

# Internet

## Technology and Applications

- EITF25 -

Kaan Bür, 2013  
(Stefan Höst)



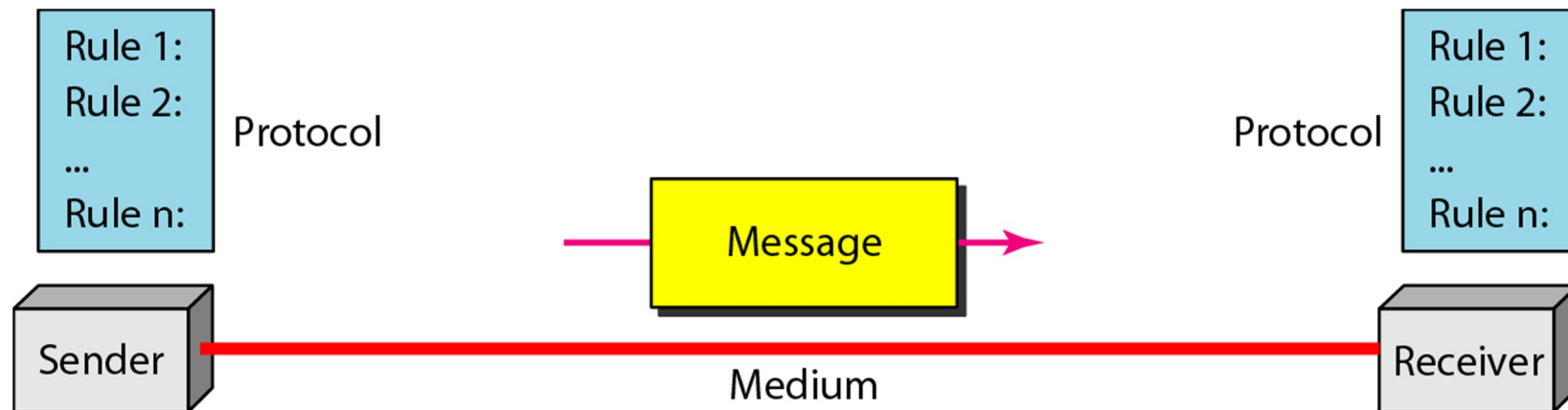
# Today's lecture

## Data Communications and Internet - An Introduction -

- Introduction
