Class A IP address

n/w → 8 bits

Hosts → 24 bits

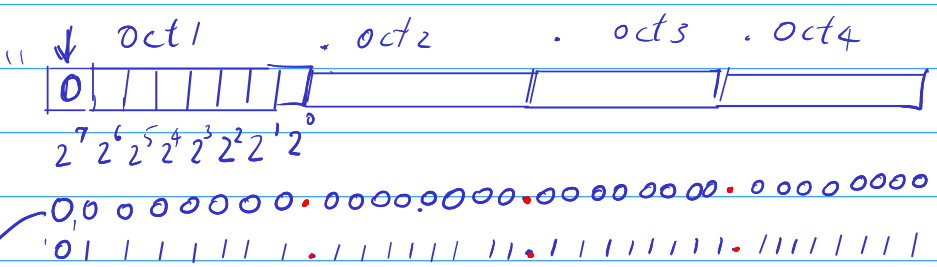
eg: 1.2.3.4 (1 = n/w, 2.3.4 = Host)

2^{24} machines

n/w ID: 1.0.0.0

0.0.0.0

255.255.255.255



1.0.0.0

127.255.255.255

$2^0 = 1$
$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$
$2^5 = 32$
$2^6 = 64$
$2^7 = 128$

1+2+4+8+16+32+64 = 127

0.0.0.0 → Anywhere IP address

1.0.0.0 – 127.255.255.255] 2^{24} computers

Class B n/w

oct1.oct2.oct3.oct4

n/w ID (16 bits) | Host ID (16 bits)

total number of computers = 2^{16}

total n/ws in Class B = 2^{16}

10000000.00000000.00000000.00000000

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0

$2^7 = 128$

128.0.0.0

191.255.255.255

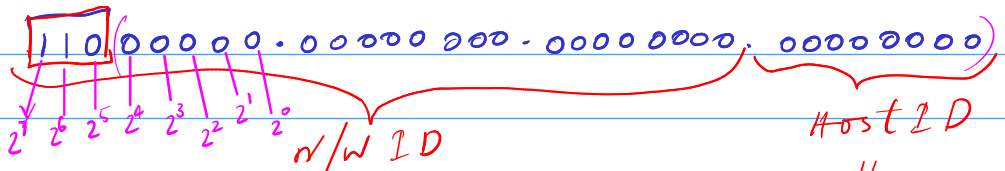
128
0
32
16
8
4
2
1
191

'CIDR'

10.1.3.4/10

192.16.8.10/23

class C N/W



$\Downarrow$ 2^{24} n/w

$\Downarrow$ 2^8 hosts

2^7 2^6 2^5

$128+64+0 = 192.0.0.0$

$128+64+0+16+8+4+2+1 = 223.255.255.255$

Subnet mask = 255.255.255.0

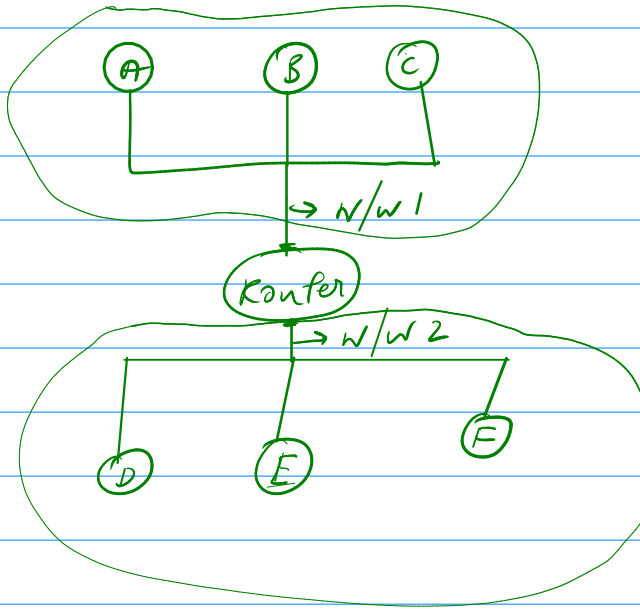
CIDR

A.B.C.D/24 → 24 bits is used for calculating n/w ID

A.B.C.D/28 → 28 bits is used for calculating n/w ID

Important factors when considering a n/w

1. A n/w ID →
2. Subnet mask
3. Broadcast IP address
4. First host address
5. Last host address



FLSM

204.15.5.0/24 → subnet into 5 smaller networks

- 5 bits → host address
- 27 bits → n/w address.

↳ net A → 14 hosts
↳ net B → 28 hosts
↳ net C → 2 hosts
↳ net D → 7 hosts
↳ net E → 28 hosts

11001100.00001111.00000101.00000000

n/w address

11001100.00001111.00000101.000 00000 → we will use 27 bits for n/w ID calculation and 5 bits for host ID calculation.

subnet mask: 11111111.11111111.11111111.111 00000

255 . 255 . 255 . 224

000 →	11001100.00001111.00000101.000 00000
001 →	11001100.00001111.00000101.001 00000
010 →	11001100.00001111.00000101.010 00000
011 →	11001100.00001111.00000101.011 00000
100 →	.100 00000
101 →	.101 00000
110 →	.110 00000
111 →	.111 00000

We borrow most significant 3-bits of Class C's Host address octet to the n/w address calculation when we do subnetting

→ Convert to decimal notation:

204.15.5.0/27 → net A
204.15.5.32/27 → net B
204.15.5.64/27 → net C
204.15.5.96/27 → net D
204.15.5.128/27 → net E
204.15.5.160/27
204.15.5.192/27
204.15.5.224/27

net A 204.15.5.0/27

Network ID → 204.15.5.0
Subnet mask → 255.255.255.224
First Host address → 204.15.5.1
Last Host address → 204.15.5.30
Broadcast address → 204.15.5.31

net B → 204.15.5.32/27

network ID → 204.15.5.32

subnetmask → 255.255.255.224

First Host address → 204.15.5.33

Last Host address → 204.15.5.62

Broadcast address → 204.15.5.63