# Routing Protocols and Applications of Mobile Ad Hoc Networks

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## ABSTRACT:

In past few years, traditional wired network have become quite outdated. Now days Mobile Ad Hoc Networks are becoming a major immerging technology in mobile computing. We have seen the advancement in the field of internet due to wireless networking technologies. It gives rise to many new applications. The emerging capabilities of mobile devices have given a new direction to the internet, which decreases the cost and allow us to use infrastructure wireless networks and infrastructure less wireless networks (i.e. Mobile Ad Hoc Wireless Network). Routing protocols in ad hoc networks has received wide interest in the past years. Some studies have been reported in the literature to evaluate the performance of the proposed routing algorithms. In this paper we focus on the applications and routing protocols of Mobile Ad Hoc Networks.
Keywords: MANET, QoS, Protocols

## INTRODUCTION:

MANET means Mobile Ad hoc Network also known as wireless Ad hoc network that usually has networking environment which follow some route on top of a Link Layer. There are nodes which are connected with each other wirelessly without a fixed infrastructure in a self-organized, self-healing, self-configured network. Nodes in MANET can move freely as the network topology changes frequently. Each node act as a router. They forward data packets to other specified nodes in the network. Fig. 1 is showing basic structure of MANET.
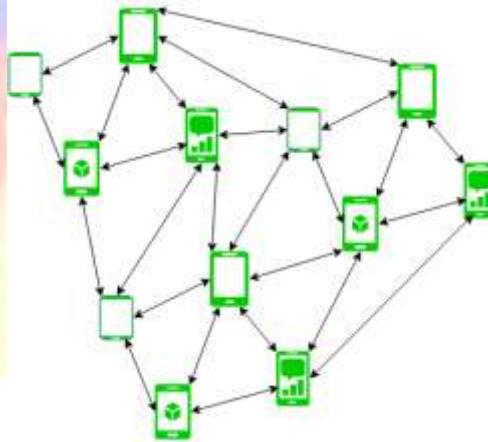


Figure 1: Mobile Ad Hoc Network

In past few decades as Wireless networks have become more and more popular, mainly in the 1990's when they are being adapted to allow mobility and wireless devices became popular. The reputation of mobile devices is increasing and wireless networks significantly increased over the past years, wireless ad hoc networks has now become one of the most lively and active fields of communication and networking research. There are so many applications of mobile ad hoc networks (MANETs), there are also some serious challenges and open

problems that has to be solved. Quality of services is the performance level of a service offered by the network to the user. The goal of QoS provisioning is to attain a more deterministic network behavior, so that information can be delivered in a better way and network resources can be utilized in a better way. The QoS parameters required for communication between the nodes are: delay, throughput, jitter, bandwidth, packet loss etc. Another important parameter of QoS is security. Security can't be neglected.

## HISTORY Of MANET:

We can divide the life cycle of MANET in First, Second and Third generation. Currently Ad Hoc

network falls in third generation. The first generation begun at 1970s. In early 1970s, the Mobile Ad hoc Network (MANET) was called packet radio network (PRNET) and that was sponsored by Defense Advanced Research Projects Agency (DARPA). They started a project named packet radio which has several wireless terminals that could communicate with each other on battlefields. The PRNET used a combination of ALOHA (Arial Locations of Hazardous Atmospheres) and CSMA approaches (Carrier Sense Medium Access) for multiple access and distance vector routing. Then in early 1980s, second generation made an appearance when the Ad- hoc network systems were further improved and implemented as a part of the SURAN (Survivable Adaptive Radio Networks) program. SURAN provides benefits by improving the radio performance by making them small in size, cheaper and power thrifty. This SURAN also provides flexibility to electronic attacks. Improvement was also done in GloMo (Global Mobile Information System) and NTDR ( Near Term Digital Radio).The purpose of GloMo was to provide multimedia connectivity to handheld devices anytime, anywhere. The NTDR make use of clustering and link state routing and organized an ad hoc network. The third generation was come to light in 1990, the concept of commercial ad-hoc networks arrived with note-book computers and other viable communications equipment. The idea of collection of mobile nodes was also proposed. Development of Standard IEEE 802.11 made the most of the ad hoc network.

