

Adhoc Network: Skills Of Creative Networking

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Abstract-

This research paper is used to throw light on the adhoc networking. Adhoc word comes from the Latin which means “for this”. It generally specifies to give a solution for any specific problem which is not solvable easy. Adhoc basically means used specifically for this purpose. The word adhoc networking refers to the kind of network which is not planned or can say little planned. In this paper we used to discuss the terms adhoc networks and its types, moreover this paper dives bit deeper into what type of challenges are faced by this network, throw light on the applications of adhoc network. This paper also showed its advantages and disadvantages.

Keywords:

Adhoc network, types of adhoc networks, advantages and disadvantages, applications and its challenges.

1. INTRODUCTION

Today’s world is so fast if you want to connected with your circle and remain updated you have to be always use the internet technology. Internet is now days available in your pocket also. Internet is network of networks. So if you want yourself updated you should be connected with network. Adhoc network helps to be creating your own network. Adhoc network is local area network that is built spontaneously when devices are connected. Adhoc network is also a wireless network. In windows operating the term adhoc is used as communication device which allows computers to communicate their data without the use of routers. In Adhoc network every node is itself a router and chooses its path to deliver its data to proper destination. It supports peer to peer architecture as well as peer to remote architecture. Adhoc network is a network which doesn’t need any prefixed infrastructure. “It is art of networking without the network”. In ad hoc networks nodes should be able to move freely and the information should be routed through new paths after old ones have been broken, the network should also be able to handled clustering. We can say Adhoc network is established when needed and always arranged but never planned.

2. TYPES OF ADHOC NETWORK

Adhoc network can be further classified into further categories:

(A) Wireless adhoc networks: This network is wireless which doesn’t require any wires to be connected with nears and dears. It helps us to connect with them anywhere in the world without having any tensions of wires. It is also further divided into two areas:

- 1) Infrastructure network: In this we need infrastructure with a network having fixed and wired gateways. When a mobile network going out of range of one base station, it connects with new base station. In this every node is depended on the network connections to which route data is move on to which link.
- 2) Infrastructure less (ad hoc) networks: It is a kind of network which does not need any prefixed infrastructure. All nodes in this type of network acts as a routers and finds out its routes and maintain its routes to other nodes also. We can also say infrastructure less network is manet (mobile adhoc network). In this every node is independent and free to move in any location. They can change their links to other devices frequently. Such networks operate themselves or may be connected to large internet network.

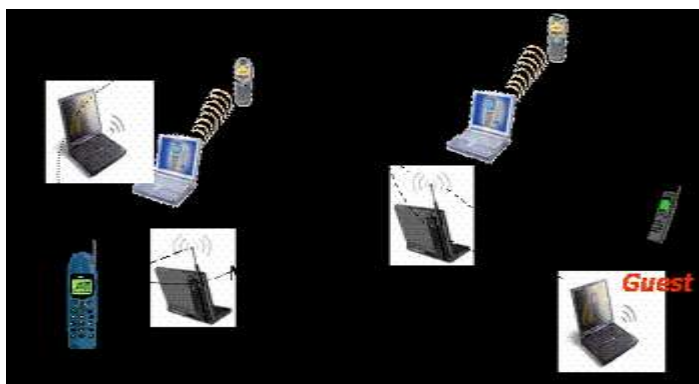


Fig 1: Mobile adhoc network

(B) Mesh network: mesh means where every node is connected to each other. And this type of network is connected to each network which is involved in this system. It is further classified into two categories:

- 1) Wireless mesh network: It is a network which is made up of fixed mesh routers which have adhoc personality. It is implemented with various wireless technologies including 802.11, 802.15, 802.16, cellular technologies or combination of more than one type. It supports 70 routing algorithms. Mesh clients with which we mostly deal are laptops, cell phones, routers and other wireless devices.

