OSI/ISO model

Foundations of computer networks

Communication protocol

- Short definition: Set of rules of communication

- Elements
  - Handshake
  - Data transmission
  - Verification and confirmation
  - Termination

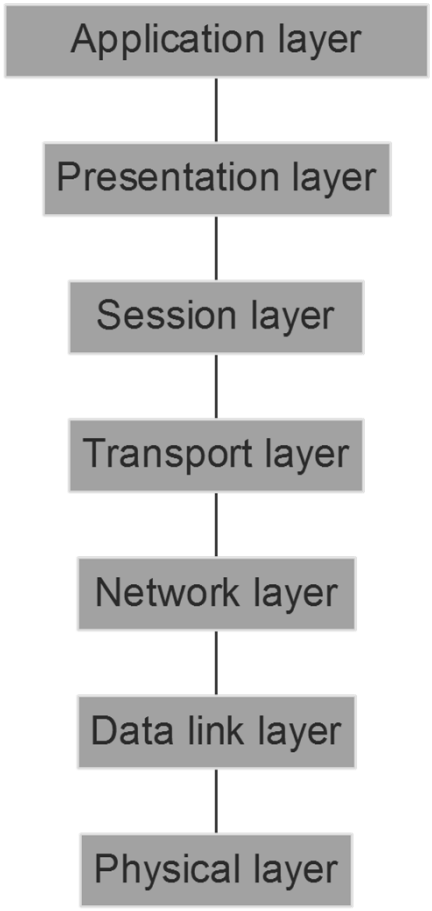
Compare wikipedia.org

ISO

- International Organisation for Standardisation
  - founded on 23 February 1947
  - members from 162 countries
  - iso.org

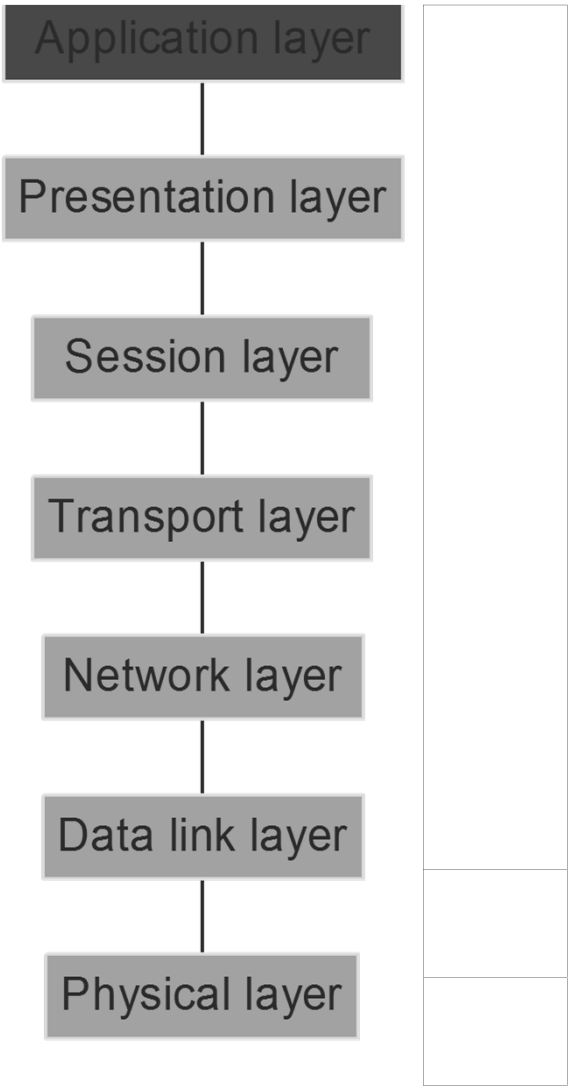
Model OSI

Open System Interconnect



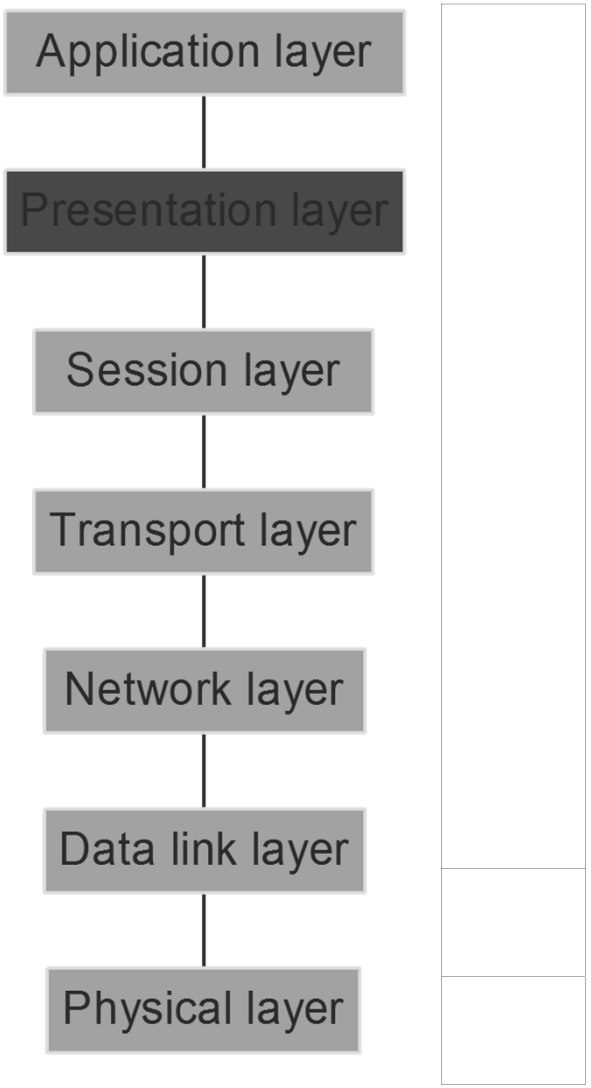
Application layer

- Creates user interface support, provides a standard application services, e.g. e-mail
  - It provides an interface to different file systems
  - It provides a common API for file sharing services, printing and communications



