Subnetting Reference Tables

POWER OF 2'S TABLE

$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$
$2^5 = 32$
$2^6 = 64$
$2^7 = 128$
$2^8 = 256$
$2^9 = 512$
$2^{10} = 1{,}024$
$2^{11} = 2{,}048$
$2^{12} = 4{,}096$
$2^{13} = 8{,}192$
$2^{14} = 16{,}384$
$2^{15} = 32{,}768$
$2^{16} = 65{,}536$

DEFAULT SUBNET MASK

Class	Format	Default Subnet Mask
A	network.host.host.host	255.0.0.0
B	network.network.host.host	255.255.0.0
C	network.network.network.host	255.255.255.0

BINARY MATH TABLE

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

SUBNET MASK TABLE

Binary	Decimal
00000000	0
10000000	128
11000000	192
11100000	224
11110000	240
11111000	248
11111100	252

SUBNET CALCULATION TABLE (2^x)

Host Bits Borrowed	2^x	Number of Subnets Created
1	2^1	2
2	2^2	4
3	2^3	8
4	2^4	16
5	2^5	32
6	2^6	64
7	2^7	128
8	2^8	256
9	2^9	512
10	2^{10}	1,024
11	2^{11}	2,048
12	2^{12}	4,096

SUBNET HOSTS & ADDRESSES CALCULATION TABLE (2^y)

Host Bits Left	2^y	Hosts per Subnet ($2^y - 2$)	Addresses per Subnet (2^y)
~~**1**~~	~~2^1~~	~~0~~	~~2~~
2	2^2	2	4
3	2^3	6	8
4	2^4	14	16
5	2^5	30	32
6	2^6	62	64
7	2^7	126	128
8	2^8	254	256
9	2^9	510	512
10	2^{10}	1,022	1,024
11	2^{11}	2,046	2,048
12	2^{12}	4,094	4,096

CLASS C POSSIBLE SUBNET MASKS

Binary (N.N.N.H)	Decimal	CIDR	# Subnets (2^x)	Block Size (2^y)	# Hosts (2^y - 2)
N.N.N.00000000	255.255.255.0	/24	$2^0 = 1$	$2^8 = 256$	$2^8 - 2 = 254$
N.N.N.10000000	255.255.255.128	/25	$2^1 = 2$	$2^7 = 128$	$2^7 - 2 = 126$
N.N.N.11000000	255.255.255.192	/26	$2^2 = 4$	$2^6 = 64$	$2^6 - 2 = 62$
N.N.N.11100000	255.255.255.224	/27	$2^3 = 8$	$2^5 = 32$	$2^5 - 2 = 30$
N.N.N.11110000	255.255.255.240	/28	$2^4 = 16$	$2^4 = 16$	$2^4 - 2 = 14$
N.N.N.11111000	255.255.255.248	/29	$2^5 = 32$	$2^3 = 8$	$2^3 - 2 = 6$
N.N.N.11111100	255.255.255.252	/30	$2^6 = 64$	$2^2 = 4$	$2^2 - 2 = 2$

CLASS B POSSIBLE SUBNET MASKS

Binary (N.N.H.H)	Decimal	CIDR	# Subnets (2^x)	Block Size (2^y)	# Hosts (2^y - 2)
N.N.00000000.00000000	255.255.0.0	/16	$2^0 = 1$	$2^{16} = 65,536$	$2^{16} - 2 = 65,534$
N.N.10000000.00000000	255.255.128.0	/17	$2^1 = 2$	$2^{15} = 32,768$	$2^{15} - 2 = 32,766$
N.N.11000000.00000000	255.255.192.0	/18	$2^2 = 4$	$2^{14} = 16,384$	$2^{14} - 2 = 16,382$
N.N.11100000.00000000	255.255.224.0	/19	$2^3 = 8$	$2^{13} = 8,192$	$2^{13} - 2 = 8,190$
N.N.11110000.00000000	255.255.240.0	/20	$2^4 = 16$	$2^{12} = 4,096$	$2^{12} - 2 = 4,094$
N.N.11111000.00000000	255.255.248.0	/21	$2^5 = 32$	$2^{11} = 2,048$	$2^{11} - 2 = 2,046$
N.N.11111100.00000000	255.255.252.0	/22	$2^6 = 64$	$2^{10} = 1,024$	$2^{10} - 2 = 1,022$
N.N.11111110.00000000	255.255.254.0	/23	$2^7 = 128$	$2^9 = 512$	$2^9 - 2 = 510$
N.N.11111111.00000000	255.255.255.0	/24	$2^8 = 256$	$2^8 = 256$	$2^8 - 2 = 254$
N.N.11111111.10000000	255.255.255.128	/25	$2^9 = 512$	$2^7 = 128$	$2^7 - 2 = 126$
N.N.11111111.11000000	255.255.255.192	/26	$2^{10} = 1,024$	$2^6 = 64$	$2^6 - 2 = 62$
N.N.11111111.11100000	255.255.255.224	/27	$2^{11} = 2,048$	$2^5 = 32$	$2^5 - 2 = 30$
N.N.11111111.11110000	255.255.255.240	/28	$2^{12} = 4,096$	$2^4 = 16$	$2^4 - 2 = 14$
N.N.11111111.11111000	255.255.255.248	/29	$2^{13} = 8,192$	$2^3 = 8$	$2^3 - 2 = 6$
N.N.11111111.11111100	255.255.255.252	/30	$2^{14} = 16,384$	$2^2 = 4$	$2^2 - 2 = 2$

