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A MODIFIED ENERGY EFFICIENT APPROACH FOR ROUTING PROTOCOL IN MANET

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ABSTRACT

As technology is enhanced different MANET devices are introduced with more mobility which in turn consumes more battery power. Energy optimisation is a basic necessity to evaluate the battery power consumption in the MANET networks. In previous research some energy efficient protocols like EPAR, MTPR etc are already available which reduces battery power consumption up to 20% only. Still there is a limitation of energy efficiency. EPAR Protocol reduces power consumption by selecting routes with more packet capacity and less energy consuming. We introduce the proposed EPAR Protocol which reduces power consumption up to 40% and increases the network lifetime. EPAR protocol has the limitation of network rescanning during link failure. Therefore proposed EPAR with implementation of Adaptive Ant colony optimization is introduced which provides alternative path in case of link failure. Proposed EPAR protocol gives better results for every parameter like delay, throughput, network load, jitter etc. Power saving is the urgent need of mobile adhoc networks to scale back gap between the power consumption needs and power accessibility.

Keywords: ***MANET, AODV, OLSR, DSDV, DSR, OSI Model.***

I. INTRODUCTION

The networks are basically of two types wired and non-wired networks. In new technologies are based on wireless technologies like wireless local area network. Different Mobile adhoc networks are introduced. Mobile adhoc networks [1] (MANETs) are instantly movable, dynamic and with fixed infrastructure. Different nodes available interact directly with other nodes in the network. Multi-hop routes are determined indirectly through intermediate nodes. Figure 1 given below depicts the mobile adhoc network. Circles represent the different MANET networks, square represents the nodes and bidirectional arrows represent the communications between different nodes. There are three nodes present in the network which communicates with each other.

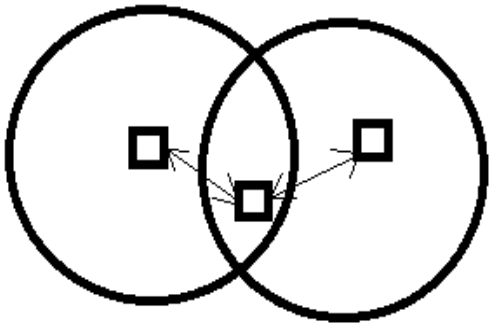

Fig.1: Example of mobile ad-hoc network

An essential issue for MANETs is that the activity of nodes is energy-constrained. From the past few years, the depth analysis has been administered in developing routing protocols for MANETs. In previous research study, decrease in amount of energy consumption mostly dependent on the hardware and operating system. More importantly for appropriate energy savings is done by using energy routing protocols that considers route with minimum energy prices it saves the route once selected so that it can be used again when required. Cluster communication is very important in Mobile unintentional Networks (MANET). Several unintentional network applications that need shut association of the member nodes depend on cluster communication. Action directions given to the troopers in a very field of honor and communications needed throughout a operation square measure some samples of these applications. Additionally, several routing protocols for wireless MANETs want a broadcast/multicast as a communication primitive to update their states and maintain the routes between nodes [3]. Multicast protocols are categorized in tree based mostly and mesh based protocols. Multicast network structures square measure fail thus ought to be readjusted and repaired continuously because of the changing properties. The Multicast protocols have to be compelled to manufacture multi-hop routes below information measure inadequacy, restricted battery power and dynamic topology attributable to nodes' unpredictable quality. Even in wired networks, building optimum multicast trees and maintaining cluster membership data is difficult that becomes preponderantly difficult in mobile accidental networks [2].

II. PROTOCOL STACK IN MANET

Protocol stack for mobile base less systems [12] is represented. The convention stack that comprises of 5 layers (a) Physical layer (b) information connection layer (c) system layer (d) transport layer (e) application layer. The layers of OSI (a) session (b) presentation (c) application are consolidated into one segment alluded to as application layer. it's a layered structure intended for the point of system frameworks that empowers for correspondence over a wide range of PC frameworks. TCP/IP was planned first. The last four layers of OSI model are a proportionate however the fifth layer inside of the TCP/IP suite (the application layer) is like the 3 layers (a) session (b) presentation (c) application layers of the OSI model. The refinement between 2 conventions stacks exists in the system layer [4].

