Network Types and Addressing

Objectives:

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

1. Describe the types of networks supported by macOS.
2. Differentiate between IP, TCP, and UDP and describe their uses.
3. Describe IPv6, IPv4, and MAC addresses.

> Additional resources used during the episode can be obtained using the download link on the overview episode.

- Physical Network Connections
    - Wired Ethernet
    - Wireless Ethernet
    - FireWire
    - Bluetooth
    - Thunderbolt Bridge
- Logical Protocols
    - IPv4
    - IPv6
    - NetBIOS
    - PPP
- Transmission Control Protocol (TCP)
    - Responsible for reliable delivery of data
    - Disassembles and re-assembles data
    - Retransmits data if necessary
- Internet Protocol (IP)
    - Responsible for navigating the network
    - Defines the start and end point of a communication
    - Represented as a binary number (base-2)
- IPv4
    - Uses a 32bit address
    - 4,294,967,295 Addresses
    - Represented as a dotted decimal number (base-10)
    - Example: 192.168.0.1/24
    - Composed of a network ID and a host ID
    - Subnet mask defines the separation between the two
- IPv6
    - Uses a 128bit address
    - Massive address space
    - 340,282,366,920,938,463,463,374,607,431,768,211,456 Addresses
    - Represented as a hexadecimal number (base-16)
    - Example: 2600:1402:14:197::c77/64
- MAC
    - Media Access Control
    - Address assigned to all Ethernet interfaces
    - For local, non-routable communications

- 48bit Hexadecimal number
- Example: 3e:15:c2:7c:89:00
- First 24 bits are the OUI (Vendor ID)
- Remaining 24 bits identify the unique interface
- All local communications use MAC address to communicate