An Alert Mechanism for Node Energy Awareness in Wireless Ad-hoc Network

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***Abstract*— Nodes operate with limited battery power in wireless ad-hoc networks. If some nodes stop working due to shortage of energy, they cannot communicate with each other. Energy efficient routing scheme deals with efficient utilization of energy resources. By regulating the early depletion of the battery, adjust the proper power level of a node and incorporate the low power strategies into the protocols used in various layers of protocol stack. Note that each message transmission and reception drains battery power. If a node drains its energy and is unable to forward any message, it moves out of the network. In this case, the route is brake and routing protocol finds an alternate route via another route discovery. In fact, residual energy of nodes utilization after threshold should be increase the energy utilization of networks. In this paper, utilization of node energy during transmission of data is discuss, problem definition and find out various methodology to overcome the failure during transmission. most of the authors give a new protocol for routing packets.**

***Keywords*— MANET, DSR, Energy Consumption, PDR, AODV, Routing Protocols.**

I. INTRODUCTION

A Mobile Ad Hoc Network (MANET) consists of a set of mobile hosts that carry out basic networking functions like packet forwarding, routing, and service discovery without the help of an established infrastructure[1]. Nodes of an ad hoc network rely on one another in forwarding a packet to its destination, due to the limited range of each mobile host's wireless transmissions. An ad hoc network uses no centralized administration. It confirm that the network will not quit working just because one of the mobile nodes moves out of the range of the others. Nodes should be able to enter and leave the network as they wish. Because of the finite transmitter range of the nodes, multiple hops are necessary to reach other nodes. single path and multipath routing protocols have not fully used the route stability to carry on the routing[2].

In ad hoc network topologies may varies due to nodes can move, join or leave the network. Topological stability requires a routing protocol to create and maintain routes among the nodes. Mobile ad-hoc networks can be deployed in areas where a wired network infrastructure may be undesirable due to reasons such as cost or convenience. It can be quickly setup to support emergency requirements, interim needs, and coverage in undeveloped areas. So there is a plethora of applications for wireless ad-hoc networks. As a matter of fact, any day-to-day application such as electronic email and file transfer can be considered to be easily deployable within an ad hoc network environment. Also, we need not emphasize the wide range of military applications possible with ad hoc networks[3]. Not to mention, the technology was initially developed keeping in mind the military applications, such as battlefield in an unknown territory where an infrastructure network is almost impossible to have or maintain. In such situations, the ad hoc networks having self-organizing capability can be effectively used where other technologies either fail or cannot be deployed effectively [4].

Topology of the network changes frequently and unpredictably since its host moves randomly. Therefore, routing is an integral part of ad hoc communication, and has received interests from many researchers. In traditional "on-demand" routing schemes like Ad Hoc On Demand Distance Vector Routing (AODV) scheme [5], when route disconnects, nodes of the broken route simply drop data packets because no alternate path to the destination is available until a new route is established. When the network traffic requires real time delivery (voice, for instance), dropping data packets at the intermediate nodes can be costly[6]. The Power aware scheme[7] in Ad hoc routing Protocol enables dynamic, self starting, multi hop routing between participating mobile nodes wishing to establish and maintain an ad hoc network. It allows mobile nodes to maintain routes to destinations with more stable route selection. This scheme responds to link breakages and changes in network topology in a timely manner and also takes care of nodes that do not have better power status to participate in route selection. One distinguishing feature of Power aware ad hoc routing scheme is its use of Power status for each route entry. Given the choice between two routes to a destination, a requesting node is required to select one with better power status and more active.

II. LITERATURE SURVEY

Several techniques have been developed to identifies the energy efficiency issues in Ad-Hoc Networks. These approaches differ in the methodology as well as the layer of the protocol stack at which they function [8]. Algorithms belonging to the category may operate between MAC layer level and Network layer level, or separately .The following section covers the most significant algorithms that belong to these categories.

Power-Aware Routing- Authors identify power-aware metrics to use with Routing Protocols on top of their MAC power savings protocol, PAMAS [9]. They indicate that the strategy followed by the different Routing Protocols that are not power conscious would lead to fast depletion of battery power and hence quick degradation of the Network operation. We have already discussed these metrics. The authors implemented the first and fourth metrics (minimize energy consumed per packet and minimize cost per packet, respectively). In their simulations, the authors used sparsely populated Networks and they did not consider mobility in their simulations. The logic behind not using mobility is that the evaluation is done for power management and not routing. In our view, mobility has a considerable effect on the performance of power efficient mechanisms.

Maximum Battery Life Routing[10], This protocol uses the γ conditional max-min battery capacity routing (CMMBCR) scheme. It uses battery capacity instead of a cost function as a route selection metric. When all nodes on some available routes between source and destination have enough remaining energy above a certain value, γ, the route with the minimum total transmission power (MTRP) among these routes is chosen. If nodes have low battery capacity in all routes, it should be avoided to enhance the lifetime of the nodes. the CMMBCR scheme reduces to the Min-Max battery cost routing (MMBCR) scheme. Minimum Energy Routing- Author propose based on less amount of energy required to get a packet from source to destination [11]. Lifetime Prediction Routing[12], objective for this work is to extend the life of network with dynamic topology. In lifetime Prediction, each node tries to provide its energy based on its early activity. PSR is only uses the remaining battery capacity of nodes.

