

Organisatorisches (1)

- **Abteilung „Echtzeitsysteme und Kommunikation“**

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- **Web-Adresse**

http://ivs.cs.uni-magdeburg.de/EuK/lehre/lehrveranstaltungen/Sommersemester_2005/KuN_VL_SS05.shtml

- Folien der Vorlesung
- Mitteilungen
- Literaturhinweise

Organisatorisches (2)

- **Übungen**

- Übungsleiter: Herr Trikaliotis
- Email:
kun05@trikaliotis.net
- Wöchentlich ab 19. KW (12. April 2005)
- Übungsgruppeneinteilung wird i.F. bekannt gegeben

- **Scheinkriterien**

- Erfolgreiches Bearbeiten der Programmieraufgaben in den Übungsstunden
- Klausur (vorwiegend Vorlesungsstoff)

Übungsgruppeneinteilung

Di 9-11

Vorname	Name
Bastian	Ansorge
Remo	Bergmann
Stefan	Hiller
Teodor	Ivanov
Sebastian	Kärsten
Karsten	Meinecke
Martin	Oelsner
Armin	Rieß
Jens	Rummler
Sandra	Ruske
Martin	Schulz
Daniel	von dem Knesebeck

Di 11-13

Vorname	Name
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René	Heilmann
Juliane	Heinze
Oliver	Krohne
Florian	Marquardt
Mykhaylo	Nykolaychuk
Marc-Peter	Schmidt
Ingo	Siegert
Tobias	Tischler
Thilo	Trautvetter
Marc	Werner

Di 13-15

Vorname	Name
Sebastian	Beyer
Christian	Bohne
Jörg	Fochtman
Jana	Fruth
Sebastian	Höll
Alexander	Kalb
Torsten	Krieg
Ronny	Merkel
Nga	Nguyen Phuong
Robert	Schoene
Steffen	Söffner
Michael	Wenske

Introduction (1)

Computer network:

An *interconnected* collection of *autonomous* computers

Interconnected computers:

Computers are said to be interconnected if they are able to exchange information

Examples for the physical connection medium:

copper wire, fiber optics (wired)

microwaves, communication satellites (wireless)

Autonomous computers:

No computer can forcibly start, stop, or control computations (actions) on another one.

Distributed system:

The existence of multiple autonomous computers is transparent (not visible) to the user.

Introduction (3)

Two types of transmission technology:

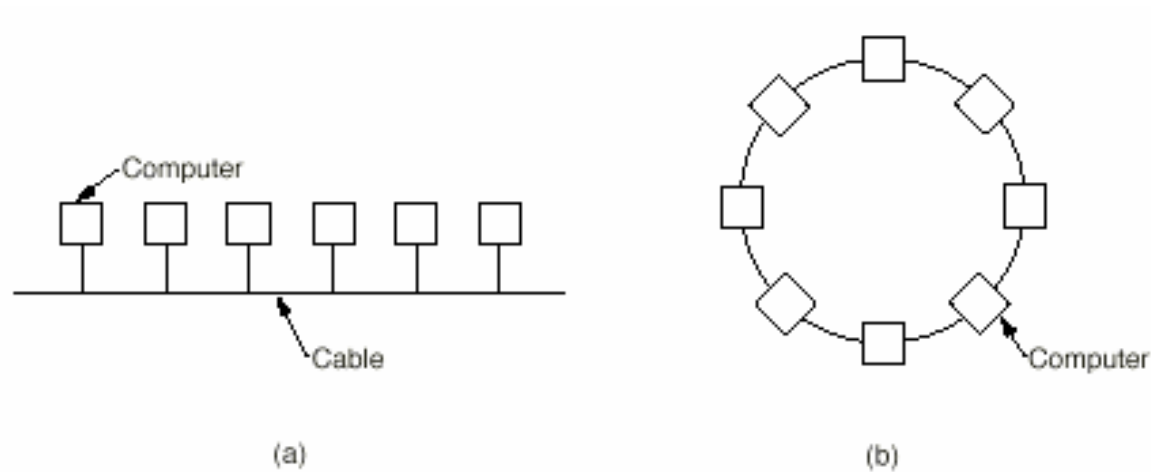
- Broadcast networks
- Point-to-point networks