Characteristics of MANET
- Network is not depending on any fix architecture for its operation.
- Easiness of deployment
- Fast installation
- Dynamic varying Topology
- Each node is working as smart node
- Not any go-between networking device is required for communications

## APPLICATION OF  MANET:

As the use of portable devices is increasing rapidly as well as growth in wireless communication and ad-hoc networking is also gaining importance with the growing number of widespread applications. Where there is little or no communication infrastructure or the existing infrastructure is costly or inconvenient to use Ad hoc networking can be applied. Mobile Ad- Hoc Networks allow users to access and exchange information regardless of their

infrastructure. MANET plays a important role in wireless communication and supply effective communication. Some of important applications are:

- <u>Commercial Sector:</u> Mobile Ad hoc can be used in emergency/rescue operations where disaster relief efforts are required for e.g. in fire, flood, or earth-quake and in other natural disaster. Emergency rescue operations must take place where non-existing or damaged communications infrastructure and rapid deployment of a communication network is needed.

- <u>Personal Area Network (PAN):</u> A personal area network (PAN) is a network that can exchange information in the vicinity of a person. Basically it is interconnection of devices in short range between individual persons. In this type of networks, to connect to other network or devices wirelessly this kind of network can be used.

- <u>Local Level:</u> Palmtop or laptops can be connected to create a multimedia network autonomously by using Ad Hoc networks to share and communicate information or data among participants for example in a Classroom or seminar various devices can be connected wirelessly and they can share information.

- <u>Quality of Service (QoS):</u> It is a challenge to provide different QoS in a varying environment.
  The inherent stochastic feature of communications quality in a MANET makes it difficult to offer fixed guarantees on the services offered to a device.

- <u>Military battlefield:</u> The modern digital battlefield demands strong and unfailing communication. In the battlefield it is required that soldiers can trust on information provided to them related to situation of battlefield.

### ROUTING PROTOCOLS IN MANET:

Nature of mobile nodes is highly dynamic and there is no central controller, traditional routing protocols cannot be applied straight to a MANET. Some of the considerations required in the design of MANET routing protocols include the mobility of nodes, unstable channel states and resource constraints such as power and bandwidth. Ad-hoc networks need multi-hop routing and all nodes can contribute in the routing protocols. Routing protocols are organized as:

Reactive Routing Protocols:

This is also called On Demand protocol. These protocols find path for nodes when it is necessary by flooding the network with Route Request packets. They are called On Demand because they do not maintain any routing information if there is no communication between nodes. Reactive protocols tend to decrease the control traffic messages overhead at the cost of increased latency in discover a new routes. Source initiated route discovery in reactive routing protocols and less delay. Reactive Protocols are AODV (ad-hoc on demand distance vector), DSR (distance vector routing) and ABR (Associatively Based Routing) protocols.

Proactive Routing Protocol:

This is also known as table driven protocol. In Proactive routing protocols each hub can store data as tables and when any type of change accrue in network topology need to update these tables according to update. There is no route discovery delay associated with finding a new route. Proactive protocols Traditional distributed shortest-path protocols Based on periodic

updates high routing overhead. Proactive routing protocols are DSDV (destination sequenced demand vector), OLSR (optimized link state routing protocols).

Hybrid Routing Protocols:

This type of protocol uses best characteristics of both Reactive and Proactive protocols. This protocol makes path within range using table driven protocol and outside range using on demand protocol. It was projected to reduce the control overhead of table driven routing protocols and also reduce the latency caused by path discovery in on demand routing protocols. Example: Zone-based Hierarchical Link State (ZHLS). It was the first hybrid routing protocol.

## CONCLUSION:

In this paper we are trying to know about different routing protocols and various application of MANET. MANET is growing rapidly today and the growth in the area of mobile computing is opening new doors for mobile communications in which mobile devices form a self organizing and self configuring network called Mobile Ad Hoc Network. Various devices can be connected wirelessly which can communicate with each other with the help of routing protocols.

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