**//////////////////////////////Subnetting:**

Subnetting is the process of dividing a physical network into multiple small sub- network. Subnetting helps the reduce the network traffic. The two types of version of IP address are

1. Ipv4 🡪 32 bit
2. Ipv6 🡪 128 bit

Ipv4

In ipv4 it is written as :

**8 bit. 8 bit. 8 bit.8 bit//////////////////////////////////////////////////////////////////**

**11111111. 11111111. 11111111. 11111111**

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

1. **0 0 0 0 0 0 0**

**Class A: 0 - 127**

**Class B: 128 – 191**

**Class C: 192 - 223**

**Class D: 224- 239**

**Class E: 240- 255**

Class A:

Default subnet mask:: 255.0.0.0

255 is the network part which is always fix and 0.0.0 is the host part.

Class B:

Default subnet mask:: 255.255.0.0

255.255 is the network part which is always fix and 0.0 is the host part.

Class C:

Default subnet mask:: 255.255.255.0

255.255.255 is the network part which is always fix and .0 is the host part.

Class D:

It is used for multicasting. It does not have any subnet mask.

Class E:

It is reserved for experimental purpose.

**Class c:**

192.168.0.0/25

🡪8.8.8.10000000

* New subnet mask: 255.255.255.128
* No of network: 2^no of on bit = 2^1= 2
* No of valid host: 2^ no of offbit -2 = 2^7-2 = 128-2 = 126
* Jumping value : total network – new subnet mask = 256-128= 128

|  |  |  |  |
| --- | --- | --- | --- |
| Network id | First ip | Last ip | Broadcast id |
| 192.168.0.0 | 192.168.0.1 | 192.168.0.126 | 192.168.0.127 |
| 192.168.0.128 | 192.168.0.129 | 192.168.0.254 | 192.168.0.255 |

192.168.0.0/27

* 8.8.8.11100000

New subnet mask: 255.255.255.224

Number of network: 2^number of on bit = 2^3 = 8

Number of valid host: : 2^ no of offbit -2 = 2^5-2 = 32-2 = 30

Jumping value : total network – new subnet mask = 256-224= 32

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Network id | First ip | | Last ip | Broadcast id | | |
| 192.168.0.0 | 192.168.0.1 | | 192.168.0.30 | 192.168.0.31 | | |
| 192.168.0.32 | 192.168.0.33 | | 192.168.0.62 | 192.168.0.63 | | |
| 192.168.0.64 | 192.168.0.65 | | 192.168.0.94 | 192.168.0.95 | | |
| 192.168.0.96 | 192.168.0.97 | | 192.168.0.126 | 192.168.0.127 | | |
| 192.168.0.128 | 192.168.0.129 | | 192.168.0.130 | 192.168.0.159 | | |
| 192.168.0.160 | 192.168.0.161 | | 192.168.0.190 | 192.168.0.191 | | |
| 192.168.0.192 | 192.168.0.193 | | 192.168.0.222 | 192.168.0.223 | | |
| 192.168.0.224 | 192.168.0.225 | 192.168.0.254 | | | 192.168.0.255 |

**Class B:**

172.168.0.0/25

🡪 8.8.11111111.10000000

New subnet mask : 255.255.255.128

Number of network : 2^number of on bit = 2^9 = 512

Number of valid host: 2^ no of offbit -2 = 2^7-2 = 126

Jumping value : total network- new subne mask= 256-128 = 128

|  |  |  |  |
| --- | --- | --- | --- |
| Network id | First ip | Last ip | Broadcast id |
| 192.168.0.0 | 192.168.0.1 | 192.168.0.126 | 192.168.0.127 |
| 192.168.0.128 | 192.168.0.129 | 192.168.0.254 | 192.168.0.255 |
| 192.168.1.0 | 192.168.1.1 | 192.168.1.126 | 192.168.1.127 |
| 192.168.1.128 | 192.168.1.129 | 192.168.1.254 | 192.168.1.255 |
| 192.168.2.0 | 192.168.2.1 | 192.168.2.126 | 192.168.2.127 |
| 192.168.2.128 | 192.168.2.129 | 192.168.2.254 | 192.168.2.255 |
| 192.168.3.0 | 192.168.3.1 | 192.168.3.126 | 192.168.3.127 |

----------

**-------**

|  |  |  |  |
| --- | --- | --- | --- |
| 192.168.255.0 | 192.168.255.1 | 192.168.255.126 | 192.168.255.127 |
| 192.168.255.128 | 192.168.255.129 | 192.168.255.254 | 192.168.255.255 |

Class A:

10.0.0.0/ 12

8.11110000.00000000.00000000

New subnet mask : 255.240.0.0

Number of network : 2^number of on bit = 2^4= 16

Number of valid host: 2^ no of offbit -2 = 2^20 -2 = 1048574

Jumping value : total network- new subne mask=256-240= 16

|  |  |  |  |
| --- | --- | --- | --- |
| 10.0.0.0 | 10.0.0.1 | 10.15.255.254 | 10.15.255.255 |
| 10.16.0.0 | 10.16.0.1 | 10.31. 255.254 | 10.31. 255.255 |
| 10.32.0.0 | 10.32.0.1 | 10.47. 255.254 | 10.47. 255.255 |
| 10.48.0.0 | 10.48.0.1 | 10.63. 255.254 | 10.63. 255.255 |
| 10.64.0.0 | 10.64.0.1 | 10.79. 255.254 | 10.79. 255.255 |
| 10.80.0.0 | 10.80.0.1 | 10.95. 255.254 | 10.95. 255.255 |
| 10.96.0.0 | 10.96.0.1 | 10.111. 255.254 | 10.111. 255.255 |
| 10.112.0.0 | 10.112.0.1 | 10.128. 255.254 | 10.128. 255.255 |

|  |  |  |  |
| --- | --- | --- | --- |
| 10.224.0.0 | 10.224.0.1 | 10.239.255.254 | 10.239.255.255 |
| 10.240.0.0 | 10.240.0.1 | 10.255.255.254 | 10.255.255.255 |