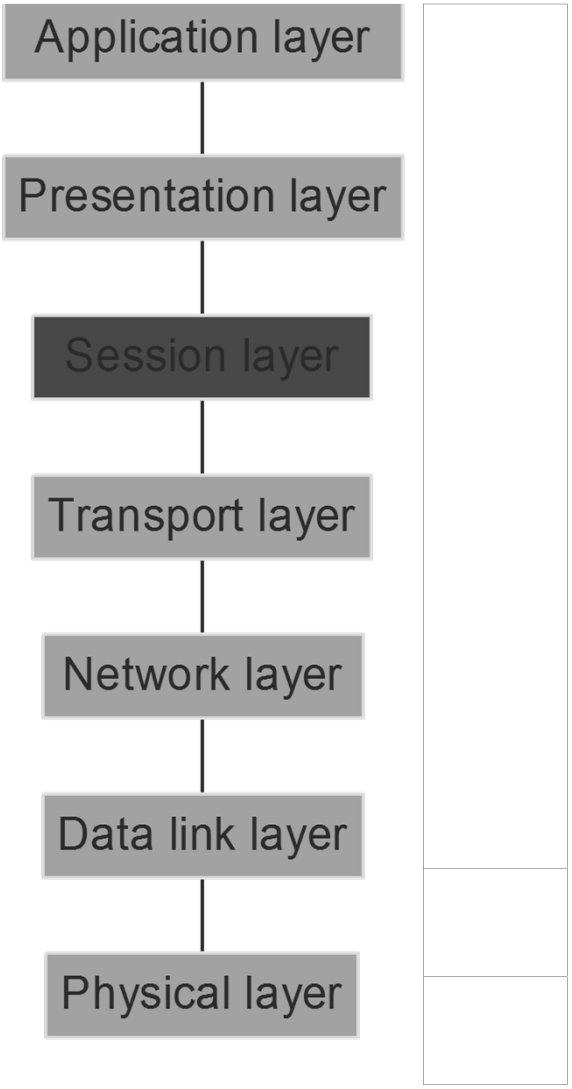
Presentation layer

- Defines the architecture independent data format, converts the data
  - It defines a common syntax and the meaning of data
  - Converts data to the format required by the computer through a coding and replacing function



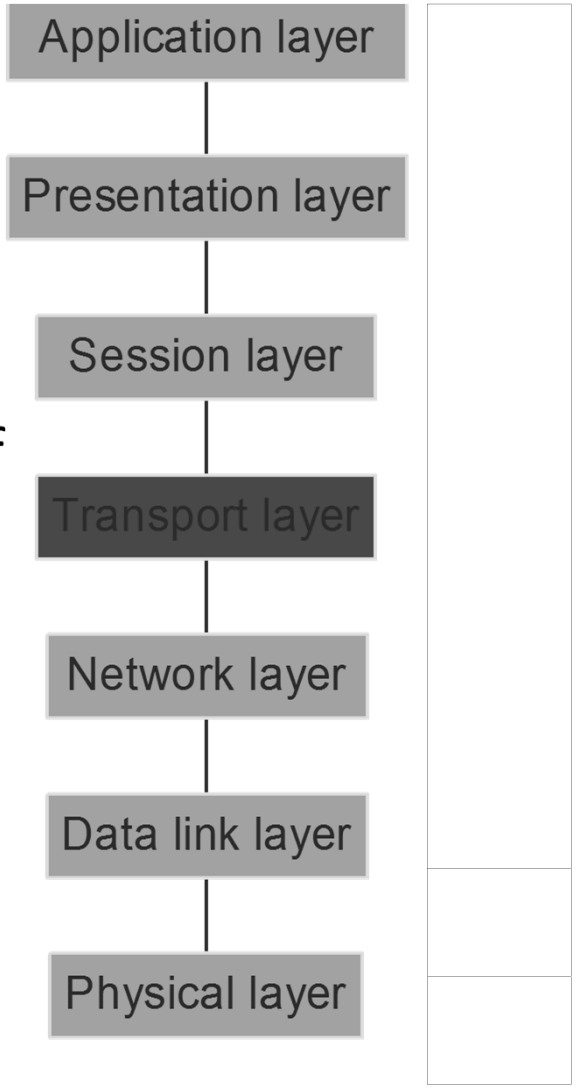
Session layer

- It supervises the connection (dialog) between systems (users), notifies errors occurs in lower layers
  - Establishes a session between services and clients
  - Supports logical service names
  - Provides checkpoints and synchronization



