Communication Networks and Protocols

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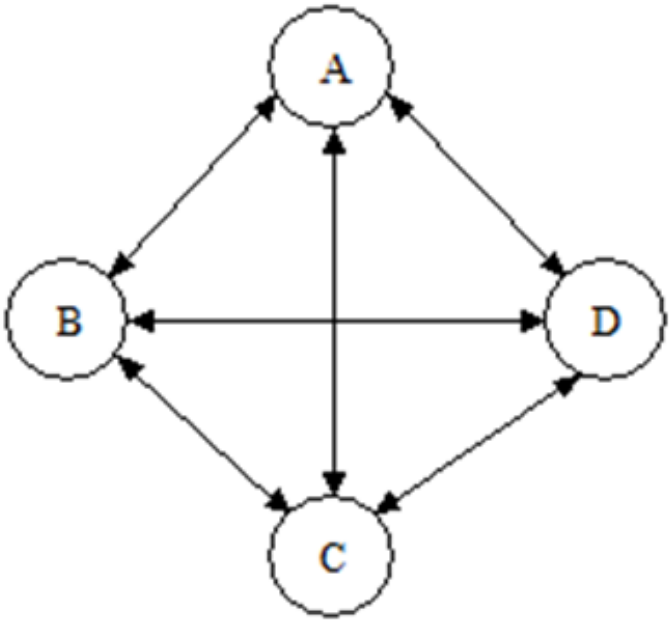
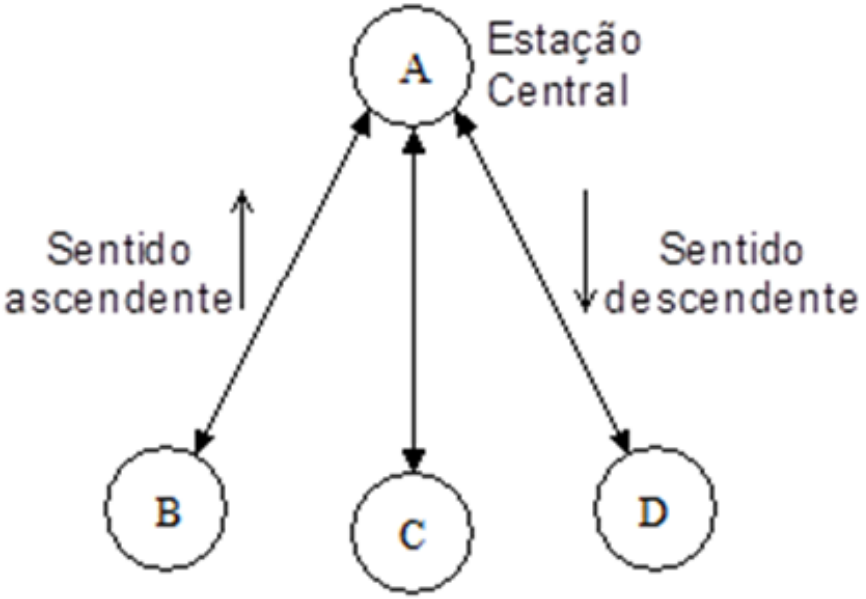
Direct vs. Centralized Networks



