

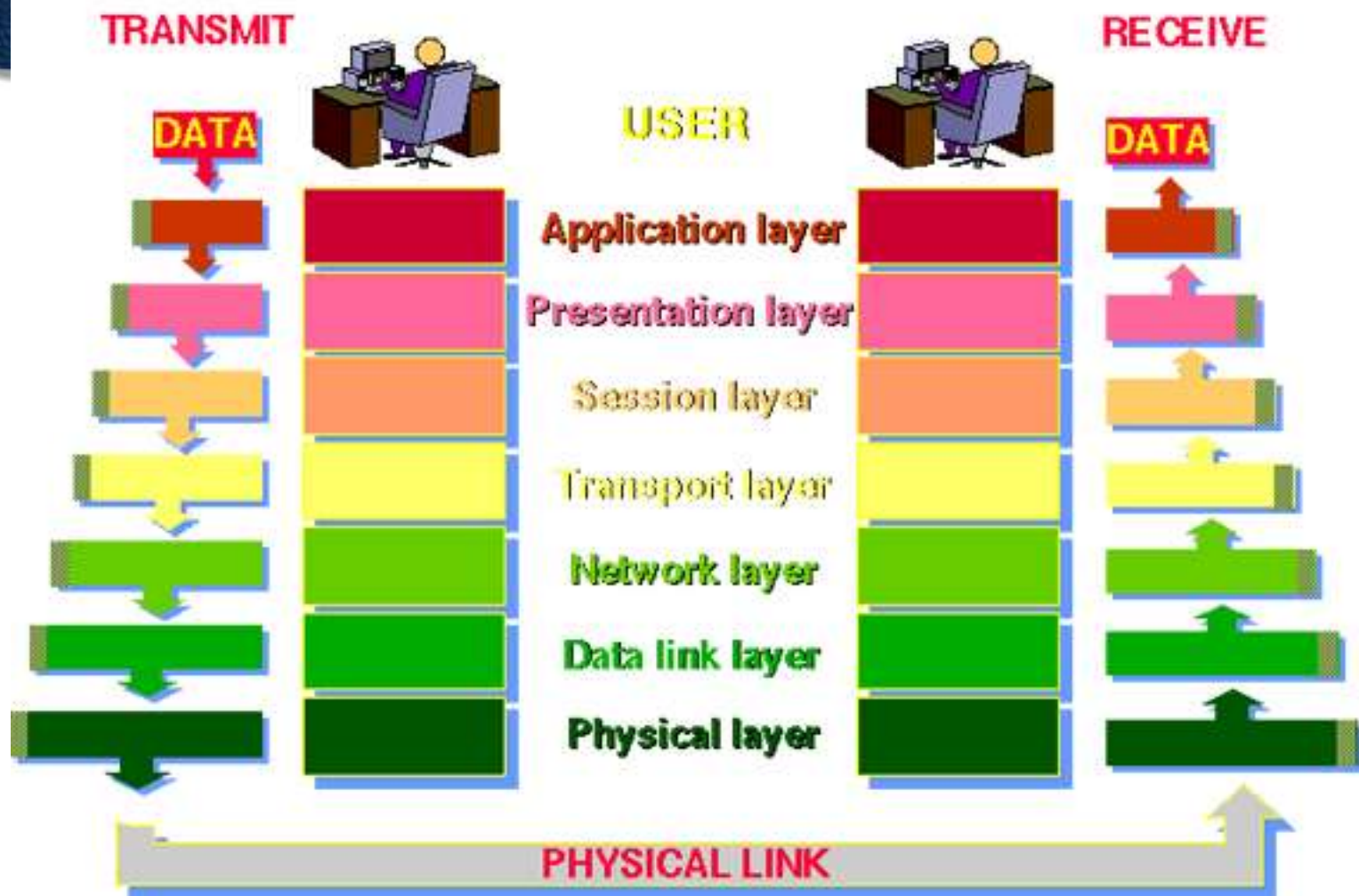


OSI Reference Model

Agenda

- **The Layered Model**
- **Layers 1 & 2: Physical & Data Link Layers**
- **Layer 3: Network Layer**
- **Layers 4–7: Transport, Session, Presentation, and Application Layers**

THE 7 LAYERS OF OSI



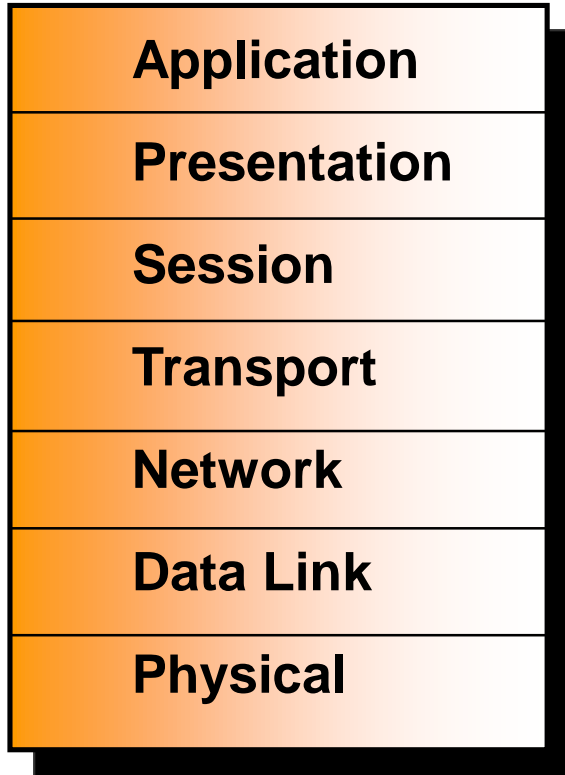
How to Remember

All	- Application
People	- Presentation
Seems	- Session
To	- Transport
Need of	- Network
Data	- Data Link
Processing	- Physical



The Layered Model

Why a Layered Network Model?

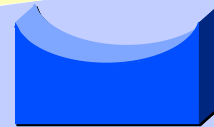
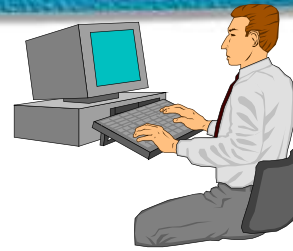
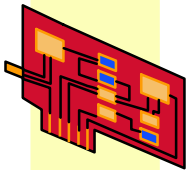


- **Reduces complexity (one big problem to seven smaller ones)**
- **Standardizes interfaces**
- **Simplifies teaching and learning**

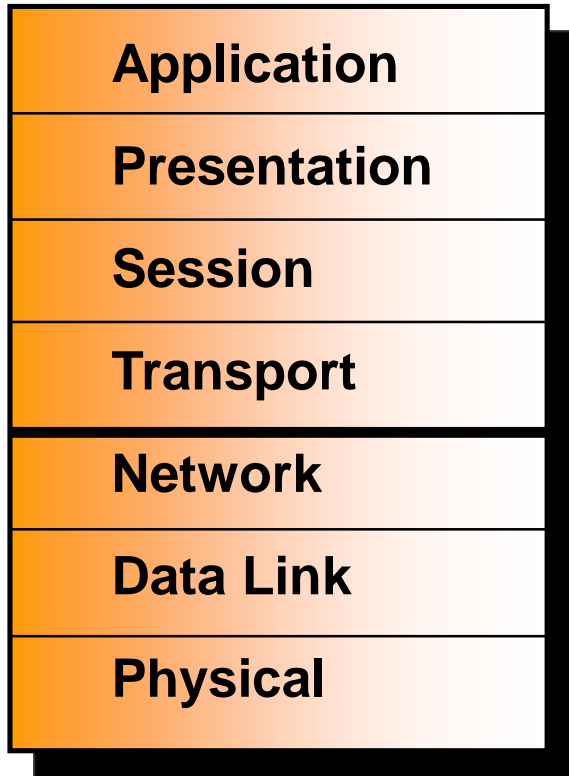
Devices Function at Layers

7	Application
6	Presentation
5	Session
4	Transport
3	Network
2	Data Link
1	Physical

NIC Card

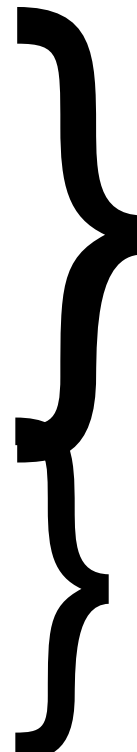
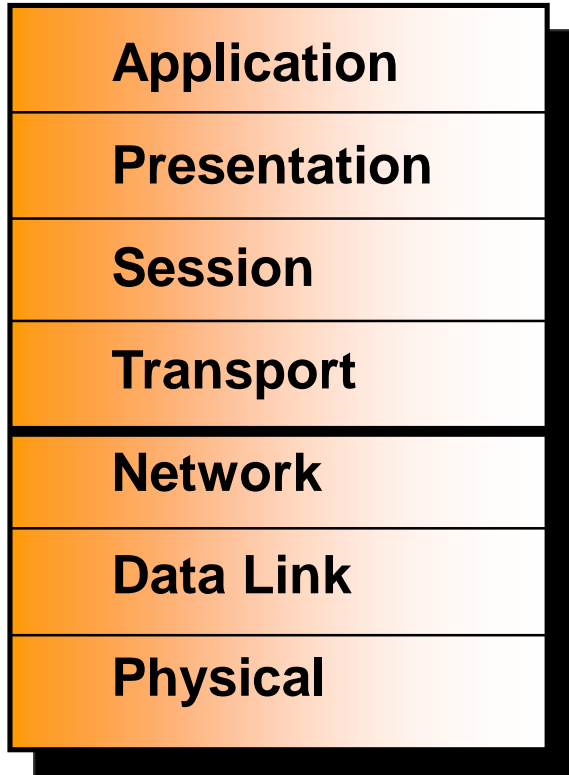


