Wifi

> What is Wifi technology?

> Wifi is an alternative network to wired network
> Used commonly to connect devices in wireless mode

> Wifi stands for Wireless Fidelity is a generic term that refers to IEEE 802.11 standard for wireless local networks or WLANs.

It is also certified Wi-Fi alliance, a global non-profit industry association of more than 300 member companies ~~devoted~~ devoted to promote the growth of wireless LANs.

> Wifi connects not only computers to each other, but also to the wired network and to the internet

> Wifi uses radio waves to transmit and receive data at high speeds

Elements of Wifi network

1. Access point :

> It is a wireless ~~lan~~ LAN transreceiver (also called base station) that can connect one many wireless devices simultaneously to the internet.

2. Wi-Fi cards :

> They accept the wireless signal and relay information. They can be internal or external.

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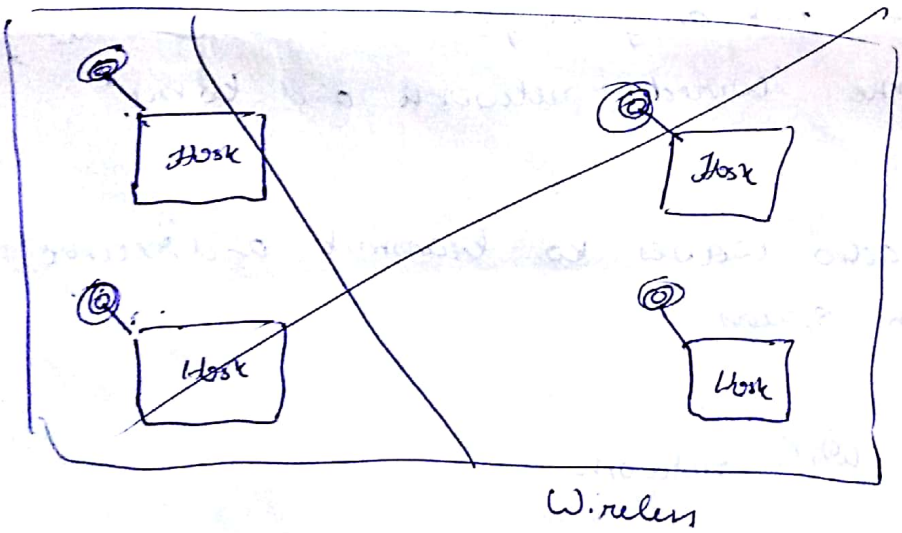
3. Safeguards :-

Firewalls and antivirus software protect networks from uninvited users and keep information secure.

WiFi topologies

1. Peer to peer topology (Ad Hoc Mode)
   - > AP is not required
   - > client devices within a cell can communicate with each other directly.
   - > It is useful for setting up a wireless network quickly and easily.



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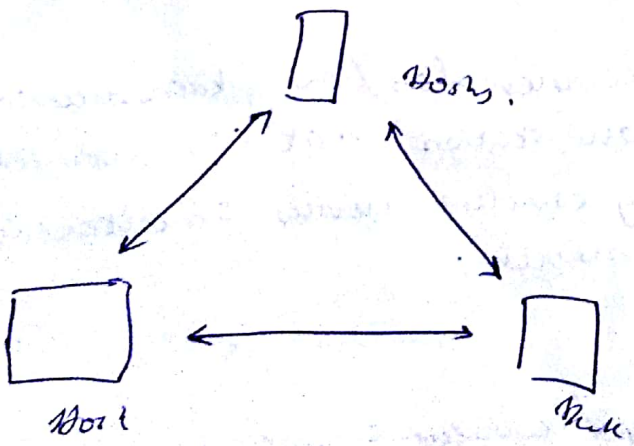

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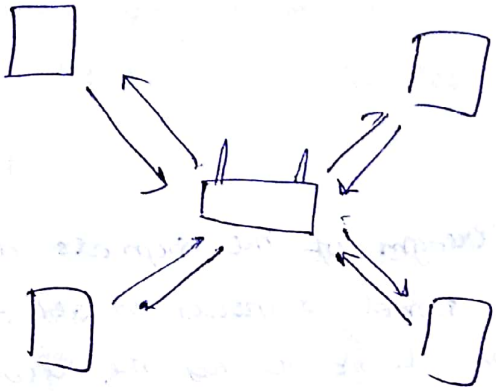
1. AP - based topology (Infrastructure Mode)

> Communicates through Access Point

> All communications have to go through AP



Hotspots

> A hotspot is a geographical area that has readily accessible wireless network

> It ~~is equ~~ has broadband internet connects and has one or more access points that allows users to access the internet wirelessly.

How it is made ?

> An access point is installed to an internet connection

> AP acts as a base station

> When a WiFi enabled device encounters a hotspot, the device can then connect to that network wirelessly.

> A single ~~acces~~ access point → 30 users
→ 100 to 150 feet range indoors
→ 300 ft outdoors.

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Advantages

1. Ease of installation
2. Cost
3. Reliability
4. Security
5. Speed.

Limitations

1. Attenuation :- Strength of the signals decrease rapidly because the signal disperses in all directions, only a small portion of it reaches the receiver.
2. Interference :- Other signals interfere with the signals if they are using the same frequency band.
3. Multipath propagation :- Receiver may receive more than one signal from the same sender because the waves get reflected from ~~walls~~ obstacles.
   ∴ Receiver picks up some signals with different phases, hence less recognizable.
4. Error :- SNR
   > If high SNR, signal is stronger than noise so we can convert signal to data
   > If low SNR, signal corrupted and data cannot be recovered.
5. Limited range :-

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WiMax

- WiMax — Worldwide Interoperability of Microwave Access.

