**EXPLICACIÓN DETALLADA**

Los cálculos se realizan en binario. Por ello lo primero que haremos será convertir la dirección IP y la máscara a binario. La máscara identifica con unos los bits de la dirección IP que corresponden a la red, y con ceros los bits que corresponden al host.   
  
Para mayor claridad marcaremos en rojo los bits de red y en verde los bits de host.

CONVERSIÓN A BINARIO

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.0.0 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 255.255.0.0 | > > | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

La red se obtiene poniendo a cero todos los bits de host. En este caso la red se corresponde con:

RED IP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.0.0/16 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

La dirección broadcast se obtiene poniendo a uno todos los bits de host. En este caso la dirección broadcast se corresponde con:

BROADCAST

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.255.255 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

El rango de hosts son todos los valores que existen entre la red y la dirección broadcast.

RANGO HOSTS

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.0.1 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.255.254 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |

**EXPLICACIÓN CÁLCULO DE SUBRED**

Una subred, es una red contenida en una red superior. Se utiliza, por ejemplo, cuando queremos segmentar una red que ya está en uso. En este caso, son redes contenida en la red 10.77.0.0/16. El número de bits de subred seleccionados, nos indicará el tamaño de la subred. Cuantos más bits elijamos, más subredes obtendremos, pero menos hosts podrán contener, y viceversa.

Para mayor claridad, marcaremos los bits de subred en azul. Así pues la primera subred que obtenemos es la siguiente.

SUBRED

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.0.0/19 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Para calcular todas las subredes resultantes, tan solo tendremos que variar los bits de la subred

RANGO SUBREDES

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.0.0/19 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.32.0/19 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10.77.224.0/19 | > > | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | . | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | . | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Consiguiendo así un total de 8 subredes.