

IP & Domain Essentials



What is an IP address? (IPv4)

- An unique identifier for a computer or device (host) on a TCP/IP network
- A 32-bit binary number usually represented as 4 decimal numbers separated by a period

Example:

206 . 40 . 185 . 73

11001110.00101000.10111001.01001001

What is an IP address? (IPv4)

- Each address is 32 bits wide

Valid addresses can range from 0.0.0.0 to 255.255.255.255

WHY?

Because $1111111b = 255_{10}$

What is an IP address?

Theoretically, a total of ≈ 4.3 billion addresses are available

WHY?

Because $2^{32} = 4,294,967,296_{10}$

The Five Network Classes

Class A

1.0.0.1 to 126.255.255.254

Class B

128.1.0.1 to 191.255.255.254

Class C

192.0.1.1 to 223.255.254.254

***01111111 = 127₁₀**

**Addresses beginning with 127 are reserved for
loopback (127.0.0.1 is YOU)**

The Five Network Classes

4. Class D

224.0.0.0 to 239.255.255.255

Reserved for multicasting

4. Class E

240.0.0.0 to 254.255.255.254

Reserved for future use

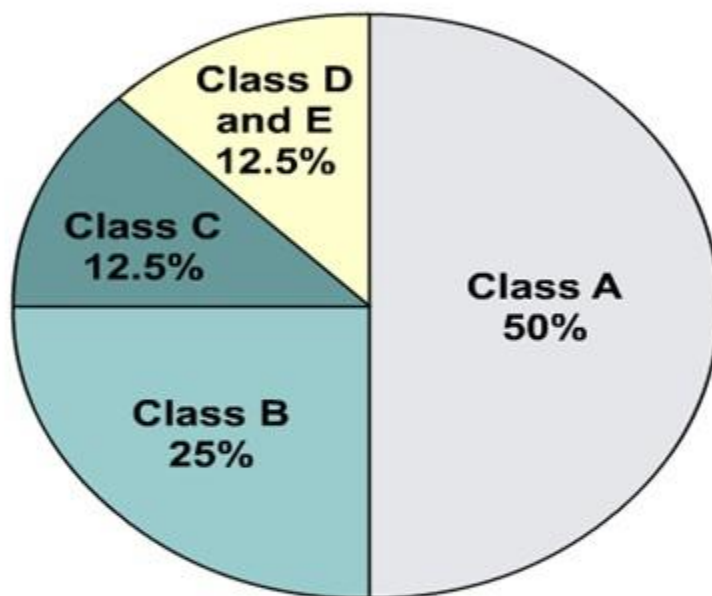
These should not be used for host addressing

There are three IP network addresses reserved for private networks

1. 10.0.0.0 - 10.255.255.255
2. 172.16.0.0 - 172.31.255.255
3. 192.168.0.0 – 192.168.255.255

These can be used by anyone for setting up an internal network.

IP addressing crisis

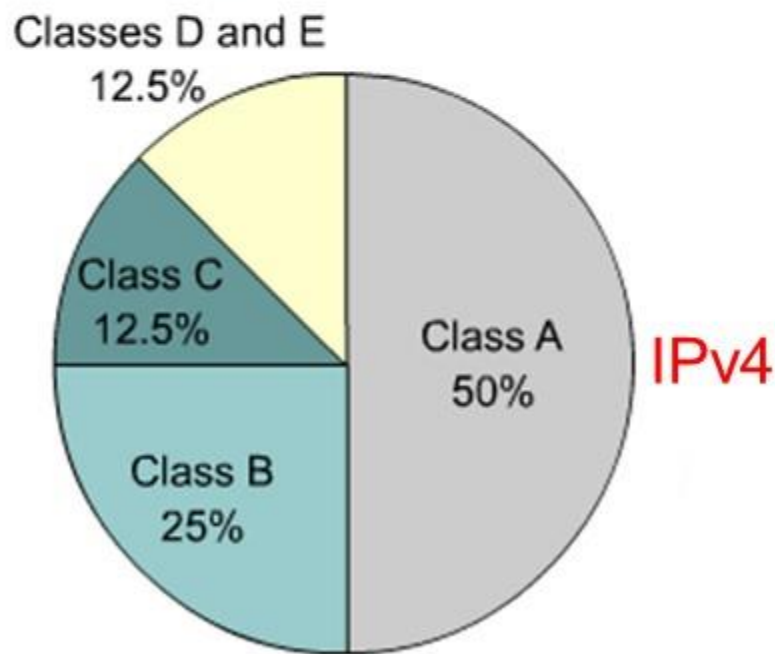


With Class A and B addresses virtually exhausted, Class C addresses (12.5 percent of the total space) are left to assign to new networks.

1. Address Depletion
2. Internet Routing Table Explosion

IPv4 Versus IPv6

1. IP version 6 (IPv6) has been defined and developed.
2. IPv6 uses 128 bits rather than the 32 bits currently used in IPv4.
3. IPv6 uses hexadecimal numbers to represent the 128 bits.



Long Term Solution: IPv6(coming)

IPv6

1. IPv6 (IP – the Next Generation) uses a 128-bit address space, yielding
340,282,366,920,938,463,463,374,607,431,768,211,456
possible addresses.
2. IPv6 has been slow to arrive
3. IPv4 revitalized by new features, making IPv6 a luxury, and not a desperately needed fix
4. IPv6 requires new software; IT staffs must be retrained
5. IPv6 will most likely coexist with IPv4 for years to come.
6. Some experts believe IPv4 will remain for more than 10 years.

Thank you!