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Ad hoc network- *An Overview*

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ABSTRACT: *In this paper we have discussed about the MANET network which can be established in emergency situations. It could be possible only with the help of two or more devices without using any centralized coordinator. The communication between devices takes place with the help of some protocols. In this type of network each node can transfer the data to each other node. We also want to describe how the ad-hoc network helps human differently in real life in such manner like when they are outside of their communication range and inside the communication range. In spite of all these features ad-hoc network also have some disadvantages like it's range is very short and the security problem which make this network less useful. This paper surveys the overview of the role of ad hoc networks in day-to-day life.*

Keywords:
MANET → ***Mobile Ad hoc Networks***

I. INTRODUCTION

On wireless networks, an ad**hoc** is instant networkin which wireless devicesare directlycommunicated with each other. Operating in ad-hoc mode allows all wireless deviceswithin the communication range.Each node initiates communication with other nodes in peer-to-peer fashionwithout involving central access points. This may be done using an Ethernet crossover cable, or the computers' wireless cards.

The range of this network is very low. .Basically, an ad hoc network is a temporary network in which connection between the nodes are created for a specific purpose with battery constrained wireless devices. The combination of wireless nodes may be only laptops, cell phones, walkie- talkie, palm tops or any wireless handheld devices or any combination of the above mentioned devices. The selection depends on the requirement of the end user.

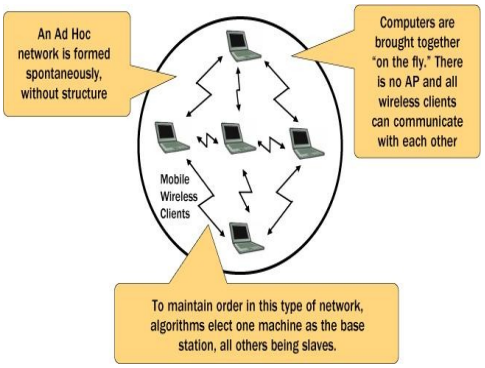

Fig.1. Ad hoc network without infrastructure

II. How does an Ad-hoc network work?

There are many kinds of routing protocols such as Ad hoc On Demand Vector Protocol(AODV), Dynamic Source Routing(DSR) are playing vital role in communication of an ad hoc network.An ad hoc network comes together as needed, not necessarily with any assistance from the existing internet infrastructure. For instance, one could turn on 15 laptops, each with the same kind infrared data communication adapter, the hope that they could form a network among themselves. The nodes are able to move relative to each other, as that happens, the link between them is broken and other link may be established.

Fig.2. Ad hoc network with various mobile devices

III. APPLICATIONS OF AD-HOC NETWORKS

3.1. COMMERCIAL

Ad-hoc network begin very important when an instant connection becomes required. Now we are going to discuss about some commercial areas in which **ad-hoc** network is applied

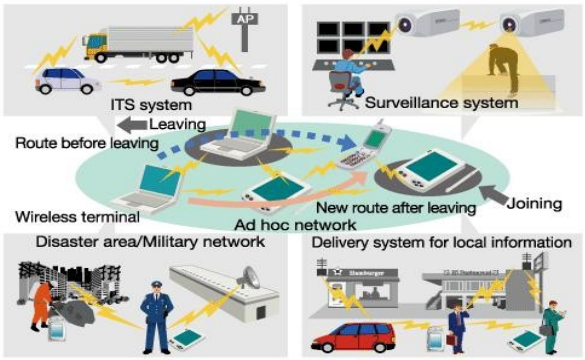

Fig.3. Applications of ad hoc network

3.2 CONFERENCING

The prototypical application requiring the establishment of an **ad-hoc** network in mobile conferencing, when mobile computers gather outside of office environment, the business infrastructure is missing, but the need of collaborative computing might be even more important here than in the everyday office environment. This required a network which can be easily establish in such cases then the **ad-hoc network** becomes the solution against this type of problem.