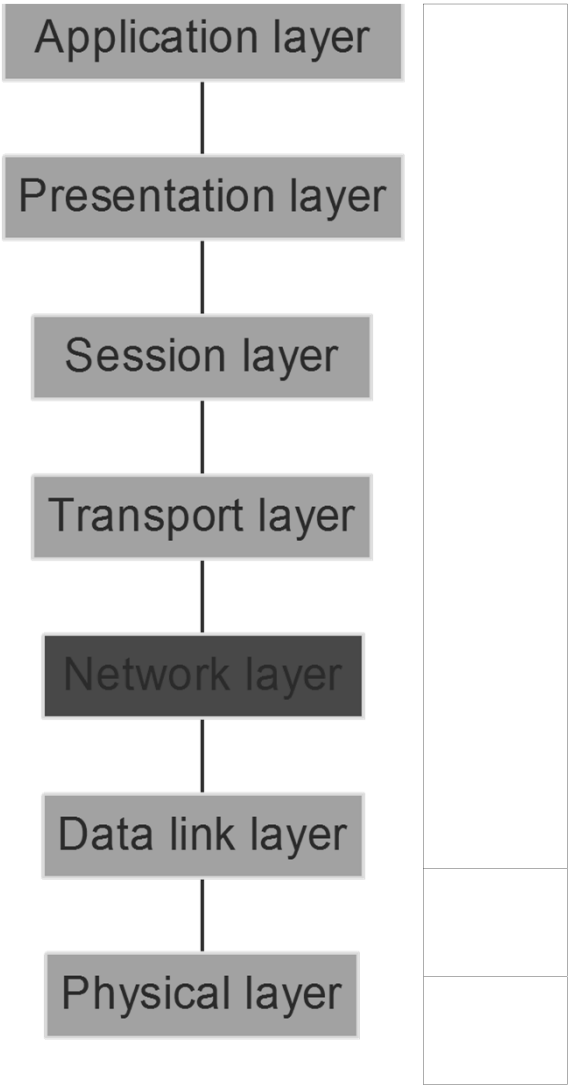
Transport layer

- It manages connections realises by network layer, provides reliable of data stream flow, control sequences of packages, recognizes doublets, timeouts, etc.
  - During sending divides the data into blocks which links during receiving
  - It carry on flow control, detects and eliminates of errors
  - It provides a separate connection for each session



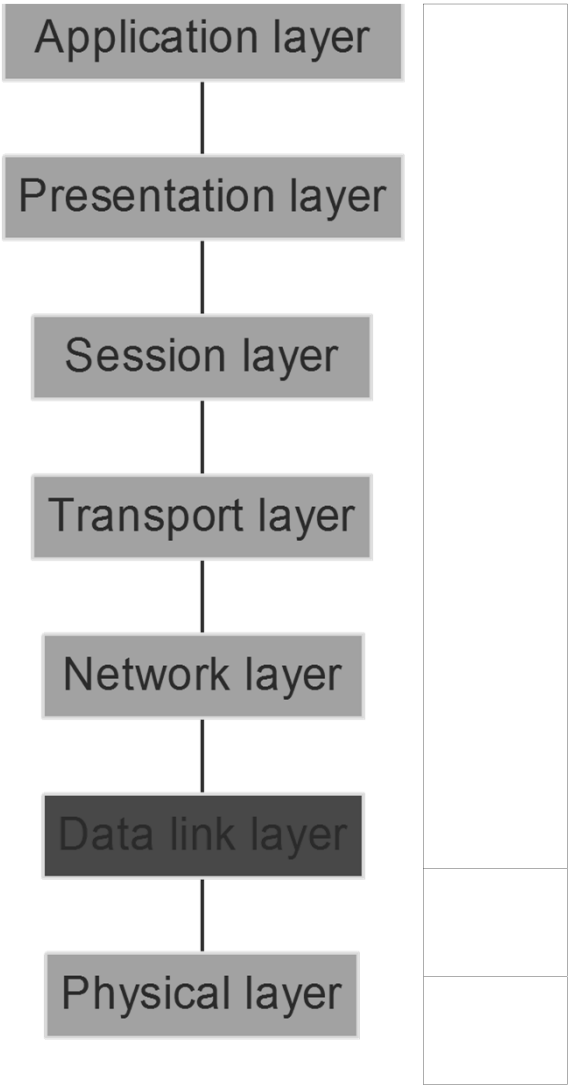
Network layer

- Creates packages, realises a route for the packets, supports network addresses, performs fragmentation and defragmentation of information
  - Makes internetwork internetwork transmission using routing functions
  - Defines addressing between stations (node+network)
  - Provides connectionless packet delivery service



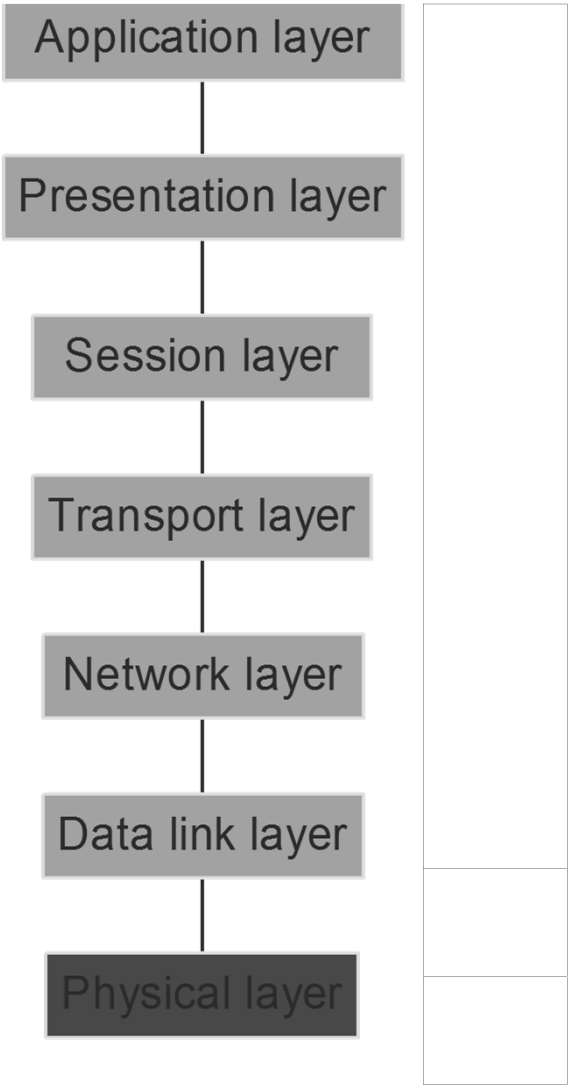
Data link layer

- Defines the rules for sending and receiving information, creates frames, monitors the flow at the physical layer
  - Sends frame, converts the received bytes into frames
  - Specifies the physical address of the station, manages the link
  - Realises the error detection in the physical layer