In WSN, the main task of a sensor node is to sense data[13] and sends it to the base station in multi hop environment for which routing path is essential. The design of routing protocols for WSNs must consider the power and resource limitations of the network nodes, the time varying quality of the wireless channel, and the possibility for packet loss and delay.

SPAN: An energy-efficient coordination algorithm for topology maintenance [14] is a distributed synchronization technique for multi hop ad hoc wireless networks that minimizes energy consumption without notably diminishing the connectivity of the network. SPAN coordinates the “stay-awake and sleep” cycle of the nodes and also performs multi hop packet routing within the ad hoc network, while other nodes remain in power saving mode and periodically check if they should remain awaken and become a coordinator. SPAN adaptively elects coordinators by allowing each node to use a random back-off delay to decide whether to become a coordinator in the network and rotates them in time. The back-off delay for a node is a function of the number of other nodes in the neighbourhood and the amount of energy left in these nodes. This technique not only preserves network connectivity, it also preserves capacity, decreases latency and provides significant energy savings. The amount of energy saving provided by SPAN increases only slightly as density decreases. Current implementation of span uses the power saving features, since the nodes practically wake up and listen for traffic advertisements [15]. The energy-aware protocol works only in the routing layer and exploits only routing-specific information [16]. Geographical adaptive fidelity (GAF) protocol [17], [18] reduces energy consumption in ad hoc wireless networks; it is used for extending the lifetime of self-configuring systems by exploiting redundancy to conserve energy while maintaining application fidelity. By identifying nodes that are equivalent from a routing perspective and then turning off unnecessary nodes, maintaining a constant level of routing fidelity, this protocol is able to conserve energy.

GAF also uses application-and system-level information; nodes that source or sink data remain on and intermediate nodes monitor and balance energy use. GAF is independent of the underlying ad hoc routing protocol; simulation studies of GAF show that it can consume 40% to 60% less energy than other ad hoc routing protocol. Also, network lifetime increases proportionally to node density. The Prototype Embedded Network (PEN) protocol [19] exploits the low duty cycle of communication activities and powers down the radio device when it is idle. Nodes interact asynchronously without master nodes and thus, the costly master selection procedure as well as the master overloading problem can be avoided. But in order for nodes to communicate without a central coordinator, each node has to periodically wake up, make its presence by broadcasting beacons, and listens a moment for any communication request before powering down again. A transmitting source node waits until it hears a beacon signal from the intended receiver or server node. Then, it informs its intention of communication during the listening period of the server and starts the communication. Due to its asynchronous operation, the PEN protocol minimizes the amount of active time and thus saves substantial energy. However, the PEN protocol is effective only when the rate of interaction is fairly low, thus more suited for applications involving simple command traffic rather than large data traffic.

III. PROBLEM DEFINITION

Power consumption during communication between nodes is mainly due to transmit-receive module. Whenever a node remains alive, energy gets consumed at the time of transmission and reception of packets. Even when the node is not actively participating

in communication, but is in the listening mode waiting for the packets, the battery keeps discharging [20]. The computational power indicates that during calculation power spent takes place in the nodes in routing and power adjustments.

Thus, energy aware routing is an important issue in such networks. Power aware routing are the major means of increasing the life of a node.

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IV. PROPOSED SOLUTION

The proposed mechanism works in form of set two value of energy as threshold value for mobile nodes in the network. If the energy level of any node in the network reaches to first threshold level that means participating node in communication aware about low battery power and when node energy reaches to second threshold value that means battery of nodes drain out completely According to the proposed approach a new energy aware efficient routing to make nodes able to aware the energy of nodes by that we remove the problem of suddenly loss of session to recognize the unfaithful nodes and extend the life time of network. Energy efficient routing scheme deals with efficient utilization of energy resources. There are little issues and solutions which witnesses the need of energy aware routing in ad hoc wireless networks. As we have shown earlier, idle energy consumption constitutes a significant percentage of the overall energy consumed by the wireless interfaces of network nodes. Therefore, reducing this energy should be a cornerstone in any energy conservation efforts. Proposed mechanism, addresses the issue of idle energy consumption in a manner fair to all network nodes. Different nodes are given equal opportunities to conserve idle energy. When idle energy is addressed, another factor remains that may still affect energy fairness within the network.

V. CONCLUSION

This approach mainly minimizes the energy depletion of nodes and maintains a more or less uniform energy usage among all the nodes in the network while maintaining effective throughput. we observe a acute performance and power usage gains using the proposed methodology. This scheme has been utilized power status of each node during transmission and mobility and suggest alternate paths. This scheme can be incorporated into any ad hoc on-demand routing protocol to improve reliable packet delivery in the face of node movements and route breaks[21]. When data packets cannot be delivered through the primary route then Alternate path are utilized for transmitting data. Its performance has been found much better than other existing protocols in dense medium as probability of finding active routes increases.

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