

Tech Moment

IP Addresses

By Tom Thorpe

Definition:

An Internet Protocol (IP) address is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication.

Internet Assigned Numbers Authority
(IANA)

Regional
Internet
Registry
(RIR)

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Internet
Registry
(RIR)

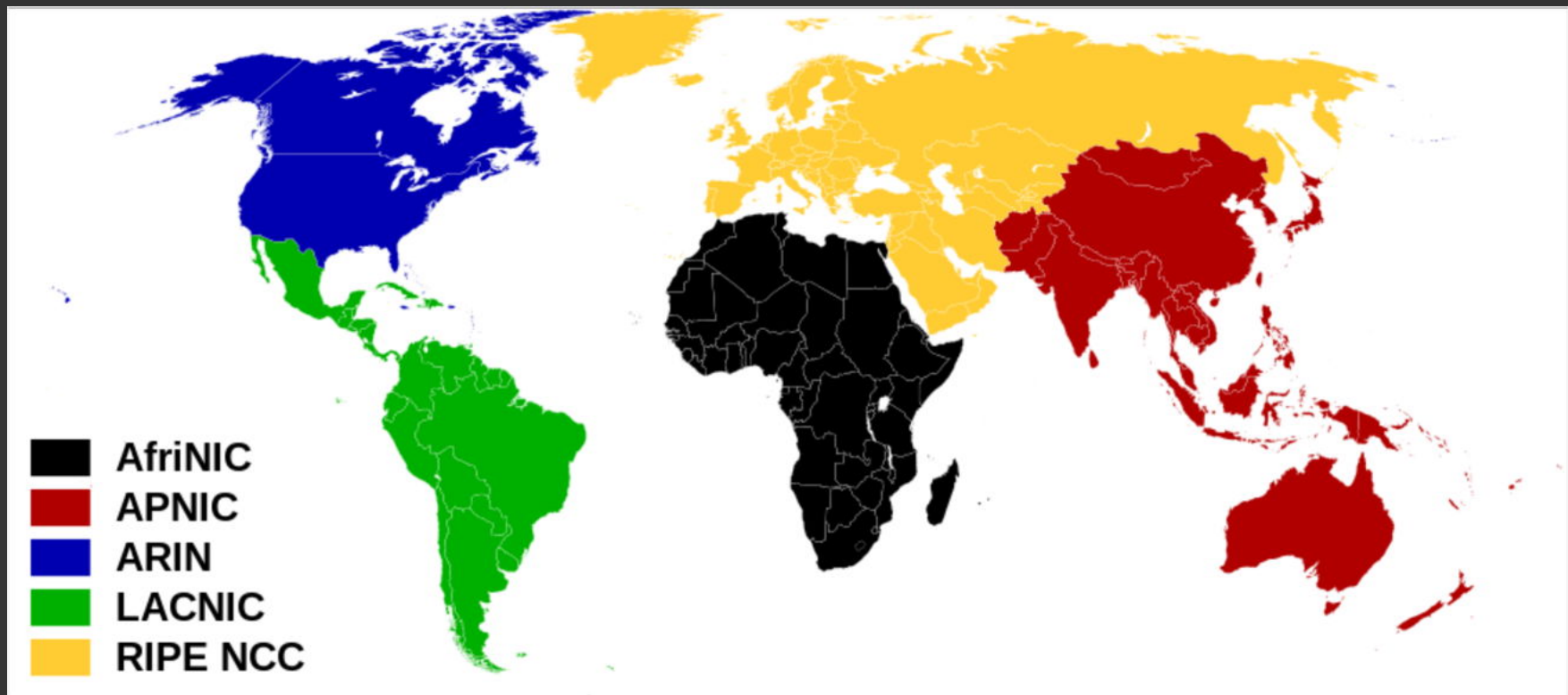
Regional
Internet
Registry
(RIR)

Regional
Internet
Registry
(RIR)

Regional
Internet
Registry
(RIR)

Internet Service Providers
(ISPs)

