

Chapter 1

History: 1895 Marconi find wireless; 1930s -

Communication $\rightarrow$ telecommunication; 1958 SCORE field; 1988 GSM; 1997: 1st WLAN

- Foundations: Cellular Sys
- Mobile management
- Mobile IP
- WiFi
- Wimax
- Self-organizing network
- Wireless Network Safety
- Wireless Personal Area Network
- Sensor network
- Internet of Things
- Software defined network

Chapter 2

Wired $\rightarrow$ diff forms electrical signals; wireless $\rightarrow$ use radio freq wave;

- Wireless $\rightarrow$ in bands by FCC for industrial, scientific or medical apps; - licensed
- Portion of the radio is reserved for apps being granted licenses.
- Space, atmosphere, ionization
- Wave interface when the

phenomenon return back to spread (2) when wave meets a hold back, it produces the original line (3) Thanks to the potential, wave has to change its linear trajectory.

Indoor to send info 2 and other and outdoor to communicate with each other by wave

Most important γ is called the path loss exponent! Radio puts fundamental limits to performance of wireless comm sys.

- $LP = L_0 + 10\alpha \log D + X$.
- Shadow effect caused by the observation of the hand the received signal strength decreased but it changes!
- $f_{d,n} = f_d = f_m \cos \theta = \frac{v}{c} f_m \cos \theta$

Env	n	Environment	n
Free	2	building	1.6-1.8
City	2.6-3.5	blocked	4-6
Urban	3-5	blockage	2-3

Large scale fading (large) Small scale fading (small)

Rician distribution

$$f_d = \frac{1}{2\pi} \frac{d\theta}{dt} = \frac{v}{\lambda} \cos \theta$$

$$I_0(x) = \frac{1}{2\pi} \int_0^{2\pi} \exp(x \cos \theta) d\theta$$

$$P_z(z) = \frac{2\pi m_z \tilde{p}_m^{(1)}}{\Gamma(m_z) P_r^{m_z}} \exp\left[-\frac{m_z^2}{P_r}\right]$$

Chapter 3+4

- 2G; TDMA; 3G; CDMA
- cellular concept: The tech of replace a single high power transmitter by several low power to support users.
- The same freq band is used in 2 base stations that are located in relative proximity to each other
- Entire network area is divided into cells due to frequency reuse.
- HLR in telecom's reference database 4 subscriber paras.
- HLR contains a copy of most of the data stored at HLR
- faster and more efficient
- GSM $\rightarrow$ CDMA

inter-SGSN routing update is the most complicated routing update. MS changes from one SGSN.

Principles: CDMA 2000 WCDMA, TD-SCDMA

11. CDMA Tech

EDGE combined with the GPRS 2.5G $\rightarrow$ 2.75G Peak Data rates are 4.5 MBITS WCDMA versions $\rightarrow$ IMT requirements 3G system.

3G system.

Multiplexing + communication channel + physical layer

14 3G + all-IP

architecture. connection-level

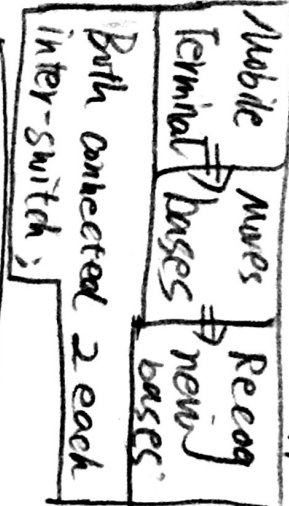
Chapter 5: Future work:

Mobile Compute Cloud + Mobile web Initiative.

Chapter 6:

signal change $\Rightarrow$ threshold $\Rightarrow$ recognize new base station $\Rightarrow$ Set up the new link

- Intra-switch handoff



3. NCH0 → Controlled
MAH0 → Assisted

4. Hard handoff: at any moment in time one call uses only one channel, in parallel which makes it cheaper! However, its shortcomings is obvious: the hard switch ping pong effect need more hardware.

Straight-line mode fluid flow
A math way + describe the level in reservoir subject to randomly determine filling.

Intra switch: when a mobile signal ⇒ weak in given cell and we can use MTSO finds other cell ⇒ its system to which

it use transferring the call then it utilize!

Some other cell in these sys to what it can transfer the call when it uses

Infer system but cell splitting ⇒ ↓↓ co-channel interference ⇒ ↑↑ handoff rate

Service delivery = Cellular network can search our available access to called users. If we succeed, caller will send us a feedback to end.

Chapter 7

① Perovent IP: we want to ↓ re-connection and make the sys more stable and easy to connect

② MM: location constantly changes

HA: home for the moving nodes, always send into outside nodes

FA: a router for nodes which are moving outside home

CoA: a node forwarding the info to out-nodes to form notification

CV: A movable node to communicate

MAH ⇒ FA: tunnels packet ⇒ HA → receiver

Mobile node → registration prospective agents, the home agent sends a registration foreign nodes ↓ request

Lifetime is limited so that a mobile node registers with the home agent ⇒ using a registration message to delete and update a binding.

Chapter 8

① DCF is NAT tech's fundamental the IEEE 802.11 based WLAN standards.

② RIS/CIS access mainly mechanism is used to ↓ amount of time spent when a collision occurs.

