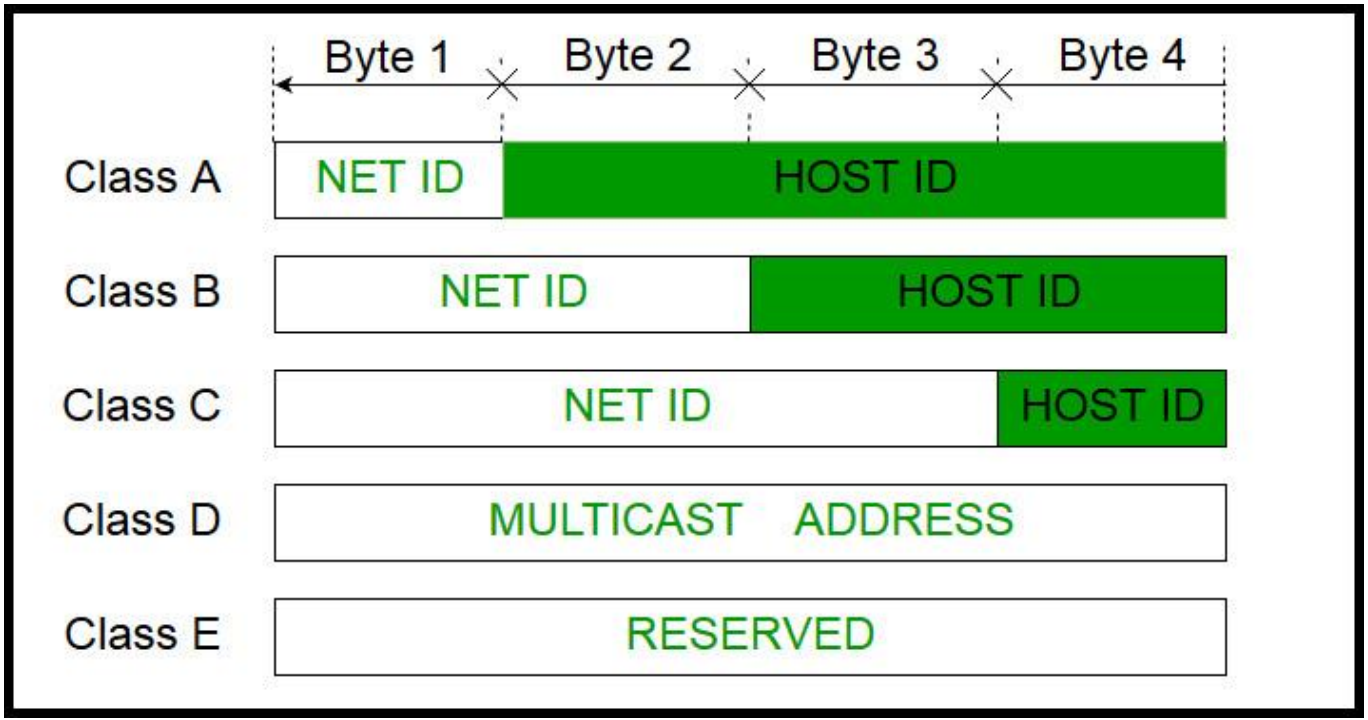
Network

Classful Networks

Classful Network Concepts



IPv4 Address Classes Based on First Octet Values

Class	First Octet Values	Purpose
A	1-126	Unicast (large networks)
B	128-191	Unicast (medium-sized networks)
C	192-223	Unicast (small networks)
D	224-239	Multicast
E	240-255	Experimental

Key Facts for Classes A, B, and C

	Class A	Class B	Class C
First octet range	1 – 126	128 – 191	192 – 223
Valid network numbers	1.0.0.0 – 126.0.0.0	128.0.0.0 – 191.255.0.0	192.0.0.0 – 223.255.255.0
Total networks	$2^7 – 2 = 126$	$2^{14} – 2 = 16,384$	$2^{21} – 2 = 2,097,152$
Hosts per network	$2^{24} – 2$	$2^{16} – 2$	$2^8 – 2$
Octets (bits) in network part	1 (8)	2 (16)	3 (24)
Octets (bits) in host part	3 (24)	2 (16)	1 (8)
Default mask	255.0.0.0	255.255.0.0	255.255.255.0

Deriving the Network ID and Related Numbers

- Network number
- First (numerically lowest) usable address
- Last (numerically highest) usable address
- Network broadcast address

What do we need to do?

- Step 1. Determine the class (A, B, or C) based on the first octet.
- Step 2. Mentally divide the network and host octets based on the class.
- Step 3. To find the network number, change the IP address's host octets to 0.
- Step 4. To find the first address, add 1 to the fourth octet of the network ID.
- Step 5. To find the broadcast address, change the network ID's host octets to 255.
- Step 6. To find the last address, subtract 1 from the fourth octet of the network broadcast address.

Examples

10.17.25.8
10.0.0.0
10.0.0.1
10.255.255.255
10.255.255.254

172.18.121.56
172.18.0.0
172.18.0.1
172.18.255.255
172.18.255.254

192.168.100.9
192.168.100.0
192.168.100.1
192.168.100.255
192.168.100.254

Quiz

1. Which of the following are not valid Class A network IDs? (Choose two answers.)
   A. 1.0.0.0
   B. 130.0.0.0
   C. 127.0.0.0
   D. 9.0.0.0

2. Which of the following are not valid Class B network IDs?
   A. 130.0.0.0
   B. 191.255.0.0
   C. 128.0.0.0
   D. 150.255.0.0
   E. All are valid Class B network IDs

3. Which of the following are true about IP address 172.16.99.45's IP network? (Select two answers.)
   A. The network ID is 172.0.0.0.
   B. The network is a Class B network.
   C. The default mask for the network is 255.255.255.0.
   D. The number of host bits in the unsubnetted network is 16.

THANK YOU