Question 4

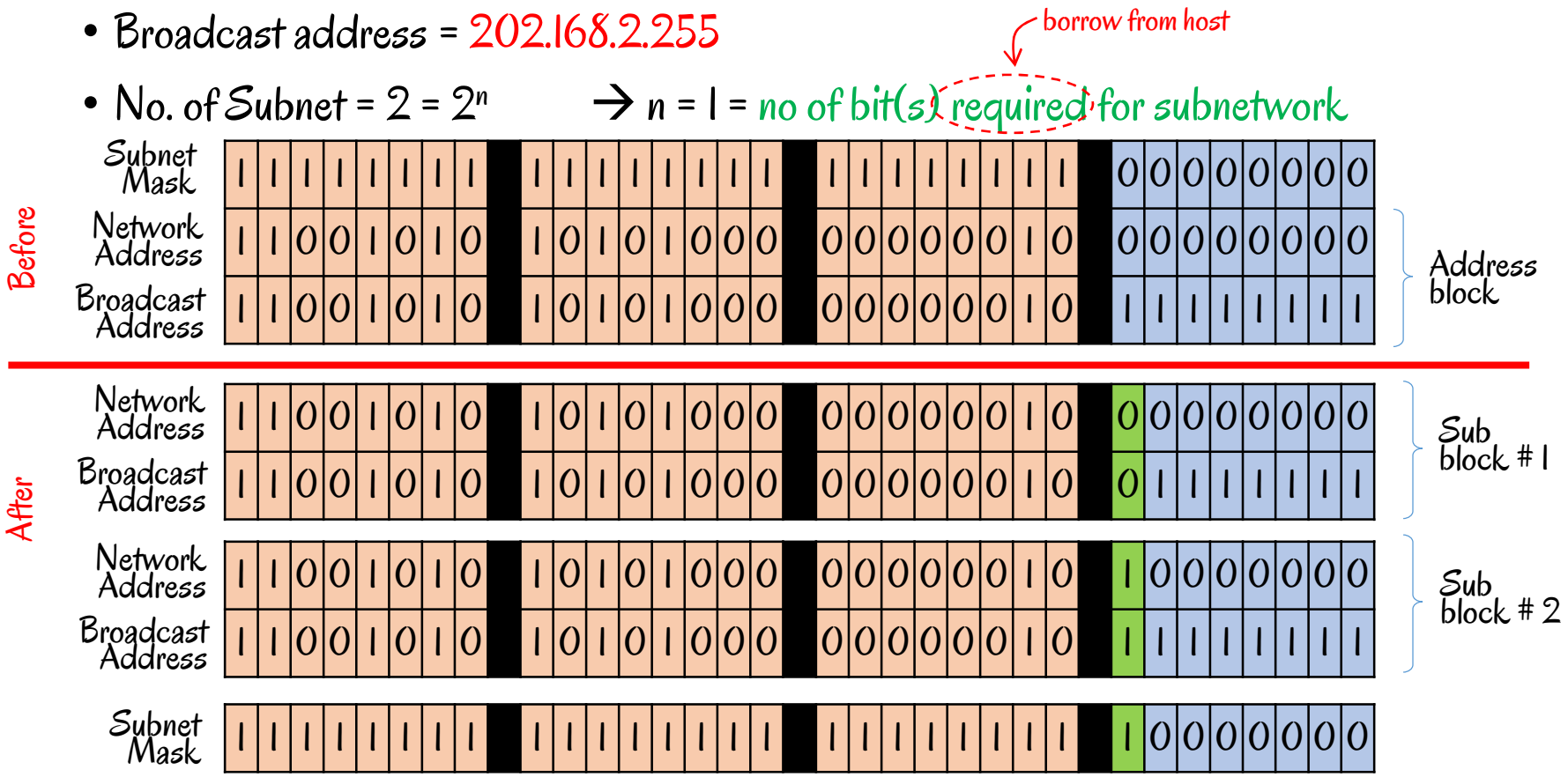
Create TWO (2) subnets from the address block 202.168.2.0/24.