Classification of networks by scale:

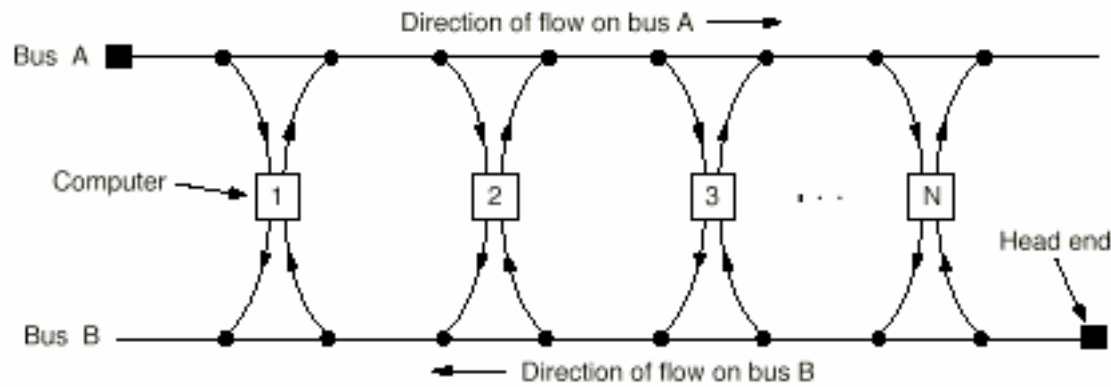
Interprocessor distance	Processors located in same	Example
0.1 m	Circuit board	Data flow machine
1 m	System	Multicomputer
10 m	Room	} Local area network
100 m	Building	
1 km	Campus	
10 km	City	Metropolitan area network
100 km	Country	} Wide area network
1,000 km	Continent	
10,000 km	Planet	The Internet

Introduction (4)

Two common topologies for broadcast LAN's (bus and ring):

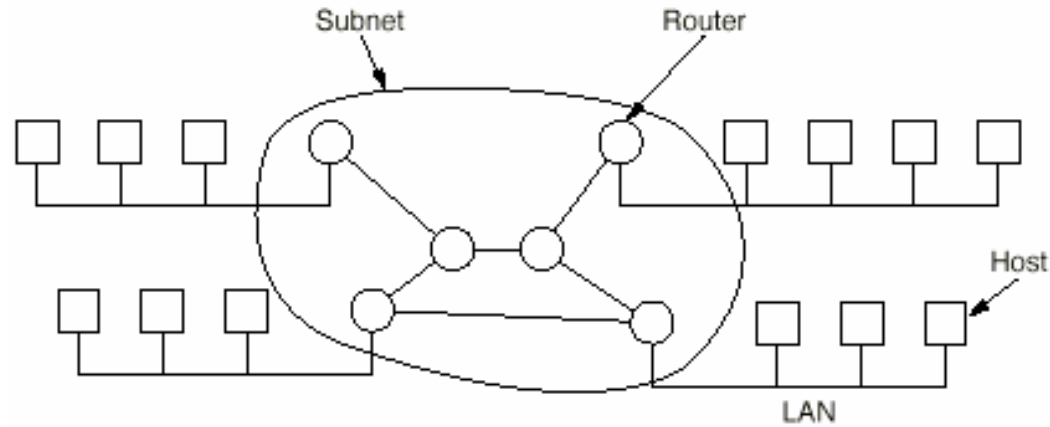


Architecture of the DQDB MAN:

