

# An Overview of Mobile Ad hoc Network (MANET): Features & Challenges

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**Abstract**— A mobile ad hoc network is the self-configure and self-organized infrastructure less network that is used for wireless. Mobile ad hoc network (MANET) are not used any centralized device to manage the nodes [1]. The range or the paths between the nodes are limited. When a node are move far from the range that node are out of network. This paper presents the study of the Manet Types, Features and its Challenges.

**Key words:** Mobile ad hoc network (MANET), PRNET (Packet Radio Network), ALOHA (Ariel Location of Hazardous Atmospheres), CSMA (Carrier Sense Multiple Access)

## I. INTRODUCTION

The first version of MANET is proposed by defense advanced Research projects Agency in 1970. In early days its name is called packet radio network. This network used to communicate between army soldiers in battlefields. The entire program of MANET network is categorized into the three generation. In the first generation start in 1972 when the MANET are called PRNET(Packet Radio Network). PRNET consist three type techniques to provide wireless communication these are ALOHA(Ariel Location of Hazardous Atmospheres), CSMA(Carrier Sense Multiple Access) and Disaster Vector Routing. With the used of these techniques PRNET provides different type of network facilities to wireless network environment. The second generation of MANET start in 1980 when the ad hoc network emerged in SURAN(Survivable adaptive Radio Network ) Program. This program improves the wireless performance of the ad hoc network by making this device smaller and cheaper. The techniques used the packet switched network without any infrastructure. The third generations actually provide the concept of ad hoc network. In this generation ad hoc network come into the notebook computers and other wireless communication devices.

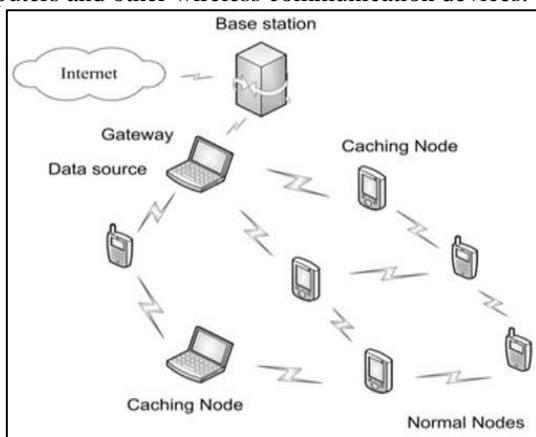


Fig. 1: Ad hoc network

## II. TYPES OF MANET

There are three types of MANET:

### A. VANET (Vehicular ad hoc network):

VANETS (Vehicular ad hoc network) is same as mobile ad hoc networks but MANET has a alone features that build it special from MANET. VANET is a type of network that provide inter-vehicle wireless communication between intelligent vehicles[4]. The communication between vehicles has two types: vehicles to vehicles and vehicles to roadside.

The vehicles ad hoc network insure that the communication path do not breakdown before the end of data transmission. This is the very difficult task in vanet because the topology of network constantly changing and the wireless path are precarious owed to high node mobility. The primary objective of vehicles ad hoc network is to provide safety mechanism to the vehicles and passengers. Vehicles ad hoc network provide the information about Current speed and the location of the vehicles. Instead of these services vanet also provide the value added services like email, audio video sharing etc.

