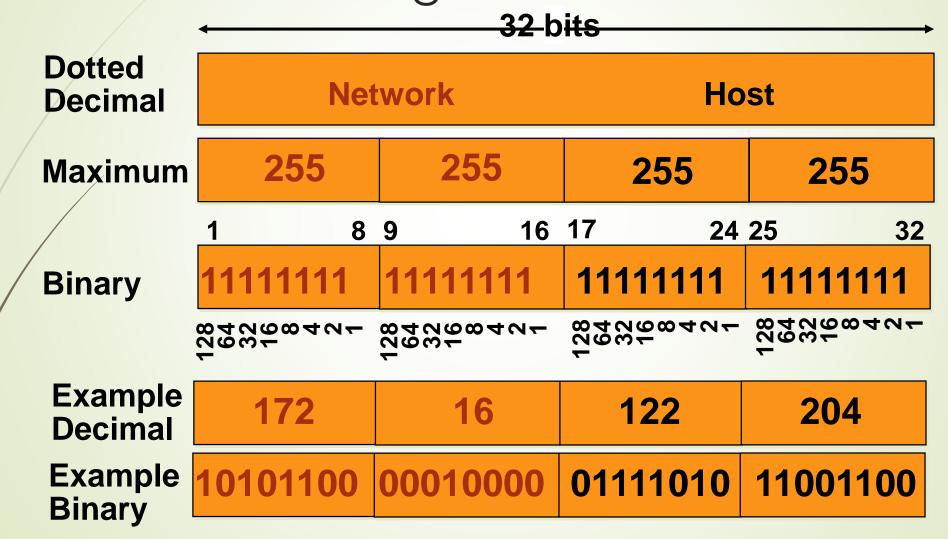
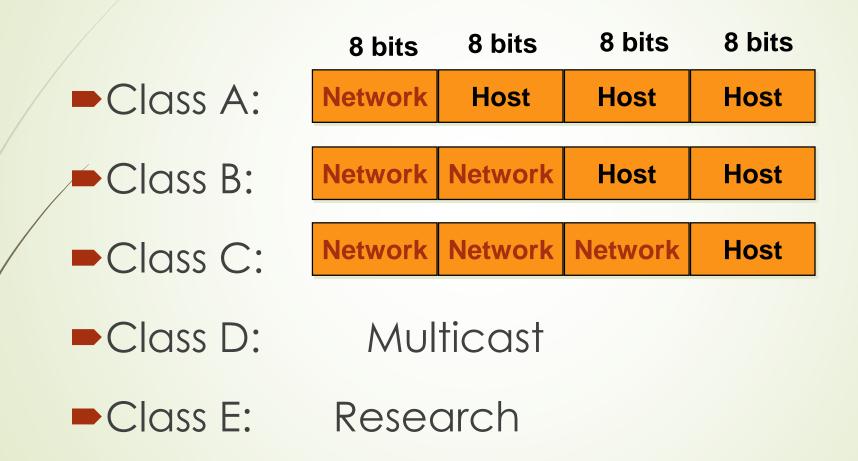
# IP subnetting

