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Review on Load Balancing Techniques for Mobile Ad Hoc Networks

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Abstract: Mobile Ad Hoc Network is a group of nodes or a collection of nodes; they communicate with each other without any central administrator. Life of node as well as the network is directly proportional to battery capacity. A lifetime of the node usually depends upon the load over the node. If a node is overly loaded, that means it is forwarding more packets and hence it might die out soon. So load balancing is another aspect to be considered while designing the routing scheme for mobile ad hoc networks. This paper presents the survey of various studies regarding the load balancing in the mobile ad hoc networks.

Keywords: MANETs, Load Balancing, Lifetime

I INTRODUCTION

Mobile Ad Hoc Network is a collection of nodes or an assembly of nodes; they connect to each other devoid of any central manager. It is a "self-configuring" device [3]. Each node in the network performs as a router to interchange the data from the source node to destination node, nodes are inadequate in power in addition to memory and they are permitted to travel anyplace inside the network. This kind of networks has a capability to deliver the message at a reasonable rate devoid of any immovable structure. So they find use in army arena, saving actions, in addition, to connecting with numerous users.

There are several problems in MANETS which report the opinions, approximately few of them are IP address, communiqué interfering, pathfinding and communiqué, power problems, safety etc. As of now some hot subjects in MANETs can be interrelated to the routing procedures, routing movement, and location updates have a upraised lot of attention of investigators. For example, the info is communicated by a source node for an eventual destination which is distant from source node range can't be conveyed straight. It can simply possible through an in-between node or chief device. Since ad-hoc networks don't have any chief device it makes use of an in-between node to advance and transfer info. At this time, distance amid sources to the destination is an imperative factor for path selection and used by numerous routing procedures to determine paths. Additionally, Lifespan of the node along with network is directly related to battery capacity. The lifespan of the node frequently rests on the weight over the node. If a node is excessively overloaded, that means it is sending extra packets and henceforth it might perish out soon. Thus weight over a node is additional characteristic to be considered while scheming the routing system for mobile ad hoc networks.

This paper presents the analysis of several studies concerning the load balancing in the mobile ad hoc networks. Afterward review in section II the conclusion has been given in section III.

II. REVIEW OF LITERATURE

In this paper [1], the writers have tried to overcome the numerous important matters of MANETs, by creating an optimum quantity of clusters by means of PAM procedure. In this paper, active channel distribution arrangement and cooperative load balancing have been prepared. Grouping the nodes which are closer to CH depending on their distance and energy can decrease the delay owing to small distance transmitting of information. Active distribution of the channel shuns the needless use of the channel for the reason that it assigns the channel simply when the request is reached, consequently owing to this, depletion of energy is decreased and delay will be lessened. If the network has additional energy, then inevitably lifetime of the network will be augmented.

In this paper [2], the writers have projected an ant based multipath backbone routing for load balancing in MANET. Once the source wishes to convey information to the destination, it chooses the several paths with supreme path preference probability by

means of swarm based ant colony optimization (ACO) method. The path preference probability is assessed based on next hop accessibility, delay besides bandwidth. Throughout pathfinding, the nodes exposed to errors are found and the appropriate route is avoided. At that time, the network load on the paths can be well-adjusted by describing an index by individual backbone node to allocate the information traffic alike on the links from source to destination.

In this examination [4] the anticipated congestion managing subject with AOMDV procedure uses data measure estimation method. The data measure estimation is completed over acknowledgment delay distinction. Transmitter fluctuates causing rate in agreement with this delay distinction, consequently evading congestion. Active queuing decreases additional overhead in network and AOMDV stabilizes load by numerous causing approaches. The projected congestion regulator module is distributed in three fragments, the primary is multipath routing that recognized extra route, and another is queue exploitation for identifying congestion and third is rate control for governed congestion in the dynamic network. The performance assessment of customary AOMDV routing, the current examination is equated with proposed theme and identified that the proposed theme delivers advanced routing performance by diminishing delay and management overhead.

The writers in [5] implement traffic-based load balance method. In this method, one of two metrics can be used, viz., active route or traffic magnitude. The active route metric defines the quantity of dynamic routing routes that a node backs. Usually, a node that contributes in sending packets to a greater amount of active routing routes will be considerably hectic. The traffic magnitude metric signifies the entire traffic load that occurs at a node and its accompanying neighbors (measured in bytes). Both metrics can be useful in load steadiness procedure and confer to the network manager necessities. They presented an outline for applying an active route metric to choose paths amongst a transmitter and a receiver that is exposed to load stability. To resolve the issue of throughput growth with the three restrictions, the subsequent two-steps method is applied. Primary, a convex optimization system is created to prototype problem as an energy minimalizing system. Additional, communication power control is assumed to create link lifespan necessities for consistent packet distribution.