- Find Network and Broadcast Address before subnetting.
- List all new subnetworks.
- Find new SubnetMask

Solution

Given, Network address = 202.168.2.0 and SM = /24 = 255.255.255.0

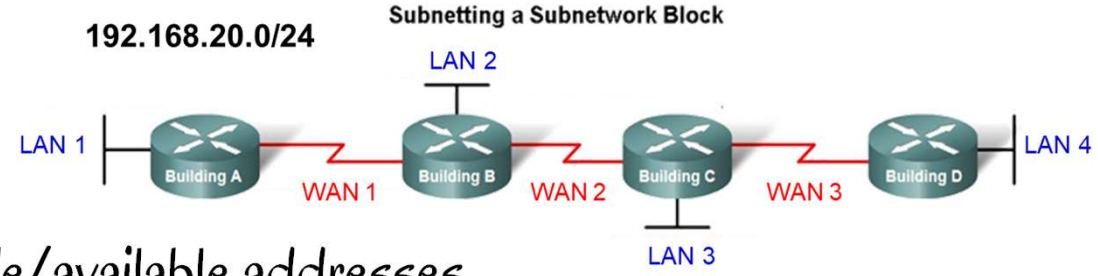
- Broadcast address = 202.168.2.255
- No. of Subnet = 2 = 2^n → n = 1 = no of bit(s) required for subnetwork



- Subnetwork 1 = 202.168.2.0 → 202.168.2.127 (128 addresses)
- Subnetwork 2 = 202.168.2.128 → 202.168.2.255 (128 addresses)
- New SubnetMask = 255.255.255.128 = /25

Question 5

Given the address block 192.168.20.0/24. To make more efficient and avoid wastage, use VLSM to create a number of subnets as shown in figure below



- Required usable/available addresses
  - LAN – 20 addresses per subnet
  - WAN – 2 addresses per subnet

List all new subnetworks

Solution

Note:
Value 2 power of n :
1, 2, 4, 8, 16, 32, 64, 128

- No. of subnetworks

  = 4 LANs and 3 WANs

- Start with LAN – highest no. of required addresses
- Required usable addresses for LAN is 20 addresses per subnet
- Must add 2 more addresses for network & broadcast addresses.
  - 20 + 2 = 22 addresses
- Nearest value 2 power of n → 22= 32
- $2^n = 32$,

