

CNOS (PROJECT) - Amazon Data Center in Iasi

Step I - Analysis of the organization's requirements

- How many physical subnets are needed today?
 - 6 subnets
- How many physical subnets are expected to be needed in the near future?
 - 8 subnets
- How many hosts are present in each subnet at this moment?
 - The total number of employees in the company is 200 who have 5 subnets divided among them with 15 hosts per subnet and 1 extra subnet for wireless devices.
- How many hosts will be there in each subnet in the near future?
 - 25 hosts
- To which class does the IP address belong?
 - Class C

Step II - Partition of bits in the host ID

Class C network: **192 . 168 . 0 . 0**

As we have predicted, 8 subnets with 25 hosts/subnet

Number of subnet bits: $2^S \geq 8 \rightarrow S = 3$ bits

The number of host bits: $2^H - 2 \geq 25 \rightarrow$ Therefore, $H = 5$ ($2^5 - 2 = 30$) which leads to 8 subnets with 30 hosts/subnet.

Step III - Determining the custom subnet mask

Class C network: **192.168.0.0**

3 bits for the subnet ID

Subnet mask (in binary): 11111111 . 11111111 . 11111111 . 11100000

Subnet mask (in decimal): **255 . 255 . 255 . 224**

In CIDR notation: **/27**

Step IV - Determining the subnet identifier and IP address of the subnets

Class C network: **192 . 168 . 0 . 0**

3 bits for the subnet ID

CIDR: **/27**

8 subnets: **#0 - #7**

The IP address (in binary): **11000000 . 10101000 . 00000000 . 00000000**

<i>Subnet</i>	<i>Subnet ID (binary)</i>	<i>IP address of the subnet</i>
#0	000	11000000 . 10101000 . 00000000 . 00000000 192 . 168 . 0 . 0
#1	001	11000000 . 10101000 . 00000000 . 00100000 192 . 168 . 0 . 32
#2	010	11000000 . 10101000 . 00000000 . 01000000 192 . 168 . 0 . 64
#3	011	11000000 . 10101000 . 00000000 . 01100000 192 . 168 . 0 . 96
#4	100	11000000 . 10101000 . 00000000 . 10000000 192 . 168 . 0 . 128
#5	101	11000000 . 10101000 . 00000000 . 10100000 192 . 168 . 0 . 160
#6	110	11000000 . 10101000 . 00000000 . 11000000 192 . 168 . 0 . 192
#7	111	11000000 . 10101000 . 00000000 . 11100000 192 . 168 . 0 . 224

Step V - Allocating the host addresses for each subnet

The IP address: **192.168.0.0 /27**

5 bits for host ID ($32 - 27 = 5$)

$2^5 - 2 = 30$ hosts/subnet

The IP address (in binary): **11000000 . 10101000 . 00000000 . 00000000**

<i>Subnet</i>	<i>Subnet ID (binary)</i>	<i>IP address of the subnet</i>	<i>Subnet Mask</i>	<i>Host Address Range</i>	<i>Broadcast address</i>
#0	000	192 . 168 . 0 . 0	255 . 255 . 255 . 224	192 . 168 . 0 . 1 – 192 . 168 . 0 . 30	192.168.0.31
#1	001	192 . 168 . 0 . 32	255 . 255 . 255 . 224	192 . 168 . 0 . 33 – 192 . 168 . 0 . 62	192.168.0.63
#2	010	192 . 168 . 0 . 64	255 . 255 . 255 . 224	192 . 168 . 0 . 65 – 192 . 168 . 0 . 94	192.168.0.95
#3	011	192 . 168 . 0 . 96	255 . 255 . 255 . 224	192 . 168 . 0 . 97 – 192 . 168 . 0 . 126	192.168.0.127
#4	100	192 . 168 . 0 . 128	255 . 255 . 255 . 224	192.168 . 0 . 129 – 192 . 168 . 0 . 158	192.168.0.159
#5	101	192 . 168 . 0 . 160	255 . 255 . 255 . 224	192.168 . 0 . 161 – 192 . 168 . 0 . 190	192.168.0.191
#6	110	192 . 168 . 0 . 192	255 . 255 . 255 . 224	192.168 . 0 . 193 – 192 . 168 . 0 . 222	192.168.0.223
#7	111	192 . 168 . 0 . 224	255 . 255 . 255 . 224	192.168 . 0 . 225 – 192 . 168 . 0 . 254	192.168.0.255

Step VI - Assigning of host addresses in each subnet – creation structure of the subnet network

Class C network: **192.168.0.0**

3 bits for the subnet ID

CIDR: **/27**

8 subnets: **#0 - #7**

<i>Subnet</i>	<i>Subnet Mask</i>	<i>IP address of the subnet</i>	<i>Host Address Range</i>
#0	255 . 255 . 255 . 224	192 . 168 . 0 . 0	192 . 168 . 0 . 1 – 192 . 168 . 0 . 30
#1	255 . 255 . 255 . 224	192 . 168 . 0 . 32	192 . 168 . 0 . 33 – 192 . 168 . 0 . 62
#2	255 . 255 . 255 . 224	192 . 168 . 0 . 64	192 . 168 . 0 . 65 – 192 . 168 . 0 . 94
#3	255 . 255 . 255 . 224	192 . 168 . 0 . 96	192 . 168 . 0 . 97 – 192 . 168 . 0 . 126
#4	255 . 255 . 255 . 224	192 . 168 . 0 . 128	192 . 168 . 0 . 129 – 192 . 168 . 0 . 158
#5	255 . 255 . 255 . 224	192 . 168 . 0 . 160	192 . 168 . 0 . 161 – 192 . 168 . 0 . 190
#6	255 . 255 . 255 . 224	192 . 168 . 0 . 192	192 . 168 . 0 . 193 – 192 . 168 . 0 . 222
#7	255 . 255 . 255 . 224	192 . 168 . 0 . 224	192 . 168 . 0 . 225 – 192 . 168 . 0 . 254