MANETS

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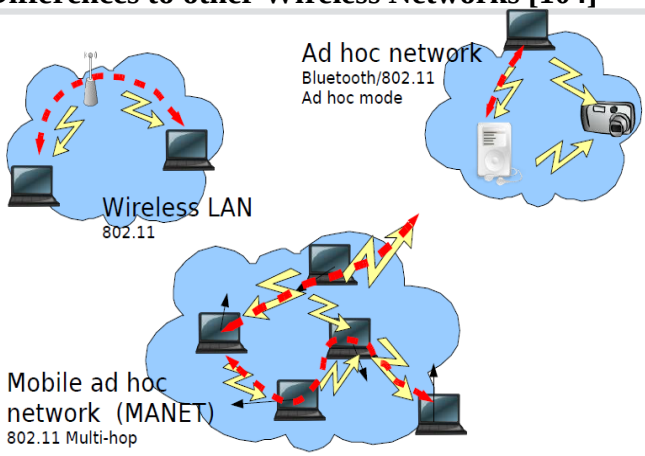
INTRODUCTION

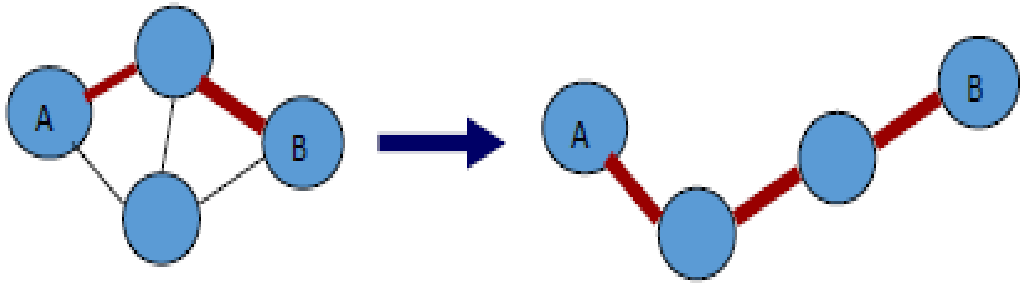
Mobile Ad-hoc Networks are infrastructure-less networks, is a cooperative engagement of a collection of mobile hosts without the required intervention of any centralized access point. Any local area network or some other small networks that are especially wireless and are only for the communication session, each user has a unique network address that is recognized as a part of network. Nodes can join together to make up a simple ad-hoc network. Wireless ad-hoc network is a decentralized type of wireless network. Because it is ad-hoc it does not rely on a pre-existing infrastructure. A lot of work on the improvement of routing of data in MANETs for different classes has been done; latest being the multimedia traffic class. As in today, on the network more and more content becoming audio-visual, it becomes very important to study the analysis of multimedia in Mobile Ad-hoc Networks.

In recent years digital video is replaced analog video in many applications. In Digital television, replacement of analog video cassettes by DVD to watch movies. The Ever-increasing demand for video transmission motivates research on how to provide Better-delivered video quality. The MPEG-4 standard provides key technologies that will enable much functionality with benefits such as improved quality and reliability [2]. Previous studies use various real video traces to evaluate their proposed network Mechanisms in simulation environment. Some researchers evaluate the different parameters like throughput, peak signal noise ratio (PSNR) etc. In today era, as in higher Bandwidth network MTU (Maximum Transmission Unit) has increasing significantly. To study the effect of larger fragment size and thus smaller fragmentation on a video Trace files becomes an important issue. In the proposed research work the multimedia Traffic carried over the UDP is tested with different fragment sizes for the following parameters- fraction of decodable frames, Average end-to-end delay, Packet Loss rate, throughput, Average PSNR and comparison between these results.

Differences to other Wireless Networks [104]



An ad-hoc network supports multi-hop routing to extend the range of wireless networks whereas range only depends upon the concentration of wireless users. MANET is a collection of mobile nodes without the required intervention of any centralized access point [5] [6].Ad-hoc is Latin and it means "for this purpose". Each node/device independently moves freely from one to another direction, will therefore change topology as well as host very frequently. These are basically those networks that have a routable networking environment. It is a temporarily formed network which is created, operated and managed by nodes themselves.



In MANETs nodes are wireless and battery powered [9]. A MANET can be considered as an autonomic system as they are self-configure, self –heal, self-organize, and self -protect. No fixed routers are available in these networks. Internet connectivity would benefit users from mobility offered by Mobile Ad hoc networks and connectivity provided by the Internet [7]. The peer to peer system infers that each node/device in the network can act as an intermediate. All nodes works together to improve the reliability of network communications. Ability of data packets to "hop" from one user to another effectively extends the network coverage area and provides a solution to overcome non-liner of issues i.e. LOS. [100] MANETs are self-forming, self-maintained, self –healing and also has network flexibility.

