ERHVERVSAKADEMI
AARHUS

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NETVÆRKS-ARKITEKTUR

PBA I CYBERSIKKERHED

APPLIKATION

PRÆSENTATION

SESSION

TRANSPORT

NETVÆRK

DATALINK

FYSISK

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Opsamling og refleksion (10-15 min)

Vi starter dagen med opsamling fra sidste gang samt gennemgang af øvelsen "02_Netværksdetektiv".
Vi diskuterer:

Hvilke data har I indsamlet?

Er der observationer der undrer jer eller som I finder særligt interessante?

02_Netværksdetektiv

Øvelse "Netværksdetektiv - Find ud af dit netværk"

Arbejd individuelt eller i par (max 2 personer)

Formål: Udforsk basale netværkskommandoer.

Brug Windows Command Prompt (cmd) eller Win Terminal til følgende:

Del 1: Din computer på netværket

1. **Kør** `ipconfig` - Hvad ser I? Skriv ned hvad I tror de forskellige tal betyder
2. **Kør** `ipconfig /all` - Hvad er forskellen? Hvad er alle de nye informationer?
3. **Diskuter**: Hvilke tal tror I identificerer jeres computer unikt?

Del 2: Test forbindelser

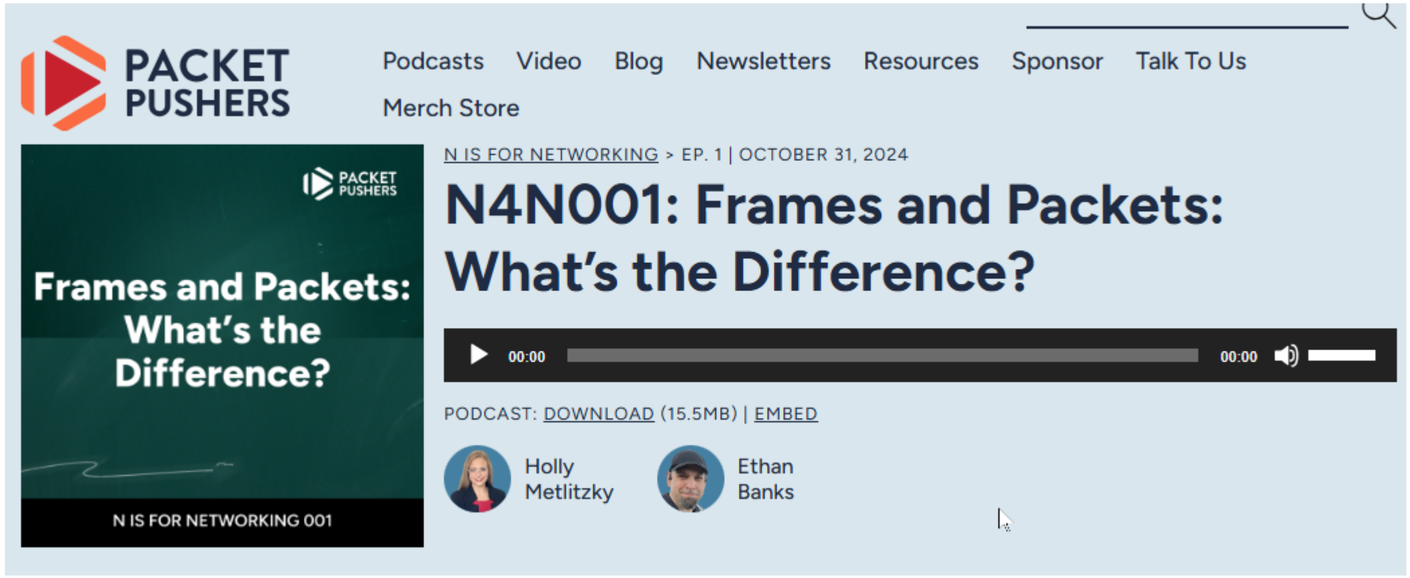
4. **Kør** `ping google.com` - Hvad sker der? Hvad betyder tallene?
5. **Kør** `ping 8.8.8.8` - Sammenlign med forrige resultat
6. **Prøv** `ping facebook.com` - Er der forskel på svarene?

