



## CIDR, Subnet Mask & Hosts

CIDR	Subnet Mask	Usable Hosts	Total Hosts	Block Size
/32	255.255.255.255	1	1	1
/31	255.255.255.254	2	2	2
/30	255.255.255.252	2	4	4
/29	255.255.255.248	6	8	8
/28	255.255.255.240	14	16	16
/27	255.255.255.224	30	32	32
/26	255.255.255.192	62	64	64
/25	255.255.255.128	126	128	128
/24	255.255.255.0	254	256	256
/23	255.255.254.0	510	512	512
/22	255.255.252.0	1,022	1,024	1,024
/21	255.255.248.0	2,046	2,048	2,048
/20	255.255.240.0	4,094	4,096	4,096
/19	255.255.224.0	8,190	8,192	8,192
/18	255.255.192.0	16,382	16,384	16,384
/17	255.255.128.0	32,766	32,768	32,768
/16	255.255.0.0	65,534	65,536	65,536
/15	255.254.0.0	131,070	131,072	131,072
/14	255.252.0.0	262,142	262,144	262,144
/13	255.248.0.0	524,286	524,288	524,288
/12	255.240.0.0	1,048,574	1,048,576	1,048,576
/11	255.224.0.0	2,097,150	2,097,152	2,097,152
/10	255.192.0.0	4,194,302	4,194,304	4,194,304
/9	255.128.0.0	8,388,606	8,388,608	8,388,608
/8	255.0.0.0	16,777,214	16,777,216	16,777,216
/7	254.0.0.0	33,554,430	33,554,432	33,554,432
/6	252.0.0.0	67,108,862	67,108,864	67,108,864
/5	248.0.0.0	134,217,726	134,217,728	134,217,728
/4	240.0.0.0	268,435,454	268,435,456	268,435,456
/3	224.0.0.0	536,870,910	536,870,912	536,870,912
/2	192.0.0.0	1,073,741,822	1,073,741,824	1,073,741,824
/1	128.0.0.0	2,147,483,646	2,147,483,648	2,147,483,648
/0	0.0.0.0	4,294,967,294	4,294,967,296	4,294,967,296

## Private IP Address Ranges

Class	Private Range
Class A	10.0.0.0 – 10.255.255.255 (10.0.0.0/8)
Class B	172.16.0.0 – 172.31.255.255 (172.16.0.0/12)
Class C	192.168.0.0 – 192.168.255.255 (192.168.0.0/16)

## Quick Reference

Network Address	First IP in the subnet
Broadcast Address	Last IP in the subnet
Usable Host Range	Between network and broadcast
Total Hosts	$2^{(32 - CIDR)}$
Usable Hosts	Total Hosts - 2 (except /31 and /32)
Default Gateway	Usually the first usable IP
DNS Server	Provided by ISP or set manually

## Common CIDR Examples

CIDR	Usable Hosts	Use Case
/30	2	Point-to-point links
/29	6	Small networks
/28	14	Small LANs
/27	30	Small offices
/26	62	Medium LANs
/25	126	Large LANs
/24	254	Standard LAN
/16	65,534	Large enterprise
/8	16,777,214	Very large networks

## Subnetting Tips

- Hosts =  $2^{(32 - CIDR)} - 2$  (except /31 and /32)
- Choose the smallest subnet that fits your hosts
- Network = IP AND Subnet Mask
- Broadcast = Network OR Wildcard Mask
- Wildcard Mask = Inverse of Subnet Mask
- Example: /24 → Wildcard Mask = 0.0.0.255

## Example: 192.168.1.10/24

IP Address	192.168.1.10
Subnet Mask	255.255.255.0
Network Address	192.168.1.0
First Host	192.168.1.1
Last Host	192.168.1.254
Broadcast Address	192.168.1.255
Usable Hosts	254
Total Hosts	256

## Useful Commands (Cisco)

```
show ip interface brief
show ip route
show running-config
ping <ip-address>
traceroute <ip-address>
ipconfig /all (Windows)
ifconfig (Linux/Mac)
```

