A Study and Analysis on Wireless Network System

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Abstract
As technology advances in society the need for wired and wireless networking has become essential. Wireless networking takes into consideration the range, mobility and the several types of hardware components needed to establish it. In the present paper a detailed study of various types of wireless links are explained. Applications of wireless types are also provided.

Keywords
Wireless Network, Links

I. Introduction

A wired network connects devices to the internet using cables up to a very short range. To avoid the cost of cables and various equipments that are used in set up of wired networks the experimentation of wireless networks began. Wireless network is the transfer of information between two or more points through air. Wireless networking uses Radio communication. The world around us is going wireless; we stream music and movies in our home. We can play music from our phones in cars, stereos and we can go to any number of public places and hook up to the internet. For example-Cell phone networks, Bluetooth, WI-Fi, GPS units, Terrestrial microwave.

II. History

The wireless industry is built by the hard work of men and women who have seen the possibilities and shared the excitement of mobility.

Table 1:

YEAR	DEVELOPMENT
1992	Guglielmo Marconi: developed first wireless telegraph system.
1927	First commercial radiotelephone service operated between Britain and US.
1947	Engineers at BELL LAB develops the concept of cellular technology.
1950	First terrestrial microwave telecommunication system was installed to support 2400 telephones circuits.
1970	ALOHnet seminal packet radio system that connected Hawaii islands with radio networks.
1983	The first commercial cellular system begins operating in Chicago.
1989	The motrola micro TAC was introduced, the smallest and lightest phones were available.
1991	World ‘s first commercial text message is sent by using CMG
1993	Internet protocol V4 established for reliable transmission over the network by TCP.
1997	Wifiprotocol(IEEE802.11).
2010	FCC proposes National Broadband plan, recommending 500MHZ of spectrum.

Wireless Links – It can be done by: Terrestrial microwave (uses earth based transmitter and receiver) Communication satellites (uses radio waves) Cellular and PCS system (divides into area) Free space optical communication(uses line of sight propagation)

Types of Wireless Network:

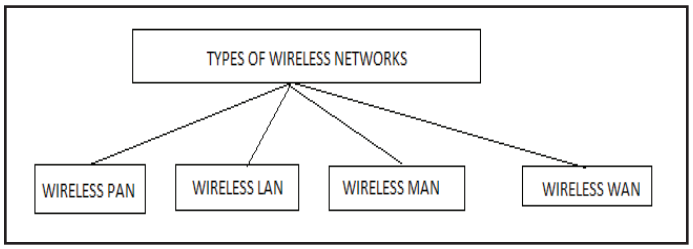

Fig. 1: Types of Wireless Network

Wireless Personal Area Network
Wpan’s are used for small area. Examples include Bluetooth, radio and invisible infrared light, zigbee are also used.

Wireless Local Area Network
IEEE802.11
IEEE has defined the specifications for the wireless LAN called IEEE 802.11, which covers the physical layer and data link layer.

Architecture
The standard defines two kinds of services: the basic service set(BSS) and extended service set(ESS).

Basic Service Set
IEEE 802.11 defines the basic service set(BSS) as the building block of wireless LAN. A basic services set is made of stationary or mobile wireless stations and a optional central base station known as the access point (AP).

Extended Service Set
It is made up of two or more BSSs with APs. In this case, the BSSs are connected through a distribution system, which is usually a wired LAN. The distributionsystem connects theAPs in the BSSs.

