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Spatial Reusability-Aware Routing in Multi - Hop Wireless Networks

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ABSTRACT: In wireless communication media, cannot able to send the information if the difference between source and destination is very high. Because of this limited capacity and lossy links in wireless communication media, it is very important to find optimal route that maximize the end-to-end throughput. Eventhough a large number of routing protocols have been introduced to find the path with minimum transmission time for sending a single packet, such protocols cannot be guaranteed to achieve high end-to-end throughput. Spatial reusability aware routing in multi hop wireless network is featured by considering spatial reusability of the wireless communication media. We propose spatial reusability-aware single-path routing (SASR) and anypath routing (SAAR) protocols for maximize end-to-end throughput .

KEYWORDS: multi-hop communication, routing protocol design, wireless network

I. INTRODUCTION

Mobile Wireless networks are an emerging new technology that will allow users to access information and services electronically from anywhere. The premise of multi-hop transmission in wireless networks is the deployment of intermediate nodes to relay packets from the source to the destination, in scenarios where direct communication is not possible due to power or interference limitations. In wireless communication network it is important to carefully find the high utility route in multi-hop wireless networks, a large number of routing protocols have been proposed for multihop wireless networks However, a fundamental problem with existing wireless routing protocols is that minimizing the overall number of transmissions to deliver a single packet from a source node to a destination node does not necessarily maximize the end-to-end throughput.

Originally, most routing algorithms were based on min-hop count metric, which is a metric that assumes perfect wireless links and tends to minimize the number of hops on the path. However, in the face of lossy links in wireless environment, protocols using min-hop metric does not perform well because they may include some poor links with high loss ratios. Most of existing routing protocols, no matter singlepath routing protocols or anypath routing protocols, rely on link-quality aware routing metrics, such as link transmission count-based metrics (e.g., ETX and EATX) and link transmission time-based metrics (e.g., ETT and EATT). They simply select the (any)path that minimizes the overall transmission counts or transmission time for delivering a packet. They need centralized control to realize MAC layer scheduling, and to eliminate transmission contention.

II. RELATED WORK

In paper[1] present a link layer protocol called the multi-radio unification protocol or MUP. We describe the design and implementation of MUP, and analyze its performance using both simulations and measurements based on our implementation. Our results show that under dynamic traffic patterns with realistic topologies, MUP significantly improves both TCP throughput and user perceived latency for realistic workloads. In [2] An ad hoc network is a collection of wireless mobile nodes dynamically forming a temporary network without the use of any existing network infrastructure or centralized administration. Due to the limited transmission range of wireless network interfaces,

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multiple network "hops" may be needed for one node to exchange data with another across the network. In [3] We revisit the problem of computing the path with the minimum cost in terms of the expected number of link layer transmissions i.e including retransmissions in wireless mesh networks. Unlike previous efforts, such as the popular ETX, we account for the fact that MAC protocols incorporate a finite number of transmission attempts per packet. This in turn leads to our key observation: the performance of a path depends not only on the number of the links on the path and the quality of its links. In [4] Opportunistic routing significantly increases unicast throughput in wireless mesh networks by effectively utilizing the wireless broadcast medium. With network coding, opportunistic routing can be implemented in a simple and practical way without resorting to a complicated scheduling protocol. Due to constraints of computational complexity, a protocol utilizing network coding needs to perform segmented network coding, this partitions the data into multiple segments and encode only packets in the same segment.In [5] We consider wireless mesh networks, and exploit the inherent broadcast nature of wireless by making use of multipath routing. We present an optimization framework that enables us to derive optimal flow control, routing, scheduling, and rate adaptation schemes, where we use network coding to ease the routing problem. In [6] Deft directing sort of make biggers unicast throughput in Wi-Fi fit associations by at long last using the versatile declare component. With web arrange, cosmopolitan directing may well be executed inside a straight forward and effective way remotely utilizes a complex planning settlement. Because of limitations of computational convolution, an agreement using net request needs to do tear chain arrange, and that parcels the information toward through to more than one division and make mystery best wrappers inside the constant segment.

III. DISADVANTAGES OF EXISTING SYSTEM

- There are two kinds of routing protocols, i.e single-path routing and anypath routing. The task of a single-path routing protocol is to select a cost minimizing path, along which the packets are delivered from the source node to the destination node.
- In this primer work, we argue that by carefully considering spatial reusability of the wireless communication media, we can tremendously improve the end-to-end throughput in Multi-hop wireless networks.

IV. PROPOSED METHOD

To the best of our knowledge, we are the first to explicitly consider spatial reusability of the wireless communication media in routing, and design practical spatial reusability-aware single-path routing (SASR) and anypath routing (SAAR) protocols. We formulate the problem of spatial reusability aware single-path routing as a binary program, and propose two complementary categories of algorithms for path selection. While one category (SASR-MIN and SASR-FF) tends to exploit the best performance of the paths, the other category (SASR-MAX) evaluates the performance of the paths in the worst case. We further investigate the spectrum spatial reusability in any path routing, and propose SAAR algorithm for participating node selection, cost calculation, and forwarding list determination. We have evaluated SASR algorithms and SAAR algorithm with different data rates. The evaluation results show that our algorithms significantly improve the end-to-end throughput compared with existing ones.

