OSI Model

Tasks involved in sending a letter

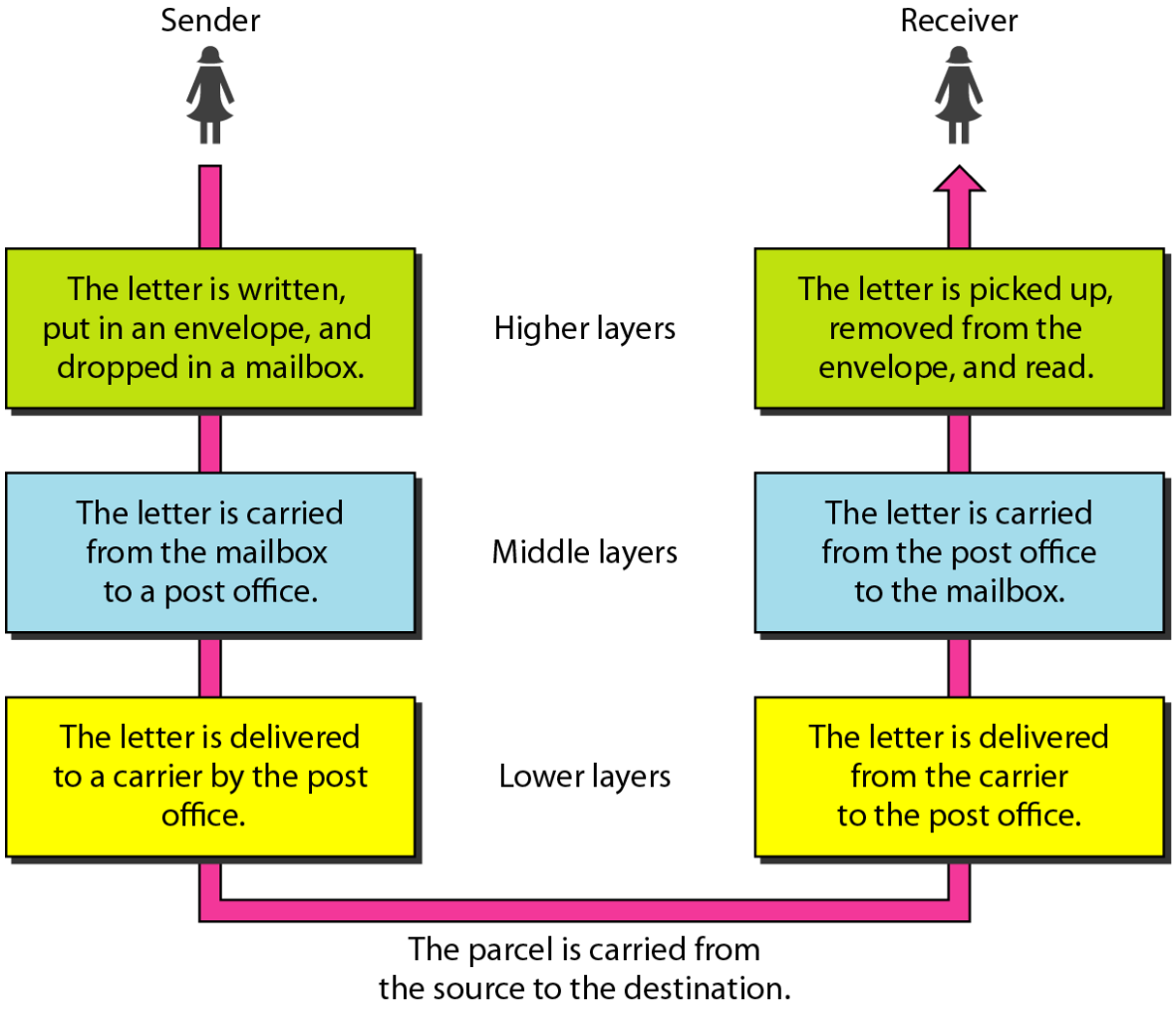
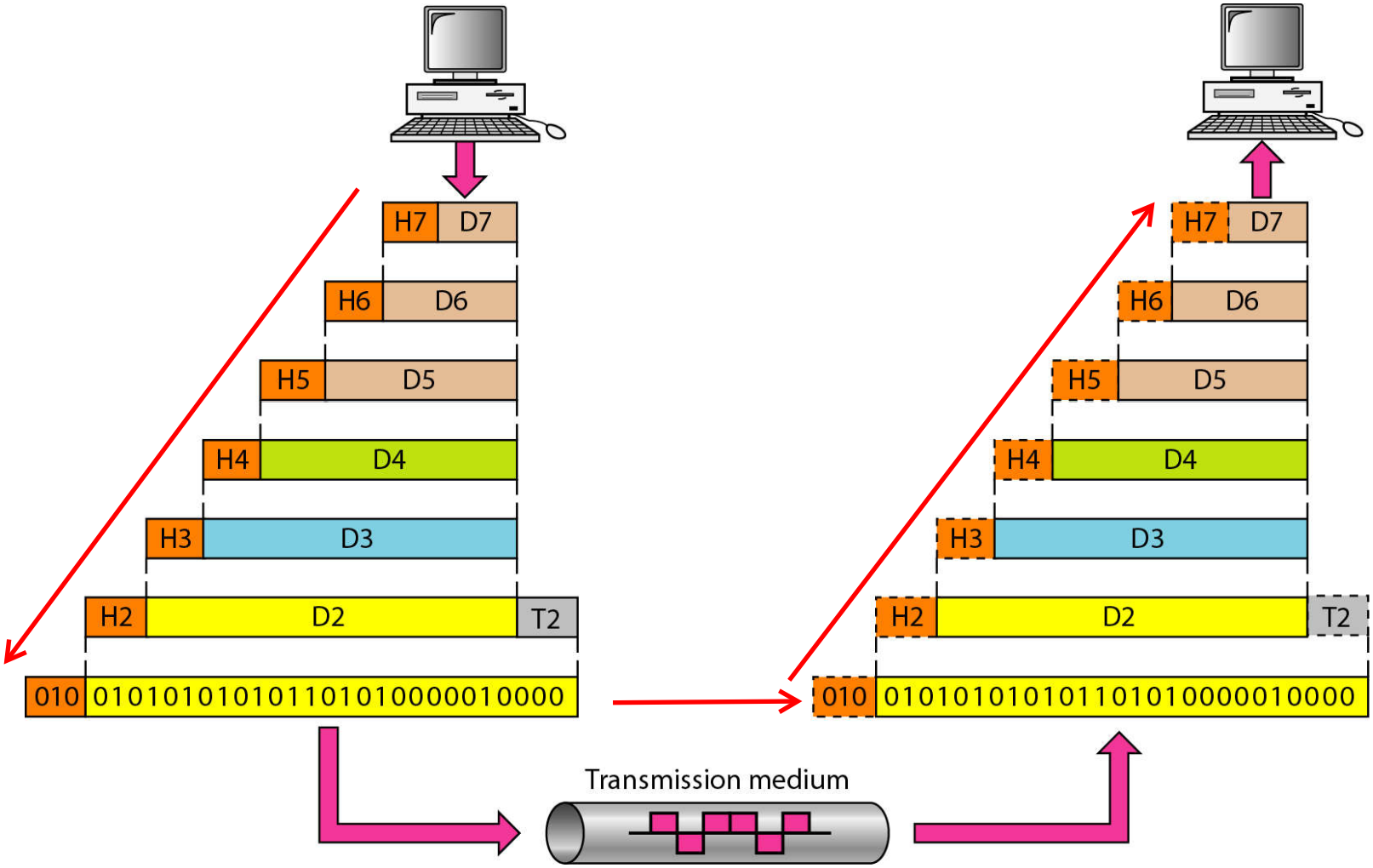


