

# Mobile Ad Hoc Network

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**Abstract** — Mobile ad hoc networks (MANETs) are autonomously self-organized networks without infrastructure support. In a mobile ad hoc network, nodes move arbitrarily; therefore the network may experience rapid and unpredictable topology changes. Because nodes in a MANET normally have limited transmission ranges, some nodes cannot communicate directly with each other. Hence, routing paths in mobile ad hoc networks potentially contain multiple hops, and every node in mobile ad hoc networks has the responsibility to act as a router. This paper is a survey of active research work on routing protocols for MANET .

**Keywords** – Manet,Ant Based Routing.

## I. INTRODUCTION

Ad hoc network are emerging as the new generation of network and defined as a collection of mobile nodes forming a temporary network without the aid of any centralized administration or standard support services. An ad hoc network is usually thought of a network with nodes that are relatively mobile compared to a wired network . hence , the topology of the network is much more dynamic and the changes are often unpredictable oppose to the internet which is a wired network .This fact creates many challenging research issues ,because the objectives of how routing should take place is often unclear because of the different resources such as bandwidth ,battery power and demands like latency .The routing protocols used in ordinary wired networks are not well suited for this kind of dynamic environment

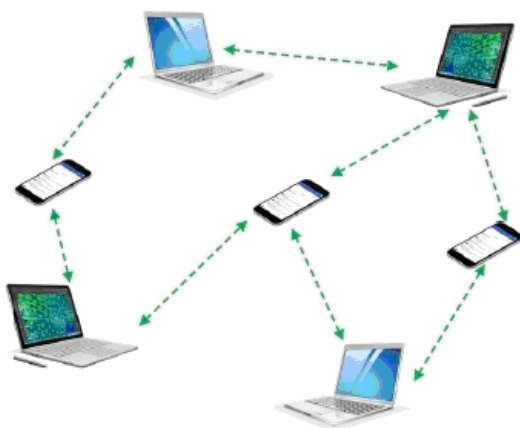


Fig .1 .Mobile ad hoc network.

### 1.1 Applications of manet

There is a widespread application of mobile ad hoc network in the commercial, Military and private sectors. Mobile Adhoc Networks allow users to access and exchange information regardless of their geographic position or proximity to infrastructure. In contrast to the

infrastructure networks, all nodes in MANETs are mobile and their connections are dynamic. Military Sector: Nowadays in military equipments there are computer device connected. Ad- hoc networking would allow the military to take advantage of common place network technology to maintain an information network between the soldiers, vehicles, and military information headquarters. Commercial Sector: Ad hoc Networks can be used in emergency or rescue operation during disasters. Rescuers must be able to communicate in order to help the people. By automatically establishing a data network with the communication equipment that the rescuers are already carrying the task is made easier.

- **Military Sector :** Military equipment now routinely contains some sort of computer equipment. Ad- hoc networking would allow the military to take advantage of commonplace network technology to maintain an information network between the soldiers, vehicles, and military information headquarters. The basic techniques of ad hoc network came from this field .
- **Commercial Sector:** Ad hoc can be used in emergency/rescue operations for disaster relief efforts, e.g. in fire, flood, or earthquake. This may be because all of the equipment was destroyed, or perhaps because the region is too remote. Rescuers must be able to communicate in order to make the best use of their energy, but also to maintain safety. By automatically establishing a data network with the communications equipment that the rescuers are already carrying, their job made easier. Other commercial scenarios include e.g. ship-to-ship ad hoc mobile communication, law enforcement, etc.
- **Low Level:** Appropriate low level application might be in home networks where devices can communicate directly to exchange information. Similarly in other civilian environments like taxicab, sports stadium, boat and small aircraft, mobile ad hoc

communications will have many applications. Data Networks: A commercial application for MANETs includes ubiquitous computing. By allowing computers to forward data for others, data networks may be extended far beyond the usual reach of installed infrastructure. Networks may be made more widely available and easier to use.

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### 1.2 Characteristics

Mobile ad-hoc networks (MANET's) have following characteristics:

- No infrastructure – flat network
- Radio communication – shared medium
- Every computer or device (node) is a router as well as end host
- Nodes are in general autonomous
- Mobility – dynamic topology
- Limited energy and computing resources . Unreliability of wireless links between nodes . Lack of incorporation of security features in statically configured wireless routing Protocol not meant for ad hoc environments.

