**How to subnet an IPv4 /24**Basic rules:

1. The total number of IP addresses in a subnet is a power of two. So that's: 1, 2, 4, 8, 16, ... etc.
2. The first IP address in a subnet is a multiple (0, 1, 2, 3 ...) of the number of IP addresses in the subnet.
3. 'x' in netmask '255.255.255.x' is 256 - number of IP addresses in the subnet.
4. In slash-notation, the netmask is '/y', where y = 32 - n, and 2ⁿ is the number of addresses in the subnet.

If we want 4 addresses in our subnet, the first address in this subnet is either 0 or 4 or 8 or 12 or ... etc. And 'x' in netmask '255.255.255.x' is: 256 - 4 = 252. So the netmask is: '255.255.255.252'. 4 = 2², so n = 2 and y is 32 - 2 = 30. The slash-notation netmask is therefore: '/30'.

**Note: You can't use IP addresses a.b.c.0 or a.b.c.255**

|  |  |  |
| --- | --- | --- |
| **Size** | **Netmask** | **/** |
| [1](http://www.sput.nl/internet/netmask-table.html#s1) | 255.255.255.255 | /32 |
| [2](http://www.sput.nl/internet/netmask-table.html#s2) | 255.255.255.254 | /31 |
| [4](http://www.sput.nl/internet/netmask-table.html#s4) | 255.255.255.252 | /30 |
| [8](http://www.sput.nl/internet/netmask-table.html#s8) | 255.255.255.248 | /29 |
| [16](http://www.sput.nl/internet/netmask-table.html#s16) | 255.255.255.240 | /28 |
| [32](http://www.sput.nl/internet/netmask-table.html#s32) | 255.255.255.224 | /27 |
| [64](http://www.sput.nl/internet/netmask-table.html#s64) | 255.255.255.192 | /26 |
| [128](http://www.sput.nl/internet/netmask-table.html#s128) | 255.255.255.128 | /25 |
| [256](http://www.sput.nl/internet/netmask-table.html#s256) | 255.255.255.0 | /24 |

**Size: 1**Netmask: 255.255.255.255 or /32 Any single address. Note: This is a rather small subnet.

**Size: 2**Netmask: 255.255.255.254 or /31 Starts with even address. Note: This is a rather small subnet and not usable. The 2 addresses are the network and broadcast address.

**Size: 4**Netmask: 255.255.255.252 or /30 Starts with multiple of 4;

|  |  |  |
| --- | --- | --- |
| **Network** | **Range** | **Broadcast** |
| 0 | 1-2 | 3 |
| 4 | 5-6 | 7 |
| 8 | 9-10 | 11 |
| 12 | 13-14 | 15 |

**Size: 8**Netmask: 255.255.255.248 or /29 Starts with multiple of 8;

|  |  |  |  |
| --- | --- | --- | --- |
| **1st - last** | **1st - last** | **1st - last** | **1st - last** |
| 0 - 7 | 8 - 15 | 16 - 23 | 24 - 31 |
| 32 - 39 | 40 - 47 | 48 - 55 | 56 - 63 |
| 64 - 71 | 72 - 79 | 80 - 87 | 88 - 95 |
| 96 - 103 | 104 - 111 | 112 - 119 | 120 - 127 |
| 128 - 135 | 136 - 143 | 144 - 151 | 152 - 159 |
| 160 - 167 | 168 - 175 | 176 - 183 | 184 - 191 |
| 192 - 199 | 200 - 207 | 208 - 215 | 216 - 223 |
| 224 - 231 | 232 - 239 | 240 - 247 | 248 - 255 |

**Example**Network: 192.168.1.24  
Netmask: 255.255.255.248  
Or;   
192.168.1.24/29  
IP addresses 192.168.1.24 to 192.168.1.31 are in this subnet (see table above).

**Size: 16**Netmask: 255.255.255.240 or /28 Starts with multiple of 16;

|  |  |  |  |
| --- | --- | --- | --- |
| **1st - last** | **1st - last** | **1st - last** | **1st - last** |
| 0 - 15 | 16 - 31 | 32 - 47 | 48 - 63 |
| 64 - 79 | 80 - 95 | 96 - 111 | 112 - 127 |
| 128 - 143 | 144 - 159 | 160 - 175 | 176 - 191 |
| 192 - 207 | 208 - 223 | 224 - 239 | 240 - 255 |

**Example**Network: 192.168.1.48  
Netmask: 255.255.255.240  
Or;   
192.168.1.48/28  
IP addresses 192.168.1.48 to 192.168.1.63 are in this subnet (see table above).

**Size: 32**Netmask: 255.255.255.224 or /27 Starts with multiple of 32;

|  |  |  |  |
| --- | --- | --- | --- |
| **1st - last** | **1st - last** | **1st - last** | **1st - last** |
| 0 - 31 | 32 - 63 | 64 - 95 | 96 - 127 |
| 128 - 159 | 160 - 191 | 192 - 223 | 224 - 255 |

**Example**Network: 192.168.1.96  
Netmask: 255.255.255.224  
Or;   
192.168.1.96/27  
IP addresses 192.168.1.96 to 192.168.1.127 are in this subnet (see table above).

**Size: 64**Netmask: 255.255.255.192 or /26 Starts with multiple of 64;

|  |  |  |  |
| --- | --- | --- | --- |
| **1st - last** | **1st - last** | **1st - last** | **1st - last** |
| 0 - 63 | 64 - 127 | 128 - 191 | 192 - 255 |

**Example**Network: 192.168.1.128  
Netmask: 255.255.255.192  
Or;   
192.168.1.128/26  
IP addresses 192.168.1.128 to 192.168.1.191 are in this subnet (see table above).

**Size: 128**Netmask: 255.255.255.128 or /25 Starts with multiple of 128; Note: This is a rather large subnet.

|  |  |
| --- | --- |
| **1st - last** | **1st - last** |
| 0 - 127 | 128 - 255 |