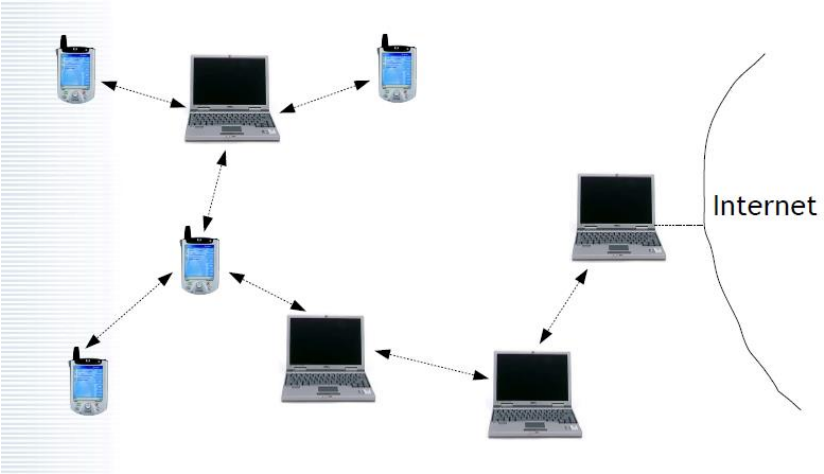
In Ad-hoc networks the infrastructure mobile nodes create routes among themselves to from own

wireless network. The advancements of wireless technologies and development of mobile devices, ad-hoc network will play an imp. Role in enabling present and future communication. Video as well as data communication mobile radio technologies has also experienced a fast n rapid growth. [101]

MANET is an infrastructure less system which has no fixed routers, no specialized hardware. All communication only provided by wireless connectivity. However Wireless Links make MANET unreliable and inconsistent too. In MANET all nodes are act as autonomous units in network which work independently and continuously change their position and topology as their movements becomes random. Due to very small and light weight, the mobile hosts are supplied by limited power resources such as small batteries. So because of this limitation causes vulnerability. [101]

As it already discussed that nodes/devices are very free to move freely and independently at unpredictable times. In MANET where network activities with discovery of topology including message delivery executed by devices.

Figure: Example of MANET [105]

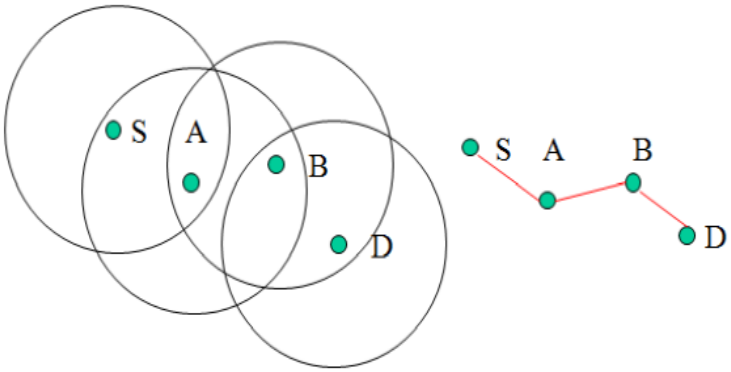


Due to the cause of multiple access, noise factor and interference conditions and the whole capacity of wireless link can be degraded the time and the throughput maybe less than the capacity of transmission. MANET has also very limited physical security.

A MANET can be a standalone network or attached to a larger network, including the internet. In these type of networks all nodes can freely communicate with every another node and nodes are independent to each other. Examples of a network are a P2P and multi-hop connected network. These networks have various advantages in terms of self-reconfiguration and adaptability to

highly variable mobile characteristics like the transmission Conditions [8]. The nodes in this network behave as routers which Discover and maintain routes to other nodes in the network. Creation of routes depends only on nodes which forwards traffic on behalf of other nodes as shown in fig . The destination node communicates with the help of intermediate nodes if it is not within the range of source node [40].

Fig: Nodes in MANET collaborate to route data



MANET allows the nodes to maintain the connections to the network. To add and remove devices from the network. There are various applications where MANETs Are useful like data exchange in local groups, during emergencies such as earthquakes; Rescue uses the Ad-hoc networking concept to send the information about the Environment and victims [10]. MANET is one of the fields which provide ubiquitous Computing capability and access of information without knowing about the location. MANETs are helpful in disaster and military applications [11] and business people also uses the Ad-hoc networks to exchange the information at anywhere and at any time without knowing about whether they will be able to find any Infrastructure. In multimedia applications MANETs play a vital role like audio and video which is another interesting domain.

