Wi-Fi Interview Questions (Wi-Fi Internships/Jobs)

Hello there,

Over the course of my professional career I have had the opportunity to appear for few a interviews, and to interview others as well. For some people, giving an interview can be daunting specially if you don't know how to prepare yourself for the interview. Oh btw I am referring to technical interviews here.

The key in my opinion to landing an interview call is certs. If you are a student pursuing an internship i would say its good to have / optional to have certs but its a huge edge over the competition if you do have relevant certs. For example, if you are seeking internships in the field of wifi, and if you have a CWNA cert of a CCNA Wireless, you definitely have a better chance of getting an interview. Please note that there is no guarantee that you will get an interview if you have a cert but it significantly increases your odds. Also, we are just talking about getting to the interview stage; IMO, its always about the interview and getting an interview call or not. Rest is totally up to 'You' as a candidate to convert the interview into an actual offer. Beyond your profile and your interview, there are various factors that play in between the interview and the offer stage. There is always the elements of right time and right place which plays a huge role in getting an offer.

For folks who are new grads and are pursuing Full-time positions in WiFi, I feel certs are a must have. Associate level for sure (example, CWNA, CCNA if not both then at least one) and preferably a professional level one too (e.g.: CWSP, CWAP, CCNP Wireless). I cannot emphasize this enough but I have come across many folks who have the certs but somehow don't know their stuff. Its embarrassing to be in such a situation as an interviewer. Its a very disappointing feeling. I would highly encourage you all to focus on the content and know it well. Yes it good to have the actual cert but the cert is of no value if your knowledge can't back that up. I would personally rather have you know your technology in depth than have the actual cert. But a combination of both of the above is ideal (having the cert and knowing what you are talking about 😀).

I think gone are those days where you could list courses like Advanced Operating Systems etc (some of the popular core courses) and hope to get an interview screen. I think you definitely need more than the courses to beef up your resume and hence please get at least 1-2 relevant certs during your degree. I think its ok to sacrifice taking an easier course or two so you can make some time for studying for certification(s). Which cert to target? Well, its tricky because to truly know WiFi, you do need to focus on the 802.11 protocol itself and books/certs like CWNP, O'Reilly survival guides are very good. That said, if you are aiming to land a job/internship at a Vendor like Cisco, HP etc,, its always a no brainer to have at least an associate level cert from that vendor. Again, ideally a combination of the above two would work great.

For vendor specific stuff, please get familiarized with the product portfolio, architecture, software release versioning etc. You can glance through some of the latest code's release notes and get a understanding of the hardware, features etc from a high level. You don't have to go too deep as its not expected to know the products without having any work experience. That said, there are several universities in the US (I think University of Colorado, UMD, etc) who have heavy coursework and lab assignments tailored around WiFi and some vendor hands-on as well. Candidates from these programs already have an edge over others.

The last point I'd like to mention is that you need to be on Linkedin. You need to have a professional social network profile (LinkedIn and if you want Twitter). Please reach out to folks in that industry for guidance/ tips etc. Many of the WiFi experts write blogs which have very useful information about the technology, current trends, vendor related stuff etc. Being active on such platforms don't hurt a bit.

Below are some of the questions that an interviewer may ask during the interview. Honestly speaking I have asked some of these questions myself while interviewing others.

The content in article should be useful for entry level as well as experienced roles.