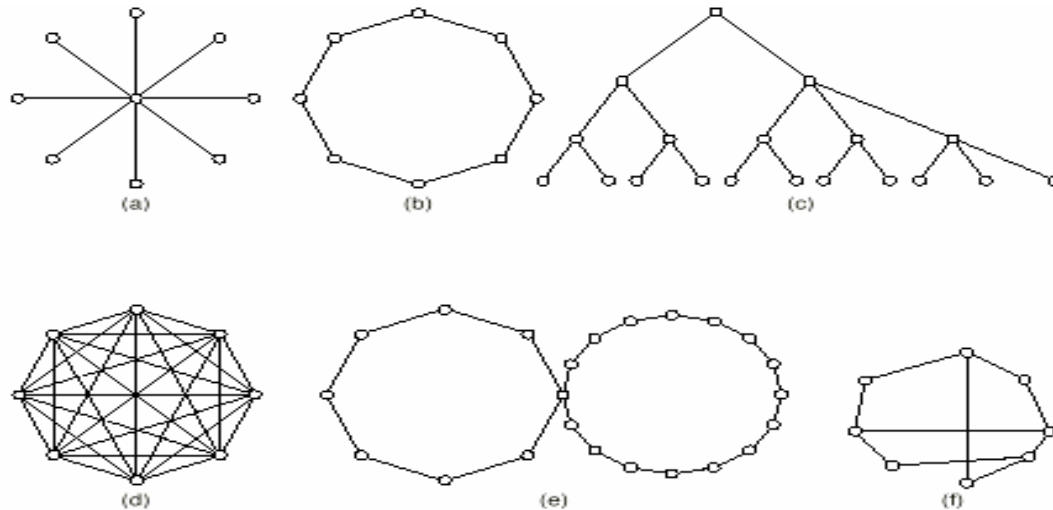


Introduction (5)

A WAN consisting of hosts and a communication subnet:



Example topologies for a point-to-point subnet:



Introduction (6)

Wireless Networks

New trend in information technology: **Mobile Computing**

Aspects of mobility:

- *User mobility*: Users communicate via wireless infrastructure
(wireless phones, Personal Digital Assistants, mobile robots)

- *Device mobility*: devices can be connected via wireless links to surrounding IT infrastructure
(computer peripherals, laptops)

Example applications

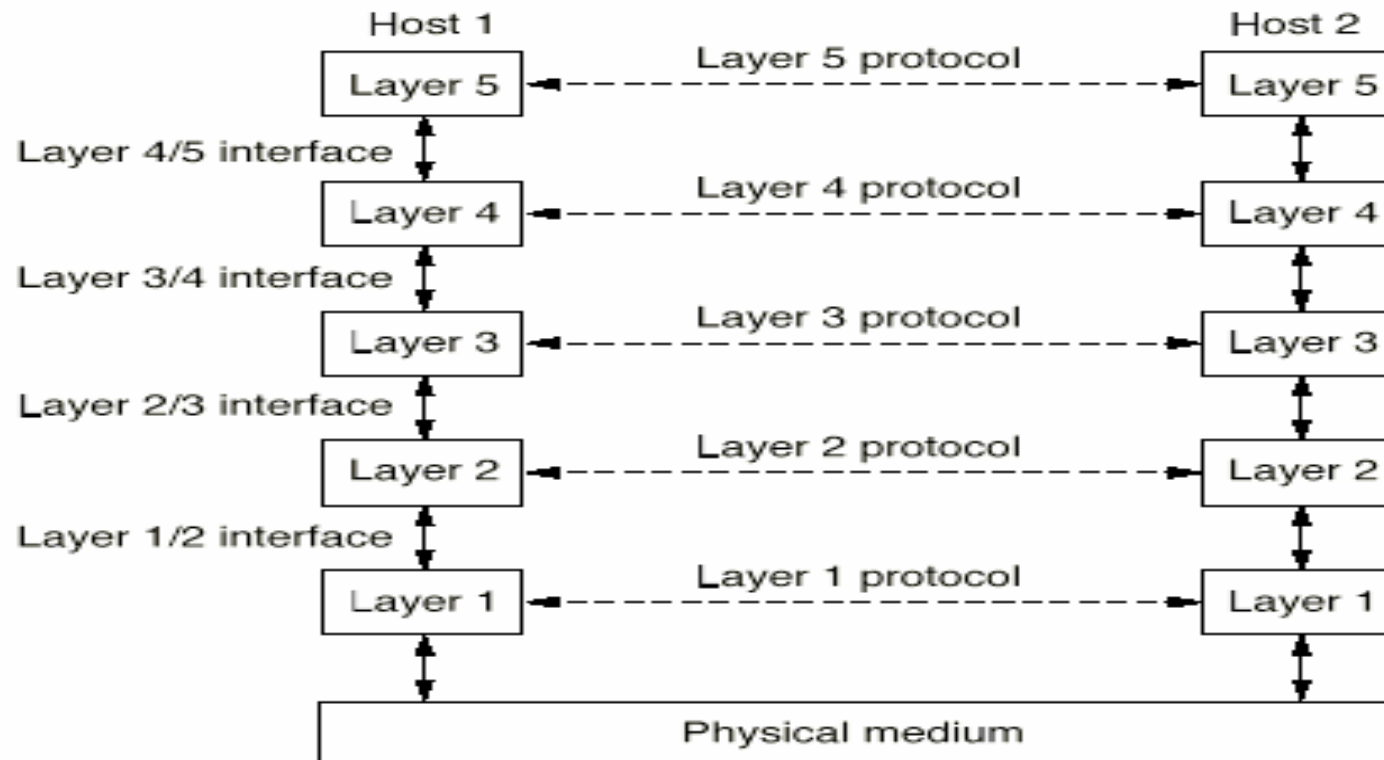
- Replacing wired networks in home / office environments
- Traffic control applications
- Data collection / diagnosis (hospitals, damage assesment)
- Hot spots (airports, hotels etc)
- Mobile robots, manufacturing

