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Performance Analysis of Multicast Routing in Mobile Ad-hoc Network

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ABSTRACT
Mobile ad-hoc network is deployed in applications such as disaster recovery and distributed collaborative computing, where routes are mostly multi-hop and network hosts communicate via packet radios. Mobile ad-hoc network offers a unique art of network formation and can be established in the absence of any fixed infrastructure. Due to the absence of centralized supported structure, an ad-hoc network suffers with various challenges. Some of the known challenges to this area include battery power, routing, bandwidth and security. In this paper we presents the comparative performance analysis for the multicast routing protocol and our proposed methods gives better results than the existing techniques.

Keywords: Mobile ad-hoc networks, Multicasting, wireless sensor networks, Dynamic source routing, Proactive routing protocol, Reactive routing protocol.

INTRODUCTION

A Mobile ad hoc network is the group of wireless mobile computers (or nodes) in which nodes collaborate by forwarding packets for each other to allow them to communicate outside range of the direct wireless transmission. Ad hoc networks require the no centralized administration or fixed network infrastructure such as base stations or access points. A MANET is an autonomous group of mobile users that the communicate over reasonably slow wireless links. The network topology may vary rapidly and unpredictably over time, because the nodes are mobile devices. Such a network may operate in the standalone fashion, or may be connected to the larger Internet. MANETs possess the certain characteristics like the Bandwidth-constrained, variable capacity links, Energy-constrained Operation, Limited Physical Security, Dynamic network topology, Frequent routing updates. Routing [16].

MANET is a group of wireless mobile nodes that may act as host as well as router and are able to move arbitrarily. MANET is a self-organized network that can be deployed anywhere, at any time to support particular conditions. In contrast to MANETs, infrastructure-dependent wireless networks are more reliable and provide Quality of Services (QoS) assurance. The unreliability in MANETs occur due to limited battery power, limited bandwidth (channel capacity), heterogeneity, high routing overhead and unpredictable node mobility. Bandwidth, Delay, Signal Strength and other metrics are used for QoS assurance in multicast group communication for both data and real time traffic [14].

Congestion takes place in MANETs with limited resources. In these networks, shared wireless channel and dynamic topology lead to interference and fading during packet transmission. Packet victims and bandwidth dilapidation are caused due to congestion, and thus, time and energy is wasted

during its recovery. Congestion can be prevented using congestion aware protocol through bypassing the affected links. Severe throughput degradation and massive fairness problems are some of the identified congestion related problems [13].

Multipath routing in a MANET is established in order to increase the reliability of data transmission that provides load balancing among the nodes. The use of multiple disjoint paths transferred the data in parallel that significantly increases the packet delivery ratio. Multipath routing schemes deal with the problem of scalability, confidentiality, integrity, and network lifetime. Multiple-path routing [12] between source and destination ensures reliability of the data transmission in a MANET. Existing multipath routing schemes in a MANET lead to problems such as flooding, empty set of neighbors, flat addressing, widely distributed information, large energy consumption, interference, and load balancing issues. Therefore, the efficient multipath routing scheme is proposed to solve one or more of these issues.

The rest of this paper is organized as follows in the first section we describe an introduction of about the wireless sensor network. In section II we discuss about the comparison for the routing protocol in mobile ad-hoc networks. In section III we discuss about the Multicast routing protocol, In section IV we presents the experimental result analysis and finally in section V we conclude the about our paper and specify the future scope.

II ROUTING PROTOCOL COMPARASION

Routing protocols for MANETs can be categorized on the basis of mechanism as reactive (routes are created on demand), proactive (pre-determined routes are stored in routing tables and are periodically updated) and hybrid (some nodes have Predefined and some have on-demand).

The reactive routing protocols also known as the on-demand routing protocols. The reactive / on-demand routing protocols set up a link between pair of nodes only when it is necessary and only for those nodes that are currently being used to send the data packets from source to the destination thus reduce the overhead problem as arise with the proactive routing protocols, while The proactive routing protocols are mostly based on shortest path algorithms and also known as table driven routing protocol because they store the information of all connected nodes in form of tables. These types of the routing protocols maintain routes to all the destinations, regardless of whether or not these routes are needed.

Parameters	Proactive	Reactive
Network Organization	Flat/ Hierarchical	Flat
Routing Scheme	Table Driven	On-demand
Latency	Low due to routing tables	High due to flooding
Communication Overhead	High	Low
Scalability Level	Low; Usually upto 100 nodes	Upto few hundred nodes; Not suitable for large networks
Availability of Routing Information	Always available; stored in tables	Available when required
Periodic Updates	Yes needed whenever the topology of the network changes	Not needed as route available on demand
Storage Capacity	High due to the routing tables	Low generally depends upon the number of routes
Mobility Support	Periodical Updates	Route Maintenance
Delay level	Small routes are pre-determined	Higher than proactive

Table 1: Comparative study between proactive and reactive protocol.

III MESH BASED MULTICAST ROUTING PROTOCOL

Mesh topology is robust and reliable for communicating data to the destination in case of node mobility or link failure. It doesn't require reconfiguration of network because there already

exist redundant (multiple) paths for every destination. All forwarding group members, multicast group members and links between them form a mesh. The characteristic feature of mesh is that the node doesn't care about upstream node, from which the packet has arrived, and it rebroadcasts non-duplicate packet. If one node lies in the transmission range of other node, then both nodes share a mesh link. So, the mesh structure has more connected links than tree and increases the robustness of multicast group, which is convenient in generous and frequent link breaks for ad-hoc networks.