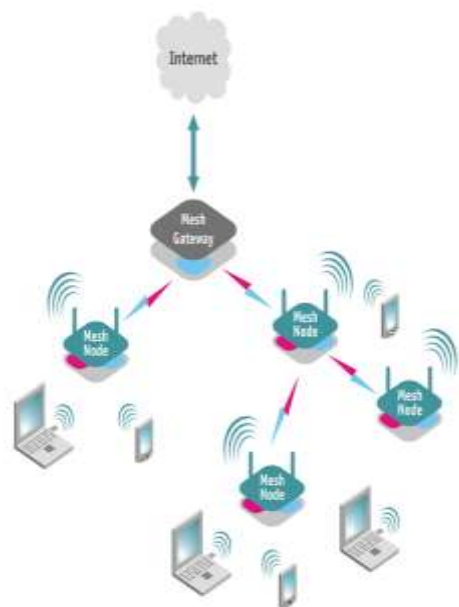


Fig 2: wireless mesh network

2) Hybrid mesh network: Hybrid mesh network allows APs to be connected by Ethernet with the other mesh nodes. It takes the advantage of spectrum to reuse the systems capability by enhancing the mesh. Hybrid network has advantage of high performance and reliable connectivity over other networks. It is the first wi-fi mesh approach that combines high gain antennas and centralized management with single WLAN systems.

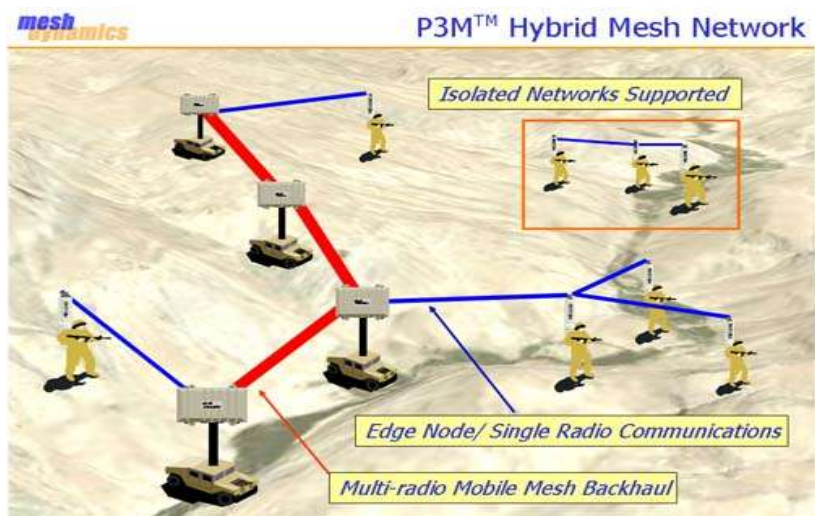


Fig 3: Hybrid mesh network

3. ADVANTAGES AND DISADVANTAGES

Advantages

There are many reasons for using adhoc networks over other networks because they provide us lots of better qualities like as follows:

Portable: It is a portable network as our daily need is of wireless network like mobile which we can use anywhere we needed. It provides us the MANET (mobile adhoc network) which covers all our needs of daily life. In normal days we have to depend on centralized activity system but manet solves our this problem as by using that we don't need to be depend on that type of system. Manet is independent system for e.g. Military system, emergency or rescue operations.

No infrastructure and less cost: If we have to work through pre established infrastructure it is costly as well as not reliable. As installation, maintenance cost of infrastructure is very high. Adhoc networks are used without any infrastructure. So they are not so expensive to use that kind of networks. Infrastructure networks are easy to destroy as comparative to infrastructure less networks.

Decentralized and robust: In adhoc network this is major advantage that these systems are decentralized as if any node is failed down then alternate routing is always possible in this. These systems are very healthy systems as they are not easily failed.

Easy to build and spontaneous infrastructure: Viruses and errors are sometimes not avoidable in the infrastructures. Even they are not easily repairable, replaceable. For this network should always be available. For avoiding these types of problems adhoc network is a good solution. They can be easily built. Network participant's acts as an adhoc nodes and hops are acted as a messages.