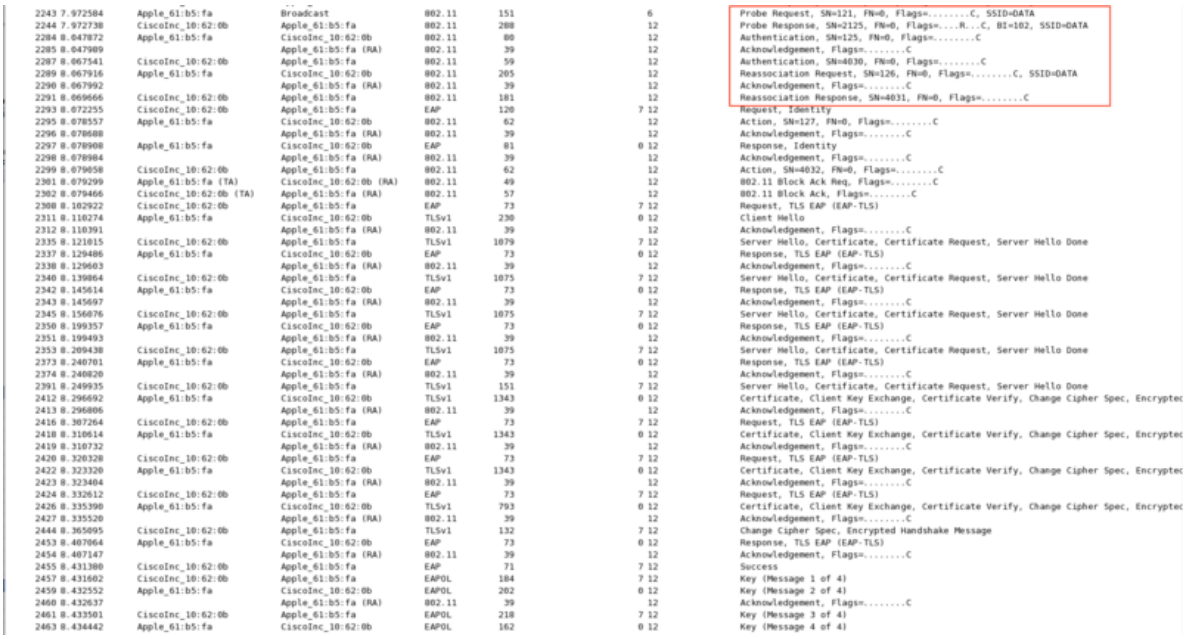
Sometimes you may find people on the interview panel who are not from wifi background and in that case you maybe asked questions around general routing and switching like STP, RIP, OSPF etc. Its good to have basic L2/L3 networking knowledge as well but its hard to prep for everything under the sun sometimes :/.

Note: This by no means is a cheatsheet or a hack to pass an interview. This is just to give you folks an idea about what kind of questions can be asked during a technical interview for a wifi (802.11) job. Also, the best use of this content is not to remember it word by word and repeating it during the interview but to take it as a guidance and learn the concepts behind it.

1. Describe the 802.11 Association process

Explain the frame exchange between the endpoint/client and the Access Point before the client goes into 'RUN' state and is authenticated and is able to pass traffic. Provide as much detail as possible. There can be spin off questions based on your response to this question. The answer is probe request, probe response, 802.11 open authentication

request, auth response (success), client sends association/ reassociation request and AP responds to that with a association/reassociation response (success). After this depending on the security type of the WLAN/SSID, further frames are exchanged. in the below snippet of wireshark you can see the reassociation process followed by EAP/TLS handshake



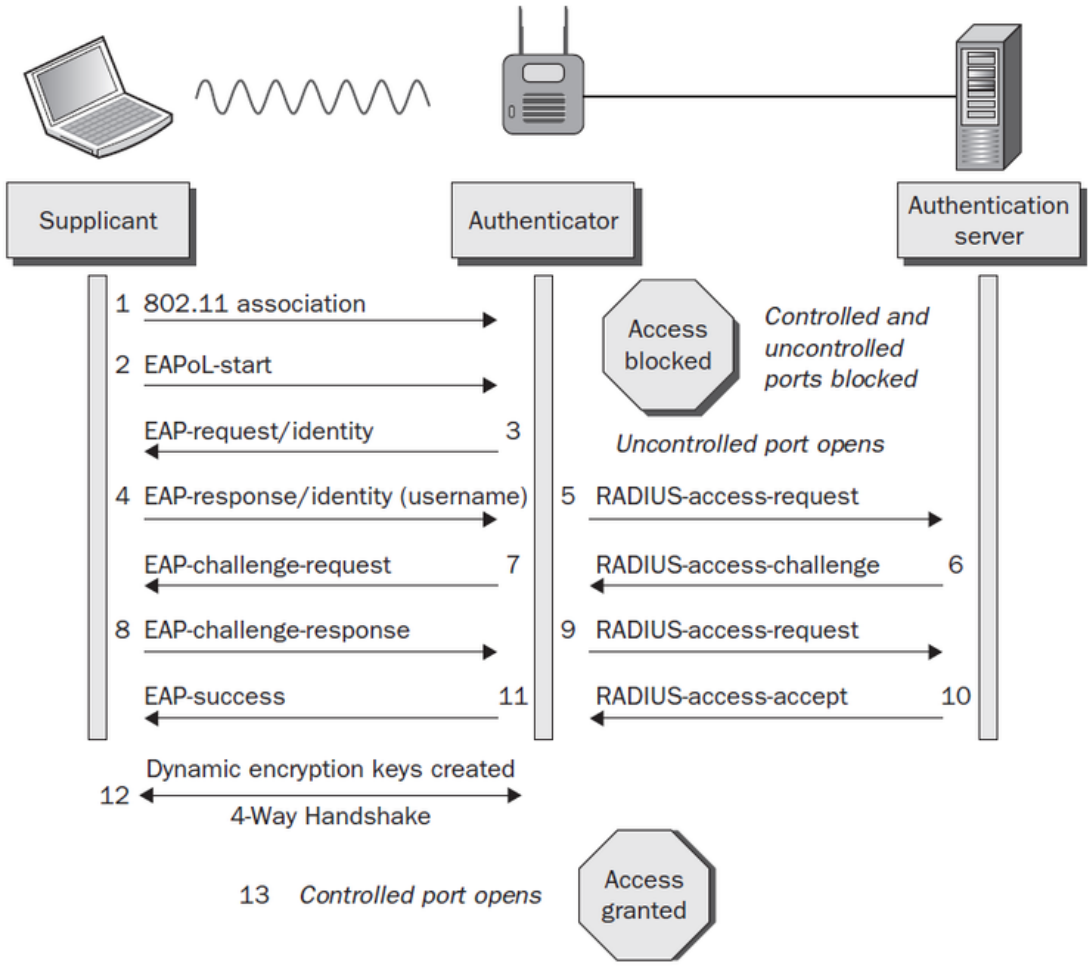
2. Describe the process in detail on how wifi client gets on the wifi network and starts passing traffic