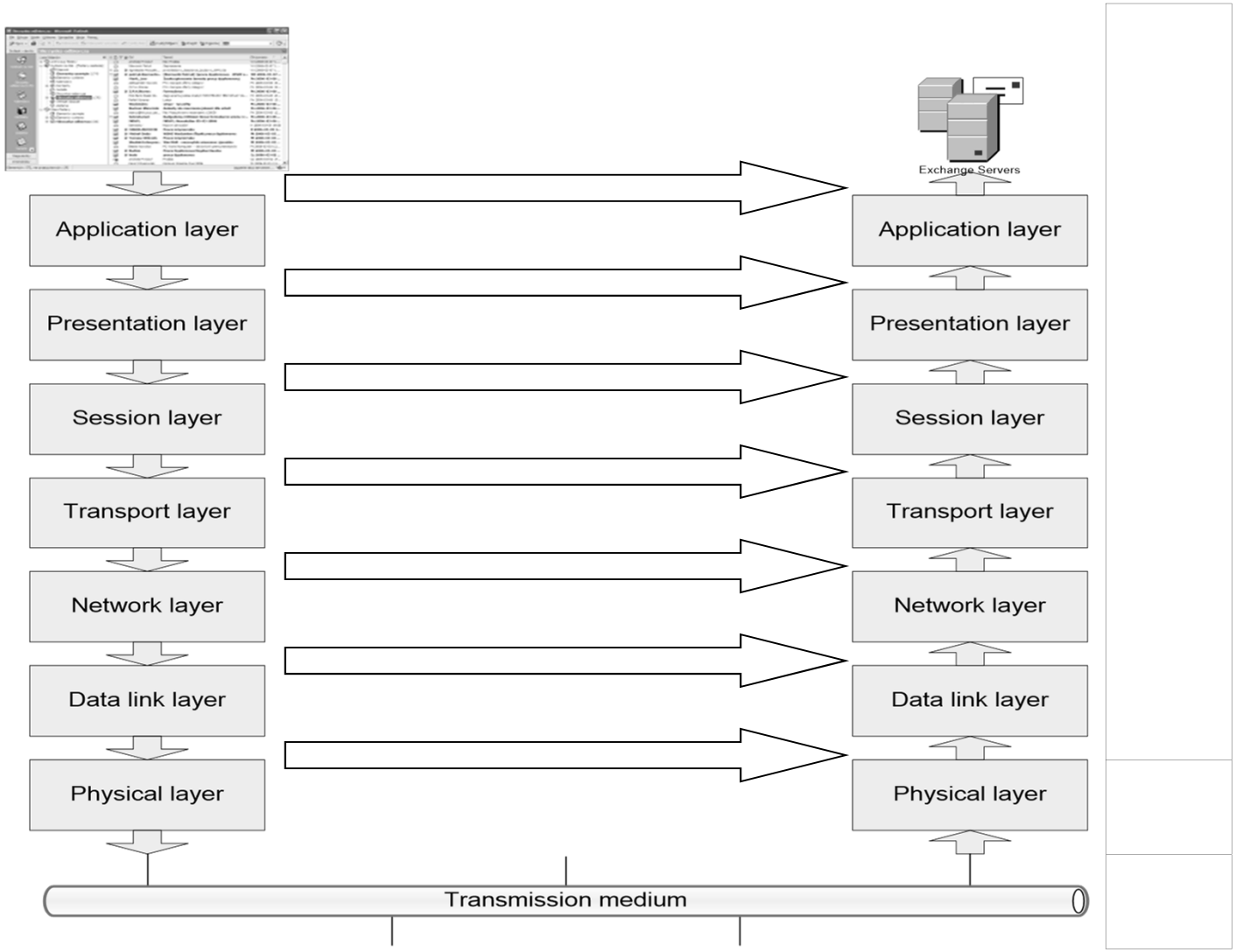


Physical layer

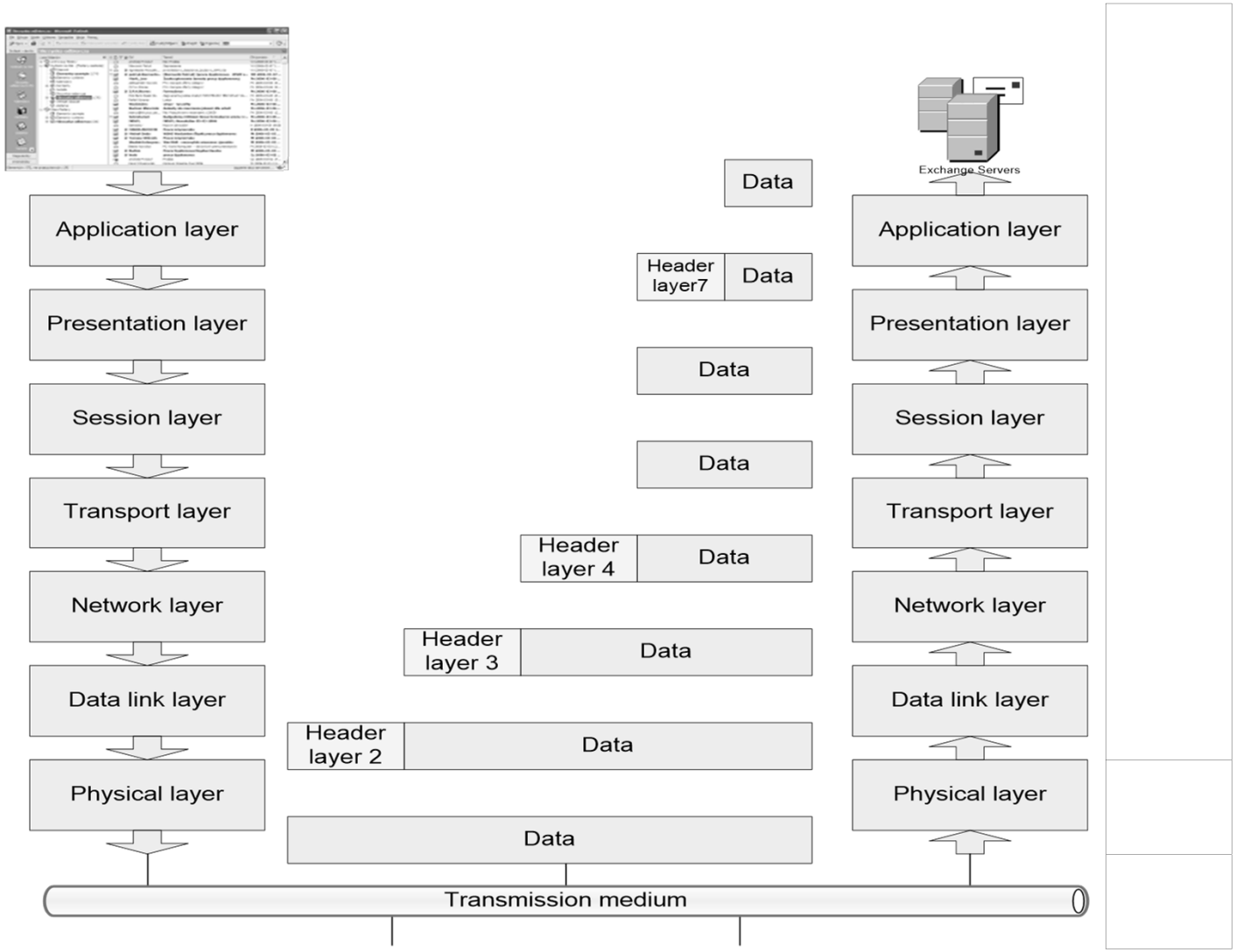
- Connects network devices, defines the electrical and mechanical components and electrical (also optical) signals in medium
  - Provides access to the medium
  - Defines the voltage, current and transfer rate of binary data
  - Defines the physical connection