Del 3: Navneopslag

7. **Kør** `nslookup google.com` - Hvad viser dette?
8. **Prøv** `nslookup 8.8.8.8` - Hvad får I tilbage?

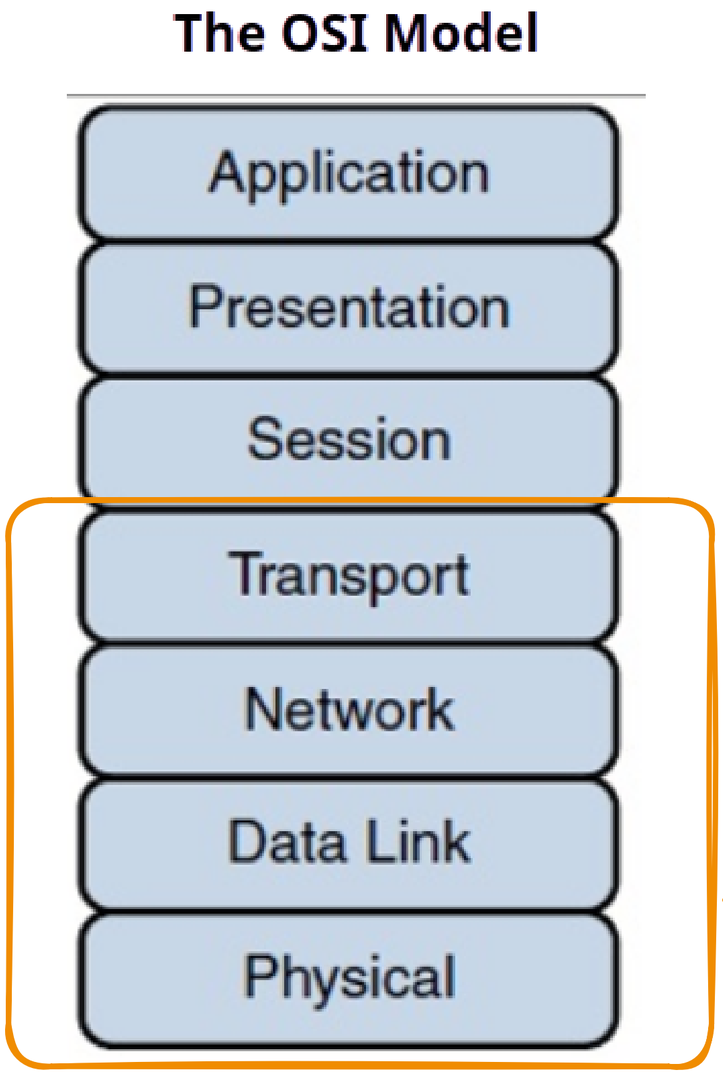
Del 4: Aktive forbindelser

9. **Kør** `netstat` - Hvad viser listen?
10. **Åbn en browser, gå til en hjemmeside, kør** `netstat` **igen** - Hvad ændrede sig?



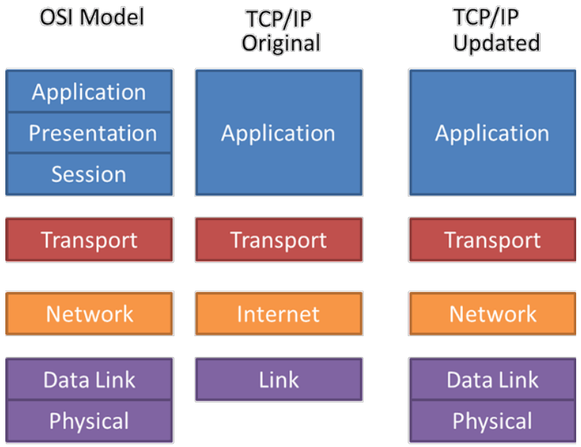
"And just remember that networking isn't hard. Other people figured it out, so you can too."

