Fundamental Network Topics (Excercise 27-08)

27. august 2019 14:50

- What is your public IP address right now, and how did you find it?

```
C:\Users\Emil PC>nslookup myip.opendns.com. resolver1.opendns.com
Server:  resolver1.opendns.com
Address:  208.67.222.222

Non-authoritative answer:
Name:    myip.opendns.com
Address:  5.179.80.204
```

- What is your private IP address right now (do this both at home and in school), and who/what gave you that address?

```
C:\Users\Emil PC>ipconfig

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : efif.dk
   Link-local IPv6 Address . . . . . : fe80::2434:dc1b:feee:ac73%9
   IPv4 Address. . . . . . . . . . . : 10.50.138.230
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 10.50.128.1
```

Det har så været efif.dk der har givet mig denne private IP adresse.

- 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 – 192.168.255.255

Disse IP adresse længder er blevet reserveret til brug som private IP adresse.

- What's special about this ip-address: 127.0.0.1?

Denne IP adresse er en "Special-purpose" IPv4 adresse, kaldet localhost. Alle computere bruger denne adresse som deres egen, men den lader dem ikke kommunikere med andre maskiner ligesom en rigtig IP adresse gør. Denne adresse bliver kun brug af computeren selv, og kun for specielle formål, modsat en normal IP adresse der bliver brugt til forsendelse af filer til og fra andre maskiner på nætværket.

- What kind of service would you expect to find on a server using these ports: 22, 23, 25, 53, 80, 443?

Port 22 lytter til udp protocol, secure shell

Secure Shell (SSH) is a protocol for secure remote login and other secure network services over an insecure network. It consists of three major components:

o The Transport Layer Protocol [SSH-TRANS] provides server authentication, confidentiality, and integrity. It may optionally also provide compression. The transport layer will typically be run over a TCP/IP connection, but might also be used on top of any other reliable data stream.

o The User Authentication Protocol [SSH-USERAUTH] authenticates the client-side user to the server. It runs over the transport layer protocol.

o The Connection Protocol [SSH-CONNECT] multiplexes the encrypted tunnel into several logical channels. It runs over the user authentication protocol.

The client sends a service request once a secure transport layer connection has been established. A second service request is sent after user authentication is complete. This allows new protocols to be defined and coexist with the protocols listed above.

The connection protocol provides channels that can be used for a wide range of purposes. Standard methods are provided for setting up secure interactive shell sessions and for forwarding ("tunneling") arbitrary TCP/IP ports and X11 connections.

Port 23 lytter til TELNET protocolen

The purpose of the TELNET Protocol is to provide a fairly general, bi-directional, eight-bit byte oriented communications facility. Its primary goal is to allow a standard method of interfacing terminal devices and terminal-oriented processes to each other. It is envisioned that the protocol may also be used for terminal-terminal communication ("linking") and process-process communication (distributed computation).

Port 25 lytter til SMTP (Simple Mail Transfer Protocol)
Port 53 lytter til DNS for domæne navne resolution.
Port 80 lytter til HTTP Protocolen
Port 443 lytter til HTTPS / SSL Protocolen
Disse protocoler er alle sammen dele af en en større opdeling af data kommunikation på World Wide Web.

- What is the IP address of studypoints.dk and how did you find it?

Når man undersøger elemtet og sender en request til hjemmeside, kan man se inde i headers informationer fra serveren, f.eks. serverens IP adresse.

▼ General

Request URL: https://studypoints.info/app/viewPublic/viewPublic.html
Request Method: GET
Status Code: 200
Remote Address: 157.230.21.145:443
Referrer Policy: no-referrer-when-downgrade

Hvis man tjekker lokationen på denne IP adresse, kan man se at webapplikation bliver hostet på en server i Tyskland af DigitalOcean.

- 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?

(Går ud fra det er et spørgsmål angående hvordan en server kan lytte til specifikke domæne navne)
Serveren lytter til domæne navnet studypoints.info og ved derfor at det skal gå til den til dedikerede server IP adresse.

- Explain shortly the purpose of an ip-address and a port-number and why we need both

  Ip-adresser er unikke adresser og hvor porte er bestemte indgange der har forskellige responser i form af services som sin server er lavet til at have.

- What is your (nearest) DNS server,?

  Hvis man skriver **ipconfig /all** i kommando prompten kan man se i bunden hvilke dns servere man bruger, jeg bruger cloudflare dns servere:

```
DNS Servers . . . . . . . . . . . : 1.1.1.1
                                    1.0.0.1
```

  Hvis man går ind og sletter dem, vil den brugte dns server være den nærmeste.

- What is (conceptually) the DNS system and the purpose with a DNS Server?

  Kommunikationen over et IP-baseret datanet kan kun foregår ved hjælp af disse IP-adresser. En DNS-Server sammenkobler så andre adresser med disse IP-adresser. Målet med det var at i stedet for at skrive en masse tal, altså baseret på et IP-baseret datanet, så kunne man nu også have andre adresser. Man kan sammenligne det med en telefonbog.

- What is your current Gateway, and how did you find it?

  Igen kan man skrive **ipconfig** og finde informationerne.

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : efif.dk
   Link-local IPv6 Address . . . . . : fe80::a434:dc1b:feee:ac73%9
   IPv4 Address. . . . . . . . . . . : 10.50.138.230
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 10.50.128.1
```

  Det vil sige at i mit tilfælde er min Gateway 10.50.128.1

- What is the address of your current DHCP-Server, and how did you find it?

  Man kan igen skrive **ipconfig /all** og finde informationen

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : efif.dk
   Description . . . . . . . . . . . : Intel(R) Dual Band Wireless-N 7260
   Physical Address. . . . . . . . . : AC-7B-A1-B4-DE-8A
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::a434:dc1b:feee:ac73%9(Preferred)
   IPv4 Address. . . . . . . . . . . : 10.50.138.230(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Lease Obtained. . . . . . . . . . : 27. august 2019 12:34:26
   Lease Expires . . . . . . . . . . : 27. august 2019 21:01:24
   Default Gateway . . . . . . . . . : 10.50.128.1
   DHCP Server . . . . . . . . . . . : 10.255.1.9
   DHCPv6 IAID . . . . . . . . . . . : 145521569
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-23-0C-E7-1B-10-C3-7B-67-CA-DB
   DNS Servers . . . . . . . . . . . : 1.1.1.1
                                       1.0.0.1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

- Explain (conceptually) about the TCP/IP-protocol stack

  TCP Er en protokol der taler med samme lag på en anden maskine. HTTP(s) snakker med applikationsniveauet, hvor TCP snakker med data. IP er en protokol der der snakker med DATA+HEAD, og TCP/IP er en model der deler kommunikationen mellem to maskiner op i mindre og simplere dele. Det står for Transmission Control Protocol / Internet Protocol.

- Explain about the HTTP Protocol (the following exercises will go much deeper into this protocol)

  HTTP (HyperText Transfer Protocl) er en protocol som primært bruges til kommunikation på World Wide Web. Brugt af alle WWW services.

- Explain (conceptually) how HTTP and TCP/IP are connected (what can HTTP do, and where does it fit into TCP/IP)

  Som beskrivet i den tidligere opgave, så er HTTP(S) en del af applikationsniveauet i TCP/IP-protocol opdelingen. Det bruges til kommunikation af hypertext, f.eks. HTML som kan vises som hjemmesider.