increases the lifetime of network proposed a set of routing matrix that support

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conversion of battery power.the ruoting protocol that select the path so as toconserve power must be aware of the states of the batteries at the given node as wel as at the other intermediate nodes in the path.

E. MDSR protocol:

We added a link breakage prediction algorithm to the dynamic source routing protocol.the mobile node uses signal power strength from the received packetsto predict the link breakage time,and send a warning to the source node of the packet,if the link is soon to be broken.the source node can perform a proactive route rebuild to avoide the disconnection.in this protocol mainly based on the minimising energy conservation in MANET.compare to dsr algorithm,MDSR very efficient in increasing network lifetime so that the performance of MDSR is reduce the link breakage and also increasing the throughput,packetdelivery ratio,decreasing the energy consumption and delay.

III. PROPOSED METHOD

ROUTE DISCOVERY AND MAINTENANCE

EPAR protocol gives maximum lifetime and minimum power consumption by selecting the stable route .Route discovery process to transfer the real time and non real time traffic therefore it provide the reliable route .

For example when multiple minimum energy routes share the single node or common node.every time we use route establishment reduce the node life time when select the path the DSR implementation choose the shortest path and best path with the minimum number of hops.In EPAR choose the shortest path depends on the nodes energy .For example consider the scenario .there are two path to Choose from.The first path contains two hops with node lifetime value is 500s,550s and second path contains three hops with node lifetime 600s,500s and700s.The lifetime of the first path is 550s.while the lifetime of the second path is 600s.Because 600s is more than 550s,the second would be choosen.

EPAR algorithm is an ondemand source routing protocol which uses energy consumption prediction .DSR selects the path shortest path ACD or ABD and MDSR selects the minimum energy efficient route path ABD or ACD or AED.But EPAR selects the AECD,because that selected path has maximum lifetime of the node .It reduces the overall network energy consumption.major aim of this routing protocol is to increase the network lifetime and energy consumption with changing dynamic toplogy in network.this protocol selects the node based on maximum network lifetime

Route discovery and maintenance process in EPAR.

We represent our objective function as follow:

$Max\ T(t)=minTi(t)$

$K \quad k$

where, $Tk\ (t)$ = lifetime of path , $Ti(t)$ =predicted lifetime of node i in path k.

Proof:

1. $Tk\ (0) = Min\ T\ i(0) = Min(TA(0); TB(0); TC(0), TD(0))$

$Tk\ (0) = Min\ Ti(0) = Min(500;\ 550) = 550$

2. $Tk\ (0) = Min\ T\ ik(0) = Min(TA(0); TE(0); TC(0); TD(0))$

$Tk\ (0) = MinTi(0) = Min(700; 550; 600) = 600$

Our approach is dynamically distributed load balancing approach which avoids energy congested nodes and chooses path that are less loaded.this helps achieve maximum lifetime in network and reduce as the energy level variation of different nodes.

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IV. DATA PACKET FORMAT IN EPAR

IP Header	DSR fixed Header	DSR Source Header	DSR source Route Address [1..N]	EPAR Source Route MTP [1…N]	Link Flag	DATA

V. PROPOSED WORK

Throughput:

It is the number of packets/bytes received by source per unit time. It is an important metric for analyzing network protocols.

Packet Delivery Ratio (PDR):

It is the ratio of actual packet delivered to total packets sent.The following table shows the values of the various parameters used during simulation of these protocols.

NETWORK LIFETIME

It is the time span from the deployment to the instant when the network is considered nonfunctional.
When a network should be considered nonfunctional is, however, application-
percentage of mobile nodes die, the network partitions, or the loss of coverage occurs. It effects on the whole network performance. If the battery power is high in all the mobile nodes in the MANET, network lifetime is increased.

END TO END DELAY

unplanned deferment of a scheduled activity because of something or occurences that impedes its commencement or continuation.delay usually has a time associated cost effects on a contrast which may be measured interms of time money or a combination

VI. SIMULATION PARAMETERS

Number of nodes	**90**
Area size	**2500*2500**
Mobility model	**Random point**
Traffic type	**CBR**
Channel capacity	**3 Mbps**
Transmit power	**0.6J**
Receiver power	**0.3J**
Idle power	**0.02J**
Initial energy	**8.1J**
Communication system	**MAC/IEEE 802.11G**
Routing protocols	**DSR,MDSR,EPAR**

shows that the consumed power of networks using EPAR and MDSR decreases signi_cantly when the number of nodes exceeds 60. On the contrary, the consumed power of a network using the DSR protocol increases rapidly whilst

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that of EPAR based network shows stability with increasing number of nodes.