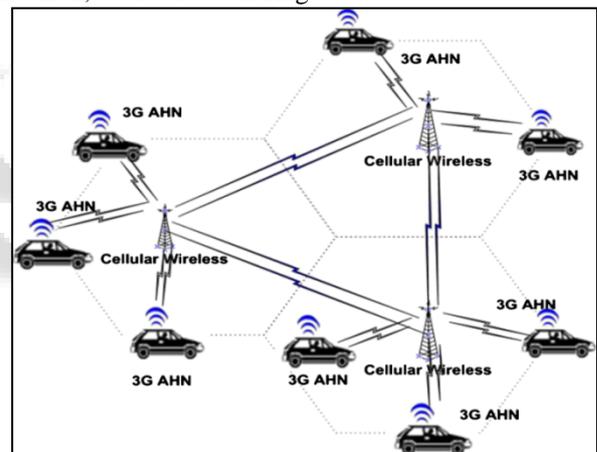


Fig. 2: Vanet Network

### B. InVANETs(Able Vehicular Ad hoc network)

InVANET is an Intelligent vehicular specially appointed system that join the smart transportation system(ITS). InVANET utilize the Wi-Fi IEEE 802.11 and WiMAX IEEE 802.16 for simple and effective correspondence between vehicles. In keen vehicular impromptu system are utilized Wi-Fi instrument with the assistance of these component we find the car vehicular data on electronic maps utilizing the web or concentrated programming. By utilizing Wi-Fi based route framework we successfully find the vehicle which is inside in enormous grounds like colleges, air terminal and passages. The InVANET additionally utilized as a manual for find and distinguish points of interest in new city. Wise vehicular specially appointed system give the enhancing of wellbeing and solace of driving and voyaging situating based directing has converted into the vehicular impromptu system for correspondence. For Internet Mobile IPv6 is generally utilized answer for give session congruity and reach ability to the web for

portable hubs. In momentum time there is progressing research in the field of InVANET for a few situations. The principle intrigue is in applications for movement situations, cell phone frameworks, sensor systems and future combated frameworks.

### C. iMANET(Internet Based adaptive Mobile ad hoc network)

Web Based versatile portable specially appointed system (iMANET) is a rising innovation in portable impromptu network(MANET). iMANET bolster self-sorting out, portable frameworks. This innovation empowers a free arrangement of versatile hubs, which can work in deterring or be associated with the more noteworthy Internet.

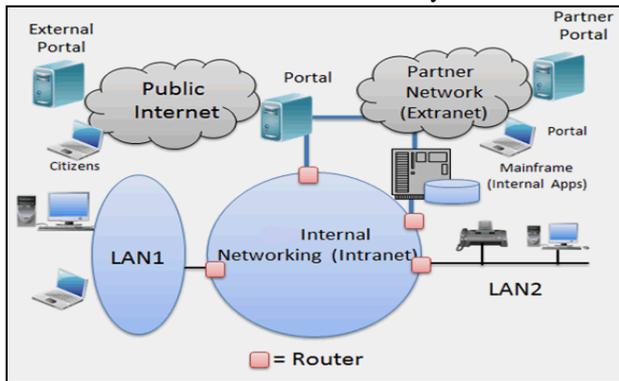


Fig. 3: iMANET NETWORK

### III. FEATURES OF MANET

#### A. Self-directed terminal

Each mobile node in the manet networks are behaved both host and router. It means nodes are sending the packet and also forward the packet or route the packet in Manet.

#### B. Easy to communicate

The communication between nodes in Manet is varying. In Manet to join and release the node are done by send a RREQ message. For joining to Manet group not any permission are required. The Manet are provide cheap and convenient for communication. The communication is cheap because not any hardware infrastructures are used in Manet.

#### C. Support multicast routing

portable specially appointed systems every one of the three sort steering, for example, unicast, multicast and communicate are utilized. At the point when a source hub needs to send a parcel to another hub that have no immediate connection to source hub. Than source hub communicate the RREQ message to the MANET systems. At the point when the another hub get the course ask for message, it built up turn around way to the source and goal to re-communicate the bundle. At the point when the bundle came to goal hub than goal hub unicast the course answer message to the source.

#### D. Malleability of link capacity

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### IV. CHALLENGES OF MANET

#### A. Routing

Multipurpose specially appointed directing is support multi-jump routing system topologies that can changes as often as possible because of portability. Powerful routing conventions are expected to build up correspondence way between hubs without bringing about movement[5]. In Manet many proposed strategy are give to course the bundle in specially appointed systems. At the point when correspondence begin in Manet and the parcel are send to another hubs. The steering table is refreshed of all hubs these refresh are perform on the grounds that the conventions trade directing control data intermittently and on the topological changes. These conventions called proactive routing conventions, these conventions reaches out by customary connection state or separation vector directing conventions that utilized as a part of wired systems. In responsive routing convention more often than not all hubs directing table cannot be refreshed. Responsive routing conventions just setup courses to hubs they speak with and these courses are kept alive the length of they are required[5,6]. At the point when close by hubs are keep setup star effectively and far away courses are setup responsively likewise conceivable and called it half breed directing convention.