Lecture 6

## IP Addressing



#### IP Address Classes

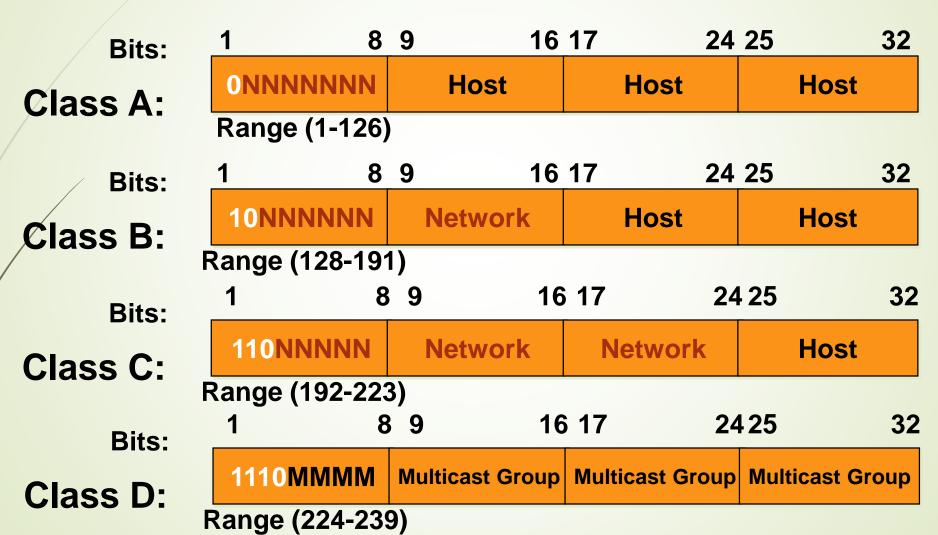


## Classes of IP Addresses

/	Class	Network Octets (Blanks in the IP address stand for octets used to identify hosts.)	Total Number of Possible Networks or Licenses	Host Octets (Blanks in the IP address stand for octets used to identify networks.)	Total Number of Possible IP Addresses in Each Network
/	Α	0 to 126	127	0.0.1 to 255.255.254	16 million
	В	128.0 to 191.255	16,000	0.1 to 255.254	65,000
	С	192.0.0 to 223.255.255	2 million	1 to 254	254

Table 18-2 Classes of IP addresses

#### IP Address Classes



# Determining Available Host Addresses

Network		Но			
	172	16	0	0	
			<del>6</del> 8484400	8795487 <del>-</del>	N
1	0101100	00010000	00000000	00000000 00000001 00000011	1 2 3
			1111 <sup>1</sup> 111 11111111 11111111	1111 <sup>1</sup> 1101 111111110 111111111	65534 65535 65536 - 2
		Г	$2^{N}-2 = 2^{16}-2$	= 65534	65534

#### **Exercise**: IP Address Classes

Address	Class	Network	Host
10.2.1.1			
128.63.2.100			
201.222.5.64			
192.6.141.2			
130.113.64.16			
256.241.201.10			

#### IP Address Classes Exercise Answers

Address	Class	Network	Host
10.2.1.1	A	10.0.0.0	0.2.1.1
128.63.2.100	В	128.63.0.0	0.0.2.100
	_		0.0.2
201.222.5.64	С	201.222.5.0	0.0.0.64
192.6.141.2	С	192.6.141.0	0.0.0.2
192.0.141.2	C	192.0.141.0	0.0.0.2
130.113.64.16	В	130.113.0.0	0.0.64.16
256.241.201.10	Nonexistent		

## Reserved IP Addresses

IP address	How it is used		
255.255.255	Broadcast messages		
0.0.0.0	Currently unassigned IP address		
127.0.0.1	Indicates your own workstation		

Table 18-3 Reserved IP addresses

#### Private IP addresses

The Internet Engineering Task Force (IETF) has directed the Internet Assigned Numbers Authority (IANA) to reserve the following IPv4 address ranges for private networks

RFC1918 name	IP address range	number of addresses	largest CIDR block (subnet mask)	host id size	mask bits	classful description
24-bit block	10.0.0.0 – 10.255.255.255	16,777,216	10.0.0.0/8 (255.0.0.0)	24 bits	8 bits	single class A network
20-bit block	172.16.0.0 – 172.31.255.255	1,048,576	172.16.0.0/12 (255.240.0.0)	20 bits	12 bits	16 contiguous class B networks
16-bit block	192.168.0.0 – 192.168.255.255	65,536	192.168.0.0/16 (255.255.0.0)	16 bits	16 bits	256 contiguous class C networks

# APIPA (Automatic Private IP Addressing)

The Windows function that provides DHCP autoconfiguration addressing. APIPA assigns a class B IP address from 169.254.0.0 to 169.254.255.255 to the client when a DHCP server is either permanently or temporarily unavailable. Designed for small non-routable networks, if a DHCP server becomes available later, the APIPA address is replaced with one from the DHCP server.

For example, when a Windows Vista machine starts up, it waits only six seconds to find a DHCP server before assigning an IP from the APIPA range. It then continues to look for a DHCP server. Previous versions of Windows looked for a DHCP server for up to three minutes.

See DHCP autoconfiguration addressing, DHCP and private IP address.

```
Connection-specific DNS Suffix . :
Autoconfiguration IP Address. . . : 169.254.103.72
Subnet Mask . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . . :
```