Table 2:

Analog transmission	Digital transmission	Digital transmission	Digital transmission
Mainly speech communication	Mainly speech communication	Mainly speech communication	Mainly speech communication
Voice band data	Digital data	Increased digital Data	Digital data
Circuit switched	Circuit switched	Packet switching	Packet switching
Local systems	Global roaming	Global roaming	Global roaming

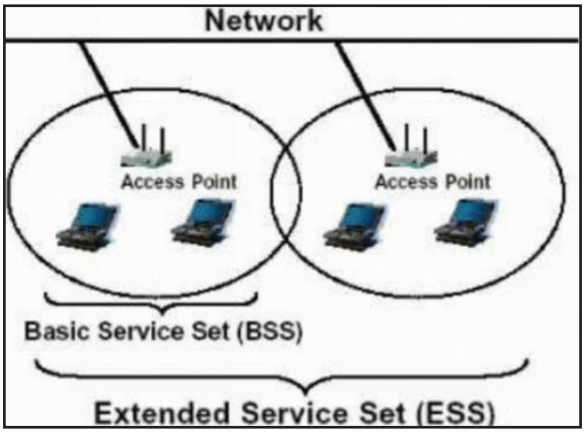

Fig. 2: BSS and ESS

Bluetooth

It is a wireless LAN technology designed to connect devices of different functions such as telephones, notebooks, computers, camera, printers, coffee makers and so on. A Bluetooth is an ADHOC network which means that network is formed spontaneously; the devices sometimes called gadgets find each other and make a network called piconet.

A piconet can have upto eight stations one of which is called primary(master), the rest are called secondary(slaves). All the secondary stations synchronize theirs clocks and hopping sequence with the primary.

Piconet can be combined to form what is called a scatternet.

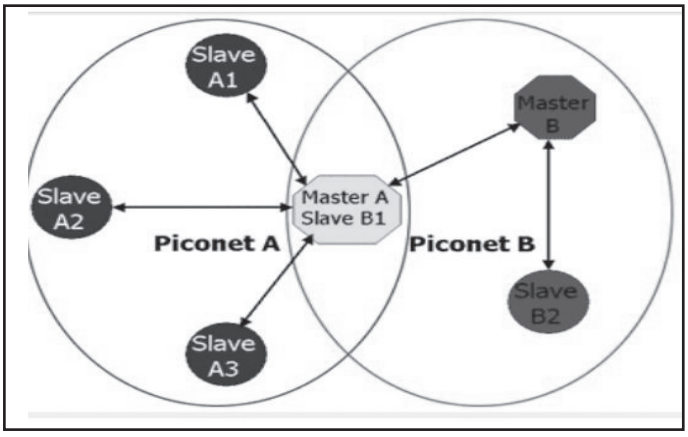

Fig. 3: Scatternet

Wireless Wan's

Cellular Telephone

Cellular telephone, sometimes called mobile telephone, is a type of short-wave analog or digital telecommunication in which a subscriber has a wireless connection from a mobile phone to a nearby transmitter. The transmitter's span of coverage is called a cell. Cellular telephony is designed to provide communication between two moving units called mobile stations (MSs) or between one mobile units and onestationary unit often called a land unit. A service provider must be able to make to locate and track a caller, assign a channel to call, and transfer the channel from the base station to the base station as the caller moves out of the range.

Satellite Networks

A satellite network is a combination of nodes that provides communication from one point to another. A node in the network can be satellite on earth station or an end user terminal or telephone.

Although a natural satellite such as Moon, can be used as a helping node in the network, satellite networks are like cellular networks in which planet is divided into cells. Satellite can provide transmission capability to and from any location on earth.

- GEO Satellite- Geostationary
- MEO Satellite- Medium Earth Orbit
- LEO- Low Earth Orbit

Application of Wireless Networks

Table 3:

Wireless features	Cellular	WLAN	GPS	Satellite based PCS
Application Area	Field service Sales force Field audit Public safety Stock wading	Retail Health care Office Manufacturing industries	Car rental Agency Toll sports	Multi media

Advantages Of Wireless Networks

1. Mobile and Versatile
2. Increased Reliability
3. Ease of Installation
4. Lower Cost
5. Rapid Disaster Discovery

Disadvantages of Wireless Networks

1. Radio Signal Interference
2. Limited Bandwidth
3. Less Security

Conclusion

Wireless networks are very common at workplace as well as at home. Technology has been created to store transmit and receive data through networks at very high rate of speed. This paper has provided some knowledge about wireless networks and also its limitations. The research work can also be extended further.

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