Pretty much the same answer as question 1.

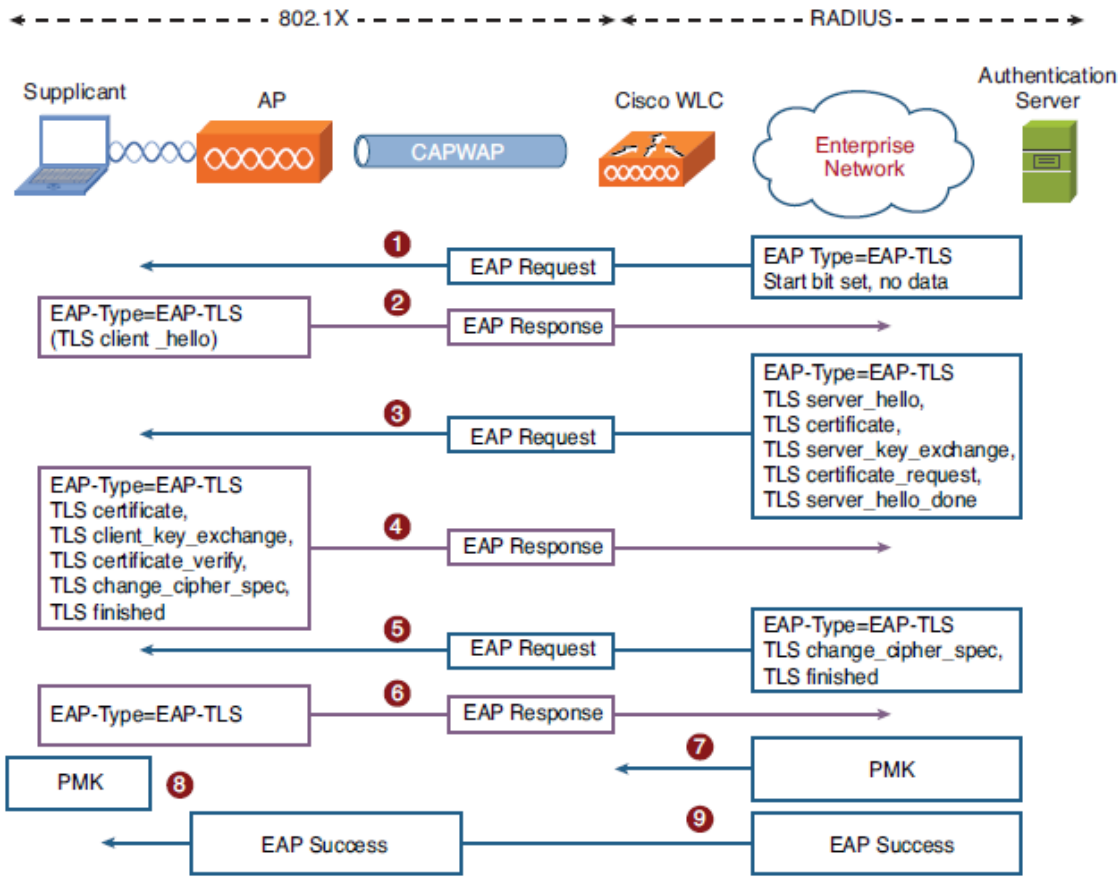
3. Describe the generic EAP process

Talk about the different entities involved like the authenticator, endpoint, authentication server etc.

