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RESEARCH ARTICLE

PEER-TO-PEER AD HOC NETWORK: AN OVERVIEW

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Abstract— Past few years, we have seen a rapid expansion in the field of mobile computing due to the proliferation of inexpensive, widely available wireless devices. Fourth-generation wireless networks may require an integration of mobile ad hoc networks (MANET) into external network to improve the flexibility of the communication and travelling. This occurrence is well-suited for commercial and other things. However, current devices, applications and protocols are solely focused on cellular or wireless local area networks (WLANs), not taking into account the great potential offered by mobile ad hoc networking. Application scenarios are not limited to emergency and rescue operations, conference or dormitory settings, automobile networks, personal networking, etc. This paper describes the concept of ad hoc networking by giving its background and also point out some of the applications that can be envisioned for ad hoc networking. Paper contains information on MANET for wireless ad hoc networking.

Keywords— application; cellular network; challenges; peep-to-peer network; overview of MANET

I. INTRODUCTION

The wireless technology has made communication very convenient for user. An Ad Hoc network is a term used to describe a network link directly between two computers using their network interfaces (wireless or wired). This would be an alternative to a more usual network setup where two or more computers would link up through a central network switch or hub [1]. Normally Ad Hoc networks are created as a temp measure to achieve a particular task like printing over Wireless or transferring files from one desktop to another. Millions of people are communicate through wireless product such as laptops, mobile etc with modem. Mobile ad hoc networking is among the recent advancements in wireless communication technology. Mobile wireless data communication, which is innovative both in terms of technology and usage per penetration, is a driving force, thanks to the Internet and the success of second-generation cellular systems[2][3].The concept of leveraging wireless communication in vehicles has fascinated researchers since the 1980s. The term VANET was originally adopted to reflect the *ad hoc* nature of these highly dynamic networks. In this paper, Vehicular Ad-Hoc Networks (VANETs) are a special kind of Mobile Ad-Hoc Networks (MANETs), where wireless-equipped (road) vehicles form a network without any additional infrastructure. Also MANET is a collection of mobile hosts which utilize multi-hop radio relaying and are able of operating without any set infrastructure.[10] In a

MANET, no such infrastructure exists and the network topology may dynamically change in an unpredictable manner since nodes are free to move. This paper represents the characteristics, possible ways of applications and challenges.

II. OVERVIEW OF AN AD HOC NETWORKING AND MANET

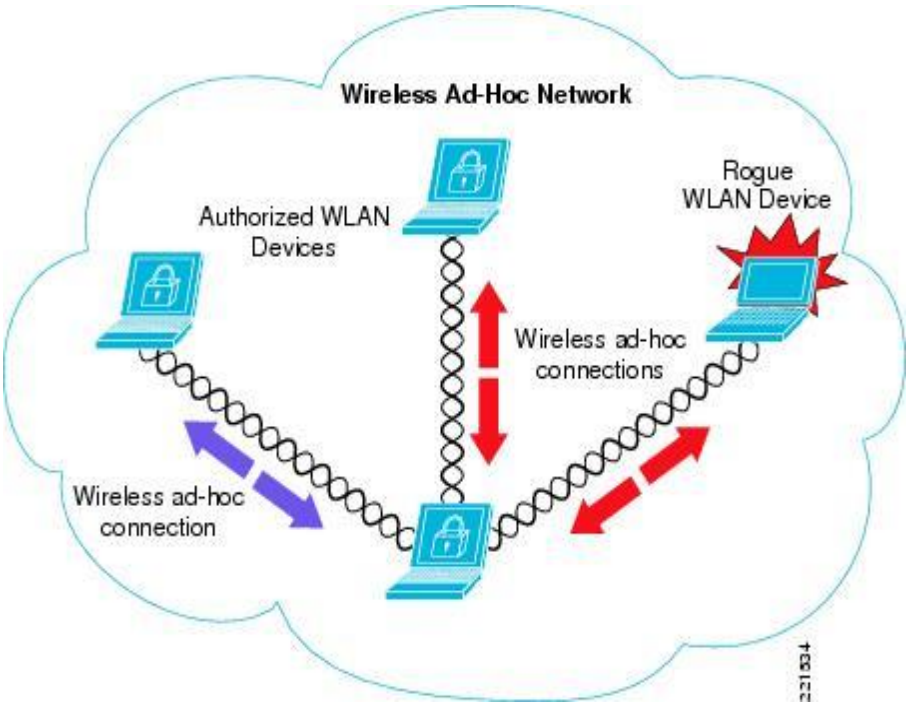
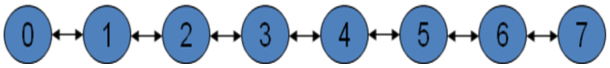