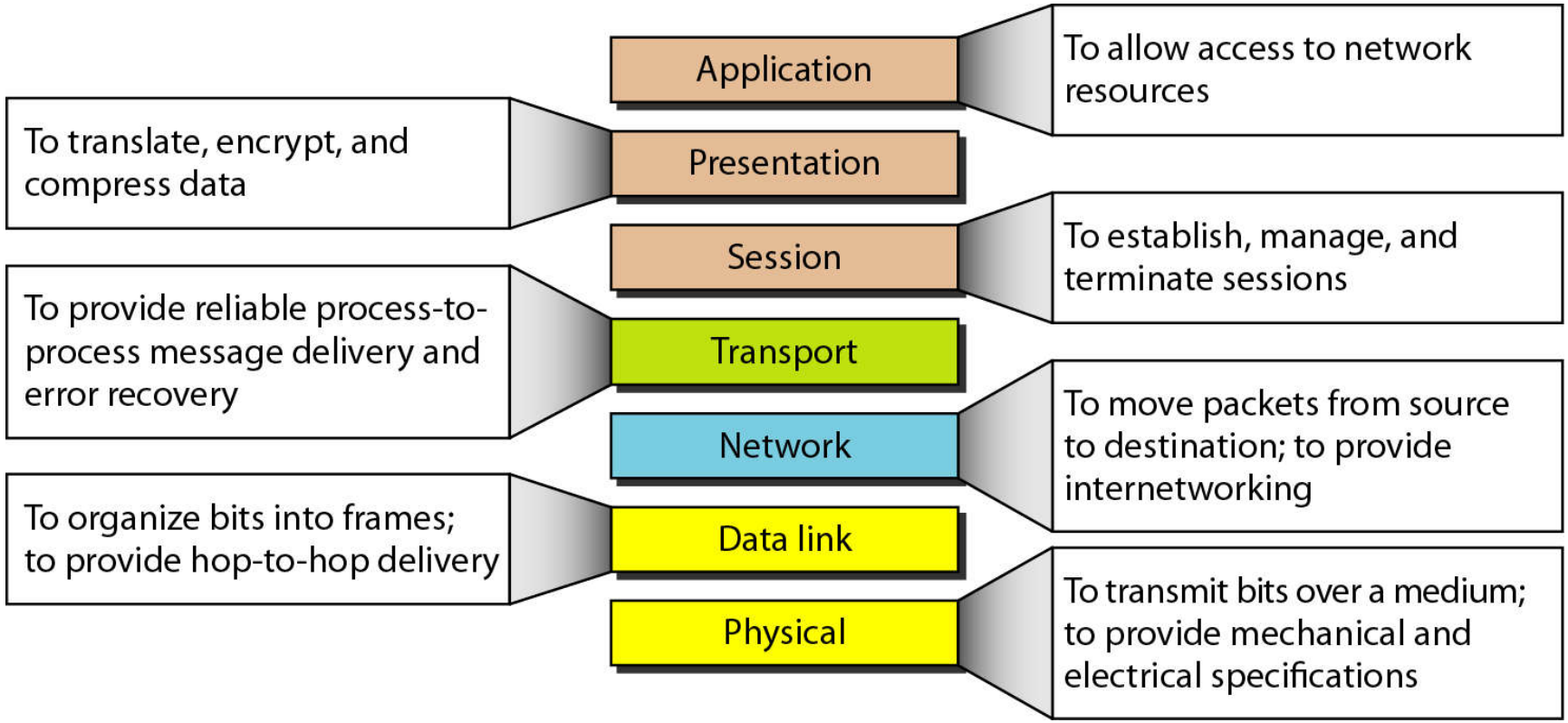
Figure 2.4 *An exchange using the OSI model*

