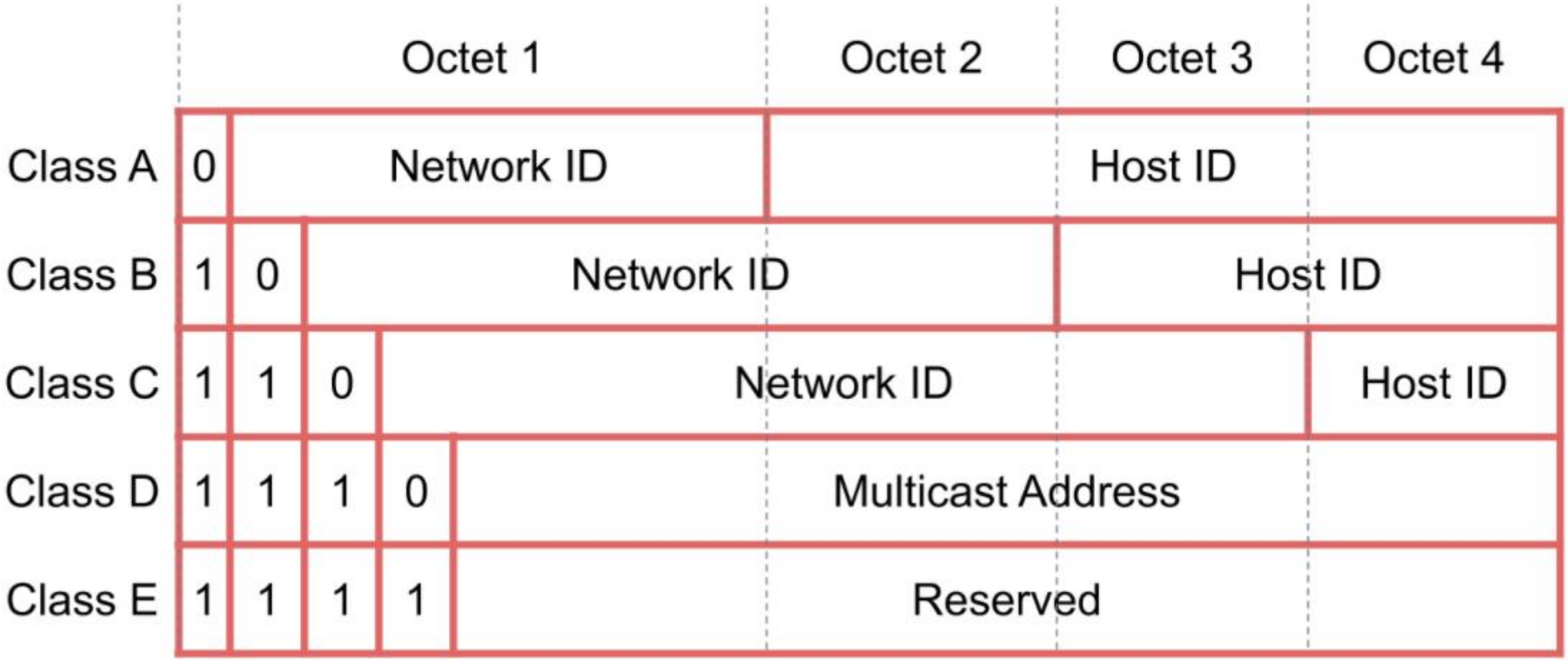
The Hierarchical IP Addressing Scheme

Network addresses are divided into 5 classes:



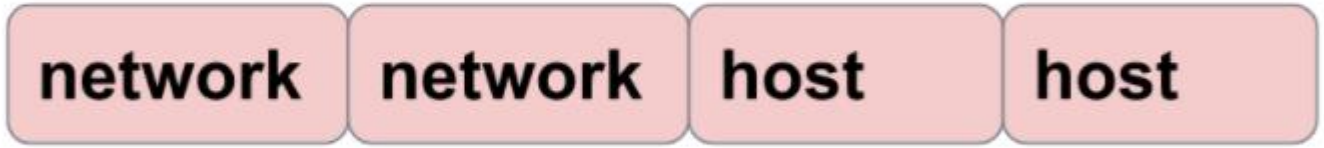
The Hierarchical IP Addressing Scheme

Class A Addresses

- Class A Network address is 1-byte long, first bit is always 0
- Maximum 2^7 = 128 Class A networks can be created
- Maximum 2^{24} = 16,777,214 hosts (excluding 2 reserved addresses)
- First bit is always **0** then
  00000000 = 0
  01111111 = 127
- The addresses **00000000** and **01111111** are reserved for default route and troubleshooting respectively
- So Class A network addresses start with 1-126

The Hierarchical IP Addressing Scheme

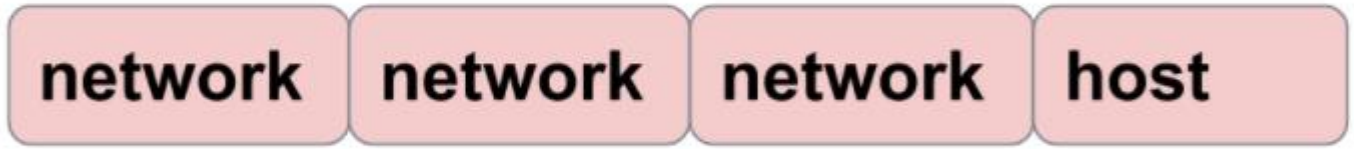
Class B Addresses



- Class B Network Address is 2-byte long, first 2 bits are always 10
- Maximum 2^{14} = 16,384 Class B networks can be created
- Maximum 2^{16} = 65,534 hosts (excluding 2 reserved addresses)
- First 2 bits are always 10 then
  10000000 = 128
  10111111 = 191
- Class B Network Addresses start with 128-191

The Hierarchical IP Addressing Scheme

Class C Addresses



- Class C Network Address is 3-byte long, first 3 bits are always 110
- Maximum 2^{21} = 2,097,152 Class C networks can be created
- Maximum 2^{8} = 254 hosts (excluding 2 reserved addresses)
- First 3 bits are always 110 then
  11000000 = 192
  11011111 = 223
- Class C Network Addresses start with 192-223

The Hierarchical IP Addressing Scheme

Class D Addresses

- Not assigned to devices on a network
- Used for special-purpose, multicast applications (such as video- and audio-streaming applications)
- Need to be registered with IANA to be used globally
- First 4 bits are always **1110** then
  11100000 = 224
  11101111 = 239
- Class D Network Addresses start with 224-239

The Hierarchical IP Addressing Scheme

Class E Addresses

- No defined use
- Reserved for usage and testing by IANA and the Internet Research Task Force (IRTF)
- Need to be registered with IANA to be used globally
- First 4 bits are always **1111** then
  11110000 = 240
  11111111 = 255
- Class E Network Addresses start with 240-255

The Hierarchical IP Addressing Scheme

IP Address Classes:

Address Class	1st Octet Range	1st Octet Bits	Network & Host Parts	# of Possible Networks & Hosts per Network
A	1-127	00000000 - 01111111	N.H.H.H	128 nets (2^7) 16,777,214 hosts per net (2^24)-2
B	128-191	10000000 - 10111111	N.N.H.H	16,384 nets (2^14) 65,534 hosts per net (2^16)-2
C	192-223	11000000 - 11011111	N.N.N.H	2,097,150 nets (2^21) 254 hosts per net (2^8)-2