3.3. EMERGENCY SERVICES

A network can be establish when the required resources becomes available, But what can be done in the situation when the existing internet infrastructure become damaged or in any natural disaster or in the battle-field where no resources available. In such situations the network applications will become increasingly important.

Ad-hoc networks can help in network impairment during this type of emergencies. Mobile unit will probably carry networking equipment in support of routine operation for the times when the internet connection is available. With this technique, emergency mobile units can greatly extend the true support.For instance Police, Fire Van, Ambulance can remain in touch if they can cooperate to form an **ad-hoc network** in the places not otherwise offering connectivity to the global network is highly impossible at that instant.

3.4. EMBEDDED COMPUTER APPLICATIONS

The world is full of machines that move, and future intelligent mobile machines will be able to process a great deal more information in which they operate. Many of these intelligent machines will both mobile and connected by wireless data communication devices. Bluetooth, PDA, computers equipped with inexpensive wireless ports which used for synchronizing data between machines owned by same person to exchange small files on local printer, ,business cards etc. This could be done by with or without Ad Hoc network but with Ad hoc it becomes more flexible & convenient. We might normally expect our ad hoc computers to have access to local information about temperature, light switch controls or traffic information which are also possible to make available instantly.

IV. ADVANTAGES OF AD HOC NETWORKS

4.1 Router free

In ad hoc network each mobile device will act as a host as well as router. It reduces the cost of wireless router as it directly communicates by connecting their network. This becomes the “main advantage” as it reduces the cost of wireless router.

4.2. Any Where Any Time

The Ad Hoc network could be created in any place where we want even in remote places as it only needs multiple wireless devices to be connected together. At the same time all the devices are battery constrained we have to monitor the resources’ battery status.

Example

Hence they are called as “unsecured network”. It doesn’t shows that the data or information transferred will be protected to other unreliable users i.e. there is no central authority which can be referred when it comes to trust decision on other parties in network.

5.4 Full Performance

Every device connected i.e. every nodes must have full performance. This is needed when every node acts as intermediate for transferring information to destination.

The medical team can utilize 802.11 radio NICs in their laptops and PDAs which are enable broadband wireless data communications as soon as they arrive on the scene.

4.3. Connection

It just requires few changes in setting while creating it from scratch and no required additional hardware or software. It's an ideal solution for connecting multiple devices in fast & easy way.

4.4. Affordable

It's affordable i.e. cheaper than any other traditional network because it reduces the cost of wireless router as well as the deployment of other resources such as centralized access point.

VI. CHALLENGES

The major challenges that are faced are posed by cellular-devices, WI-FI hotspots, info station, mobile peer-to-peer Ad hoc mesh networks for broad band networks, vehicular networks, sensor networks and pervasive systems are :

- Naming and addressing flexibility.
- Location services that provide Information on geographic position.
- Self-organization and discovery for distributed control of network topology.
- Decentralized management for remote monitoring and control.
- Sensor network features such as aggregation, content routing and in-network Processing.
- Economic incentives to encourage efficient sharing of resources.

V. DISADVANTAGES OF AD-HOC NETWORK

5.1. Weaker Signal

The signals aren't strong as compared to wireless networks which use a router to function properly.

5.2. Range

The range in Ad Hoc network is very small comparatively to other wireless networks. The communication range is about 100m which can be extended by multihop communication of nodes.

5.3. Security

The main disadvantage is security which occurs due to the following reasons:

1. The dynamic topology
2. Infrastructure less by nature
3. No boundary
4. Scalability
5. Absence of accountability in joining and leaving from the network.

VII. CONCLUSION

An ad hoc network presents a new scenario for an easy connectivity of users in without depending on pre-existing or pre-established conditions, either from a logical perspective and infrastructure. Also, an ad hoc is used less LAN access points and potentially less transmission power. However, ad hoc networks should overcome many technological and technical constraints to be considered for general use and, is still far from providing a scenario of connectivity and total mobility between all autonomous devices.

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