Host Layers



Host layers: Provide accurate data delivery between computers

Media Layers



Host layers: Provide accurate data delivery between computers

Media layers: Control physical delivery of messages over the network

Application Layer

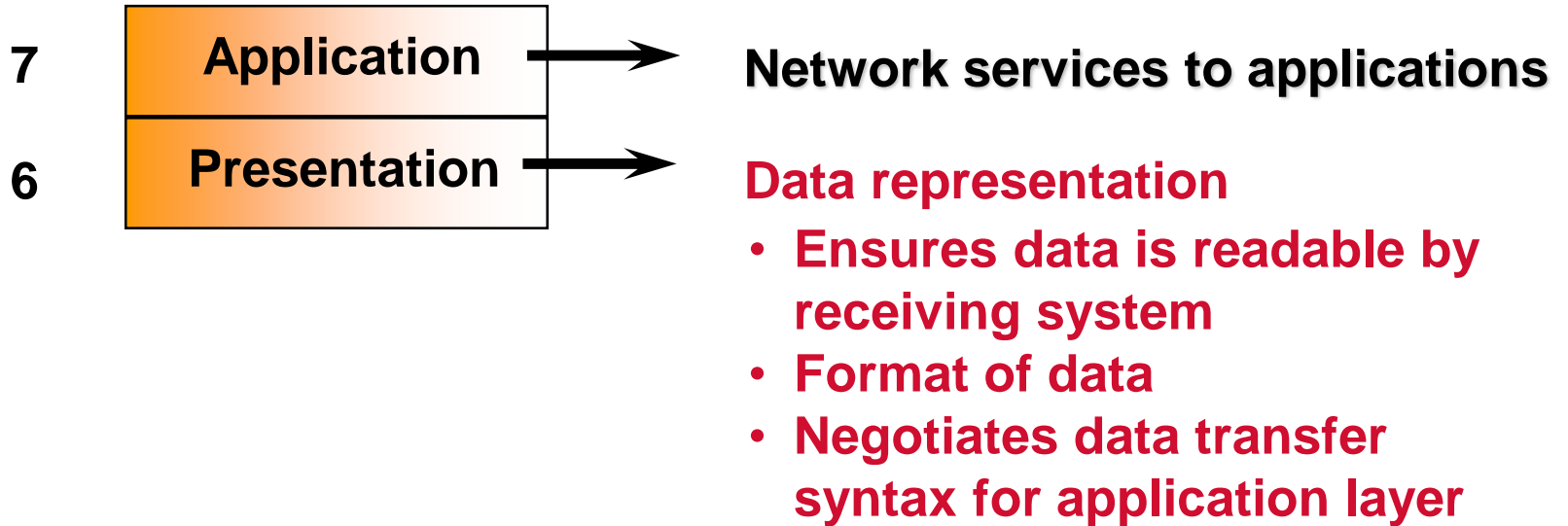
7

Application

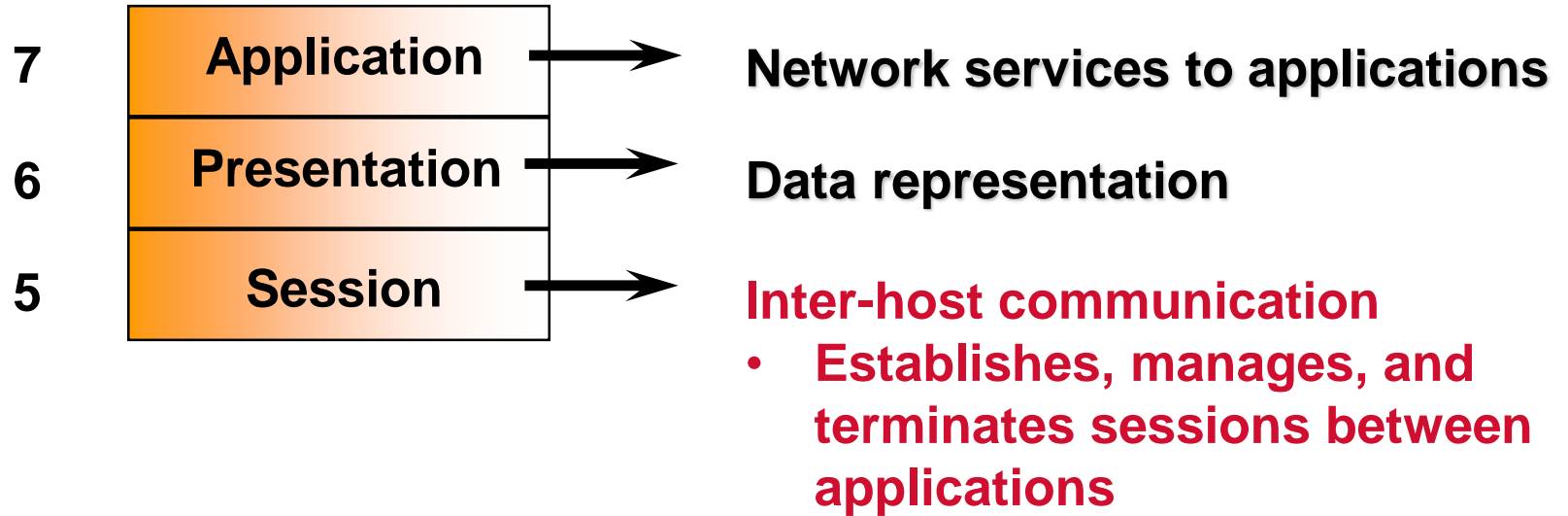
A diagram consisting of a rectangular box with a white-to-orange gradient fill and a black border. The word "Application" is written in black text inside the box. A black arrow points from the right side of the box to the right. To the right of the arrow is a block of red text describing the layer's function.

Provides network services to application processes (such as electronic mail, file transfer, and terminal emulation)