Applications of MANET

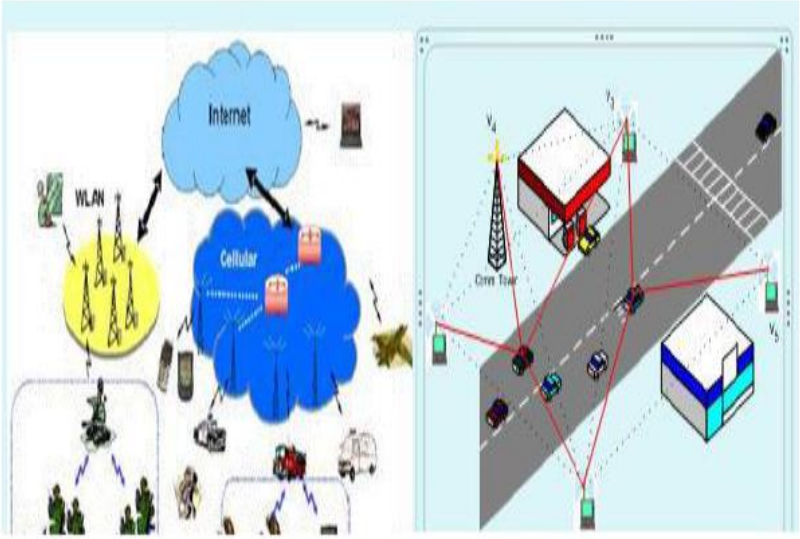
MANET is used in many areas like Military battlefield as it demands robust and reliable Communication for relaying info for awareness.

MANET is also used in Sensor Networks that can be used to detect any properties of Area like pollutions, pressure, temperature etc.

MANET is applicable in Disaster Area Network which includes any type of as it can be flood,

earthquake. These type of rescue operations often need the relayed Information from one team to another over a small handled.

Fig: Applications of MANETs



MANET- Military [104]

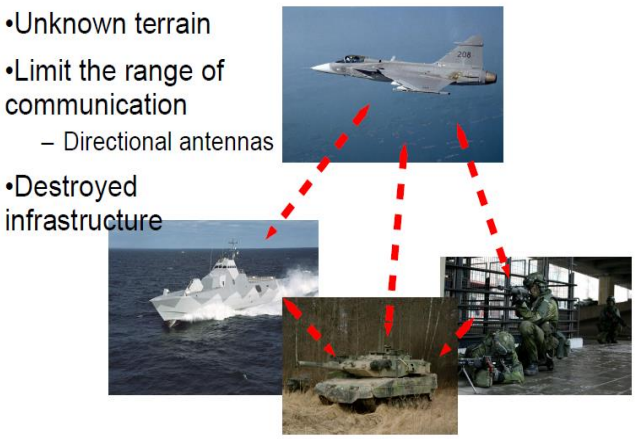
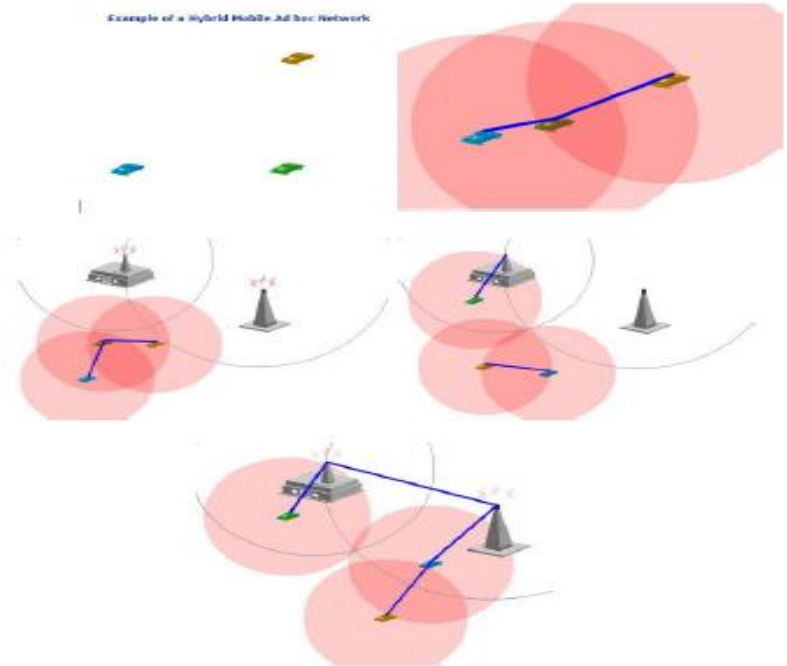


Figure: MANET- Disaster [104]

While MANETs are completely independent and self-contained, they also can tied to an Internet or Private Networks (IP based local or global) which is called as Hybrid MANETs. [100]

Hybrid MANET:-



History of MANETs

The earliest MANETs were sponsored by DARPA in the early 1970s which were called 'packet radio' networks. BBN Technologies and SRI International are designed & experimented with these earliest systems. The whole Experimenters included Jerry Burchfiel, Robert Kahn, and Ray Tomlinson of later TENEX and Internet & email fame. Later DARPA experiments included the Survivable Radio Network (SURAN) project, which took place in the 1980s. And the third wave of academic activity started in the mid-1990s with the advent of inexpensive 802.11 radio cards for personal Computer. The Current MANETs are designed primary for military utility; examples include JTRS & NTDR.[100]. IEEE 802.11-wireless protocol incorporates an ad-hoc networking system when no wireless access points are present, although it would be considered a very low-grade, Ad-hoc set of rules (protocols) by specialists in the field. This system only handles traffic within a local "cloud" of wireless devices. Each device transmits and receives data, but does not route anything between the network's systems. However, higher-level protocols can be used to aggregate various IEEE ad-hoc networks into MANETs. [100]

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