III. ROUTING PROTOCOL

It is the system for building route and sending packet from source to destination node. It comprises of 2 stages, route decision for various source-destination sets and delivery of data packets to the right destination.

Different protocols and routing tables unit acclimated meet these two stages. This overview paper is focused on discovering and selecting energy economical routes. There is a bent to unit reaching to discuss about the chief methodologies at intervals the routing unit proactive, reactive, and hybrid then the ultimate definition of energy efficiency in addition as energy economical routing algorithms.

A. Classification of Routing Protocols for MANET

1) Proactive (Table-Driven) routing protocols:

Proactive protocols incessantly maintain recent list of destinations within the network by exchanging topological info among the network nodes. Thus, once there is a desire for a route to a destination, such route information is accessible. samples of the proactive protocols are-DSDV [2] (Destination-Sequenced Distance-Vector), Wireless Routing Protocol (WRP)[7], stratified State Routing protocol, Optimized Link State Routing,(OLSR)[4]

and Topology Dissemination supported Reverse-Path Forwarding routing protocol (TBRPF). The most disadvantages of such algorithms area unit high latency time in route finding and excessive flooding will result in network preventive.

2) Reactive (On demand) routing protocols:

The reactive routing protocols support some form of query-reply dialog. It is also called on demand routing. It is more economical than proactive routing and present work is introduced after doing many modifications in this kind of routing. This kind of routing is introduced to search out a route on demand between a source and destination whenever that route is required. Discovering the route on demand avoids the value of maintaining routes that are not being employed and additionally manages the traffic of the network because it does not send excessive control messages that considerably produce an outsize distinction between proactive and reactive protocols. Time delay in reactive protocols is larger comparative to proactive types since routes are calculated once it is required. e.g. Ad-hoc On Demand Distance Vector (AODV), and Dynamic supply Routing (DSR)[7][9] etc.

3) Hybrid routing protocols:

In this strategy reactive and proactive schemes are combined to form new mixed strategy which removes disadvantages of proactive and reactive protocols. Hybrid routing is a kind of routing which performed well as compared to previous routing.

It is applicable for all kinds of protocols [10][11].

IV. ENERGY EFFICIENCY

For a wireless systems, the gadgets operational on battery endeavour to seek after the energy efficiency heuristically by decreasing the energy they expended, These gadgets maintains the acceptable performance by using good energy saving tasks. The way of power control utilization is not just one standard for choosing energy efficiency. The energy efficiency of protocols may be measured by the length of the time over that the system will keep up an accurate execution level that is for the most part known as the network lifetime. In case where routing maximizes the period of the network is totally different from minimum energy routing. Minimum energy routes [1][6] typically attract a lot of traffic flows. Nodes in these routes overused their energy in terribly tiny amount of your time that the whole network cannot perform any task as a result of the failure on of those nodes. The energy consumed in network is balanced that is consumed among totally different nodes of the networks. Routing with most lifetimes balances all the routes associate degree nodes globally so as that the network maintains sensible performance level for an extended time. Hence, energy efficiency is not solely measured by the flexibility consumption but in further general it may be measured by the length of it slow over that the network can maintain an explicit performance level. There are unit uncountable ways in which to reason routing algorithms one is flooding and broadcast routing, that is normally necessary throughout the operation of the wireless network, wish to find node failure and broadcast some information.

The second kind of routing is multicast routing. The multicast routing is usually common in wireless networks, to talk in an extremely one-to-group fashion. The last is uni-cast, that is typically in associate end-to-end fashion so the foremost common fairly routing in networks. It goes whereas not expression that node failure is extraordinarily realizable among the wireless network. Hence, saving energy once broadcasting thus on get over the node failure or to re-routing around the failing nodes is vital. By identical token, multicast has identical