Fig 1. ad hoc wireless network

As shown in above fig 1. computers or laptops directly connected not by wired but singles are trasform with radio wave to communicate with each other.This is used for WLAN. LAN as we know are used to interact with small range comuter system for communication,if authenticated WLAN is found it then interact.[5][6] The principle behind ad hoc networking is multi-hop relaying in which messages are sent from the source to the destination by relaying through the intermediate hops (nodes).In multi-hop wireless networks, communication between two end nodes is carried out through a number of intermediate nodes whose function is to relay information from one point to another. A static string topology is an example of such network:



A) Manet

In the last few years, efforts have been focused on multi-hop "ad hoc" networks, in which relaying nodes are in general mobile, and communication needs are primarily between nodes within the same network. An examples of such developments is the Bluetooth standard that is one of the first commercial realizations of ad hoc wireless networking developed by Bluetooth Special Interest Group (SIG):piconet formed by a group of nodes establishes a single-hop (master node) point-to-point wireless link.A scatternet formed by multiple piconets (master nodes) can establish a multi-hop wireless network [5].

Though the IEEE 802.11 protocols have developed for the wireless networks, they don't function well in multi-hop networks.Realizing the necessity of open standards in this emerging area of computer communication, the mobile ad hoc networks (MANET) standards are being developed by the Internet Working Tasking Force (IETF) MANET working group.

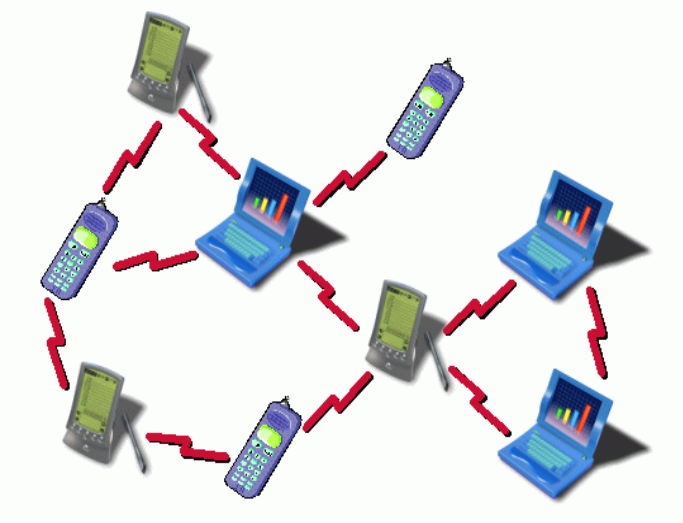


Fig 2. Mobile ad hoc networking

In multiple- hop networking communication take place through intermediate node to each other. Mobile is also wireless device to communicate. Bluetooth application is available on mobile, laptops to connect. A MANET is a type of ad hoc network that can change locations and configure itself on the fly. Because MANETS are mobile, they use wireless connections to connect to various networks. This can be a standard Wi-Fi connection, or another medium, such as a cellular or satellite transmission. Some MANETs are restricted to a local area of wireless devices (such as a group of laptop computers), while others may be connected to the Internet. For example, A VANET (Vehicular Ad Hoc Network), is a type of MANET that allows vehicles to communicate with roadside equipment. While the vehicles may not have a direct Internet connection, the wireless roadside equipment may be connected to the Internet, allowing data from the vehicles to be sent over the Internet. The vehicle data may be used to measure traffic conditions or keep track of trucking fleets. Because of the dynamic nature of MANETs, they are typically not very secure, so it is important to be cautious what data is sent over a MANET.