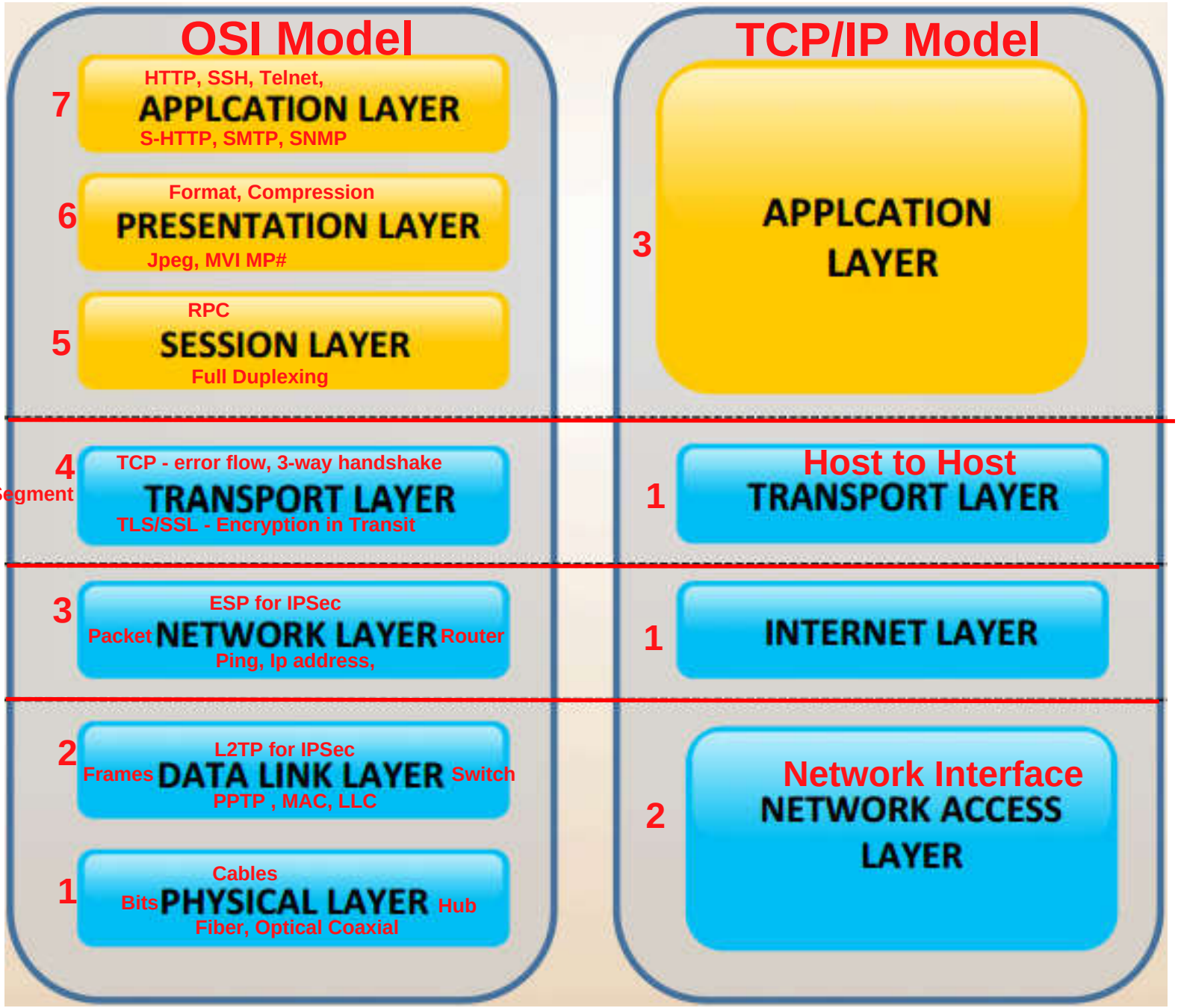


Summary of OSI Model Layers

7	The application layer is responsible for providing services to the user.
6	The presentation layer is responsible for translation, compression, and encryption.
5	The session layer is responsible for dialog control and synchronization.
4	The transport layer is responsible for the delivery of a message from one process to another.
3	The network layer is responsible for the delivery of individual packets from the source host to the destination host.
2	The data link layer is responsible for moving frames from one hop (node) to the next.
1	The physical layer is responsible for movements of individual bits from one hop (node) to the next.