IV EXPERIMENTAL RESULT ANALYSIS

We use network simulator 2 to simulate our proposed technique. In the simulation, the channel capacity of wireless hosts is set to the same value: 11 Mbps. In the simulation, wireless nodes move in a 900 meter × 900 meter region for 200 seconds simulation time. DSR permits the network to be entirely self-organizing and self-configuring. The protocol is designed on the basis of two principles i.e. route discovery and route preservation. The purpose behind combining both principles together is to search for the shortest path and similarly to maintain source route to random destination in the Mobile ad hoc network.

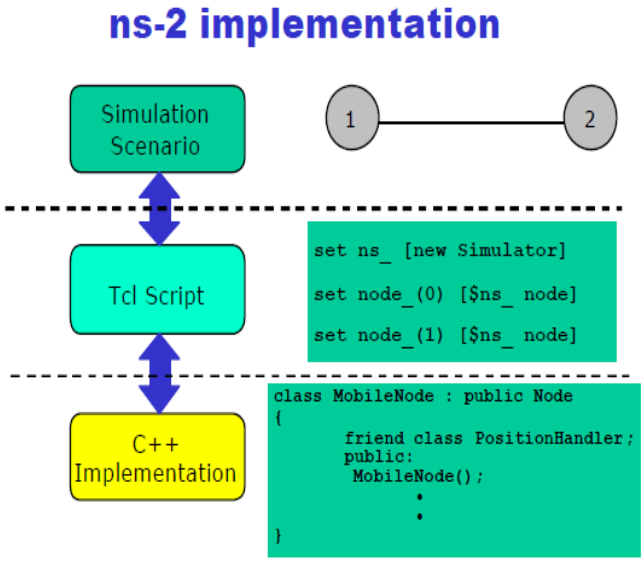

Fig 1: This above figure shows that the basic network simulation implementation environment.

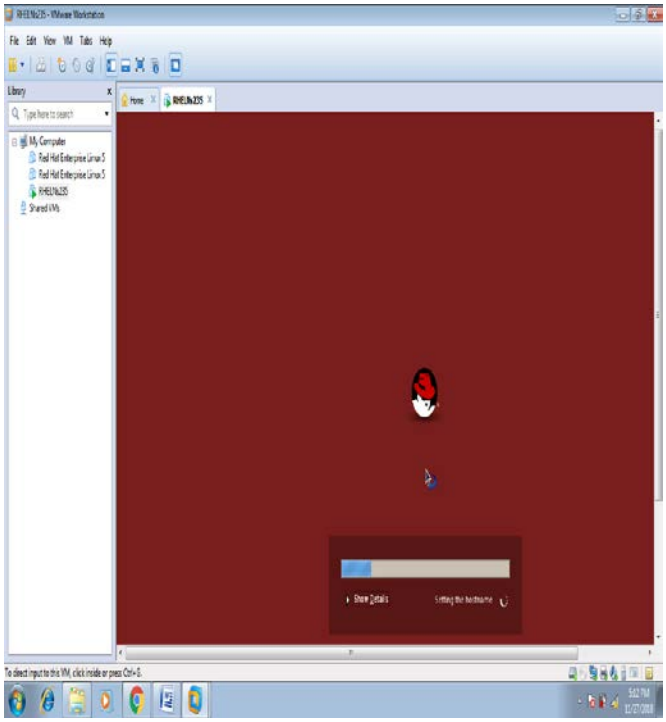

Fig 2: This window shows the progress of upload the red hat enterprise Linux.

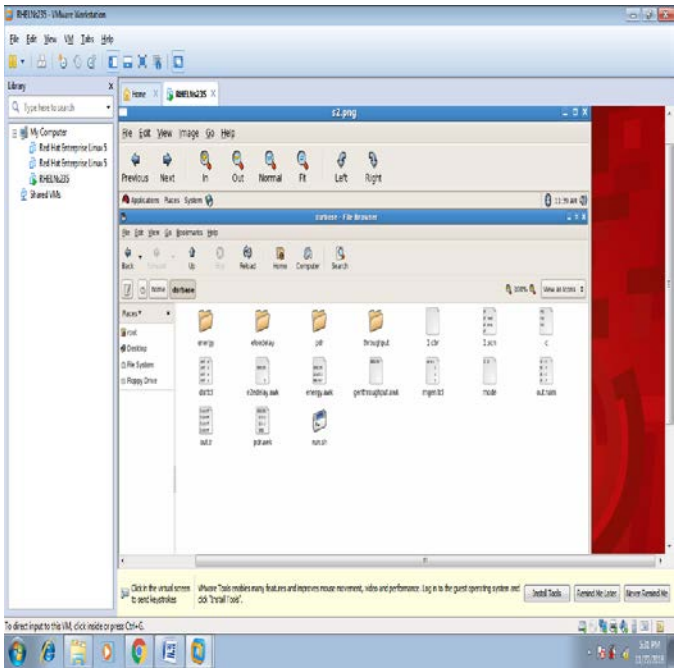

Fig 3: This window shows the all files and their description used in a red hat enterprise Linux.

V CONCLUSIONS AND FUTURE SCOPE

Mobile Ad-Hoc networks (MANET) have become related to several aspects in human life while normal users uses the wireless mobile systems without prior knowledge about how such systems works. Here we use various types of routing protocol Dynamic source routing protocol is one of them It's uses source routing through which the sender knows the complete hop-by-hop route to the destination. These routes are stored in a route cache. In this paper we presents the experimental comparative study and shows here the our proposed method gives better results than the existing techniques.

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