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.

Network Address: 10100111.10001101.11011000.00000000
Convert last 32-22 = 10 bits to 1
Broadcast Host: 10100111.10001101.11011011.11111111
Convert to Decimal: 167.141.219.255

Calculate the last host:

Last Host: 167.141.219.254

Next Subnet:

Subnet: 167.141.220.0

A company needs at least 50 subnets and at least 500 hosts per subnet. What subnet mask should they use for the 10.0.0.0 network?

10.0.0.0
Binary: 00001010.00000000.00000000.00000000

Total number of host addresses: 25000

Total number of host addresses for subnet mask of /16 = 65536

65536 - 25000 = 40536

10.0.0.0/17

/17 binary conversion = 11111111.11111111.10000000.00000000
Decimal = 255.255.128.0
Subnet mask = 255.255.128.0