Subnet

A subnet is a logical subdivision of an IP network or a smaller network within a larger network.

Subnet Mask

A subnet mask is a number that identifies the network and host portions of an IP address.

Binary Representation

Range 0-255 bits

For 160

128	64	32	16	8	4	2	1
1	0	1	0	0	0	0	0

For 255

128	64	32	16	8	4	2	1
1	1	1	1	1	1	1	1

For 252

128	64	32	16	8	4	2	1
1	1	1	1	1	1	0	0

For 192

128	64	32	16	8	4	2	1
1	1	0	0	0	0	0	0

For 168

128	64	32	16	8	4	2	1
1	0	1	0	1	0	0	0

192.168.252.0
11000000.10101000.11111100.00000000

Subnet Calculation Problem

how to calculate the network, first host, last host, broadcast, and next subnet for the target ip address of 167.141.217.134/22?

Subnet Mask:
CIDR notation /22 means the subnet mask is 255.255.252.0
How?
Convert /22 to binary: 11111111.11111111.11111100.00000000

Determine the network address:

IP   :   167.141.217.134
Subnet Mask :   255.255.252.0
Network   :   167.141.216.0
How?

IP	10100111	10001101	11011001	10000110
Mask	11111111	11111111	11111100	00000000
Network	10100111	10001101	11011000	00000000

If IP and Mask both have 1, Network bit is 1. Else Network bit 0

167

128	64	32	16	8	4	2	1
1	0	1	0	0	1	1	1

141

128	64	32	16	8	4	2	1
1	0	0	0	1	1	0	1

216

128	64	32	16	8	4	2	1
1	1	0	1	1	0	0	0

0

128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	0

Calculate the first host:

First Host: 167.141.216.1

Calculate the broadcast address:

The broadcast address is the highest address in the subnet, where all host bits are set to 1.
Add 2^10 bit with network address.

Why base 10?

The network had a mask of 22. Total network bit is 32.

32 - 22 = 10

Therefore the base is 10 bit

2^10=1024

1024/256 = 4

1024 - 1 = 1023

Network : 167.141.216.0

Broadcast Host: 167.141.219.255

Range: 167.141.216.0 - 167.141.219.255

Another way to calculate is:

Network Address: 10100111.10001101.11011000.00000000

Convert last 32-22 = 10 bits to 1

Broadcast Host: 10100111.10001101.11011011.11111111

Convert to binary: 167.141.219.255

Calculate the last host:

Last Host: 167.141.219.254

Next Subnet:

Subnet: 167.141.220.0