Disadvantages

In today day’s wireless communication is everyone’s need and preference because it is trendy as well as time saving. Wireless media looks nice in our rooms as they are not clumps and not looks bad because of wires. But as every concept has merits it also has demerits which will be discussed in this section.

1) Lower data rate: Biggest problem of adhoc networks are low data rate. Wave which is used for data communication. It delivers better data through wired media than wireless media. Higher performance can transmit better data but within the small range.

Higher error rate: The infrastructure data deals with the lesser error rate because the electronic wave which is used for handling transmission of data works better with the wired medias as compared to wireless structure as obstacles causes errors in the data.

Security: Adhoc networks are suffered with various kinds of attacks. Some attacks are impossible to detect as passive attacks as they just listen the signals and attack on the signals. Because adhoc networks don’t have the infrastructure so it is not possible to detect from where it comes. As unauthorized user can easily access the data and corrupt it. Anyone can modify the data. So in adhoc network is security of data and network is not available to the system and whole network.

Scalability: As in adhoc networking no proper technology and topology is working. Every node has a router so it detects its own path and informs to all other nodes. There are lots of controls messages pass onto the nodes. The increased numbers of control messages burden the bandwidth. As nodes increases control messages are also increased. So to control the bandwidth we should know the how many control messages are required in the network.

4. APPLICATIONS OF ADHOC NETWORK

Medical sector: Adhoc network is used in medical sector for monitoring body functions and implantation.

Military sector: In this adhoc networking is useful in establishing communication in remote areas and in battle field where no wired media is allowed.

Emergency area: It is useful in emergency operations such as searching peoples in natural disasters, in rescue areas, earthquake warnings and in crowd controlling areas.

Bluetooth: for exchanging data with nearest wireless medias.

Collaborative and distributive computing: A group of people in teleconference or group conferences can exchange the data. Streaming of multimedia objects with the participating nodes.

Environmental sector: In this it is used to monitor the water level pollution and to provide a early warnings.

Biological sector: for animal tracking and undersea exploration.

Aerospace sector: used for monitoring robots on the different planets.

Home sector: for checking electricity meter, water and gas.

Industrial sector: for remote sensing power plants.

Personal area networking (PAN): used in cell phones, laptops, ear-phones and wrist watches.

Civilian’s environment: used in taxi cab network, meeting rooms, sports stadiums, boats and small aircrafts.

Wireless sensor networks: used to measure temperature, detect vibrations, and make pictures.

5. CHALLENGES FACED BY THE ADHOC NETWORKS

(A) Wireless network:

Packet loss due to transmission errors

Limited communication bandwidth

Frequent partitions and disconnections

Broadcast nature of communication

End to end TCP performance degradation

Mobile computer:

Short battery life

Limited capacities

Mobility:

Dynamically changing of routes/topologies

Lack of mobility awareness by system/applications

Routing:

Location dependent on number of nodes

Computing power/battery power

Security and privacy

Quick route reconfiguration

Support for time-sensitive traffic

Security:

Information disclosure

Denial of service attacks

Resource consumption

Self organization:

Neighbor topology

Topology organization and reorganization

Energy management:

Transmission power management

Battery energy management

Processor power management

Devices power management

Medium access scheme:

Resource reservation

Use of direct antennas

Capability for power control

Synchronization

Real-time traffic support

5. CONCLUSION

At the end we can say that adhoc network is bliss for this generation in terms of networking. Adhoc network plays a vital role especially in disaster areas. Adhoc network is self-created, self-organized and self administrated wireless network. Adhoc is used less LAN access points and less transmission power. Adhoc network offers ease of deployment, low cost, flexibility and secured access which allows clients to work in high speed network environment without any costing of connecting any servers, maintaining them and keep backing them always with the fear of losing data. Advent of adhoc network make the human life bit easy. All of our program files, important data, emails, and other office data can be accessed from anywhere. Business scenarios, applications and economic models need to be identified, together with the technical advances, making a transition of adhoc networks to make worldwide available.

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