The OSI Model—A Network Framework



The **Open Systems Interconnection (OSI) model** is a framework that standardizes network communication. It breaks down network tasks into manageable layers, making it an essential tool for networking professionals to understand, design, and troubleshoot networks.

TCP / IP



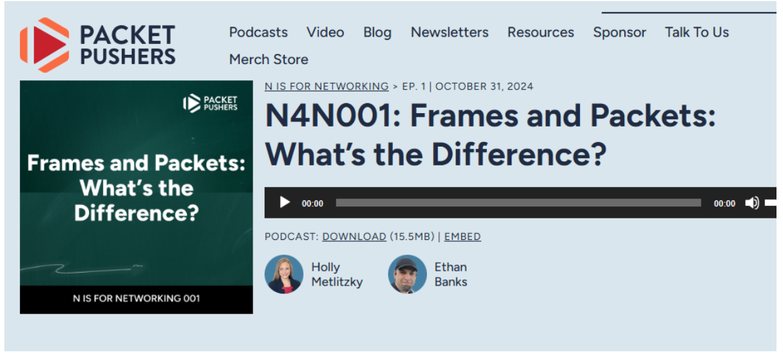
Why Use Network Models?

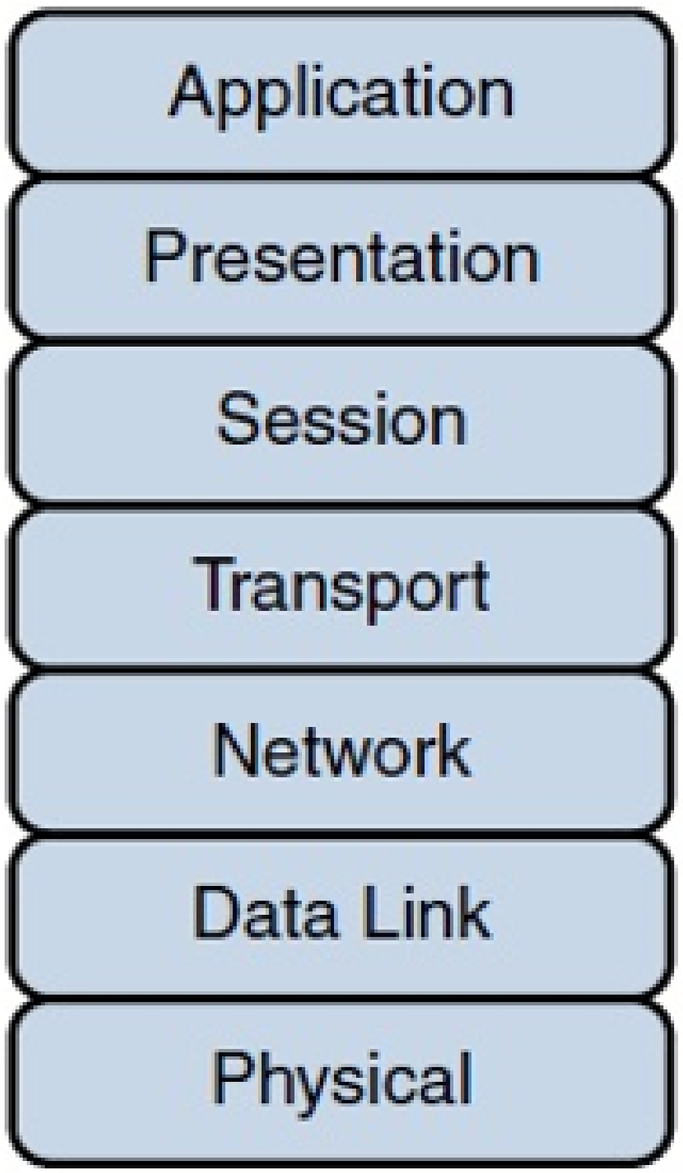
Seven Layers

Network models like the OSI model simplify complex communication processes. By standardizing these functions, they allow interoperability across devices and help maintain device compatibility in diverse networks.

PDU Types

Lower layers assign unique metadata to each Protocol Data Unit (PDU), managed by the NIC driver.