Network Software Architecture (1)

Tasks of the Network Software are, e.g.:

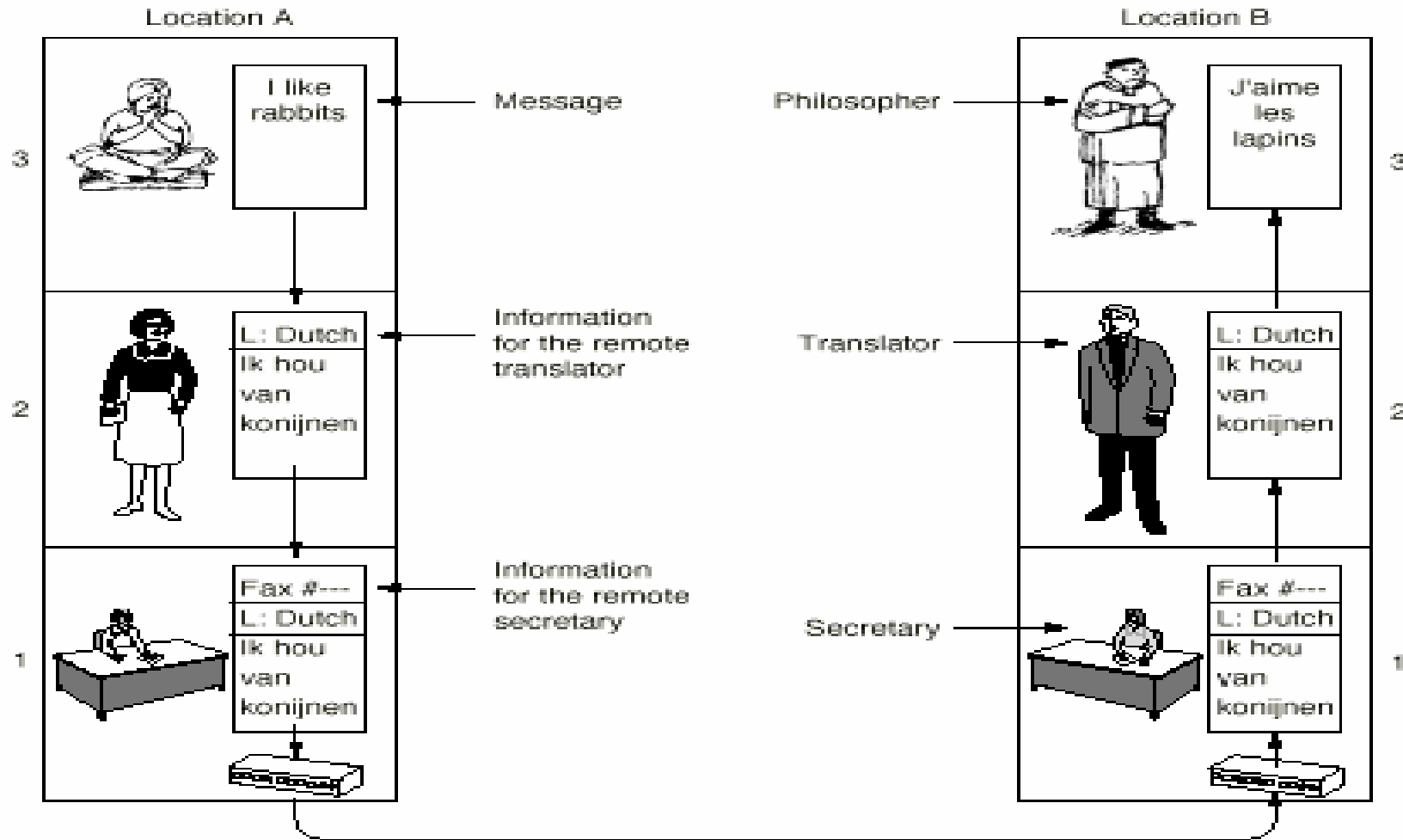
- error control
- flow control
- fixed message length (segmentation and reassembly)
- routing

