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Enhancement of Wireless Mesh Network Using Hop By Hop Network

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ABSTRACT: Wireless Mesh Network (WMN) has become an important edge network to provide Internet access to remote areas and wireless connections in a metropolitan scale. The main aim is to identify the maximum available bandwidth path. A new path weight is proposed to capture the available path bandwidth information. To satisfy the consistency and loop-freeness requirements the hop-by-hop protocol algorithm and random path based on the new path weight is used. Using the consistency property each node makes a proper packet forwarding decision, so that the packet is traversed through the intended path. The objective of the work is to explore a security enhanced dynamic routing algorithm based on distributed routing information widely supported in existing wired and wireless networks.

1.INTRODUCTION

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 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. A mesh network can be designed using a flooding technique or a routing technique.

When using a routing technique, the message is propagated along a path, by hopping from node to node until the destination is reached. To ensure all its paths' availability, a routing network must allow for continuous connections and reconfiguration around broken or blocked paths, using self-healing algorithms. A mesh network whose nodes are all connected to each other is a fully connected network.

An infrastructure wireless network consists of an access point or a base station. In this type of network the access point acts like a hub, providing connectivity for the wireless computers. It can connect or bridge the wireless LAN to a wired LAN, allowing wireless computer access to LAN resources, such as file servers or existing Internet Connectivity. A wireless sensor network is a group of specialized transducers with a communications infrastructure intended to monitor and record conditions at diverse locations. Commonly monitored parameters are temperature, humidity, pressure, wind direction and speed, illumination intensity, vibration intensity, sound intensity, power-line voltage, chemical concentrations, pollutant levels and vital body functions.

A sensor network consists of multiple detection stations called sensor nodes, each of which is

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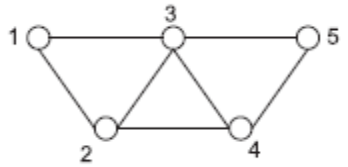
small, lightweight and portable. Every sensor node is equipped with a transducer, microcomputer, transceiver and power source. The transducer generates electrical signals based on sensed physical effects and phenomena. The microcomputer processes and stores the sensor output. The transceiver, which can be hard-wired or wireless, receives commands from a central computer and transmits data to that computer. The power for each sensor node is derived from the electric utility or from a battery.

1.1 CLIQUE BASED METHOD

A link in the wireless network becomes a node in the link conflict graph. If two links in the wireless networkinterfere with each other, a link between thetwo corresponding nodes in the link conflict graph.



1.2 THE CONFLICT GRAPH

Links 1 and 2 interfere witheach other since node b cannot send and receivesimultaneously. Links 1 and 3 interfere with each othersince the signal from c is strong enough to interfere thereception at b. Therefore, there are links between 1 and 2 as
well as 1 and 3 in the conflict graph. Assume that links 1and 4 do not interfere because the signal from d cannotaffect b in successfully receiving the signal from a. There is no direct link between 1 and 4.It is difficult to find the scheduling mechanism to achieve the maximum available bandwidth.An interference clique is the set of links which interferewith each other. In the conflict graph, the correspondingnodes of these links form a complete subgraph. In Fig. 2b,{1, 2}, {1, 3}, {1, 2, 3}, and {3, 4, 5} are interference cliques.A maximal interference clique is a complete subgraph that isnot contained in any other complete subgraph. Forinstance, {1, 2, 3} and {3, 4, 5} are maximal cliques while{1, 2} and {1, 3} are not maximal cliques.

2.PROTOCOLS

2.1QOS ROUTING PROTOCOL

The necessary and sufficient condition is used to describe whether the path is available or not. After identifying the path weight is assigned to each path which satisfies the optimality constraints.

2.2 PATH SELECTION

The distance vector mechanism is used to identify the information about the node to its neighbours. Based on this information the neighbor nodes will identify the optimal path. The path selection is mainly based on the weight assigned to each node .

2.3 ISOTONIC PATH WEIGHT

The routing table is constructed based on the weight. The necessary and sufficient condition is used for developing the routing protocol.

2.4TABLE CONSTRACTION AND OPTIMALITY

The isotonic property of the node is used to develop the routing table and identify the maximum bandwidth form source to destination.