- Network topologies §1.1-2
- Network models §2.1-5

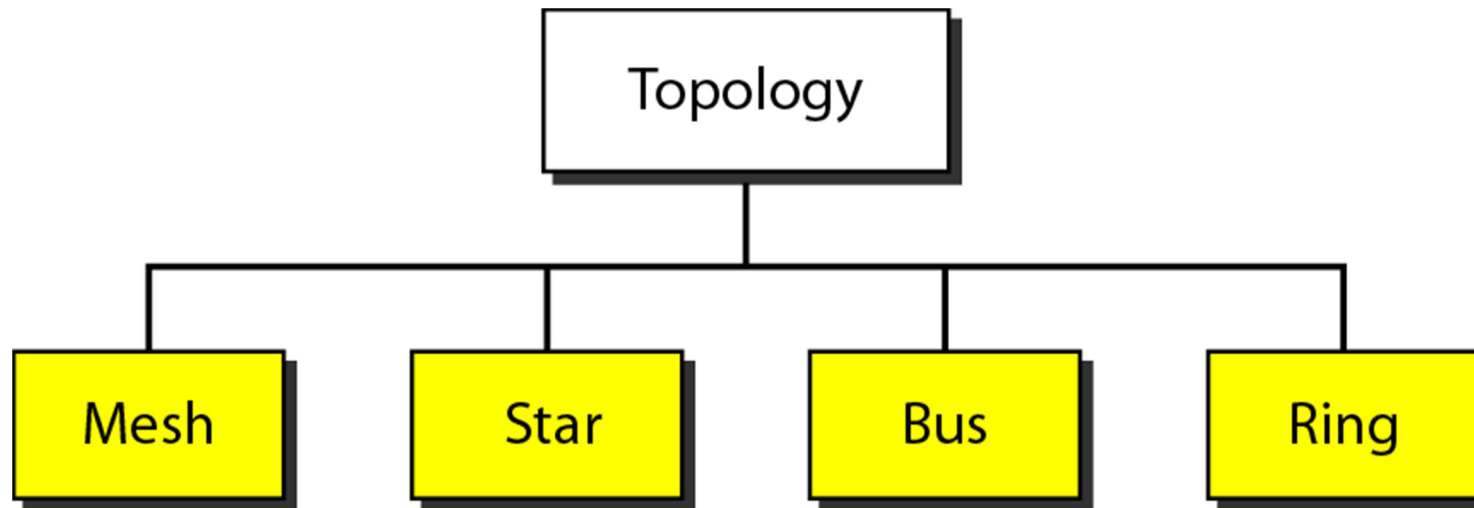
# Introduction

- Data
- Communication
- Network



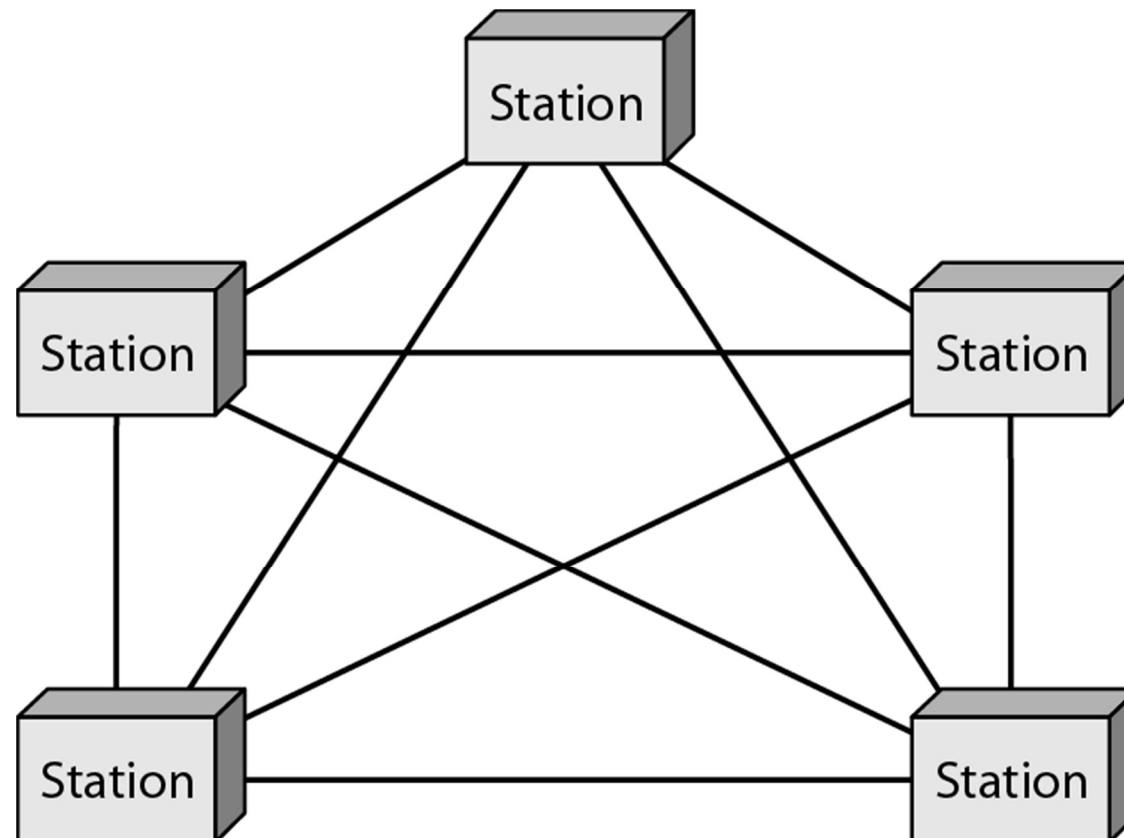
# Network topologies

- Layout of links and nodes