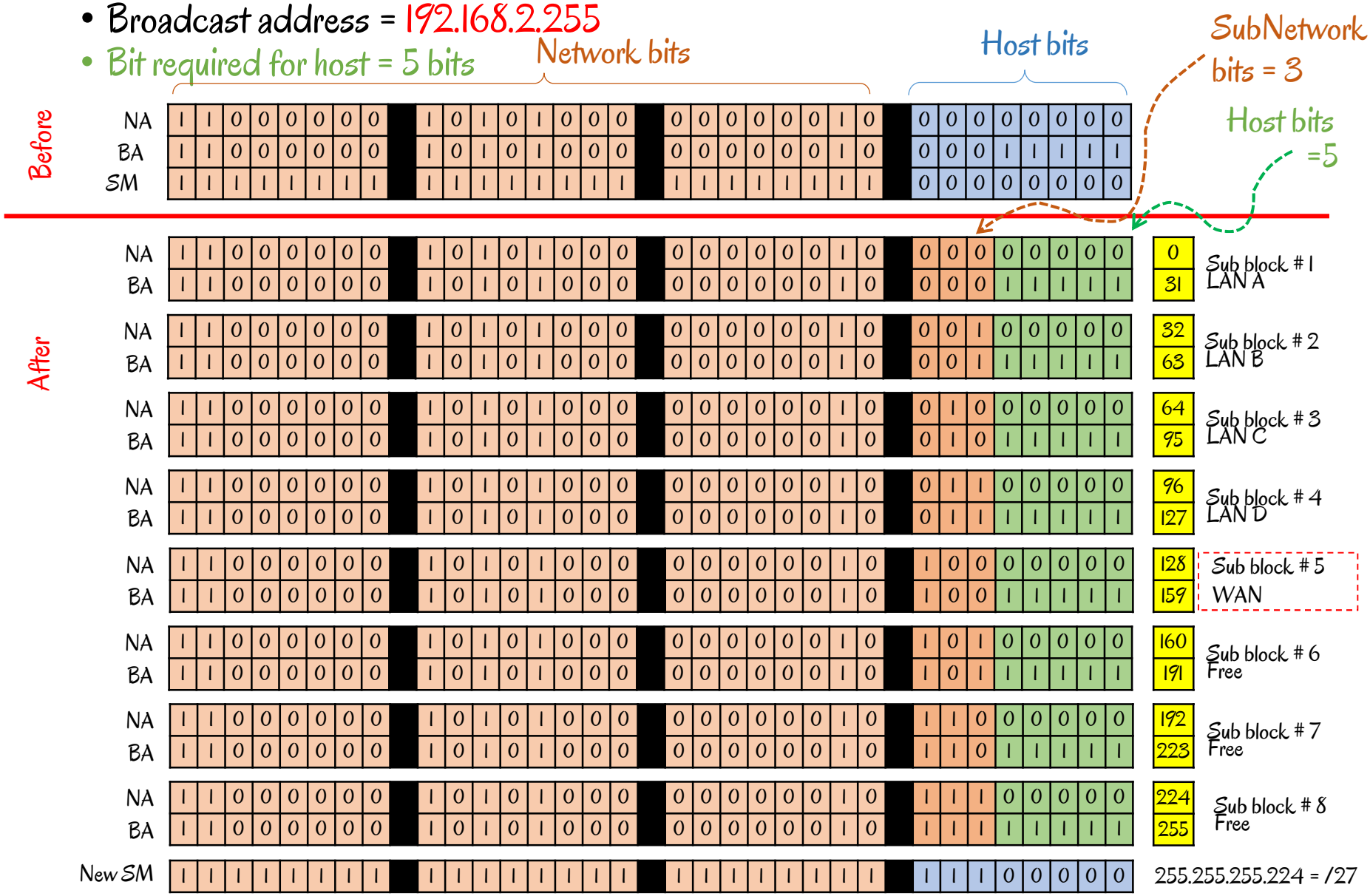
  In this case, n refer to host

  n=5 = no of bits required for host

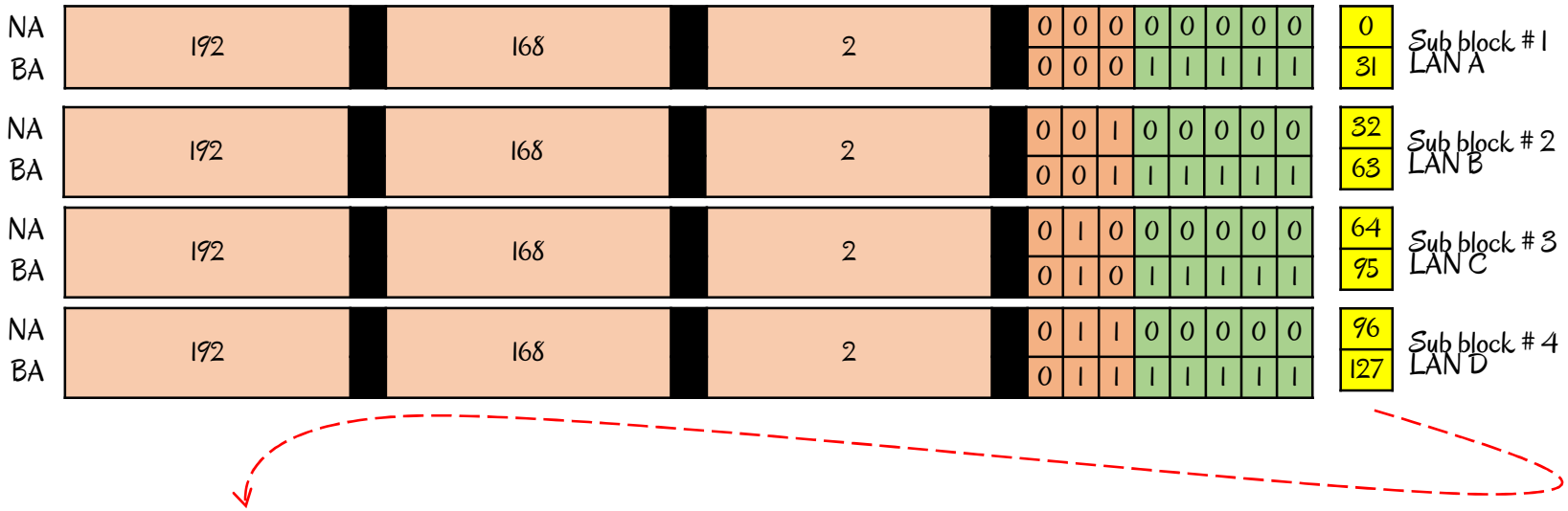
Solution

Given, Network address = 192.168.2.0 and SM = /24 = 255.255.255.0

- Broadcast address = 192.168.2.255
- Bit required for host = 5 bits



- Need 4 LANs



LAN A : 192.168.2.0 → 192.168.2.31
LAN B : 192.168.2.32 → 192.168.2.63
LAN C : 192.168.2.64 → 192.168.2.95
LAN D : 192.168.2.96 → 192.168.2.127

Subnet Mask = total Network bits
= 24 + 3
= 27

Slash notation = /27
Dotted notation = 255.255.255.224

