

Fundamental Network Topics

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

These exercises are meant to be answered with text, based on internet searches so write down your reply so you will remember for later.

- What is your public IP address right now, and how did you find it?
My public IP address is 5.179.80.205 and I found it by going to the page <https://ifconfig.me/>.
- What is your private IP address right now (do this both at home and in school), and who/what gave you that address?
My private IP address is 192.168.56.1 and I found it by using the command `ipconfig`.
- What's special about these address ranges?
 - 10.0.0.0 – 10.255.255.255
 - 172.16.0.0 – 172.31.255.255
 - 192.168.0.0 – 192.168.255.255They are reserved IPv4 addresses for private networks.
- What's special about this ip-address: 127.0.0.1?
The IP address 127.0.0.1 is referred to as *localhost* and it is most commonly known for testing purposes, since it is the loopback IP address.
- What kind of service would you expect to find on a server using these ports: 22, 23, 25, 53, 80, 443?
 - Port 22: Remote login protocol secure shell (SSH)
 - Port 23: Telnet, used for accessing system remotely but is not very secure
 - Port 25: Simple Mail Transfer Protocol (SMTP) used by e-mail servers
 - Port 53: DNS protocol
 - Port 80: Used for accessing Web servers
 - Port 443: This is the Hypertext Transfer Protocol Secure (HTTPS) that combines the HTTP with a cryptographic protocol, which can be used for secure transmission of data from Web pages.
- What is the IP address of studypoints.info and how did you find it?
The IP address of studypoints.info is 157.230.21.145, which I found out by using the command `nslookup`, which finds the specified DNS server and maps a domain name to an IP address.
- If you write <https://studypoints.info> in your browser, how did “it” figure out that it should go to the IP address you discovered above?
DNS name resolution is the name of the process of a DNS server resolving a domain name into an IP address, which is what happens when we write the domain name “studypoints.info” in the browser.
- Explain shortly the purpose of an ip-address and a port-number and why we need both
An IP address provides a specific location with an identifiable address to a networked device, such as my local computer, on the internet. If there are more than one device with the same IP address, only one device would be able to connect, if there were no ports. The port numbers work as extensions, which can handle multiple in- and outgoing connections.

- What is your (nearest) DNS server?
My closest DNS server 10.3.1.2 and I found it by using the command `ipconfig /all`.
- What is (conceptually) the DNS system and the purpose with a DNS Server?
The Domain Name System, DNS, is a protocol and it converts domain names into IP addresses. You connect through a DNS Server, since it uses the database with domain names mapped to IP addresses.
- What is your current Gateway, and how did you find it?
My current Gateway is 10.50.128.1 and I found it by using the command `ipconfig /all`.
- What is the address of your current DHCP-Server, and how did you find it?
The address of my current DHCP-Server is 10.255.1.9 and I found it by using the command `ipconfig /all`.
- Explain (conceptually) about the TCP/IP-protocol stack
The TCP/IP-protocol stack is modelled with 4 layers stacked on top of each other. The layers are from lowest to highest; the *link* layer, the *internet* layer, the *transport* layer, and the *application* layer.
 - The link layer contains communication technologies for a local network and can be implemented on top of virtually any low-level network technology.
 - The internet layer establishes internetworking, and it provides logical addressing and packet routing, which ensures data are delivered to the right destination. The most important protocol in this layer is IP.
 - The transport layer handles host-to-host communication. The most important protocols in this layer are TCP and UDP.
 - The application layer contains all protocols for specific data communications services on a process-to-process level.
- Explain about the HTTP Protocol (the following exercises will go much deeper into this protocol)
The HyperText Transfer Protocol, HTTP, is a Client-Server protocol, which means requests are initiated by the recipient, which usually is the web browser. HTTP defines how messages are formatted and transmitted, and what actions the web servers and browsers should take in response to various commands.
- Explain (conceptually) how HTTP and TCP/IP are connected (what can HTTP do, and where does it fit into TCP/IP)
HTTP operates at the *application* layer of the TCP/IP model. HTTP messages are delivered through TCP/IP connections.