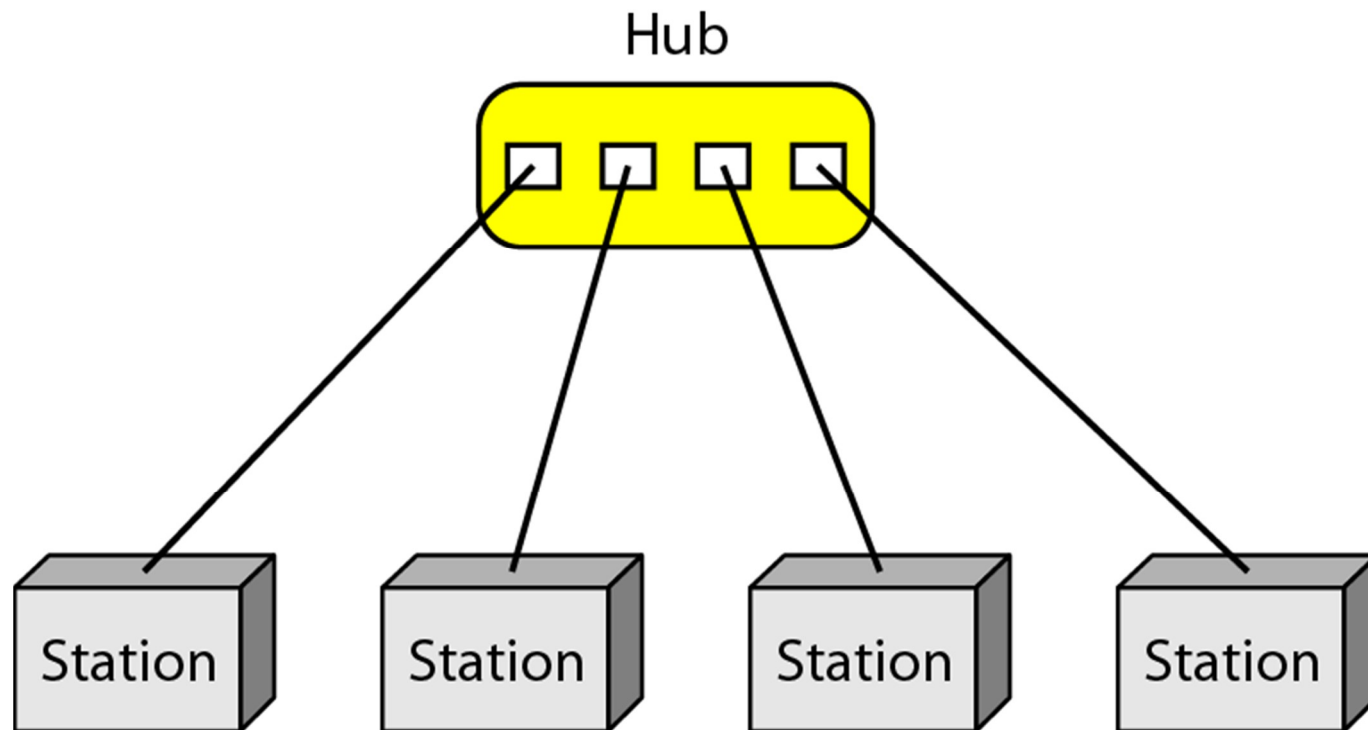


# Mesh network

- Redundant links

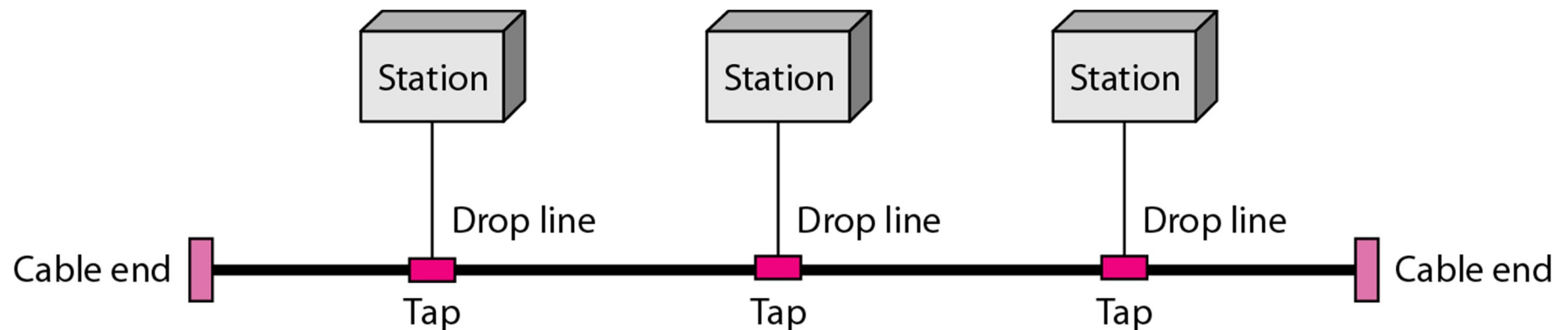


# Star network



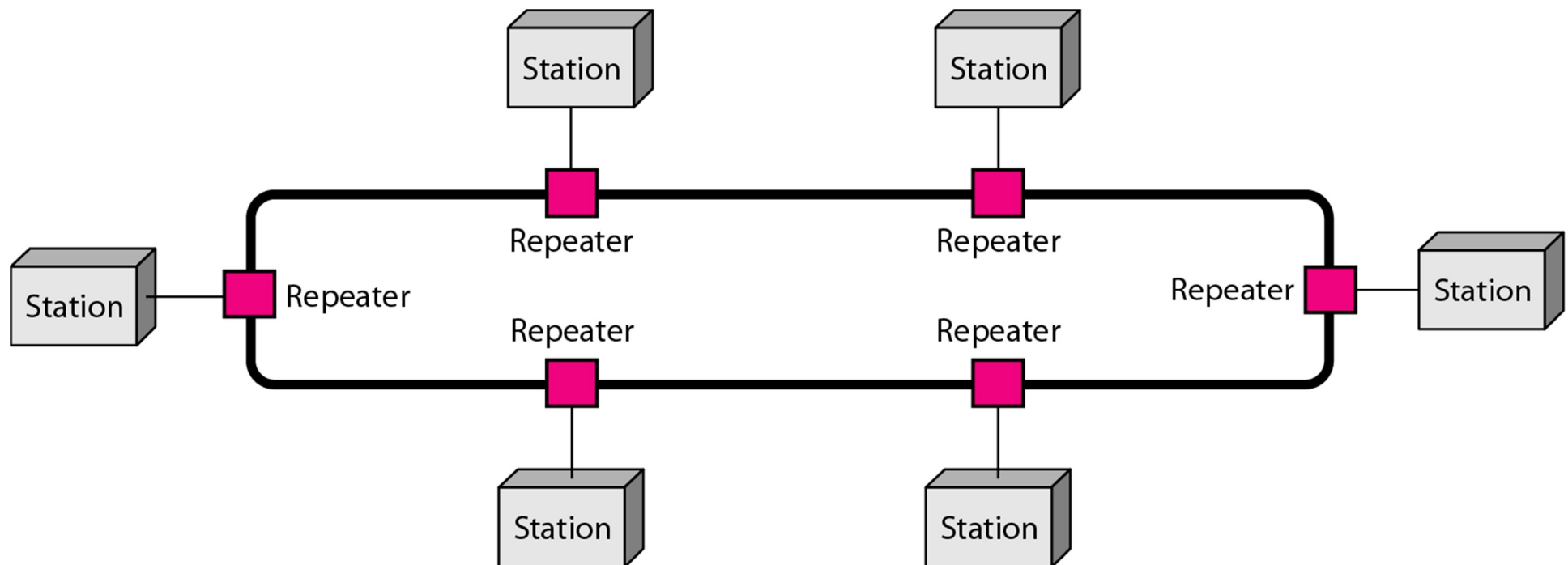
# Bus network

- Simple
- Vulnerable to collisions



