Computer Networks

Subnetting

Creating Subnets

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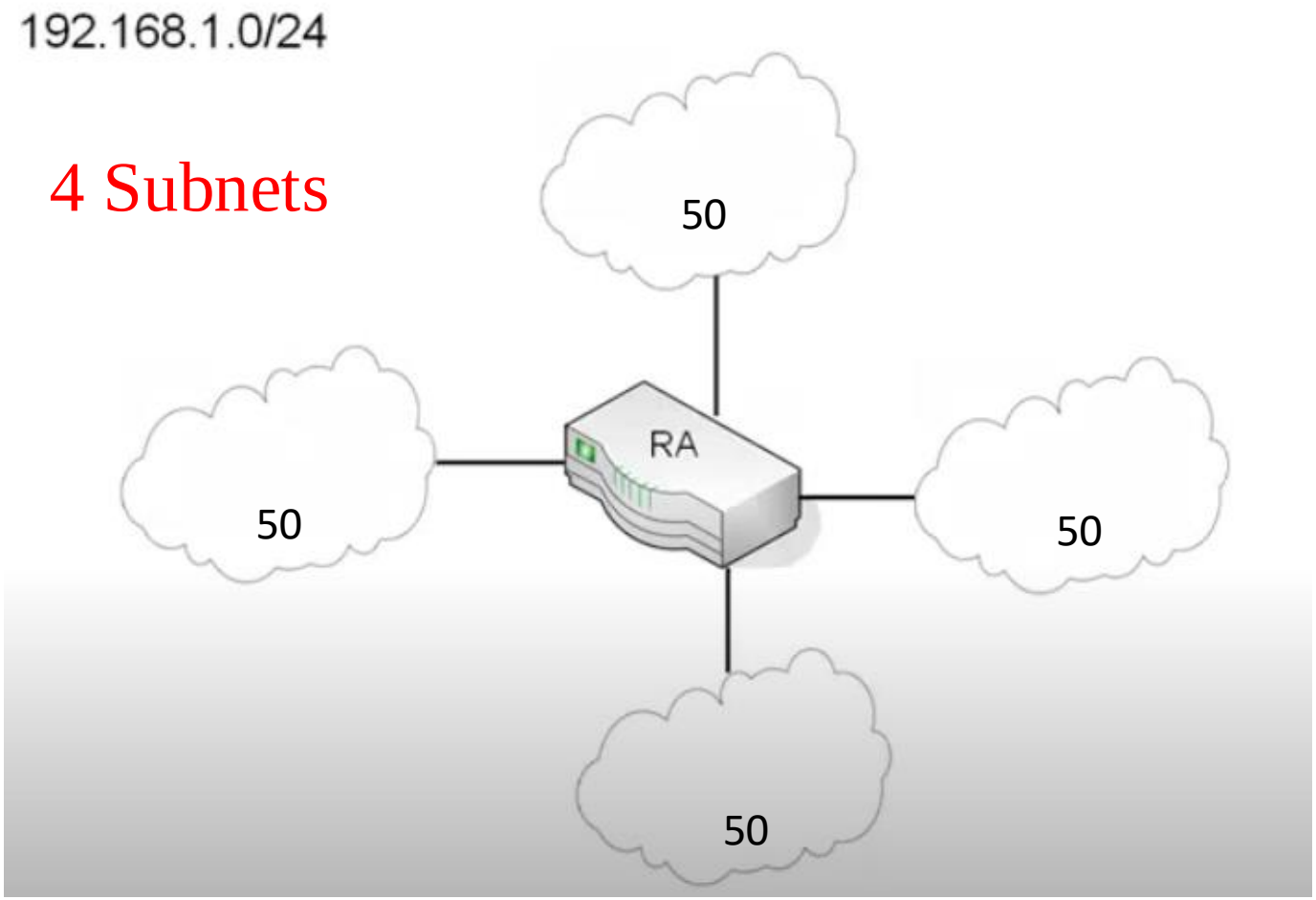

Questions to Ask yourself

- What is the IP Address?

  192.168.1.0 255.255.255.0
- Which is the class of IP Address?

  Class C
- How many Subnets are required?

  4 Subnets (LABs)
- How many Valid Hosts are required?

  50 Valid Hosts (Devices)

Creating Subnets Class C (Required Information)

- Number of Subnets (LABs): 2^subnet bits
- Number of valid hosts: 2^host bits – 2

Number of Subnets	Number of Valid Hosts
2^1 = 2	2^7 = 128 – 2 =126
2^2 = 4	2^6 = 64 – 2 = 62
2^3 = 8	2^5 = 32 – 2 = 30
2^4 = 16	2^4 = 16 – 2 = 14
2^5 = 32	2^3= 8 – 2 = 6
2^6 = 64	2^2= 4 – 2 = 2

Creating Subnets (Required Information)

