Using Subnetting to define and to increase the size of your host (network)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subnet | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 |
| Host | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| Subnet  Mask | /24 | /25 | /26 | /27 | /28 | /29 | /30 | /31 | /32 |

255.255.255.1 /32

The number of Networks are determined by the weight of the least significant bit Total Host = 22 – 2 = 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   1 |

-------------------------------------------------------------------- / 31 -------------------------------------------------------------------------------------------------- | 1 host

255.255.255.2 /31

The number of Networks are determined by the weight of the least significant bit Total Host = 22 – 2 = 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | 0 |   2 |

-------------------------------------------------------------------- / 31 -------------------------------------------------------------------------------------------------- | 2 host

255.255.255.4 /30

The number of Networks are determined by the weight of the least significant bit Total Host = 22 – 2 = 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | 0 | 0 |   4 |

-------------------------------------------------------------------- / 30 -------------------------------------------------------------------------------------------------- | 4 host

255.255.255.8 /29

The number of Networks are determined by the weight of the least significant bit Total Host = 23 – 2 = 6

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | 0 | 0 | 0 |   8 |

-------------------------------------------------------------------- / 29 ---------------------------------------------------------------------------------------------- | -- 8 host ---

255.255.255.16 /28

The number of Networks are determined by the weight of the least significant bit Total Host = 24 – 2 = 14

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | 0 | 0 | 0 | 0 |   16 |

-------------------------------------------------------------------- / 28 ------------------------------------------------------------------------------------------ | --- 16 host ----

255.255.255.32 /27

The number of Networks are determined by the weight of the least significant bit Total Host = 25 – 2 = 30

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | 0 | 0 | 0 | 0 | 0 |   32 |

-------------------------------------------------------------------- / 27 ------------------------------------------------------------------------------------ | ------ 32 host --------

255.255.255.64 /26

The number of Networks are determined by the weight of the least significant bit Total Host = 26 – 2 = 64

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | 0 | 0 | 0 | 0 | 0 | 0 |   64 |

-------------------------------------------------------------------- / 26 ------------------------------------------------------------------------------ | --------- 64 host ---------

255.255.255.128 /25

The number of Networks are determined by the weight of the least significant bit Total Host = 27 – 2 = 126

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   128 |

-------------------------------------------------------------------- / 25 ------------------------------------------------------------------------ | ---------- 128 host --------------

255.255.255.0 /24

The number of Networks are determined by the weight of the least significant bit Total Host = 28 – 2 = 254

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

-------------------------------------------------------------------- / 24 ---------------------------------------------------------------- | -------------- 256 host ------------------

255.255.254.0 /23

Total Host= use 29 - 2 = 510 host (per Network) x 128 networks = 65,280

The number of Networks are determined by the weight of the least significant bit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |   254 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

255.255.252.0 /22

Total Host = use 210 - 2 = 1022 host

The number of Networks are determined by the weight of the least significant bit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | 0 | 0 |   252 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

255.255.248.0 /21

Total Host = use 211 - 2 = 2046 host

The number of Networks are determined by the weight of the least significant bit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | 0 | 0 | 0 |   248 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

Or the number of NETWORKS can be determined from 248-256 = 8 total Networks.

Now, the Networks are arranged in multiples of “8”.

255.255.240.0 /20

Total Host = use 212 - 2 = 4094 host

The number of Networks are determined by the weight of the least significant bit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | 0 | 0 | 0 | 0 |   240 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

255.255.224.0 /19

Total Host 4,094 use 213 - 2 = 8190 host

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |   255 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | *1* | *1* | *1* | 0 | 0 | 0 | 0 | 0 |   224 | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |   0 |

192 .168 .254 .1

11000000.10101000.11111110.00000001

11111111.11111111.11111110.00000000

11000000.10101000.11111110.00000000

192 .168 .254 .0

192.168.254.0 – 192.168.254.255