CLASS A POSSIBLE SUBNET MASKS

Binary (N.H.H.H)	Decimal	CIDR	# Subnets (2^x)	Block Size (2^y)	# Hosts (2^y - 2)
N.00000000.00000000.00000000	255.0.0.0	/8	$2^0 = 1$	$2^{22} = 16,777,216$	$2^{22} – 2 = 16,777,214$
N.10000000.00000000.00000000	255.128.0.0	/9	$2^1 = 2$	$2^{23} = 8,388,608$	$2^{23} – 2 = 8,388,606$
N.11000000.00000000.00000000	255.192.0.0	/10	$2^2 = 4$	$2^{22} = 4,194,304$	$2^{22} – 2 = 4,194,302$
N.11100000.00000000.00000000	255.224.0.0	/11	$2^3 = 8$	$2^{21} = 2,097,152$	$2^{21} – 2 = 2,097,150$
N.11110000.00000000.00000000	255.240.0.0	/12	$2^4 = 16$	$2^{20} = 1,048,576$	$2^{20} – 2 = 1,048,574$
N.11111000.00000000.00000000	255.248.0.0	/13	$2^5 = 32$	$2^{19} = 524,288$	$2^{19} – 2 = 524,286$
N.11111100.00000000.00000000	255.252.0.0	/14	$2^6 = 64$	$2^{18} = 262,144$	$2^{18} – 2 = 262,142$
N.11111110.00000000.00000000	255.254.0.0	/15	$2^7 = 128$	$2^{17} = 131,072$	$2^{17} – 2 = 131,070$
N.11111111.00000000.00000000	255.255.0.0	/16	$2^8 = 256$	$2^{16} = 65,536$	$2^{16} – 2 = 65,534$
N.11111111.10000000.00000000	255.255.128.0	/17	$2^9 = 512$	$2^{15} = 32,768$	$2^{15} – 2 = 32,766$
N.11111111.11000000.00000000	255.255.192.0	/18	$2^{10} = 1,024$	$2^{14} = 16,384$	$2^{14} – 2 = 16,382$
N.11111111.11100000.00000000	255.255.224.0	/19	$2^{11} = 2,048$	$2^{13} = 8,192$	$2^{13} – 2 = 8,190$
N.11111111.11110000.00000000	255.255.240.0	/20	$2^{12} = 4,096$	$2^{12} = 4,096$	$2^{12} – 2 = 4,094$
N.11111111.11111000.00000000	255.255.248.0	/21	$2^{13} = 8,192$	$2^{11} = 2,048$	$2^{11} – 2 = 2,046$
N.11111111.11111100.00000000	255.255.252.0	/22	$2^{14} = 16,384$	$2^{10} = 1,024$	$2^{10} – 2 = 1,022$
N.11111111.11111110.00000000	255.255.254.0	/23	$2^{15} = 32,768$	$2^9 = 512$	$2^9 – 2 = 510$
N.11111111.11111111.00000000	255.255.255.0	/24	$2^{16} = 65,536$	$2^8 = 256$	$2^8 – 2 = 254$
N.11111111.11111111.10000000	255.255.255.128	/25	$2^{17} = 131,072$	$2^7 = 128$	$2^7 – 2 = 126$
N.11111111.11111111.11000000	255.255.255.192	/26	$2^{18} = 262,144$	$2^6 = 64$	$2^6 – 2 = 62$
N.11111111.11111111.11100000	255.255.255.224	/27	$2^{19} = 524,288$	$2^5 = 32$	$2^5 – 2 = 30$
N.11111111.11111111.11110000	255.255.255.240	/28	$2^{20} = 1,048,576$	$2^4 = 16$	$2^4 – 2 = 14$
N.11111111.11111111.11111000	255.255.255.248	/29	$2^{21} = 2,097,152$	$2^3 = 8$	$2^3 – 2 = 6$
N.11111111.11111111.11111100	255.255.255.252	/30	$2^{22} = 4,194,304$	$2^2 = 4$	$2^2 – 2 = 2$