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Optimal Broadcast Capacity and Delay Trade-Off in Mobile Adhoc Network's

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ABSTRACT

Mobile Ad hoc Networks (MANETs) are self-organizing networks consisting of mobile nodes that can communicate with each other without the need for any fixed infrastructure. In MANETs, multicast communication is a key requirement for applications such as mobile gaming, video streaming, and group collaboration. However, multicast communication in MANETs faces many challenges due to the dynamic nature of the network topology and limited resources, including bandwidth and energy. In this project, we propose an optimal multicast capacity and delay trade off algorithm for MANETs that can efficiently allocate network resources to multicast groups while minimizing delay.

Key Terms: Mobile Ad hoc Networks, Multicast communication, optimal multicast capacity, data transmission, node mobility.

I. INTRODUCTION

The term MANET (Mobile Ad hoc Network) refers to a multihop packet based wireless network composed of a set of mobile nodes that can communicate and move at the same time, without using any kind of fixed wired infrastructure. MANET is actually self organizing and adaptive networks that can be formed and deformed on-the-fly without the need of any centralized administration.

Otherwise, a stand for "Mobile Ad Hoc Network" A MANET is a type of ad hoc network that can change locations and configure itself on the fly.

Because MANETS are mobile, they use wireless connections to connect to various networks. This can be a standard Wi-Fi connection, or another medium, such as a cellular or satellite transmission.

How MANET works?

The purpose of the MANET working group is to standardize IP routing protocol functionality suitable for wireless routing application within both static and dynamic topologies with increased dynamics due to node motion and other factors. Approaches are intended to be relatively lightweight in nature, suitable for multiple hardware and wireless environments, and address scenarios where MANETs are deployed at the edges of an IP infrastructure. Hybrid mesh infrastructures (e.g., a mixture of fixed and mobile routers) should also be supported by MANET specifications and management features. 2 Using mature components from previous work on experimental reactive and proactive protocols, the WG will develop two

Standards track routing protocol specifications: • Reactive MANET Protocol(RMP) • Proactive MANET Protocol(PMP) If significant commonality between RMRP and PMRP protocol modules is observed, the WG may decide to go with a converged approach. Both IPv4 and IPv6 will be supported. Routing security requirements and issues will also be addressed. The MANET WG will also develop a scoped forwarding protocol that can efficiently flood data packets to all participating MANET nodes. The primary purpose of this mechanism is a simplified best effort multicast forwarding function. The use of this protocol is intended to be applied ONLY within MANET routing areas and the WG effort will be limited to routing layer design issues. The MANET WG will pay attention to the OSPF-MANET protocol work within the OSPF WG and IRTF work that is addressing research topics related to MANET environments

II. LITERATURE SURVEY

1) Degenerate delay-capacity tradeoffs in adhoc networks with Brownian mobility

AUTHORS: X. Lin, G. Sharma, R. R. Mazumdar and N. B. Shroff

There has been significant recent interest within the networking research community to characterize the impact of mobility on the capacity and delay in mobile ad hoc networks. In this correspondence, the fundamental tradeoff between the capacity and delay for a mobile ad hoc network under the Brownian motion model is studied. It is shown that the two-hop relaying scheme proposed by Grossglauser and Tse (2001), while capable of achieving a per-node throughput of $\Theta(1)$, incurs an expected packet delay of $\Omega(\log n/\sigma_n^2)$, where σ_n^2 is the variance parameter of the Brownian motion model. It is then shown that an attempt to reduce the delay beyond this value results in the throughput dropping to its value under static settings. In particular, it is shown that under a large class of scheduling and relaying schemes, if the mean packet delay is $O(n^\alpha/\sigma_n^2)$, for any $\alpha<0$, then the per-node throughput must be $O(1/\sqrt{n})$. This result is in sharp contrast to other results that have recently been reported in the literature.

2) Capacity and Delay Tradeoffs for Adhoc Mobile Networks

AUTHORS: M. Neely and E. Modiano

We consider the throughput/delay tradeoffs for scheduling data transmissions in a mobile ad hoc network. To reduce delays in the network, each user sends redundant packets along multiple paths to the destination. Assuming the network has a cell partitioned structure and users move according to a simplified independent and identically distributed (i.i.d.) mobility model, we compute the exact network capacity and the exact end-to-end queueing delay when no redundancy is used. The capacity-achieving algorithm is a modified version of the Grossglauser-Tse two-hop relay algorithm and provides O(N) delay (where N is the number of users). We then show that redundancy cannot increase capacity, but can significantly improve delay. The following necessary tradeoff is established: delay/rate≥O(N). Two protocols that use redundancy and operate near the boundary of this curve are developed, with delays of $O(\sqrt{N})$ and O(log(N)), respectively. Networks with non- i.i.d. mobility are also considered and shown through simulation to closely match the performance of i.i.d. systems in the $O(\sqrt{N})$ delay regime.