Network Architecture: A set of layers and protocols



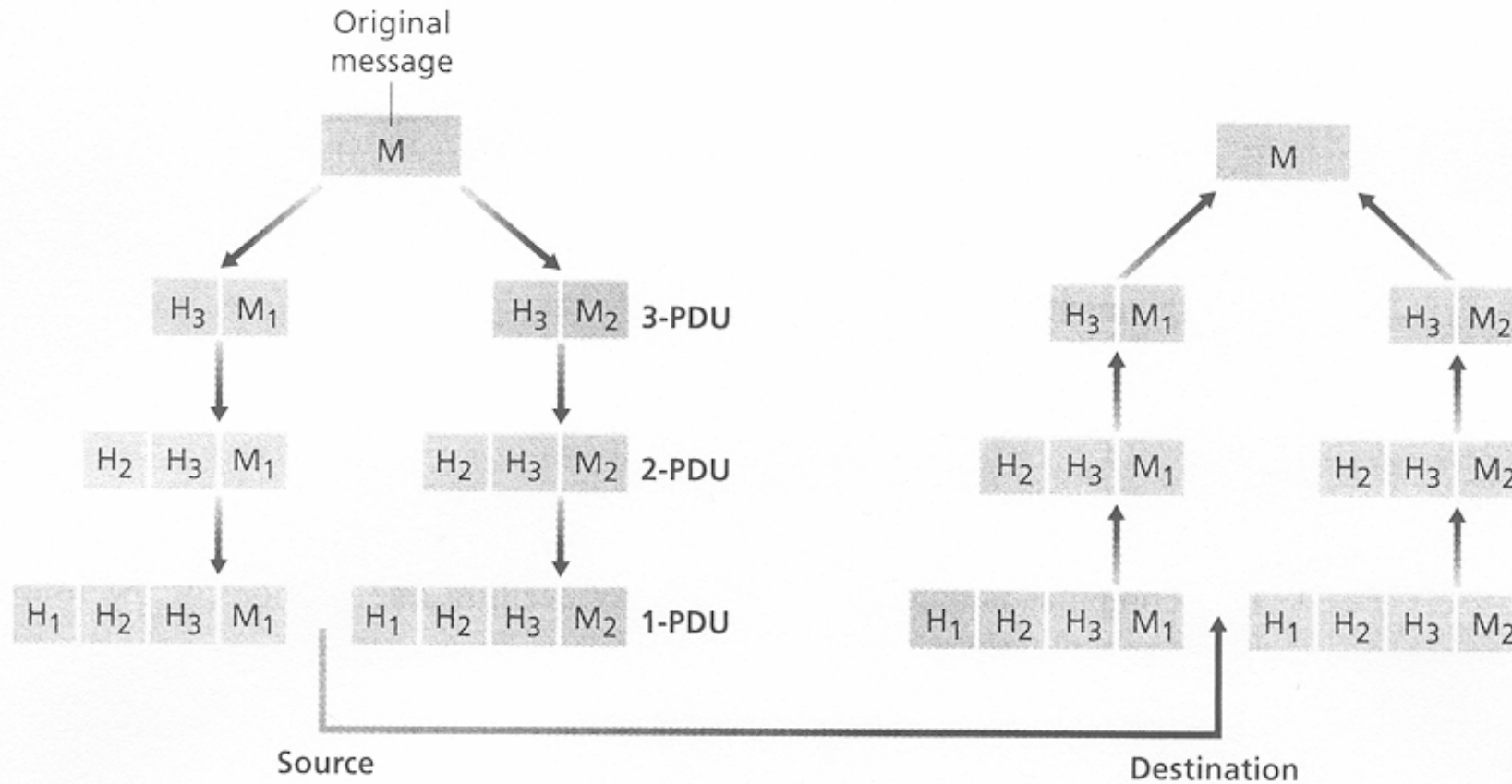
Network Software Architecture (2)