challenge to realize the energy efficiency [11][19]. For unicast, it's extraordinarily related to the node and link standing that require a wise thanks to do routing any. Sometimes, shortest path routing is presumptively not the only choice from the energy potency purpose of read. Energy is also a limiting think about case of Ad-hoc networks [12]. Routing in ad-hoc networks has some distinctive characteristics. First-energy of nodes is crucial and depends upon battery that has restricted power an. Second-nodes can move in associate uncontrolled manner so frequent route failures unit potential. Third-wireless channels have lower and extra variable system of measurement compare to wired network. Energy economical routing protocols unit the only real answer to on top of state of affairs. Most of the work of constructing protocols energy economical has been done on "on demand routing protocols" as a results of these protocols ar extra energy economical rather than proactive protocols but still these have some drawbacks that are mentioned among ensuing section. Energy efficiency may additionally be achieved by wise flooding at the route discovery methodology in reactive protocols. And energy potency may additionally be achieved by victimization economical metric for route alternative like perform operate, node energy, battery level etc. Here energy efficiency doesn't mean solely the less power consumption here energy potency implies that increasing the fundamental measure among that any network maintains certain performance level.

V. PROPOSED APPROACH

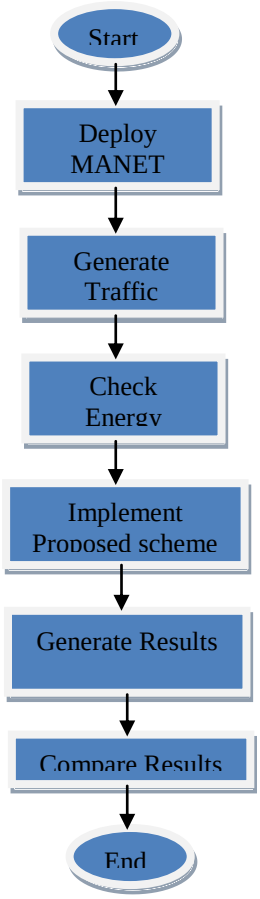

Figure 2: Flow Chart for Implementation

VI. RESULTS AND DISCUSSION

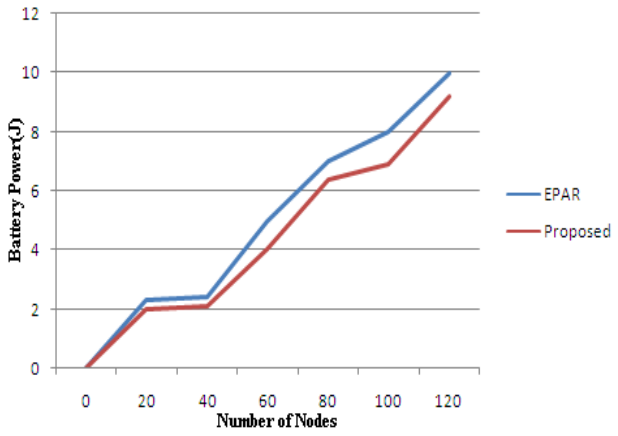

Figure 3: Battery Power (J)

Figure 4 defined about the Batter Power consumed by the existing and proposed approach. Proposed approach has lesser consumption than that of EPAR.

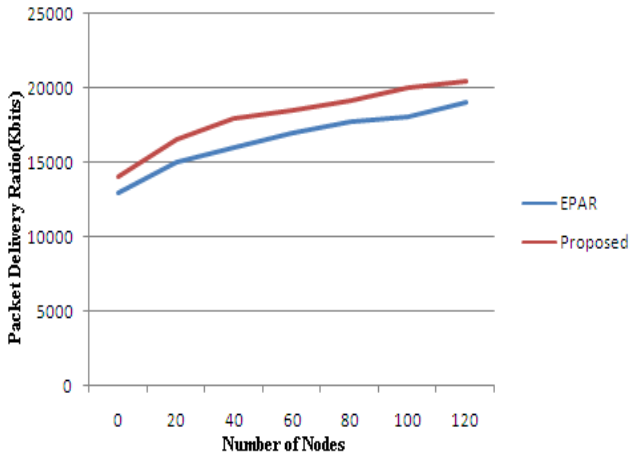

Figure 4: Packet Delivery Ratio (Kbits)

Packet Delivery Ratio defined in figure 5 is quite better in case of Proposed as compared to the EPAR.

