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RESEARCH ARTICLE

Energy Efficient Administrator Based Routing Approach in MANET

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ABSTRACT- MANET is a well-known network in which wireless nodes are connected. The infrastructure-less nature of the mobile ad hoc networks (MANET) causes several issues including energy consumption, node authentication, and secure routing. This paper presents an Energy Efficient and Administrator based Secured Routing (EEABSR) approach in MANET that ensures energy efficient secure routing in MANET. This attempts to reduce the computational overhead to offer an energy efficient scheme. In MANET there is no base station or any other infrastructure, helping to setup or perform the network activity required. Thus in this case the nodes are the routers transferring the data packets themselves. Hence a robust and good routing protocol that will perform all the functions but with an optimized network activity to decrease the network traffic as well as make the transmission fast is very essential. Thus while building the routing protocol, this work kept in mind these three factors: making the transmission fast, decreasing the network traffic and properly utilizing the energy consumed by each router. This paper classifies the nodes in the network into two categories such as administrator nodes, associative nodes based on the range and the position of the nodes in the network. This protocol hopes that, if it is able to set threshold value in the admin nodes, it can guarantee that the admin node successful working in network without failed. The proposed EEABSR outperforms the existing solutions and leads to a decent solution as it sends data at an optimal speed while taking care of the computational overhead.

Keyword- MANET, AODV, EEABSR

INTRODUCTION

A major role to globally reduce energy consumption will be played by Ad hoc routing technologies. The communication in case of mobile Ad hoc network, MANET, is mainly based on the radio signals transmitted by the node. Again MANET, being a wireless network, is quite different from the common mobile communication. In mobile communication bridge networks within its own range are used by the nodes to communicate with

other nodes. The bridge networks act mainly as base stations which the source node needs to contact while sending a data packet to its destination. In MANET, there is no base station or any other infrastructure, helping to setup or perform the network activity required. Thus in this case the nodes are the routers transferring the data packets themselves. Hence a robust and good routing protocol that will perform all the functions but with an optimized network activity to decrease the network traffic as well as make the transmission fast is very essential. The insecurity of the wireless links, energy constraints, relatively poor physical protection of nodes in a hostile environment, and the vulnerability of statically configured security schemes have been identified in literature as such challenges. Nevertheless, the single most important feature that differentiates MANET is the absence of a fixed infrastructure. The absence of infrastructure and the consequent absence of authorization facilities impede the usual practice of establishing a line of defence, separating nodes into trusted and non-trusted. Such a distinction would have been based on a security policy, the possession of the necessary credentials and the ability for nodes to validate them. In the MANET context, there may be no ground for an a priori classification, since all nodes are required to cooperate in supporting the network operation, while no prior security association can be assumed for all the network nodes.

Additionally, this research proposed simple but efficient balanced energy consumption among all admin nods. EEABSR is based on one of most important routing protocols AODV. The balanced energy can be applied in most on-demand routing protocols. It is implemented in the process of routing discovery. When a RREQ message is broadcast in the network, not every admin node receive message, will broadcast it. The node will first be lower than a threshold value, the RREQ is dropped, and otherwise, the message is forward. If so, the RREQ message will be dropped, and the destination will be receive route request message only when all Admin node along the route have enough battery levels.

EXISTING SYSTEM

AODV [4]

In AODV, a source node initiates route discovery when it needs to communicate with a destination for which it does not have a route. Route discovery is initiated by the source node broadcasting a route request message (RREQ) that contains a request ID. If a node receives a RREQ that it has received previously, it drops the request. Otherwise, it stores the address of the node from which it received the request. In this manner, a reverse route to the source is established. If the RREQ reaches the destination node or a node that has a route to the destination, the node sends a route reply message (RREP) to the source. Intermediate nodes that do not have a path to the destination re-broadcast the request when they receive it for the first time. As the RREP is sent back to the source, each node stores the address of the node that sent the reply. The forward path determined from the source to the destination is used for sending packets to the destination. AODV uses sequence numbers maintained for the different destinations so as to guarantee freshness of routing information. AODV nodes offer connectivity information by broadcasting local Hello messages. If a node has not sent a broadcast within a specified time interval, it broadcasts a Hello message. Thus, a node can have a local table that contains all of its neighbours.