#### B. Scalability

In current time every single prominent system administration calculation are intended to take a shot at settled or generally little remote systems. As of late numerous versatile specially appointed system applications include expansive systems with a great many hubs like sensor systems and strategic systems[3]. Adaptability is the basic employments to arrangement in these system calculations. The means towards a substantial system comprising of hubs with constrained assets are not straight forward and show many difficulties that are still to be explain in region, for example, tending to, directing. Area administration, setup administration, interoperability, security and high limit remote innovations and so on.

#### C. Quality of Service

Nature of administrations in specially appointed systems created to blend the necessity of heterogeneous applications in the Internet. The nature of administration is an embrace by the system to give beyond any doubt execution to a stream as far as the amounts of data transfer capacity, deferral, jitter and parcel misfortune likelihood and so forth in heterogeneous systems keep up the nature of administration is extremely troublesome in light of the fact that the no bring together gadget are utilized and the hubs are allowed to move anyplace in the systems and they interacts the system[7]. Because of the way of specially appointed systems nature of administration cannot be ensured for quite a while due to the connection quality variety.

#### D. Security

In versatile specially appointed system security is the measures basic issue that is still for the most part unfamiliar region. Hubs in portable impromptu system utilize the radio medium to share our information that conceivably increment condition, they are especially prostrate by the noxious assault like refusal of administration assault. Lack of any unify organize administration or validation expert max the powerfully changing remote structure is extremely delicate to penetration, listening in, impedance and so on.

Security is considered to be a measure boundary in business use of specially appointed system advances. In security concern cryptography is the customary procedure to secure the information over system transmission yet in the cryptographic approach key dispersion is the testing errand. Thus, the analyst endeavors on secure information sending. The most basic issue is the danger of a hub been caught and bargained. This hub is utilized to refresh the steering data and access to basic data on the systems, transferred information yet it can likewise send wrong directing data which would be deadened the necessary system.

#### E. Energy Conservation

In versatile impromptu system, no settled framework are utilized so specially appointed systems need to course compact, constrained power sources. The power proficiency is the most well-known issue in specially appointed system. The battery energy of hub is essential assets to conveyed a bundle to the goal. The battery energy of the hubs must be managed with proficiency to maintain a strategic distance from end of hub[10]. The hubs vitality proficiency are measured by the proportion of the measure of information conveyed by the hub to the aggregate vitality extended.

#### F. Node co-operation

In MANET the data is go through the node by node. One node forward the data packet to another node and the packet reach the destination node. So these situations the node cooperation are very important issue in MANET. This is the basic requirement in MANET for node communication. These are several reason of node not cooperate one another, the most direct reason is power saving. Cooperation among the nodes are harder to enforce in MANET due to many reasons. First is, nodes can randomly join and leave the networks. Second, spotting of misbehaving nodes is in scattered manner due to deficiency of centralize mechanism [11]. The nodes are divided into four categorize.

- 1) Cooperative node: this type of nodes active when route discovery and packet forwarding take place with positive attitude.
- 2) Malicious Nodes: They are active in both route discovery and landing attack. These types of node try impairment or damage the networks.
- 3) Selfishness: they are active in route discovery but not in packet forwarding. These nodes prone to gain help from the networks without unforced to payback.
- 4) Hacker Node: Hacker node might try to bug the information exchanged between the nodes.

#### V. CONCLUSION

In MANET the wireless nodes are independent to move anywhere. Nodes in MANET are consist memory and

energy to used when communication take place. It has different types with no. of features. The mobility is the common problem of the MANET. Because of the no centralized device are used in MANET then every wireless nodes act like sender and also receiver.

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