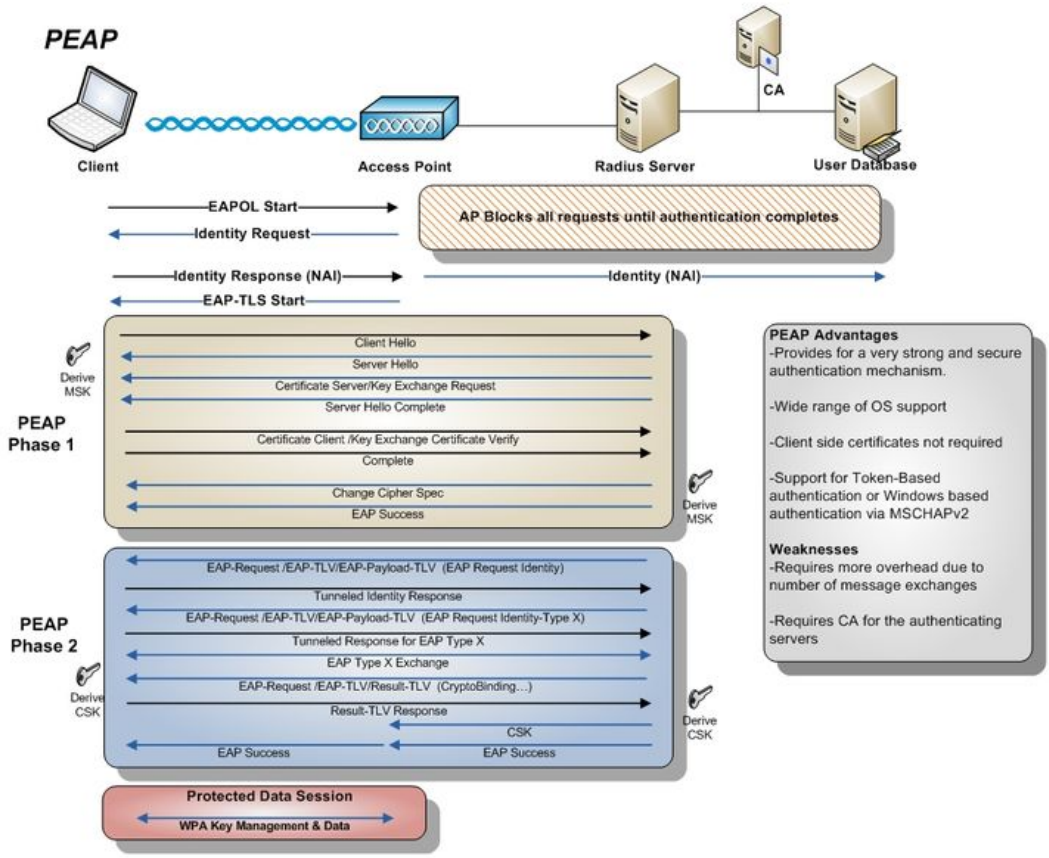
FIGURE 4.24 Generic EAP exchange



4. Explain EAP-TLS process



5. Explain EAP-PEAP



6. Describe in detail what happens when you open the web browser on a client to surf google.com

This article gives a very in-depth breakdown of the process. You just need to know the high level details mainly around DNS and HTTP request

http://igoro.com/archive/what-really-happens-when-you-navigate-to-a-url/ (http://igoro.com/archive/what-really-happens-when-you-navigate-to-a-url/)

7. What is the difference between 'Association frame' and 'Reassociation frame'

https://mrncciew.com/2014/10/28/802-11-mgmt-association-reqresponse/ (https://mrncciew.com/2014/10/28/802-11-mgmt-association-reqresponse/)

https://mrncciew.com/2014/10/28/cwap-reassociation-reqresponse/ (https://mrncciew.com/2014/10/28/cwap-reassociation-reqresponse/) (https://mrncciew.com/2014/10/28/cwap-reassociation-reqresponse/)