Regional Internet Registries



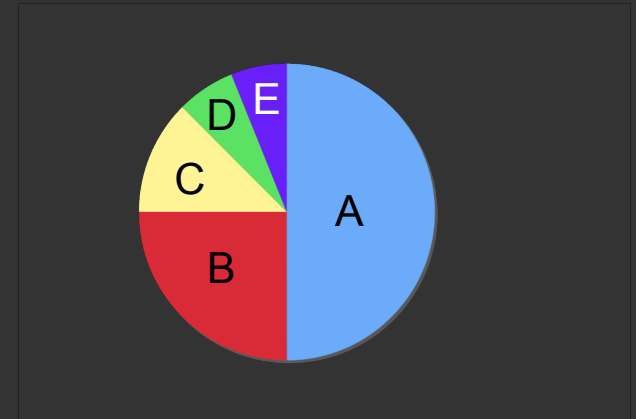
An IP address consists of 32 bits

Example: The MUG's webserver (sbamug.com)

Bit 31 Bit 0
11010000011100011001101000101000

- Usually expressed in dotted decimal notation
 - e.g. 208.113.154.40
 - Each number (0-255) corresponds to 8 binary bits (00000000 to 11111111)

The original network architecture



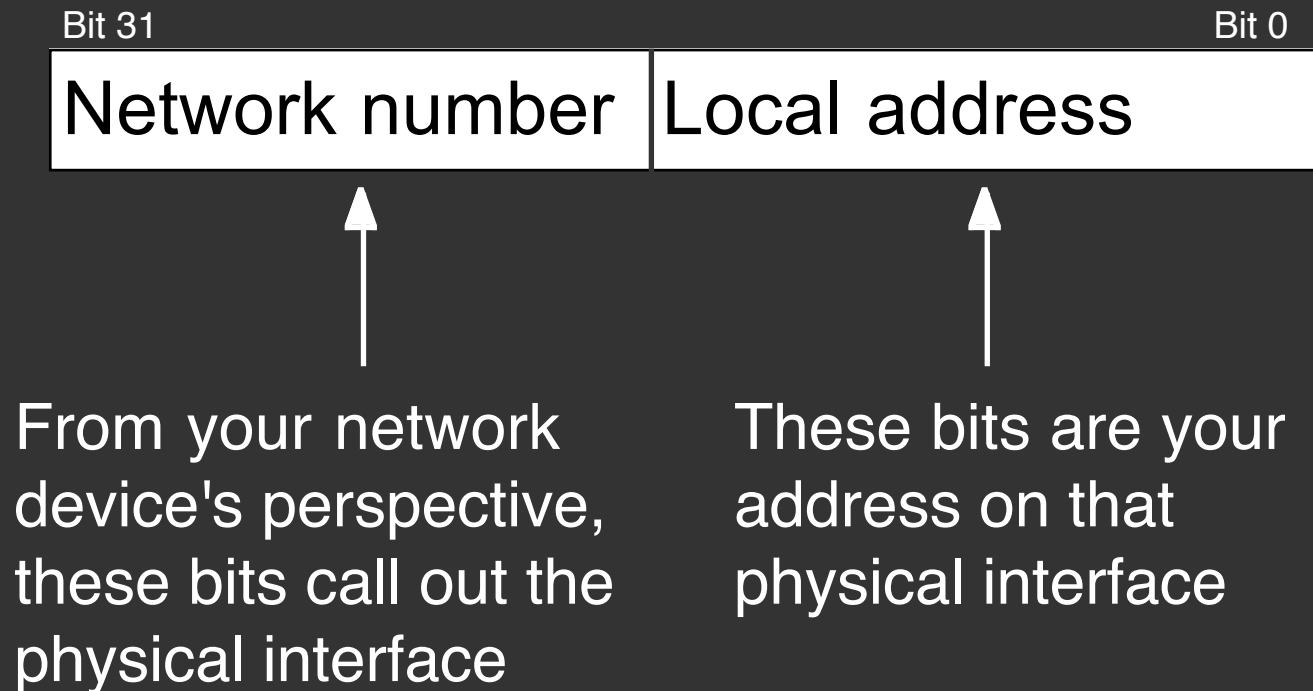
<u>Class</u>	<u>Number Networks</u>	<u>Number Addresses</u>	<u>Address Range</u>
A	128	16M	0.0.0.0 - 127.255.255.255
B	16k	64k	128.0.0.0 - 191.255.255.255
C	2M	256	192.0.0.0 - 223.255.255.255
D	Multicast		224.0.0.0 - 239.255.255.255
E	Reserved		240.0.0.0 - 255.255.255.255