Figure 2.15 *Summary of layers*




OSI Model
7
HTTP, SSH, Telnet,
APPLCATION LAYER
S-HTTP, SMTP, SNMP
6
Format, Compression
PRESENTATION LAYER
Jpeg, MVI MP#
5
RPC
SESSION LAYER
Full Duplexing
4
Segment
TCP - error flow, 3-way handshake
TRANSPORT LAYER
TLS/SSL - Encryption in Transit
3
ESP for IPSec
Packet
NETWORK LAYER
Router
Ping, Ip address,
2
L2TP for IPSec
Frames
DATA LINK LAYER
Switch
PPTP , MAC, LLC
1
Cables
Bits
PHYSICAL LAYER
Hub
Fiber, Optical Coaxial
TCP/IP Model
3
APPLCATION LAYER
1
Host to Host
TRANSPORT LAYER
1
INTERNET LAYER
2
Network Interface
NETWORK ACCESS LAYER

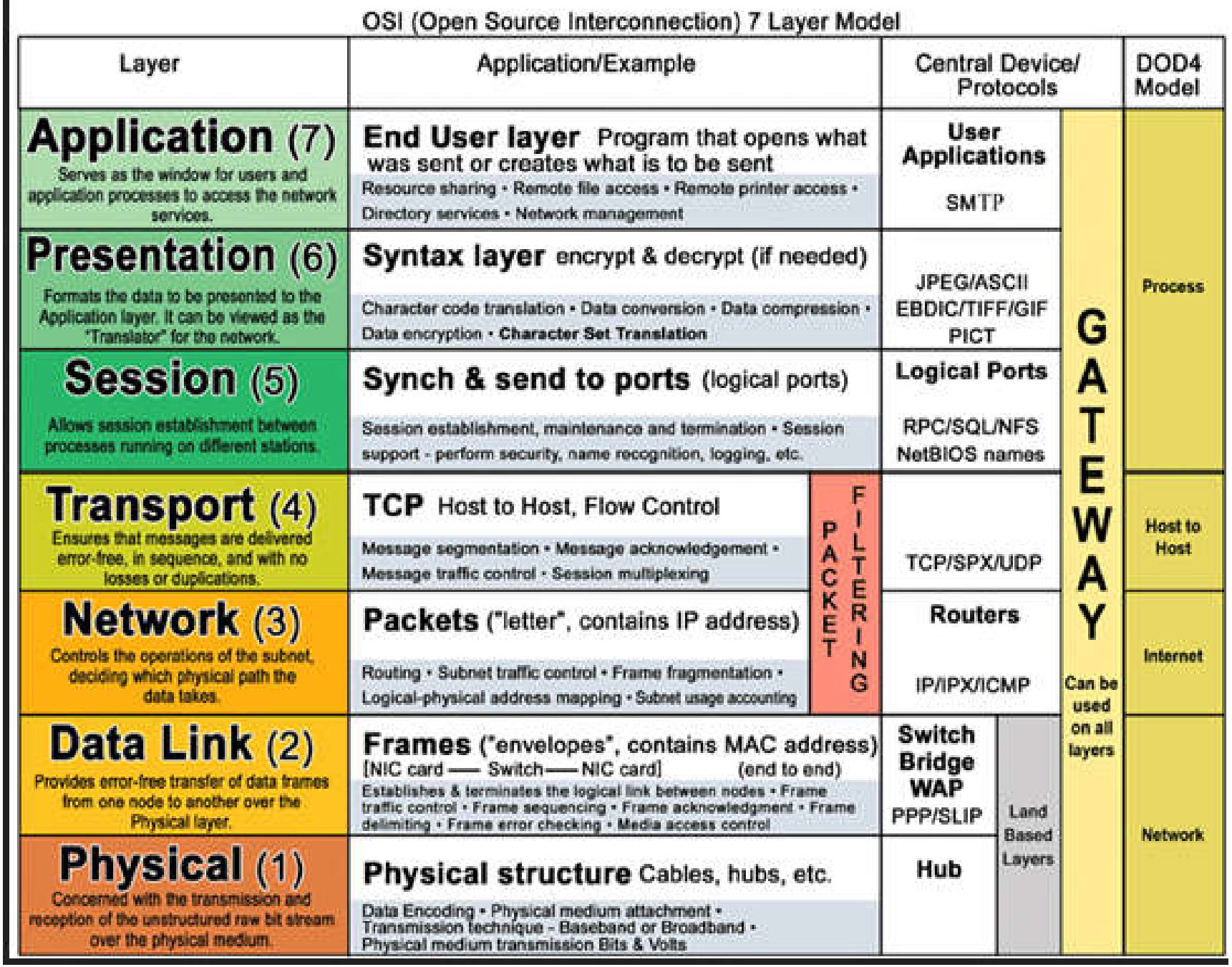
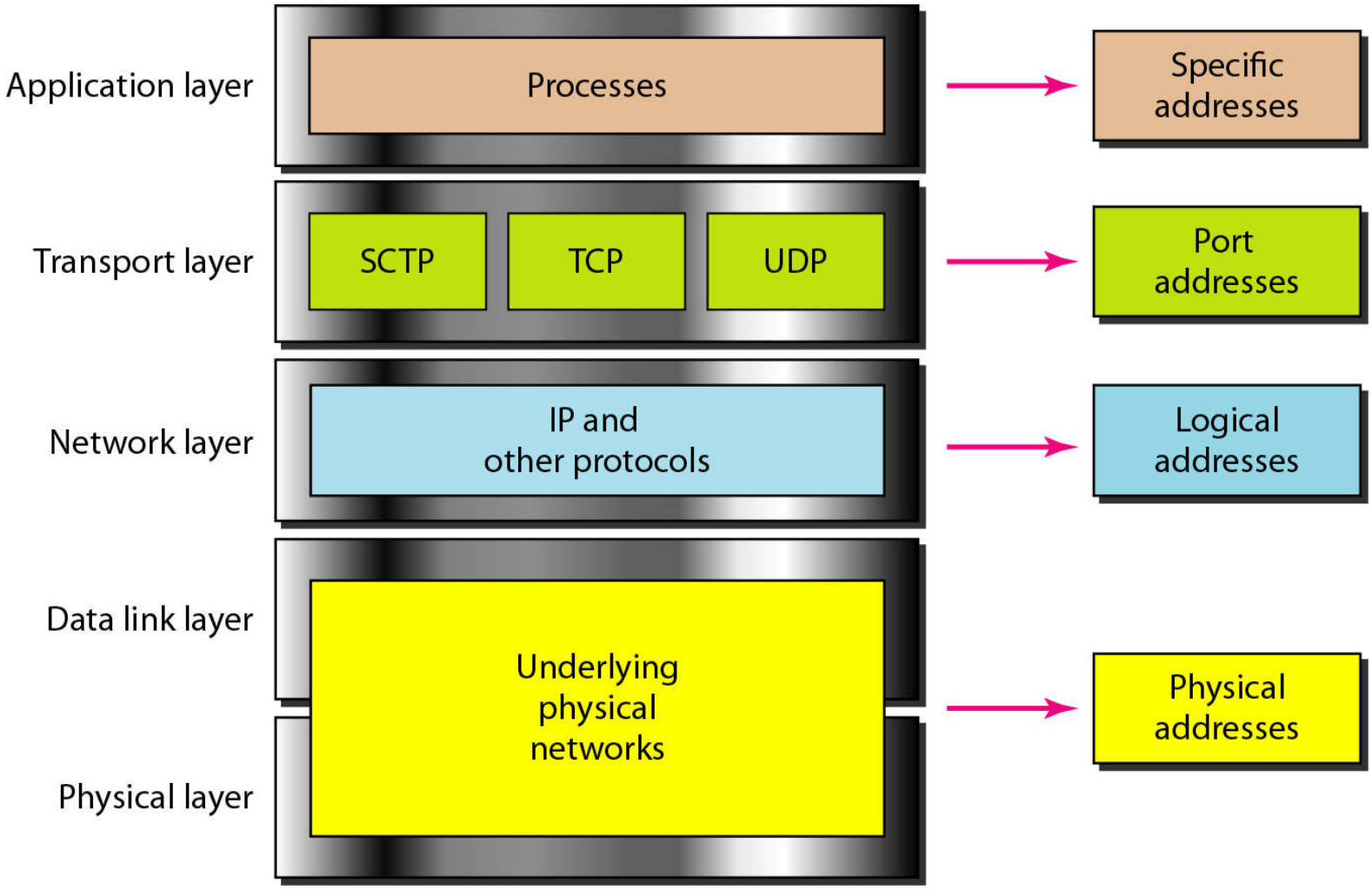
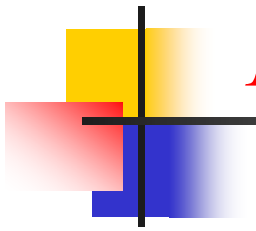