The philosopher-translator-secretary architecture:

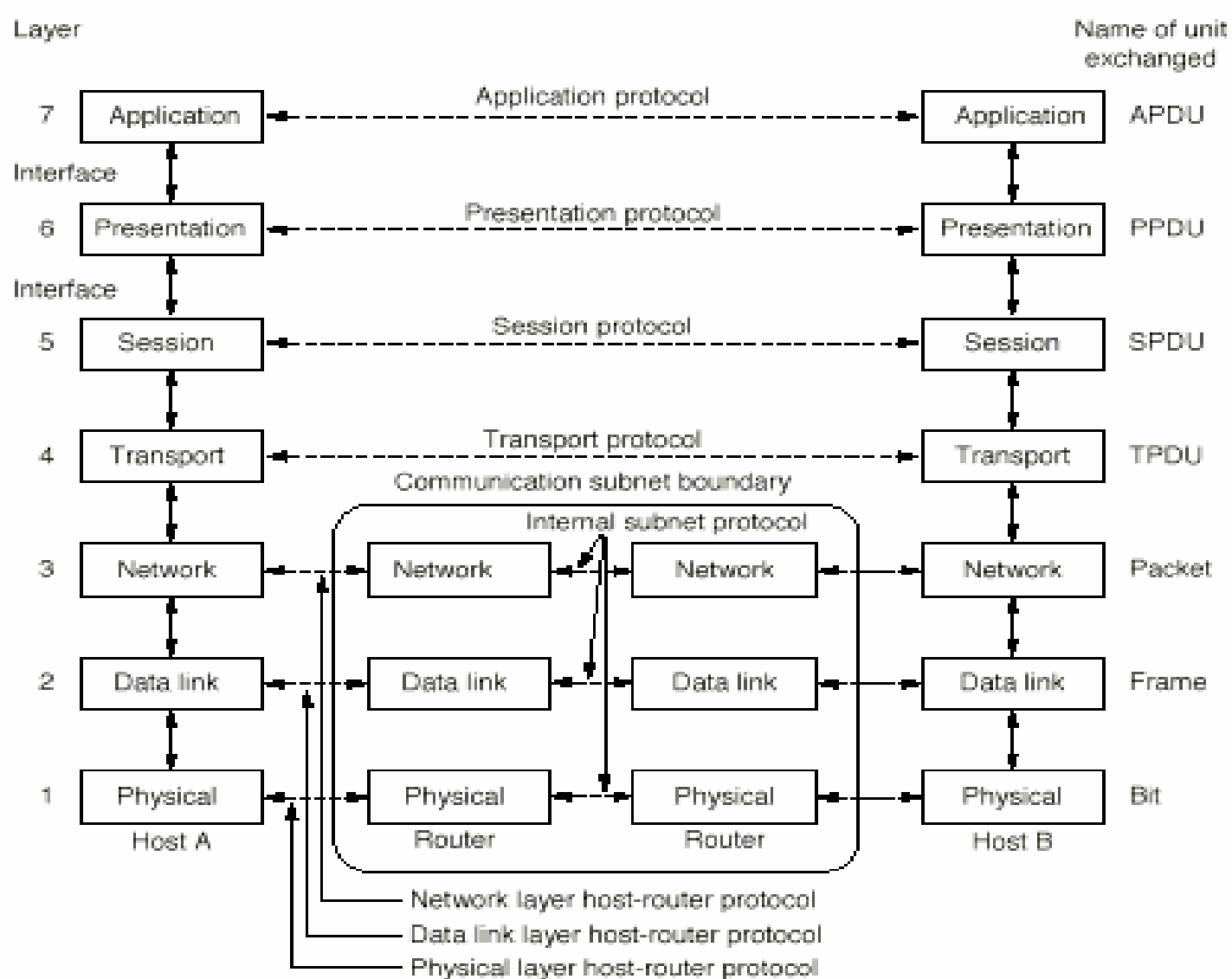


Network Software Architecture (3)

Different PDUs (Protocol Data Units) at different layers in