AODV ROUTING IN WIRELESS AD-HOC NETWORKS

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Abstract - **The main challenge is to transmit the packets in multiple paths ,so it reduces the time delay and improve the delay performance and expected time delay over existing opportunistic routing policies. Before transmission occurs, transceiver send some broadcast signals to probability of neighbor's nodes . Neighbor's nodes receiving that signals after that neighbor's nodes respond signals to that transceiver. If receiving respond signal by first node transceiver then resend acknowledgement to their neighbor's nodes. After that a link quality checks the link state in the nodes by using two methods active and passive probing. Before transmitting the packets router send some broadcast signals over a different network And getting some response from various routers. Based on that concept router knows good link So we can use good link for our transmissions. A distance-vector routing protocol send and receive updates, calculates best path, detect and react topology changes. The DVRP achieve by router send some request as broadcast to their neighbour's nodes and get back some response from their neighbour's using that router calculate the distance between the sender and receiver node. Traffic is a main problem during data transmission in all network, so we have to solve this problem by choosing traffic less path .In this module, we choose only traffic free path only. Before transmission occurs we get three paths based on the priority. Traffic is a main problem in networks, so we choose the less traffic path in nodes.**

Index Terms— Congestion **measure, implementation, Lyapunov analysis, opportunistic routing, queuing stability, wireless ad-hoc networks.**

I. INTRODUCTION

OPPORTUNISTIC routing for multi-hop wireless ad hoc networks has long been proposed to overcome the decencies of conventional routing. Opportunistic routing mitigates the impact of poor wireless links by exploiting the broadcast nature of wireless transmissions and the path diversity. More precisely, the opportunistic routing decisions are made in an online manner by choosing the next relay based on the actual transmission outcomes as well as a rank ordering.

II. PROBLEM DESCRIPTION

The opportunistic routing schemes can potentially cause severe congestion and unbounded delay. In contrast, it is known that an opportunistic variant of backpressure, diversity backpressure routing (DIVBAR) ensures bounded expected total backlog for all stabilize arrival rates. To ensure throughput optimality backpressure-based algorithms in to do something very difficult rather than using any metric of closeness to the destination , they choose the receiver with the largest positive differentials backlog E-DIVBAR is proposed. when choosing the next relay among the set of potential forwarders E-DIVBAR considers the sum of the differential backlog and the expected hop-count to the destination.

A. *Disadvantages of Existing System*

The existing property of ignoring the cost to the destination, however, becomes the bane of this approach, leading to poor delay performance in low to moderate traffic. Other existing provably throughput optimal routing policies distribute the traffic locally DIVBAR and hence, result in large delay. E-DIVBAR does not necessarily result in a better delay performance than DIVBAR.

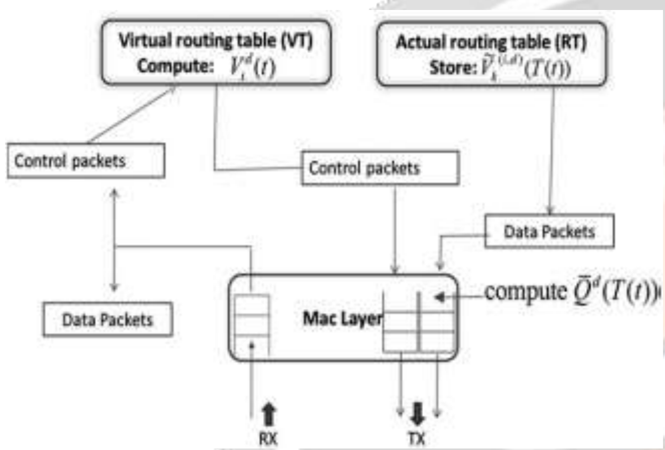
III. PROPOSED SYSTEM

The main contribution of the paper is to provide a distributed opportunistic routing policy with congestion diversity (D-ORCD) under which, instead of a simple addition used in E-DIVBAR, the congestion information is integrated with the distributed is integrated with the distributed shortest path computations. A comprehensive investigation of the performance of d-ORCD is provided in two directions: we provide detailed simulation study of delay performance of D-ORCD. We also tackle some of the system-level issues observed in realistic settings via detailed simulations. In addition to the simulation studies, prove that D-ORCD is throughput optimal when there is a single destination and the network operates in stationary regime. While characterizing delay performance is often not analytically tractable, many variants of backpressure algorithm are known to achieve throughput optimality.

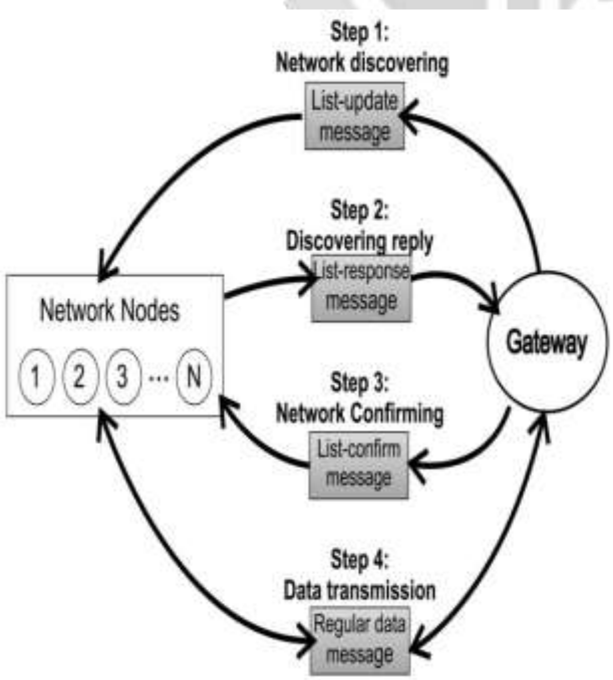
A. *Advantages of Proposed System*

The D-ORCD exhibits better delay performance than state-of-the-art routing policies with similar complexity, namely, EXOR, DIVBAR, and E-DIVBAR. We also show that the relative performance improvement over existing solutions, in general, depends on the network topology but is often significant in practice, where perfectly symmetric network deployment and traffic conditions are uncommon. The throughput optimality of D-ORCD by looking at the convergence of D-ORCD to a centralized version of algorithm.

B. D-ORCD design



B. Sending of packets



IV. LITERATURE SURVEY

[1] S. Biswas and R. Morris, "ExOR: Opportunistic multi-hop routing for wireless networks," *ACM SIGCOMM . Common. Rev.,* vol. 35, pp. 33–44, Oct. 2005.

The problem of routing packets across a multi-hop network consisting of multiple sources of traffic and wireless links while ensuring bounded expected delay. Each packet transmission can be overheard by a random subset of receiver nodes among which the next relay is selected opportunistically. The main challenge in the design of minimum-delay routing policies is balancing the trade-off between routing the packets along the shortest paths to the destination and distributing the traffic according to the maximum backpressure. Combining important aspects of shortest path and backpressure routing, this paper provides a systematic development of a distributed opportunistic routing policy with congestion diversity (D-ORCD). D-ORCD uses a measure of draining time to opportunistically identify and route packets along the paths with an expected low overall congestion. D-ORCD with single destination is proved to ensure a bounded expected delay for all networks and under any admissible traffic, so long as the rate of computations is sufficiently fast relative to traffic statistics.

[2] S. Jain and S. R. Das, "Exploiting path diversity in the link layer in wireless ad hoc networks," in Proc. Wow Mom, 2005, pp. 22–30.

An any cast mechanism at the link layer for wireless ad hoc networks. The goal is to exploit path diversity in the link layer by choosing the best next hop to forward packets when multiple next hop choices are available. Such choices can come from a multipath routing protocol, for example. This technique can reduce transmission retries and packet drop probabilities in the face of channel fading. We develop an any cast extension of the IEEE 802.11 MAC layer based on this idea. We implement the protocol in an experimental proof-of-concept test bed using the Berkeley motes platform and S-MAC protocol stack. We also implement it in the popular ns-2 simulator and experiment with the AOMDV multipath routing protocol and Ricean fading channels. We show that any cast performs significantly better than 802.11 in terms of packet delivery, particularly when the path length is large or fading is substantial.

[3] P. Larsson "Selection diversity forwarding in a multi-hop packet radio network with fading channel and capture," ACM SIGMOBILE Mobile Comput. Commune. Rev., vol. 5, no. 4, pp. 47–54, Oct. 2001.

