Minimization of the Packet Losses in MANETS based on both Static and Dynamic Routing Protocols

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ABSTRACT
The world is shrinking and one such reason for it is the mobile technology. With the increase in mobiles even the number of nodes in the Mobile Ad-hoc Networks (MANETs) has to be increased. The MANETs are dynamic in nature and this initiates issues in determining the best possible route for the packets. Moreover the packets may face excess traffic and congestion in the network which degrade the performance of overall network and making the scenario worst these problems even lead to packet losses. Although several protocols have already been designed to discuss over these issues we still try to propose a new routing protocol which combines the properties of both static and dynamic routing protocol and thereafter tries to eliminate the problems inherent in the network through density based routing. Our research mainly focuses on the average traffic of the network and after analysing it the packet is given a path from source to destination which is less congested. At the end we find an improved protocol which not only reduces the packet losses occurring because of congestion and overloading but also which is less vulnerable to problems and is more adaptable to changing situations.

Keywords
Static routing, Dynamic routing, MANETs, Traffic analysis, Density

1. INTRODUCTION
There are basically two types of routing-static and dynamic. In static routing the path of the packet is already decided before its actual flow, whereas in dynamic routing it keeps on changing depending upon the the changing configuration of the network. This implies that the network can automatically select the optimized or the backup route. In the event of routing in MANETs we face problems like packet lose due to network congestion and path discovery delay. Various routing algorithms have already been devised to overcome these problems. The dynamic routing method has two parts: the routing protocol that is used between neighbouring routers to convey information about their network environment, and the routing algorithm that determines paths through that network. The protocol defines the method used to share the information externally, whereas the algorithm is the method used to process the information internally. Some properties which are desirable for routing algorithms are correctness, simplicity, robustness, stability, fairness and optimality. We have tried to include the better features of both static as well as dynamic routing algorithms in our protocol which focuses on the density based on traffic analysis.After this introduction we have given related work insection 2, proposed system in section 3, proposed algorithm in

2. RELATED WORK
A distance vector routing protocol advertises the number of hops to a network destination (the distance) and the direction in which a packet can reach a network destination (the vector).
The distance vector algorithm, also known as the Bellman-Ford algorithm, enables a router to pass route updates to its neighbours at regularly scheduled intervals. Each neighbour then adds its own distance value and forwards the routing information on to its immediate neighbours. The result of this process is a table containing the cumulative distance to each network destination. Distance vector routing protocols, the earliest dynamic routing protocols, are an improvement over static routing, but have some limitations. When the topology of the internet work changes, distance vector routing protocols can take several minutes to detect the change and make the appropriate corrections. One advantage of distance vector routing protocols is simplicity. Distance vector routing protocols are easy to configure and administer. They are well suited for small networks with relatively low performance requirements. Most distance vector routing protocols use a hop count as a routing metric. A routing metric is a number associated with a route that a router uses to select the best of several matching routes in the IP routing table. The hop count is the number of routers that a packet must cross to reach a destination. Routing Information Protocol (RIP) is the best known and most widely used of the distance vector routing protocols. RIP version 1 (RIP v1), which is now outmoded, was the first routing protocol accepted as a standard for TCP/IP. RIP version 2 (RIP v2) provides authentication support, multicast announcing, and better support for classless networks. The Windows Server 2003 Routing and Remote Access service supports both RIP v1 and RIP v2 (for IPv4 only). Using RIP, the maximum hop count from the first router to the destination is 15. Any destination greater than 15 hops away is considered unreachable. This limits the diameter of a RIP internet work to 15. However, if you place your routers in a hierarchical structure, 15 hops can cover a large number of destinations. The routing tables on dynamic routers are updated automatically based on the exchange of routing information with other routers.

3. PROPOSED SYSTEM
In the proposed system we use some feature of a static routing algorithm and some feature of a dynamic routing algorithm. The system is capable enough to find out the next node for delivery of the packet to destination. In this system we calculate the traffic density of the line / channel. For calculation of the traffic density we have used the simple pattern like road traffic analysis. In this calculation we have found the ratio of incoming packets and outgoing packets. This calculation ensures that the traffic is busy or free. If we will send the packet on the congestion then the possibility of packet loss is increased so firstly the router will

compute the traffic density and then decide whether to send the packet or not. Our system reduces the possibility of packet loss. We decide a certain amount of time for updating the table stored on the router. In the existing distance vector routing protocol the packet delivery becomes slow when the routers update the routing table. But in our system we fix a certain amount of time after which the table will get updated.