the protocol architecture:

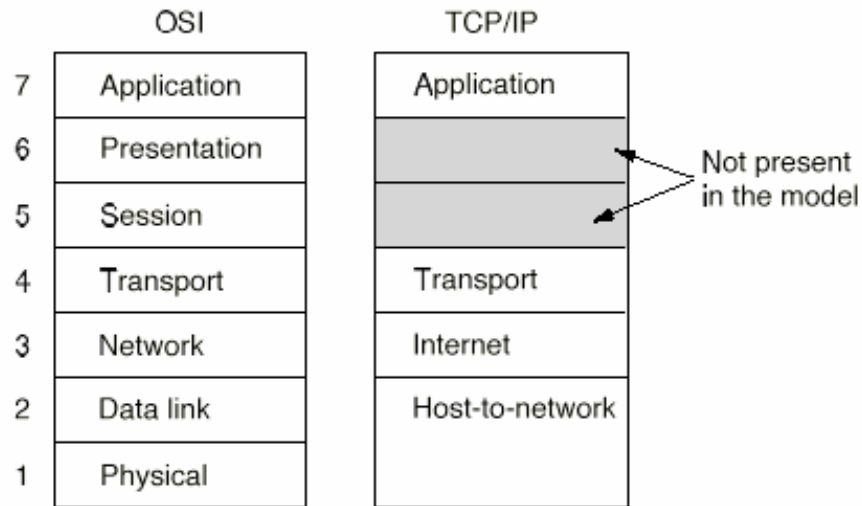


The OSI Reference Model

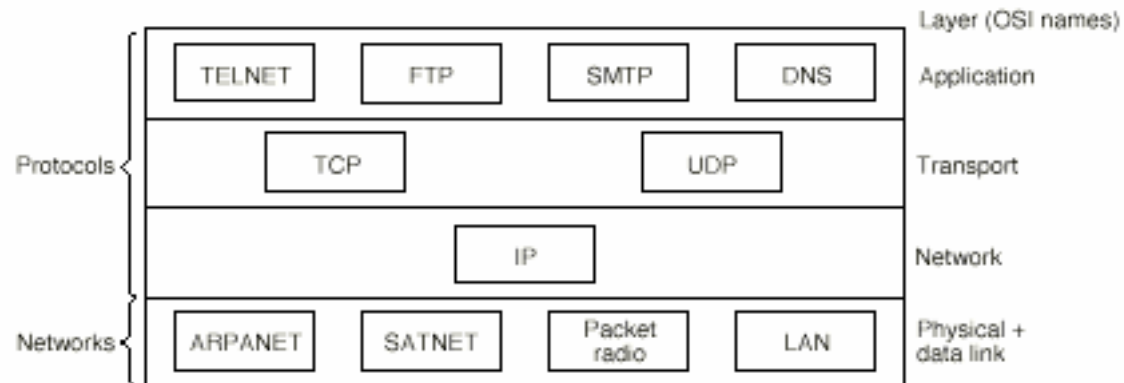


The TCP/ IP Reference Model

The TCP / IP Model:

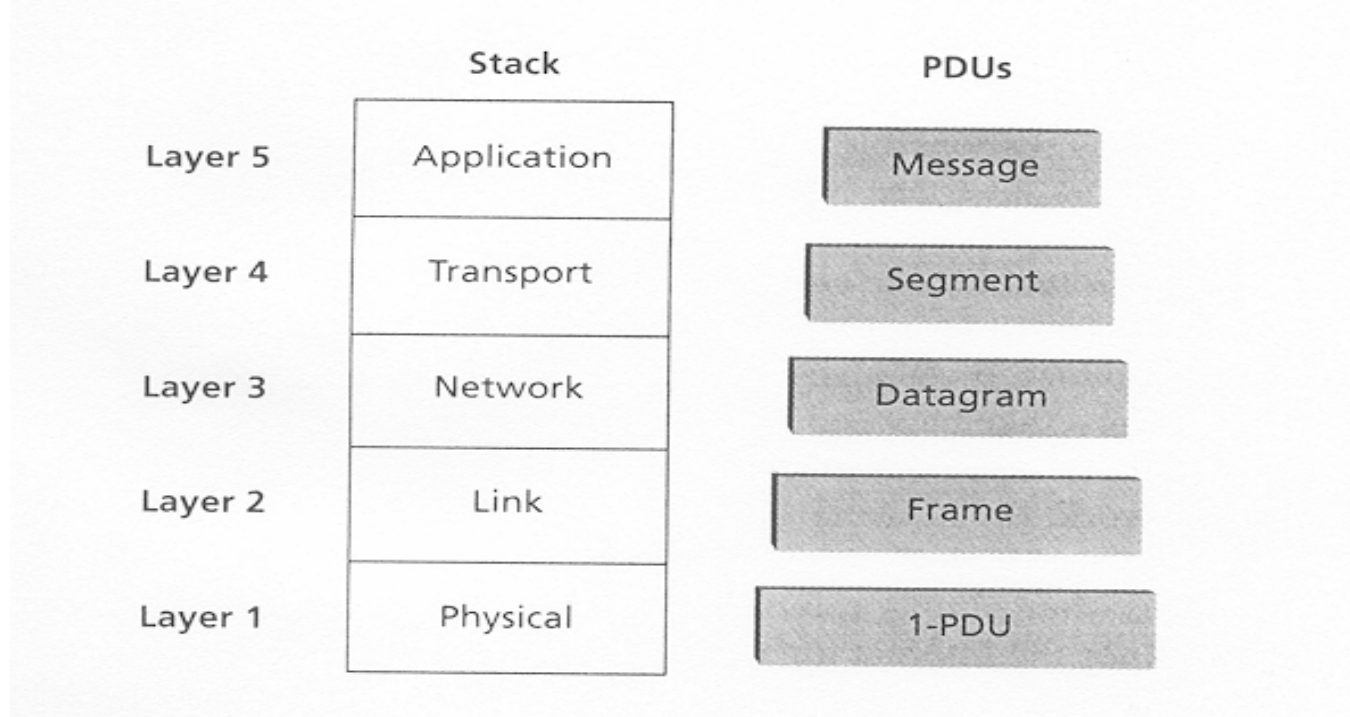


Initial protocols and networks in the TCP / IP model:



Hybrid reference model (Internet architecture)

The hybrid protocol stack and the respective protocol data units used in this lecture:



The **physical layer** is not addressed further. It deals with transmitting raw bits over a physical transmission medium. The delivered service at the interface to the upper layer must ensure that sending a bit 1 at one side will result in receiving bit 1 at the other side. To do so, it must reflect the specific properties of the medium.

Examples for transmission media:

wired: magnetic media, twisted pair, coaxial cable, fiber optics

wireless: electromagnetic spectrum, radio- micro-, infrared waves

ISDN and **ATM** are examples for physical communication systems

Network Software Architecture (4)

Data flow through the layers:

