Guaranteed Packet Transfer in MANET In and Out of Coverage Areas and Energy Saving Using Random Casting

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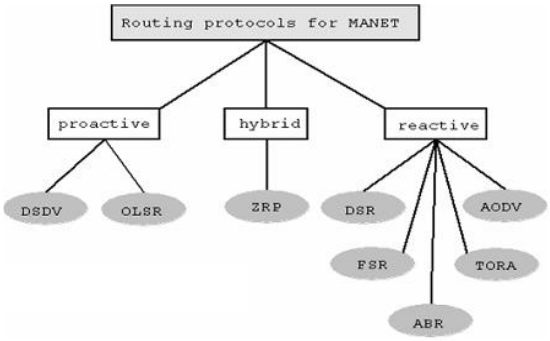
Abstract— The main objective analysis of packet loss in coverage area and less coverage area and reduced packet loss and increase the reliability in MANET . Each node on its neighborhood information is updated in a timely manner to achieve guaranteed coverage . The main Challenge in mobile networks is increase the reliability,Packet deliver ratio, reduce the load balancing and reduce therless consume power. MANET supports the power consumption and energy efficient and collision free.To determine a small set of forward nodes to ensure full coverage and less coverage areas. This reduces broadcast redundancy, battery power, increase guaranteed coverage area in and out.. Nowadays, there is a huge increase of handled devices. Laptops, mobile phones and PDAs take an important place in the everyday life. Hence, the challenge is now to make all these devices communicate together in order to build a network. Obviously, this kind of networks has to be wireless. Indeed, the wireless topology allows flexibility and mobility.

Index Terms— MANET, PDAs, DSR ,802.11PSM, broadcasting, Randomcast .

I. INTRODUCTION

MANET is formed by a set of mobile wireless devices with no fixed topology. The nodes can move freely, leave and enter the network at anytime. Mobile ad hoc networks (MANET) consist of hundreds to thousands of small, low-cost, low-powered sensor nodes, where the nodes radio communication, capabilities, bandwidth, and energy, the most important design consideration for MANET is to extend their operational lifetime by minimizing power consumption. This is the reason why protocols with low energy consumption have been an important research orientation in this field. Nowadays, there is a huge increase of handled devices. Laptops, mobile phones and PDAs take an important place in the everyday life. Hence, the challenge is now to make all these devices communicate together in order to build a network. Obviously, this kind of networks has to be wireless. Indeed, the wireless topology allows flexibility and mobility. In this context, the idea of ad hoc networks was developed. In this context, the idea of ad hoc networks was developed[4]. In mobile ad hoc networks (MANETs), every node overhears every data transmission occurring in its vicinity and thus, consumes energy unnecessarily. However, since some MANET routing protocols such as Dynamic Source Routing (DSR) collect route information via overhearing, they would suffer if they are used in combination with 802.11 PSM. Allowing no overhearing may critically deteriorate the performance of the underlying routing protocol, while unconditional overhearing may offset the advantage of using PSM. This paper proposes a new communication mechanism, called RandomCast, making a prudent balance between energy and routing performance. In addition, it reduces redundant rebroadcasts for a broadcast packet, and thus, saves more energy. Extensive simulation using ns-2 shows that RandomCast is highly energy-efficient compared to conventional 802.11 in terms of total energy consumption.

II.MANET Routing Protocols



III.QOS FACTORS

A. Throughput is the total number of packets received by the destination.

B. End to End Delay is the average end to end delay of data packets from senders to receivers.

C.Media Access Delay is the media transfer delay for multimedia and real time traffics' data packets from senders to receivers.

D.Packet delivery ratio (PDR) is the ratio of the number of data packets received by the destination node to the number of data packets sent by the source node.

E. Routing load specifies the load over communications links for traffic flow.

IV. MAIN CHARACTERISTICS OF AD HOC NETWORKS

- ***Dynamic topology***

  Hosts are mobile and can be connected dynamically in any arbitrary manner. Links of the network vary and are based on the proximity of one host to another one.

- **Autonomous**

  No centralized administration entity is required to manage the operation of the different mobile hosts.

- **Bandwidth constrained**

  Wireless links have a significantly lower capacity than the wired ones; they are affected by several error sources that result in degradation of the received signal.

Energy constrained

mobile hosts rely on battery power, which is a scarce resource; the most important system design criterion for optimization may be energy conservation.

- **Limited security**

  Mobility implies higher security risks than static operations because portable devices may be stolen or their traffic may cross insecure wireless links.

V. NEED FOR ADHOC NETWORKS

Ad Hoc networks are needed as mobile hosts need to communicate with each with no fixed infrastructure and no administrative help because It may not be physically possible for the establishment of the infrastructure. It may not be practically economical to establish the infrastructure or It may be because of the expediency of the situation does not permit the installation of the infrastructure.