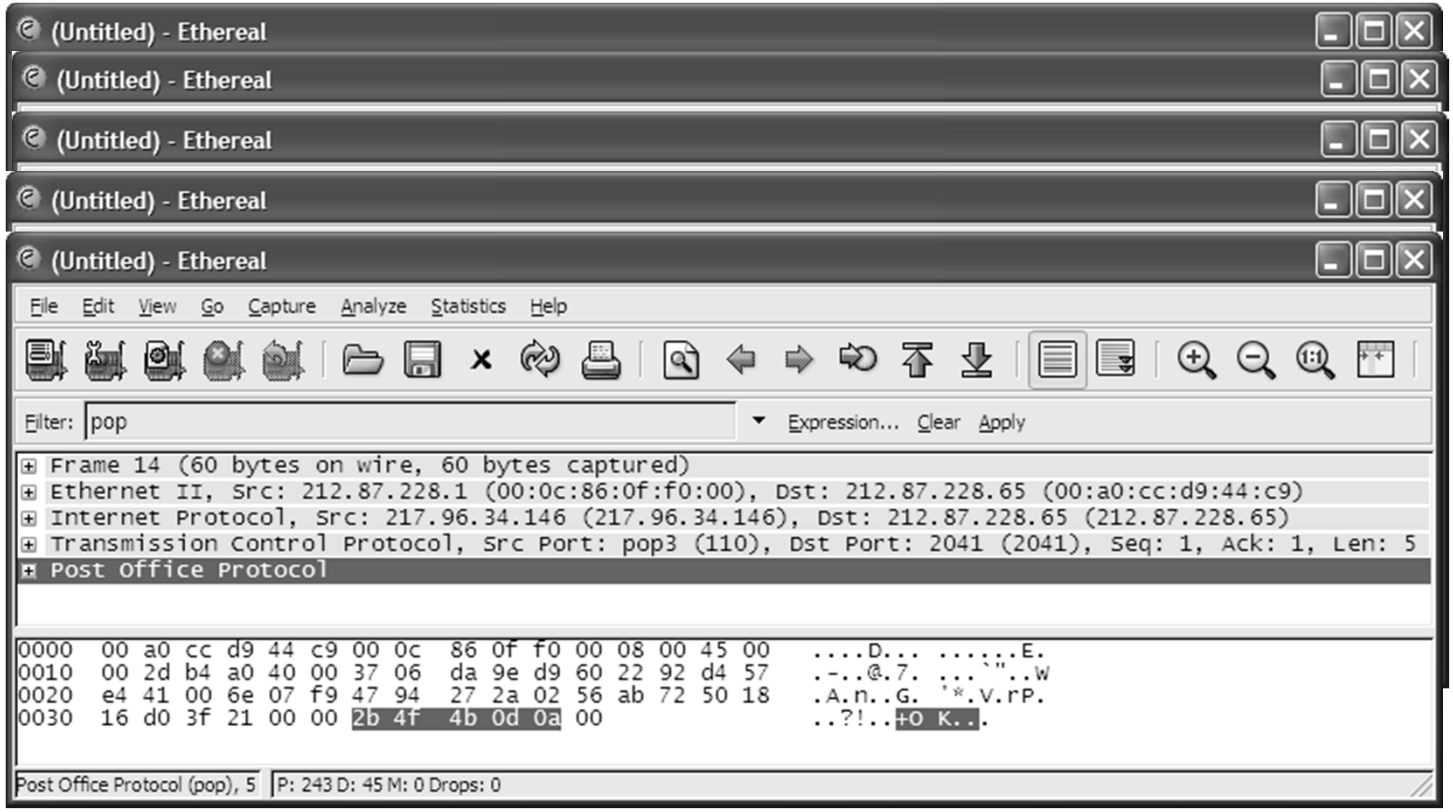
Functioning



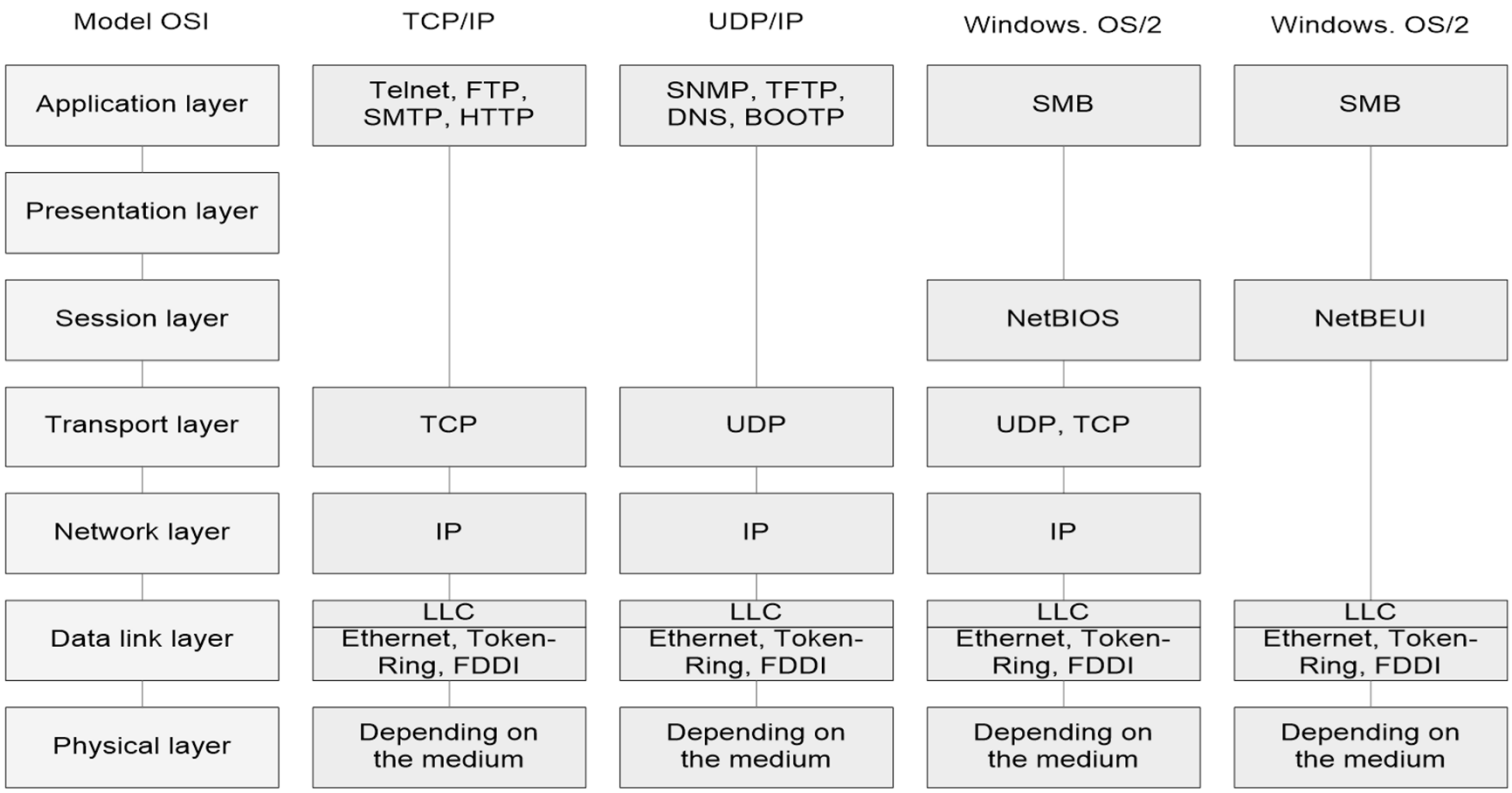
Encapsulation



Example of encapsulation