8. What is a near - far issues in terms of wifi

Please refer to CWNA Chapter on WLAN troubleshooting

FIGURE 12.10 Mismatched AP and client power

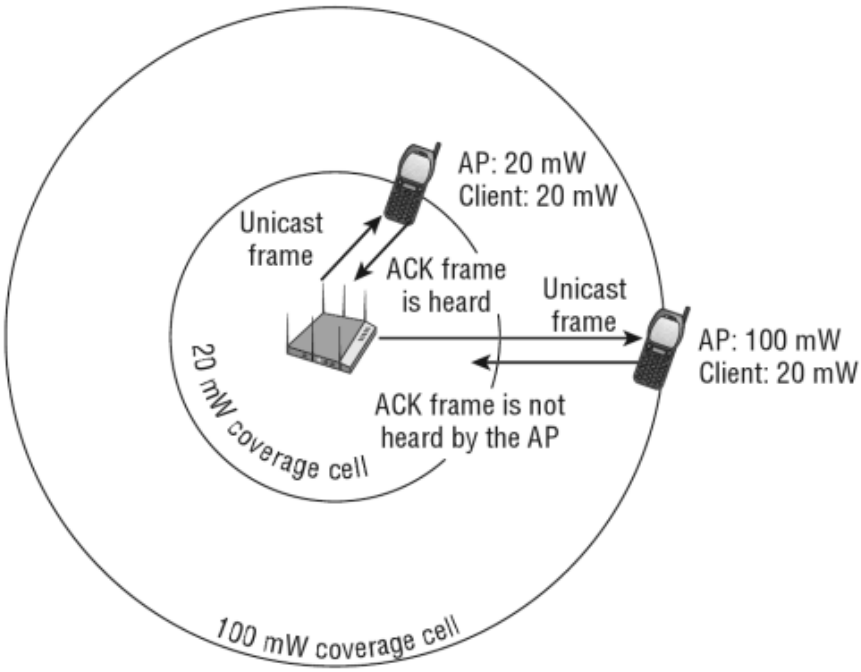
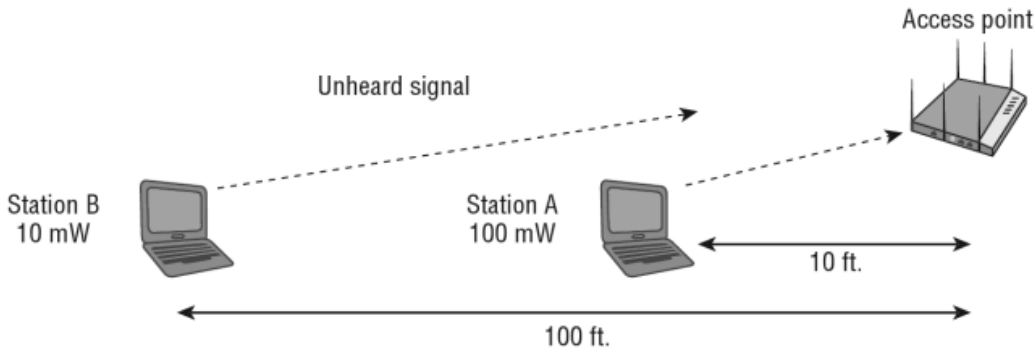


FIGURE 12.11 The near/far problem



9. What is the hidden node/terminal problem?

https://www.youtube.com/watch?v=BLEt10OkE4g (https://www.youtube.com/watch?v=BLEt10OkE4g)

10. How would you troubleshoot low throughput issue on the wifi network

There is no real 'correct' answer for such open ended questions. The interviewer is trying to access your analytical thinking and troubleshooting skills. If the interview is for a customer rep or test engineer, this question would be very important.

Throughput issues can steam from variety of root causes. It is important to ask a few questions and understand what is the problem symptom before you get started. You should look at the data rate at which the client is connecting (802.11n, ac etc), what MCS rate and the clients capability, SNR, RSSI of the client to start off with. A handy tool is WLC / AP debugs logs in conjunction with Over-the-air 802.11 sniffer captures. You can follow the traffic pattern (you won't be able to decode the actual qos data on most occasions) to try and get a sense of any RF issues (if you see too many Retries or

