

IPv4 Subnet Cheat Sheet

CIDR	Subnet Mask	Total IPs	Usable IPs
/32	255.255.255.255	1	1
/31	255.255.255.254	2	2*
/30	255.255.255.252	4	2
/29	255.255.255.248	8	6
/28	255.255.255.240	16	14
/27	255.255.255.224	32	30
/26	255.255.255.192	64	62
/25	255.255.255.128	128	126
/24	255.255.255.0	256	254
/23	255.255.254.0	512	510
/22	255.255.252.0	1024	1022
/21	255.255.248.0	2048	2046
/20	255.255.240.0	4096	4094
/19	255.255.224.0	8192	8190
/18	255.255.192.0	16,384	16,382
/17	255.255.128.0	32,768	32,766
/16	255.255.0.0	65,536	65,534
/15	255.254.0.0	131,072	131,070
/14	255.252.0.0	262,144	262,142
/13	255.248.0.0	524,288	524,286
/12	255.240.0.0	1,048,576	1,048,574
/11	255.224.0.0	2,097,152	2,097,150
/10	255.192.0.0	4,194,304	4,194,302
/9	255.128.0.0	8,388,608	8,388,606
/8	255.0.0.0	16,777,216	16,777,214
/7	254.0.0.0	33,554,432	33,554,430
/6	252.0.0.0	67,108,864	67,108,862
/5	248.0.0.0	134,217,728	134,217,726
/4	240.0.0.0	268,435,456	268,435,454
/3	224.0.0.0	536,870,912	536,870,910
/2	192.0.0.0	1,073,741,824	1,073,741,822
/1	128.0.0.0	2,147,483,648	2,147,483,646

RFC 1918 Private IP ranges

Class	Size	Subnet Mask	Range of IPs
Class A	10.0.0.0/8	255.0.0.0	10.0.0.0 - 10.255.255.255
Class B	172.16.0.0/12	255.240.0.0	172.16.0.0 - 172.31.255.255
Class C	192.168.0.0/16	255.255.0.0	192.168.0.0 - 192.168.255.255

Binary

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

IPv4 Subnet Formulas

Number of subnets = 2^n , where 'n' is the number of borrowed bits.

Number of hosts = $2^h - 2$, where 'h' is the number of host bits.

The block size for a subnet is 256 minus the subnet mask value.

OSI and TCP/IP Models

OSI Model	OSI mnemonic	TCP/IP Model	PDU	Address Type	Protocol Example
Application	all	Application	Data		HTTP, FTP, DNS, IMAP, SMTP
Presentation	people				
Session	seem				
Transport	to	Transport	Segment	Port	TCP, UDP
Network	need	Internet	Packet	IP	IP, IPv6, ICMP
Data Link	data	Network Interface	Frame	MAC	Ethernet, CDP
Physical	processing		Bit		10BASE-T

IPv6

Prefix	/48s	/56s	/64s
/24	16M	4G	1T
/25	8M	2G	512G
/26	4M	1G	256G
/27	2M	512M	128G
/28	1M	256M	64G
/29	512K	128M	32G
/30	256K	64M	16G
/31	128K	32M	8G
/32	64K	16M	4G
/33	32K	8M	2G
/34	16K	4M	1G
/35	8K	2M	512M
/36	4K	1M	256M
/37	2K	512K	128M
/38	1K	256K	64M
/39	512	128K	32M
/40	256	64K	16M
/41	128	32K	8M
/42	64	16K	4M
/43	32	8K	2M
/44	16	4K	1M
/45	8	2K	512K
/46	4	1K	256K
/47	2	512	128K
/48	1	256	64K
/49		128	32K
/50		64	16K
/51		32	8K
/52		16	4K
/53		8	2K
/54		4	1K
/55		2	512
/56		1	256
/57			128
/58			64

IPv6 Contraction

Remove leading zeros.

Use :: on the longest set of zeros (or on the leftmost set of zeros if there are two sets of the same length).

Do not use :: on a single set of zeros.

Write the address in lowercase.

Hexadecimal

Hex	Decimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	12
D	13
E	14
F	15

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