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 Cheat-sheet

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
/59			32
/60			16
/61			8
/62			4
/63			2
/64			1

::1/128 is the **loopback address.**

::FFFF:0:0/96 are the **IPv4-mapped addresses.**

fe80::/10 are the **link-local unicast.**

2001:db8::/32 are the **documentation addresses.**

ff00::/8 are **multicast addresses**

Hexadecimal digit	Decimal Value
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

1) The number of subnets possible with x subnetting bits is 2^x

2) The number of subnetting bits is the new prefix length minus the original prefix length.

Contraction:

-Remove leading zeros

-Use **::** on the longest set of zeros possible, or on the leftmost set of zeros

-Do not use **::** on a single 16-bit set of zeros

-IPv6 must be written in lowercase.

IPv4 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	16384	16382
/17	255.255.128.0	32768	32766
/16	255.255.0.0	65536	65534
/15	255.254.0.0	131072	131070
/14	255.252.0.0	262144	262142
/13	255.248.0.0	524288	524286
/12	255.240.0.0	1048576	1048574
/11	255.224.0.0	2097152	2097150
/10	255.192.0.0	4194304	4194302
/9	255.128.0.0	8388608	8388606
/8	255.0.0.0	16777216	16777214
/7	254.0.0.0	33554432	33554430
/6	252.0.0.0	67108864	67108862
/5	248.0.0.0	134217728	134217726
/4	240.0.0.0	268435456	268435454
/3	224.0.0.0	536870912	536870910
/2	192.0.0.0	1073741824	1073741822
/1	128.0.0.0	2147483648	2147483646

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 to Decimal

Bits	Value	Power of two
100000000	256	8
10000000	128	7
1000000	64	6
100000	32	5
10000	16	4
1000	8	3
100	4	2
10	2	1
1	1	0

Formulas

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

Number of hosts = $2^{(32-n)}-2$ where n is the number of subnet mask bits

The block size for a subnet is 256-subnet mask value.

The broadcast address is one less than the next network address.

The usable hosts are between the network address and the broadcast.