



DT153G Network Technology A

# Laboratory Assignment 1\*

Lennart Franked<sup>†</sup>

October 14, 2020

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**Aids** Course literature, dictionary and lecture materials.

**Maximum points** 27

**Questions** 7

## 1 Introduction

This laboratory assignment is part of the first half of the course Network Technology A.

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\*Some questions in this laboratory assignment has been written with inspiration of questions written by Magnus Eriksson at Mid Sweden University.

<sup>†</sup>E-post: [lennart.franked@miun.se](mailto:lennart.franked@miun.se).

## 2 Examination

Always motivate your answers, show all your calculations and give proper references on all your answers. Failure to do this will result in an F on the assignment even though your answers may be correct. This assignment is to be performed individually and all the answers must be written in your own words such that you show that you have understood both the question and your answer. This assignment will be checked against Urkund, which is an anti-plagiarism tool. The grade on this assignment will be pass (P) or fail (F). Consult the course study guide about what happens if you get an F or Fx.

### 2.1 Preliminary grade

The following grading criteria applies:  $F < 50\% \leq Fx < 60\% \leq P$ , with no question awarded zero points.

## 3 Aim

After completion of Laboratory Assignment 1 you will have shown that you

- have knowledge about the basic tools used for network troubleshooting.
- know how different configurations affect the network.
- have knowledge about what each layer do during a network establishment.
- have the knowledge about the different bandwidth measurements.

## 4 Reading instructions

Before starting laboratory assignment 1, you should have read the corresponding chapters in the course literature.

## 5 Tasks

Perform the following tasks, either at home or in the network lab at University.

You can learn alot about a network with the help of simple tools that are available on any computer today. *You are not allowed to install any new software to solve this laboratory assignment, unless it is explicitly specified in the question.*

1. Start by check the basic network configurations.
  - (1p) (a) What is the computer's MAC address?
  - (1p) (b) What is the computer's IP address?

- (1p) (c) What is the computer's subnet mask?
  - (1p) (d) What is the network ID of your subnet?
  - (1p) (e) What is the broadcast address of your subnet?
  - (1p) (f) Based on the MAC-address, who is the organisation behind your network interface controller? (You can use external tools to help with this, for example tshark/wireshark, or a OUI-lookup on the web)
  - (2p) (g) Is the IP address dynamically or manually set? Name one advantage and one disadvantage for each address allocation method.
  - (1p) (h) What is the DNS server set to?
  - (1p) (i) What is the purpose of the DNS server?
2. Next point of business is to make sure that the gateway to the outside network is correctly applied. Use 'netstat' to confirm this. Refer to netstat's documentation for information on how to retrieve this information. *Do NOT search for the answer on the internet, the entire point of this assignment is for you to learn and get comfortable with program documentation and not having to browse the internet and rely on questionable blogs all the time.*
- (1p) (a) What is your default gateway, show how you reached to this conclusion with the help of netstat.
  - (1p) (b) What flags did you use on netstat to achieve this?
  - (1p) (c) Explain the meaning of every *column*.
3. What other computers can you find in your broadcast domain? However before doing this, you need to flush all previously stored network data your computer might have stored about other computers in the network on the computer, since that information might be outdated by now.
- (1p) (a) How do you flush the previously stored information about available computers on your broadcast domain?
  - (1p) (b) What is the process to obtain information about available computers on your broadcast domain?
  - (1p) (c) Sadly you are not able to see all the computers on the broadcast domain from your computer, even though they are connected and working, give one theory why this is so.
4. You are feeling rather confident that the default gateway on this computer is not the only gateway your packages must traverse before actually reaching your ISP and beyond.
- (2p) (a) What program can you use to confirm or refute this 'hunch' of yours, and how does this utility work?
5. Next on the agenda is to check what bandwidth you have, however you will not use available online tools such as bredbandskollen. Go to ftp.sunet.se and locate a reasonable sized Linux image file to download. Time the download in seconds and calculate how long it took to download.
- (1p) (a) What is your goodput in B/s, kB/s and kiB/s?

- (1p) (b) What is your goodput in bit/s, kb/s and kib/s?
- (2p) 6. The restlessness is hitting you hard. . . You decide to take a short break and look at an old short movie. The movie you want to watch is available at:  
<http://www.bigbuckbunny.org>  
Based on your result from question 5 on the previous page. If you were to stream this movie, what is the highest quality you can choose without having to rely on heavy buffering for watching?
7. It is time to be a bit more intrusive, install Wireshark, which is a packet sniffing software, consult the documentation on their website for details of how to operate this software.  
Once installed, clear all the locally cached addresses and DNS information (if possible) before you proceed with the next step.  
Using Wireshark, start a new capture and then visit a web page that you haven't visited before. Once established, stop the capture in Wireshark.
- (4p) (a) Study your capture-file and present all the protocols involved in the process of retrieving a website. Include the relevant data along with an explanation from your capture file to clearly present your findings.
- (1p) (b) Since a packet capture will capture all the activity on the network card, it is important to filter out the unwanted data. Explain the difference between 'capture filters' and 'display filters', together along with advantages and disadvantages of them.

## 6 Submissions

Before submitting, make sure that your solutions follow the criteria given in section 2. Your solutions to all the numbered questions must be submitted in *PDF-format*.