UNIT 11.COMPUTER NETWORKS

Activities 3. Solutions

Computer Systems
CFGS DAW

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Licencia

Nomenclatura

A lo largo de este tema se utilizarán distintos símbolos para distinguir elementos importantes dentro del contenido. Estos símbolos son:

Actividad opcional. Normalmente hace referencia a un contenido que se ha comentado en la documentación por encima o que no se ha hecho, pero es interesante que le alumno investigue y practique. Son tipos de actividades que no entran para examen

Atención. Hace referencia a un tipo de actividad donde los alumnos suelen cometer equivocaciones.

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1.1 Activity 1

You are connected to a network using the IP 137.189.200.120/19.

Which is your broadcast address?

The IP is a Class B, so that its mask should be /16 (255.255.0.0). Since it's different, you are connected to a subnet.

3 bits have been taken from the host ID, which means that there are 2^3 subnets.

The subnet mast is: 255.255.224.0

Performing the AND operation:

137.189.11101000.01111000

255.255.11100000.00000000

137.189.11100000.00000000 → 137.189.224.0 is the subnet to which is connected.

Changing the bits of the host id to 1 we get the broadcast IP:

137.189.111**11111.11111111 → 137.189.255.255**

1.2 Activity 2

Our network address is 80.0.0.0/8.

We need to divide the network into the necessary subnets so that there will be at least 1500 hosts in each subnet.

1500 hosts→ 2^{11} = 2048, so that the host ID must have 11 bits. The network ID will take 13 bits from the host ID.

255.**11111111.11111**000.0000000 → **255.255.248.0**

There will be 2^{13} subnets → 8192

1.3 Activity 3

Our computer has the IP 201.10.100.10. Indicate:

a) IP class and default mask.

Class C.

Default mask: 255.255.255.0 or /24 in CIDR notation.

b) Mask when net is divided in 3 subnets.

3 subnets will need two bits from host id.

255.255.192.0

c) Network ID and broadcast IP of each subnet.

IP	Subnet	Broadcast
201.10.100.**00**000000	→ 201.10.100.0	→ 201.10.100.63
201.10.100.**01**000000	→ 201.10.100.64	→ 201.10.100.127
201.10.100.**10**000000	→ 201.10.100.128	→ 201.10.100.191
201.10.100.**11**000000	→ 201.10.100.192	→ 201.10.100.255

d) Subnet that our IP belongs to.

Performing the AND operation:

201.10.100.10

255.255.192.0

201.10.64.0 → second subnet

e) Number of host available to each subnet.

5 bits left for the host id → 2^5 = 32 hosts – 2 (subnet and broadcast) = **30**

1.4 Activity 4

In your company there are:

- 4 servers.
- 5 departments.
- between 100 and 200 computers in each department.

You must create one subnet for each department and one for the servers. How would you divide your net? You must choose the IP, subnet mask, and so on.

We need at least 5 subnets: 4 departments + 1 for the servers. Therefore, 3 bits are needed to take from the host ID. ($2^3 = 8$

The number of hosts cannot be variable, so that we must have enough bits for the host ID to distinguish at least 200 computers. Therefore, 8 bits. ($2^8 = 256$)

We cannot use a class C IP, since the maximum number of hosts is 256.

A class A IP will leave lots of not usable IP and it would make it very difficult to configure the network.

A class B IP is the best option, such as: 150.1.0.0

The mask will be: 255.255.224.0 (/19)

1.5 Activity 5

Based on your results of activity 4, draw a diagram similar to this one, indicating the network hardware necessary to connect all the computers.

You don't have to draw every computer, but at least a couple for each subnet, representing first *usable* IP and last *usable* IP.