IPv4 Addressing

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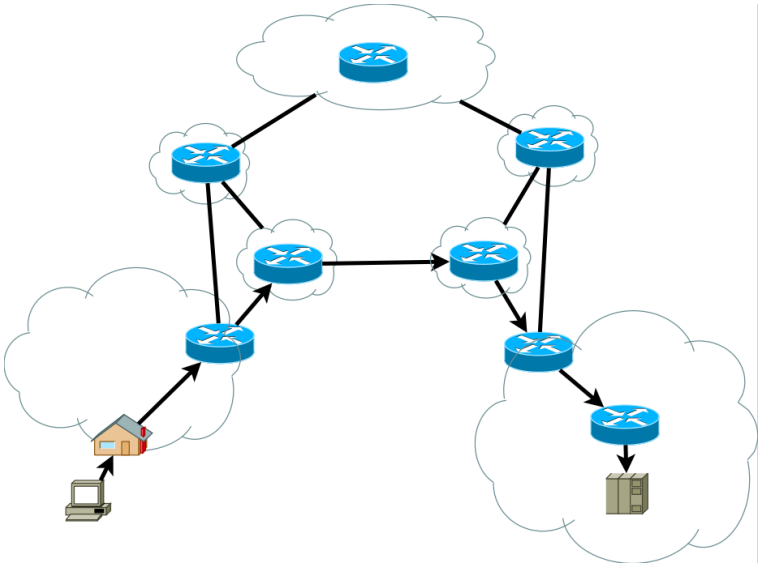
Recap: Internet Layer Communication

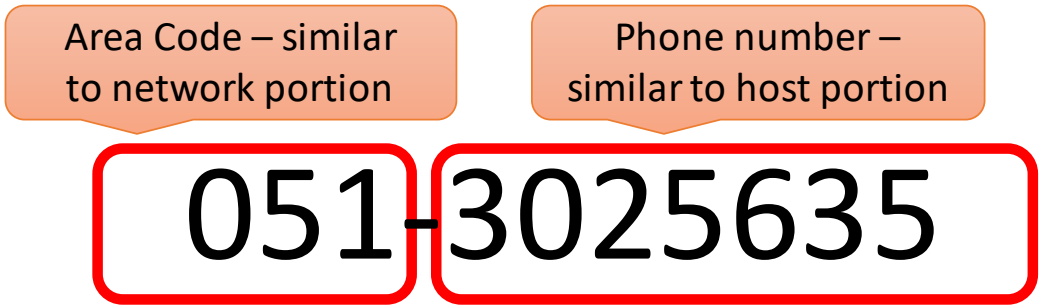
- Internet/Network layer protocols primary function is to move data from one network to another network
- Network addresses(IP Addresses) must have a mechanism to locate hosts on different networks
- Routers use the network portion of this address to determine which path to use to reach its destination.