The optimality is used to identify the best path in a network to transfer the packet. In routing protocol, if a node finds anew nondominated path, it will advertise this pathinformation to its neighbors. Each node keeps two tables: distance table and routing table.Node s puts all the nondominated paths advertised by its
neighbors in its distance table. It keeps all the nondominatedpaths found by s itself in its routing table.

2.5 PACKET FORWARDING AND CONSISTENCY

In a traditional hop-by-hop routing protocol, a packetcarries the destination of the packet, and when a node
receives a packet, it looks up the next hop by thedestination only. In this mechanism, apart from thedestination, a packet also carries a Routing Field whichspecifies the next four hops the packet should traverse.
When a node receives this packet, it identifies the pathbased on the information in the Routing Field. It

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updatesthe Routing Field and sends it to the next hop.In our packet forwarding mechanism, each intermediatenode determines the fourth next hop but not the next hop asin the traditional mechanism.

Our packet forwardingmechanism still requires each intermediate node to make
route decision based on its routing table. Besides, only theinformation of the first few hops of a path is kept in therouting table in each node and the routing field in a packet.
Therefore, our mechanism possesses the same characteristicsof a hop-by-hop packet routing mechanism, and isa distributed packet forwarding scheme.

2.6 ROUTE UPDATE

After the network accepts a new flow or releases an existingconnection, the local available bandwidth of each node willchange, and thus the widest path from a source to adestination may be different. When the change of the localavailable bandwidth of a node is larger than a threshold(say 10 percent), the node will advertise the new informationto its neighbors. After receiving the new bandwidthinformation, the available bandwidth of a path to adestination may be changed. Although the node is static,the network state information changes very often.

3.CONCLUSION

The maximum available bandwidth path problem, which is a fundamental issue to support quality-of-service in wireless mesh networks. The main contribution of our work is a new left-isotonic path weight which captures the available path bandwidth information. The left-isotonicity property of our proposed path weight facilitates us to develop a proactive hop-by-hop routing protocol, and 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. It tested the performance of our protocol under different scenarios.

REFERENCES

[1] Couto.D, Aguayo.D, Bicket.J, and Morris.R,(2003)"A High-Throughput Path Metric for Multi-Hop Wireless Routing," Proc. ACM MobiCom, pp. 134-146.
[2] Chiu.C.Y, Kuo.Y.L, Wu.E, and Chen.G.H,(2008)"Bandwidth-Constrained Routing Problem in Wireless Ad Hoc Networks," IEEE Trans. Parallel and Distributed Systems, vol. 19, no. 1, pp. 4-14.
[3] Draves.R, Padhye.J, and Zill.B, (2004)"Comparison of Routing Metrics for Static Multi-Hop Wireless Networks," Proc. ACM SIGCOMM, pp. 133-144.
[4] Li.H, Cheng.Y, Zhou.C, and Zhuang.W,(2009)"Minimizing End-to-End Delay: A Novel Routing Metric for Multi-Radio Wireless Mesh Networks," Proc. IEEE INFOCOM, pp. 46-53.
[5] Sobrinho.J.L,(2001)"Algebra and Algorithms for QoS Path Computation and Hop-by-Hop Routing in the Internet," Proc. IEEE INFOCOM, pp. 727-735.
[6] Salonidis.T, Garetto.M, Saha.A, and Knightly.E,(2007)"Identifying High Throughput Paths in 802.11 Mesh Networks: A Model-Based Approach," Proc. IEEE Int'l Conf. Network Protocols (ICNP '07), pp. 21-30.
[7] Tang.J, Xue.G, and Zhang.W,(2005)"Interference-Aware Topology Control and QoS Routing in Multi-Channel Wireless Mesh Networks," Proc. ACM MobiHoc, pp. 68-77.
[8] Zhang.Q and Zhang.Y.Q,(2008)"Cross-Layer Design for QoS Support in MultihopWirelessNetworks," Proc. IEEE, vol. 96, no. 1, pp. 234-244.
[9]Yang.YandKravets.R,(2009)
"Contention-Aware Admission Control for Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 4, no. 4, pp. 363-377.
[10] Yang.Y and Wang.J,(2008)"Design Guidelines for Routing Metrics in Multihop Wireless Networks," Proc. IEEE INFOCOM, pp. 2288- 2296, Apr. 2008.