User Services

Data Formatting & Encryption

Session Management

Data Transfer & Control

IP Addressing & Routing

Framing & MAC Addressing

Signals & Media

Del 4: Aktive forbindelser

9. **Kør** `netstat` - Hvad viser listen?
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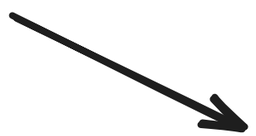

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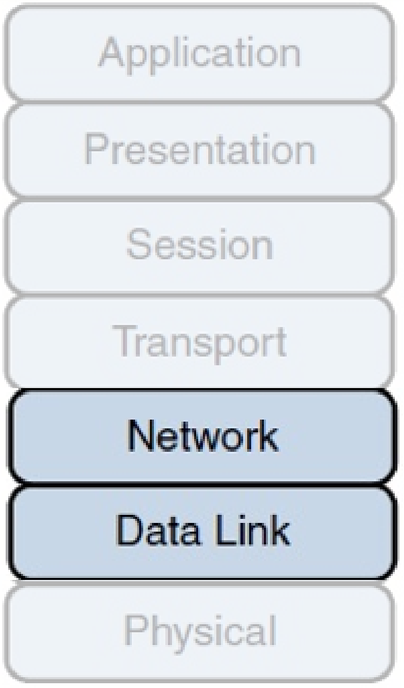
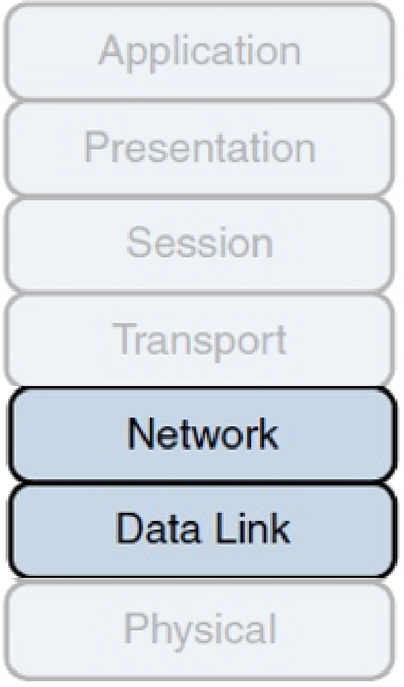



```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : localdomain
   Description . . . . . . . . . . . : Intel(R) Wireless-AC 9560 160MHz
   Physical Address. . . . . . . . . : 0C-7A-15-B6-7D-D5
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   IPv6 Address. . . . . . . . . . . : fd14:822e:662c:51b5:e85a:b965:22f2:a61a(Preferred)
   Temporary IPv6 Address. . . . . . : fd14:822e:662c:51b5:522:60a0:9208:15e1(Preferred)
   Link-local IPv6 Address . . . . . : fe80::f8c3:a5fc:26ef:6c73%21(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.105(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : 08 September 2025 16:18:55
   Lease Expires . . . . . . . . . . : 09 September 2025 23:09:32
   Default Gateway . . . . . . . . . : 192.168.1.1
   DHCP Server . . . . . . . . . . . : 192.168.1.1
   DHCPv6 IAID . . . . . . . . . . . : 118258197
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2E-F1-CA-18-0C-7A-15-B6-7D-D5
   DNS Servers . . . . . . . . . . . : 1.1.1.1
                                       8.8.8.8
                                       1.1.1.1
                                       8.8.8.8
   NetBIOS over Tcpip. . . . . . . . : Enabled
```




```