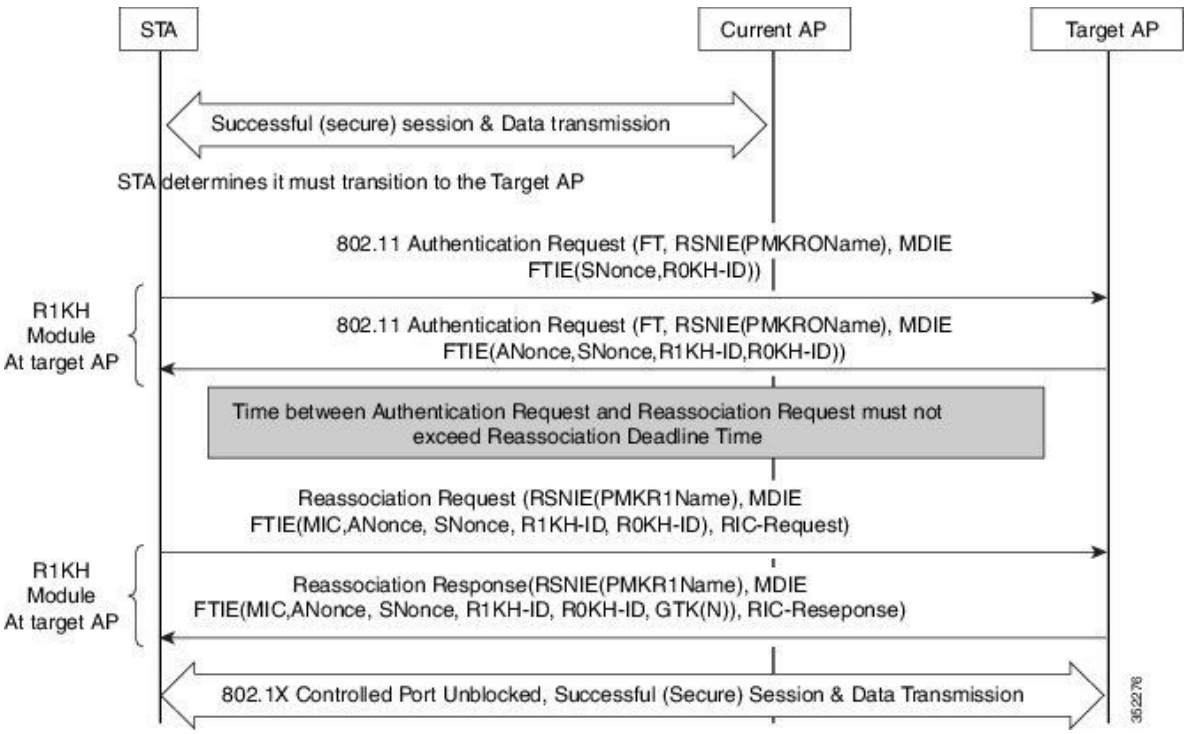
rate downshift). On odd occasion if there is a bug you may land up with incorrect sequencing of the data frames, qos mis configs and potential A-MPDU issues. Next step once you are past the Layer 1 and 2 of the OSI model is to start exploring the layer 3 traffic (decapsulated, preferably at the VLAN level or default gateway). Check for TCP windowing issues or retransmit etc. The problem could be between specific hosts/ servers etc.

11. How would you troubleshoot one way audio issue

Typically one way audio issues stem from power mismatch between the AP and the VoWiFi device. The VoWiFI device has limited transmit power compared to the AP which can cause one way audio issues. The VoWiFi device can hear the AP communication even at relatively far off distances but at cell edge or beyond if the VoWiFi transmits data back, the AP sometimes cannot interpret the data leading to one way audio. This is the simplest form of one way audio issue. You need to determine if the communication is between 2 VoWiFi devices or one VoWiFi and one wired phone. There could be configurations that may block peer to peer communication which may potentially lead to one way audio or no audio between two VoWiFi devices. The way to troubleshoot such issue is normally double check the configurations are ok and adhere voice of wifi best practices and then delve into debugs + over the air captures for further isolating the problem.

12. Briefly explain 802.11r

https://en.wikipedia.org/wiki/IEEE_802.11r-2008 (https://en.wikipedia.org/wiki/IEEE_802.11r-2008)



13. What are the data rates of 802.11b, 802.11g, 802.11a, 11n and 11ac (they can also ask history of 802.11b, g and a). There are too many 802.11n MCS rates so most likely you should not expect a question like that.

802.11(a, b, g) comparison

Standards	802.11g	802.11b	802.11a
Data Rate Support	54, 48, 36, 24, 18, 12, 9, 6,11, 5.5, 2, 1 Mbps	11, 5.5, 2, 1 Mbps	54, 48, 36, 24, 18, 12, 9, 6 Mbps
Max. Data Rate	54 Mbps	11 Mbps	54 Mbps
Frequency Band	2.4 GHz (2.4 GHz to 2.4835 GHz)	2.4 GHz (2.4 GHz to 2.4835 GHz)	5 GHz (5.725 GHz to 5.850 GHz)
Channels	3 non-overlapping channels, up to 13 overlapping	3 non-overlapping channels, up to 13 overlapping	12 non-overlapping channels
Technique	OFDM/CCK (6,9,12,18,24,36,48,54) OFDM (6,9,12,18,24,36,48,54) DQPSK/CCK (22, 33, 11, 5.5 Mbps) DQPSK (2 Mbps) DBPSK (1 Mbps)	DQPSK/CCK (11, 5.5 Mbps) DQPSK (2 Mbps) DBPSK (1 Mbps)	BPSK (6, 9 Mbps) QPSK (12, 18 Mbps) 16-QAM (24, 36 Mbps) 64-QAM (48, 54 Mbps)
Max. Range*	Up to 1,000 ft	Up to 1,000 ft	Up to 500 ft
Backward Compatibility	802.11b	N/A	N/A
Features	Replacement for 802.11b with higher data rate and better security	Most widely deployed today	Ideal for high-density environments