IP/Network Packet

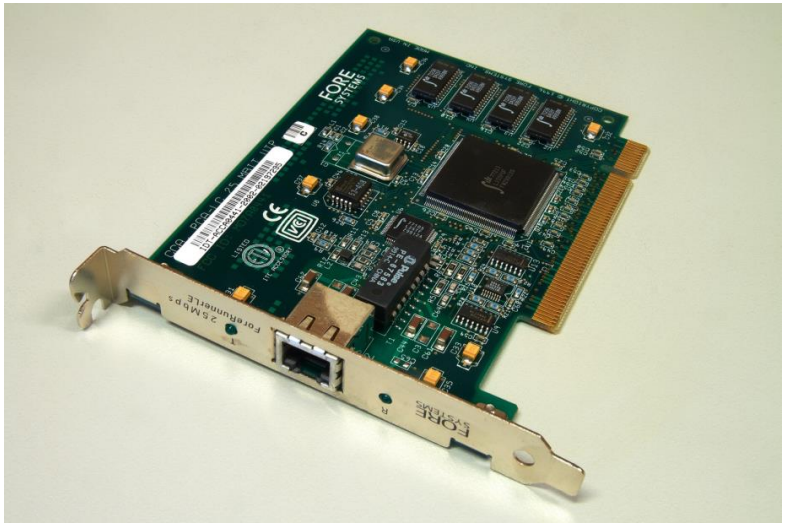
IPv4 Address: Phone number analogy

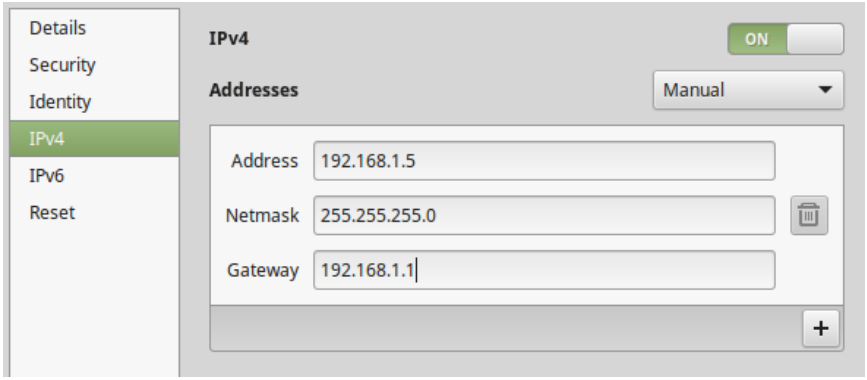
- Phone numbers are like network addresses



MAC and IP Address

- Physical/MAC address
  - Flat Addressing Scheme
  - "Burned" into Network Interface
  - Doesn't change (like a PPS number
- IP Address
  - Hierarchical Addressing
  - Software defined
  - Your devices "mailing" address (ie it usually changes when you move)
- You need both...





MAC is flat addressing

- If the Internet was a flat network with only MAC addresses, switches would need to know the millions MAC addresses or broadcast the frame as an unknown unicast.

IP is Hirarchial

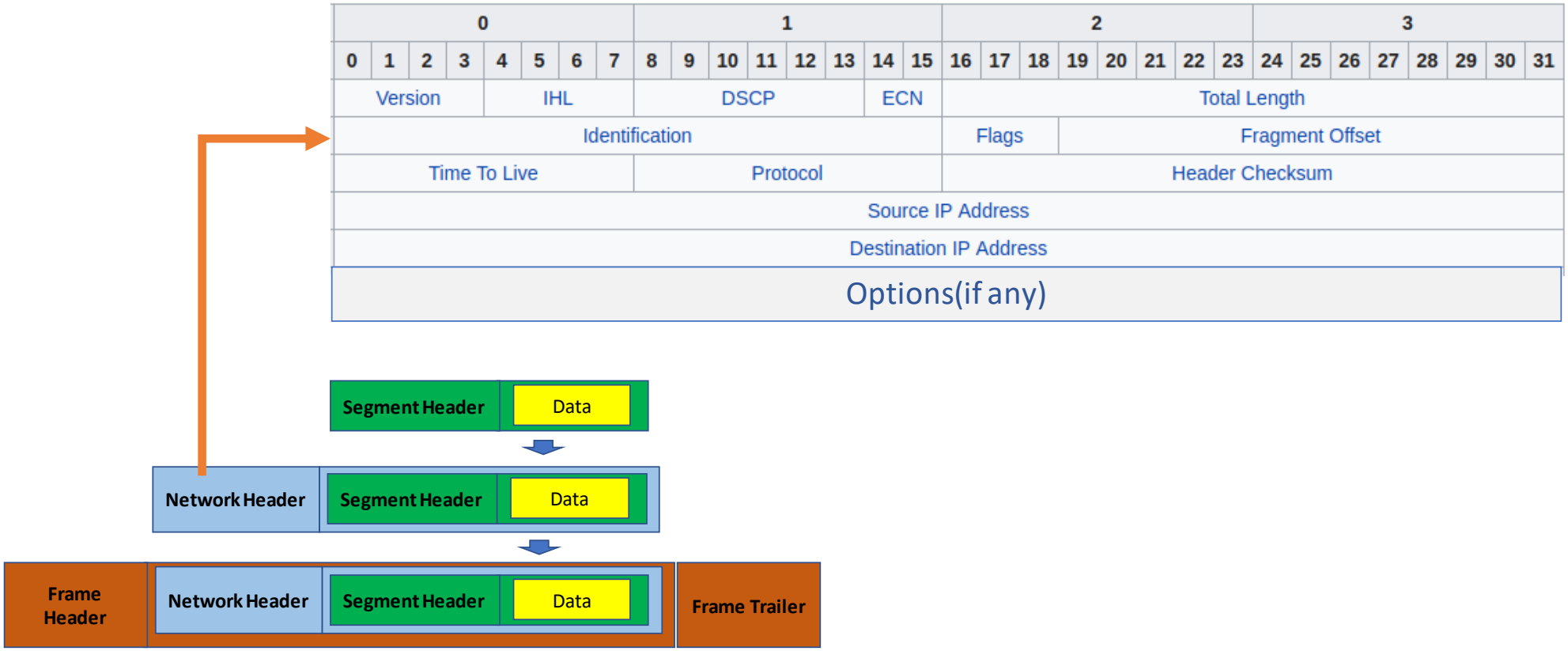
- IP address indicates what network the packet belongs to.
- Routers maintain lists of IP network addresses to route the packet to the right network.

