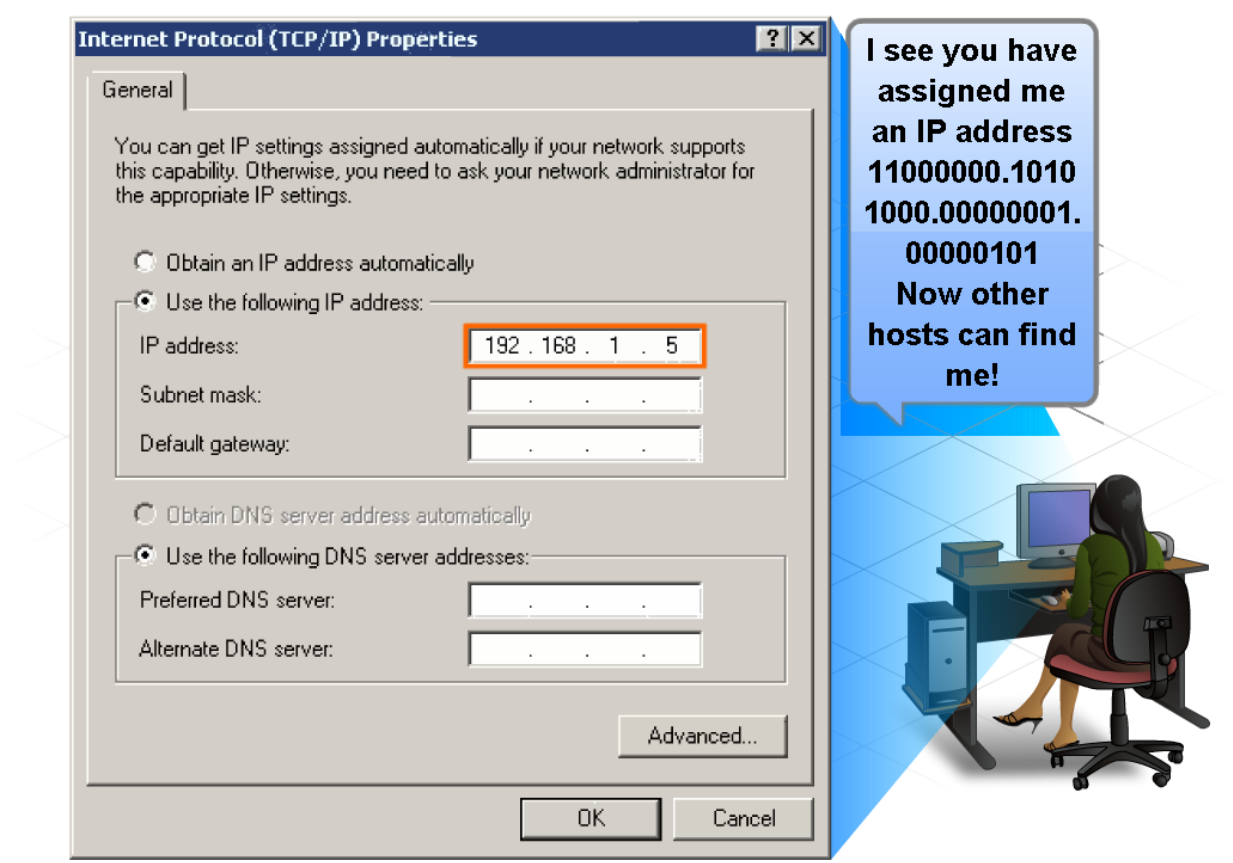
IP SUBNETTING– IPV4

IP ADDRESSING STRUCTURE

- Describe the dotted decimal structure of a binary IP address and label its parts



IP version 4 (IPv4) is the current form of addressing used on the Internet.

CLASSIFY AND DEFINE IPV4 ADDRESSES

- Identify the address ranges reserved for these special purposes in the IPv4 protocol

Reserved IPv4 Address Ranges

Type of Address	Usage	Reserved IPv4 Address Range	RFC
Host Address	used for IPv4 hosts	0.0.0.0 to 223.255.255.255	790
Multicast Addresses	used for multicast groups on a local network	224.0.0.0 to 239.255.255.255	1700
Experimental Addresses	• used for research or experimentation • cannot currently be used for hosts in IPv4 networks	240.0.0.0 to 255.255.255.254	1700 3330

CLASSIFY AND DEFINE IPV4 ADDRESSES

- Identify the historic method for assigning addresses and the issues associated with the method

IP Address Classes

Address Class	1st octet range (decimal)	1st octet bits (green bits do not change)	Network(N) and Host(H) parts of address	Default subnet mask (decimal and binary)	Number of possible networks and hosts per network
A	1-127**	00000000-01111111	N.H.H.H	255.0.0.0	128 nets (2^7) 16,777,214 hosts per net (2^24-2)
B	128-191	10000000-10111111	N.N.H.H	255.255.0.0	16,384 nets (2^14) 65,534 hosts per net (2^16-2)
C	192-223	11000000-11011111	N.N.N.H	255.255.255.0	2,097,150 nets (2^21) 254 hosts per net (2^8-2)
D	224-239	11100000-11101111	NA (multicast)		
E	240-255	11110000-11111111	NA (experimental)		