### 1.3 Issues in Mobile AD-HOC Networks:

There are several issues within ad hoc networks that make them very complicated to integrate with the existing global internet. The problems are addressed below:

1. Routing Routing is one of the most complicated problems to solve as ad hoc networks have a seamless connectivity to other devices in its neighborhood. Because of multi hop routing no default route is available. Every node acts as a router and forwards each other's packets to enable information sharing between mobile nodes.
2. Security Clearly a wireless link is much more vulnerable than a wired link. The science of cracking the encryption and Eaves dropping on radio links has gone on since the first encryption of radio links was established. The user can insert spurious information into routing packets and cause routing loops, long time-outs and advertisements of false old routing table updates. Security has several unsolved issues that are important to solve to make the ad hoc network into a good solution.
3. Quality of Service (QoS) QoS is a difficult task for the developers, because the topology of an ad hoc network will constantly change. Reserving resources and sustaining a certain quality of service, while the

network condition constantly changes, is very challenging

### 1.4 Challenges in Mobile AD-HOC Networks:

- Host is no longer an end system - can also be an acting intermediate system .
- Host is no longer an end system - can also be an acting intermediate system changing the network topology over time
- Potentially frequent network partitions
- Every node can be mobile
- Limited power capacity
- Limited wireless bandwidth
- Presence of varying channel quality
- No centralized entity – distribute

### 1.5 Classification

Mobile ad-hoc networks (MANET's) are of following types:

- Vehicular Ad hoc Networks (VANETs): - These are used for communication among Vehicles and between vehicles and roadside equipments.
- Internet based mobile ad hoc networks (iMANET):- These are ad hoc networks that link mobile nodes and fixed Internet-gateway nodes. In such type of networks normal Adhoc routing algorithms don't apply directly.

## II. LITERATURE SERVAY

In this paper we introduce the concept of mobile ad hoc network, routing protocol and wireless network .we also mentioned different types of application based topology which are used in wireless network . These recent evolutions have been generating a renewed and growing interest in the research and development of MANET. In recent years, the eminent growth of mobile computing devices, which mainly include laptops, personal digital assistants (PDAs) and handheld digital devices, has caused a revolutionary change in the computing world: computing will not merely rely on the capability provided by the personal computers, and the concept of ubiquitous computing emerges and becomes one of the research hotspots in the computer science society .

## III. METHODOLOGY

MANETs have applications in rapidly deployed and dynamic military and civilian systems. The network topology in a MANET usually changes with time. Therefore, there are new challenges for routing protocols in MANETs since traditional routing protocols may not be suitable for MANETs. For example, some assumptions used by these protocols are not valid in MANETs or some protocols cannot efficiently handle topology changes. Researchers are designing new MANET routing protocols and comparing and improving existing MANET routing

protocols before any routing protocols are standardized using simulations.

### 1. Routing Protocols

Routing is the act of moving information from a source to a destination in an internetwork. During this process, at least one intermediate node within the internetwork is encountered. The routing concept basically involves, two activities: firstly, determining optimal routing paths and secondly, transferring the information groups (called packets) through an internet work [9]. The later concept is called as packet switching which is straight forward, and the path determination could be very complex. Routing protocols are classified into different categories depending on their properties. Centralized vs. Distributed

- Static vs. Adaptive
- Reactive vs. proactive
- In centralized algorithms, all route choices are made at central node, while in distributed algorithms, the computation of the routes is shared among the network nodes another classification of routing protocols relates to whether they change routes in response to the traffic input patterns. In static algorithms, the route used by the source destination pairs is fixed regardless of traffic conditions [10-12]. It can only change in response to a node or link failure. This type of algorithm cannot achieve high throughput under a broad variety of traffic input patterns.

### IV. SCOPE AND FUTURE RESEARCH

More and more efficient routing protocols for MANET might come in front in the coming future, which might take security and QoS (Quality of Service) as the major concerns. So far, the routing protocols mainly focused on the methods of routing, but in future a secured but QoS-aware routing protocol could be worked on. Ensuring both of these parameters at the same time might be difficult. A very secure routing protocol surely incurs more overhead for routing, which might degrade the QoS level. So an optimal trade-off between these two parameters could be searched. In the recent years some multicast routing protocols have been proposed. The reason for the growing importance of multicast is that this strategy could be used as a means to reduce bandwidth utilization for mass distribution of data. As there is a pressing need to conserve scarce bandwidth over wireless media, it is natural that multicast routing should receive some attention for ad hoc networks. So it is, in most of the cases, advantageous to use multicast rather than multiple unicast, especially in ad where bandwidth comes at a premium

### V. CONCLUSION

This paper presents a number of routing protocols for MANET, which are broadly categorized as proactive and

reactive. Proactive routing protocols tend to provide lower latency than that of the on-demand protocols, because they try to maintain routes to all the nodes in the network all the time. But the drawback for such protocols is the excessive routing overhead transmitted, which is periodic in nature without much consideration for the network mobility or load. This paper discussed about Mobile Ad-hoc networks, their classification, their characteristics, and the issues and challenges that are posed by Mobile ad-hoc networks. This paper also gave a detailed review of literature about Mobile ad-hoc networks and the issues and challenges posed by them. The future scope of this research paper is to improve the standard of Mobile ad-hoc networks so as to overcome the issues and challenges posed by them.

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