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Hop-by-Hop Routing in Wireless Mesh Networks with Bandwidth Guarantees

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ABSTRACT

Wireless Mesh Network (WMN) have been envisioned as an important solution to the next generation wireless networking. In this paper, we study the problem of identifying the maximum available bandwidth path, overcome the fundamental issue in and ensure the Efficient Way to packet data Transmission in WMNs. Due to interference among links, bandwidth, a well-known bottleneck metric in wired networks, is neither concave nor additive in wireless networks. We propose a new path weight which captures the available path bandwidth information. We formally prove that our hop-by-hop routing protocol based on the new path weight satisfies the consistency and loop-freeness requirements. The consistency property guarantees that nodes perform a proper packet forwarding decision, so that a data packet does traverse over the intended path. Our extensive simulation experiments Results also show that our proposed path weight outperforms existing path metrics in identifying high-throughput paths

Keywords :

I . INTRODUCTION

Wireless mesh network is a topology where all nodes/routers are connected to each other i.e. full mesh or, almost connected to each other i.e. partial mesh. The main features of mesh topology are high scalability, adaptability and reliability. Wireless Mesh Networks have nodes comprised of mesh routers and mesh clients. In a multi-hop wireless mesh network, it is always preferable to choose a path with higher throughput between a pair of source /destination nodes to fully exploit the network capacity. Since Wireless Mesh Networks have emerged as a practical solution for the wireless extension of the broadband internet, finding high throughput path is important. This paper surveys the different routing approaches for wireless mesh network that using bandwidth as routing metric.

II.RELATED WORKS

There have been extensive researches for routing in wireless mesh networks. The routing will normally be based on either finding the shortest path or finding a path with a highest data rates or more formally as path with highest bandwidth. In this paper the routing schemes we propose are based on the bandwidth of the links. computation of bandwidth.

We will be using the Clique Based Bandwidth computation for calculation of the maximum avail- able bandwidth in a path.

A source identifies a widest path to a destination; intermediate nodes on the widest path may not make a consistent packet forwarding decisions by using the traditional destination-based hop-by-hop forwarding Packet mechanism.

A new path weight that captures the concept of available bandwidth. We give the mechanism to compare two paths based on the new path weight. the widest path, many researchers develop new path weights, and the path with the minimum/maximum weight is assumed to be the maximum available bandwidth path. The expected transmission count (ETX) metric. In particular, it tells us whether a path is worthwhile to be advertised, meaning whether a path is a potential subpath of a widest path

III. ROUTING PROTOCOL

we first present our path selection mechanism. It is based on the distance-vector mechanism. We give the necessary and sufficient condition to determine whether a path is not worthwhile to be advertised. We then describe our new isotonic path weight. We show that the routing protocol based on this new path weight satisfies the optimality requirement .

3.1. Bandwidth Estimation

To Bandwidth sometimes defines the net bit rate, channel capacity, or the maximum throughput of a logical or physical communication path in a digital communication system. The computation of bandwidth in wireless medium is difficult because of interference from other nodes during transmission.

3.2 Path Selection:

We would like to develop a distance-vector based mechanism. In the traditional distance-vector mechanism, a node only has to advertise the information of its own best path to its neighbors. Each neighbor can then identify its own best path. In this module, we mentioned that if a node only advertises the widest path from its own perspective, its neighbors may not be able to find the widest path. To illustrate, consider the network where the number of each link is the available bandwidth on the link

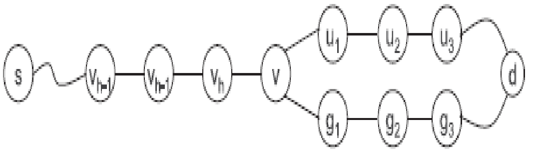

Fig .2 . Illustration for path comparison.

3.3 Isotonic Path Weight
In this module, we introduce our new isotonic path weight, also describes how we use the path weight to construct routing tables. The isotonicity property of a path weight is the necessary and sufficient condition for developing a routing protocol satisfying the optimality and consistency requirements.

3.4 Table Construction and Optimality
The isotonicity property of the proposed path weight allows us to develop a routing protocol that can identify the maximum bandwidth path from each node to each destination. In particular, it tells us whether a path is worthwhile to be advertised, meaning whether a path is a potential subpath of a widest path. In our routing protocol, if a node finds a new nondominated path, it will advertise this path information to its neighbors. We call the packet carrying the path information the route packet

3.5 Packet Forwarding and Consistency
In a traditional hop-by-hop routing protocol, a packet carries the destination of the packet, and when a node receives a packet, it looks up the next hop by the destination only. In our mechanism, apart from the destination, a packet also carries a Routing Field which specifies the next four hops the packet should traverse. When a node receives this packet, it identifies the path based on the information in the Routing Field. It updates the Routing Field and sends it to the next hop.

3.6 Route Update
After the network accepts a new flow or releases an existing connection, the local available bandwidth of each node will change, and thus the widest path from a source to a destination may be different. When the change of the local available bandwidth of a node is larger than a threshold (say 10 percent), the node will advertise the new information to its neighbors. After receiving the new bandwidth information, the available bandwidth of a path to a destination may be changed. Although the node is static, the network state information changes very often. Therefore, our routing protocol applies the route update mechanism.

IV. CONCLUSION
The proposed routing algorithm is implemented for wireless mesh network. The implementation is carried using network simulator tool. The proposed model can satisfy the consistency and optimality requirements thus providing a a Quality of Service for data transmission in a mesh network.. The main contribution of our work is a new left-isotonic path weight which captures the available path bandwidth information. and we formally proved that our protocol satisfies the optimality and consistency requirements. Based on the available path bandwidth information, a source can immediately determine some infeasible connection requests with the high bandwidth requirement..

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