OSI model vs. other stacks of protocols



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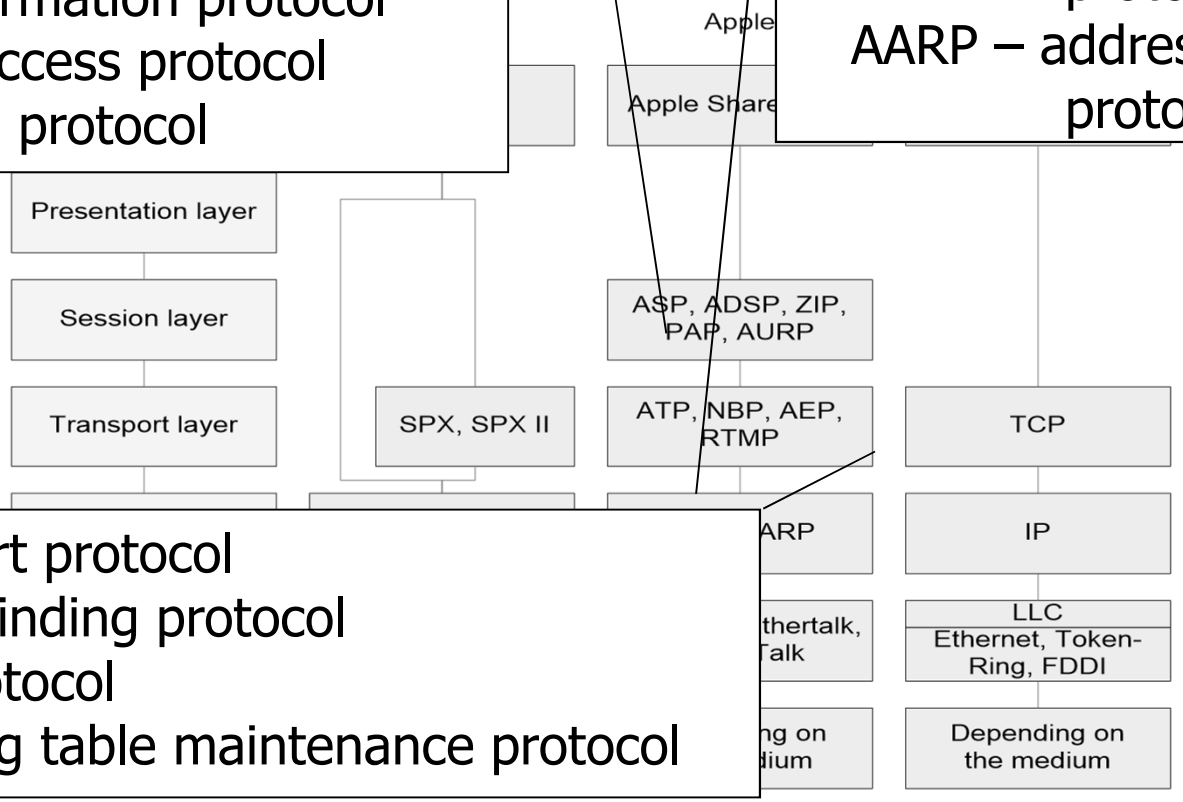
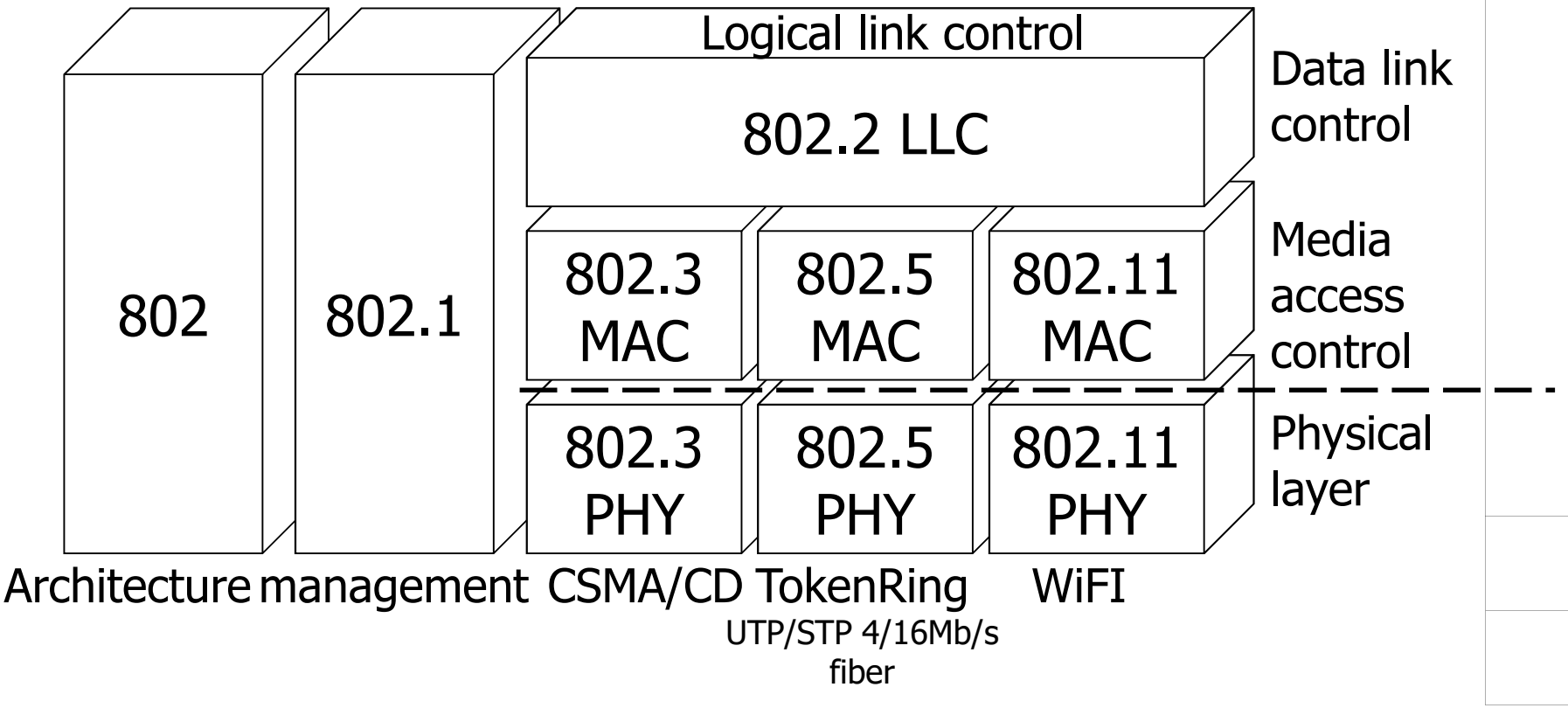
ASP – session protocol
ADSP – data stream protocol
ZIP – zone information protocol
PAP – printer access protocol
AURP – routing protocol