TABLE 1: IEEE 802.11 PHY STANDARDS

Release date	Standard	Band (GHz)	Bandwidth (MHz)	Modulation	Advanced antenna technologies	Maximum data rate
1997	802.11	2.4	20	DSSS, FHSS	N/A	2 Mbits/s
1999	802.11b	2.4	20	DSSS	N/A	11 Mbits/s
1999	802.11a	5	20	OFDM	N/A	54 Mbits/s
2003	802.11g	2.4	20	DSSS, OFDM	N/A	54 Mbits/s
2009	802.11n	2.4, 5	20, 40	OFDM	MIMO, up to four spatial streams	600 Mbits/s
2012 (expected)	802.11ad	60	2160	SC, OFDM	Beamforming	6.76 Gbits/s
2013 (expected)	802.11ac	5	40, 80, 160	OFDM	MIMO, MU-MIMO, up to eight spatial streams	6.93 Gbits/s

802.11n rates: http://mcsindex.com/ (http://mcsindex.com/)

802.11ac MCS rates

http://wirelessonthego.postach.io/post/802-11ac-mcs-rates (http://wirelessonthego.postach.io/post/802-11ac-mcs-rates)

14. Difference between dB, dBm, dBi

http://www.antenna-theory.com/definitions/decibels.php (http://www.antenna-theory.com/definitions/decibels.php)

http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-fixed/9218-quick-ref.html (http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-fixed/9218-quick-ref.html)

15. What cell edge and cell overlap would you survey for a voice deployment

-65 to -67 dBm

http://www.cisco.com/c/en/us/td/docs/solutions/Enterprise/Mobility/emob73dg/emob73/ch9_Voic.
(http://www.cisco.com/c/en/us/td/docs/solutions/Enterprise/Mobility/emob73dg/emob73/ch9_Voic

16. What data rates are beacons sent out / broadcasted?

Beacons are broadcasted at the mandatory data rates set on the 2.4 and 5GHz radios.

17. How many MCS rates are there for 802.11ac?

There are nine for a specific Spacial stream.
http://wirelessonthego.postach.io/post/802-11ac-mcs-rates
(http://wirelessonthego.postach.io/post/802-11ac-mcs-rates)

18. Modulation techniques -

http://www.ni.com/tutorial/7131/en/ (http://www.ni.com/tutorial/7131/en/)

http://www.wirelessdesignonline.com/doc/modulation-techniques-for-high-speed-wlan-sys-0001 (http://www.wirelessdesignonline.com/doc/modulation-techniques-for-high-speed-wlan-sys-0001)

19. What is antenna beamwidth

https://en.wikipedia.org/wiki/Beamwidth (https://en.wikipedia.org/wiki/Beamwidth)

20. Have you heard of 802.11ah?

https://en.wikipedia.org/wiki/IEEE_802.11ah
(https://en.wikipedia.org/wiki/IEEE_802.11ah)

21. Explain in as much detail as possible when you try and ping a server on the internet

http://images.globalknowledge.com/wwwimages/whitepaperpdf/WP_Mays_Ping.pdf
(http://images.globalknowledge.com/wwwimages/whitepaperpdf/WP_Mays_Ping.pdf)

Assuming the ping involves a packet being sent over an Ethernet or WiFi network, ARP is used to find the Ethernet hardware address of the device that receives the outbound packet. Typically this will be the router for the LAN the machine originating the ping is on.

The typical process is:

- You enter a command to ping a destination.
- DNS is used to determine the IP address (if needed).
- The routing table is consulted to find the next hop towards that destination.
- ARP is used to find the hardware address of the next hop.
- The IP packet is sent to the next hop, encapsulated in an Ethernet or WiFi frame

22. What is MIMO, SU-MIMO, MU-MIMO, Beamforming etc

These are some of the most common terms you will come across while reading content on 11n and 11ac. The books i have referenced have all you need on these concepts

23. What is the difference between Active scanning and Passive scanning?

Passive scanning: Its the process where the client (STA) listens (on different channels) to the beacons from the AP or Ad Hoc station. The STA continues to listen to the beacons till its hears a beacon with the SSID of the network it wishes to join.

Active scanning: This involves the STA sending a probe request frame. The station sends the probe request frame when it is actively trying to join a specific SSID (network). The probe request frame will either contain the SSID name of the network or a broadcast SSID. If probe request is sent specifying a specific SSID, then only the APs serving the SSID will respond with a probe response frame. If probe request is sent with broadcast SSID then all APs within reach will respond.

