

Review Questions 21

Your Name:

Please print out this form (two-sided, if you can) and write your answers *legibly* in the spaces provided. If you can't write legibly, type.

1. Explain why 802.11 networks send acknowledgments, when Ethernet networks do not.

The fact that collision detection is not always possible, e.g., because of hidden terminals is one reason, and so is the fact that wireless channels are much more unpredictable than wired channels, so that data corruption is more likely.

2. What are the different roles of a beacon frame in an 802.11 network? How often are they sent?

Beacons are used to allow wireless stations to discover available access points and associate with one of them. In addition, beacons carry a list of nodes that have pending packets (at the AP), which is used by wireless stations to determine whether or not they can go back to sleep. Beacons are typically sent every 100 ms.

3. Assume that two ISPs have each their own AP to offer WiFi access in a café, but did not coordinate so that both selected channel 1. How will the 802.11 protocol operate when two devices associated with different ISPs attempt to communicate at the same time? What would change if the two ISPs had coordinated their channel selection and chosen channels 1 and 11, respectively?

The fact that both APs used the same channel simply means that they will have to share the transmission resources associated with that channel. They will both send separate beacon frames that will carry different SSID and source MAC addresses. This means that when a station transmits a frame to the AP it is associated with, the frame will carry the corresponding MAC address, and therefore only be received by the correct AP. Similar isolation will be realized for RTS and CTS frames. However, note that CTS frames from one AP will be ignored by stations associated with the other AP, and conversely, RTS addressed to one AP will be ignored by the other AP. Hence, additional collisions may arise that would have been avoided in the case of a single AP. In particular, collisions will occur whenever two stations transmit simultaneously or when the APs transmit at the same time.

Because the two APs are sharing the same channel, the total capacity that is available for their transmissions and those of the stations associated with them is typically less than half the capacity available from sole access to the channel (because of the additional collisions that occur).

Those problems would be altogether avoided if the two APs had selected non-overlapping channels such as channel 1 and 11. In this case, they would have been able to gain access to the full channel capacity.