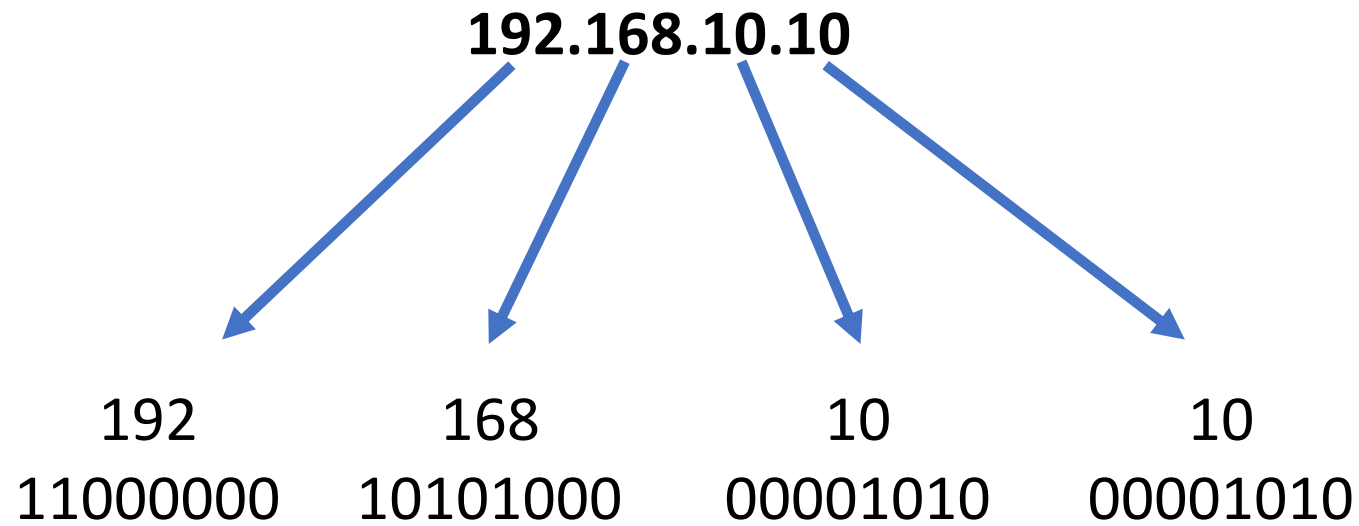


Converting Decimal to Binary



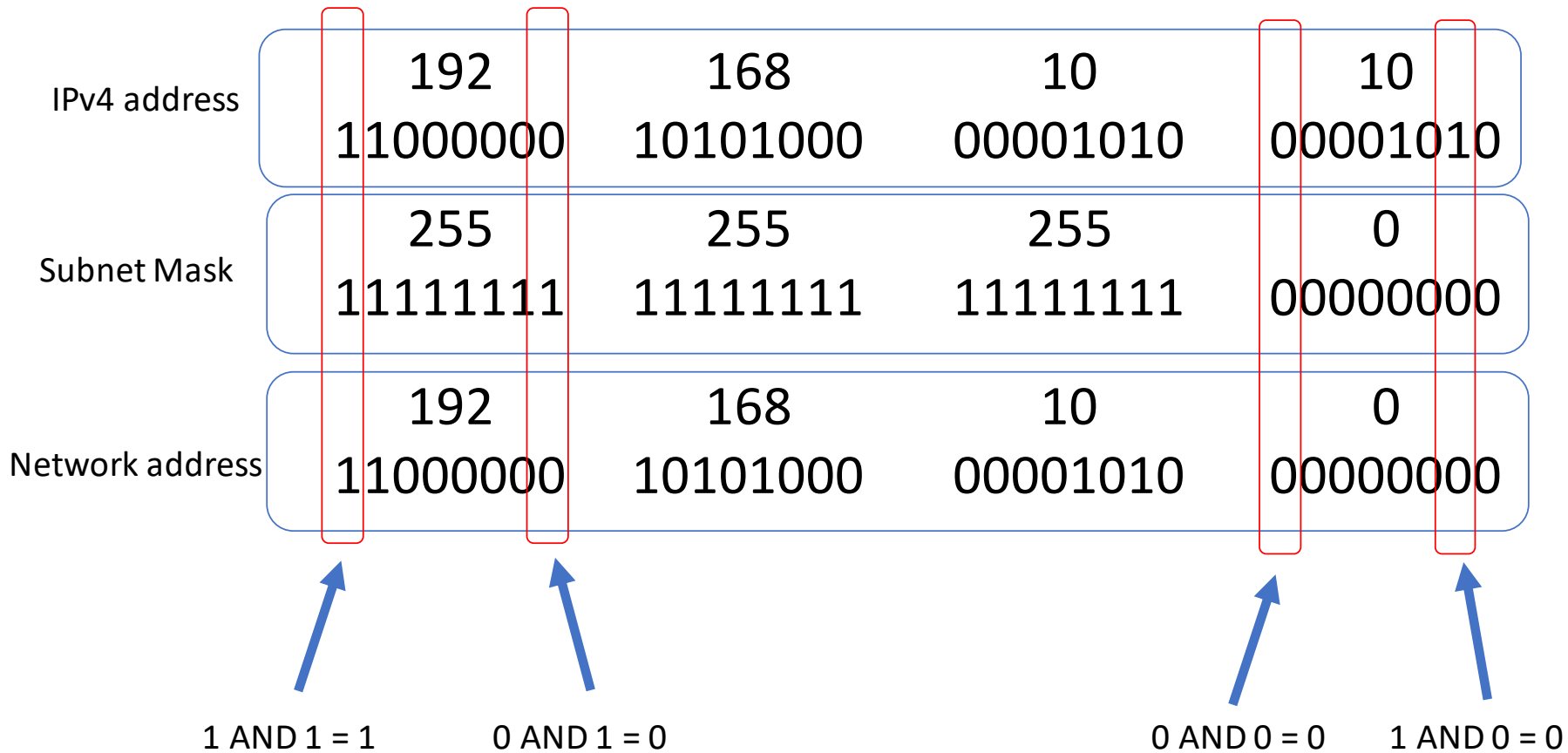
IPv4 Subnet Mask

- A subnet mask is a separate 32-bit pattern used to define the network and host portions of an address.
- Shows where the network portion is in the IP.

IPv4 address	192 11000000	168 10101000	10 00001010	10 00001010
Subnet Mask	255 11111111	255 11111111	255 11111111	0 00000000
Network address	192 11000000	168 10101000	10 00001010	0 00000000

Subnet mask always has 1s from left to final position of network address. 1s show the location of network portion

IPv4 Subnet Mask – bitwise AND operation



Network Address Prefix Length

/23 indicates number of bits
"borrowed" for network address

Network Address 10.1.0.0/23

Subnet mask is : 255.255.254

(11111111.11111111.11111110.00000000)

10.1.0.1 00001010.00000001.00000000.00000001 (first)

10.1.1.254 00001010.00000001.00000000.11111110 (last)

10.1.1.255 00001010.00000001.00000000.11111111 (broadcast)

Cannot use network or broadcast
address

Number of hosts: $2^9 - 2 = 510$ hosts

Network Address Prefix Length