32 addresses per subnetwork
30 usable address,
2 unusable addresses
→ 1 network address (1st address)
→ 1 broadcast address (last address)

Required usable/available addresses
= 20 <30

Solution

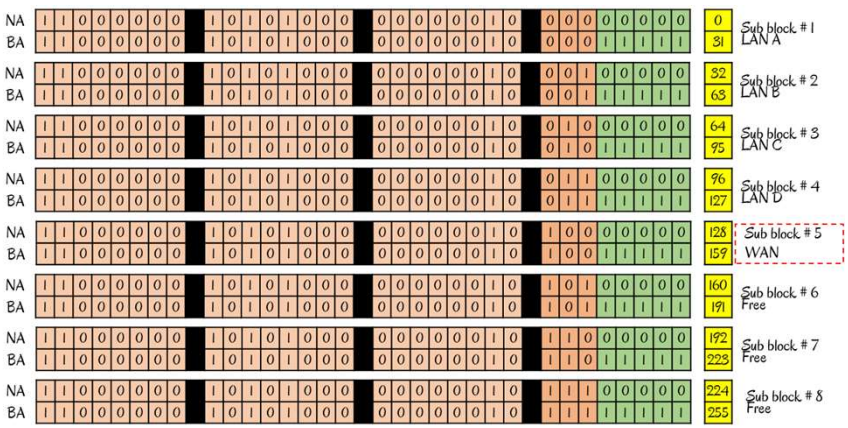
WAN

- Required usable addresses for WAN is 2 addresses per subnet
- Must add 2 more addresses for network & broadcast addresses.

  2 + 2 = 4 addresses
- Nearest value 2 power of n → 4 = 4
- $2^n = 4$,

  n=2 = no of bits required for host

- Sub Block / Sub Network available
  - # 5 →#8 (#1 →#4 already used by LAN)
  - Let say we choose #5

