

Internet Protocols (1/4)

1

Information exchange in an Internet requires (1/3)

- Unique designation of the information addressee
 - Each Internet participant receives an Internet address
 - Internet addresses are hierarchically organized
 - Internet addresses are unique worldwide
- Determination of the transmission path in the network
 - Information is sent to the addressee via various intermediate stations
 - The path is not determined at the sender but decided by the involved intermediate system

Internet Protocols (2/4)

2

Information exchange in an Internet (2/3)

- Transmission of the complete information
 - Internet is based on the transmission principle of packet switching:
 - Information is broken down into small data packets and provided with transport information
 - Data packets are then sent individually through the network
 - It must be ensured that the receiver can again reassemble the information completely and in the correct order

Internet Protocols (3/4)

3

Information exchange in an Internet requires (3/3)

- Error-free information transmission
 - Because of transmission errors and malfunctions, individual data packets can get damaged or even lost
 - Mechanisms are therefore needed to detect errors and automatically correct them, e.g., a repeated request for lost packets

Internet Protocols (4/4)

4

Internet does not have a homogenous structure. Communication is organized via different incompatible physical networks, each with its own communication protocols and format.

- At the various network borders, data packets must be adapted to the valid format of the next network and be transmitted with the techniques valid there
- Tasks are handled by the network operating system and executed by each intermediate station

Layer Model (1/4)

5

Network operating systems must solve extremely complex communication tasks

The hierarchical nature of these communication tasks allows a division into different layers → **Layer model**

Each layer is responsible for the solution of a certain subproblem

- Physical signals are exchanged at the lowest layer
- On the next layer, binary data is converted into physical signals
- Binary data must be provided with address information and indicated as belonging together
- ...

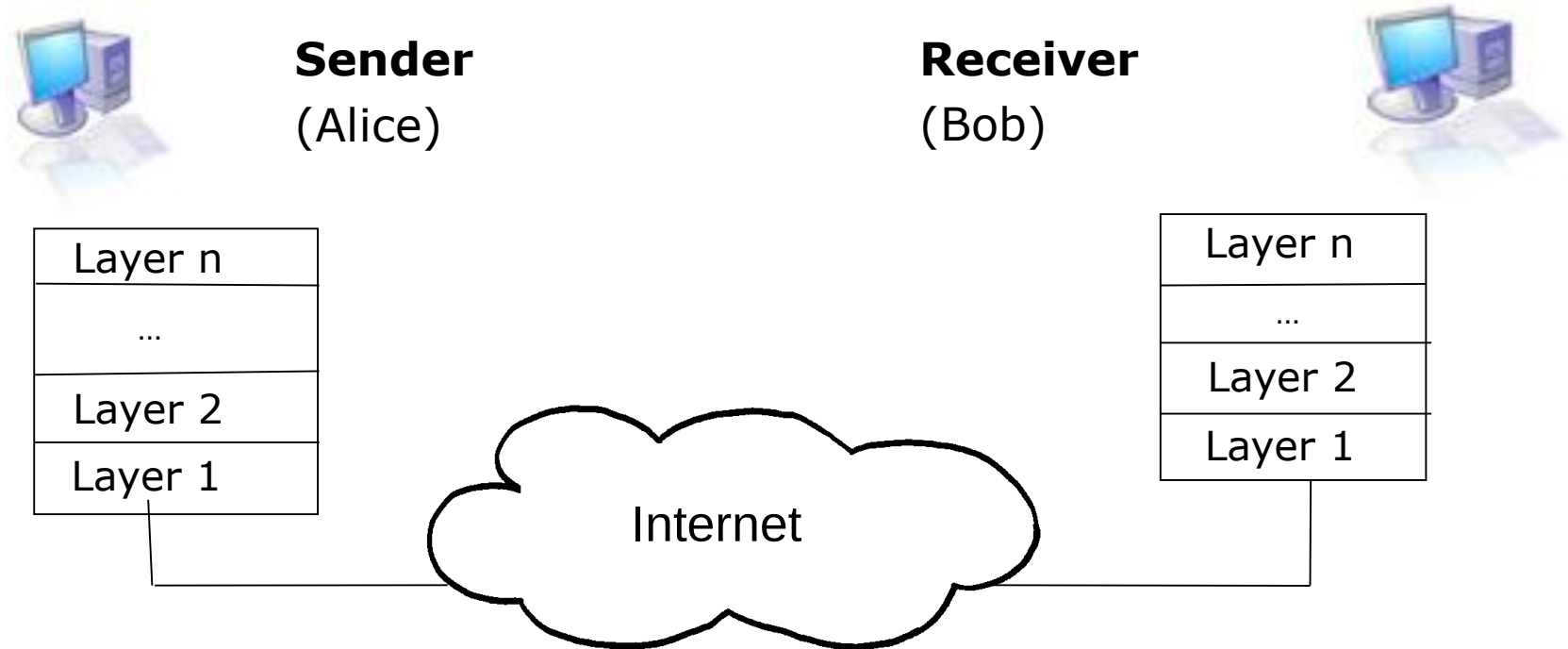
Layer Model (2/4)

6

- Sender and receiver both follow the same layer model, with the layers at the same level communicating with each other
- Layers at the same level communicate by means of **communication protocols**
- Layer models are organized hierarchically: each layer only communicates with the layer directly adjacent to it
- In this way, complex communication tasks can be solved in a modular form

Layer Model (3/4)

7

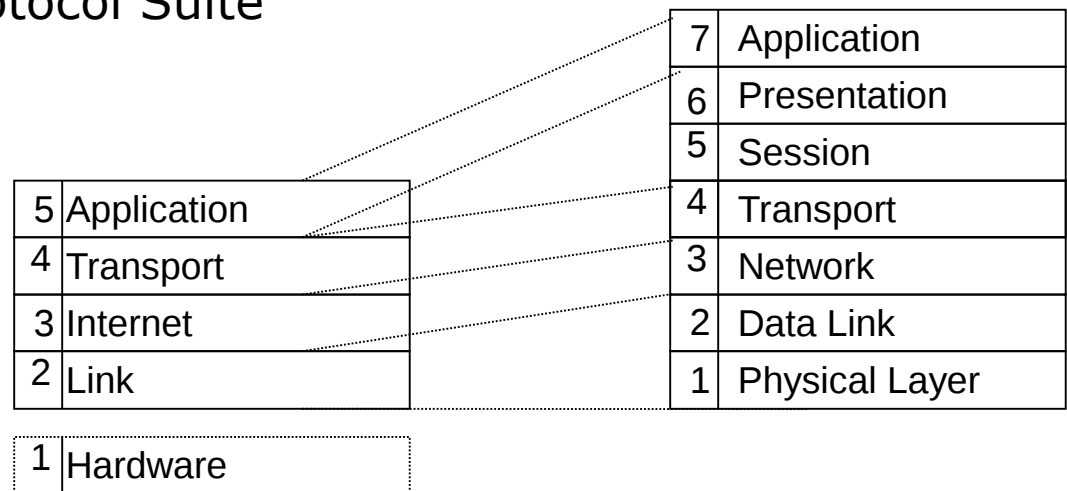


Layer Model (4/4)

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There are different layer models:

- **ISO/OSI Reference Model** – e.g. implemented in the X.25 protocol family in telecommunications
- **TCP/IP Stack** – implemented in the TCP/IP Internet Protocol Suite



TCP/IP Stack

ISO/OSI Stack