> It is a wireless internet service designed to cover wide geographical area serving large number of users at low cost.

Two parts:-

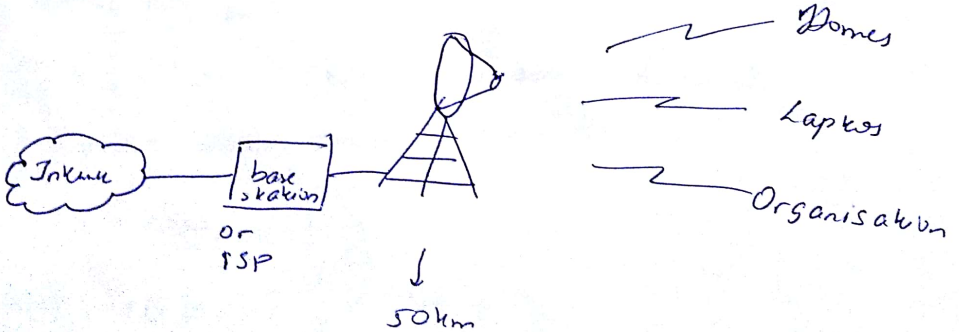
> WiMax base station
> WiMax Receiver

Forms of Wireless Service

> Non line of Sight
> Line of sight

Line of Sight — one base station to another

Non line of sight — base station to customers



So for the next 50 km, we need another tower.

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Types of connection

1. Point to point
2. Point to multipoint

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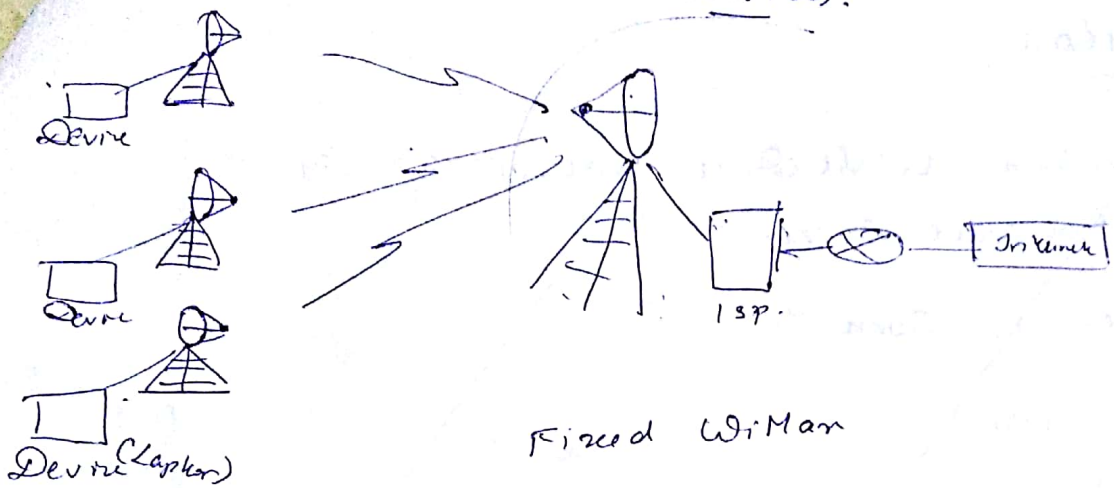
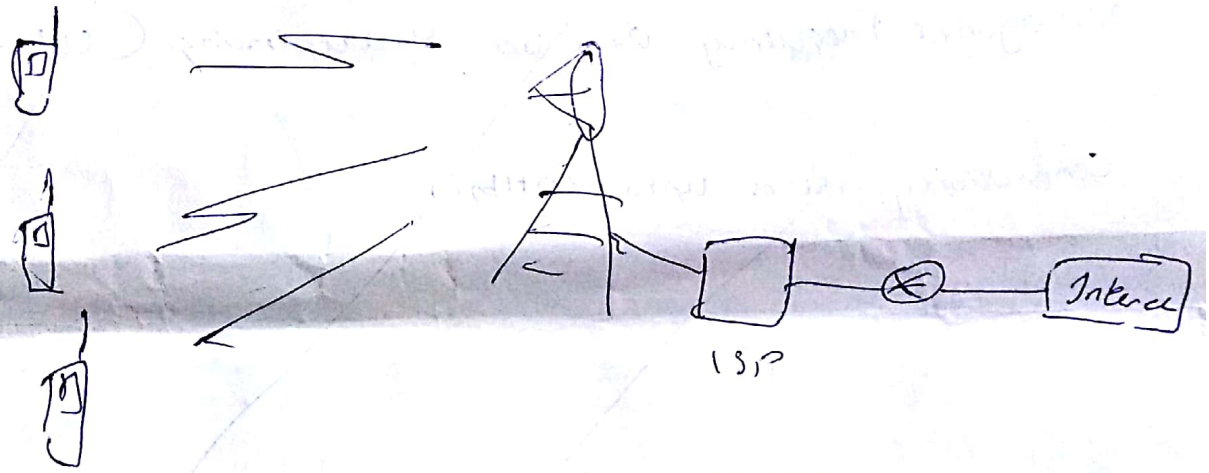
Types of Services.



Fixed WiMax



Mobile WiMax

Advantages.

> Single WiMax station can serve hundreds.
> Data rate upto 75 Mbps

Disadvantages

> Interference
> Heavy rains
> Line of sight for long distance communication.

Applications

LTE

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Orthogonal Frequency division Multiplexing (OFDM)

Connectivity speed upto 70Mbps

Wifi	WiMax
> upto 54 Mbps	> upto 70Mbps.
> Range - 30m	> Range 50 km (because of frequencies used and power of transmitter)
> Freq. Range (5 GHz)	> 10-66 GHz.

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