24. TCP handshakes, TCP Windowing

You can google it :)

25. 5GHz spectrum channels for WiFi use

http://wirelessonthego.postach.io/post/new-b-regulatory-domain-for-wlan-equipment-for-us (http://wirelessonthego.postach.io/post/new-b-regulatory-domain-for-wlan-equipment-for-us)
(http://wirelessonthego.postach.io/post/new-b-regulatory-domain-for-wlan-equipment-for-us)

26. Common interferers on 2.4GHz

Microwave, 2.4 GHz video camera, 2.4GHz cordless phones, bluetooth devices etc

27. What is the difference between MSDU and MPDU

https://www.youtube.com/watch?v=fYPspcM68h0 (https://www.youtube.com/watch?v=fYPspcM68h0)
(https://www.youtube.com/watch?v=fYPspcM68h0)

https://mrncciew.com/2013/04/11/a-mpdu-a-msdu/
(https://mrncciew.com/2013/04/11/a-mpdu-a-msdu/)
(https://mrncciew.com/2013/04/11/a-mpdu-a-msdu/)

28. What is the difference between MSDU and A-MSDU

https://www.youtube.com/watch?v=fYPspcM68h0 (https://www.youtube.com/watch?v=fYPspcM68h0)

https://mrncciew.com/2013/04/11/a-mpdu-a-msdu/
(https://mrncciew.com/2013/04/11/a-mpdu-a-msdu/)

https://www.cwnp.com/forums/posts?postNum=286912
(https://www.cwnp.com/forums/posts?postNum=286912)
(https://www.cwnp.com/forums/posts?postNum=286912)

29. What is a guard interval

https://en.wikipedia.org/wiki/Guard_interval
(https://en.wikipedia.org/wiki/Guard_interval)
(https://en.wikipedia.org/wiki/Guard_interval)

https://wifijedi.com/2009/02/11/how-stuff-works-short-guard-interval/
(https://wifijedi.com/2009/02/11/how-stuff-works-short-guard-interval/)
(https://wifijedi.com/2009/02/11/how-stuff-works-short-guard-interval/)

30. How many (max) mac addresses are present in a 802.11 header

Four - Sender Address (SA), Transmitter address (TA), Destination address (DA) and Receiver address (RA)

http://community.arubanetworks.com/t5/Technology-Blog/802-11-MAC-Header-Breakdown/ba-p/219264 (http://community.arubanetworks.com/t5/Technology-Blog/802-11-MAC-Header-Breakdown/ba-p/219264)
(http://community.arubanetworks.com/t5/Technology-Blog/802-11-MAC-Header-Breakdown/ba-p/219264)

31. Difference between DCF and PCF

http://www.wi-fiplanet.com/tutorials/article.php/1548381/80211-Medium-Access-Methods.htm (http://www.wi-fiplanet.com/tutorials/article.php/1548381/80211-Medium-Access-Methods.htm)

http://www.vocal.com/networking/802-11-distributed-coordination-function-dcf/
(http://www.vocal.com/networking/802-11-distributed-coordination-function-dcf/)

https://en.wikipedia.org/wiki/Point_coordination_function
(https://en.wikipedia.org/wiki/Point_coordination_function)

https://en.wikipedia.org/wiki/Distributed_coordination_function
(https://en.wikipedia.org/wiki/Distributed_coordination_function)
(https://en.wikipedia.org/wiki/Distributed_coordination_function)

32. What are the types of 802.11 frames?

Management, Control, Data frame and reserved

There can be so many more questions from these books below.

Below are some of the books, materials to review/read to better prepare yourself for the interview

- CWTS
- CWNA
- CWSP
- CWAP
- 802.11n Survival Guide O'Reilly
- 802.11ac Survival Guide O'Reilly

For Vendor specific (in this case Cisco since thats all I know :/)

- http://www.cisco.com/c/en/us/td/docs/wireless/controller/8-1/Enterprise-Mobility-8-1-Design-Guide/Enterprise_Mobility_8-1_Deployment_Guide.html (http://www.cisco.com/c/en/us/td/docs/wireless/controller/8-1/Enterprise-Mobility-8-1-Design-Guide/Enterprise_Mobility_8-1_Deployment_Guide.html)
- CCNA Wireless 640-722 official cert guide
- Designing and deploying 802.11 Wireless networks: A practical guide to implementing 802.11n and 802.11ac Wireless networks for Enterprise-Based applications (2nd edition) by Jim Geier
- Deploying and troubleshooting Cisco Wireless LAN Controllers by Lee Johnson (this maybe outdated but still a good read for foundational level knowledge on Cisco architecture)

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(/tag/wifi-interview-preparation)Wifi Interview Preparation (/tag/wifi-interview-preparation)
(/tag/wifi-jobs)Wifi Jobs (/tag/wifi-jobs)
(/tag/802-11-jobs)802 11 Jobs (/tag/802-11-jobs)
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