The interest of wireless mobile ad hoc networking motivates detailed examination of routing schemes specifically targeted for the demanding constraints that an unreliable, time varying and broadcast like wireless medium imposes. Incorporation and exploitation of radio characteristics are fundamental keys to successful and near optimal operation of routing schemes in a wireless environment. In this paper, forwarding methods for wireless mobile multi-hop networking in Rayleigh fading and non-fading channels are examined. An adaptive forwarding scheme denoted Selection Diversity Forwarding (SDF) is introduced and compared with two classical forwarding methods. It is shown that SDF presents significant performance improvements. In particular and in contrast to the reference methods NFP and MFR, the performance of SDF is enhanced under fading channel conditions. It is found that local path adaptation has potential to perform better than routing approaches along a single path.

[4] M. Zori and R. R. Rao, "Geographic random forwarding GeRaF) for Ad-Hoc and sensor networks: Multi-hop performance," IEEE Trans. Mobile Comput. vol. 2,no. 4, 2003.

A novel forwarding technique based on geographical location of the nodes involved and random selection of the relaying node via contention among receivers. It focuses on the multi-hop performance of such a solution, in terms of average number of hops to reach a destination as a function of the distance and of the average number of available neighbors. An idealized scheme (in which the best relay node is always chosen) is discussed, and its performance is evaluated by means of both simulation and analytical techniques. A practical scheme to select one of the best relays is shown to achieve performance very close to that of the ideal case. Some discussion about design issues for practical implementation is also given.

V. PROTOCOL IMPLEMENTATION DETAILS

A. *Three-Way Handshake*

The implementation of D-ORCD, analogous to any opportunistic routing scheme, involves the selection of a relay node among the candidate set of nodes that have received and acknowledged a packet successfully. One of the major challenges in the implementation of an opportunistic routing algorithm, in general, and D-ORCD in particular, is the design of an 802.11 compatible acknowledgement mechanism at the MAC layer. Below we propose a practical and simple way to implement acknowledgement architecture.

The transmission at any node is done according to 802.11 CSMA/CA mechanism. Specially, before any transmission, Transmitter performs channel sensing and starts transmission after the back off counter is decremented to zero. For each neighbors node, the transmitter node then reserves a virtual time slot of duration, where is the duration of the acknowledgement packet and is the duration of Short Inter Frame Space (SIFS) [18]. Transmitter then piggy-backs a priority ordering of nodes with each data packet transmitted. The priority ordering determines the virtual time slot in which the candidate nodes transmit their acknowledgement. Nodes in the set that have successfully received the packet then transmit acknowledgement packets sequentially in the order determined by the transmitter node.

B. *Link Quality Estimation*

D-ORCD computations given by (1) utilize link success probabilities for each pair of nodes. We now describe a method to determine the probability of successfully receiving a data packet for each pair of nodes. Our method consists of two components: active probing and passive probing. In the active probing, dedicated probe packets are broadcasted periodically to estimate link success probabilities. In passive probing, the overhearing capabilities of the wireless medium are utilized.

The nodes are configured to promiscuous mode, hence enabling them to hear the packets from neighbors. In passive probing, the MAC layer keeps track of the number of packets received from the neighbors including the retransmissions. Finally, a weighted average is used to combine the active and passive estimates to determine the link success probabilities. Passive probing does not introduce any additional overhead cost but can be slow, while active probing rate is set independently of the data rate but introduces costly overhead.

C *Traffic analysis in path*

Before transmission occurs we get three path based on priority. Every path has several nodes and we get receiving state and transmission rate for those paths. Using transmitting and receiving rate we calculate traffic or congestion less path. Traffic is defined as either the amount of data or the number of messages over a circuit during a given period of time. Traffic analysis enables you to determine the amount of bandwidth you need in your circuits for data.