Note: This scheme was abandoned in 1993

The Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of the IP address space for private internets

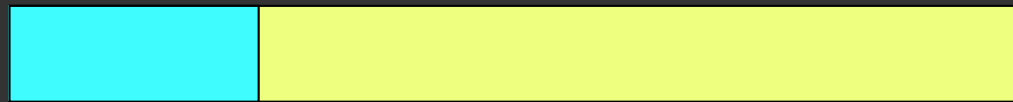
<u>Address Range</u>	<u>Number Networks</u>	<u>Addresses per network</u>
10.0.0.0 - 10.255.255.255	1	16M
172.16.0.0 - 172.31.255.255	16	64k
192.168.0.0 - 192.168.255.255	256	256

An IP address has two parts



Network number vs Local address

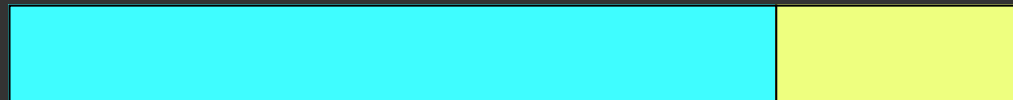
Class A



Class B



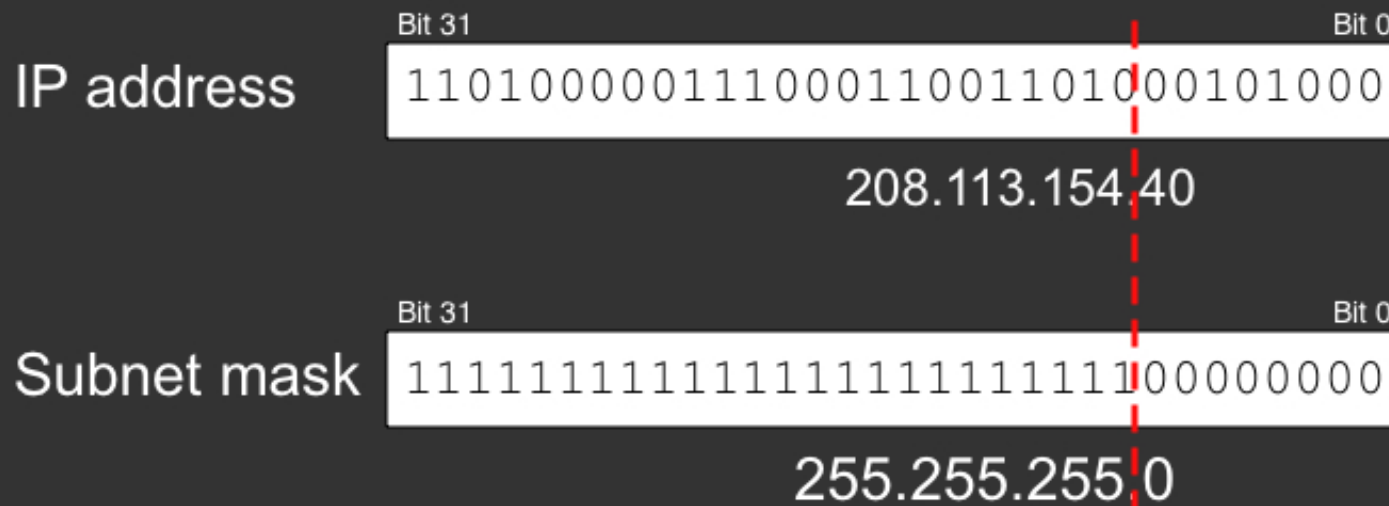
Class C



Q. How do you tell the two parts apart?

A. A subnet mask

The MUG's webserver



Custom subnet masks

- The defaults work for most networks
- For complex networks you may have to specify a subnet mask

Rule: All devices on a given network must use the same subnet mask

Summary

- IP address assignments are managed globally and allocated down to your ISP
- IPv4 addresses are 32-bits long
- There are three blocks of IP address space set aside for private internets
- Run with the default subnet masks unless you have a good reason to deviate
- We're out of IPv4 addresses, look for IPv6 in the future