B) What Is Ad Hoc Networking?

An Ad Hoc network is a term used to depict a network link directly between two computers using their network interfaces (wireless or wired). This would be an alternative to a more usual network setup where two or more computers would link up through a central network switch or hub. Normally Ad Hoc networks are created as a temp measure to attain a particular task like printing over Wireless or transferring files from one PC to another. An Ad Hoc network would not normally takes the place of any other network already configured on a PC. Windows 7 for instance can remember and deal with many networks that have been setup on the PC.

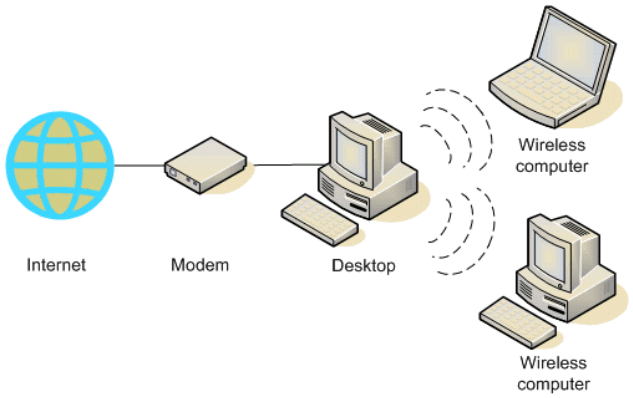


Fig 3. An Ad hoc networking

An ad-hoc wireless network is one in which there are no wired components. The term 'ad-hoc' refers to temporary solutions, so when you transfer a file from a PDA device to a laptop using only wireless connections it is a temporary connection, and also ad-hoc.

III. CELLULAR AND AN AD HOC WIRELESS NETWORK

Cellular network is infrastructure dependent network. An Ad Hoc Wireless network multi-hop radio system is relaying and without support of infrastructure Wireless Mesh Networks, Wireless Sensor Networks.

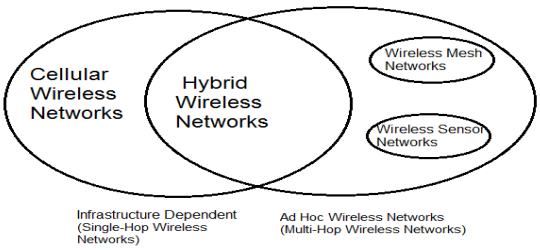


Fig 4. Cellular network and ad hoc networking

The major differences between cellular networks and ad hoc networks as brief are:

- To reduce power consumption and reuse the limited radio spectrum resources, a cellular network was formed. Cell size is one of the factors in channel reuse rate. Basically channel reuse rate in smaller cell size is higher than the channel reuse rate in bigger cell size. A cellular architecture would then present a challenge to the frequent handover procedure to the smaller cell size would usually induce a higher hand-off frequency. In addition to cellular network an ad hoc network is another network architecture for wireless networks [8].

A) Peer-To-Peer Ad Hoc Networking

This concept was popularized by file sharing systems such as the music-sharing application Napster (originally released in 1999) [5]. The peer-to-peer movement allowed millions of Internet users to connect "directly, forming groups and collaborating to become user-created search engines, virtual supercomputers, and file systems. The basic concept of peer-to-peer computing was envisioned in earlier software systems and networking discussions, reaching back to principles stated in the first Request for Comments. Following figure show the working of peer to peer network working.