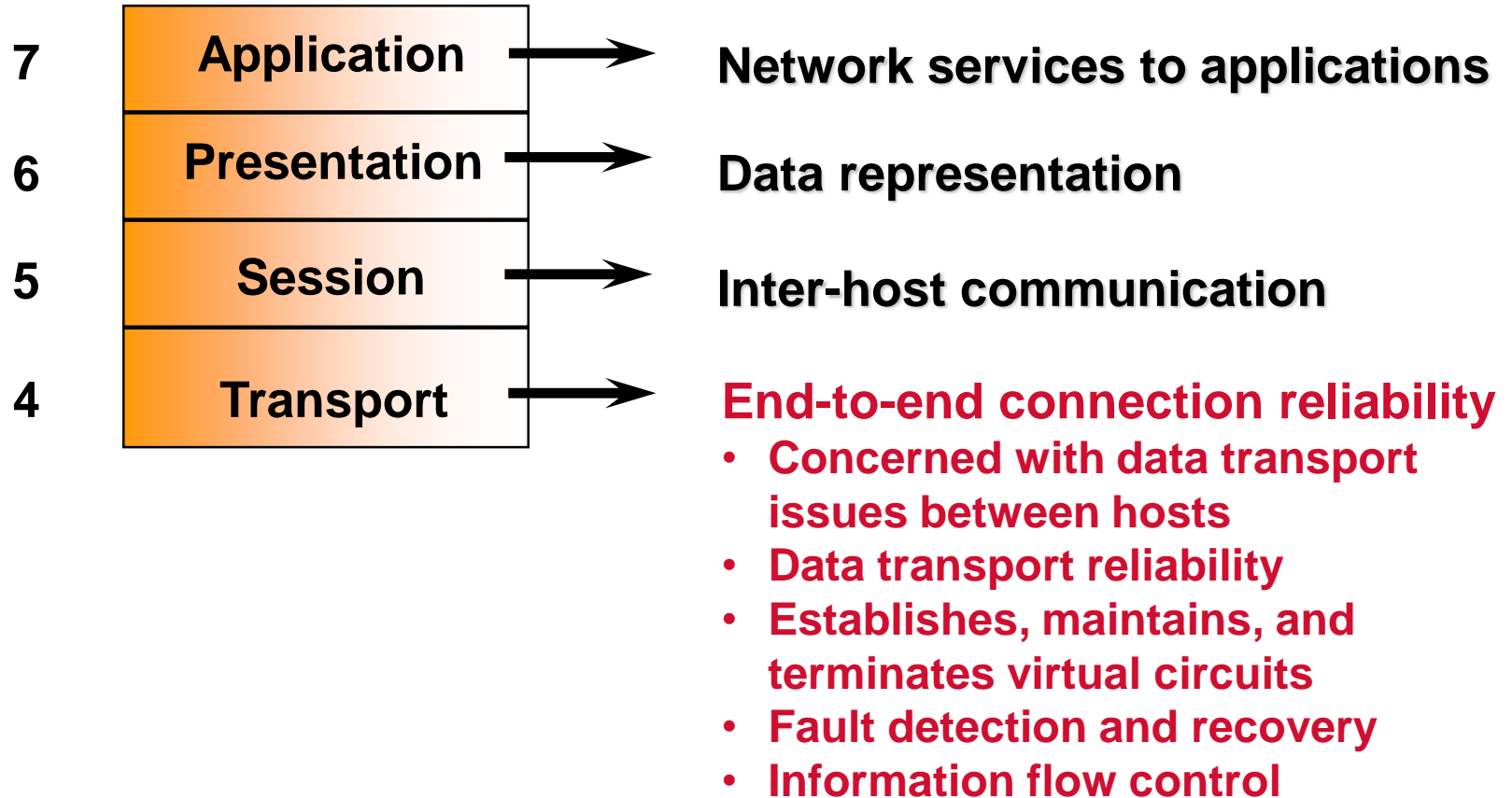
Presentation Layer



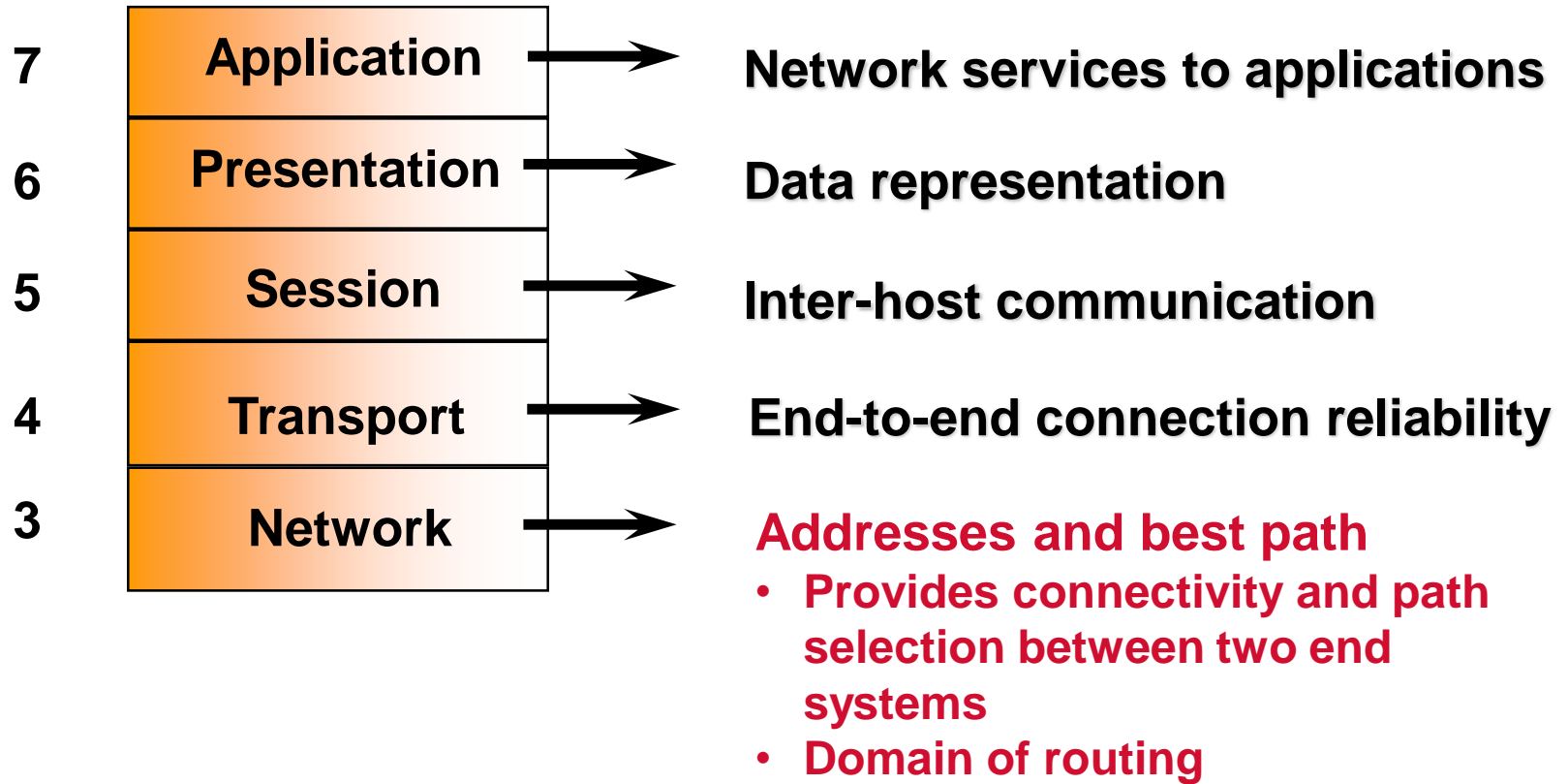
Session Layer



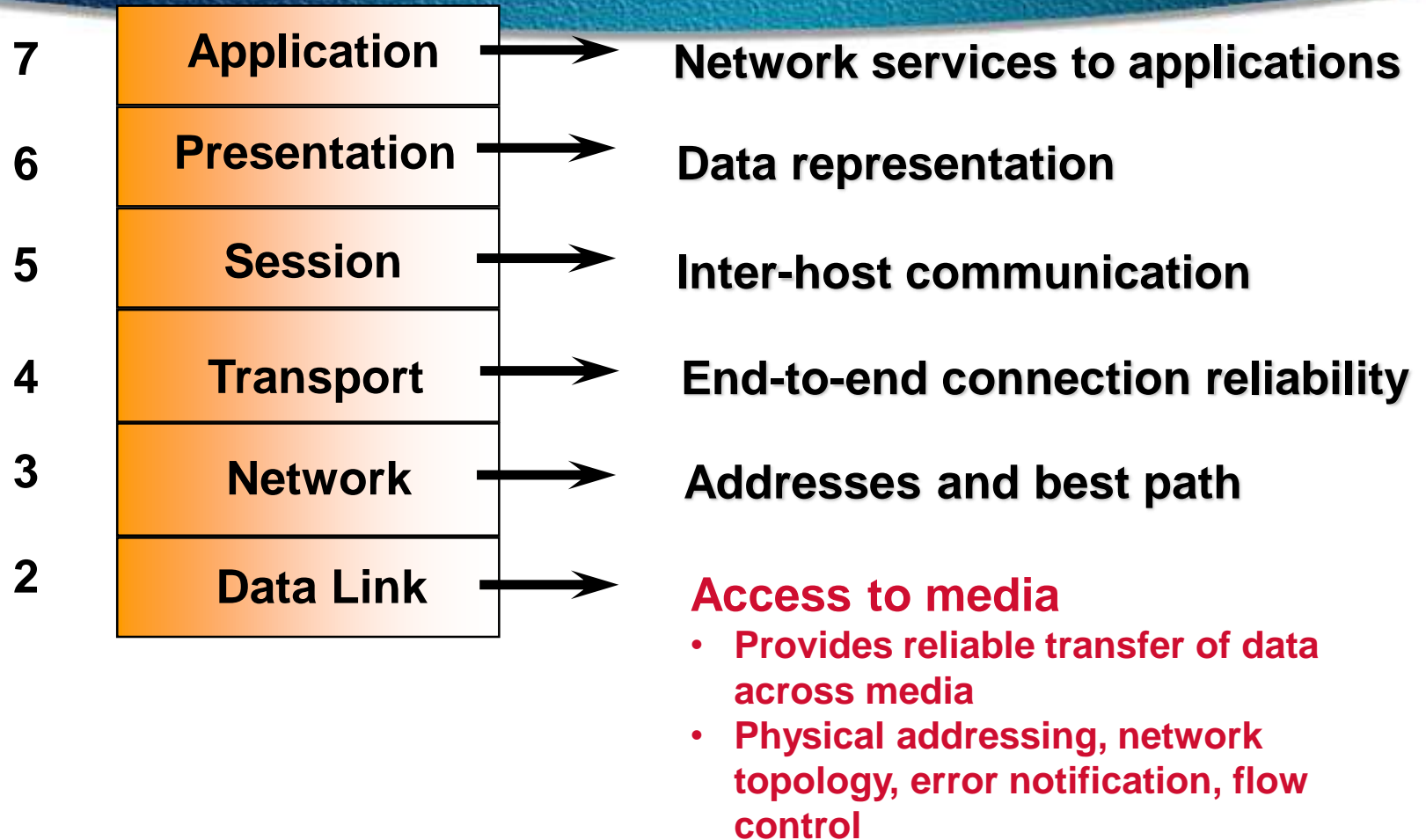
Transport Layer



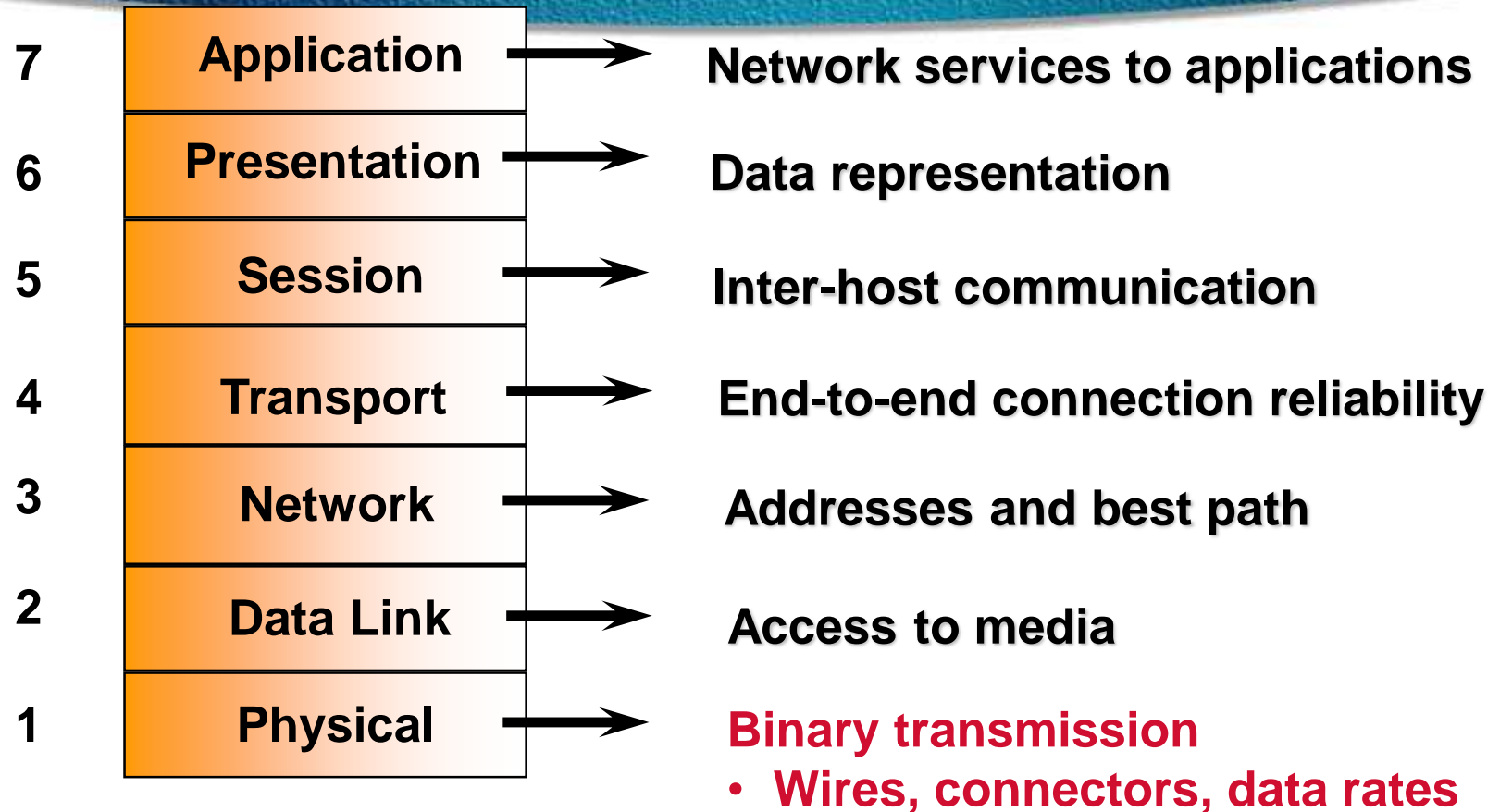
Network Layer



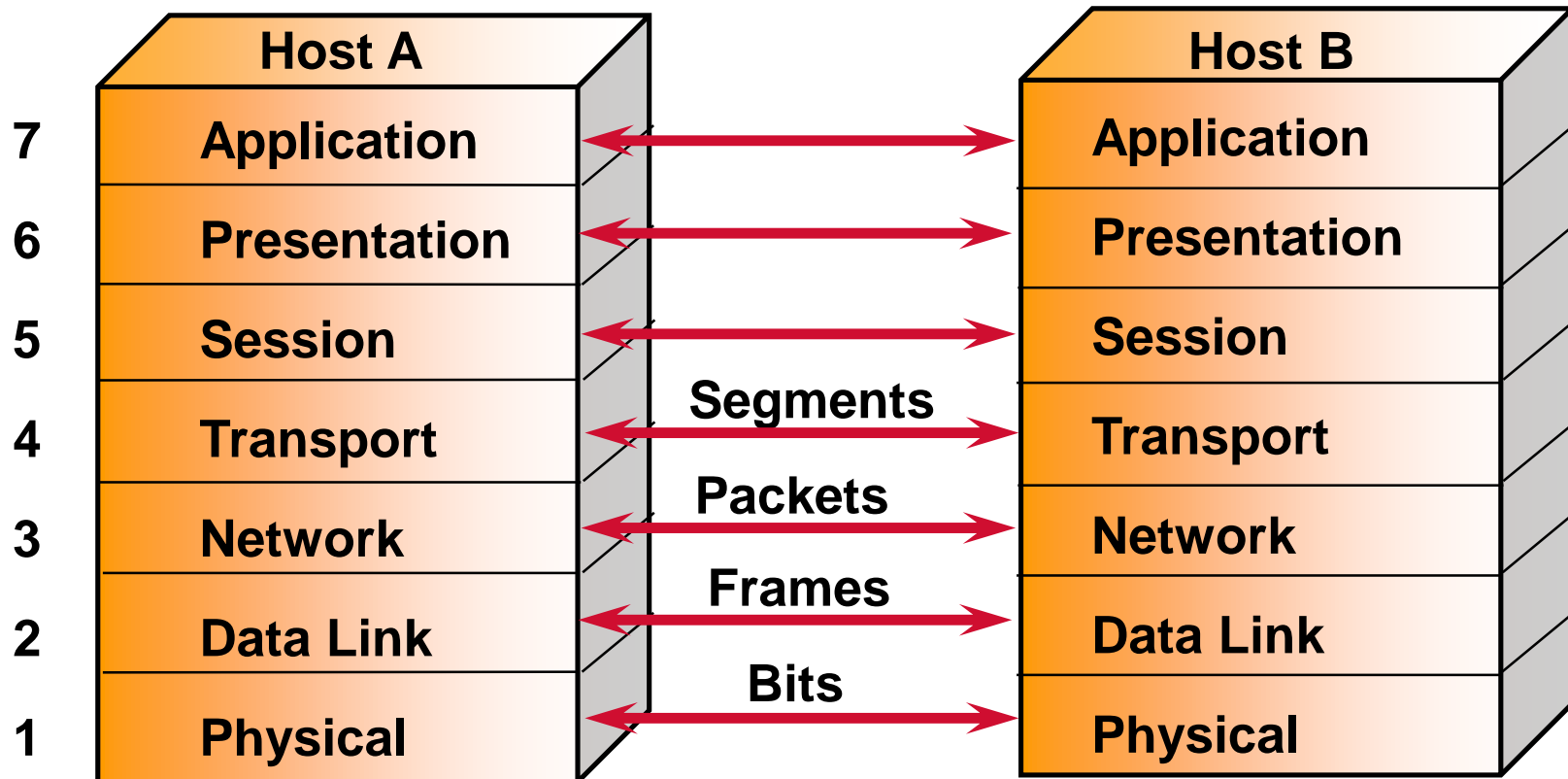
Data Link Layer



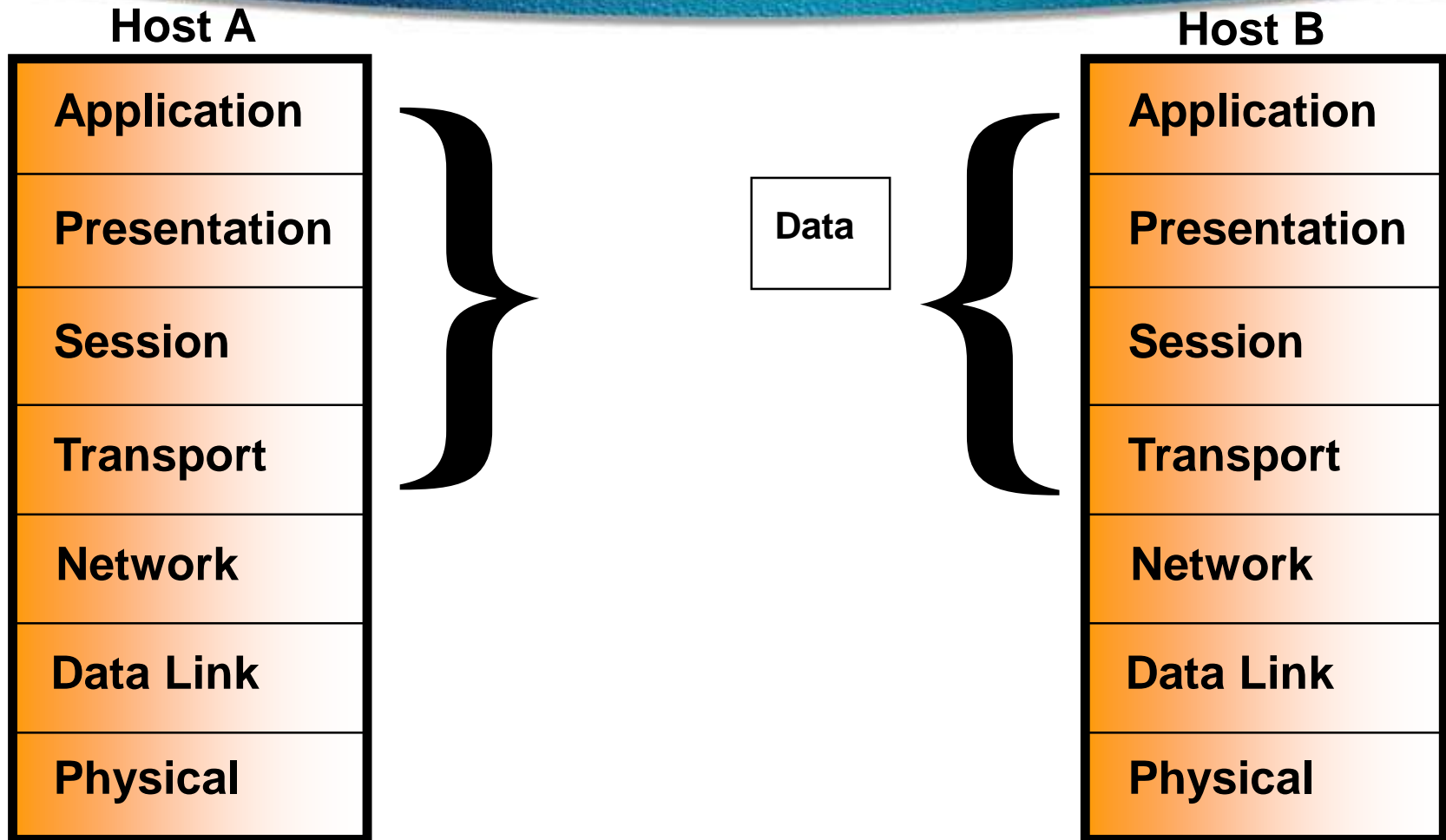