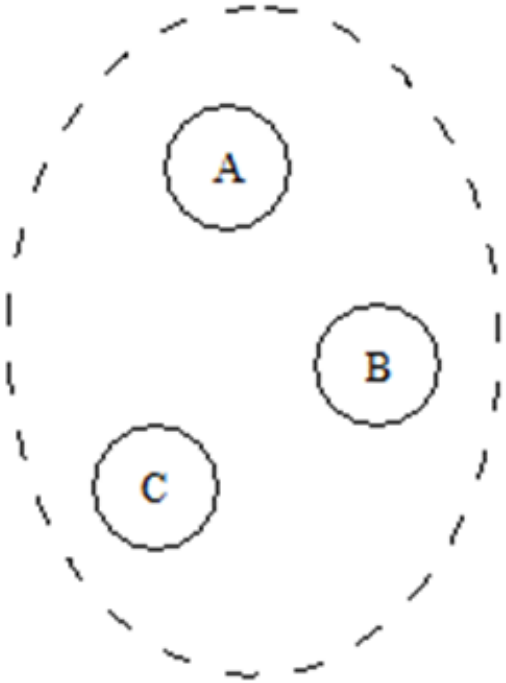
Comunicação directa



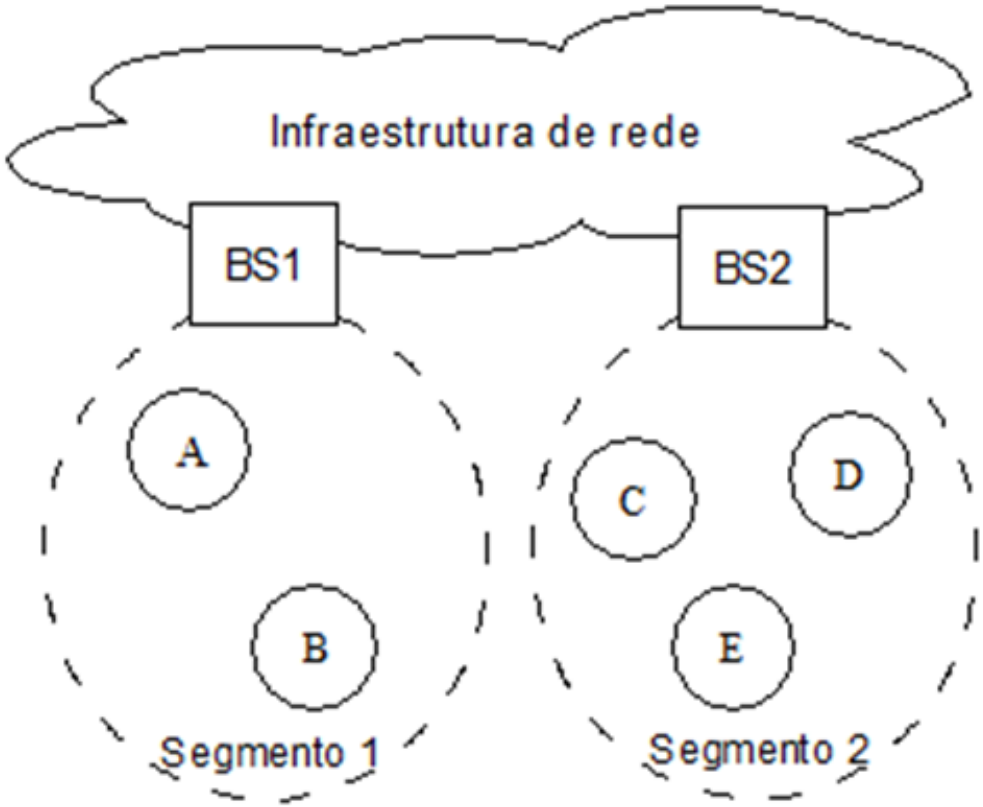
Comunicação centralizada

- Central station: Master, Base station, Access point
- Topologies
  - Star, Mesh, Tree
  - Physical vs. Logical, Cabled (Bus, Ring)

