SANCHEZ Pablo

Networks and Protocols Project: ABC Distributions

Stage 2: design and implementation of efficient addressing scheme to support staff effectively

We now have implemented the network topology. We must design the IP addressing scheme to have a properly working network. We have a given private address range that is 192.168.2.0/24. The first step is to compute the number of hosts per department we have. To do so, we take the number of PCs+1. Hence, we have 1+1=2 hosts for the management, 11+1=12 hosts for the sales and 5+1=6 hosts for finance. We have the hosts per departments, using them, we can calculate the number of bits to borrow to support the number of subnets in the topology table, and get how many subnets we can end up having. Using the formula 2^n - 2 we gent the following number of hosts in our topology:

Sales: 2^4 – 2 = 14 is the closest value above 12

Finance: 2^3 – 2 = 6 is the closest value above 6

Management: 2^2 – 2 = 2 is the closest value above 2

But considering we want the company to expand, we’ll use an extra bit, which means we don’t use n but n+1:

Sales: 2^5 – 2 = 30 hence we consider 30 hosts

Finance: 2^4 – 2 = 14 hence we consider 14 hosts

Management: 2^3 – 2 = 6 hence we consider 6 hosts

Now that we know how many hosts we’ll have to deal with, we can compute the slash of the subnet mask:

Sales: /27 because 30 is written on 5 bits and 32 - 5 = 27

Finance: /28 because 14 is written on 4 bits and 32 – 4 = 28

Management: /29 because 6 is written on 3 bits and 32 – 3 = 29

Our private address range starts with 192 so we have a class C with a subnet mask beginning by 255.255.255.0. Each department has a different subnet mask.

First the subnet masks of each department are the following ones:

Sales: 128+64+32 = 224, hence the subnet mask is 255.255.255.224

Finance: 128+64+32+16 = 240, hence the subnet mask is 255.255.255.240

Management: 128+64+32+16+8 = 248, hence the subnet mask is 255.255.255.248

We obtain the following topology table:

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

We don’t consider the 000 because it can’t be used as a subnet.

Reading this table, we can give the following table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Management** | **Finance** | **Sales** |
| **Subnet network address** | 192.168.2.80 | 192.168.2.64 | 192.168.2.32 |
| **Subnet mask (slash notation)** | /29 | /28 | /27 |
| **Subnet address range** | 6 hosts | 14 hosts | 30 hosts |
| **First usable address** | 192.168.2.81 | 192.168.2.65 | 192.168.2.33 |
| **Last usable address** | 192.168.2.86 | 192.168.2.78 | 192.168.2.62 |
| **Broadcast address** | 192.168.2.87 | 192.168.2.79 | 192.168.2.63 |