Physical Layer



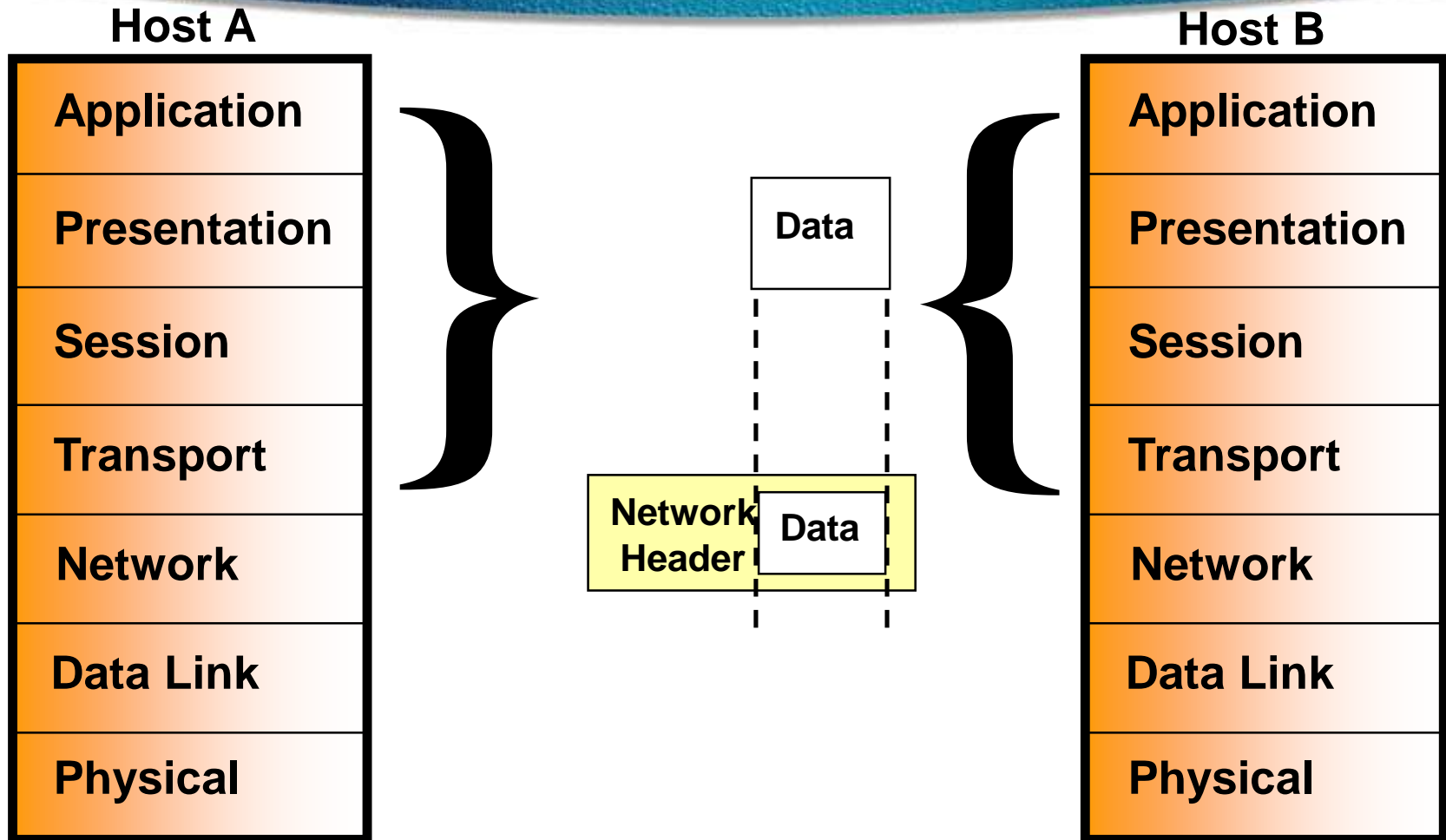
Communications



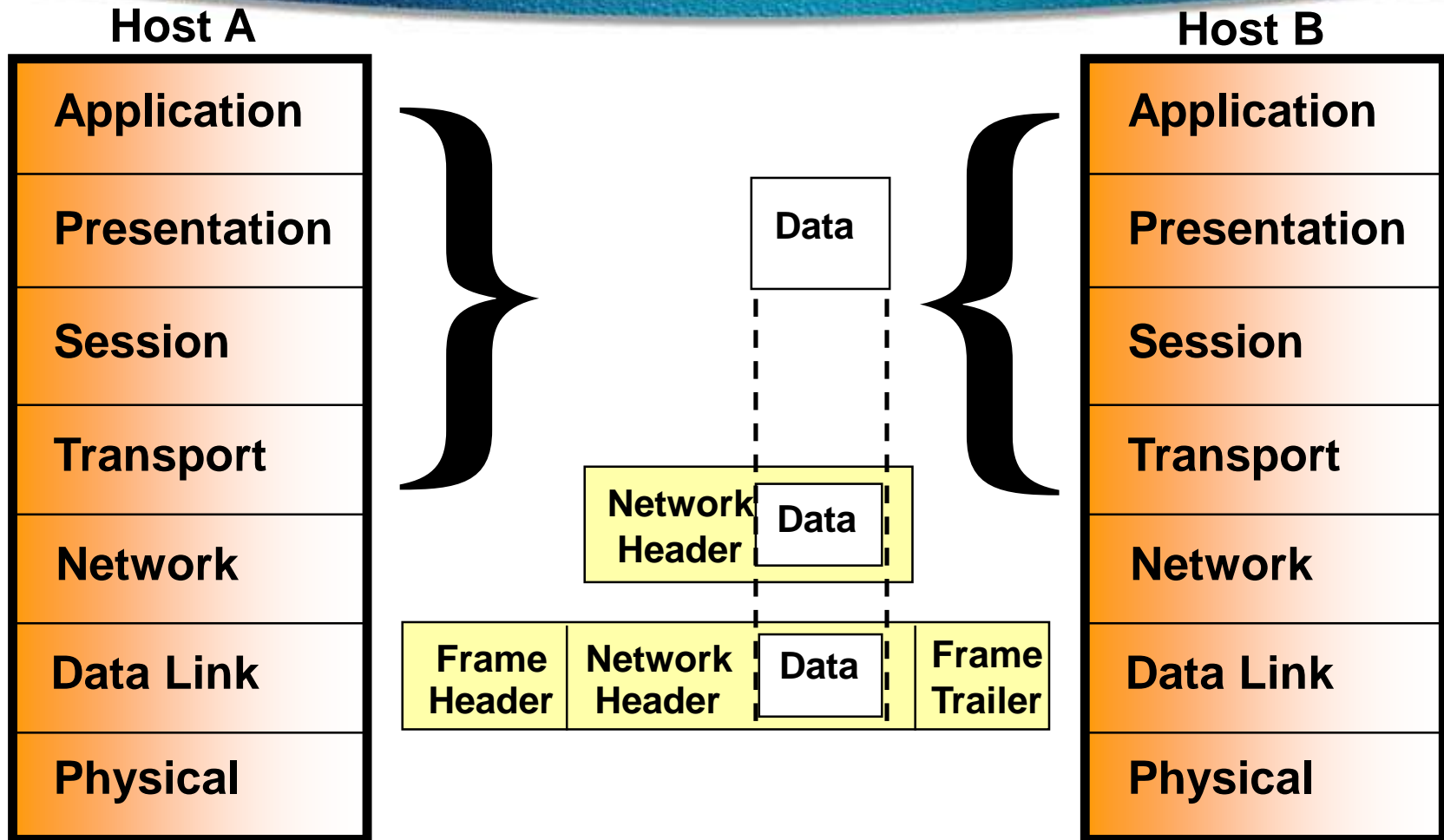
Data Encapsulation



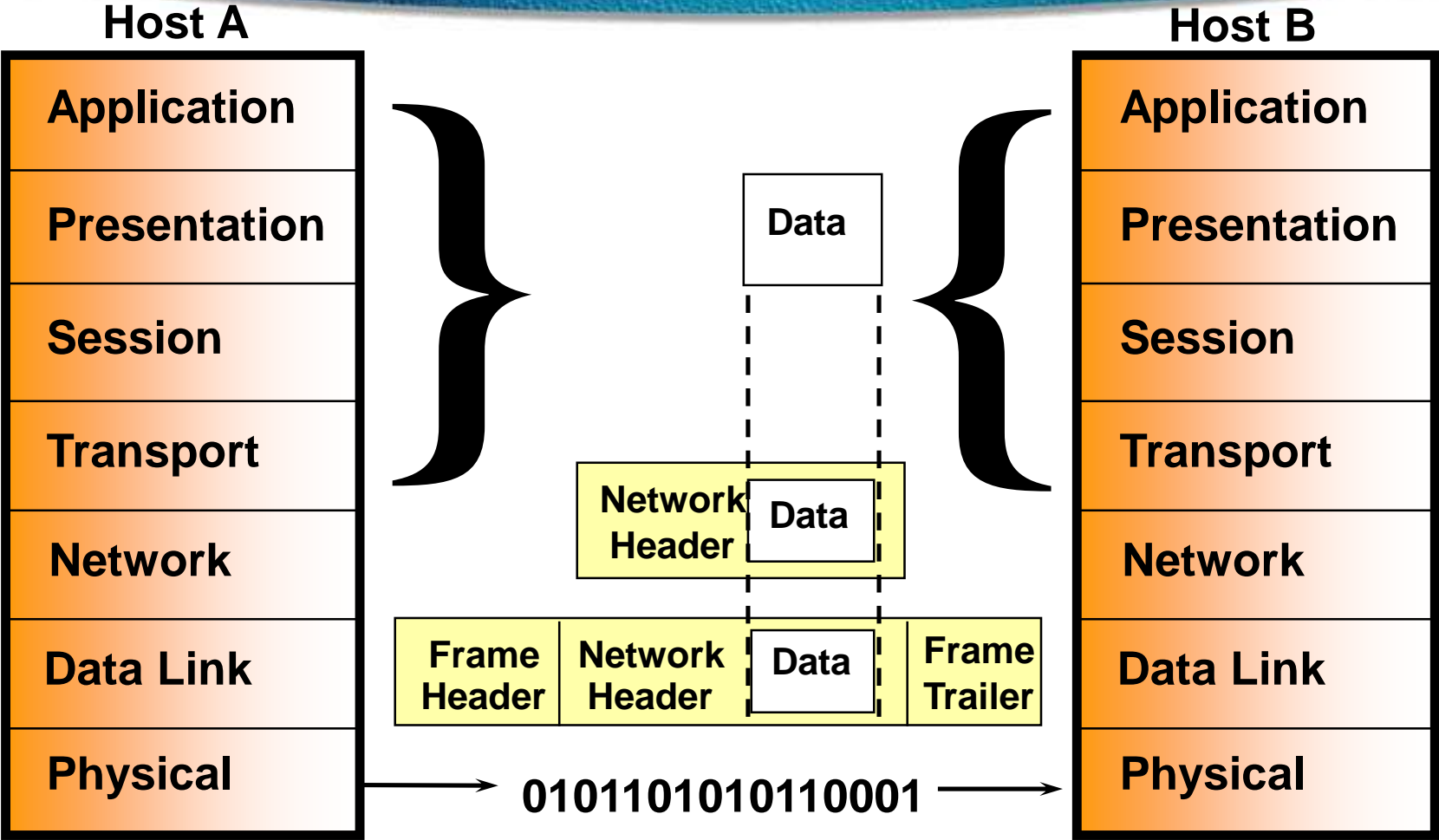
Data Encapsulation



Data Encapsulation



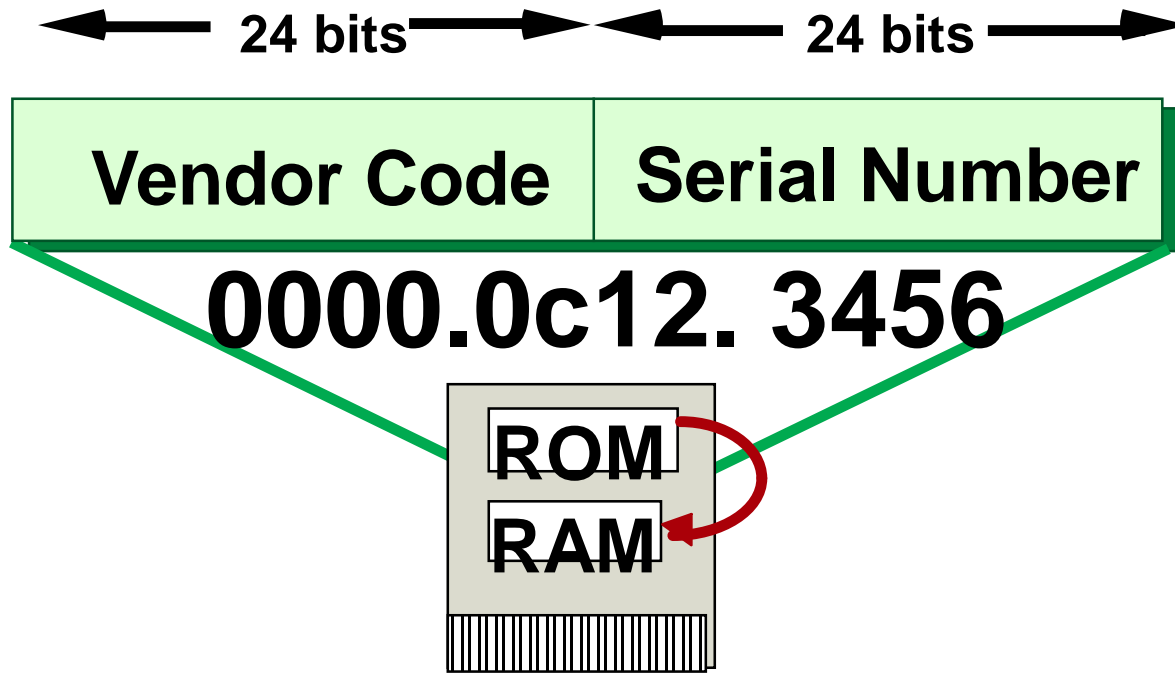
Data Encapsulation






Layers 1 & 2: Physical & Data Link Layers