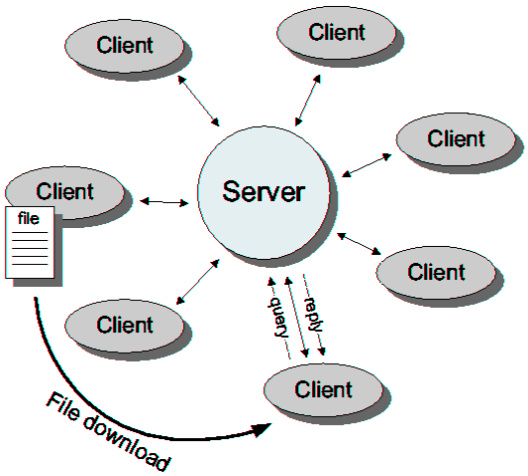


Fig 5. Peer-to-Peer Network

A peer-to-peer network is appropriate for a small network, perhaps up to 10 computers. For a larger network, a dedicated server (or several) is appropriate for several reasons, including centralized management, safety, stability [9]. Usually as a rule of thumb a peer to peer network is appropriate when the number of clients is about 10 or less, and you don't need a dedicated technician to run the network. In addition, a peer to peer network is best used when the growth of the network is small or slow as well.

Small departments and companies successfully use peer to peer networking because they do not require anything more costly or sophisticated [9] [10].

B) Application Of An AD HOC Network

The decentralized nature of wireless ad hoc networks makes them suitable for a variety of applications where central nodes can't be relied on and may improve the scalability of networks compared to wireless managed networks, though theoretical and practical limits to the overall capacity of such networks have been identified. Minimal configuration and quick deployment make ad hoc networks suitable for emergency situations like natural disasters or military conflicts. The presence of dynamic and adaptive routing protocols enables ad hoc networks to be formed quickly [10].

Wireless ad-hoc networks can be further classified by their application:

a. Automobile networking.
b. Military Application.
c. Campus environment establishment.
d. Mobile networking.
e. Other networking Expansion.

1) Military Application:

Ad hoc network is having connection between two or more node. It is establishing communication among a group of soldiers for tactical operations. Coordination of military object moving at high speeds such as fleets of airplanes or ships and Requirements: reliability, efficiency, secures communication, and multicasting routing [1].

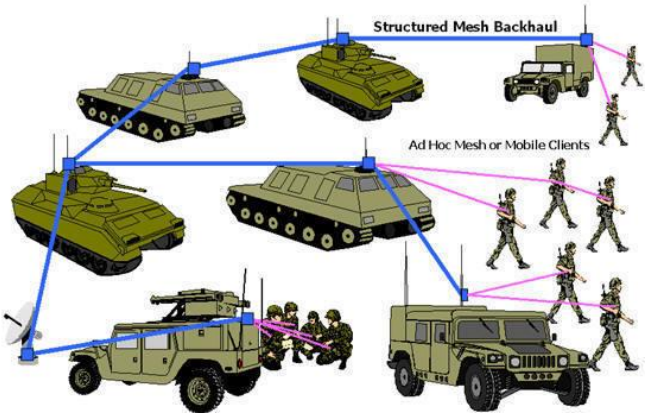


Fig 6. An application of military

IV. CONCLUSION

In this paper we review recent application of ad hoc networking, this paper gives one application in brief. The main focus is on the analysis of MANET difference between cellular network and ad hoc network, application. The rapid growth in the field of mobile computing is driving a new alternative way for mobile communication, in which mobile devices form a self-organizing, self-creating, and self-administering wireless network, called a *mobile ad hoc network*. Its inherent elasticity, be short of infrastructure, ease of deployment, auto-configuration, low price and possible applications making it an essential part of future enveloping computing environments. From a technological point of view, the recognition of this vision still requires a large number of challenges to be solved interconnected to devices, protocols, applications and armed forces. The succinct discussion in this paper shows that, although the large efforts of the MANET research community and the speedy progress made during the last years. From reasonable point of view, mobile ad hoc networks open up original business opportunities for telecom operators and service provider. To this end, appropriate business circumstances, applications need to be identified, together with technological proceed, making a transition of ad hoc networks to the profitable world workable. By analysing above paper we want to conclude that peep- to- peer networking is strongly interactive.

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