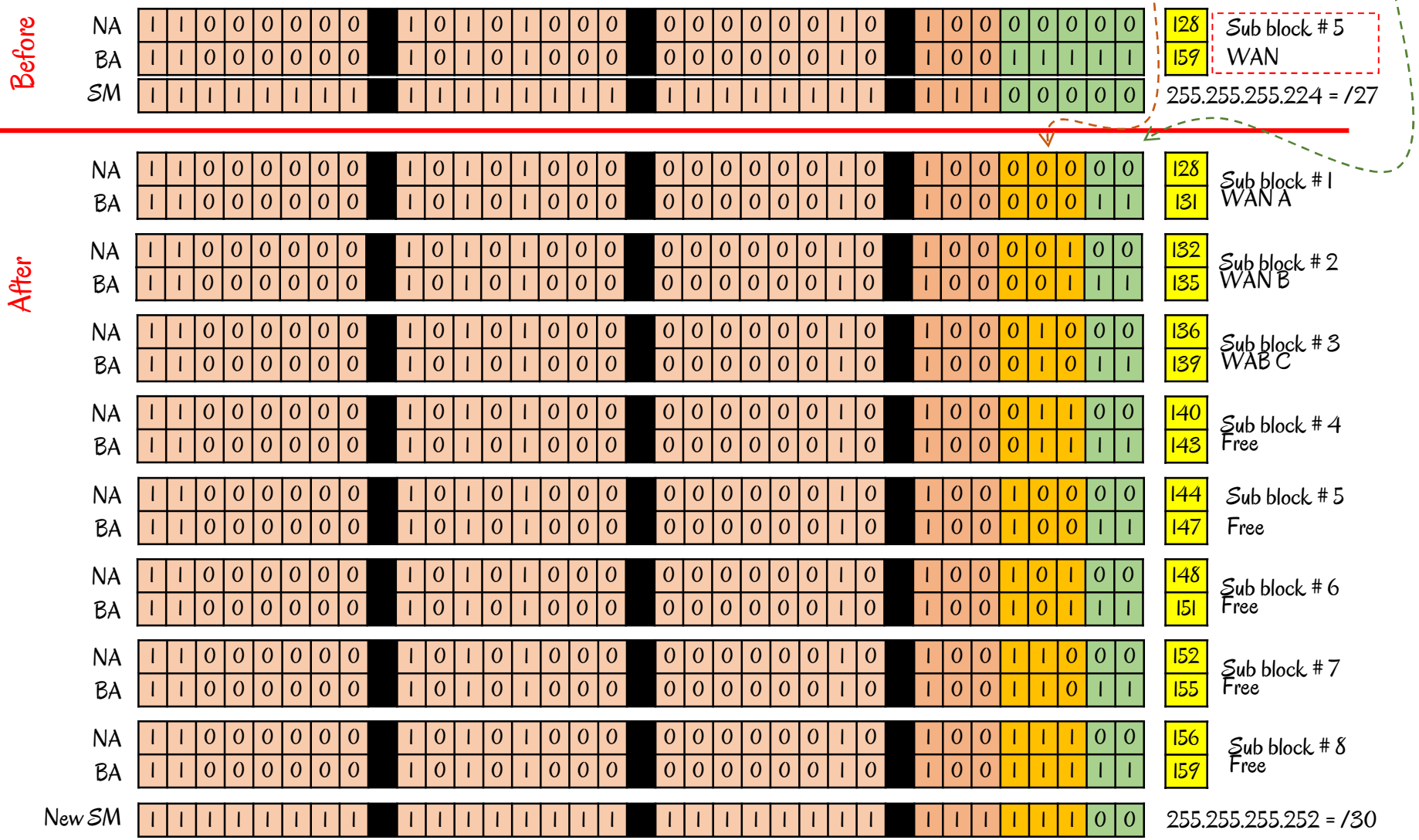


- Network address = 192.168.2.128
- Broadcast address = 192.168.2.159
- SM = /27 = 255.255.255.224
- Bit required for host = 2 bits