Ad hoc vs. Infrastructure-based Networks

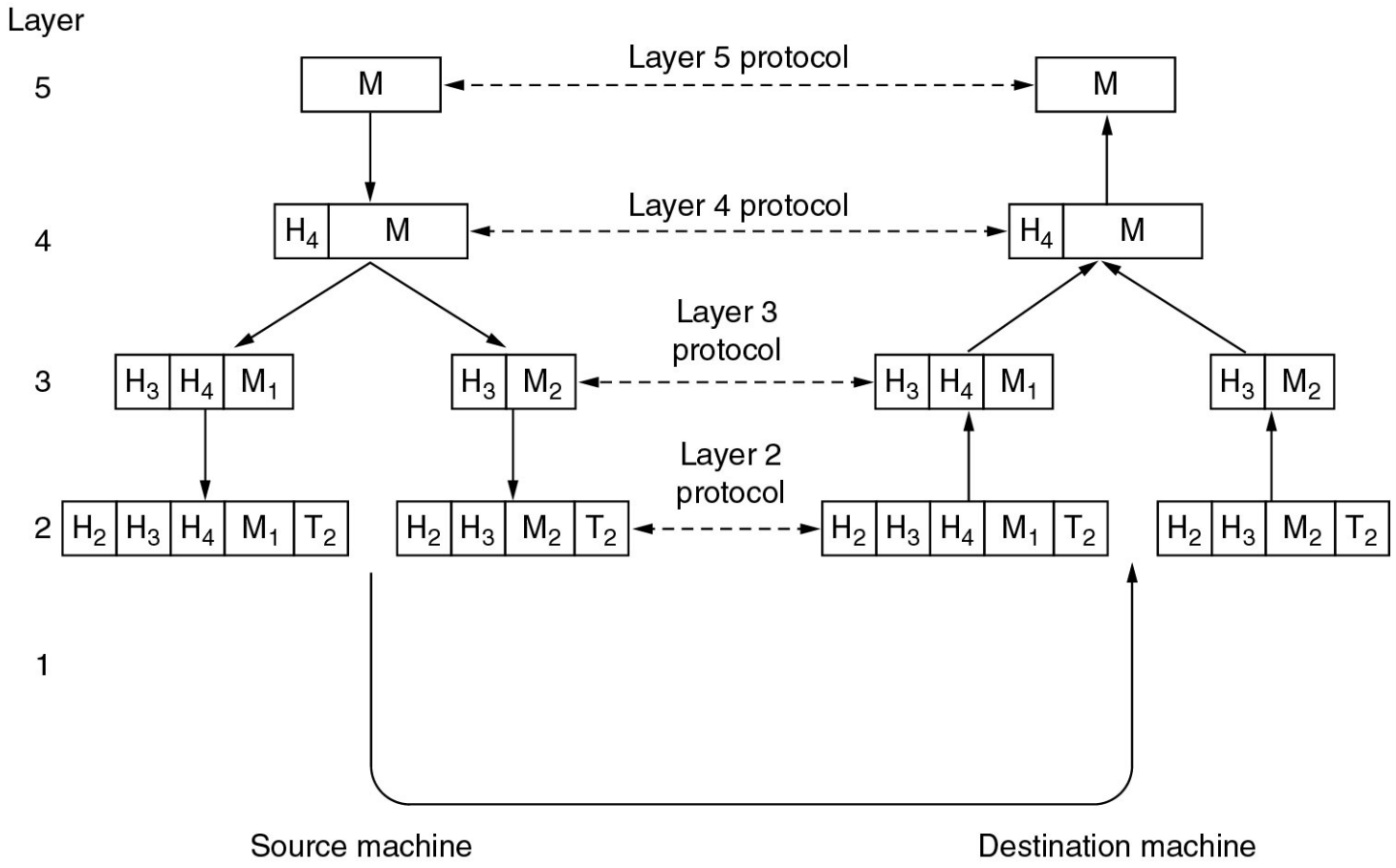


Rede ad hoc



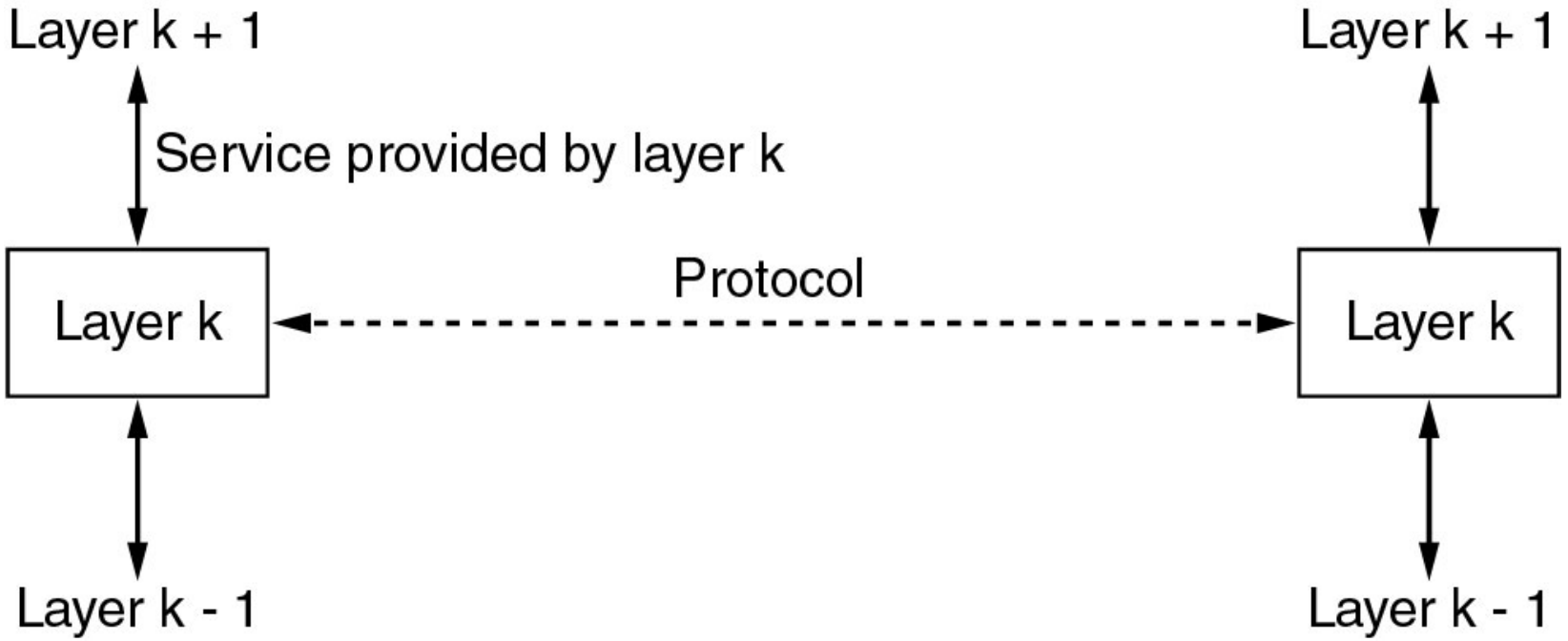
Rede baseada em infraestrutura

Protocol Hierarchies

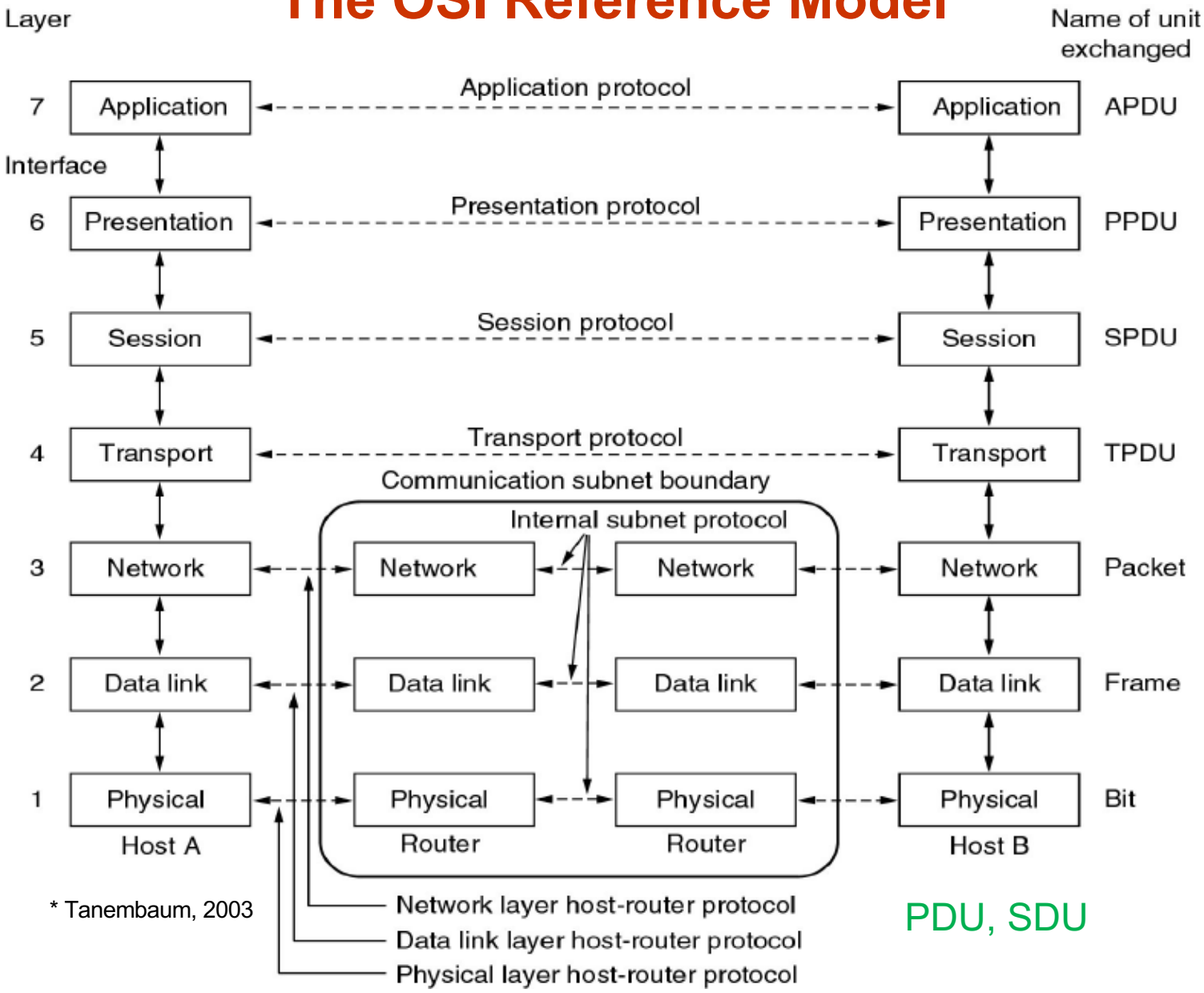