# Ring network

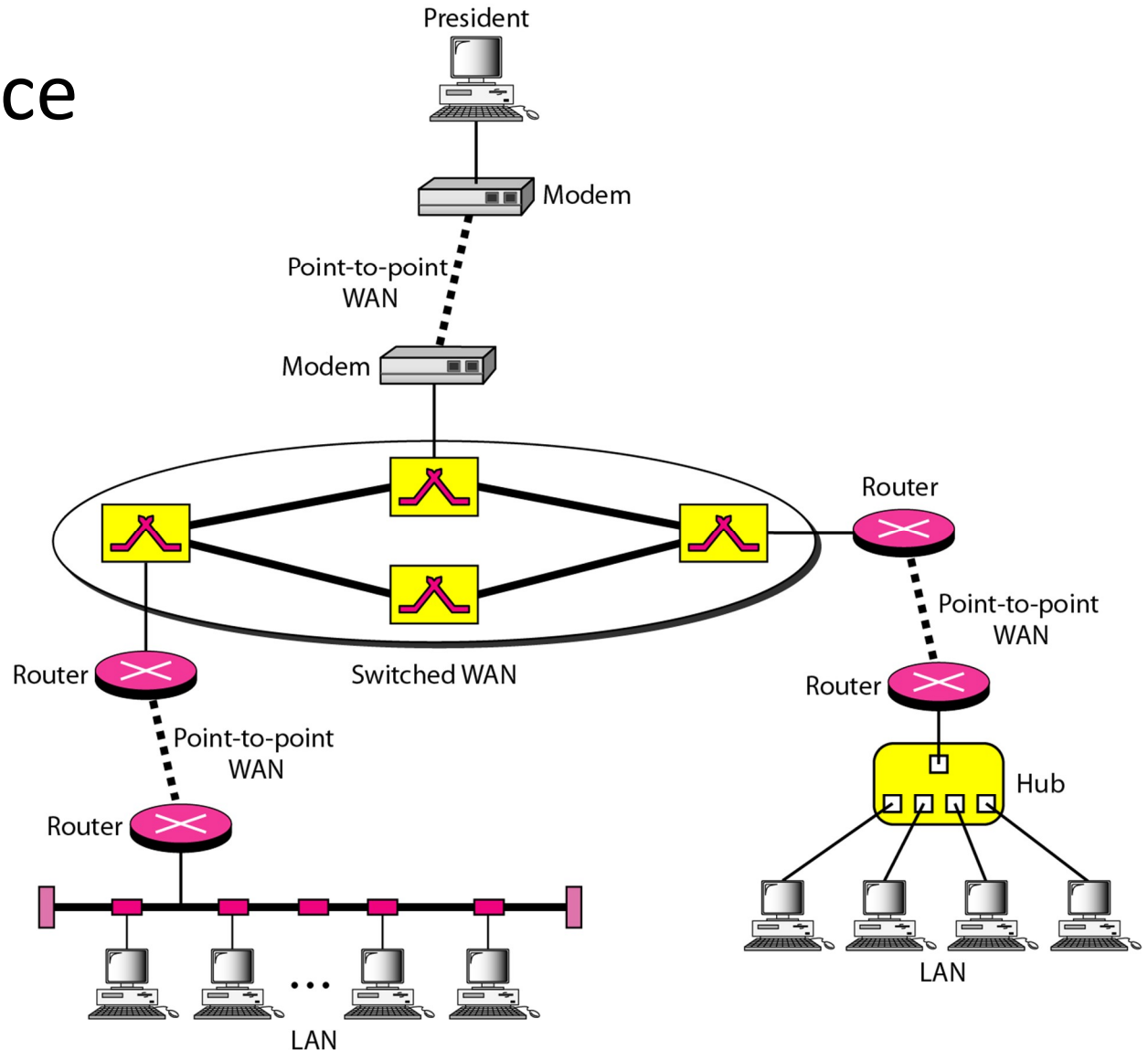
- Circular
- Susceptible to node failures





# Network engineering

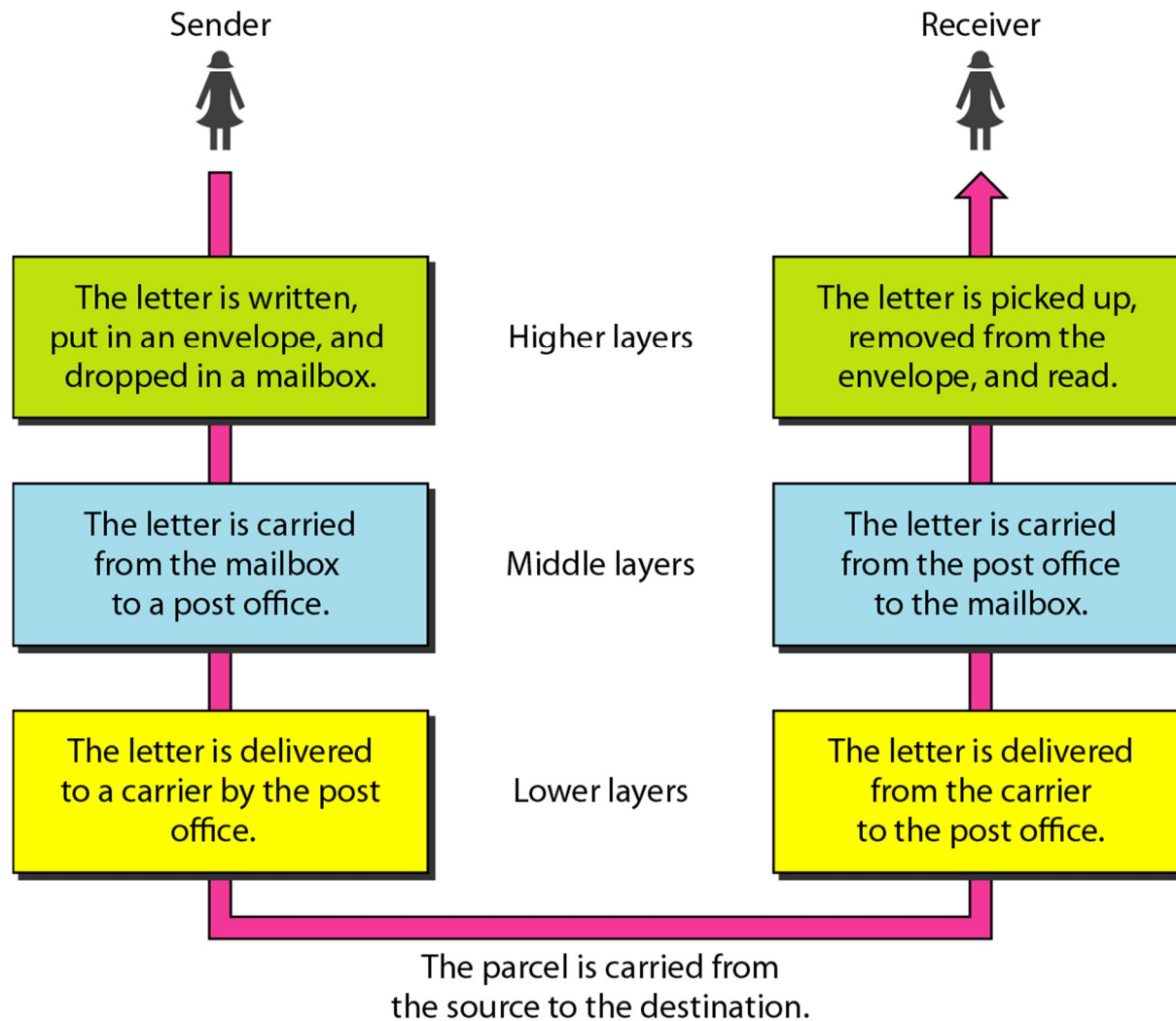
- High performance
  - Reliability
  - Throughput
  - Speed
  - Security



