DEVELOPMENT OF MAXIMUM BANDWIDTH CAPTURING PATH WEIGHT PROTOCOL TO RECOVER BANDWIDTH CONSTRAINED ROUTING PROBLEM

Manju Gupta
P.G Student in CSE Department,
Adesh Institute of Engg. & Technology Faridkot,
Punjab, India

Pankaj Sharma
Assistant Professor in ECE Department
Adesh Institute of Engg. & Technology Faridkot,
Punjab, India

Abstract— A fundamental issue in supporting quality-of-service is the problem of identifying the maximum available bandwidth path WMNs. Since Wireless Mesh Network (WMN) has become an important edge network to provide Internet access to remote areas and wireless connections in a metropolitan scale. Due to interference among links, bandwidth, a well-known bottleneck metric in wired networks, is neither concave nor additive in wireless networks. A new path weight which captures the available path bandwidth information is proposed. Hop-by-hop routing protocol based on the new path weight satisfies the consistency and loop-freeness requirements. The consistency property guarantees that each node makes a proper packet forwarding decision, so that a data packet does traverse over the intended path. The simulation study shows that the proposed path weight outperforms existing path metrics in identifying high-throughput paths.

Keywords—wireless mesh network, packet forwarding, quality-of-service, throughput

I. INTRODUCTION

A wireless mesh network (WMN) consists of a large number of wireless nodes. The nodes form a wireless overlay to cover the service area while a few nodes are wired to the Internet. As part of the Internet, WMN has to support diversified multimedia applications for its users. It is essential to provide efficient Quality-of-Service (QoS) support in this kind of networks. Seeking the path with the maximum available bandwidth is one of the fundamental issues for supporting QoS in the wireless mesh networks. The available path bandwidth is defined as the maximum additional rate a flow can push before saturating its path. Therefore, if the traffic rate of a new flow on a path is no greater than the available bandwidth of this path, accepting the new traffic will not violate the bandwidth guaranteed of the existing flows.

A wireless mesh network (WMN) is a communications network made up of radio nodes organized in a mesh topology. Wireless mesh networks often consist of mesh clients, mesh routers and gateways. The mesh clients are often laptops, cell phones and other wireless devices while the mesh routers forward traffic to and from the gateways which may, but need not, connect to the Internet. The coverage area of the radio nodes working as a single network is sometimes called a mesh cloud. Access to this mesh cloud is dependent on the radio nodes working in harmony with each other to create a radio network. A mesh network is reliable and offers redundancy.

When one node can no longer operate, the rest of the nodes can still communicate with each other, directly or through one or more intermediate nodes. The animation below illustrates how wireless mesh networks can self form and self heal. A wireless mesh network can be seen as a special type of wireless ad-hoc network. A wireless mesh network often has a more planned configuration, and may be deployed to provide dynamic and cost effective connectivity over a certain geographic area. An ad-hoc network, on the other hand, is formed ad hoc when wireless devices come within communication range of each other.

The mesh routers may be mobile, and be moved according to specific demands arising in the network. Often the mesh routers are not limited in terms of resources compared to other nodes in the network and thus can be exploited to perform more resource intensive functions. In this way, the wireless mesh network differs from an ad-hoc network, since these nodes are often constrained by resources.

II. SUBJECT STRATEGY

This section first presents the architecture of a proposed system. Next, the coordinator selection methods are presented.

Architecture
MODULES

- Node Initialization
- Available bandwidth Selection
- Path construction
- Packet forwarding
- Route update

Node Initialization

A wireless mesh network (WMN) is a communications network made up of multiple nodes organized in a mesh topology. Mesh networking (topology) is a type of networking where each node must not only capture and disseminate its own data, but also serve as a relay for other nodes, that is, it must collaborate to propagate the data in the network. Mesh networks can be seen as one type of ad hoc network. Mobile ad hoc networks (MANET) and mesh networks are therefore closely related, but MANET also have to deal with the problems introduced by the mobility of the nodes. In this simulation, we have taken 20 numbers of nodes design as shown in the following figure.

Available bandwidth Selection

Seeking the path with the maximum available bandwidth is one of the fundamental issues for supporting QoS in the wireless mesh networks. The available path bandwidth is defined as the maximum additional rate a flow can push before saturating its path. Maximum available bandwidth path is also called widest path. There are 20 number of nodes are initialized in the simulation, each and every nod is assigned with an available bandwidth. The relay nodes for one hop or hop by hop transmission are taken is such as way that, the nodes, which is having highly available bandwidth are taken into account.

Path construction
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. The best path is one, which is constructed by the best available bandwidth path. Also widest path refers to the path that has the maximum estimated available bandwidth. 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 non-dominated path, it will advertise this path information to its neighbors.

Packet forwarding

Suppose that source node ‘s’ wants to transmit traffic to destination ‘d’ along the widest path <s; v1; . . . ; vn; d>. Then, each node vi on this path should make the consistent decision so that the traffic does travel along p. If vi selects the next hop according to its widest path to d, the traffic may not be sent along the best path from s to d. The consistent hop-by-hop packet forwarding 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.

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, then the node will advertise the new information to its neighbours. 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, routing protocol applies the route update mechanism in AODV.

ALGORITHM

Step 1: Deploy ‘N’ number of nodes in the wireless mesh network
Step 2: Choose source node ‘S’ and destination node ‘D’
Step 3: Create TCP/UDP connection among the nodes
Step 4: Declare bandwidth value ‘B’ for all nodes in the network
Step 5: Create Routing Table, one-hop neighbor for all nodes deployed in WMN
Step 6: Create Routing path

For Node (i=0, i<n)

If {

Bandwidth value = 0
assign the node to routing table Rt

}

Return Rt
Step 7: Start the packet delivery by using the router derived above

Step 8: Destination receives packet from source using hop by hop routing mode

SCREEN SHOTS

III. LITERATURE REVIEW

- The expected transmission count (ETX) metric was proposed. ETX of a link is the predicted number of data transmissions required to send a packet over that link, which is estimated by proactively sending a dedicated link probe packet periodically. The ETX of a path is the sum of the ETX metrics of all links on this path.
Expected Transmission Time (ETT) is an improved version of ETX that also considers the effect of packet size and raw data rate on the links because of the use of multiple channels.

Interference aware (iAWARE), Interference Aware Resource Usage (IRU), and Contention-Aware Transmission Time (CATT), are all extended from ETT. iAWARE is the ETT metric adjusted based on the number of the interference links and the existing traffic load on the interference links. IRU is the ETT metric weighted with the number of the interference links, while CATT extends IRU by considering the effect of packet size and raw data rate on the links because of the use of multiple channels.

TDMA-based MAC model and discuss how to assign the available time slots on each link for a new flow in order to satisfy the bandwidth requirement of the new flow.

V. EXPERIMENTAL RESULTS

The above graph defines the throughput for the proposed protocol. The experiment was running 10 seconds of time. Throughput is the rate at which a network sends receives data. It is a good channel capacity of net connections and rated in terms bits per second (bit/s).

REFERENCES