In this paper [6], the writers have presented Load Balancing Real-Time Dynamic Source Routing that is a differentiated service routing based on DSR procedure. To ensure so, they have offered an actual graph-based technique that allows applying diverse routing strategies to DSR. At that time, with the assistance of a classifier module, they separated the network flows into the finest effort and real-time flows. The finest effort flows do not have any precise necessities; although real-time packets require reaching their target beforehand a precise time limit. Their planned routing talks about finest-effort flow through the network edge by means of an anticipated node centrality metric; this routing strategy is known as load-balancing. They well-defined node centrality as the quantity of its neighbors in the network and realized it to the DSR. Alternatively, their planned routing procedure tried to direct real-time flows through a network midpoint, which enclosed a lesser load as a consequence of load-balancing strategy. Simulation outcomes confirmed that their planned technique achieves improvement in addressing both real-time and finest effort traffic.

In this paper [7] the writers have projected a Load Balancing Strategy and Dynamic Location Update system which amends prevailing GPSR to steady the load at the respective node and adjust the beacon update agreeing to traffic configurations and movement in the network separately. Once a sender node S needs to forward an information packet to destination D, the information packets will be sent through maximum effective route bearing in mind both the position and load statistics in the beacon message. Consequently, the finest route can be decided based on DLU and LB systems combined in GPSR which aids to improve the global routing performance.

In this paper [8] the suggested RAINs: Recursive Algorithm for Impostor Node Selection procedure is effective in terms of choice of the associated cluster node to handle a blockage problem. This mechanism positions the associated node for the CH to part the network load in that manner; the entire load is dispersed amongst the CH and its consistent, truthful, potential nodes. The planned procedure is recursive in nature as it evokes itself to choose finest potential node for load division by the CH. If CH is met with serious blockage problem, the planned procedure permits choosing neighboring reliable potential nodes for load distribution and in event of accomplishment, load/traffic is dispersed. Neighbor nodes those are consistent and potential and decide to part the load symbolize their self as impostor character and act same as CH.
The table below shows the comparison of few of the techniques mentioned above:

Technique	Operation
Cluster-Based Load Balancing Technique [1]	• Creates optimum quantity of clusters by means of PAM procedure. • Assigns channel to the nodes only when there is some data to send.
Ant-Based multipath backbone routing [2]	• Chooses the nodes in the path according to path preference probability. • Checks the loads over the path using the round trip times.
AOMDV routing using data measure estimation [4]	• Uses the active queueing to estimate the congestion.

	• Avoids the congestion by fluctuating the data sending rates in accordance with the delay measurement of the path.
RTLB-DSR [6]	• Separates the network flows into best-effort and real-time flows. • Directs real-time flows through a network midpoint, which enclosed a lesser load.
RAIN [8]	• Entire load is dispersed amongst the CH acting as imposter node, and its potential neighbors. • If CH is overloaded, then its neighboring node is chosen for load distribution.

CONCLUSION

The paper has embodied numerous load balancing systems for mobile ad hoc networks. The load balancing is the method normally implemented to attain energy effectiveness in mobile ad hoc networks. Load balancing is the technique to dispense the load amongst the numerous routes from source to a destination node in the network. This is typically done by multipath routing procedures such as AOMDV. When the information is sent over numerous routes the energy depletion of the nodes gets consistently dispersed as they have to forward a smaller quantity of information consequently improving the lifespan of the nodes. The writers in [11] have worked on attaining load balancing in the network by means of ant colony optimization based backbone routing system. In future, we would like to further improve the performance using the current scheme for MANETs.

REFERENCES

[1] Jayashree Lakshmi, Arshiya Sultana, "Reduced Energy Consumption and Cooperative Load Balancing Via Reliable Routing in Cluster-Based MANETs", IEEE International Conference On Recent Trends in Electronics Information Communication Technology, May 20-21, 2016.

[2] Pitchaimuthu Francis Antony Selvi, Moola Seetharamaiyer Kasiviswanathan Manikandan, "Ant-based multipath backbone routing for load balancing in MANET", IET Communications (Volume: 11, Issue: 1, 1 5 2017) 22 December 2016. IEEE.

[3] Bora Karaoglu and Wendi Heinzelman, "Cooperative Load Balancing and Dynamic Channel Allocation for Cluster-Based Mobile Ad-Hoc Networks" IEEE Transactions on Mobile Computing, Vol 14, No 5.2015

[4] Sunita Gupta, Ghanshyam Prasad Dubey, "Enhanced Load Balancing and Delay Constraint AOMDV Routing in MANET", Symposium on Colossal Data Analysis and Networking (CDAN), IEEE. March 2016.

[5] Hasan Abdulwahid, Bin Dai, Benxiong Huang, and Zijing Chen, "Optimal Energy and Load Balance Routing for MANETs", 4th International Conference on Computer Science and Network Technology (ICCSNT 2015), IEEE.

[6] Hanif Maleki, Mehdi Kargahi, Sam Jabbehdari, "RTLB-DSR: a Load-Balancing DSR Based QoS Routing Protocol in MANETs", 4th International Conference on Computer and Knowledge Engineering, 2014 IEEE.

[7] Anju Sara Varghese and S. Caroline Jebakumari, "Dynamic Beacon based and Load Balanced Geo Routing in MANETs", International Conference on Communication and Signal Processing, April 3-5, 2014, IEEE.

[8] Ajay Jangra, Niharika Bhardwaj, "RAINs: Recursive Algorithm for Impostor Node Selection to balance the load in MANETs", International Conference on Communication and Signal Processing, April 3-5, 2014, IEEE.