** All zeros (0) and all ones (1) are invalid hosts addresses.

PRIVATE ADDRESSES

The private address blocks are:

10.0.0.0 to 10.255.255.255 (10.0.0.0 /8)

172.16.0.0 to 172.31.255.255 (172.16.0.0 /12)

192.168.0.0 to 192.168.255.255 (192.168.0.0 /16)

ASSIGNING ADDRESSES

- Describe the process for requesting IPv4 public addresses, the role ISPs play in the process, and the role of the regional agencies that manage IP address registries

Entities that Oversee IP Address Allocation

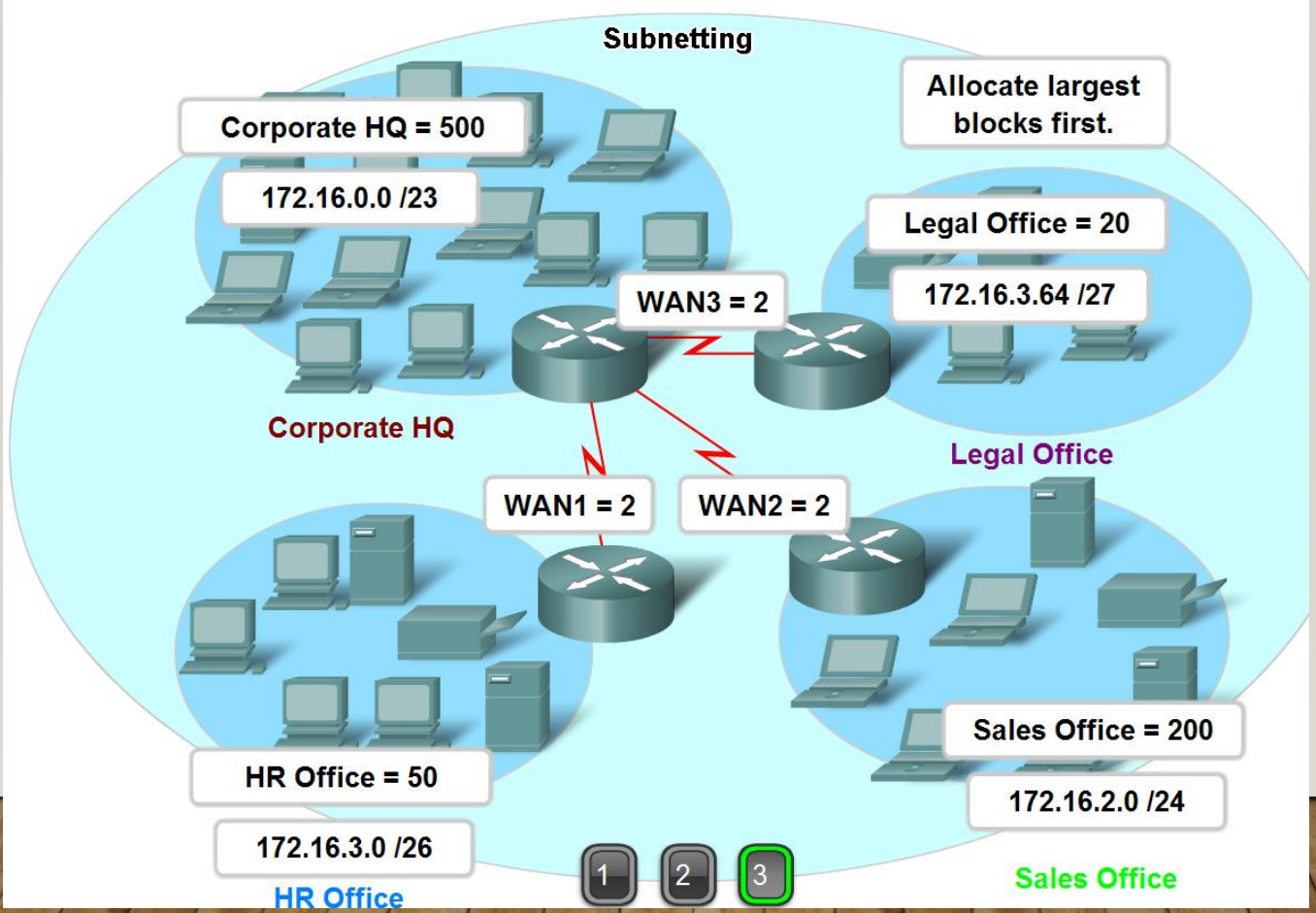
Global	**IANA**				
Regional Internet Registries	**AfriNIC** Africa Region	**APNIC** Asia/ Pacific Region	**LACNIC** Latin America And Caribbean Region	**ARIN** North America Region	**RIPE NCC** Europe, Middle East, Central Asia Region

SUBNETTING

Subnetting allows for creating multiple logical networks from a single address block. Since we use a router to connect these networks together, each interface on a router must have a unique network ID.

