

1. pre-industrial $\rightarrow$ electromagnetic induction $\rightarrow$ phone $\rightarrow$ radio $\rightarrow$ broadcast $\rightarrow$ SCORZ $\rightarrow$ GSM
2. WiFi; Wi-Fi; WiMAX; Wireless Network; 8. ② ①
1. reliable, high cost; unstable, low cost 2. use in licensed band / can't
3. environmental noise, Multipath transfer effect 4. larger than wave; sharp edges; equal to wave length or less 5. indoor; indoor; 6. $32.45 + 20 \lg f_c [\text{MHz}] + 20 \lg d$
- $P_r = G_t P_t / L$ $L = L_p L_s L_f$ $Z = D/C = 3 \text{ dB}$
- two-ray: $Z = (X + X' - D)/C$ $P_r \approx [4\pi h_t h_r / d^2]^2 P_t$ $L_p = 1 / [4\pi h_t h_r / d^2]^2$
- 7 signal received; signal received not enough 8 $\frac{1}{2} [1 - \text{erf}(a) + (1 - \text{erf}(\frac{1-ab}{b})) \exp(\frac{1-2ab}{b^2})]$
- 9 $[8.29 \lg(4.54 \text{ km})]^2 + 1 \leq 20 \text{ MHz}$
 $[3.2 \lg(4.75 \text{ km})]^2 - 4.9 \gg 20 \text{ MHz}$ 5140309221
10. through different paths; the more of wave source ③ ④
11. no direct path; no channel to dominate; N paths 组号: 10
12. more of the same 13.
- 14 $e^{P^2} / \rho f a \sqrt{2\pi}$ $LCK = (1 - e^{-P^2}) \rho f a \sqrt{2\pi} / e^{P^2} - 1$
1. GSM (2G) - GPRS - EDGE - WCDMA 2. $P_t \uparrow$ cell radius $\uparrow$ system capacity $\downarrow$
3. $q = (N \times \frac{S}{I})^{1/K} = \frac{P}{R} = \sqrt{2N}$ 4 in area, mobile phone; base station; contrary uplink; base station; area of cells; connect with others; 5 manage subscriber; GSM services; carry out cell switching; 6 enter cell which delivered to channel
- 7 increase speed of transmission; a wider range; voice quality 8. channel assign at different time; same time; 9 network node; subscriber connect to network
- 10 WCDMA, CDMA2000, TDSDMA 11 high spectral efficiency, strong confidentiality
12. 3.84 Mcps; 5 MHz; 1940 ~ 1955 MHz (up), 2130 ~ 2145 MHz (down)
- 13 Broadband internet access, wireless search, video call
1. Mobile cloud computing, mobile web
1. location update, initiate a call, call handoff. 2 mobile station from one to another
- 3 monitor the port signal by mobile station; mobile station report to network and signal noise; evolution of NCHO
4. don't take up too much resources; improve call quality, take up more system
- 5 control by feedback signal 6.
- 7.
8. higher than threshold, handoff. 9. avoid pilot contamination, increase capacity. low frequency resource. 10. layer rows on a client, a data longer get stored on a server. 11. routine area report, update location, 12 high cost, suitable for athletic enough.