DRAWBACKS:

AODV has involved in a lot of network activity associated with it since there are routing packets transmitted all over the network to know the desired route with more wastage of energy. Moreover, AODV does not ensure secured routing and is susceptible to several routing attacks. In the proposed protocol however, the admin nodes take the duty of network transmission and so the overall load on the network decreases many folds. The network traffic depends on the dynamic nature of the network, lower the amount of changes in the network, lower will be the network traffic.

RELATED WORK

Many routing schemes have been investigated in the literature that deals with energy efficiency. Most of these schemes directly involve modifying the standard AODV or DSR routing protocols, with the aim to increase the energy efficiency in the networks without taking into account the secureness of the data packets transmission. Representative such schemes are discussed as follows.

In [5], Al-Gabri et al. defined a new routing protocol called Local Energy Aware AODV protocol(called LEA-AODV), which reduces the energy consumption by taking into account the initial energy of a node, the transmission power of the node, and the reception power of the node. These metrics are calculated and used to evaluate whether a power hungry node will conserve power by not forwarding data packets on behalf of others. Their simulations were based on (1) max speed and total energy consumption, (2) pause time and total energy consumption, (3) maximum speed and network life time, and (4)Pause time and network life time. Their results showed that the life time of the network can be prolonged substantially.

In [6], Adoni and Joshi modified the Optimized Link State Routing (OLSR) routing protocol with the shortest hop routing method for data transmission, but instead of using one route, they use multiple paths so as to avoid congestion. They call their algorithm Modified OLSR with multipath (OLSRM). Using alternate paths in turn decreases the energy expenditure of nodes or makes them uniform. Performance metrics were used to evaluate their implementation such as number of nodes alive versus nodes' velocity, average end-to-end delay and nodes' speed versus routing overhead. They compare their results to that of OLSR and they obtained a 10-25% increase in node velocity and 5-10% increase in routing overhead.

In [7], Verma et al. proposed a way to maximize the lifetime of MANETs by avoiding nodes with low energy and nodes that have more buffered packets than others in the network. They also optimized the energy consumption by varying the transmission range of the nodes. The performance metrics chosen were total energy consumed versus number of connections with varied pause times. They showed a 10-20% reduction in energy consumption and a 10% increase in the lifetime of the network. This improvement is done without increasing the routing overheads.

Unlike the above-described schemes, our proposed scheme is energy efficient admin based secure routing algorithm, where energy consumption at each node is now incorporated into the route selection phase, in order to decide on the secure route to be used to transfer the data packets. In their scheme, there are nodes that have different roles. These nodes are referred to as associative nodes, administrator nodes. Their evaluations are based on the number of packets dropped and the average power consumed.

PROPOSED WORK

This work proposes energy efficient and administrator based routing approach for MANETs. This approach ensures security to the MANET by using various types of nodes such as common nodes, associative nodes and administrator nodes. This protocol initially involves in the selection of the Zone and selection of the administrator or admin nodes. The rectangular area of the overall network is divided into small regions and this region like a zone. For the dynamically changing network the nodes will be randomly located in each region. The nodes located each region forms one zone. After the zone formation select the admin for all zone. Node which is having highest energy and highest degree is elected as admin node. Degree refers to the number of neighbors of the node. A parameter alpha is introduced to elect the admin node which is the function of energy and degree of the node. The node which is having the highest alpha is elected as admin node.

If source is not a admin node, it just sends the broadcast packet to its admin node. When admin receives the broadcast packets it is sends to next admin and find the destination. If admin to admin directly not communicate then used to associative node. Which node having two admin is neighbours node it is an associative node. Electing the admin we have to reduced energy and set the threshold value to each admin for a reduced the packet dropped ratio in the network.