MAC Address

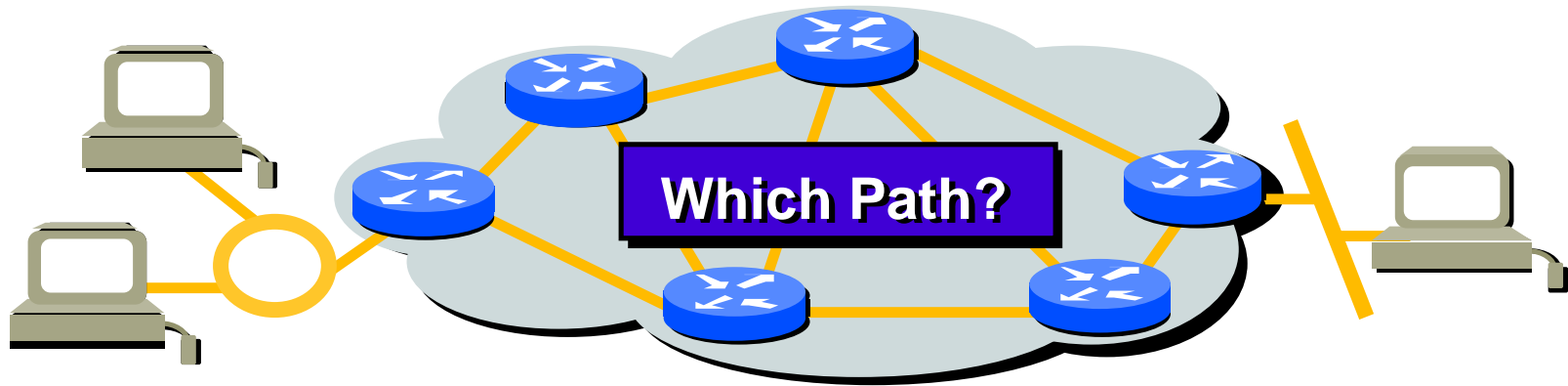


- MAC address is burned into ROM on a network interface card



Layer 3: Network Layer

Network Layer: Path Determination



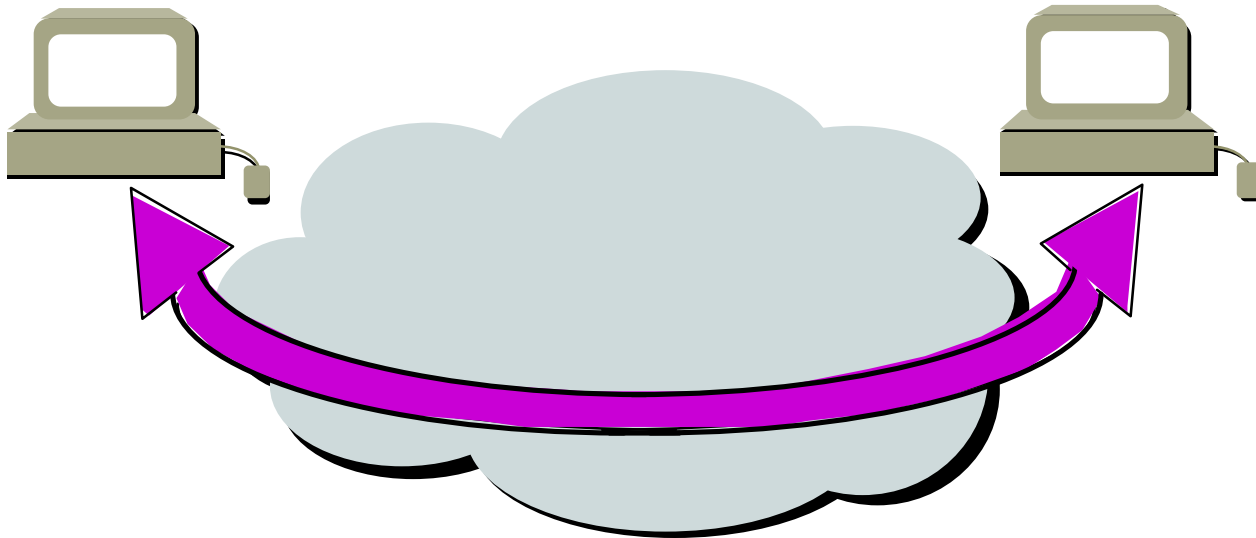
- **Layer 3 functions to find the best path through the internetwork**

A person in a white shirt and tie is working on a large, curved, metallic structure, possibly a tunnel or a large pipe. The scene is dimly lit with a blue tint. The person is positioned in the upper right quadrant, reaching up towards the structure. The structure itself is a large, curved pipe or tunnel with a rough, metallic interior. The overall atmosphere is industrial and technical.

