

Assignment 10
Computer Networking
Wireless Questions – Kurose_Ross

R5. Describe the role of the beacon frames in 802.11.

Beacon frame is one of the management frames in IEEE 802.11 based WLANs. It contains information about the network which includes the Access Point's SSID and MAC address. The wireless station scans the 11 channels for beacon frames from Access Points that are present, after which the wireless host selects one of the access points for association. The host typically chooses the beacon frame with the highest strength.

The beacon frame also contains several important fields:

- Timestamp: this allows all devices connected to the AP to synchronize with the AP.
- Beacon interval: this is the time interval between beacon transmissions.
- SSID: Service Set Identifier.
- Supported data rates
- Parameter sets: This includes information about the specific signaling methods

R6. True or false: Before an 802.11 station transmits a data frame, it must first send an RTS frame and receive a corresponding CTS frame.

False, the RTS/CTS exchange is only used to reserve the channel for the transmission of a long DATA frame.

R7. Why are acknowledgments used in 802.11 but not in wired Ethernet?

Acknowledgments are used in an 802.11 wireless networks due to the high rate of errors in wireless networks and the sender would have no way of knowing that the receiver received the data intact due to signal loss, signal to noise ratio, fading, multi-path propagation and interference, whereas ethernet is a physical connection and so it does not face these transmission problems.

R8. True or false: Ethernet and 802.11 use the same frame structure.

False, Ethernet and 802.11 have different frame structures.

R9. Describe how the RTS threshold works.

The RTS threshold is set when the frame size is longer than the threshold and the RTS (Request to Send)/CTS (Clear to Send) sequence is used. For many wireless stations, the default RTS threshold value is larger than the maximum frame length, so the RTS/CTS sequence is skipped for all DATA frames sent.

R10. Suppose the IEEE 802.11 RTS and CTS frames were as long as the standard DATA and ACK frames. Would there be any advantage to using the CTS and RTS frames? Why or why not?

Yes. They are still necessary to avoid the hidden terminal problem. The CTS and RTS frames make sure a node A sending to B won't interfere with another node C also attempting to contact B, even if A and C are unable to see each other.

R11. Section 6.3.4 discusses 802.11 mobility, in which a wireless station moves from one BSS to another within the same subnet. When the APs are interconnected with a switch, an AP may need to send a frame with a spoofed MAC address to get the switch to forward the frame properly. Why?

Initially the switch has an entry in its CAM table which associates the Host with the original Access Point 1 and the datagram destined for the host would be directed via Access Point 1. When the host connects to the new Access Point 2, the ethernet frames to the Host should be directed from the Access Point 2. So, the Access Point 2 sends a broadcast ethernet frame with the host's source address. The frame is received by the switch. This forces the switch to update its CAM table, so that frames destined to the host are sent via the new Access Point 2.

R12. What are the differences between a master device in a Bluetooth network and a base station in an 802.11 network?

Bluetooth devices organize themselves into a piconet of up to 8 slave devices. One of the devices is designated as the master, and the remaining devices are slaves. The master's clock determines the time in the Piconet. A master device can transmit in each odd-numbered slot, a slave can only transmit only after the master has communicated with it and then slave transmits to the master. There can be parked devices in the network and these devices cannot communicate until their status has been changed from parked to active by the master node.

A base station or access point is a receiver and transmitter acting as the hub of the WIFI network. Additionally, may also function as the gateway between a wired network and the wireless network. This is also an example of infrastructure mode.