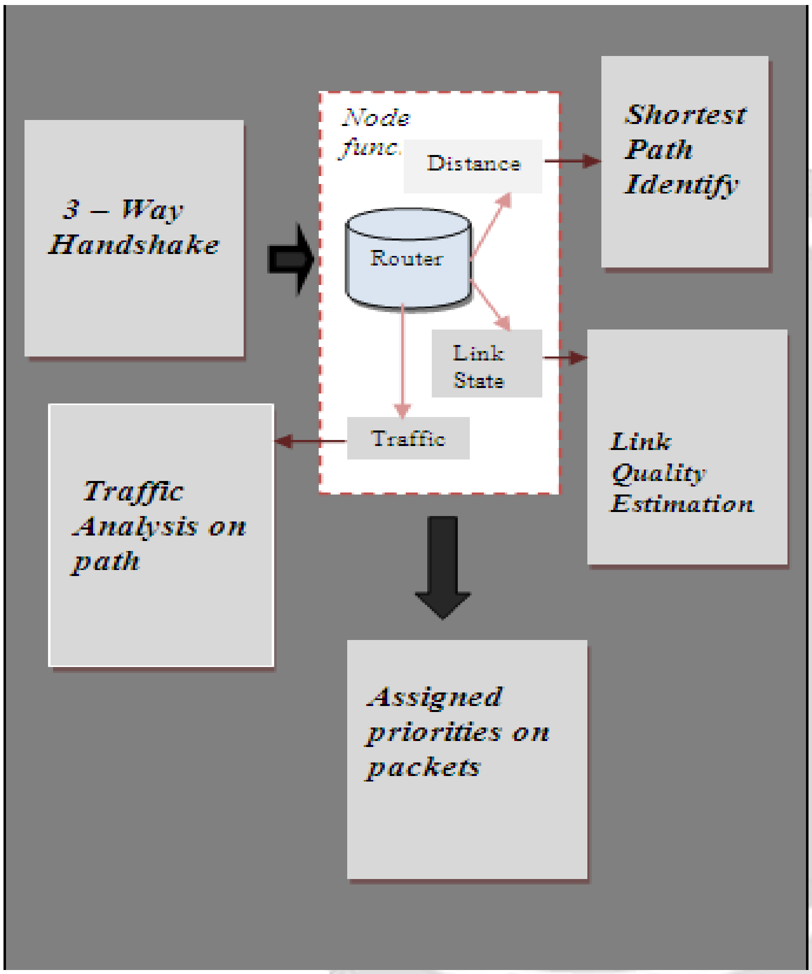
D. Shortest path identification

A distance-vector routing protocol requires that a router inform its neighbors of topology. Distance vector routing protocols have less complexity than other protocols. Examples of distance-vector routing protocols include R1Pv1; R1Pv2. **Dijkstra's algorithm** is an algorithm for finding the shortest paths between nodes in a graph. Dijkstra's original variant found the shortest path between two nodes, but a more common variant fixes a single node as the "source" node and finds shortest paths from the source to all other nodes in the graph, producing a shortest-path tree. Dijkstra's algorithm can be used to find the shortest route between one city and all other cities. As a result, the shortest path algorithm is widely used in network routing protocols most notably IS-IS and Open Shortest Path First (OSPF). Then every path from that node to any other node in the new graph will be the shortest path between those nodes in the original graph, and all paths of that length from the original graph will be present in the new graph. Then to actually find all these shortest paths between two given nodes we would use a path finding algorithm on the new graph, such as depth-first search.

E. *Assigning priorities in packets*

The problem with network priority schemes is that lower priority traffic may be held up indefinitely when traffic is heavy unless there is sufficient bandwidth to handle the highest load levels. Even high-priority traffic may be held up under extreme traffic loads. One solution is to *overprovision* network bandwidth, which is a reasonable option given the relatively low cost of networking gear today. As traffic loads increase, router buffers begin to fill, which adds to delay. If the buffers overflow, packets are dropped. When buffers start to fill, prioritization schemes can help by forwarding the packets to the priority and delay-sensitive traffic before other traffic. This requires that traffic be classed (CoS) and moved into queues with the appropriate service level. One can imagine an input port that classifies traffic or reads existing tags in packets to determine class, and then moves packets into a stack of queues with the top of the stack having the highest priority. As traffic loads increase, packets at the top of the stack are serviced first. Selecting the path based on high packets and low packets. The high packets are send in low traffic and min distance. Then acknowledgement is to receive in another path.

VI. SYSTEM ARCHITECTURE



VII. CONCLUSION

It provided a distributed opportunistic routing policy with congestion diversity (D-ORCD) by combining the important aspects of shortest path routing with those of backpressure routing. Under this policy packets are routed according to a rank ordering of the nodes based on a congestion measure. Furthermore, we proposed a practical distributed and asynchronous 802.11 compatible implementation of D-ORCD, whose performance was investigated via a detailed set of Qual Net simulations for practical and realistic networks. Simulations showed that D-ORCD consistently outperforms existing routing algorithms. We also provided theoretical throughput optimality proof of D-ORCD.

REFERENCES

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