# Network models

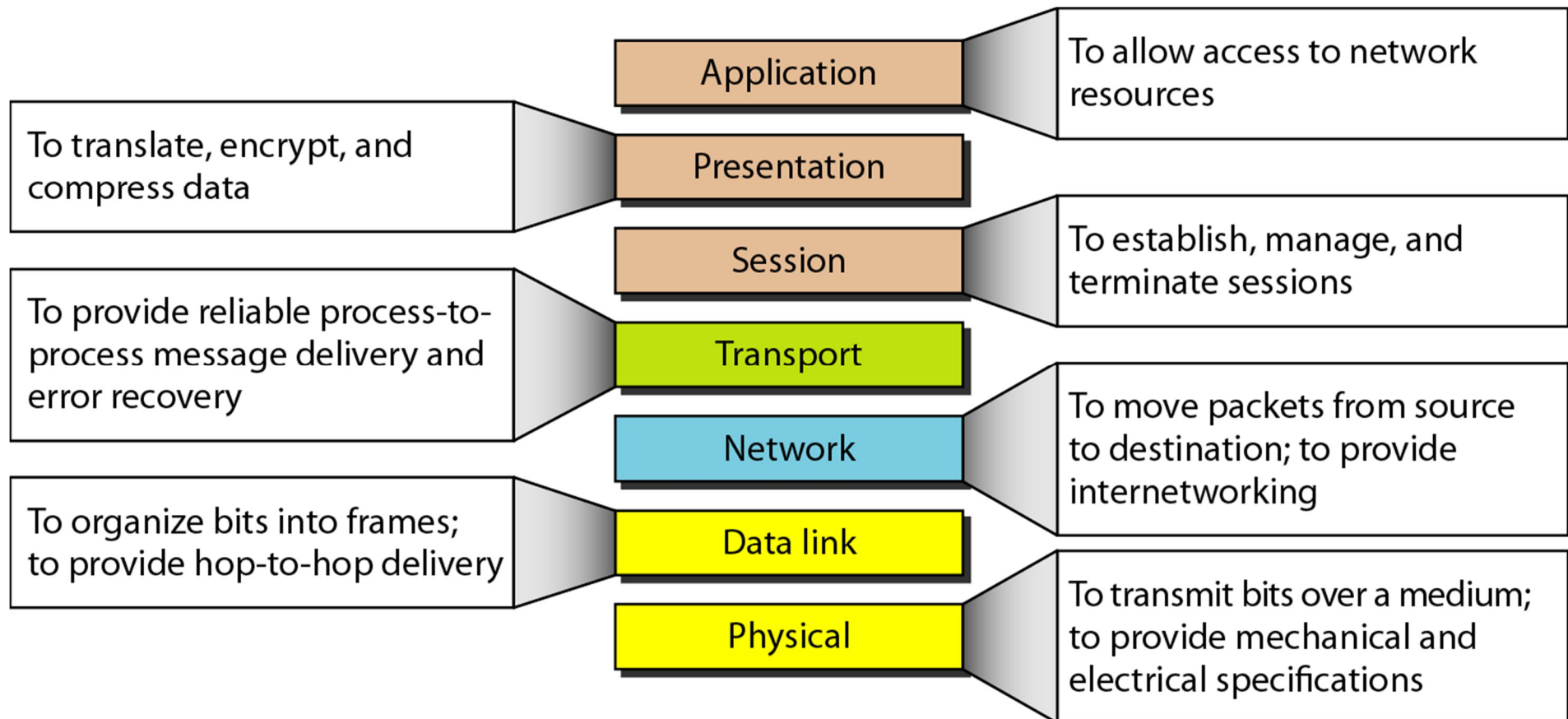
- Why?
  - Too complicated
  - Divide and conquer
- Layered architecture
  - Hierarchy
  - Specialisation
  - Simplification