- Tactical operation – for fast establishment of military communication during the deployment of forces in unknown and hostile terrain.
- Rescue mission – for communication in areas without adequate wireless coverage.
- National security – for communication in times of national crisis, where the existing communication infrastructure is non-operational due to a natural disaster or a global war.
- Law enforcement – for fast establishment of communication in exhibitions, conferences, or sales presentations.
- Commercial use – for setting up communication in exhibitions, conferences, or sales presentations.
- Education – for operation of wall-free (virtual classrooms).
- Sensor networks - for communication between intelligent sensors mounted on mobile platforms.

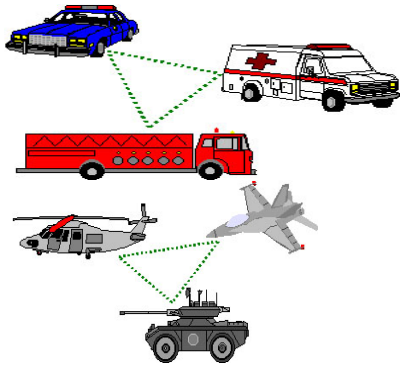


Figure1 A Mobile Ad Hoc Network

The following are the features of MANET

- Robust routing and mobility management algorithms to increase the networks reliability and availability.

- Adaptive algorithms and protocols to adjust to frequently changing radio propagation, network, and traffic conditions.
- Low-overhead algorithms and protocols to preserve the radio communication resource.

VI.EXISTING SYSTEM

Nodes in the MANET exhibit nomadic behavior by freely migrating with in some area, dynamically creating and tearing down associations with other nodes. Nodes can communicate with each other at anytime and without restrictions, except for connectivity limitations and subject to security provisions. MANET's are distinguished from other ad hoc networks by rapidly changing network topologies, influenced by the network size and node mobility. Such networks typically have a large span and contain hundreds to thousands of nodes.

XI.PROPOSED SYSTEM

RANDOMCAST describes the proposed RandomCast protocol. It is designed to improve energy performance by controlling the level of overhearing and forwarding without a significant impact on network performance. The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes. DSR allows the network to be completely self-organizing and self-configuring, without the need for any existing network infrastructure or administration.

VII.RANDOMIZED OVERHEARING

Source node sends the data to the destination by specifying the randomized overhearing by using the ATIM window. The randomized overhearing is based on the neighbor nodes of source node and it's intermediate nodes. Generating a random value for each node (0.0 to 1.0) and compare the value with the default threshold value fixed by user. If the node value is greater than the threshold means it will receive the data which is transmitted by the source. The randomized overhearing improves the routing efficiency in mobile networks.

VIII.DSR

The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes. DSR allows the network to be completely self-organizing and self-configuring, without the need for any existing network infrastructure or administration. The protocol is composed of the two main mechanisms of "Route Discovery" and "Route Maintenance", which work together to allow nodes to discover and maintain routes to arbitrary destinations in the ad hoc network. All aspects of the protocol operate entirely on-demand, allowing the routing packet overhead of DSR to scale automatically to only

that needed to react to changes in the routes currently in use. The protocol allows multiple routes to any destination and allows each sender to select and control the routes used in routing its packets, for example for use in load balancing or for increased robustness. Other advantages of the DSR protocol include easily guaranteed loop-free routing, operation in networks containing unidirectional links, use of only "soft state" in routing, and very rapid recover when routes in the network change. The DSR protocol is designed mainly for mobile ad hoc networks of up to about two hundred nodes, and is designed to work well with even very high rates of mobility. This document specifies the operation of the DSR protocol for routing unicast IPv4 packets.

Table 1: Flag Types New Wireless Trace Format

N	Node Property
I	IP Level Packet Information
H	Next Hop Information
M	MAC Level Packet Information
P	Application Level Packet Information

Table2: Wireless Event Using The New Trace Format

Flag	Type	Value
	s—r—d—f	action type
-t	double	Time
-Ni	int	Node ID
-Nx	double	X Coordinate
-Ny	double	Y Coordinate
-Ne	double	Node Energy Level
-Nl	string	Trace Name (AGT, RTR ...)
-Nw	string	Drop Reason
-Hs	int	Node ID
-Hd	int	Node ID For Next Hop
-Ma	hexadecimal	Duration
-Ms	hexadecimal	Source Ethernet Address
-Md	hexadecimal	Destination Ethernet Address
-Mt	hexadecimal	Ethernet Type
-P	string	Application Type (arp, dsr, cbr, tcp, ...)

X.MANET SCENARIO

A pure Manet scenario similar to the simulations was set up in order to gain some experience and to verify the structure of the experiment. The simulation settings were as follows:

- Simulation area of 1500m×300m. A rectangle area is chosen to have longer distances between the nodes than in a quadratic area, i.e. packets are sent over more hops.
- IEEE 802.11 MAC.

- Two ray ground propagation model.
- Node mobility defined by random waypoint movement model.
- Constant bit rate traffic.
- UDP.

