

Integrate MANET and Mobile IP by Fixed and Mobile dynamic Gateway for advancement of MANET global connectivity

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ABSTRACT

Mobile ad-hoc wireless networks are generally considered as stand-alone networks having low radio frequency. The services in an isolated ad hoc network are, however, very limited. It is very meaningful to enable an ad hoc terminal to use the services in the global Internet or to be reached by another terminal in the global Internet through integration of an ad hoc network with a Mobile IP using fixed and dynamic mobile Gateway. Our proposed framework make following contribution: 1) Fixed and Mobile Gateway use for Integration of MANET with Mobile IP 2) Handoff technique integrate wired and wireless infrastructured node with MANET node on bases of mutual needs.

General Terms

Frame work Design

Keyword: fixed and Dynamic mobile gateway, Global connectivity ,MANET

1 INTRODUCTION

Infrastructure and infrastructure less are the two category of Mobile wireless network. Infrastructure less wireless network known as MANET differs from conventional infrastructured wireless networks in that MANET contains no base stations, and therefore all MANET connections are wireless[1,2]. Due to limited communication range of wireless signal, node operates not only as a host but also as a router, forwarding packets for other mobile nodes in the network that may not be within direct wireless communication range of each other. Mobile Internet protocol is another widely

accepted standard protocol that uses mobile agents to support flawless handoffs, making it possible for mobile hosts to roam from subnet to subnet without changing IP addresses. Global communication of MANET node is possible by its integration with Mobile IP [3,4] which may not be able to access the Internet directly, to share the Internet connection. However, MANET and Internet have many unsuited features. These differences are not only the organization and topology of networks, but also communication protocol of nodes in both networks. In this paper, we propose the framework of fixed and mobile dynamic gateway concept that acts as an interface between MANET and the Internet

This paper is organized as follows. Section II discusses the previous work done in this area. Section III describes the proposed model of framework for fixed & mobile dynamic gateway concept; Section IV describes the working of framework. Section V offers concluding remarks.

2 PREVIOUS WORK

One of the first approaches for MANET and Mobile IP integration is described in [7]. In this work, a method for integrating the ad hoc routing protocol daemon with the Mobile IP routing daemon (*mipd*) to manipulate the kernel IP routing table is described, a modified version of the Routing Information Protocol (RIP) is used for Integration. In paper [8] MIPMANET describe nodes in an ad hoc network that want Internet access register with the foreign agent and use their home address for all communication. Mobile nodes tunnel all packets destined for the Internet to the registered foreign agent. The foreign agent decapsulates the packets and forwards them to the destination. The AODV routing

protocol is used to deliver packets between mobile nodes and the foreign agent. Additionally, MIPMANET utilizes a new algorithm, 2 called MIPMANET Cell Switching (MMCS), to determine when mobile nodes in the ad hoc network should register with a new foreign agent. In this solution, it is assumed that a mobile node that wants Internet access has been assigned a home address that is valid on the Internet. Ratanchandani and Kravets [9], has given a mix scheme to provide Internet connectivity to the MANET nodes, using Mobile IP. The system uses techniques such as TTL scoping of agent advertisements, eavesdropping and caching agent advertisements to join the advantages of proactive and reactive approaches to providing connectivity. The paper of Joe C. Chan, Doan B. Hoang [10] presented novel architecture for mobile ad-hoc systems and services (AMASS). In this paper it maximizes the synergies of MANETs and P2P for building wireless on-demand systems and services. MANETs provide dynamic physical connectivity while P2P offers dynamic associations of entities (users, devices, and services) for direct resources sharing. Second, its Mobile P2P overlay unites mobility, connectivity, and services for universal communications. In paper[11] Shuo Ding, Arek Dadej, Steven Gordon[12] analyzed the Mobile IP agent registration, routing interoperability, and smooth gateway handoff issues arising when an ad-hoc network is connected to the Internet via multiple gateways and proposed an architecture framework for supporting IP mobility and communications. In research paper Habib Ammari [12], approach of integrating the MANET with Internet is based on the use of mobile Gateways. The mobile Gateways use Mobile IP when communicating with the Internet and DSDV when they interact with MANET nodes. Research s paper of Jinhua Zhao, Xiaozong Yang, and Hongwei Liu[13] describe load-balancing strategy and security routing protocol for a multi-gateway architecture called dynamic gateway, the gateway nodes may or may not act as gateway according to formula of the dynamic gateway, its optimize approach to select an optimal gateway and a foreign agent could overcome the problem of load-balancing for multi gateway. To ensure secure operation, it suggests secDSDV authenticated routing protocol.

3 FRAMEWORK FOR FIXED & MOBILE DYNAMIC GATEWAY

Frame work show that MANET nodes (MN) access Internet source through fixed gateway and mobile dynamic gateway. Fixed gateway is one of mobile node has two interfaces , one connected to the Internet uses normal IP routing to send packets in and/or out MANET, while the interface connected to MANET uses the MANET routing protocol to route packets within MANET. The mobile dynamic gateway is also some of the MANET node uses as gateway and optimizes the gateway according to distance, number of nodes

registered, and quantity of communication. The gateway nodes act as gateways in one time period, but they do not be gateways in another time period according to the criterion of the gateway selection. Foreign agent (FA) supplies Internet connectivity to dynamic gateway. Any interaction between MANET nodes and Internet has to be provided by dynamic gateways or fixed gateway. Fixed gateway is in coverage area of Mobile IP its provide facility of Internet connection to MAET node. A mobile dynamic gateway is a MANET node, which is one hop away from foreign agent to act as gateway. Thus, dynamic gateway motion is limited to the coverage area of foreign agents. When a dynamic gateway moves out of one hop away from foreign agent, it becomes a normal MANET node, but not a mobile dynamic gateway. These dynamic gateways can use Mobile IP when they communicate with the Internet, and uses MANET protocols when they interact with MANET. Mobile dynamic gateway frequently changes its position so continuous service of gateway is not provided by it to recover the loss of route node uses fixed gateway for communication using same care-of address.