- Number of Subnets: 2^subnet bits
- Number of valid hosts: 2^host bits – 2

Number of Subnets	Number of Valid Hosts
2^1 = 2	2^7 = 128 – 2 =126
2^2 = 4	2^6 = 64 – 2 = 62
2^3 = 8	2^5 = 32 – 2 = 30
2^4 = 16	2^4 = 16 – 2 = 14
2^5 = 32	2^3= 8 – 2 = 6
2^6 = 64	2^2= 4 – 2 = 2

4 Subnets & 50 Valid Hosts

- 192.168.1.0 255.255.255.0
- 11111111.11111111.11111111.11000000 (/26)
- 192.168.1.0 255.255.255.192 (128+64)
- 256 – 192 = 64

Subnets	1st Valid Host	Last Valid Host	Broadcast
192.168.1.0	192.168.1.1	192.168.1.62	192.168.1.63
192.168.1.64	192.168.1.65	192.168.1.126	192.168.1.127
192.168.1.128	192.168.1.129	192.168.1.190	192.168.1.191
192.168.1.192	192.168.1.193	192.168.1.254	192.168.1.255

How to Find All Subnets Numbers

Class B

- 172.16.0.0 255.255.0.0
- 11111111.11111111.11111111.11100000 (/27)
- 172.16.0.0 255.255.255.224
- 2^11 = 2048 Subnets
- 0-255 = 256
- 256 x 8 = 2048 Subnets
- 256 – 224 = 32

Class B …

Subnets	1st Valid Host	Last Valid Host	Broadcast
172.16. 0.0	172.16. 0.1	172.16. 0.30	172.16. 0.31
172.16. 0.32	172.16. 0.33	172.16. 0.62	172.16. 0.63
172.16. 0.64	172.16. 0.65	172.16. 0.94	172.16. 0.95
172.16. 0.96	172.16. 0.97	172.16. 0.126	172.16. 0.127
172.16. 0.128	172.16. 0.129	172.16. 0.158	172.16. 0.159
172.16. 0.160	172.16. 0.161	172.16. 0.190	172.16. 0.191
172.16. 0.192	172.16. 0.193	172.16. 0.222	172.16. 0.223
172.16. 0.224	172.16. 0.225	172.16. 0.254	172.16. 0.255

Class B … 0 – 255 (2nd Octet)

Subnets	1st Valid Host	Last Valid Host	Broadcast
172.16.1.0	172.16.1.1	172.16.1.30	172.16.1.31
172.16.1.32	172.16.1.33	172.16.1.62	172.16.1.63
172.16.1.64	172.16.1.65	172.16.1.94	172.16.1.95
172.16.1.96	172.16.1.97	172.16.1.126	172.16.1.127
172.16.1.128	172.16.1.129	172.16.1.158	172.16.1.159
172.16.1.160	172.16.1.161	172.16.1.190	172.16.1.191
172.16.1.192	172.16.1.193	172.16.1.222	172.16.1.223
172.16.1.224	172.16.1.225	172.16.1.254	172.16.1.255

How to Find the Subnets Number of an IP Address

No Subnetting Class A

- IP Address: 10.0.20.5
- Subnet Marks: 255.0.0.0

- Network Address:

  10.0.0.0

Subnetting Class B

- 172.200.10.5
- 255.255.255.0

- 2^8 = 256 2^8 -2= 254

Subnets	Hosts
• 172.200.9.0	0 – 255
• 172.200.10.0	0 – 255
• 172.200.11.0	0 – 255

Class B …

Subnets	1st Valid Host	Last Valid Host	Broadcast
172.200.0.0	172.200.0.1	172.200.0.254	172.200.0.255
172.200.1.0	172.200.1.1	172.200.1.254	172.200.1.255
:			
172.200.10.0	172.200.10.1	172.200.10.254	172.200.10.255
:			
172.200.255.0	172.200.255.1	172.200.255.254	172.200.255.255

Subnetting Class C

- 192.168.20.73
- 255.255.255.240

- 256 – 240 = 16
- 0, 16, 32, 48, 64, ~~80~~

- Subnet/Network Address:
- 192.168.20.64

How to Find the Broadcast Address

No Subnetting Class A

- Q. What is the broadcast address of the following IP address?

- 10.20.11.5
- 255.0.0.0

- **Answer:**

- Broadcast Address: 10.255.255.255

Subnetting Class B

- Q. What is the broadcast address of the following IP address?

- 172.16.20.20
- 255.255.255.0

Answer:

- Broadcast Address: 172.16.20.255

Subnetting Class C

Q. What is the broadcast address of the following IP address?

- 192.168.2.33
- 255.255.255.248
- **Answer:**
- 256 – 248 = 8
- 0, 8, 16, 24, 32, 40, 48
- Next Network = 40
- 40 – 1 = **39**
- Broadcast Address:192.168.2.39

Questions

- Find Broadcast Address: 192.168.2.67 / 26
- Find Network Address: 192.168.2.134 / 27

- Create Subnets if you have IP address of Class B and you need 260 Valid Hosts for Subnets 128