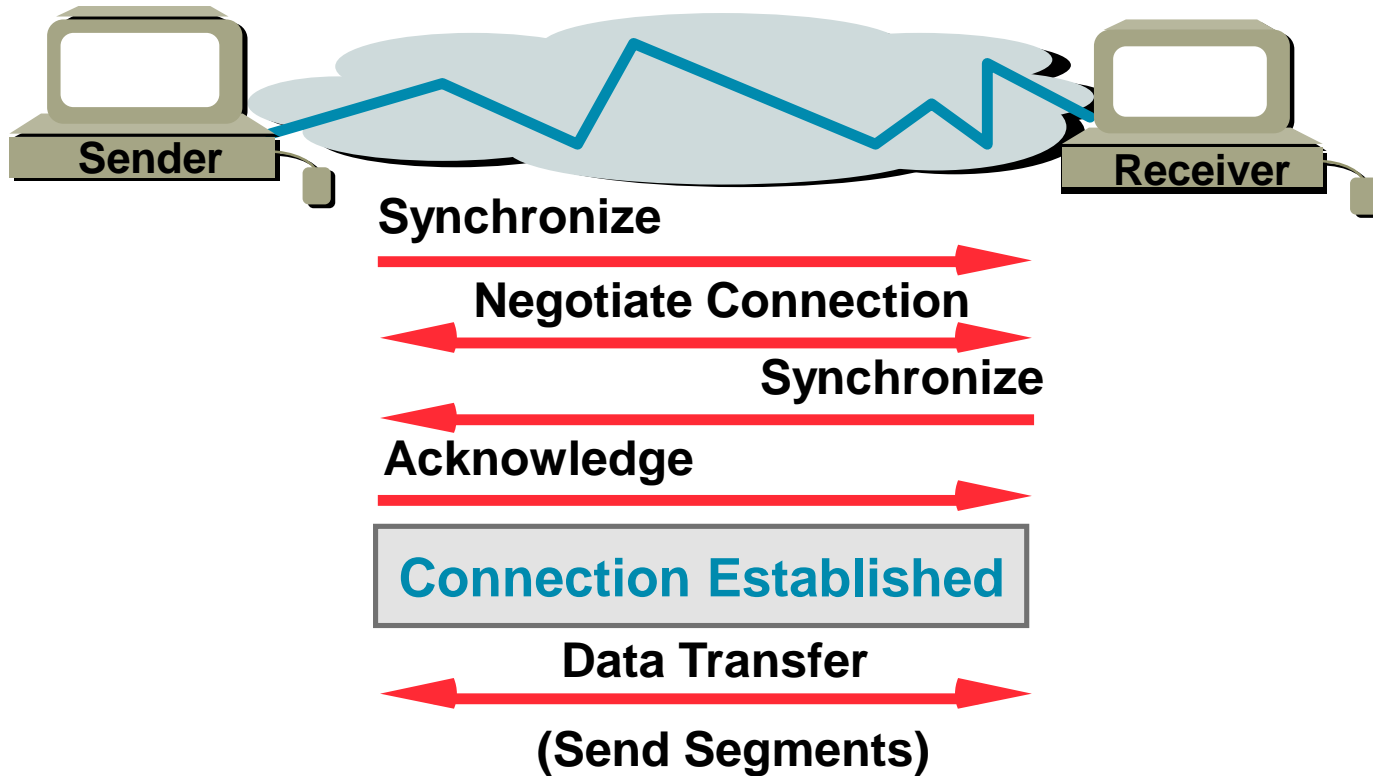
**Layers 4–7:
Transport, Session,
Presentation, and
Application Layers**

Transport Layer

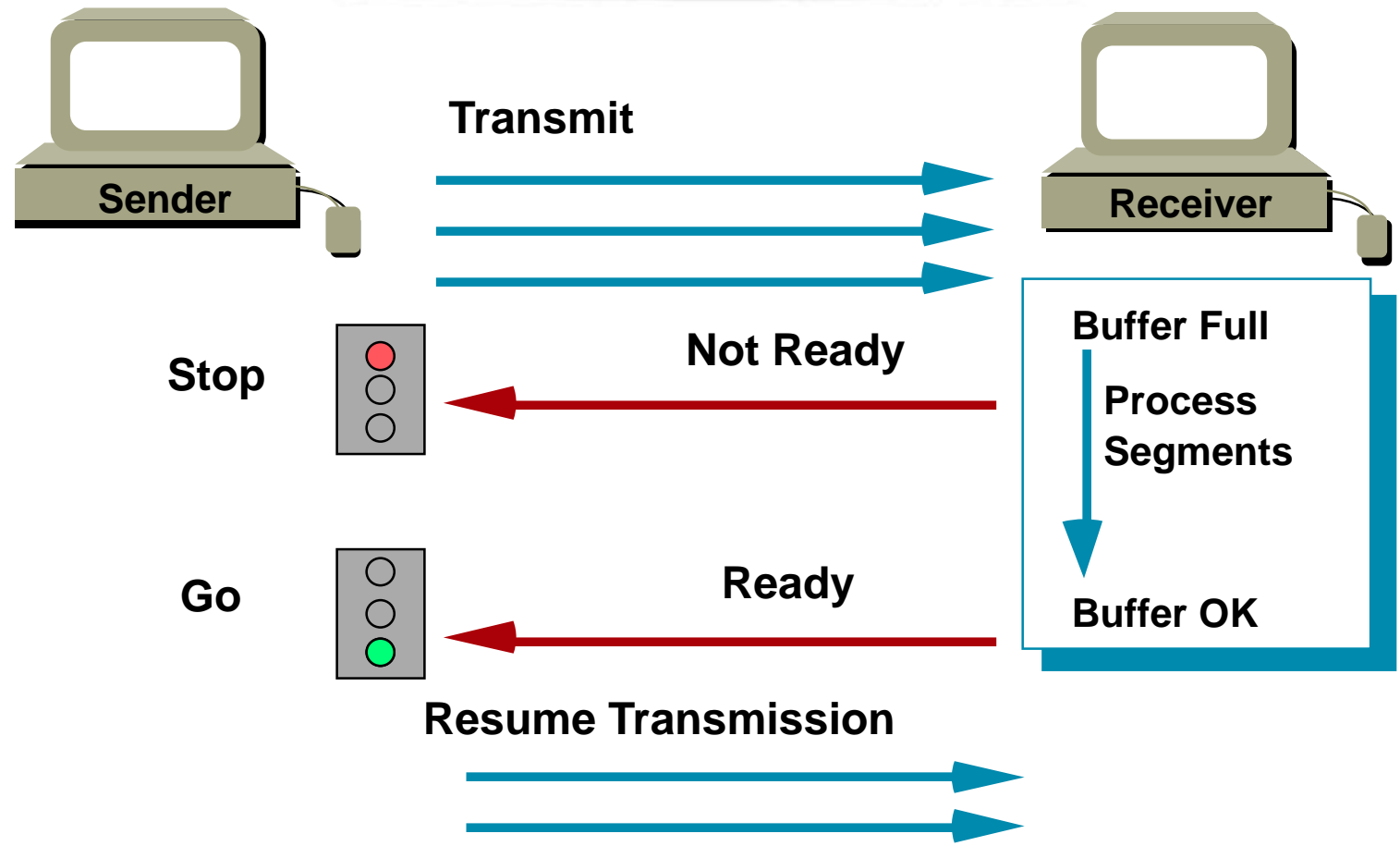
- **Segments upper-layer applications**
- **Establishes an end-to-end connection**
- **Sends segments from one end host to another**
- **Optionally, ensures data reliability**



Transport Layer— Establishes Connection



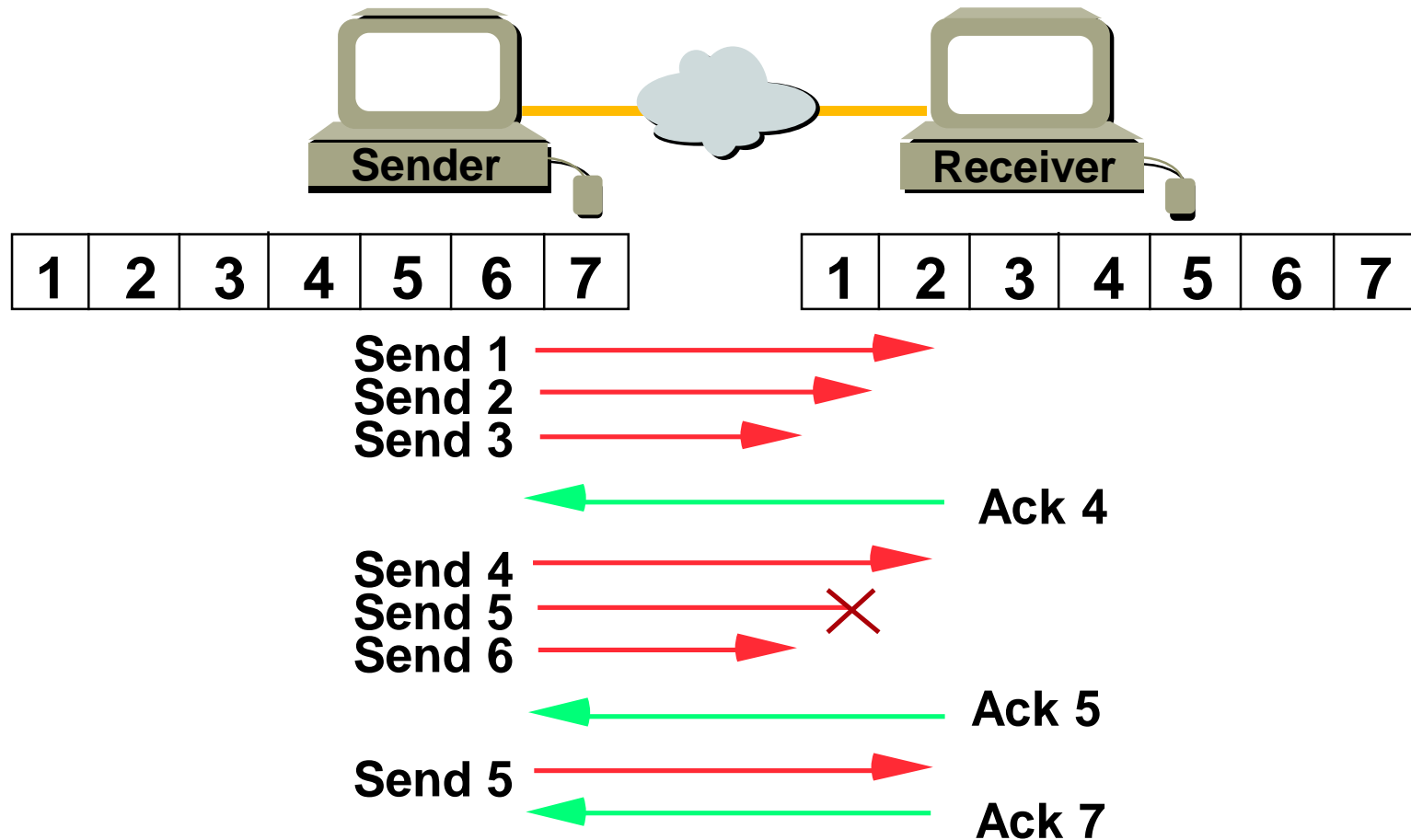
Transport Layer— Sends Segments with Flow Control