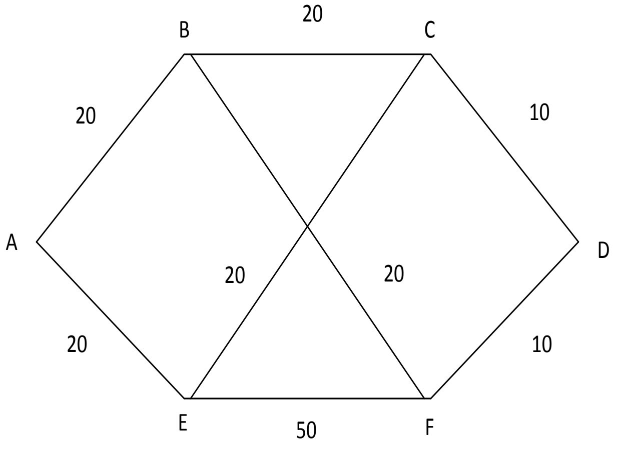

Figure 1. A Subnet with Line Capacity

In the proposed density base routing protocol we use the concept in static routing and calculate the ratio of the incoming and outgoing traffic from a particular pair of nodes. This proposed system use parameter is given Table 1.The figure 1 shows a subnet with line capacity in kbps. First and foremost we calculate the distance of the neighbor of connected router/node. Each router maintains the ratio table for each neighbor. The channel or line capacity will also be included for calculation of the traffic Cij between router i and router j. 1/µ is the mean packet size and µCij is the number of packet with Cij channel capacity. In this algorithm the node/router calculate the ratio of all incoming and outgoing packets.

Table 1: Use Parameter

Parameter	Meaning
1/µ	the mean packet size
λ	the actual flow pkt/sec
µc	the number of packets

4. PROPOSED ALGORITHM:

4.1. Each router will calculate the ratio of incoming packets /outgoing packets. Each router also maintains the routing table and updates its connected neighbors.

4.2. Router considers the channel capacity to calculate the traffic ratio.

4.3. Formula to calculate the traffic ratio is given below
Traffic ratio=Incoming packets / Outgoing Packets

4.4. If traffic ratio >= 1 then we assume that the traffic is not jam and router can send the packets through that channel /line. Because if the packets are coming properly on the node then we assume that there is no congestion in the line.

4.5. If traffic ratio < 1 then we assume that the traffic is jam. And router will not send the data through that channel.

4.6. Each router maintains the routing table and traffic ratio of all the connected nodes. And arrange in the ascending order.

4.7. The router will select the path of packet according to the table.

4.8. Routing table will update after a certain period of time.

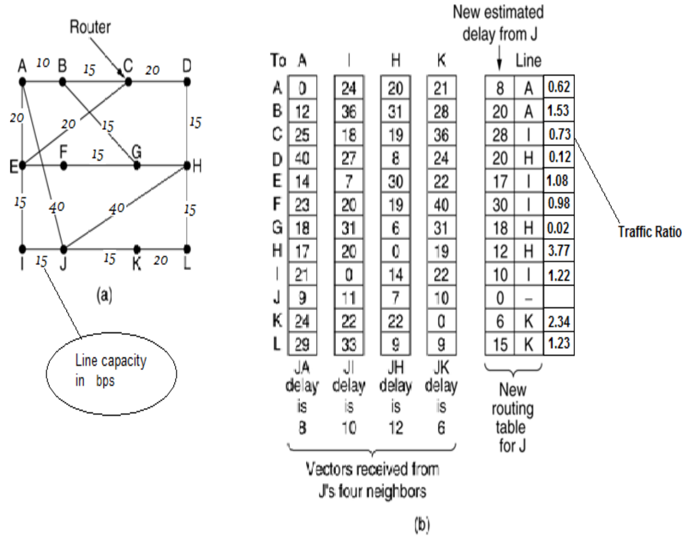

Figure 2 Routing Table [11]

5. ANALYSIS

In this example we have taken the subnet with six routers. We assume the packet size to be 800bits. In the figure 1 show the channel capacity is given over each edge. In this example we calculate for the router 'B'. When the subnet initiates then each router connected to 'B' sends their table to the 'B'. And then B calculates the traffic ratio for each connecting route. The calculation is shown in the figure 3 According to this algorithm the router will choose the best available path for sending packet towards the destination. After the certain period of time the table will get updated. For this updating, the router demands the route table to the neighbour or connected routers.