XI.REVISED FORMAT FOR WIRELESS TRACES

In an effort to merge wireless trace, using cmu-trace objects, with ns tracing, a new, improved trace format has been introduced. This revised trace support is backwards compatible with the old trace formatting and can be enabled by the following command:

$ns use-newtrace

This command should be called before the universal trace command

$ns trace-all <trace-fd>.

Sets up new format for wireless tracing by setting a simulator variable called newTraceFormat. Currently this new trace support is available for wireless simulations only and shall be extended to rest of *ns* in the near future.

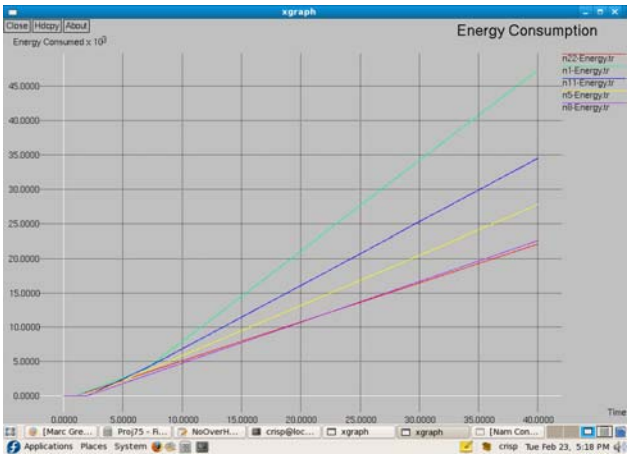
An example of the new trace format is shown below:

s -t 0.267662078 -Hs 0 -Hd -1 -Ni 0 -Nx 5.00 -Ny 2.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 0.255 -Id -1.255
It message -Il 32 -If 0 -Ii 0 -Iv 32
s -t 1.511681090 -Hs 1 -Hd -1 -Ni 1 -Nx 390.00 -Ny 385.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 1.255 -Id -1.255
It message -Il 32 -If 0 -Ii 1 -Iv 32
s -t 10.000000000 -Hs 0 -Hd -2 -Ni 0 -Nx 5.00 -Ny 2.00 -Nz 0.00 -Ne
-1.000000 -Nl AGT -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 0.0 -Id 1.0 -It tcp -Il 1000 -If
2 -Ii 2 -Iv 32 -Pn tcp -Ps 0 -Pa 0 -Pf 0 -Po 0
r -t 10.000000000 -Hs 0 -Hd -2 -Ni 0 -Nx 5.00 -Ny 2.00 -Nz 0.00 –Ne

XII.COMPARISION

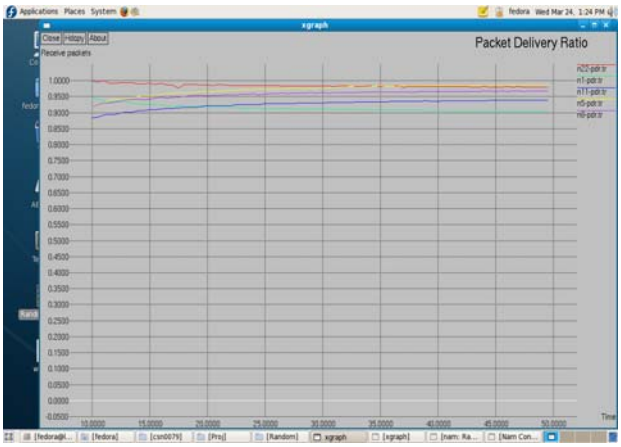
- NO OVERHEARING
- UNCONDITIONAL OVERHEARING
- RANDOMIZED OVERHEARING

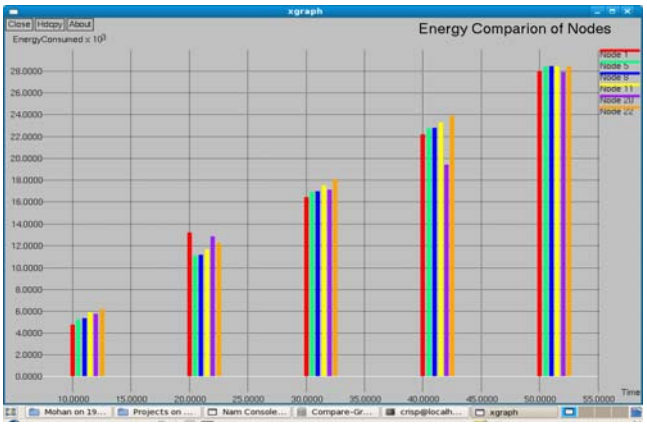
NO OVERHEARING:



In this only intermediate nodes will receive the packets and if any of them failed then route discovery will be activated so that energy will be consumed more.

UNCONDITIONAL OVERHEARING:





XIII RESULT

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