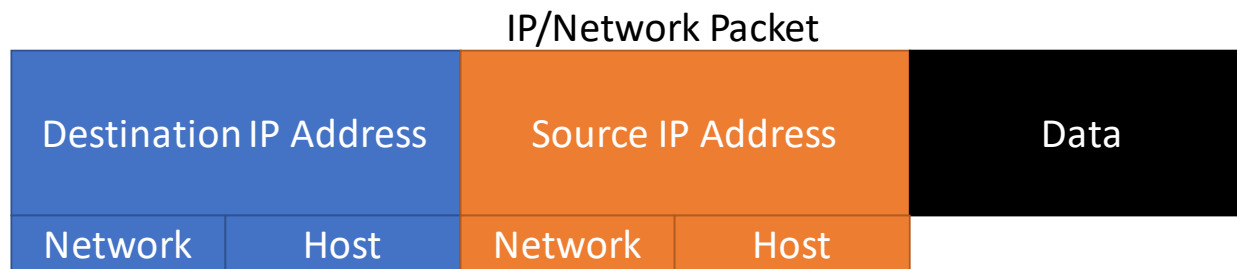
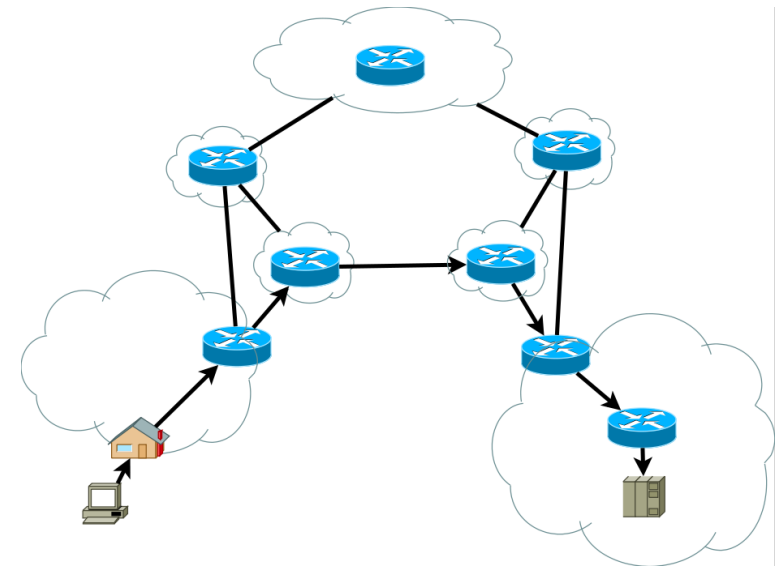


IPv4 Addressing

Frank Walsh

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.



IPv4 Address: Phone number analogy

- Phone numbers are like network addresses

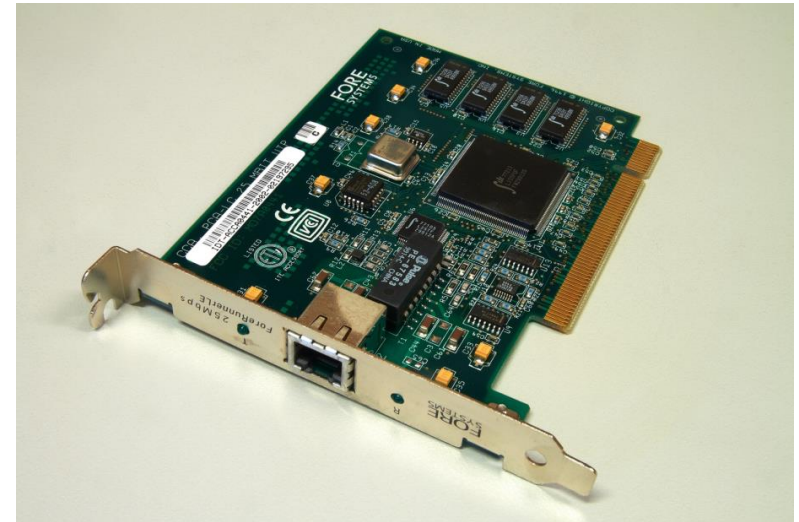
Area Code – similar
to network portion

Phone number –
similar to host portion

051-3025635

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...