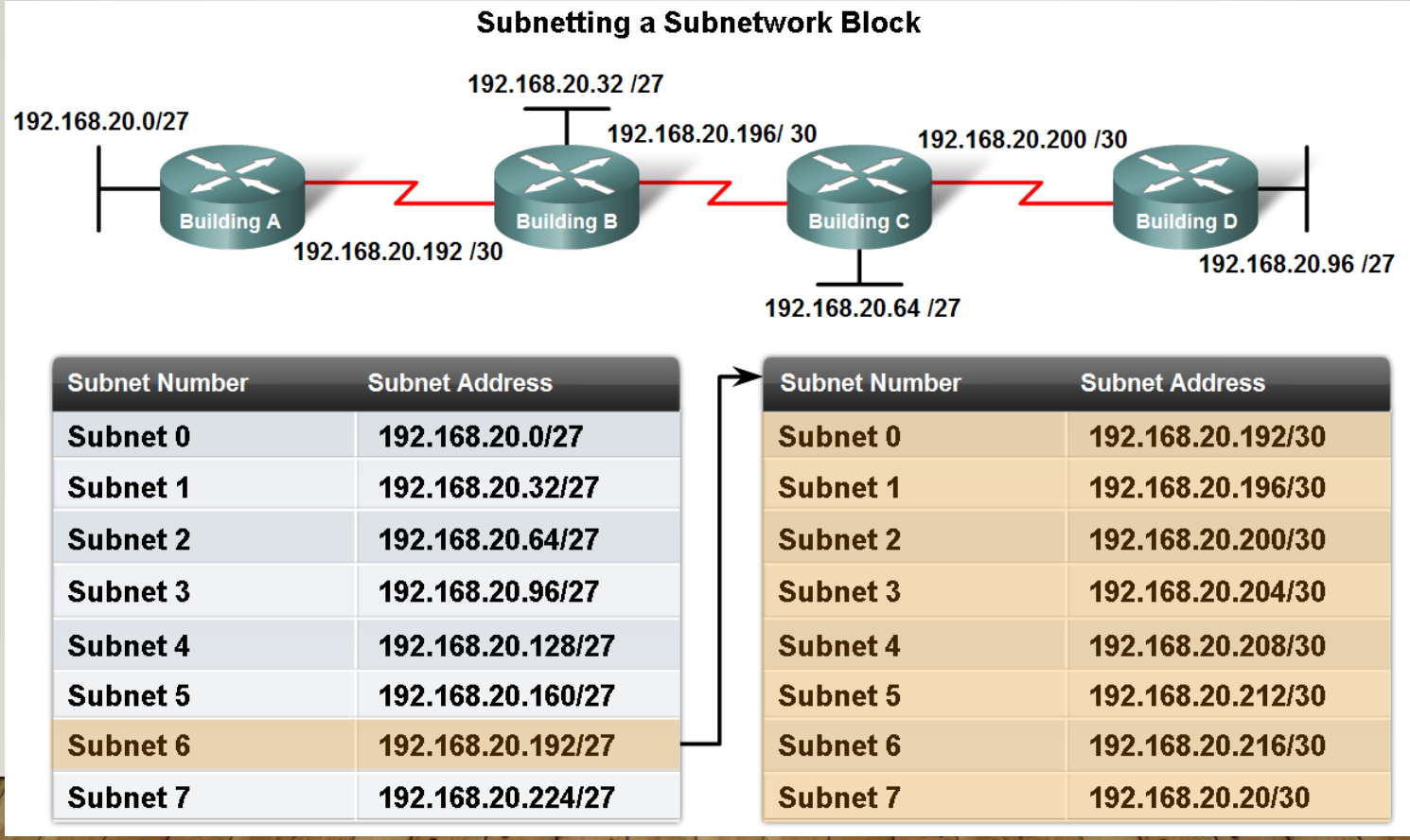
CALCULATING ADDRESSES

- Extract network addresses from host addresses using the subnet mask



CALCULATING ADDRESSES

- Calculate the number of hosts in a network range given an address and subnet mask



Subnet Number	Subnet Address
Subnet 0	192.168.20.0/27
Subnet 1	192.168.20.32/27
Subnet 2	192.168.20.64/27
Subnet 3	192.168.20.96/27
Subnet 4	192.168.20.128/27
Subnet 5	192.168.20.160/27
Subnet 6	192.168.20.192/27
Subnet 7	192.168.20.224/27

Subnet Number	Subnet Address
Subnet 0	192.168.20.192/30
Subnet 1	192.168.20.196/30
Subnet 2	192.168.20.200/30
Subnet 3	192.168.20.204/30
Subnet 4	192.168.20.208/30
Subnet 5	192.168.20.212/30
Subnet 6	192.168.20.216/30
Subnet 7	192.168.20.20/30

Notes: Valid host, 3rd Subnet, and VLSM

THANK YOU