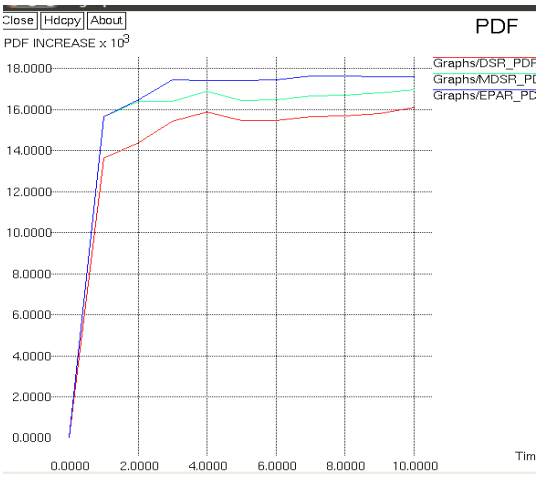

Fig2: Packet delivery ratio

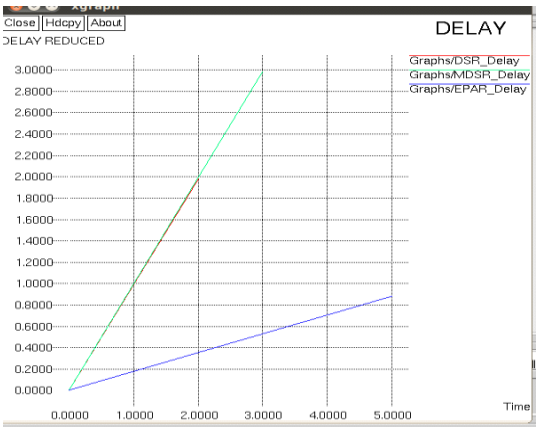

Fig3:end to end delay

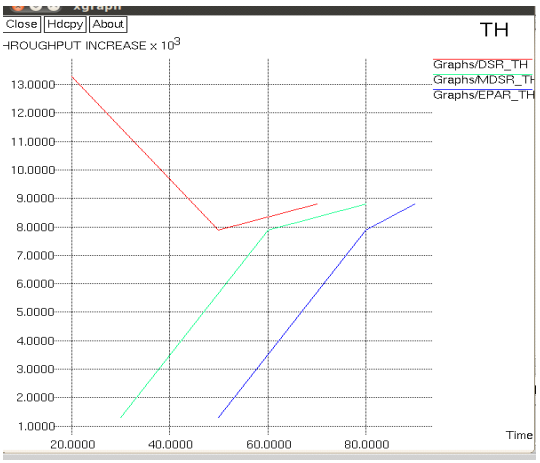

Fig 4 throughput

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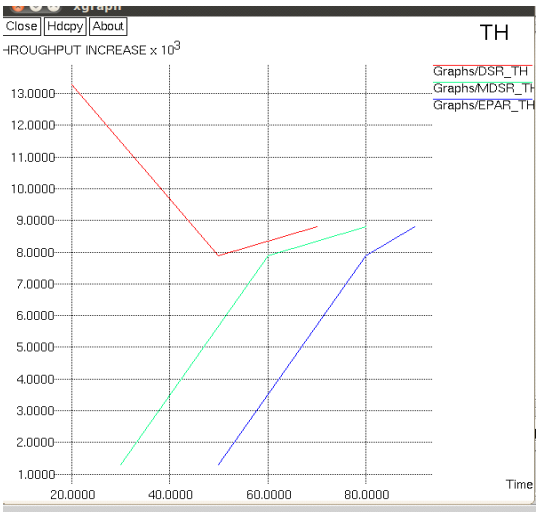

Fig4:throughput

VI. CONCLUSION

To reduce the energy consumption of a MANET, i.e. we presented an original solution called EPAR which is basically an improvement on DSR. This study has evaluated three powers aware adhoc routing protocols in different network environment taking into consideration energy and packet delivery ratio. Overall, the according shows that the end to end delay energy consumption and throughput in small size networks did not reveal any significant differences. However, for medium and large ad-hoc networks the DSR performance proved to be inefficient in this study. In particular, the performance of EPAR, MDSR and DSR in small size networks was comparable.The EPAR and MDSR produced good results and the performance of EPAR in terms of throughput is good. From the various graphs, we can successfully prove that our proposed algorithm quite outperforms the traditional energy efficient algorithms in an obvious way.The EPAR algorithm outperforms the original DSR algorithm by 40%

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