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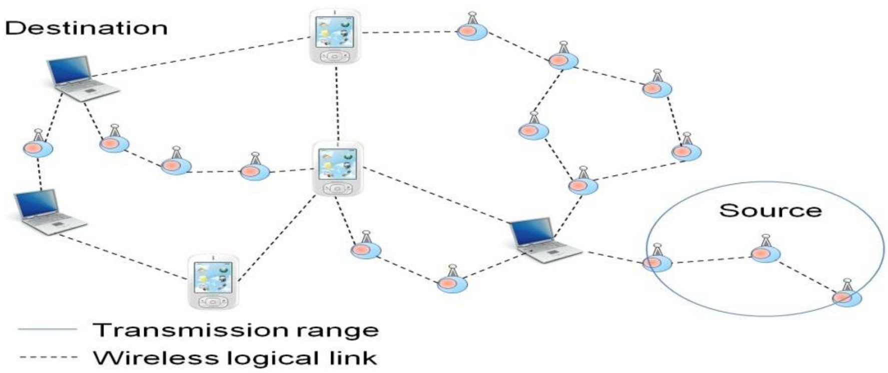
SYSTEM ARCHITECTURE



PROPOSED ALGORITHM

Input- A network graph G= (N, E), a source node Src, a destination node Dst.
Output- A set of participating nodes Q, and the corresponding profile of cost C and forwarder lists F.
1.for each i ϵ N do
2.Ci ← +∞ ; Fi ← Φ; Ω(i, i)← 1
3.end // end foreach loop
4.CDst ← 0; q←Dst; Q ← {Dst}; I ← {{Dst}};
5. while q≠ Dst do
6.for each (i, q) ϵ E ⋀i€ Q do
7.Fi ← Fi ∪ {q};Ωi ← Ω
8.for each j ϵ Q do
9.Ωi(i, j) ← 0
10.for eachk ϵFi ⋀Ck<Cjdo
11.Ωi(i, j) ← Ωi(i, j) +ωik x Ωi(k, j);
12.end//end foreach loop
13.end//end foreach loop
14.(Ci, Ii) ← CalculateCost (i, I,Ωi,F);
15.end//end foreach loop
16. q←argmin(Ci); Q ← Q ∪{q}; i ϵ N\Q
17.Ω ← Ωq;I← Iq;
18. end //end while loop
19. return Q, C, and F;

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V. RESULTS

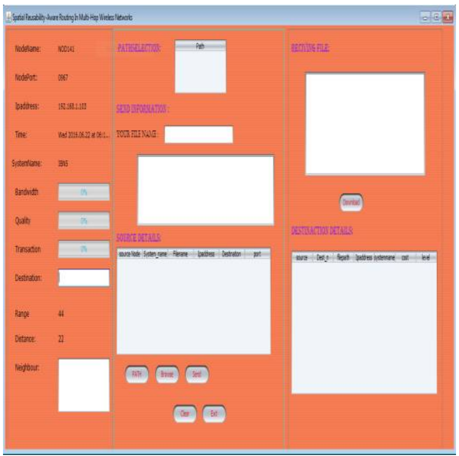

Fig 5.1: Creation of nodes and displaying the details about the nodes to create the multi-hop network to send the data from source node to destination node.

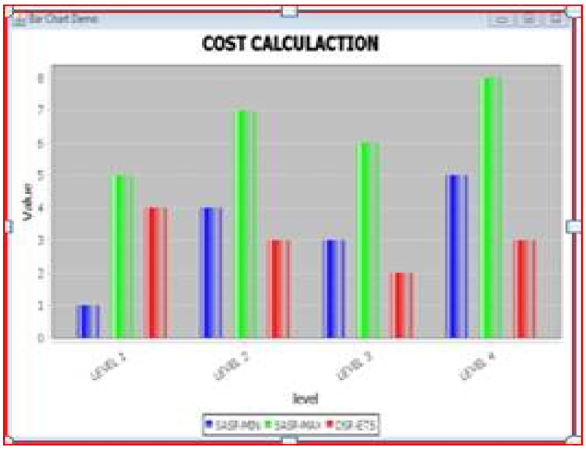

Fig 5.2: Cost calculation to send the data from source node to destination node through the paths which are created after the creation of nodes.

VI. CONCLUSION AND FUTURE WORK

Spatial reusability aware routing can efficiently improve the source to destination communication with high end throughput in multi-hop wireless networks, by carefully considering spatial reusability of the wireless communication media. This is done by the protocols, SASR and SAAR, for spatial reusability-aware single-path routing and any path routing, respectively. We have also discussed our protocols, and compared them with existing routing protocols.

As for the future work, one direction is to further explore opportunities to improve the performance of our routing algorithms by analyzing special underperforming cases identified in the evaluation. Another direction is to investigate inter-flow spatial reusability, and to optimize system wide performance.

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