OSI (Open Source Interconnection) 7 Layer Model
Layer
Application/Example
Central Device/ Protocols
DOD4 Model
Application (7)
Serves as the window for users and application processes to access the network services.
End User layer Program that opens what was sent or creates what is to be sent
Resource sharing • Remote file access • Remote printer access • Directory services • Network management
User Applications
SMTP
Presentation (6)
Formats the data to be presented to the Application layer. It can be viewed as the "Translator" for the network.
Syntax layer encrypt & decrypt (if needed)
Character code translation • Data conversion • Data compression • Data encryption • Character Set Translation
JPEG/ASCII
EBDIC/TIFF/GIF
PICT
Process
Session (5)
Allows session establishment between processes running on different stations.
Synch & send to ports (logical ports)
Session establishment, maintenance and termination • Session support - perform security, name recognition, logging, etc.
Logical Ports
RPC/SQL/NFS
NetBIOS names
Transport (4)
Ensures that messages are delivered error-free, in sequence, and with no losses or duplications.
TCP Host to Host, Flow Control
Message segmentation • Message acknowledgement • Message traffic control • Session multiplexing
PACKET FILTERING
TCP/SPX/UDP
Host to Host
Network (3)
Controls the operations of the subnet, deciding which physical path the data takes.
Packets ("letter", contains IP address)
Routing • Subnet traffic control • Frame fragmentation • Logical-physical address mapping • Subnet usage accounting
Routers
IP/IPX/ICMP
Internet
Data Link (2)
Provides error-free transfer of data frames from one node to another over the Physical layer.
Frames ("envelopes", contains MAC address)
[NIC card — Switch — NIC card] (end to end)
Establishes & terminates the logical link between nodes • Frame traffic control • Frame sequencing • Frame acknowledgment • Frame delimiting • Frame error checking • Media access control
Switch
Bridge
WAP
PPP/SLIP
Land Based Layers
Network
Physical (1)
Concerned with the transmission and reception of the unstructured raw bit stream over the physical medium.
Physical structure Cables, hubs, etc.
Data Encoding • Physical medium attachment • Transmission technique - Baseband or Broadband • Physical medium transmission Bits & Volts
Hub
GATEWAY
Can be used on all layers

Figure 2.18 *Relationship of layers and addresses in TCP/IP*





Example 2.2 MAC Address

Most local-area networks use a 48-bit (6-byte) physical address written as 12 hexadecimal digits; every byte (2 hexadecimal digits) is separated by a colon, as shown below:

07:01:02:01:2C:4B

Vendor Name | Unique ID for NIC

A 6-byte (12 hexadecimal digits) physical address.