What is Networking

What is Networking?
Connection between devices is called network

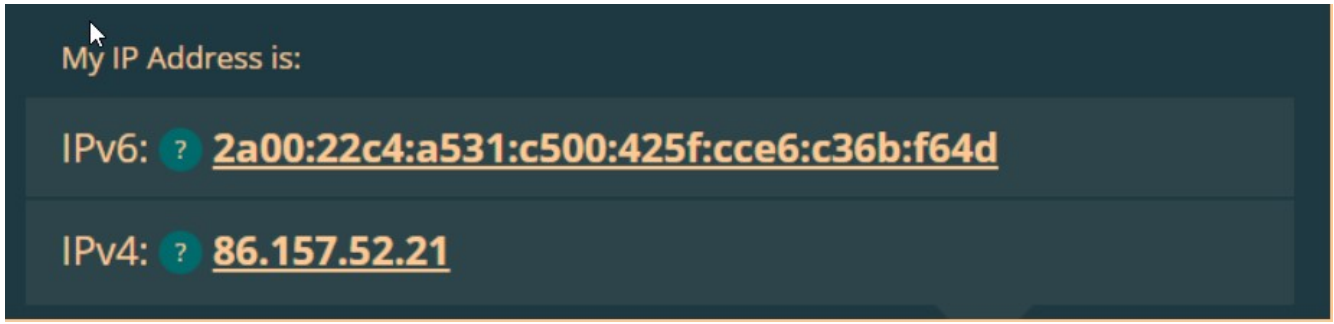
What is the Internet?
The Internet is one giant network that consists of many, many small networks within itself.
As previously stated, the Internet is made up of many small networks all joined together.
These small networks are called private networks, where networks connecting these small networks are called public networks -- or the Internet! So, to recap, a network can be one of two types:

- A private network
- A public network

Identifying Devices on a Network
Devices have the same thing: two means of identification, with one being permeable. These are:
I An IP Address
II A Media Access Control (MAC) Address -- think of this as being similar to a serial number.

IP Address

- Briefly, an IP address (or Internet Protocol) address can be used as a way of identifying a host on a network.
- An IP address is a set of numbers that are divided into four octets.
- This number is calculated through a technique known as IP addressing & subnetting
- A public address is used to identify the device on the Internet, whereas a private address is used to identify a device amongst other devices.
- Public IP addresses are given by your Internet Service Provider (or ISP) at a monthly fee (your bill!)



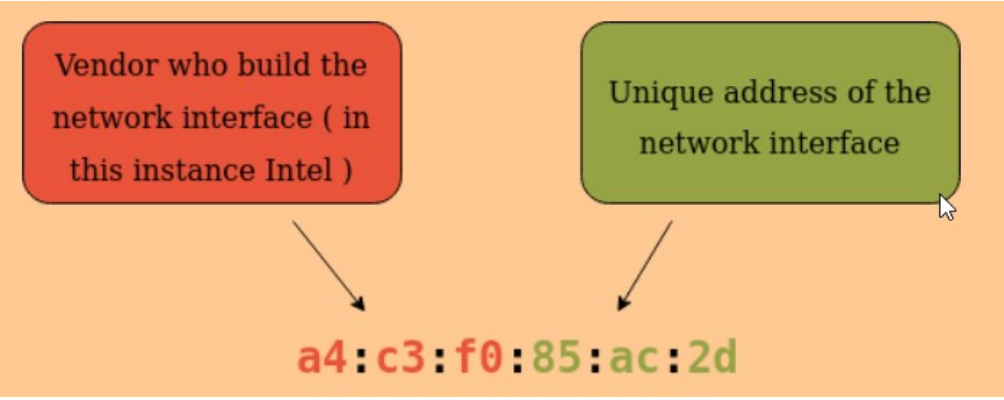
FACTS:

- approximately 50 billion devices connected on the Internet by the end of 2021
- IPv4 which uses a numbering system of 2^32 IP addresses (4.29 billion)
- IPv6 Supports up to 2^128 of IP addresses (340 trillion-plus)

MAC Address

- Devices on a network will all have a physical network interface, which is a microchip board found on the device's motherboard.
- This network interface is assigned a unique address at the factory it was built at, called a MAC (Media Access Control) address.

- The MAC address is a twelve-character hexadecimal number
- For example, a4:c3:f0:85:ac:2d
- The first six characters represent the company that made the network interface, and the last six is a unique number.
- However, an interesting thing with MAC addresses is that they can be faked or "spoofed" in a process known as spoofing.
- This spoofing occurs when a networked device pretends to identify as another using its MAC address.



Ping (ICMP)

- Ping is one of the most fundamental network tools available to us.
- Ping uses ICMP (Internet Control Message Protocol) packets to determine the performance of a connection between devices,
- for example, if the connection exists or is reliable.
- The time taken for ICMP packets travelling between devices is measured by ping,
- This measuring is done using ICMP's echo packet and then ICMP's echo reply from the target device.
- Syntax: ping IP address or website URL

Command Prompt

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

C:\Users\SS>ping  github.com

Pinging github.com [20.207.73.82] with 32 bytes of data:
Reply from 20.207.73.82: bytes=32 time=38ms TTL=114
Reply from 20.207.73.82: bytes=32 time=62ms TTL=114
Reply from 20.207.73.82: bytes=32 time=50ms TTL=114
Reply from 20.207.73.82: bytes=32 time=50ms TTL=114

Ping statistics for 20.207.73.82:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 38ms, Maximum = 62ms, Average = 50ms

C:\Users\SS>
```