

IPv4 ADDRESSES

*An **IPv4 address** is a **32-bit** address that uniquely and universally defines the connection of a device (for example, a computer or a router) to the Internet.*

Topics discussed in this section:

Address Space

Notations

Classful Addressing

Classless Addressing

Network Address Translation (NAT)



An IPv4 address is 32 bits long.

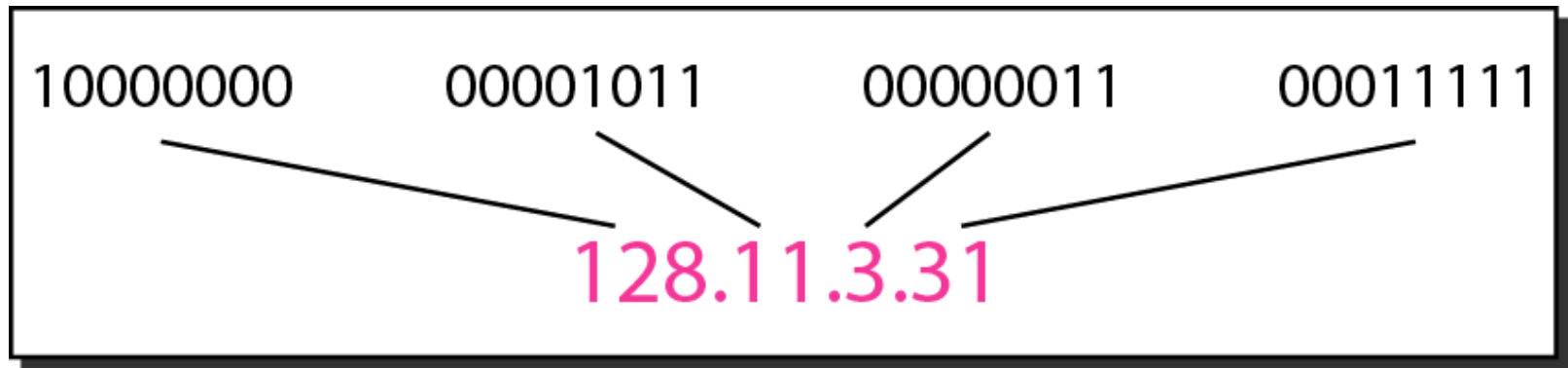


**The IPv4 addresses are unique
and universal.**



**The address space of IPv4 is
 2^{32} or 4,294,967,296.**

Dotted-decimal notation and binary notation for an IPv4 address





Example

Change the following IPv4 addresses from binary notation to dotted-decimal notation.

a. 10000001 00001011 00001011 11101111

b. 11000001 10000011 00011011 11111111

Solution

We replace each group of 8 bits with its equivalent decimal number (see Appendix B) and add dots for separation.

a. 129.11.11.239

b. 193.131.27.255



Example

Change the following IPv4 addresses from dotted-decimal notation to binary notation.

a. 111.56.45.78

b. 221.34.7.82

Solution

We replace each decimal number with its binary equivalent (see Appendix B).

a. 01101111 00111000 00101101 01001110

b. 11011101 00100010 00000111 01010010



Example

Find the error, if any, in the following IPv4 addresses.

- a.*** 111.56.045.78
- b.*** 221.34.7.8.20
- c.*** 75.45.301.14
- d.*** 11100010.23.14.67

Solution

- a.*** ***There must be no leading zero (045).***
- b.*** ***There can be no more than four numbers.***
- c.*** ***Each number needs to be less than or equal to 255.***
- d.*** ***A mixture of binary notation and dotted-decimal notation is not allowed.***



**In classful addressing, the address space is divided into five classes:
A, B, C, D, and E.**

Class Ranges of Internet Addresses

	From	To
Class A	0.0.0.0 NetidHostid	127.255.255.255 NetidHostid
Class B	128.0.0.0 NetidHostid	191.255.255.255 NetidHostid
Class C	192.0.0.0 NetidHostid	223.255.255.255 NetidHostid
Class D	224.0.0.0 Group address	239.255.255.255 Group address
Class E	240.0.0.0 Undefined	255.255.255.255 Undefined

Figure *Finding the classes in binary and dotted-decimal notation*

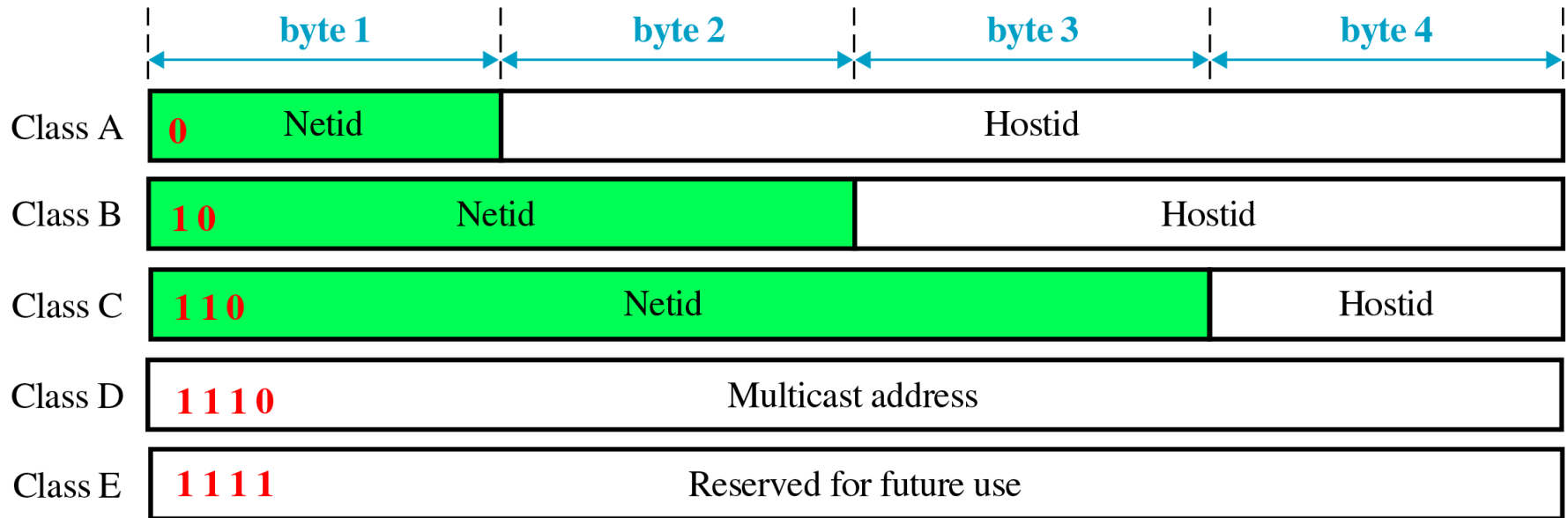


Table *Number of blocks and block size in classful IPv4 addressing*

<i>Class</i>	<i>Number of Blocks</i>	<i>Block Size</i>	<i>Application</i>
A	128	16,777,216	Unicast
B	16,384	65,536	Unicast
C	2,097,152	256	Unicast
D	1	268,435,456	Multicast
E	1	268,435,456	Reserved

Question :

Q: Explain following in detail.

b)Subneting

c)Superneting

Q: What is addressing in Computer Network?

Explain different Classes of IPv4 Address.