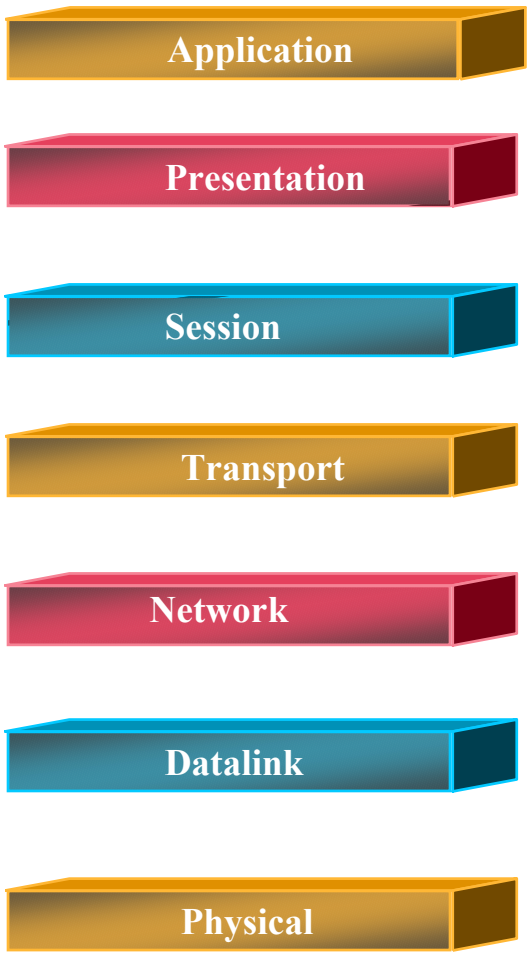
OSI Model

OSI Model

- ISO Standard 7489
- Composed of seven layers
- Each layer can be viewed as a protocol
  - Protocol: a set of rules that govern communications between hardware and/or software components
- OSI model is both hardware & software

OSI Layers



- **Network (not user) applications**
- **Ensures that information sent from one system will be readable by another system.**
- **Manages, communication sessions (program to program logical link)**
- **End to end network reliability**
- **Network to network link. Uses logical addresses**
- **Provides transport of data across a local physical network link. Uses physical addresses**
- **Specifications for the physical link between systems**

Physical Layer

- The physical layer is concerned with:
  - The electrical, mechanical and procedural specifications for a point-to-point data transmission.
  - Many type of media can be used as long as it follows the specifications:

Coax	Optical
Fiber	Other

Data-Link Layer

- Provides a protocol that delivers reliability to upper layers for the point-to-point connections established by the physical layer.
- Builds upon the capabilities of the lower layer.

Data-Link Layer

- Note the Data-Link layer is split
  - MAC layer. This is hardware dependent
  - LLC layer. This is hardware independent

Specified by 802.X protocols

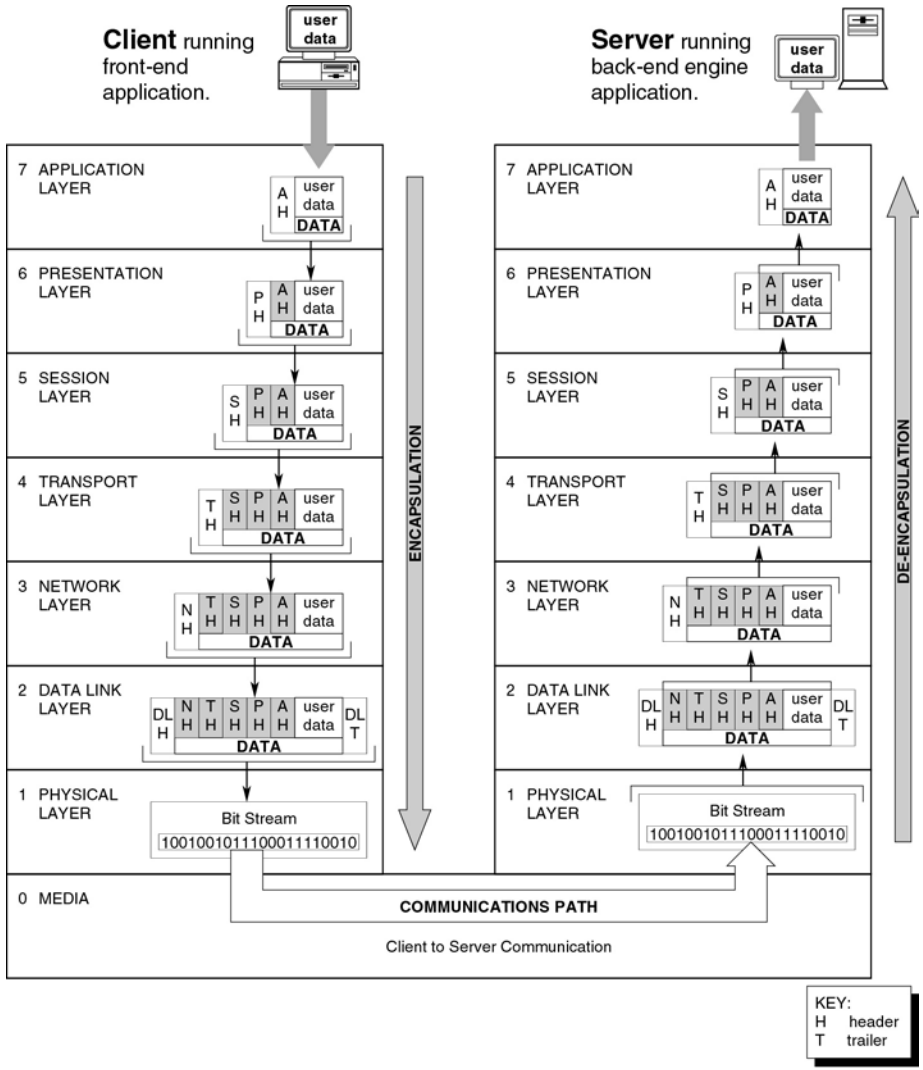
Assures reliability of point-to-point data links

Is This always true?