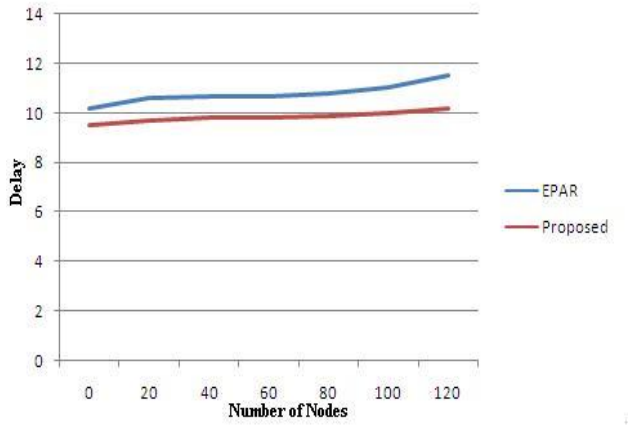

Figure 5: Delay (sec.)

Delay defined in figure 5 is quite better in case of Proposed as compared to the EPAR.

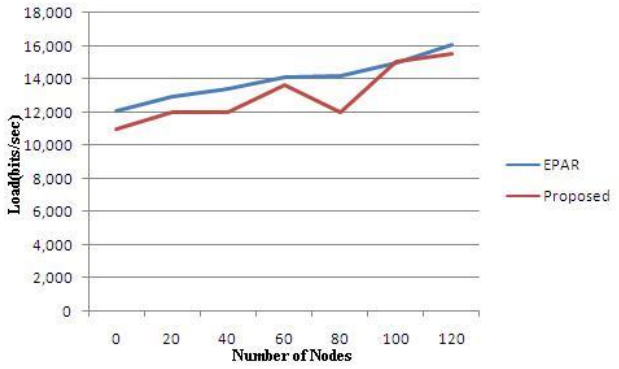

Figure 6: Load(sec.)

Load defined in figure 5 is quite better in case of Proposed as compared to the EPAR.

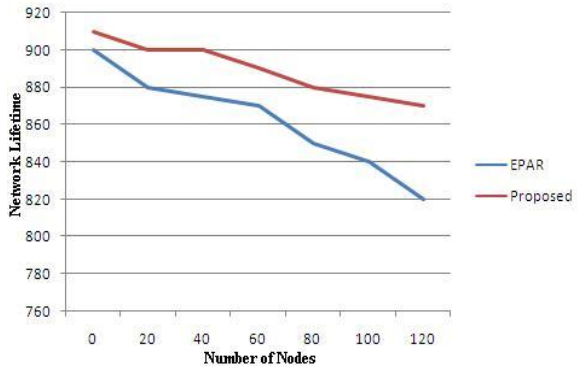

Figure 7: Network lifetime (sec.)

Network lifetime defined in figure 7 is quite better in case of Proposed as compared to the EPAR.

All the above given results are generated by using OpNet Simulator (optimized network engineering Tool) by using wireless–LAN type of data in MANETS. All the above results are generated using adaptive ant colony optimization algorithm.

VII. CONCLUSION

This paper concludes that there is not one protocol which might offer the simplest performance in ad-hoc network. Performance of the protocol varies in keeping with the variation within the network parameters, as we all know that in ad-hoc network properties endlessly vary. Restricted power provides is that the biggest challenge of a mobile adhoc networks. Thus its necessary to pick out the protocol that performs best for explicit form of network. It is found that the changed algorithmic rule contains a comparable performance with relation to finish to finish Delay, output and varied drops with the present EPAR protocol. Proposed EPAR gives better results for parameters like delay, load, Throughput and good network lifetime. From the simulation results it's finished that the lifespan and packet delivery ratios of the network is improved with the reduction in varied drops and finish to finish delay for the proposed EPAR over the present EPAR protocol. Additionally proposed EPAR protocol reduces power consumption up to 40%. It is discovered that more enhanced EPAR than Proposed EPAR is possible if correct energy model will be used with more appropriate energy saving mechanisms will be used in future.

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