**LAB 14**

**IPv4 subnetting**

1. Split the network with IP address 100.90.0.0/16 into a number of subnets so that each subnet can contain at least 500 hosts. Waste as few IP addresses as possible.
2. How many bits do you need to provide for the host ID? Explain!

Number of hosts is equal to 2number\_of\_hosts-2

Number of hosts must be 9 🡪 29-2=510

1. How many bits do you have to provide for the subnet ID? Explain!

32 – (16-9) = 7

1. How many subnets can you then create if you split the network that way?

27 = 128

1. Enter the network addresses of the first 3 and the last 2 subnets in prefix notation.

* Subnet 0: 100.90.0.0/23
* Subnet 1: 100.90.2.0/23
* Subnet 2: 100.90.4.0/23
* Subnet 126: 100.90.252.0/23
* Subnet 127:100.90.254.0/23

1. So what is the last host address in the 3rd subnet?

100.90.5.254/23

1. Further split the third subnet of the subnetted network from the previous question into a number of subnets (VLSM) so that each subnet can contain at least 50 hosts. Waste as few IP addresses as possible.
2. How many bits do you need to provide for the host ID? Explain!

Number of hosts is equal to 2number\_of\_hosts-2

Number of hosts must be 6 🡪 26-2=62

1. How many extra bits do you then have to provide for the subnet ID within the third subnet? Explain!

32 - (16+7+6) = 3

1. How many VLSM subnets can you then create within third original subnet?

23 = 8

1. Enter the network addresses of the first 3 and the last 2 VLSM subnets in prefix notation.

* Subnet 0: 100.90.4.0 /26
* Subnet 1: 100.90.4.64 /26
* Subnet 2: 100.90.4.128 /26
* Subnet 6: 100.90.5.128 /26
* Subnet 7: 100.90.5.192 /26

1. So what is the last host address in the 3rd subnet?

100.90.4.190/26

1. Most of the answers to the previous questions can be verified by using an (offline or online) **ip calculator**.

In linux, programs are offered via so-called **packages**. To install a program that is not in Debian, you need to download and install the package in which this program is located with a so-called **package manager**. In Debian you can use the command line tool called ***apt*** (Advanced Package Tool).

First of all, you need to update the package database with the following command:

***sudo apt update***

You can then install a new package using the following command:

***sudo apt install <package name>***

Download and install the package called ***ipcalc*** on your Linux-VM now using this tool.

Then just enter the name of the program (ipcalc) to see how you can use this offline ip calculator to check for yourself the solutions of the previous exercises. Use ***man ipcalc*** for more information about the program and try ipcalc to verify your answers!