- 13 Will be established in old MR and New MR.
1. replace IP is troublesome 2. location often changes; a router on the mobile; foreign link; IP address associated; communication object;
 3. A visit B, B edge generates tunnel and assigned to routing table
 4. HA $\xleftarrow{(CN, HA)}$ device $\xrightarrow{(CN, IP)}$ FA $\longleftrightarrow$ router $\xrightarrow{\text{registered with home agent}}$ get a care of address
 6. network, register again; 7. declare the presence FA, HA
 - 8 notify the transfer HA. 9 identity information is wrong. can't send request
 - 10 entire is encapsulated to be a new IP; inserted between IP and IP load;
 - 11 between HA and FA, from FA to HA, send to real address.
 - 12 mobile node connect to foreign link, 13 HA send to FA; FA send to CN; CN send to HA
1. Distributed Coordination Function; Point Coordination Function;
 2. get license with through RTS/CTS and suppress neighbor nodes transference
 3. IEEE 802.11 defines WLAN quality-of-service ETX: a variety of access types according to situation adjust network; hybrid coordination access
 4. a center with infrastructure, ad-hoc mode not; 5. ordinary mobile terminal function; maintain network, routing information; provide wireless channel support
 6. 802.11 work on physical layer and digital link layer
 7. identify network layer protocol; provide addressing; deliver frames wireless; provide transmission and reception of PHY; 8. transfer in direct path; further distance, but electronic interference 9. 802.11, 802.11b, 802.11a, 802.11g
 - 10 AIFS $\downarrow$ priority $\uparrow$ 11. indicate how long station; point coordinator.
- 12
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- 13 communicate with node: one to one one to many.
14. the nodes dominates channel length 15. INVSANIA, INVORA; PCF, HCF
 - 16 make up at same time 17. maintains a copy of TSF
 - 18 periodically, advertise capability 19. high delays, inter-synop periods
 - 20 cost harm to terminals and base station 21 PS mode; by guessing;
 - 22 STA sleep time; station active in ATIM 23 hand handoff
 - 24 impossible to transmit a large data one time.

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- 25 change working mode 26. Dest Addr, Source PAN IP
27 802.11a is a improved standard of 802.11b and OFDM
28 Provide data confidentially 29 CRC-32 checksum for integrity
31 Decrypted text matches the original challenge text.
32 keys, algorithm; whitelist blacklist, sacrifice convenience; authenticated target's 33 client request and response. client listen on each channel.
34. setting min and max back-off slots 35 $S_{indv} = \frac{1}{n} P_s E[P] / (1 - P_{re}) \sigma + T_s + T_c$
1. long distance, high-speed, access 2. TLL and PMD. Protocols support
3 domain to a given channel into many orthogonal, use sub-carrier modulation.
1. depend on pre-deployed infrastructure; a temporary system
2 adjacent frequency radiation, resulting loss. 3 exclusion region that can be replaced
4. in receiver area, out of receiver area; in transmitter area, out of receiver area
1. 1) request an authentication frame 2) AP return a verification frame 3) text encryption 4) AP text decryption 2 1) send EAPOL 2) request for identity
3) send identity 4) Chip technique 5) RADIUS, verification
- 3 WEP uses shared key for authentication. WAPI improves security mechanism
- 1 Transmission, distance, energy consumption 2. Active state, sniff state, park state.
3 two way communication with electronic tag, receive control; communication with reader
4. antenna design, package technique, tag application 5. monitoring of production data, quality tracking, sales statistics of goods
1. sensor network: perceive collect information; transmit information; observe data collection
2 perceive data; data processing; communicate with other devices and transmit
provide energy; 3 ultra C4ISR system, remote health, environmental inspection system
4. ultra-miniature sensor; wear sensor in specific parts; furniture embedded in sensor
5. large scale, dynamic, data as center. 7 solar energy, nuclear energy
1. Radio frequency identification technology, sensing technology. data mining
2 Good security, high processing, large system capacity 3. Bluetooth
low energy inherited the class Bluetooth, low energy inherited the class Bluetooth
4. Perceive outside use intelligence technology
5. Using the human body as medium convert into broadband network with high-speed.

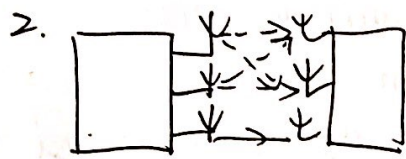
1. SDN is an emerging network architecture. 2) control channel is established between controller and repeater 3) controller collect 4) controller achieve path 4) repeater receive data

3. Traffic visualization, guard against DDoS, cloud security 4. No limitation of low cost

1. Camera, infrared module, wireless network

2. Indoor positioning: using the distance sensor of car to locate the target

1. MIMO systems have more channels between transmitter.



3. decrease BBR and space-multiplexing sends data into sub-data through

4. Distributed MIMO, MIMO and MIMO network.

1. The value of bitcoin fluctuates greatly. Transaction is legal by verifying the private key. Transactions using bitcoin are safe.

2. Code area and functional graphics, delimiters, positioning graphics.