Enhanced AODV Routing Protocol Methodology Using Leader Election Algorithm in MANET

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Abstract— **Link failure prediction is a new area of researcher area in mobile ad-hoc network. The failure of link decease the performance of routing protocol in mobile ad-hoc network, for the improvement of quality of service in mobile ad-hoc network we proposed message efficient leader finding algorithm with modified backup routing protocol, it plays a major role in link failure prediction algorithm the process of link failure prediction implied in form of distributed node distribution. Proposed a new link stability prediction method based on current link-related or user-related information in shadowed environments.**

Index Terms— **Leader Election, AODV, MANET.**

I. INTRODUCTION

Wireless mobile ad hoc networks are self-organizing communication networks without any infrastructure. Peer nodes work collaboratively to transport packets through the network in a store and forward fashion since the limited transmission radius of nodes necessitates multi-hop communication. MANETs are appropriate in scenarios in which an infrastructure is either not feasible due to economic constraints or not available due to physical constraints such as natural disasters or battlefield deployments.

The main advantage of location prediction is to allocate, in advance, the convenient next access point before the mobile terminal leaves its current one, in order to reduce the interruption time in communication between terminal mobiles. In without infrastructure networks or MANETs, mobile's location means its geographic coordinates. Location prediction in Ad Hoc networks is a new topic. Its main advantage is to estimate link expiration time in order to improve routing performances.

Security Attack in ADHOC Network

- Flooding Attack.
- Black Hole Attack.
- Link Spoofing Attack.
- Worm Hole Attack
- Colluding Misrelay Attack.

II. LINK FAILURE PREDICTION

It is a necessity for every network to have some form of reliable communication where the delivery of the packets to the destination is guaranteed. For ad hoc networks however the standard TCP does not give satisfactory performance. In the ad hoc network the nodes are drifting and there are no base stations. In other words the topology of the network is continually changing. The communication between the sender and receiver nodes take place through other nodes in the network and each of the intermediate nodes is acting as a router for the communication. The connection can have multiple hops. This causes performance losses due to the high error rate, network congestion and possible connection failure there are various methods for detecting and improving the link failure problem in Ad-Hoc Network. Transmission range and speed of the mobile nodes are related parameters, since scaling the speed up has the same effect as scaling the transmission range down, as long as the area dimensions are adjusted accordingly. The number of nodes was chosen to allow for both a connected network and a sufficiently large sample of link durations. A lower node density results in lower probability for the network. A higher node density would enlarge the number of measured link durations.

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III. LEADER ELECTION

The classical definition of the leader election problem is to eventually elect a unique leader from among the nodes in a network. We will want to specialize this definition in two important ways. Our first modification arises from the fact that in many situations, it may be desirable to elect a leader with some system-related characteristic rather than simply electing a “random” leader. For example, in a mobile ad hoc network it might be desirable to elect the node with maximum remaining battery life or the node with a maximum number of neighbors, as leader. Leader election based on such an ordering among nodes fits well with the class of leader election algorithms that are known as “extreme-finding” leader-election algorithms. The second modification is motivated by the need to accommodate frequent topology changes - changes that can occur during the leader election process itself. Network partitions can form due to node movement; multiple partitions can also merge into a single connected component. Given these considerations, the requirements for our leader election algorithm are: after topological changes stop sufficiently long, every connected component will eventually have a unique leader with maximum identifier from among the nodes in that component. It is important to realize that it is impossible to guarantee a unique leader at all times. When a network becomes partitioned, a component will be without a leader until the leader-election process terminates. Similarly, when components merge together there will temporarily be two leaders in the merged component.

IV. PROPOSED METHODOLOGY

A. ALGORITHM MESSAGE EFFICIENT LEADER FINDING

The algorithm proposed a system model describe as MANET comprising n independent mobile nodes in the form of undirected graph G = (V, E), where set of vertices V correspond to the set of nodes and edges E between any two vertices represent that corresponding nodes are within transmission radii of each other. In addition, we have the following primary assumptions:

- Node Identity (ID)
- Communication Link
- Neighbor Information
- Node Communication
- Constrained Node Mobility
- Message Delivery
- Election Message (EM) & Coordinator Message (CM)
- Node Weight (NW)
- Acknowledgement Message (AM)
- No two isolated MANETs

The secondary assumptions about MELFA:

- Existence of Routing Protocol
- No Fixed Initiator
- Node Buffer

B. MODIFIED BACKUP ROUTING PROTOCOL

- Initialized node state
- Initial selection value is set 0
- Calculate the power of energy of selected node as P= $\sum_{I=0}^{M-1} Pi, i+1$
- Create group activation phase
- GAi[t]←0,t=0.....GA-1
- ti←0 single node in network
- now selection of single node in group node calculate total power of Transceiving power $P = \sum_{i=0}^{M-1}(pi, i+1+Pr)$ for selection of active node for calculating a neighbor threshold as Tval= $\sqrt{Pxi - Pyi}$
- If value of Tval is less than selected node power value then selected lower power node as master
- If node=0 then
- Select ←Random(0....gGA-1)
- Send control message
- If not priority group then
- If send any group of priority at transmitter then
- node←0
- else if node ++≥1/perority node then
- node ←active mode

V. CONCLUSION

In this dissertation we modified the AODV routing protocol for secured communication and energy efficient process instead of link failure and traffic congestion. Our proposed model reduces the link failure in dynamic topology during control messaging. It reduces failure of link increases the performance of network. For the co-ordination of node used election technique. The proposed algorithm divide node in two states sleeps mode and active mode. The processes of going node sleep to active mode calculate priority of all sleep nodes and compare with arithmetic mean of threshold. The value of sleep mode greater and equal to threshold thus acts as master node in group. In this fashion the utilization of power minimized on time of group communication. Our experimental result shows maximum life time network in comparison to AODV routing protocol. In future we also improved the key authentication mechanism in group communication.

REFERENCES

[1] Awadhesh Kumar Singh and Shantanu Sharma” Message Efficient Leader Finding Algorithm for Mobile Ad Hoc Networks” in IEEE, 2011, PP-97-103.

[2] Awadhesh Kumar Singh and Shantanu Sharma” Elite Leader Finding Algorithm for manets” in 10th International Symposium on Parallel and Distributed Computing in 2011.

[3] Sunil Kumar, Siddharth Khimsara, Kashyap Kambhatla and Kalyani Girivanesh ” Robust On-Demand Multipath Routing with Dynamic Path Upgrade for Delay-Sensitive Data over Ad Hoc Networks” in Journal of Computer Networks and Communications, 2013.

[4] Vibhor Kumar Goal, Rishabh Shrivastava and Vivek Malik” An Algorithm for Improvement of Link Failure in Mobile Ad-Hoc Network” in International Journal for Science and Emerging Technologies with Latest Trends, 2013.