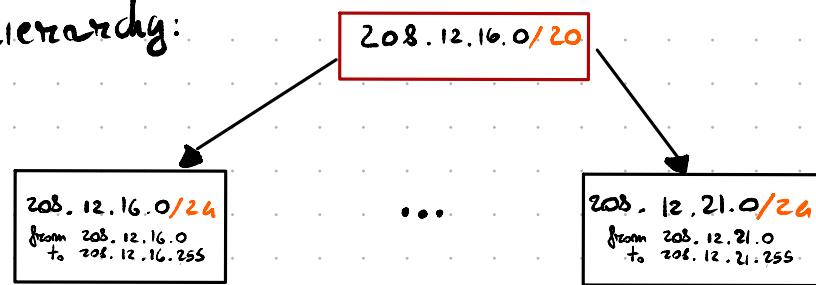


## Ex.1

- What do the first three lines mean? Hint: compare the /24 prefixes in lines 2 and 3 with the /20 prefix in line 1.

(1) 208.12.16.0/20 → 11010000.00001100.00010000.00000000  
 (2) 208.12.21.0/24 → 11010000.00001100.00010101.00000000  
 (3) 208.12.16.0/24 → 11010000.00001100.00010000.00000000

- (1) has  $2^{12}$  RESERVED ADDRESSES, from "208.12.16.0" to "208.12.31.255";
- It follows that (2) and (3) are subset of (1), each requiring  $2^8$  addresses.
- There is so the following hierarchy:



- For each of the following IP addresses, what would Router 1 do at the reception of a packet with this IP address as the destination address? (explain why by showing bit by bit address-prefix matching):

135.46.63.10, 135.46.57.14, 135.46.52.2, 192.53.40.7, 192.53.56.7, 208.12.16.0, 208.12.21.0, 208.12.31.0, 208.12.44.0.

	Address / Mask	Next Hop
1→	208.12.16.0/20	Router 2
2→	208.12.21.0/24	Router 3
3→	208.12.16.0/24	Router 4
4→	192.53.40.0/23	Router 3
5→	135.46.56.0/22	Router 4
6→	135.46.60.0/22	Router 3
	default	Router 2

FROM TO

(1)	11010000.00001100.00010000.00000000 208.12.16.0	11010000.00001100.00011111.11111111 208.12.31.255
(2)	11010000.00001100.00010101.00000000 208.12.21.0	11010000.00001100.00010101.11111111 208.12.21.255
(3)	11010000.00001100.00010000.00000000 208.12.16.0	11010000.00001100.00010000.11111111 208.12.16.255
(4)	11000000.00110101.00101000.00000000 192.53.40.0	11000000.00110101.00101001.11111111 192.53.41.255
(5)	10000111.00101110.00111000.00000000 135.46.56.0	10000111.00101110.00111011.11111111 135.46.57.255
(6)	10000111.00101110.00111100.00000000 135.46.60.0	10000111.00101110.00111111.11111111 135.46.63.255

• 135.66.63.10	IS ADDRESSED TO	ROUTER 3	by	(6)
• 135.66.57.16	IS ADDRESSED TO	ROUTER 4	by	(5)
• 135.66.52.2	IS ADDRESSED TO	ROUTER 2	by	DEFAULT
• 192.53.40.7	IS ADDRESSED TO	ROUTER 3	by	(4)
• 192.53.56.7	IS ADDRESSED TO	ROUTER 2	by	DEFAULT
• 208.12.16.0	IS ADDRESSED TO	ROUTER 4	by	(3)
• 208.12.21.0	IS ADDRESSED TO	ROUTER 3	by	(2)
• 208.12.31.0	IS ADDRESSED TO	ROUTER 2	by	(1)
• 208.12.66.0	IS ADDRESSED TO	ROUTER 2	by	DEFAULT

## Ex. 2

(1) The network 193.53.32.0/20 has  $2^{12}$  hosts

(2) The **smallest** address usable by an host is 193.53.32.1 and the **largest** is 193.53.35.254

(3) Yes we can, in classfull networking classes A, B and C corresponds respectively to /8, /16 and /24 subnets, so:

- 17.0.0.0 corresponds to 17.0.0.0/8
- 136.16.0.0 corresponds to 136.16.0.0/16
- 195.65.32.0 corresponds to 195.65.32.0/24

(4) By using a CLASSFUL ADDRESSING the best option is to use 4 Class C of addresses (1024 addresses), but we waste  $1024 \cdot 800 = 224$  addresses. By using A or B we have a greater waste of addresses.

(5) We can allocate 202.0.70.0/22 to have 1024 addresses

(6) By CIDR we can have different sized Networks with more flexibility than CLASSFUL ADDRESSING. So we waste less addresses.