Systematic Directional Routing Protocol using Approximation Algorithmic Rules

J.Lavanya[1] A.Rajashree[2]
[1]Assistant Professor
[1]Department of Computer Science [2]Department of Electronics & Communication Engineering
[1]Idhaya College for Women, Tamil Nadu, India [2]Jerusalem College of Engineering, Chennai, India

Abstract— *This paper addresses the issues relating to broadcasting such as node interference and latency delay in Ad-Hoc networks. These problems could be overcome by our proposed algorithm SDRP (Systematic Directional Routing Protocol) which is mainly inspired by the existing on demand directional routing protocol DRP. Use of directional antennas for broadcasting is of increasing acceptance in ad-hoc networks. Given the key benefits of smart antennas are minimum energy consumption and bandwidth conservation. Although excess of literature directed towards use of smart antennas, a powerful protocol for reducing redundancy, end to end delay and interference is on research. One such protocol is SDRP. SDRP is a reactive protocol that combines the effect of DRP (Directional Routing Protocol) and Approximation algorithm that finds the optimal solution for broadcasts problems. The duo pack will considerably decreases the end to end delay and latency giving out significant performance benefits, thereby substantially increasing the throughput.*

Keywords— Approximation Algorithmic Rules, Directional Routing Protocol

I. INTRODUCTION

Broadcasting is an inevitable operation in networks. Broadcasting is the process of transmitting the packets that will be received by every device on the network. Broadcasting relies mainly on routing protocols in Mobile Ad Hoc Networks. Mobile ad hoc networks (MANETs) can be defined as a collection of large number of mobile nodes that form temporary network without aid of any existing network infrastructure or central access point. Each node that is participating in the network acts both as host and a router and must therefore is willing to forward to packets for other nodes. The characteristics of MANETs such as: dynamic topology, node mobility, provides large number of degree of freedom and self-organizing capability of that make it completely different from other network.

Due to the nature of MANETs, to design and development of secure routing is challenging task for researcher in an open and distributed communication environments.

The nodes may be located in or on airplanes, ships, trucks, cars, perhaps even on people or very small devices, and there may be multiple hosts per router. A MANET is an autonomous system of mobile nodes. The system may operate in isolation, or may have gateways to and interface with a fixed network. In the latter operational mode, it is typically envisioned to operate as a stub network connecting to a fixed internet work. Stub networks carry traffic originating at and/or destined for internal nodes, but do not permit exogenous traffic to transit through the stub network.

The applications of MANET technology could include industrial and commercial applications involving cooperative mobile data exchange. In addition, mesh-based mobile networks can be operated as robust, inexpensive alternatives or enhancements to cell-based mobile network infrastructures. There are also existing and future military networking requirements for robust, IP-compliant data services within mobile wireless communication networks many of these networks consist of highly dynamic autonomous topology segments.

Routing refers to the path and passage of data traffic in the form of packet and frames. The process of routing's aim is to transfer the logical packets from their source to their eventual destination. This process is however monitored by routing protocols. The routing protocols illustrate how routers can communicate among themselves. The routing information is circulated that enables the routers to communicate within the computer network.

II. PROPOSED SYSTEM

In our proposed system, we have come up with duo pack of approximation algorithm and Directional Routing Protocol that finds optimal solution to latency and delay. Broadcasting is a fundamental operation in wireless networks and plays an important role in the communication protocol design. In multi hop wireless networks, however, interference at a node due to simultaneous transmissions from its neighbours makes it nontrivial to design a minimum-latency broadcast algorithm, which is known to be NP-complete. We present a simple 12-approximation algorithm for the one-to-all broadcast problem that improves all previously known guarantees for this problem. We then consider the all-to-all broadcast problem where each node sends its own message to all other nodes. For the all-to-all broadcast problem, we present two algorithms with approximation ratios of 20 and 34, improving the best result available in the literature. Finally, we report experimental evaluation of our algorithms. Our studies indicate that our algorithms perform much better in practice than the worst-case guarantees provided in the theoretical analysis and achieve up to 37 percent performance improvement over existing schemes.

III. SYSTEM IMPLEMENTATION

This paper describes the requirement analysis in accordance with the input and the resources and it also describes the implementation of the project with the technology used. This project analyses on product and resource requirement, which is required for this successful system.

System implementation is the stage of the project when the theoretical design is turned into a working system. If the implementation is not correctly planned and controlled, it can cause chaos. Thus it can be considered to be the most crucial stage in achieving new system. While implementing the system the first thing taken into account is

establishing the physical Network. And thus a physical network is to be established with the hardware and software requirements. The objectives of this maintenance work are to make sure that the system gets into work all time without any bug. Provision must be for environmental changes which may affect the computer or software system. This is called the maintenance of the system. Nowadays there is the rapid change in the software world. Due to this rapid change, the system should be capable of adapting these changes. In our project the process can be added without affecting other parts of the system.

IV. STRUCTURAL DESIGN

The product requirement includes input and output requirements it gives the wants in term of input to produce the required output. The resource requirements give in brief about the software and hardware that are needed to achieve the required functionality. There are two broadcasting strategies involved.

A. One-to-all broadcasting module

In one-to-all, a single source node transfers messages to many other nodes. There are many algorithms proposed for efficient one-to-all broadcasting strategies. We consider their one-to-all algorithms Pipelined Broadcast Scheduling (PBS). PBS first sends a message to all nodes in a maximal independent set (MIS). In the second phase, PBS schedules the nodes in the MIS to transmit to their neighbours. In this technique, we consider only the "Pipelined Broadcasting Scheduling". Topolgy with more number of nodes from 25,50,75,100, transmission is done using One-to-all technique implemented using PBS technique.

B. All-to-all broadcasting module

In all-to-all broadcasting strategies, an all-to-all algorithm called Interleaved Gossiping Algorithm (IGA) is proposed, which works similar to CDA except for the transmission schedule of secondary nodes. In IGA, secondary nodes are divided by three sets depending on their BFS level. Then, each set is divided into four non interfering groups by running Iterative Minimal Covering algorithm, which results in the bound of 12 time slots for secondary nodes. Gandhi et al. present an all-to-all algorithm (which we call MSB). Topology with more number of nodes from 25,50,75,100, transmission is done using All-to-all technique implemented using CDA and MSB technique.

V. CONCLUSION

Hence we have successfully implemented SDRP protocol in network simulator. We assure that SDRP considerably reduces packet latency and delay and thus the result is represented in the form of graphs. Although excess of literature directed towards invention of a powerful protocol, SDRP suits all those needs. In this paper, we have introduced a cross layered Systematic Directional Routing Protocol (SDRP) specifically tuned to the underlying directional antennas.

SDRP attempts to alleviate some of the inherent drawbacks involved in directional communications while exploiting the potential benefits such as increased coverage range and directionality. Our simulation results indicate that SDRP has a substantial decrease in route discovery latency as well as directional broadcasting overhead as compared to DRP. The efficient route recovery mechanisms in SDRP prevent any throughput degradation due to frequent movements of intermediate nodes. However, it is worthwhile to note that throughput gain in case of directional antenna systems depends on the topology under consideration. Our simulation results have been promising, validating the effectiveness of DRP.

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