

CIDR - Fundamentals

Subnet

Mechanism to divide a LAN into multiple independent networks

- Security, by reducing visibility between hosts
- Monitoring and blocking

CIDR Notation (Classless Internet Domain Routing)

Most restrictive	0.0.0.0/32	No access
	72.183.104.30/32	Only a single ip can access
	72.183.104.0/24	First 3 octets must match
	72.183.0.0/16	First 2 octets must match
	72.0.0.0/8	First octet must match
Least restrictive	0.0.0.0/0	Open to everyone

IPv4 Subnet Mask Cheat Sheet

	Addresses	Hosts	Netmask	Amount of a Class C
/30	4	2	255.255.255.252	1/64
/29	8	6	255.255.255.248	1/32
/28	16	14	255.255.255.240	1/16
/27	32	30	255.255.255.224	1/8
/26	64	62	255.255.255.192	1/4
/25	128	126	255.255.255.128	1/2
/24	256	254	255.255.255.0	1
/23	512	510	255.255.254.0	2
/22	1024	1022	255.255.252.0	4
/21	2048	2046	255.255.248.0	8
/20	4096	4094	255.255.240.0	16
/19	8192	8190	255.255.224.0	32
/18	16384	16382	255.255.192.0	64
/17	32768	32766	255.255.128.0	128
/16	65536	65534	255.255.0.0	256

CIDR - range

[IP Subnetting from CIDR Notations](#)

The screenshot shows a subnet calculator interface. At the top, it says "Subnetting from CIDR Notation". Below that, it displays the IP address "192.168.60.55 /20 (255.255.240.0)". It then shows the binary representation of the subnet mask: "Network ID: 192 168 48 0" and "Broadcast ID: 192 168 | 255". A "Usable IPs:" field is shown below. Below the binary fields, there is a row of numbers: 128, 64, 32, 16, 8, 4, 2, 1. Underneath these numbers, a binary sequence is shown: "xxxxxxxx.xxxxxxxx .00111100.xxxxxxxx" and "11111111.11111111.11110000.00000000 .00110000.". The ".00110000." part is highlighted in red.

CIDR

192.168.60.55/20 =

Step#1:

- translate /20 bits into binary and find subnet
- 11111111.11111111.11110000.00000000**

- Means = 20 bits turned ON.
 - 255.255.240.0

Base:

128 64 32 16 8 4 2 1 => total = 255.

Step # 2

- Identify network ID from 3rd OCTET value (eg: = 60)

Network ID	192	168	48	0
Broadcast ID	192	168	63	255

- **NETWORK id derivation**

Base	128	64	32	16	8	4	2	1
(a) 3rd octet/index 60 derived	0	0	1	1	1	1	0	0
(b) 3rd index Of binary Step#1	1	1	1	1	0	0	0	0
(c) Multiply 2nd And 3rd rows	0	0	1	1	0	0	0	0
(d) Substitute from base			32	16				

- **Network ID** = 32 + 16
- **Broad Cast ID** = Network ID + (Last binary 1 bit equivalent base value of step#1) - 1
 - 11111111.11111111.11110000.00000000. (20 bits)
- **Broad cast Id** = (32+16) + (16) - 1 = **63**

Step#3:

Derive usable IP's

Usable IP's	IP address ranges excluding network ID and broad cast ID
Usable IP's	192.168.48.1 - 192.168.63.254