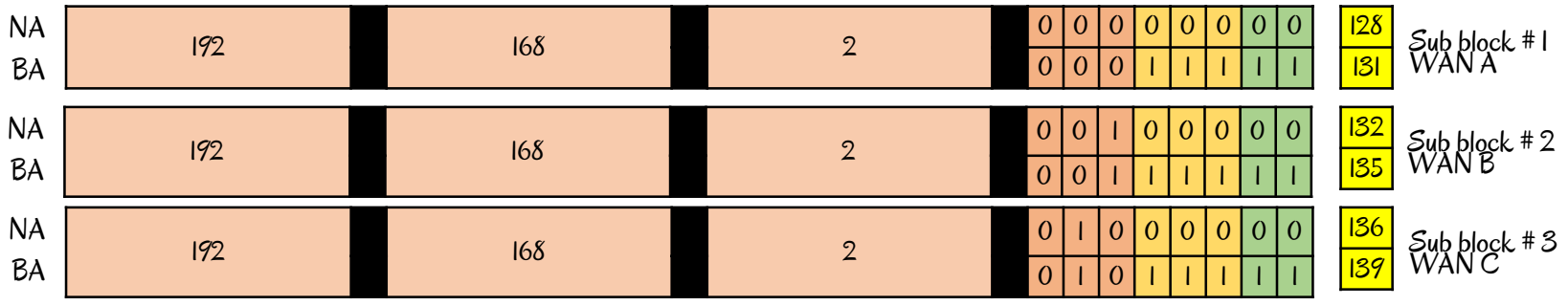
Sub block # 5
WAN

SubNetwork bits = 3

Host bits =2



- Need 3 WANs



LAN A : 192.168.2.128 → 192.168.2.131
LAN B : 192.168.2.132 → 192.168.2.135
LAN C : 192.168.2.136→ 192.168.2.139

Subnet Mask = total Network bits
= 27 + 3
= 30

Slash notation = /30
Dotted notation = 255.255.255.252

4 addresses per subnetwork
2 usable address,
2 unusable addresses
→ 1 network address (1st address)
→ 1 broadcast address (last address)

Required usable/available addresses
= 2

Solution

- Total allocated addresses

  = 4 LANs + 3 WANs

  = 4(32) + 3(4)

  = 128 + 12 = 140 address

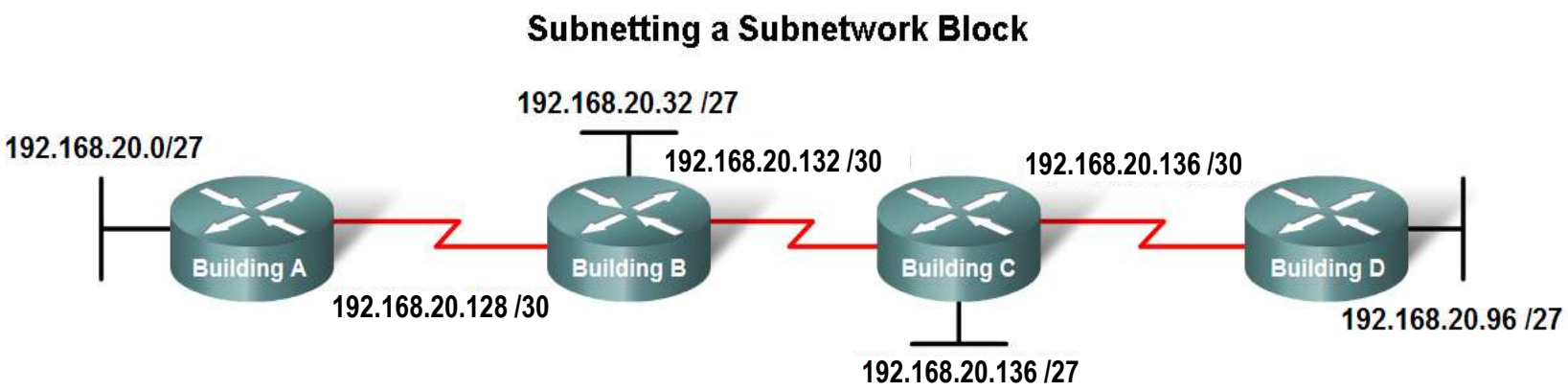
- Total saved addresses for future use

  = Total given addresses – Total allocated addresses

  = 256 – 140

  = 116 addresses

Solution


Subnetting a Subnetwork Block
192.168.20.32 /27
192.168.20.0/27
192.168.20.132 /30
192.168.20.136 /30
Building A
Building B
Building C
Building D
192.168.20.128 /30
192.168.20.96 /27
192.168.20.136 /27