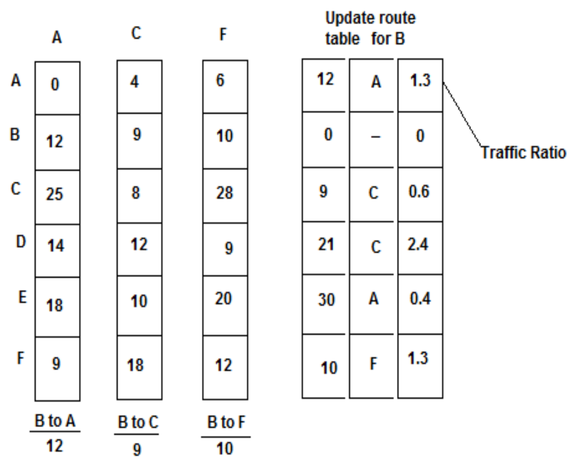

Figure 3 Update Routing Table

5. CONCLUSION

We have developed a new routing protocol for minimizing the overheads involved in route maintenance and discovery. By using this protocol we can efficiently send the packets from sorce to destination. However testing this algorithm with very large network has not been undertaken and this lies as a future work for researchers.

6. REFERENCES

[1] Bhadauria, S.S.; Shrivastava," A wireless ad-hoc network: Design and performance evaluation of dynamic routing model ", International Conference on Recent Advances in Microwave Theory and Applications, 2000, pp. 546 – 549.

[2] Mehran Abolhasan, Tadeusz wysocki, Eryk Dutkiewicz (2003). A review of routing protocols for mobile ad hoc networks.

[3] Guangyu Pei, Gerla M, Tsu-Wei Chen," Fisheye state routing: a routing scheme for ad hoc wireless networks", International Conference on Communications, 2000, pp. 70 - 74.

[4] Joa-Ng, I-Tai Lu, "A GPS-based peer-to-peer hierarchical link state routing for mobile ad hoc networks", Vehicular Technology Conference Proceedings, 2000, pp. 1752 - 1756 vol.3.

[5] Tamilarasi, M. Chandramathi, S. Palanivelu," Overhead reduction and energy management in DSR for MANETs", 3rd International Conference on Communication Systems Software and Middleware and Workshops, 2008, pp. 762 – 766.

[6] Broustis, I. Jakllari, G. Repantis, T.Molle, "A Comprehensive Comparison of Routing Protocols for Large-Scale Wireless MANETs", Sensor and Ad Hoc Communications and Networks, 2006, pp. 951 – 956.

[7] Kummakasikit, M. Thipchaksurat, S. Varakulsiripunth, "Performance Improvement of Associativity-Based Routing Protocol for Mobile Ad Hoc Networks", Fifth International Conference on Information, Communications and Signal Processing, 2005, pp. 16 – 20.

[8] Detti, A. Blefari-Melazzi, N. Loreti, "Overlay, Boruvka-Based, Ad-Hoc Multicast Protocol: Description and Performance Analysis", International Conference on Communications, 2007, pp. 5545 – 5552.

[9] SreeRangaRaju, Mankanala, Mungara, Jitendranath," ZRP versus DSR and TORA: a comprehensive survey on ZRP performance ", 10th IEEE Conference on Emerging Technologies and Factory Automation, 2005, pp. 1024.

[10] Latiff, L.A. Ali, A. Ooi Chia-Ching; Fisal," Development of an indoor GPS-free self-positioning system for mobile ad hoc network (MANET)", 13th IEEE International Conference on Networks Jointly held with the 2005 IEEE 7th Malaysia International Conference on Communication , 2005.

[11] Behrouz A. Forouzan – Data Communications and Networking, ISBN: 0-07-118160-1

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