Protocols, Modularity (Layers), Encapsulation, Layer Independence

Services to Protocols Relationship



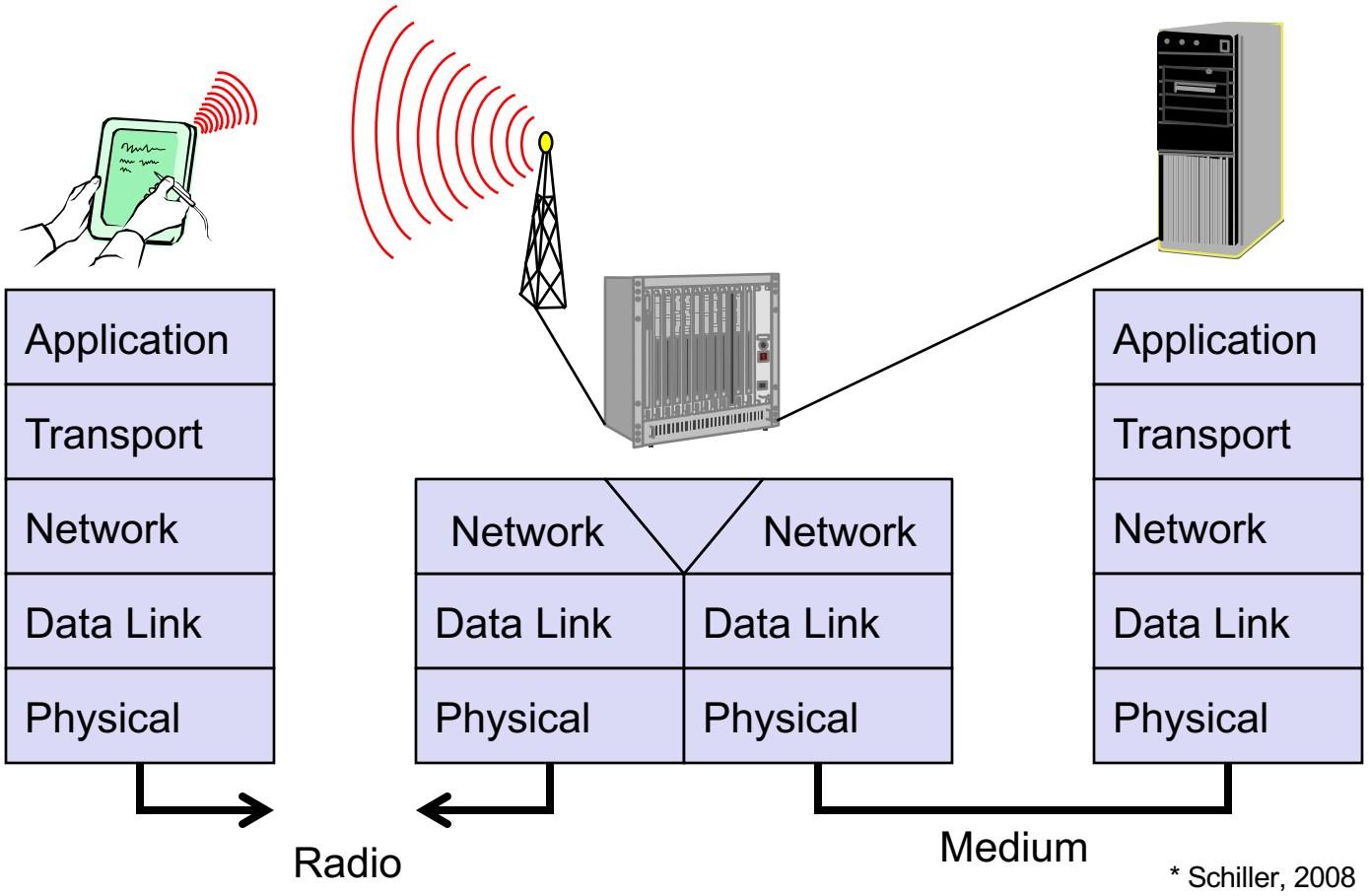
The OSI Reference Model



* Tanembaum, 2003

PDU, SDU

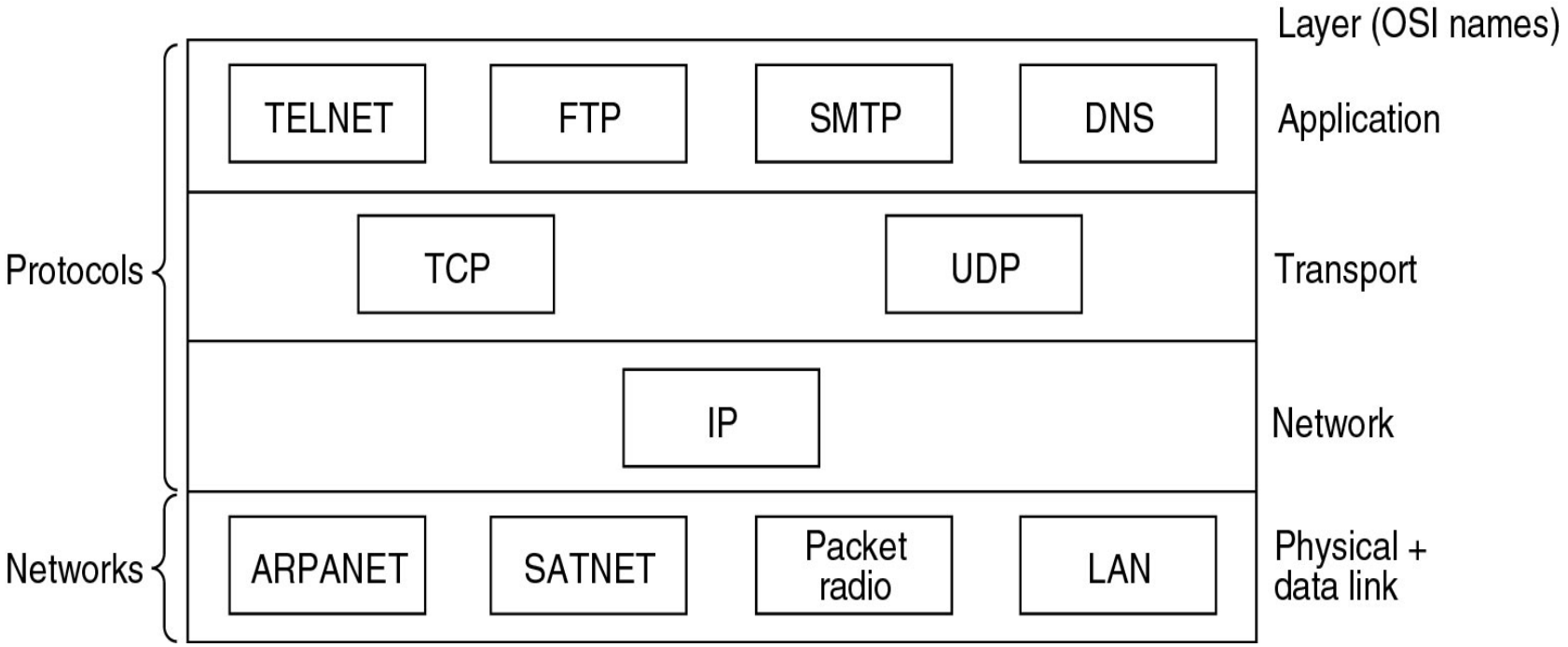
Reference Model Used in Practice