# Layer concept

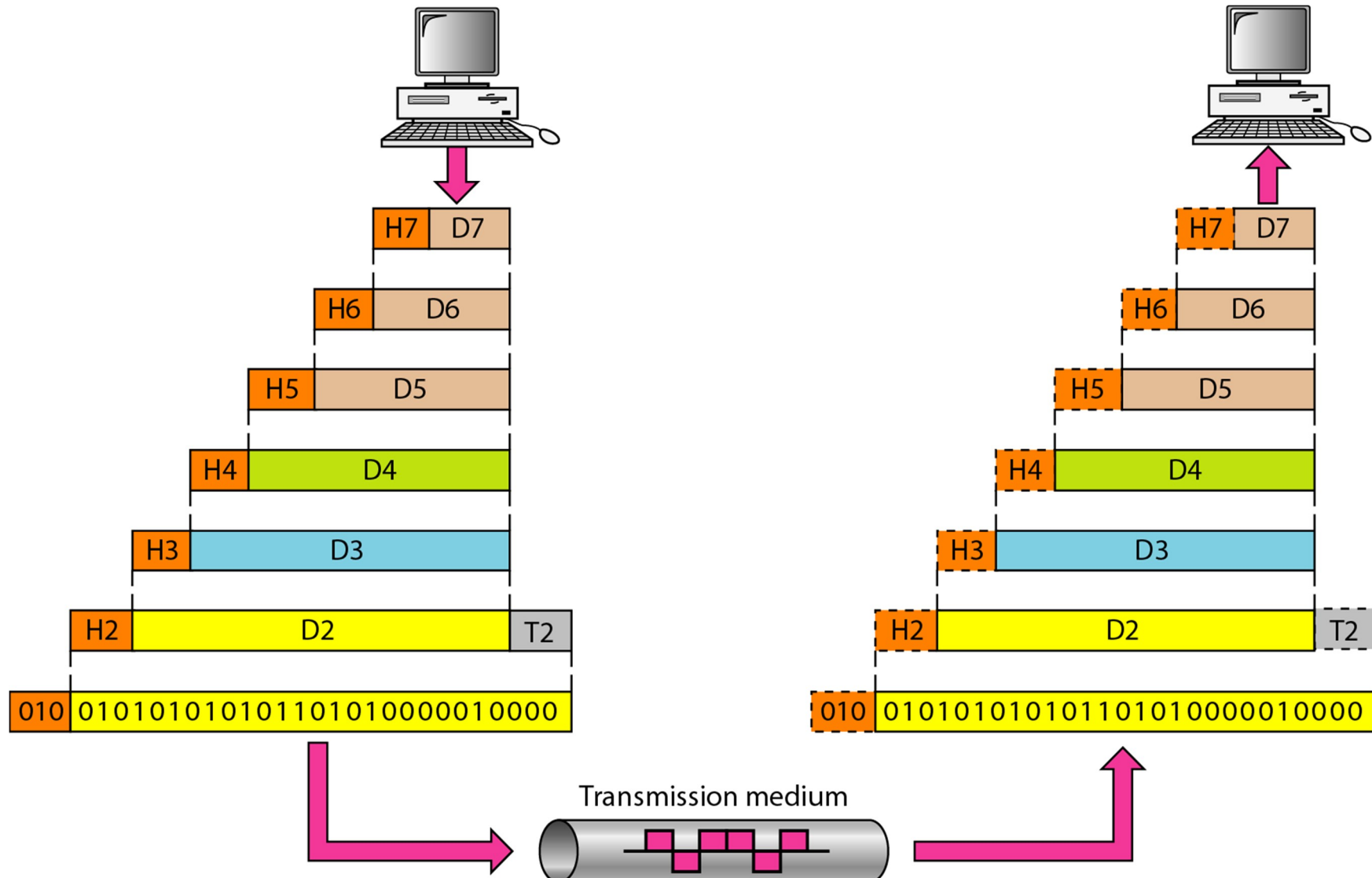


# OSI model "Open Systems Interconnection"

- Developed by ISO, 1970~

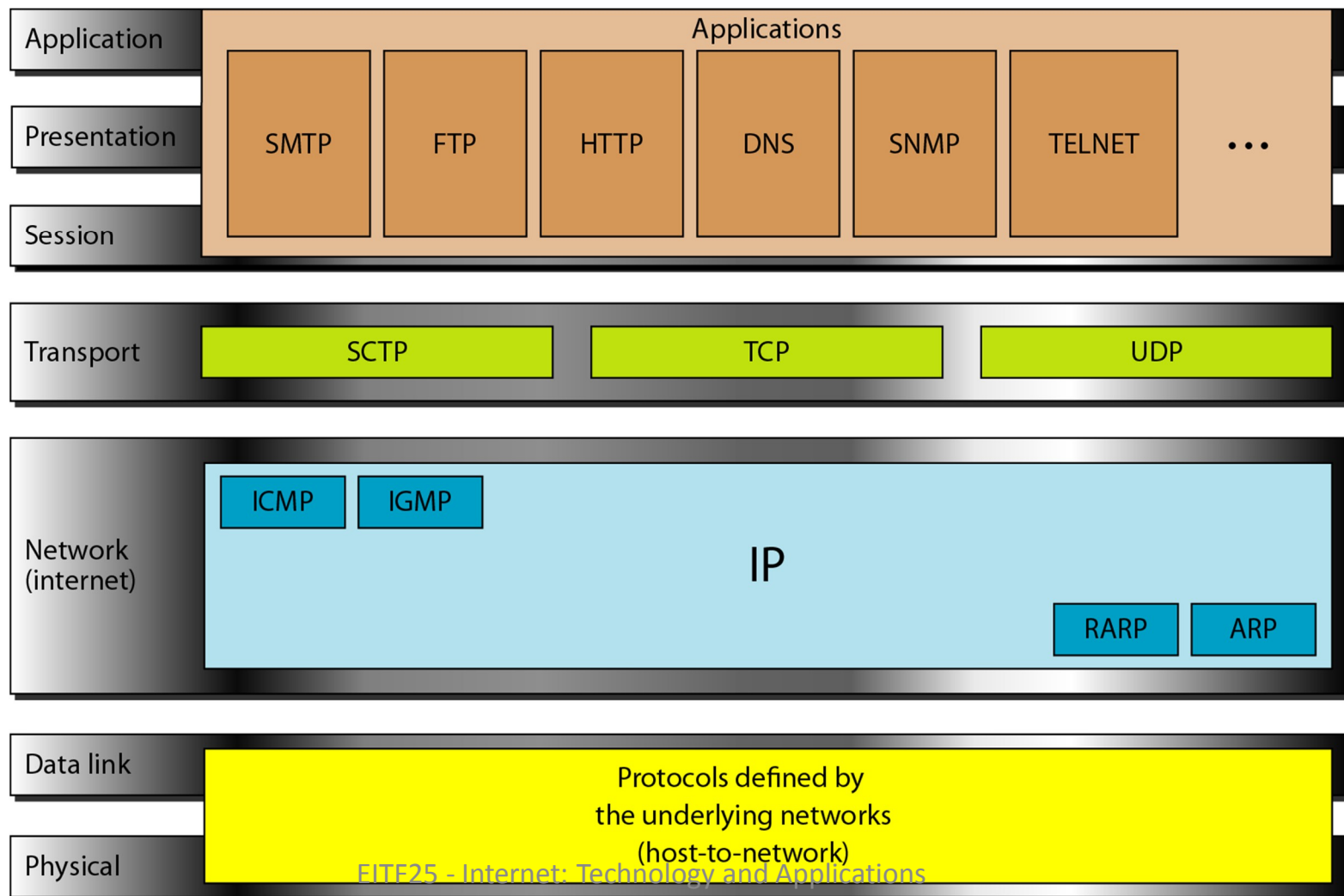


# Encapsulation

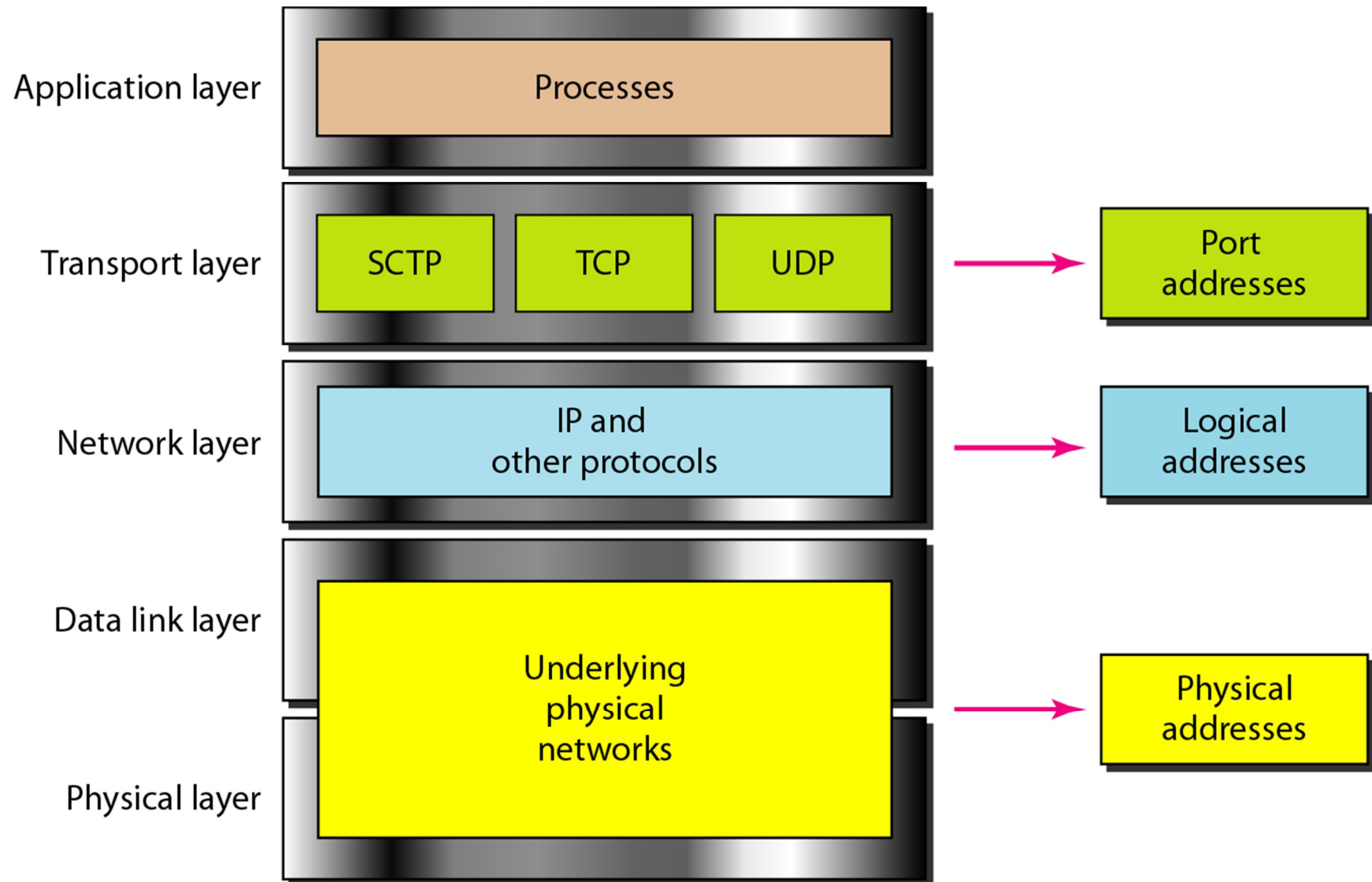


# TCP/IP model

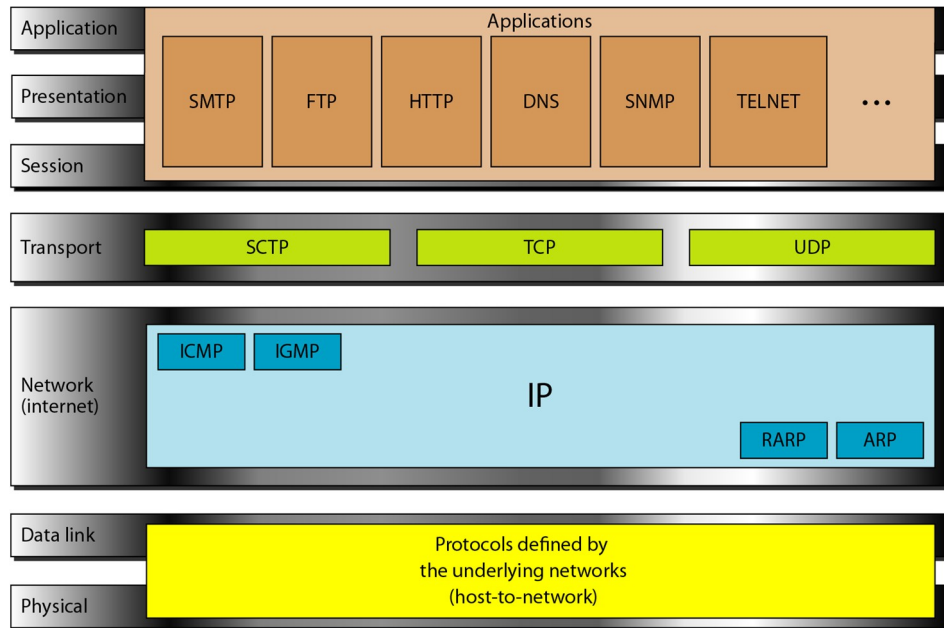
- Developed by DARPA, 1970~



# Addressing in TCP/IP



# See you in 15' :)







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# Internet – Technology and Applications

<http://www.eit.lth.se/course/eitf25>

- Mandatory alternative for I<sub>3D</sub> students
- Optional for F<sub>4</sub>, Pi<sub>4</sub> students
- 6 credits
- Level G2 (basic)



# Course Objectives

- Understanding data communications
- Understanding the basics of Internet
- Practice with networks and protocols
- Critical judgement of theory and praxis



# Intended Learning Outcomes

## 1. *Knowledge and understanding:*

- a) **Explain** the basics of how computers communicate; **apply** their knowledge into given topologies;
- b) **Explain** how the Internet protocol suite operates; **describe** the functions of various protocols;
- c) **Explain** how Internet applications work; **be aware of** the security risks associated with these.