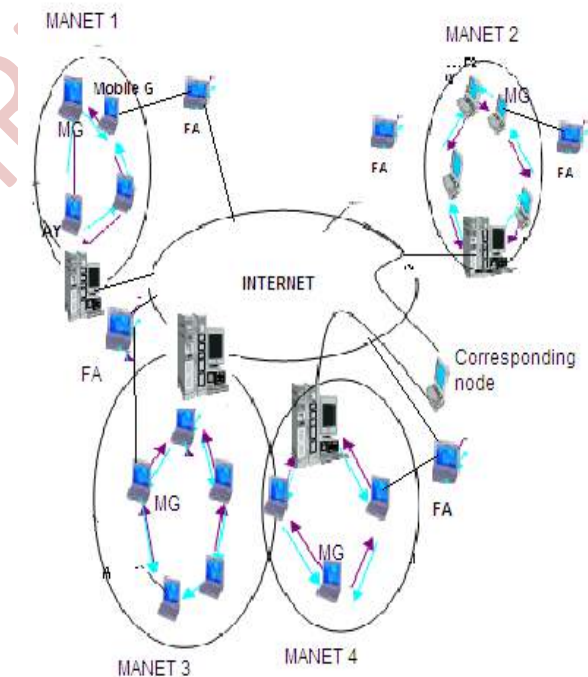


Fig1. Framework For Fixed & Dynamic gateway

3.1 The fixed and Mobile dynamic gateway has several advantages:

- It provide continuous service of node connectivity.

- Mobile dynamic gateway and fixed Gateway use as per requirement it is beneficial for the node of network to exchange data and improve performance.
- Fixed and Dynamic gateway is available for same service so the MANET nodes automatically switch to the optimal gateway.
- The problem of load-balancing for multi-gateway can be overcome.

4 WORKING OF FIXED AND DYNAMIC GATEWAY

A MANET node, called "A", wants to access a node, say "B", its first search the node within MANET range using MANET protocol if it is not present in range than it request for global connectivity using Fixed and dynamic gateway. Fixed gateway router is a node located between a fixed Internet access network and a mobile wireless ad hoc network, which is used to join the MANET nodes to the Internet. It provides Internet connectivity for MANET nodes. The MANET node should discover the gateway information and its route in order to access Internet. When the MANET node moves inside a MANET with multiple gateways which is fixed and mobile, it should be able to discover and select the gateway with the optimal route. Therefore, gateway discovery with minimum delay, minimum overhead, and optimal route is an important issue. A mobile dynamic gateway can work only when it registered with foreign agent. A MANET node "A" selects an optimized dynamic gateway. Node A initiates a gateway solicitation and broadcasts it through MANET. After dynamic gateways, which are currently present in MANET, received the gateway solicitation, they should unicast a gateway advertisement to node A. Node A is registered with Mobile dynamic gateway or fixed gateway utilizes the gateway for communication with "B". Mobile dynamic gateway frequently change its position so its provide gateway facility for short period of time in this situation its Handoff to fixed gateway for continues communication. Handoff in the integration routing solution is used for route optimization. When a mobile node detects a new gateway with a short path, it initiates the handoff to the new gateway and this will optimize the route. Most of the integrated approaches use hop count as a metric for handoff decision. The handoff decision depends on the movement detection method. There are two methods for movement detection: receiving the agent advertisement message and invalidating the route entry.

4.1 Selection method of fixed and mobile dynamic Gateway

Fixed and Dynamic gateway, providing Internet connection with MANET nodes, must register with a foreign agent and in the same manner, the MANET

nodes accessing Internet must register with fixed and dynamic gateways. Several definitions are given in selecting the best gateway.

Definition 1 Shortest Path: First priority is always given to those gateway which provide internet connection by shortest path

Definition 2 Life time: Second priority is given to connection life time. Gateway which provide longest period of internet connectivity is selected

Definition 3 Gateway load: Third priority is given to that gateway which have minimum number of node support for internet connection

A dynamic gateway would select first than it handoff node to fixed gateway third definition is use as alternate method for both gateway. A MANET node would automatic use the load technique.

5 CONCLUSION

An infrastructure based wireless network and mobile ad hoc networks (MANETs) can be combined using Fixed and Dynamic Gateway, and allow MANET to obtain Internet connectivity. Integrating a fixed infrastructure network with a MANET provides global service to MANET. The MANET nodes can access the Internet and access a wide range of Internet services. MANET nodes can move to different MANETs without losing the connection. This paper has presented a study of Gateway for integrating MANETs with the Internet. A framework for integrating Mobile IP and MANETs is proposed. We believe that this approach is a better approach for Integration of Mobile IP and MANET. For future work, the proposed framework should be implemented and studied with different routing scenarios

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