Details	IPv4 <input checked="" type="checkbox"/>
Security	
Identity	
IPv4	Addresses <input type="text" value="Manual"/>
IPv6	Address <input type="text" value="192.168.1.5"/>
Reset	Netmask <input type="text" value="255.255.255.0"/>
	Gateway <input type="text" value="192.168.1.1"/>
	<input type="button" value="+"/>

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

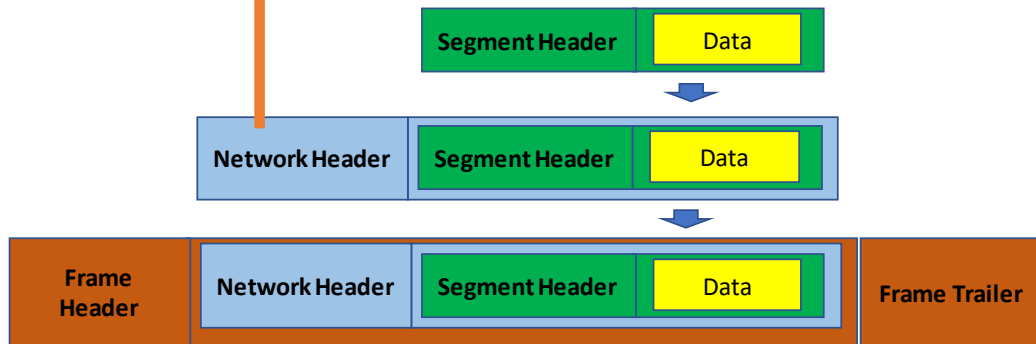


Your ISP



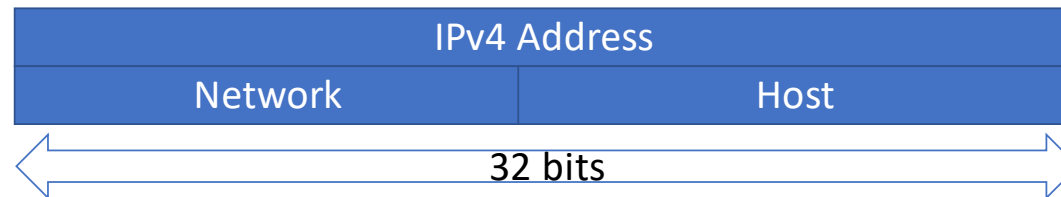
The IP Packet Header

0								1								2								3							
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version				IHL				DSCP				ECN				Total Length															
Identification																Flags		Fragment Offset													
Time To Live								Protocol								Header Checksum															
Source IP Address																															
Destination IP Address																															
Options(if any)																															



IPv4 Addressing

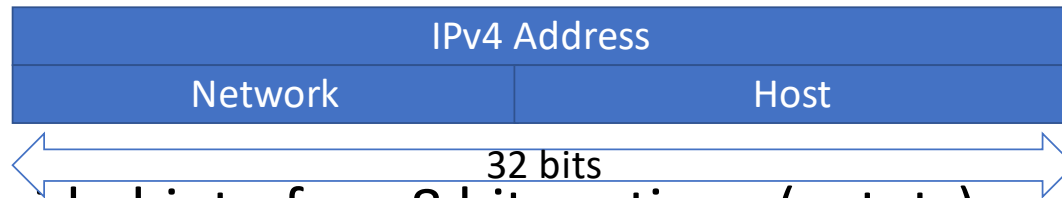
- Which bits refer to network number???



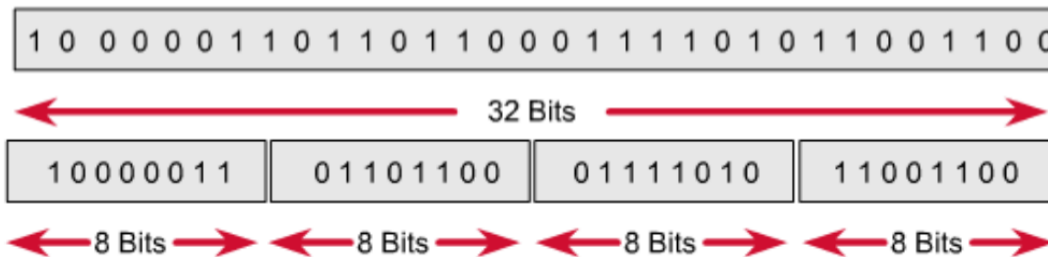
- In the past – Classful IP addressing
 - Value of first octet(8 bits) determined the network/host portion
- Nowadays
 - Classless IP addressing
 - Use a subnet mask to determine network portion of address
- Classless IP Addressing is what is used within the Internet and in most internal networks.

IPv4 Addressing

- IPv4 are 32 bits



- Divided into four 8 bit sections (octets)



- Typically expressed in **Dot Decimal Notation**