wlp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.165  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::20f:b818:f07:f407  prefixlen 64  scopeid 0x20<link>
        inet6 fd14:822e:662c:51b5:7d23:d951:fcb9:b025  prefixlen 64  scopeid 0x0<global>
        inet6 fd14:822e:662c:51b5:b32b:abb8:20b7:4433  prefixlen 64  scopeid 0x0<global>
        ether c8:94:02:6d:cf:1d  txqueuelen 1000  (Ethernet)
        RX packets 268311  bytes 379724780 (379.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 112275  bytes 16249131 (16.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
hans@hans-ThinkPad-T14-Gen-1:~$ ip -c addr show dev wlp3s0
6: wlp3s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether c8:94:02:6d:cf:1d brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.165/24 brd 192.168.1.255 scope global dynamic noprefixroute wlp3s0
       valid_lft 84338sec preferred_lft 84338sec
    inet6 fd14:822e:662c:51b5:b32b:abb8:20b7:4433/64 scope global temporary dynamic
       valid_lft 1742sec preferred_lft 1742sec
    inet6 fd14:822e:662c:51b5:7d23:d951:fcb9:b025/64 scope global dynamic mngtmpaddr noprefixroute
       valid_lft 1742sec preferred_lft 1742sec
    inet6 fe80::20f:b818:f07:f407/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

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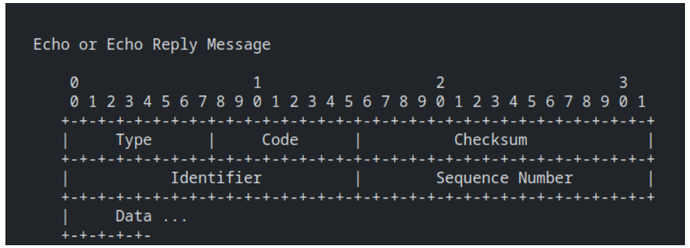
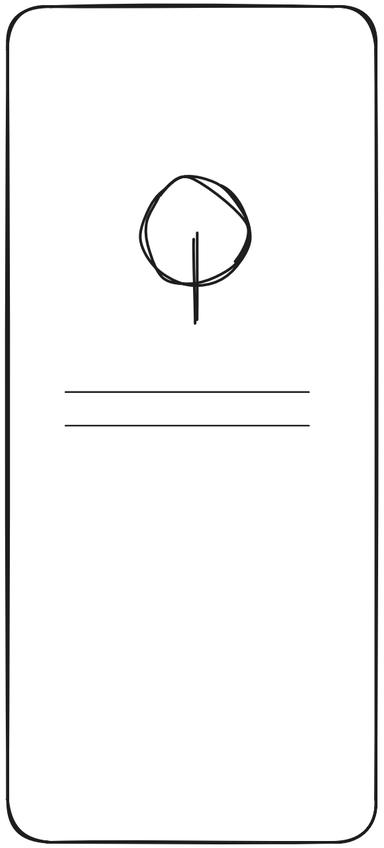
RFC 792

Summary of Message Types

0	Echo Reply
3	Destination Unreachable
4	Source Quench
5	Redirect
8	Echo
11	Time Exceeded
12	Parameter Problem
13	Timestamp
14	Timestamp Reply
15	Information Request
16	Information Reply

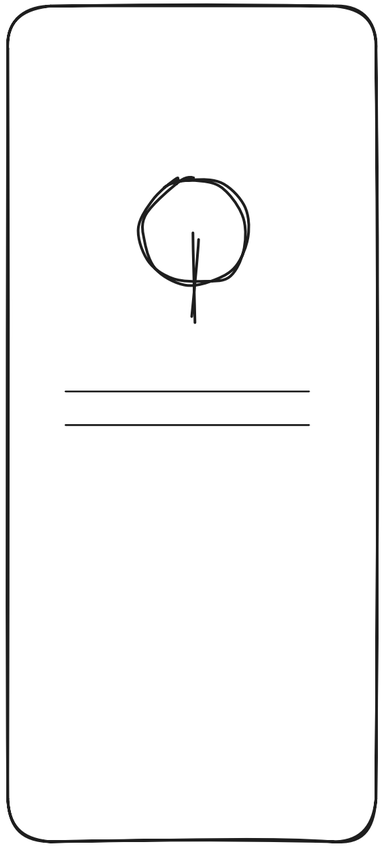
Echo or Echo Reply Message





icmp echo (8)

icmp echo reply (0)



Server 1

Server 2

Via EDU netværk ping min IP

Live - demo - win11 cloud