Research Issues and Challenges in Wireless Networks: an Overview

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Abstract:- Wireless technology has become valuable because of its infrastructure less working. The term wireless deals with the communication or transmission of information over a distance without any physical source i.e. cables or any other electrical conductors. This transmission is performed by using electromagnetic waves like radio frequencies, infrared, satellite, etc. But this technology has some drawbacks or challenges which are Signal fading, mobility, data rate enhancements, minimizing size and cost, and user security and. In this paper we will study both of these research issues as well as challenges.

Keyword:- *Exponential LAN, peer-to-peer, mobility.*

I. INTRODUCTION

The wireless technology is rapidly evolving and plays an important role in this era. Wireless communication continues exponential growth in most of the fields i.e. the cellular telephony, wireless internet and wireless home networking areas. Wireless.

Communication is one of the important mediums of transmission of data or information from one device to other devices. The Communication is set and the information is transmitted through the air, without requiring any cables.. The devices used for wireless communication are cordless telephones, mobiles, GPS units,

ZigBee technology, wireless computer parts, and satellite television, etc. Due to this technology computer networks require limited bandwidth to achieve connectivity. These handheld devices allowed users access to stored data at any place and any time. Users could set their devices anywhere and can access all networking resources immediately. This is the main aim of wireless networks, and they are capable of delivering it. In this time of technology wireless networks have become of worldwide use at any place i.e. inside home or outside home. In performing this effectively some security issues may appear. With time it became mandatory that some form of security so that users can be protected from intruders. The current wireless access points present a larger security access than the earlier internet connections.

- *IEEE 802.11*

802.11 is a standard created by institute of electrical and electronics engineer (IEEE) for defining all aspects of radio frequency wireless networking. The wireless network technology uses the 802.11 technology that deals with radio frequencies and data transmission. 802.11 define the air interface between a wireless client and a base station or between two wireless clients. The two different spectrum methods defined by 802.11 are direct sequence spread spectrum (DSSS) and frequency hopping spectrum. DSSS sends data out on one frequency at a time. FHSS uses a random number sequence for switching the carrier among the various frequency channel to avoid the interference.

A. Infrastructured Networks

Infrastructured networking is a framework in which all devices communicate with each other by first going through an access point. In infrastructure mode, wireless devices can communicate with each other or can communicate with a wired network. When one access point is connected to wired network and a set of wireless nodes is referred to as a Basic Service Set (BSS). An Extended Service Set (ESS) is a set of two or more BSSs that form a single sub network. It is widely used wireless LAN. The access point acts as a hub to connect two wireless computers. Access points is also known as infrastructure wireless LAN. This mode is similar to a star topology where the wireless network range can be extended by adding additional access points to the existing network. The location of access points requires proper planning to provide effective wireless connectivity.

B. peer-to-peer (P2P) or Ad-Hoc

In this type multiple computers are connected wirelessly using wireless network interface card(NIC).This network allows wireless devices to directly communicate with each other. Computers can access printers and share files using this type of networking, but cannot access a wired LAN resource .This mode is similar to mesh topology. It is implemented when number of users is less.

II. RESEARCH CHALLENGES OF WIRELESS NETWORKS

A. Signal Fading

Fading is a phenomenon of signal is always unwanted. Fading reduces the strength and clarity of signal in wireless communications, fading there are many factors which causes fading of signal. These variables include time, geographical position, and radio frequency. A fading channel is a

communication channel that experiences fading. Wireless communication is generally used in thickly populated areas with large number of buildings. The heights of these buildings and material used in them affect the strength of signal. These causes reflection and refraction several times.

B. Mobility

Mobility is defined as the freedom of nodes to move from one place to another while maintaining the connection. If the connection breaks this situation is called handoff. But as nodes are free to move it shows mobility properties. To maintain mobility, an ongoing connection should not break as a user roams around. In an infrastructured network, a handoff occurs when a mobile host moves away from the range of a base station or access point to that of another one. A protocol is therefore required to avoid this situation of handoff.

C. Power and Energy

Power is the capacity of any device which decides it working efficiency. If a device is fixed it can get continuous supply of energy from any source but if a device is not fixed or it if free to move , it will also need adequate energy to work which it has to store or to work in efficient manner so that it may need less energy to work. For wireless networks it is necessary to consume energy efficiently to operate in continuous manner supply of power. To conserve energy, a mobile device should be able to operate in an effective and efficient manner.

D. Data Rate

For any network high data rate is the key factor which considered a good quality of that network. At low speed of data transmission high pixel images of video signals cannot be sent. Data rate qualifies the quality of any network. High data rate network is always preferred over the low data rate network. High speed of data transmission is required to send multimedia source. Data rate of any network depends on many factors like data compression algorithm, power control and the data transfer protocol etc. The challenge is now to improve data algorithms to transfer audio and video signals without interruption.

III. CONCLUSION

In this paper we have studied various research issues and challenges present in wireless networks. This paper represents research issues and some challenges like signal fading problem , mobility problem ,power and energy , data rate enhancement problems of the wireless networks .As the popularity of wireless networks is rapidly evolving, achievement of the data rate enhancements, minimizing size, cost, low power networking has become more challenging. As the popularity of wireless networks is increasing day by day , these problems can be minimized by using proper algorithms individually or combination of more than one algorithms.

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