Network Layer

- The protocol responsible for the establishment, maintenance and termination of end-to-end network links.
- In the TCP/IP stack, provides the IP to IP communications
- This layer is protocol STACK dependent.
  - IP to IP
  - IPX to IPX

Layer to Layer Communications



GOLDMAN & RAWLES: LAN 2e
FIG: 02-02

Network Layer Transport

MAC Layer Transport

Physical Transport

Connection Media

Transport Layer

- Responsible for providing reliability for the end-to-end network layer connections
  - Error Recovery
  - Flow Control
  - Sequence Control
- Protocol stack dependent
  - SPX for Netware
  - TCP for TCP/IP

Session Layer

- Responsible for establishing, maintaining, and terminating sessions between user applications programs
- Application programs are referred to as Middleware
  - Low level links through the Web, to database programs, etc.

Presentation Layer

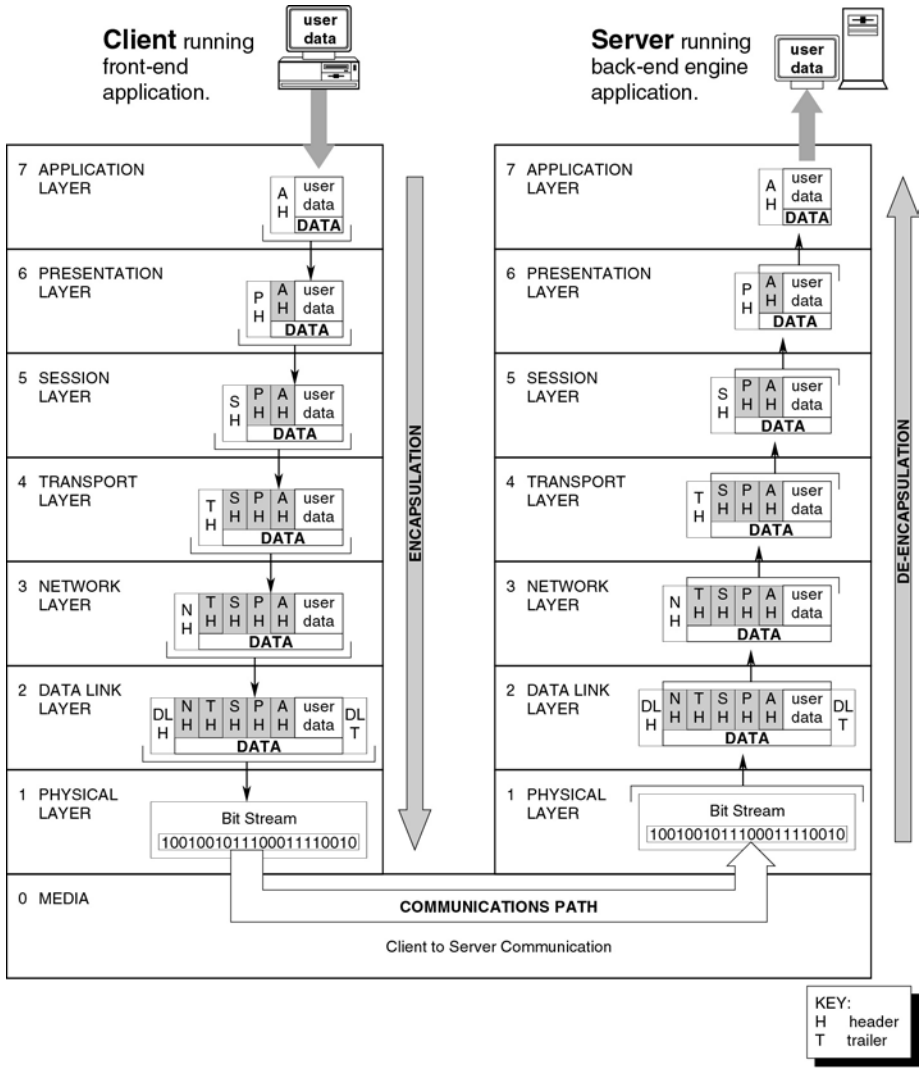
- Provides an interface between user application and various presentation-related services. (Not user interface related)
- Provides encoding transparency.
  - ASCII can talk to an EBCDIC
  - FYI, uses a common intermediate code

Application Layer

- Network applications such as:
  - Mail (SMTP) 
  - FTP
  - HTTP

- Not to be confused with user applications
  - Network Utilities

Encapsulation



De-Encapsulation

GOLDMAN & RAWLES: LAN 2e
FIG: 02-02

OSI Layers

- IP Protocol Supported Layers
  - Layers 1 & 2 match
  - Layers 3, & 4 are functionally present
  - No layers 5 & 6
  - Layer 7 is present
- IP predates the OSI model
  - more on this when we look at IP