III. PROPOSED SYSTEM

The proposed system is an optimal multicast capacity and delay tradeoff algorithm for MANETs that can efficiently allocate network resources to multicast groups while minimizing delay. The system consists of two main modules: the Capacity Allocation Module and the Delay Optimization Module. The Capacity Allocation Module uses a distributed algorithm to allocate network resources to multicast groups based on their capacity requirements and the available network resources. The Delay Optimization Module uses a heuristic algorithm to optimize the delay for each multicast group by adjusting the multicast transmission rate based on the network conditions.

IV. SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 Mb.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 6Gb.

SOFTWARE REQUIREMENTS

- Operating system : - Windows XP.
- Coding Language : C#.NET.
- Tool : VISUAL STUDIO 2019.

System Modules

MODULES

ROUTING PROTOCOLS:

Routing protocols play a vital role in determining the multicast capacity and delay tradeoff in MANETs. The selection of an appropriate routing protocol can significantly impact the network's performance. Several routing protocols such as ODMRP, MAODV, and AMRoute have been proposed to address this issue.

MOBILITY MANAGEMENT:

Mobility management is another important module that plays a crucial role in determining the multicast capacity and delay tradeoff in MANETs. It deals with the efficient handling of node mobility and ensures that the multicast session remains intact, even when nodes move in and out of the multicast group.

QUALITY OF SERVICE MECHANISMS:

QoS mechanisms provide a means to control and manage the network's resources effectively. In MANETs, QoS mechanisms are used to ensure that the multicast packets are delivered with minimal delay and maximum reliability. Some of the commonly used QoS mechanisms are packet scheduling, admission control, and flow control.

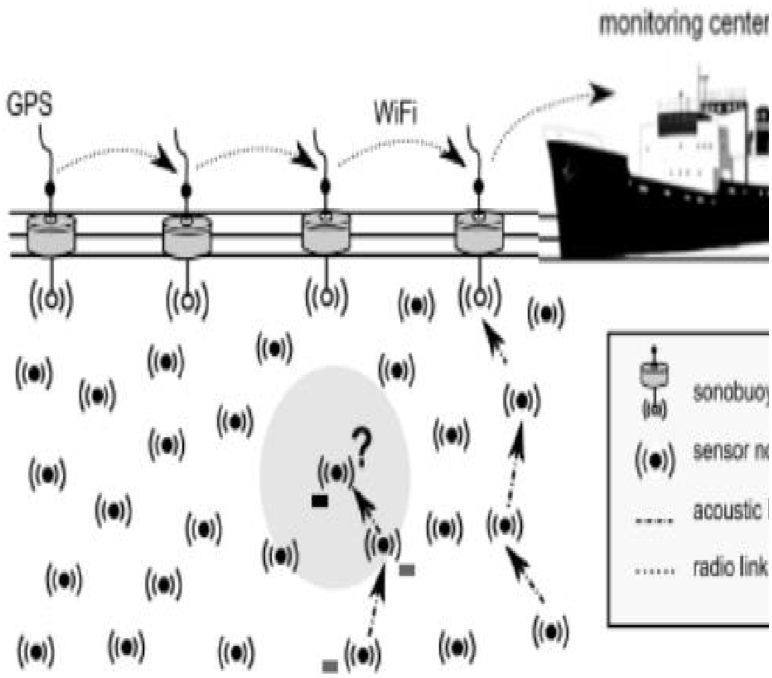
MULTICAST TREE CONSTRUCTION:

Multicast tree construction is a module that deals with the efficient creation of multicast trees in MANETs. The multicast tree is a logical structure that is used to route multicast packets to all the nodes in the group. The efficient construction of the multicast tree can significantly improve the multicast capacity and delay tradeoff in MANETs.

POWER MANAGEMENT:

Power management is a module that deals with the efficient use of battery power in mobile devices. It is important to ensure that nodes conserve their battery power while participating in a multicast session. Several power management techniques such as sleep mode and dynamic power management have been proposed to address this issue.

V. ARCHITECTURE DIAGRAM



VI. CONCLUSION

In this project we have studied about how MANETS works. In MANETs, multicast communication is a key requirement for applications such as mobile gaming, video streaming, and group collaboration. However, multicast communication in MANETs faces many challenges due to the dynamic nature of the network topology and limited resources. In this project, we propose an optimal multicast capacity and delay tradeoff algorithm for MANETs that can efficiently allocate network resources to multicast groups while minimizing delay**.**

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