Wireless Protocols

At the end of this episode, I will be able to:

1. Identify wireless protocols

Exam Objective: 2.3 - Compare and contrast protocols for wireless networking.

Description: In this episode, we discuss common protocols used in wireless network communication. We will identify the Institute for Electrical and Electronics Engineers (IEEE) 802.11 standards, wireless channels, the 2.4 GHz and 5 GHz frequencies, Bluetooth, NFC, RFID and long-range fixed wireless.

- **Frequencies and channels**
  - ISM (Industrial, Scientific and Medical) (FCC)
  - UNII (Unlicensed - National Information Infrastructure) (U-NI)
  - 2.4 GHz (Wi-Fi, Bluetooth, cordless devices, medical devices)
    - 13 channels (11 channels in North America, 3 non-overlapping)
  - 5 GHz (less saturation, wider channels through bonding)
    - 23 non-overlapping channels

- **802.11**
  - .11a
  - .11b
  - .11g
  - .11n (Wi-Fi 4)
  - .11ac (Wi-Fi 5)
  - .11ax (WiFi 6)
- **Bluetooth**
  - 2.4 GHz frequency/ 10 meters or 32.8 ft.
  - Multiple revisions
    - Standards (formerly 802.15.1, today Bluetooth SIG)
      - 1.1 - Legacy (First standardization) 1 Mbps
      - 2.0 - Bluetooth + EDR (Enhanced Data Rate) 3 Mbits
      - 3.0 - Bluetooth + HS (High speed, 24 Mbps via co allocated Wi-Fi channel)
      - 4.0 - Bluetooth + LE (Low energy implementations, focus begins on IoT)
      - 5.0 - Varity of revisions of this version
  - **Near Field Communications (NFC)**
    - point-to-point contact/0-2 cm
    - 13.56 MHz
    - Contactless payment
    - Proximity cards
    - Asset tracking
  - **Radio-frequency identification**

        - Unpowered/powered tags cards to store data
        - Powered tags can increase the range up to 100 meters
        - Components
            - Tag (sends data to the reader)
            - Reader ()
            - Antenna
    - **Long-range fixed wireless**
        - Licensed and unlicensed bands
        - Farther distances than traditional Wi-Fi (160 ft/kilometer)

- Additional Reference Materials
    - Not applicable if blank