WIT

UCD

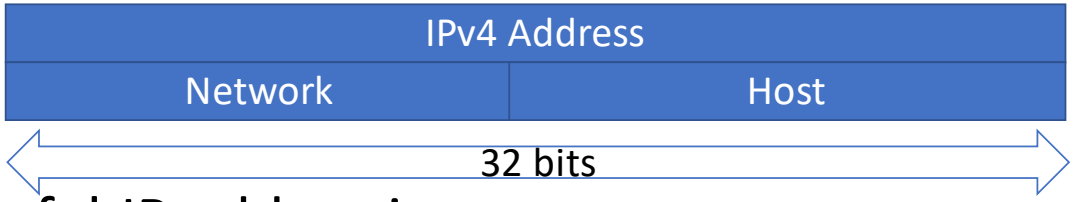
Your ISP

The IP Packet Header



IPv4 Addressing

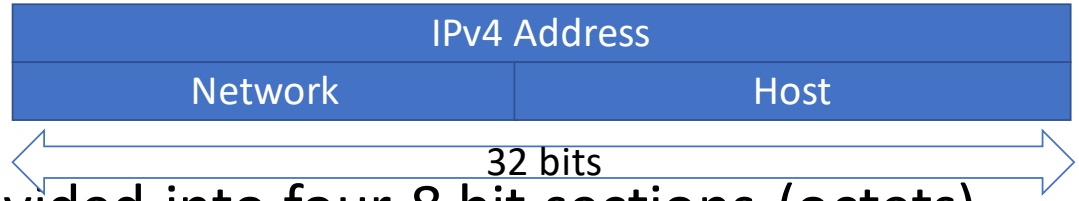
- Which bits refer to network number???



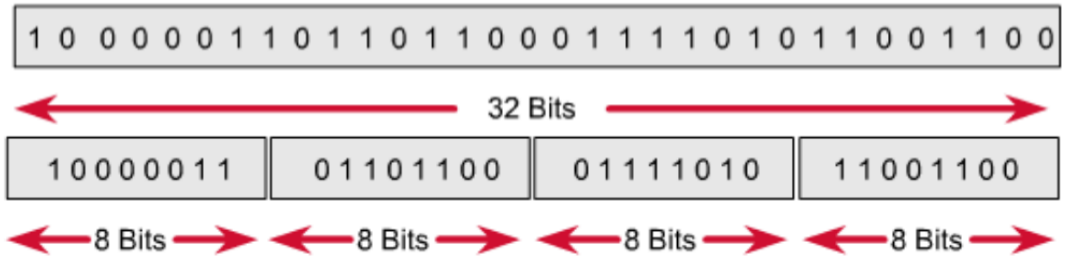
- In the past – Classful IP addressing
  - Value of first octet(8 bits) determined the network/host portion
- Nowadays
  - Classless IP addressing
  - Use a subnet mask to determine network portion of address
- Classless IP Addressing is what is used within the Internet and in most internal networks.

IPv4 Addressing

- IPv4 are 32 bits



- Divided into four 8 bit sections (octets)



- Typically expressed in **Dot Decimal Notation**