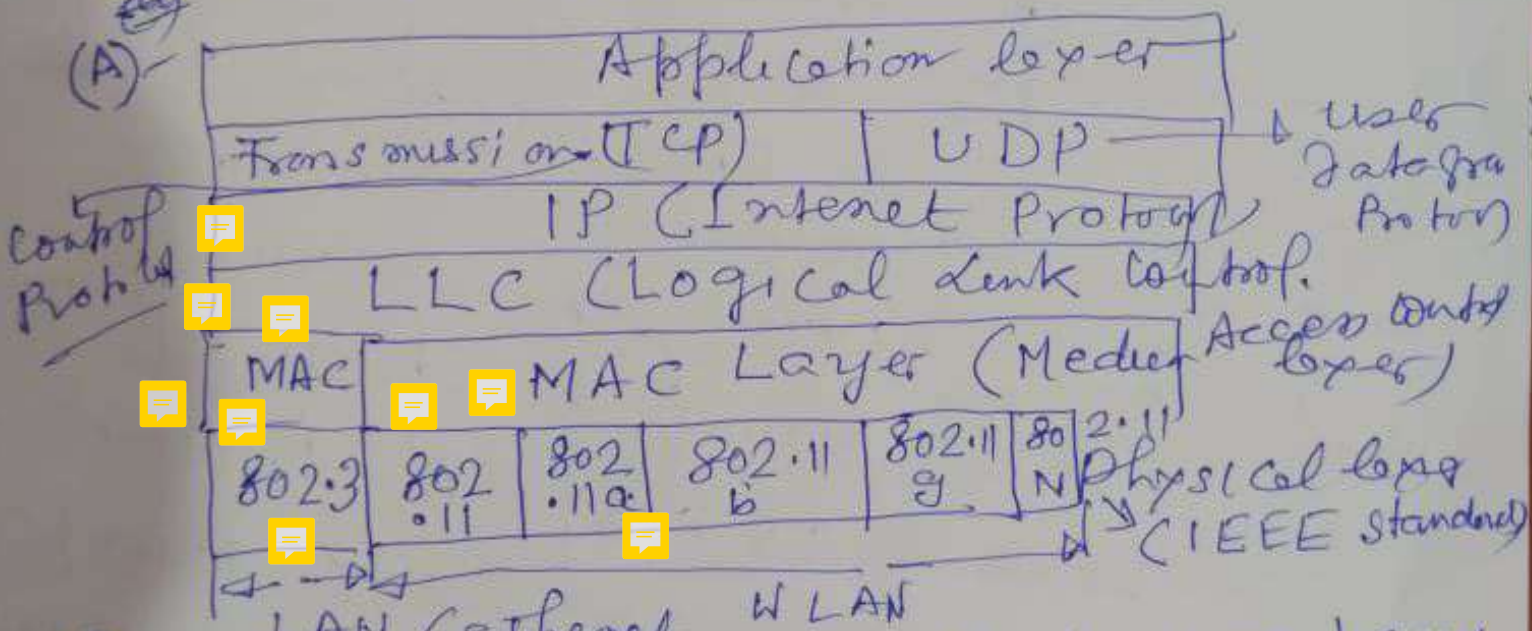
Wireless Local Area Networks.

(WLAN) (Wifi) - Wireless Fidelity

1. WLAN Protocol stack

(A)

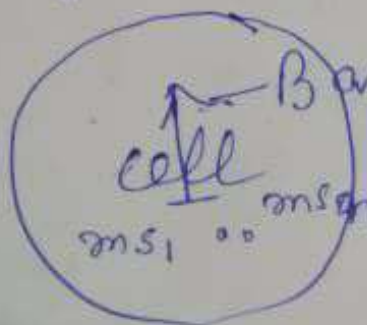


(B) WLAN Type

① Infrastructure based

(ii) Infrastructure Less.

(i) Infrastructure_based



ms2 → ms2 are mobile stations:

- Laptop
- Phones
- Desktop also

(i) Infrastructure Based.
With Base stn.

types of MAC Protocols:
(a) Centralised (both Base stn)
— Poll based
— Polling done by the Base stn

(b) Distributed: without the control of Base stn.
— The stations compete among Themselves to get channels using a protocol known as CSMA/CA Protocol (Carrier Sense Multiple Access/Collision Avoidance)

(c) CSMA/CA was developed from wired Local Area Network protocol of ethernet (IEEE 802.3)
— CSMA/CD (Carrier Sense Multiple Access / Collision Detection)

(d) Collision Detection (CD) is not possible in WLAN - so the mechanism is collision Avoidance.

(e) Used in Campus, Airport, CCA, office...

(f) Infrastructure Less WLAN

(a) known as Adhoc Network

(b) Does not have a Base station
- No centralised Poll-based protocol.

(c) The distributed protocol here also known as CSMA/CA

(d) Adhoc network is used in military war/battle field.
- no centralised stn
- All are independent station
- If one station is destroyed due to Bombarding, other stations take care.

(02) Physical layer of WLAN

(a) - Frequency sprectrum 1
- 2.4 GHz band.
(2.4 GHz to 2.481 GHz)
BW = 81 MHz)

- Frequency sprectrum 02
- 5 GHz Band.
(5 GHz to 5.081 GHz)
BW = 80 MHz

(b) The Above two frequency Bands are known as Lincensed Free band
- Anybody can use them without Lincense
- Also known as ISM (Indus trial scientific and Medical Band)
- To avoid interfesence between two nearby WLAN the power of transmission

is restricted.

— If anybody transmit beyond the power limit, it will create interference in the near by WLAN managed by other Administrator and he may sue from the former in the court.

(c) The physical layer (of protocol stack page-1 (A)) describes the physical architecture of the following WLANs (wifi) — (i) IEEE 802.11
(ii) IEEE 802.11a
(iii) IEEE 802.11b
(iv) IEEE 802.11g
(v) IEEE 802.11n.

(3)(a) Physical Architecture of IEEE 802.11 (Single WLAN)

— There are two Technologies here:

(i) → Frequency Hopping spread spectrum (FHSS)

(ii) Direct Sequence spread spectrum Technology. (DSSS)

(iii) spread spectrum Technology

- ~~Support~~ a channel is in WLAN having a BW 80 MHz at 2.4 GHz (2.04 GHz to 2.48 GHz)
- If the transmission takes place using the whole 80 MHz. Bandwidth and if the data is corrupted by transmission error, then the whole transmission shall be rejected.
- So 80 MHz bandwidth is divided into small small frequency slots (Mini channels)
- Data in WLAN is transmitted using the small frequency slots

— If the data is completed in a mini slot (mini channel) only that data shall be rejected, other data can be used.

There are Two spread spectrum
— (a) FHSS
— (b) DSSS

(a) FHSS — 80 MHz total bandwidth is divided into 27 mini channels each 3 MHz ; CH1 , CH2 , ... CH27

— Transmission takes place in a specific Random Sequence known by sender and receiver station : say Sequence 1 :
2, 6, 8, 12
16, 18, 20, 24
26, 2, 6, 8, 12,

— Another Sender and Receiver of WLAN by other administrator can use Sequence 2 : 1, 4, 7, 9, 11
17, 19, 22, 27

- Another Sender can Receive of another WLAN use the 3rd sequence: 3, 5 ...
- Three operate WLAN managed by same or 3 different Admins can co-exist.