

Subnetting Tip Sheet v5

Courtesy of
EasySubnetting.com

Class of IP Addresses				
Class	Range	High Order Bits	Number of Networks	Number of Hosts
A	1-127	0	126	1,666,214
B	127-191	10	16,384	65,534
C	192-223	110	2,097,152	254
D	224-239	1110	Used for Multicasting	
E	240-255	11110	Experimental, reserved for future use	

Default Subnet Mask, Networks, and Hosts Per Class				
Class A	/8	11111111.00000000.00000000.00000000	255. 0. 0. 0	N . H . H . H
Class B	/16	11111111.11111111.00000000.00000000	255.255. 0. 0	N . N . H . H
Class C	/24	11111111.11111111.11111111.00000000	255.255.255. 0	N . N . N . H

Quick Binary Chart								
Bits, Right to Left	8	7	6	5	4	3	2	1
Octet borrow from	128	64	32	16	8	4	2	1
Custom subnet to be used	128	192	224	240	248	252	254	255
Bits Borrowed	1	2	3	4	5	6	7	8
Subnets Created (2^N) <i>NEW ROUTERS</i>	2	4	8	16	32	64	128	256
Subnets Created (2^N-2) <i>OLD ROUTERS</i>	0	2	6	14	30	62	126	254
Class C Remaining Hosts (2^N-2)		62	30	14	6	2	0	0

Steps To Subnetting

1. Determine Class
2. Determine Default Subnet Mask
3. Determine # of Subnets
OR
4. Determine # of Hosts
5. Determine Borrowed Bits
6. Determine Custom Subnet Mask

To Create Custom Subnet Mask

Subnets: Start from LEFT to RIGHT turning bits on (borrow) from the host portion of the default subnet mask. Add up borrowed bits and calculate number of subnets using 2^N where N is the number of borrowed bits. Older routers require subtracting two subnets.

Hosts: From RIGHT to LEFT, add the number of remaining bits turned OFF and calculate the number of hosts on each subnet using 2^N-2 where N is the number of remaining bits.

Bits	$2^N - 2 = x$
1	$2 \times 1 = 2 - 2 = 0$
2	$2 \times 2 = 4 - 2 = 2$
3	$2 \times 4 = 8 - 2 = 6$
4	$2 \times 8 = 16 - 2 = 14$
5	$2 \times 16 = 32 - 2 = 30$
6	$2 \times 32 = 64 - 2 = 62$
7	$2 \times 64 = 128 - 2 = 126$
8	$2 \times 128 = 256 - 2 = 254$
9	$2 \times 256 = 512 - 2 = 510$
10	$2 \times 512 = 1,024 - 2 = 1,022$
11	$2 \times 1,024 = 2,048 - 2 = 2,046$
12	$2 \times 2,048 = 4,096 - 2 = 4,094$
13	$2 \times 4,096 = 8,192 - 2 = 8,190$
14	$2 \times 8,192 = 16,384 - 2 = 16,382$
15	$2 \times 16,384 = 32,768 - 2 = 32,766$
16	$2 \times 32,768 = 65,536 - 2 = 65,534$
17	$2 \times 65,536 = 131,072 - 2 = 131,070$
18	$2 \times 131,072 = 262,144 - 2 = 262,142$
19	$2 \times 262,144 = 524,288 - 2 = 524,286$
20	$2 \times 524,288 = 1,048,576 - 2 = 1,048,574$
21	$2 \times 1,048,576 = 2,097,152 - 2 = 2,097,150$
22	$2 \times 2,097,152 = 4,194,304 - 2 = 4,194,302$
23	$2 \times 4,194,304 = 8,388,608 - 2 = 8,388,606$
24	$2 \times 8,388,608 = 16,777,216 - 2 = 16,777,214$