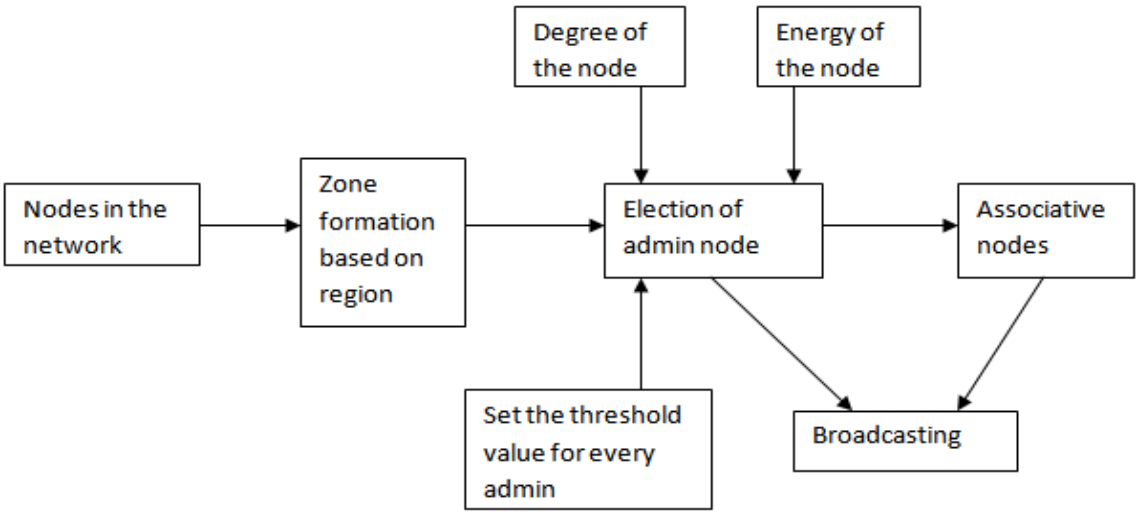

Fig. 1 block diagram of proposed system

ADVANTAGES

The proposed EEABSR protocol ensures energy efficient and secured data transmission in MANET using the admin nodes.

By using the admin node, this protocol reduces the amount of network activity for each node that is

required for data transmission that leads to less energy consumption.

By set threshold value, we have reduced packet dropped rate because they have complete energy then there are pass packet.

PERFORMANCE MATRIX AND RESULT ANALYSIS

a. Performance Metrics:

Number of Packets dropped:

It is the number of packets dropped by the admin/ associative nodes in case of energy exhaustion.

Number of Packets dropped = number of packets received –number of packets transmitted

Average consumed power:

Energy consumed of node (i) = initial energy of node (i) – current energy of node (i)

It is the amount of power consumed by node for each communication. The performance of the proposed protocol, EEABSR is compared with the AODV protocol. In EEABSR protocol, packets will be dropped only when the admin battery gets exhausted below a threshold. In the meantime a new admin will be selected & the previous admin will be recharged. It performs consistently well. In AODV, it is observed that overhearing consumed most of the energy. Idle power and overhearing effects dominate the energy consumption in the simulation of a dense network. In EEABSR, the network traffic is mostly restricted in between the admin and hence the overall overhead is reduced, thus reducing the overall energy consumption.

b. Simulation Parameter:

An extensive simulation model having scenario of n (user defined) mobile nodes and n UDP/TCP connections is used to study inter-layer interactions and their performance implications. The other parameters used in this model are as under:

Channel	Wireless Channel
Simulation run time	20 seconds
Area in which nodes move	600X600
Packet size	1024bytes
Routing Protocol	AODV
No. of Node	10,20,30,40,50
Propagation Model	TwoRayGround
Network Interface Type	Wireless Physical
MAC Type	Mac/802.11
Antenna Type	Omni Antenna

Table 1: simulation parameter

c. Result Analysis:

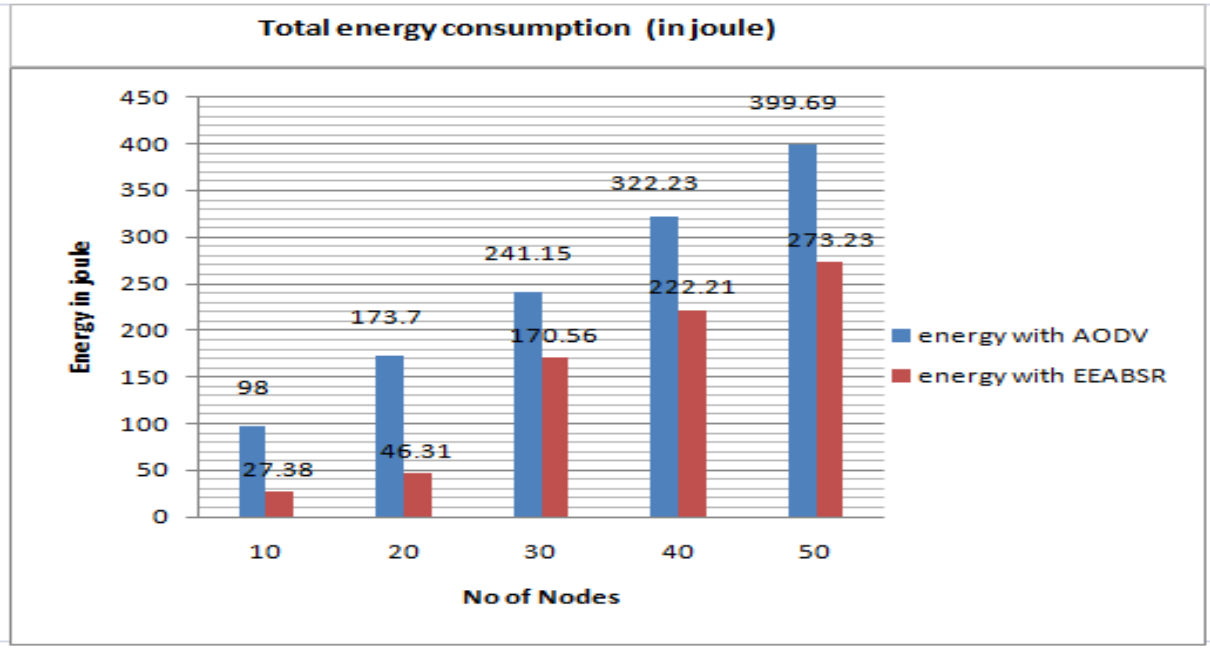

Fig. 2 No. of nodes and total energy consumption

While increasing the number of nodes in the network it will increase the energy consumption in the network. Compare to existing system energy consumption of the system.

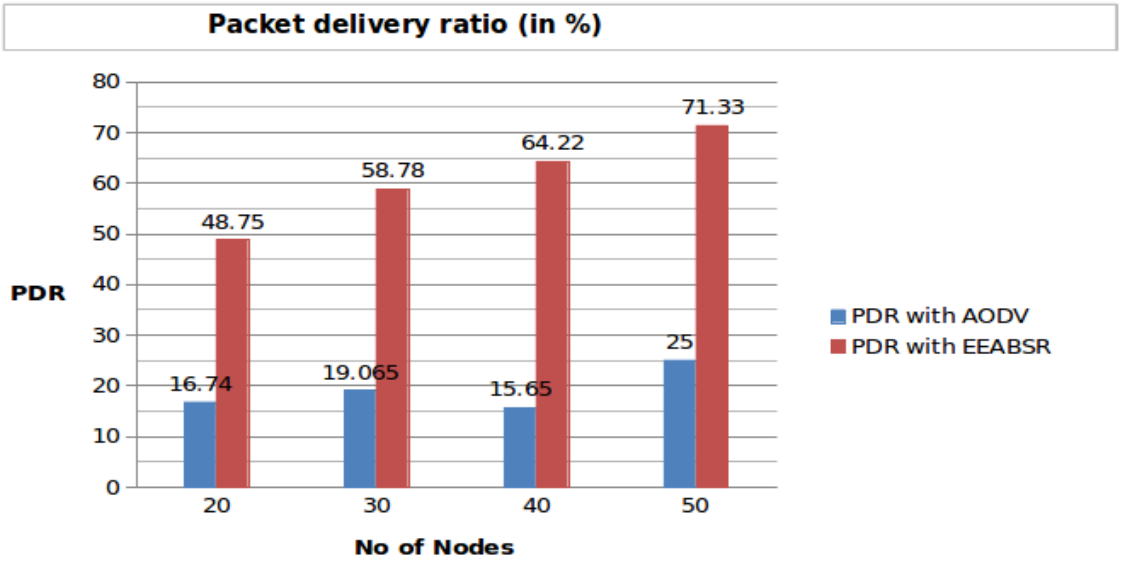

Fig. 3 No. of nodes and packet delivery ratio

Compare to existing system proposed system increased packet delivery ratio because to set threshold value to all administrator node.

CONCLUSION

This approach actually is a basic design built to increased packet delivery ratio and reduce computation and also improve the energy efficiency of the data packet transmission through the network and it performs very efficiently in that respect. This approach will be much more optimal compare to the existing protocols such as AODV.

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