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A STUDY ON RECEIVER BASED MULTICAST FOR WIRELESS SENSOR NETWORKS

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ABSTRACT

Multicast routing protocols typically rely on the a priori creation of a multicast tree (or mesh), which requires the individual nodes to maintain state information. In dynamic networks with bursty traffic, where long periods of silence are expected between the bursts of data, this multicast state maintenance adds a large amount of communication, processing, and memory overhead for no benefit to the application. Thus, we have developed a stateless receiver-based multicast (RBMulticast) protocol that simply uses a list of the multicast members' (e.g., sinks') addresses, embedded in packet headers, to enable receivers to decide the best way to forward the multicast traffic. This protocol, called Receiver-Based Multicast, exploits the knowledge of the geographic locations of the nodes to remove the need for costly state maintenance (e.g., tree/mesh/neighbor table maintenance), making it ideally suited for multicasting in dynamic networks. RBMulticast was implemented in the OPNET simulator and tested using a sensor network implementation.

Index terms: RB Multicast, OPNET, Traffic, Protocol.

I INTRODUCTION

Multicast members are requesting data to source, source checks whether the multicast members are requesting different data, if source send data through intermediate nodes else intermediate nodes acts as a multicast region and send a copy of data to one of the multicast member. Multicast members addresses are embedded in a RB Header.

routing around the perimeter of the region. By keeping state only about the local topology, GPSR scales better in per-router state than shortest-path and ad-hoc routing protocols as the number of network destinations increases. Under mobility's frequent topology changes, GPSR can use local topology information to find correct new routes quickly. We describe the GPSR protocol, and use extensive simulation of mobile wireless networks to compare its performance with that of Dynamic Source Routing. Our simulations demonstrate GPSR's scalability on densely deployed wireless networks.

II LITERATURE SURVEY

GPSR: GREEDY PERIMETER STATELESS ROUTING FOR WIRELESS NETWORKS

C.-H. Feng and W.B. Heinzelman says that Greedy Perimeter Stateless Routing (GPSR), a novel routing protocol for wireless datagram networks that uses the positions of routers and a packet's destination to make packet forwarding decisions. GPSR makes greedy forwarding decisions using only information about a router's immediate neighbors in the network topology. When a packet reaches a region where greedy forwarding is impossible, the algorithm recovers by

A CROSS-LAYER PROTOCOL FOR EFFICIENT COMMUNICATION IN WIRELESS SENSOR NETWORKS

I. Akyildiz, M. Vuran, and O. Akan says that severe energy constraints of battery-powered sensor nodes necessitate energy-efficient communication in Wireless Sensor Networks (WSNs). However, the vast majority of the existing solutions is based on classical layered protocols approach, which leads to significant

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overhead. It is much more efficient to have a unified scheme which blends common pro layer functionalities into a cross-layer module. In this paper, a cross layer protocol (XLP) is introduced, which achieves congestion control, routing, and medium access control in a cross-layer fashion. The design principle of XLP is based on the cross-layer concept of initiative determination, which enables receiver-based contention, initiative-based forwarding, local congestion control, and distributed duty cycle operation to realize efficient and reliable communication in WSNs. The initiative determination requires simple comparisons against thresholds, and thus is very simple to implement, even on computationally impaired devices. To the best of our knowledge, XLP is the first protocol that integrates functionalities of all layers from PHY to transport into a cross-layer protocol. A cross-layer analytical framework is developed to investigate the performance of the XLP. Moreover, in a cross-layer simulation platform, the state-of-the-art layered and cross-layer protocols have been implemented along with XLP for performance evaluations. XLP significantly improves the communication performance and outperforms the traditional layered protocol architectures in terms of both network performance and Implementation complexity.

A MULTICAST ROUTING PROTOCOL FOR AD-HOC NETWORKS

J.Garcia-Luna-Aceves and E.Madruga introduces the Core-Assisted Mesh Protocol (CAMP) is introduced for multicast routing in ad-hoc networks. CAMP generalizes the notion of core-based trees introduced for internet multicasting into multicast meshes that have much richer connectivity than trees. A shared multicast mesh is defined for each multicast group; the main goal of using such meshes is to maintain the connectivity of multicast groups even while network routers move frequently. CAMP consists of the maintenance of multicast meshes and loop-free packet forwarding over such meshes. Within the multicast mesh of a group, packets from any source in the group are forwarded along the reverse shortest path to the source, just as in traditional multicast protocols based on source-based trees. CAMP guarantees that, within a finite time, every receiver of a multicast group has a reverse shortest path to each source of the multicast group. Multicast packets for a group are forwarded along the shortest paths from sources to receivers defined within the group's mesh. CAMP uses

cores only to limit the traffic needed for a router to join a multicast group; the failure of cores does not stop packet forwarding or the process of maintaining the multicast meshes.

GEOCASTING IN MOBILE AD HOC NETWORKS: LOCATION-BASED MULTICAST ALGORITHMS

K.Chen and K.Nahrstedt introduced the effective location-guided tree construction algorithm, it addresses the problem of geocasting in mobile ad hoc network (MANET) environments. Recasting is a variant of the conventional multicasting problem. For multicasting, conventional protocols define a multicast group as a collection of hosts which register to a multicast group address. However, for geocasting, the group consists of the set of all nodes within a specified geographical region. Hosts within the specified region at a given time form the geocast group at that time. We present two different algorithms for delivering packets to such a group, and present simulation results.

GEOGRAPHIC RANDOM FORWARDING (GERAF) FOR AD HOC AND SENSOR NETWORKS: MULTI HOP PERFORMANCE

J.G.Jetcheva and D.B.Johnson proposed a novel forwarding technique based on geographical location of the nodes involved and random selection of the relaying node via contention among receivers. We focus 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.

III CONCLUSION

Current multicast protocols generally rely on various tree structures and hence intermediate nodes need to maintain tree states or routing states for packet delivery. In this paper, we presented a new stateless multicast protocol for ad hoc networks called Receiver-Based Multicast. RBMulticast stores a destination list inside the packet header; this destination list provides

information on all multicast members to which this packet is targeted. Thus, there is no need for a multicast tree and therefore no tree state is stored at the intermediate nodes. The sender node does not need a routing table or a neighbor table to send packets but instead uses a “virtual node” as the packet destination. Thus, RB Multicast requires the least amount of state of any existing multicast protocol.

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