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Fundamental Network Topics

You can do most of the exercises in this document by yourself, but they are meant as exercises with a supplementary discussion in the class, so you will gain a lot more from participating in the class.

Understanding Basic Network Terms like IP, TCP/IP, DNS, DHCP and more.

Most of these exercises are meant to be answered with text, so write down your reply so you will remember.

- **What is your public IP address right now, and how did you find it?**
  - 82.211.194.119 (at home)
  - https://www.whatismyip.com/

- **What is your private IP address right now and who/what gave you that address?**
  - **At home:** 192.168.0.103
  - **At school:** 10.50.138.188
  - Open Command Prompt, type in ipconfig, find IPv4 Address.

- **What's special about these address ranges?**
  - The mentioned ranges are all private IP addresses.
  - **10.0.0.0 – 10.255.255.255** is the range of Class A IP addresses. These are used for very large networks.
  - **172.16.0.0 – 172.31.255.255** is the range of Class B IP addresses. These are used for medium networks e.g. within enterprises and organizations.
  - **192.168.0.0 – 192.168.255.255** is the range of Class C IP addresses. These are used for small networks e.g. in small business and home networks.

- **What's special about this ip-address: 127.0.0.1?**
  - The IP address is referring to the local computer you are sitting in front of right now.

- **What kind of service would you expect to find on a server using these ports: 22, 23, 25, 53, 80, 443?**
  - **Port 22: SSH** Remote Login Protocol logs into another computer over network.
  - **Port 23: Telnet** enters commands through a terminal emulation program.
  - **Port 25: SMTP** Simple Mail Transfer Protocol sends emails between servers.
  - **Port 53: DNS** Domain Name System translates domain names into IP addresses.
  - **Port 80: HTTP** defines how messages are formatted and transmitted over web.
  - **Port 443: HTTPS** transmits individual messages securely.

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- **What is the IP address of studypoints.dk and how did you find it?**
  - 165.227.137.75
  - Open Command Prompt, type in tracert studypoints.dk

- **If you write https://studypoints.dk in your browser, how did "it" figure out that it should go to the IP address you discovered above?**
  - The DNS (Domain Name System) translates the domain name studypoints.dk into the IP address 165.227.137.75.

- **Explain the purpose of an ip-address and a port-number and why we need both**
  - **IP address** identifies the destination computer.
  - **Port number** identifies the specific destination application.
  - We need both IP address and port number because we need to know which computer to communicate with and which program on this computer.

- **What is your (nearest) DNS server?**
  - 10.3.1.1
  - Open Command Prompt, type in ipconfig/all, find DNS Servers

- **What is (conceptually) the DNS system and the purpose with a DNS Server?**
  - The purpose of the DNS server is to translate domain names into IP addresses in order to open internet addresses for us.

- **What is your current Gateway, and how did you find it?**
  - 192.168.0.1
  - Open Command Prompt, type in ipconfig, find Default Gateway

- **What is the address of your current DHCP-Server, and how did you find it?**
  - 192.168.0.1
  - Open Command Prompt, type in ipconfig/all, find DHCP Server

- **Explain (conceptually) about the TCP/IP-Protocol stack**
  - The Transmission Control Protocol (TCP) and the Internet Protocol (IP) are working together in order to allow one computer to talk to another. The communication happens through compiling packets of data and sending them to the right location.
  - It is a 5-layer model. The 5 layers are: Application, Transport, Network, Data Link and Physical.

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- **Explain about the HTTP Protocol**
  - The HTTP Protocol is a protocol for request and response functions in a client-server computing model. A client submits an HTTP request message to the server and the server, which provides resources, returns a response message to the client.

- **Explain (conceptually) how HTTP and TCP/IP are connected (what can HTTP do, and where does it fit into TCP/IP)**
  - HTTP request/response must establish a TCP connection before the client and server can exchange messages. The TCP connection is used to send a request and receive an answer. HTTP is on top, at the application layer of the TCP/IP protocol stack.