IEEE 802.11e, EDCA, HCF

IEEE 802.11e-2005 is approved standard to IEEE 802.11 that defines a set of quality of services (QoS) ↑

LAN. EDCA is Enhanced distributed channel access which can have a ↑ share to sent low-priority traffic a station with high.

HCF is hybrid coordination function. With in HCF.

- ① HCCA
- ② EPCa

Ad-Hoc modes

An ad-hoc network allows each device to communicate directly with each other. Only able to Ad-hoc devices

Chapter 9 and 10

9.1 Wimax techs QoS ↓
 UFDMA/OFDMA + AAS +

MIMO so that we can mobilize the services and

WIMAX-SC, WIMAX-SSC,

WIMAX-OFDMA.

we can ↓ ICI so that we can use traditional AP structure

$N, n-i (1 \leq i \leq N)$ represents

nodes i is distance between i and j (1) $d_{ij} \leq R_t$

(2) each node: $d_{kj} \leq R_l$ node k data transmission

(3) $TH_{\text{topp}} = \frac{E(P)}{\min(4, H_L) \times T}$

$E(P)$ is averaged distance

H_L is number of the paths

from (1), bT !

Chapter 11

1. requirement frame describe the working schedule of WEP

2. After AP receiving that

msg, if the state is exactly the info "success", then we have to send the exact info

3. WEP/WAPI/IEEE

802.11 (TKIP) can't

AES.

Chapter 12

1. BLE 4.0 Low Energy with the lowest cost to do the same work

2. UEM and low delay

3. distance 160m

4. Page + Scan

Inquiry + Inquiry Scan

Master Response + Inquiry Response + Piconel-

(Slave-Master)

RFID Tag + Reader

(3) Software system Reader

Chapter 13

1. The WSN is nodes from a few to 1000, which

the sensor network get the data.

2. The process of data transfer

People can manages all WSN (GCP) with the management node

publish the monitoring, missing.

Chapter 14

Good Security

Software Defined Radio

Body Area Network

Cognitive radio

RFID devices embedded inside Military and space apps.

Chapter 15-16

Open Flow protocol is in

SDN Tech: Directly connect

Switcher and V. Leonard

VXLAN

Television Camera and

microphone + pressure

Sensor + touch sensor

CISCO + Erlson + IBM

Microsoft: Protocol Dev.

Forwarding SDN

Upon Computing Project

(GCP)

Chapter 19-22

MIMO + SISO

MIMO, $N_t + N_r$

$N_t \times N_r$, $y = H \times x$

AUGN



QR code: Square QR

more QR > 60x fine

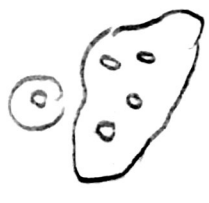
360 V okay

In the structure made

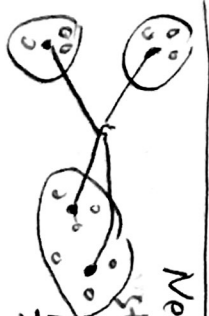
It requires the use of AP (Access Point), which controls wireless communication.

↑ levels of security

Potentially after transit



Ad-hoc Mode
No base nodes can only communicate within the coverage area.

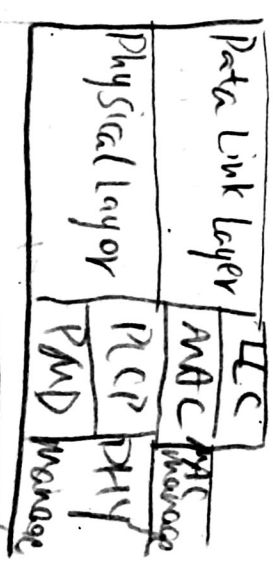


Network Infrastructure
Structure made

- Network Host
- Application Layer
- Transport Layer (TCP/UDP)
- Data Link Layer (MAC)
- Network Layer (IP)
- PHYSICAL Layer (PHY)

Logical Link Control (LLC)

is data communication protocol layer is the upper sublayer of data link layer of seven-level OSI model.



PHYSICAL Layer devices

802.11 - 1 MAC / 3 PHY Layers
(2 in 2.4 GHz, 1 in IR)

802.11a/b/g

Point coordination function
CRCF) and hybrid function
(HRCF)

UNICAST.

Unicast is sending of msg to a single destination.

Network Allocation Layer.
NABD is virtual.

Carrier-sending mechanism

uses such as IEEE 802.11 and/or IEEE 802.16 (WiMax)

The virtual carrier sending is logical abstraction which

limit → need for physical qos.

802.11 in ad-hoc, CFP qos as in CP.

Explain why synchronization is needed in 802.11.

Timing Synchronization Function.
TSF's synchronization.

Explain how is the sync achieved in 802.11

MM in cellular wireless networks.

IP fragmentation is on IP process that breaks datagrams into smaller pieces so that

into smaller pieces so that

MTU (maximum transmission unit) than the original size

The fragments are reassembled by the receiving host

WEP (wired Equivalent Privacy) which is a security protocol for

WEP/WPA. As explained, they only provide confidentiality at the network level.

MAC Filtering Problem: doesn't identify easily spoofed, not a secret info.

Active Scan on the channel.

Directed probe broadcast.