DDP – datagram delivery protocol
AARP – address resolution protocol

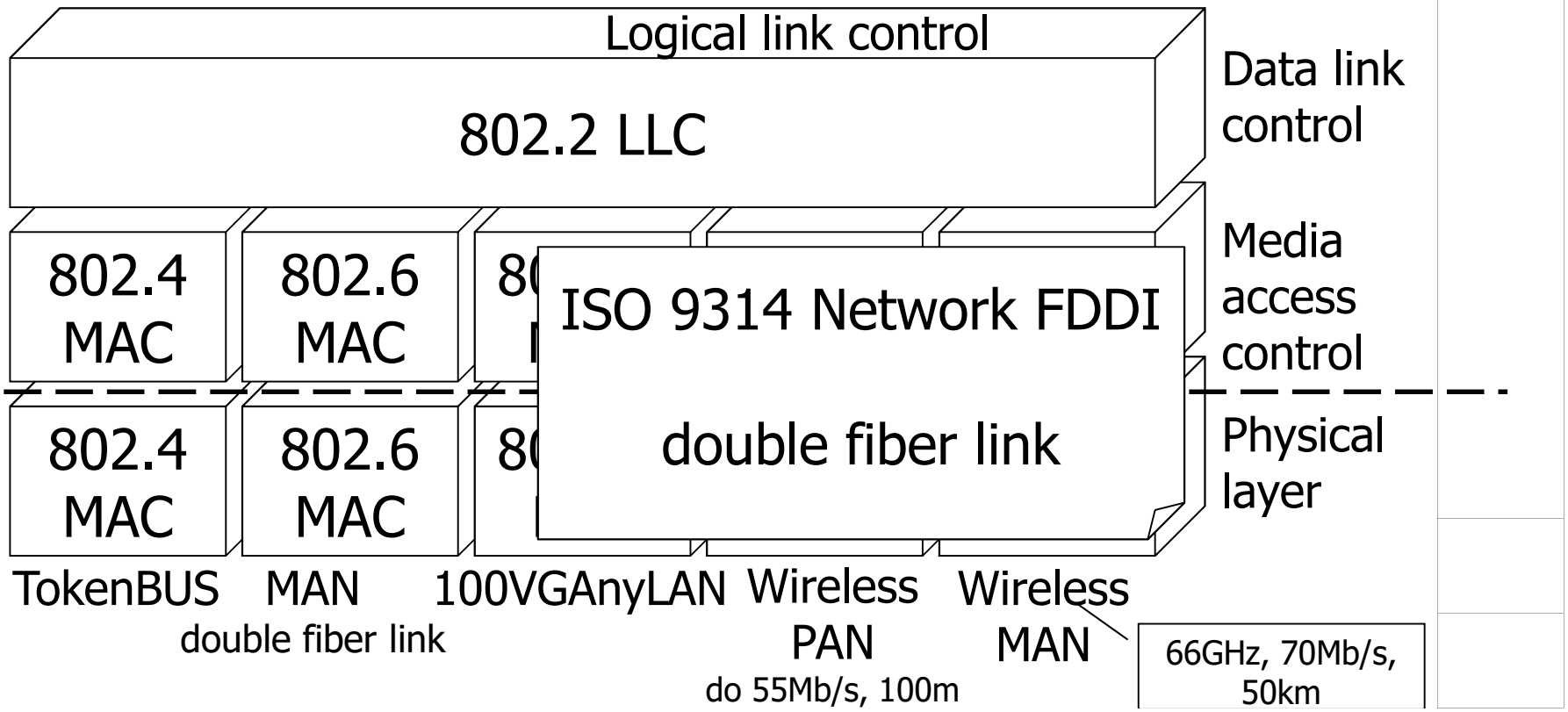


ATP – transport protocol
NBP – name binding protocol
AEP –echo ptotocol
RTMP – routing table maintenance protocol

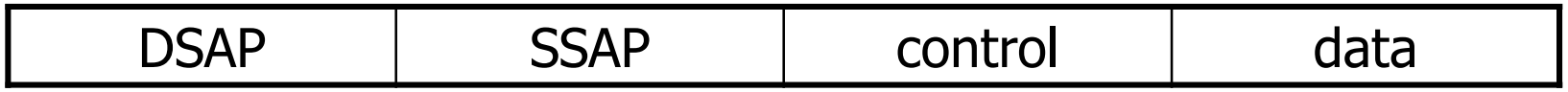
IEEE 802


802
802.1
Logical link control
802.2 LLC
802.3 MAC
802.5 MAC
802.11 MAC
802.3 PHY
802.5 PHY
802.11 PHY
Data link control
Media access control
Physical layer
Architecture
management
CSMA/CD
TokenRing
WiFI
UTP/STP 4/16Mb/s
fiber

IEEE 802 c.d.


Logical link control
802.2 LLC
Data link control
802.4 MAC
802.6 MAC
ISO 9314 Network FDDI
double fiber link
Media access control
Physical layer
TokenBUS
MAN
double fiber link
100VGAnyLAN
Wireless PAN
do 55Mb/s, 100m
Wireless MAN
66GHz, 70Mb/s, 50km

IEEE 802.2 LLC



- DSAP
  - Destinatio
- SSAP
  - Source Ser
- control
  - determine
    layers abo

type 1 - connectionless service, without connection set, it can be a two-point or multipoint (broadcast)
type 2 - connection service - sending information after making the connection link (guarantees control of the order flow, errors confirmation)
type 3 - connectionless service with confirmation, no statement of links, but the response from the receiver which confirming the receiving