Network Address 10.1.0.0/22 00001010.00000001.00000000.00000000
255.255.252.0 11111111.11111111.11111100.00000000

10.1.0.1 00001010.00000001.00000000.00000001 (first)

10.1.3.254 00001010.00000001.00000011.11111110 (last)

10.1.3.255 00001010.00000001.00000011.11111111 (broadcast)

Number of hosts: $2^{10} - 2 = 1024 - 2 = 1022$ hosts

IPv4 Dot Decimal Prefix Notation

	<u>Dotted Decimal</u>	<u>Significant bits shown in binary</u>
Network Address	10.1.1.0/24	10.1.1.00000000
First Host Address	10.1.1.1	10.1.1.00000001
Last Host Address	10.1.1.254	10.1.1.11111110
Broadcast Address	10.1.1.255	10.1.1.11111111
Number of hosts:	$2^8 - 2 = 254$ hosts	
Network Address	10.1.1.0/25	10.1.1.00000000
First Host Address	10.1.1.1	10.1.1.00000001
Last Host Address	10.1.1.126	10.1.1.01111110
Broadcast Address	10.1.1.127	10.1.1.01111111
Number of hosts:	$2^7 - 2 = 126$ hosts	
Network Address	10.1.1.0/26	10.1.1.00000000
First Host Address	10.1.1.1	10.1.1.00000001
Last Host Address	10.1.1.62	10.1.1.00111110
Broadcast Address	10.1.1.63	10.1.1.00111111
Number of hosts:	$2^6 - 2 = 62$ hosts	