Internetworking, Gateways

Stack Example: TCP/IP

- Protocols and networks in the TCP/IP model initially.

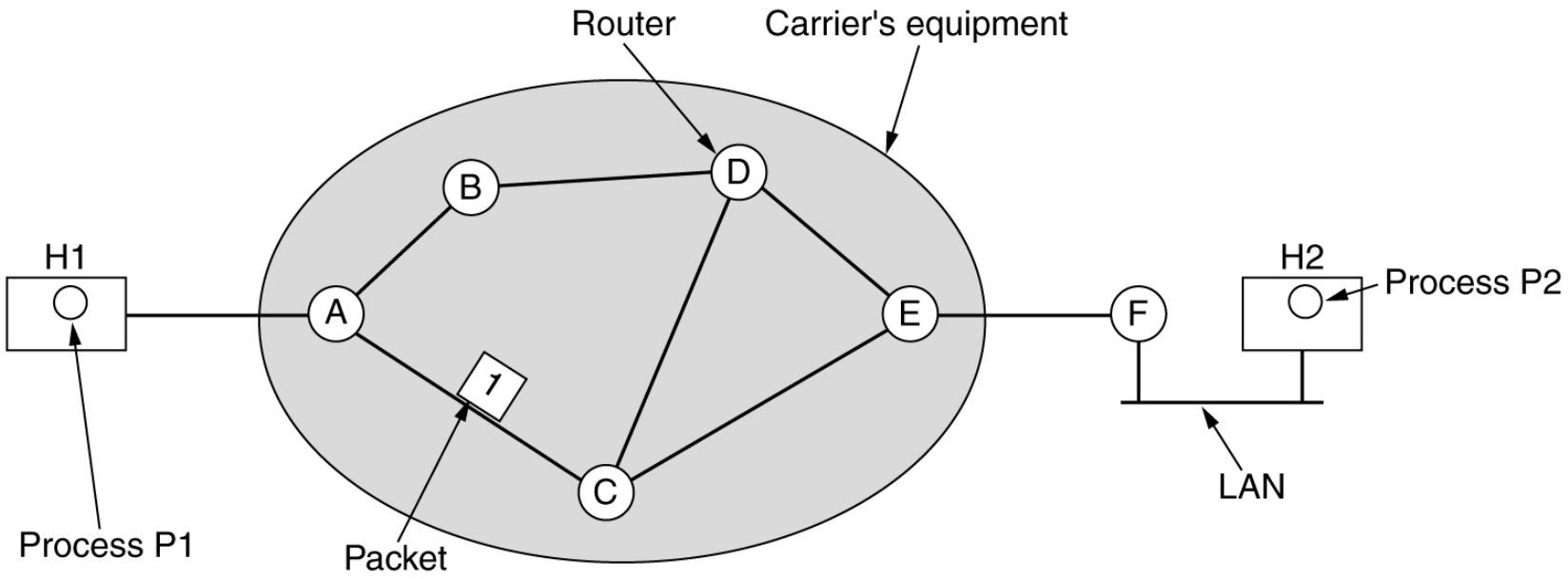


Functions of the Layers

- **Physical Layer**
  - Concerns transmission of the bit stream at the electrical and mechanical level
  - Modulation
  - Synchronization
  - Error Correction
- **Data Link Layer**
  - Framing – Identification of start and end of frames
  - Error Control
  - Flow Control
  - Medium Access Control

Functions of the Layers (cont.)

- **Network Layer**
  - Routing
  - Addressing
  - Internetworking
  - Congestion control



Functions of the Layers (cont.)

- **Transport Layer**
  - End-to-end error control and flow control
  - Multiplexing
- **Application Layer**
  - Supports application and end-user processes