**CIDR Block** **Range**

CIDR stands for Classless inter-domain routing.

Let’s take an ip address for Ipv4. Ipv4 is a 32-bit address which are divided into 4 groups. Each group is called as Octet, because it has 8 bits per each group.

Octet-1 Octet-2 Octet-3 Octet-4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   27+26+25+24+23+22+21+20   |  | | --- | | 255 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   27+26+25+24+23+22+21+20   |  | | --- | | 255 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   27+26+25+24+23+22+21+20   |  | | --- | | 255 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   27+26+25+24+23+22+21+20   |  | | --- | | 255 | |

So, if all bits in an octet turned on octet value is 255, if all are turned off octet value is 0.

So, each octet will vary between 0 – 255.

192.168.0.1

Octet-1 Octet-2 Octet-3 Octet-4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |   27+26+25+24+23+22+21+20   |  | | --- | | 192 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |   27+26+25+24+23+22+21+20   |  | | --- | | 168 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   27+26+25+24+23+22+21+20   |  | | --- | | 0 | | Index positions   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   Bits   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |   27+26+25+24+23+22+21+20   |  | | --- | | 1 | |

Every 32-bit Ipv4 address will have network bits and host bits. Let’s look at the below ip address.

192.168.0.1/24

In this ip 24 represents the number of network bits out of 32. So, 32 – 24 = 8 bits represents the host bits.

Formula to calculate number of ip address we can get/CIDR Block range is

2(total bits – network bits) = 2(32 – 24) = 28 = 256 (0 – 255)

So, we can get 256 ip address range/CIDR block range.

Out of 256 ip address first address 0 is used as network id and last address 255 is used as Broadcast id. So final usable ip address are 1 – 254.