# Intended Learning Outcomes

## 2. *Skills and abilities:*

- a) **Use** Internet applications;
- b) **Design and code** basic web pages;
- c) **Use** network analysis tools and **analyse** communication protocols.



## Intended Learning Outcomes

3. *Critical judgement and evaluation:*
  - a) **Formulate** the relation between the various Internet protocols;
  - b) **Evaluate** the suitability of an Internet protocol for supporting a given application type;
  - c) **Make** simple security judgements.



# Assessment

	Intended Learning Outcomes	Activities	Assessment Tasks
<b>Knowledge and Understanding</b>	Explain the basics of how computers communicate; apply what they learned into given topologies	Student reading, Lectures, Exercise sessions	Individual work in online quizzes and final take-home exam
	Explain how the Internet protocol suite operates; describe the functions of its various protocols		
	Explain how Internet applications work; be aware of the security risks associated with these		
<b>Skills and Abilities</b>	Use network analysis tools and analyse communication protocols	Laboratory projects 1, 2	Project reports 1, 2
	Design and code basic web pages	Laboratory project 3	Project report 3
<b>Critical Judgement</b>	Formulate the relation between the various Internet protocols	Final take-home exam	Individual work in final take-home exam
	Evaluate the suitability of an Internet protocol for supporting a given application type		

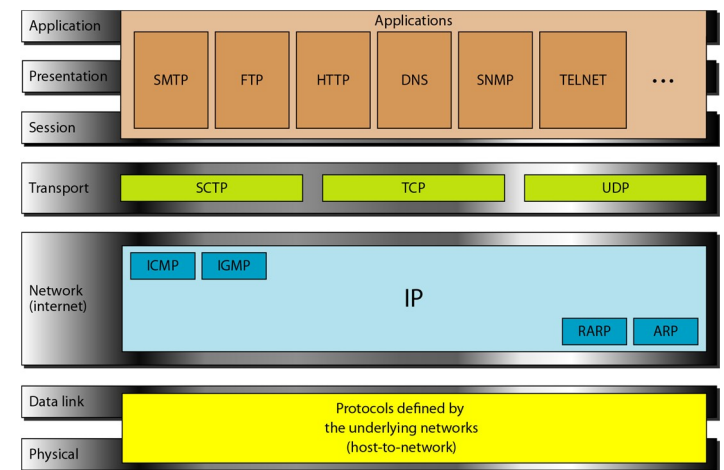


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Mon	Tue	Wed	Thu	Fri
				Lecture 1
Lecture 2	Exercise			

## Course Structure

- 1 intro + 10 lectures
- 5 exercise sessions
- **3 laboratory projects**
- **2 hand-in problem sets**
- **1 final take-home exam**



## Lectures

- L01: Physical layer
- L02: Flow control
- L03: Network access
- L04: Wide area net.
- L05: Internet prot.
- L06: Internet app.
- L07: Mobile systems
- L08: Routing
- L09: Security
- L10: Web search






## Exercise Sessions

- One per each pair of lectures
  - L01+L02 → E01 etc.
- Coding, multiplexing, error and flow control
- IEEE 802.x, IP, TCP, UDP
- Routing, networking



## Laboratory Projects

- Groups of two – online registration (Sign up)
- PPP Lab
  - **To do: Read docs, prepare, then book lab time!**
- Networking Lab
  - Uses , see <http://www.wireshark.org>
- WWW Lab



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# Hand-in Problem Sets & Take-home Final Exam

- Same rules apply as in a written test
  - Individual work (**no groups**)
  - Original answers (**no copying**)



# Workload Distribution

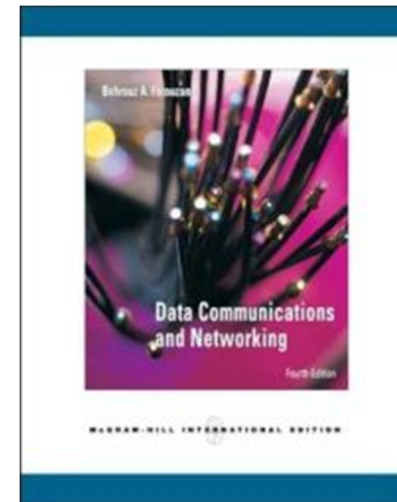
<b>6 credits</b>	<b>160 h</b>
Lectures and exercises	30 h
Hand-in problems & take-home exam	16 h
PPP lab (~4 days)	32 h
Networking lab (~2 days)	16 h
WWW lab (~2 days)	16 h
<b>Self study time</b>	<b>50 h</b>



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## Literature (1)

- Data Communications and Networking
  - Behrouz A. Forouzan
  - 4<sup>th</sup> or 5<sup>th</sup> ed, McGraw-Hill





## Literature (2)

- Datakommunikation och nätverk
  - M. Kihl, J.A. Andersson
  - Studentlitteratur, upplaga 1:1
  - Facit till övningsuppgifter
- OBS: Jens has an offer for you!





## Staff

Course head:	Stefan Höst
Lecturer:	Kaan Bür
Exercise guide:	William Tärneberg
Lab guide:	Antonio Franco



## Final Remarks

- Elect two course representatives
  - Give them feedback
- Course evaluation
  - Help us to improve the course
- Recommended follow-up course
  - ETSF10 Internet Protocols





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# Most Important

Plan ahead your time!

**ENJOY THE COURSE!**



## Today's Programme

- **Survey** on subject familiarity
  - with last year's exam in ETSF052  
"Computer Communications"
- Note that ETSF052 exams are 5 hour long, and no help (e.g. books or Internet) is allowed.