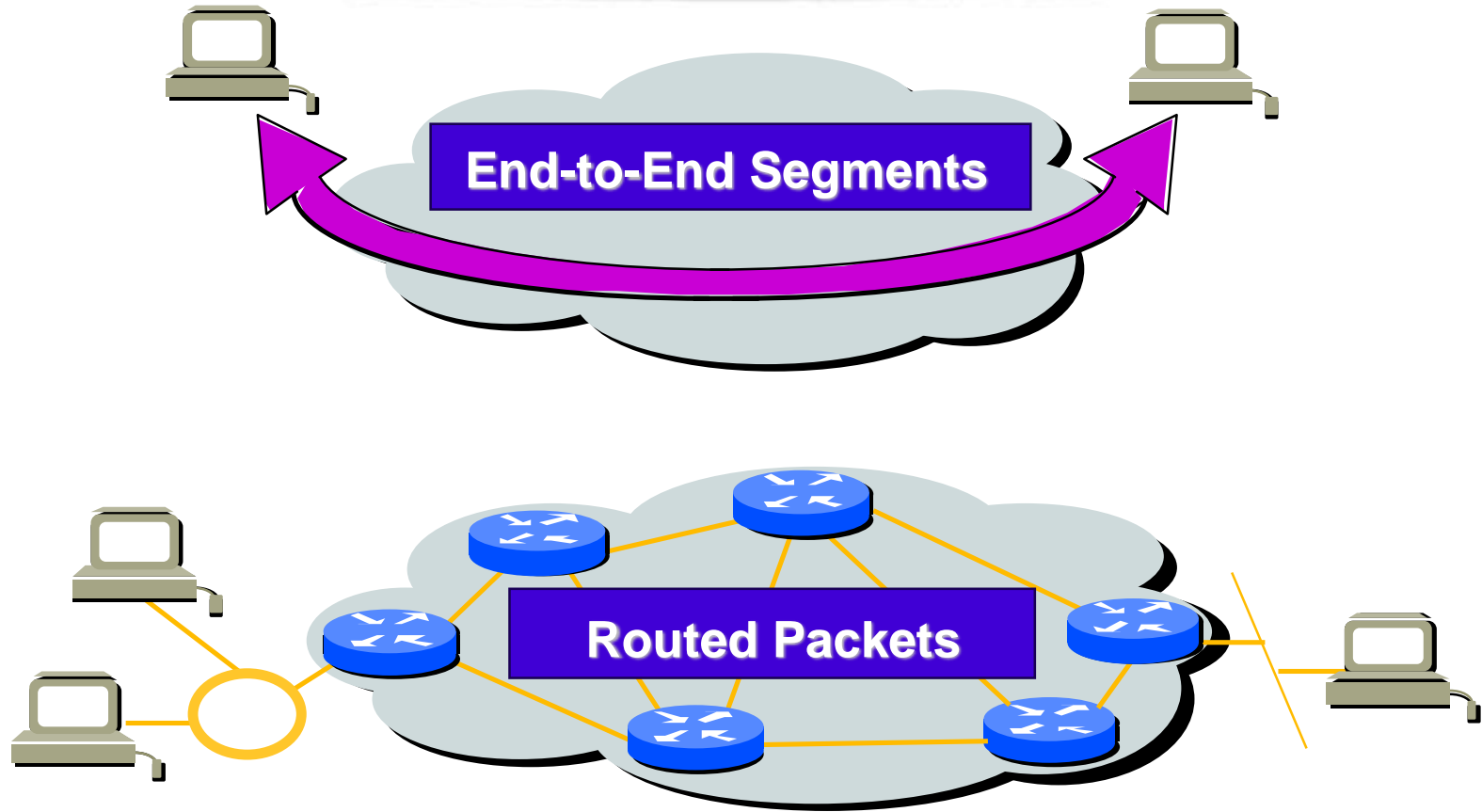
Transport Layer— Reliability with Windowing



Transport Layer— An Acknowledgement Technique

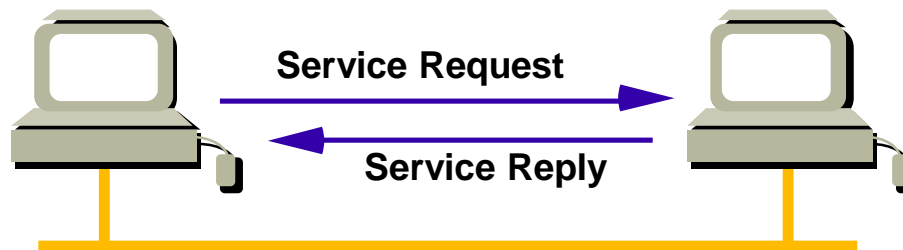


Transport to Network Layer



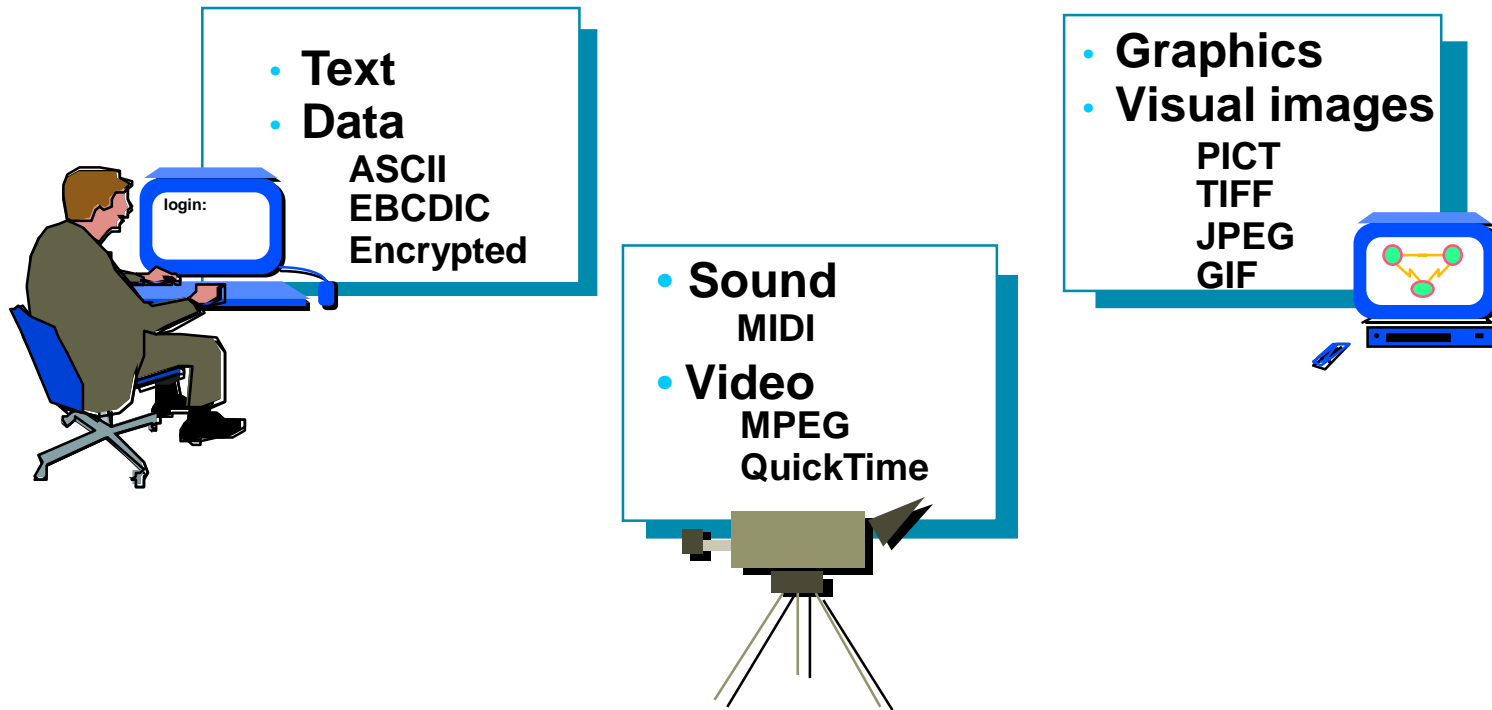
Session Layer

- Network File System (NFS)
- Structured Query Language (SQL)
- Remote-Procedure Call (RPC)
- AppleTalk Session Protocol (ASP)
- DEC Session Control Protocol (SCP)



- Coordinates applications as they interact on different hosts

Presentation Layer



- Provides code formatting and conversion for applications

Application Layer

COMPUTER APPLICATIONS

Word Processor
Presentation Graphics
Spreadsheet
Database
Design/Manufacturing
Project Planning
Others

NETWORK APPLICATIONS

Electronic Mail
File Transfer
Remote Access
Client-Server Process
Information Location
Network Management
Others

INTERNETWORK APPLICATIONS

Electronic Data Interchange
World Wide Web
E-Mail Gateways
Special-Interest Bulletin Boards
Financial Transaction Services
Internet Navigation Utilities
Conferencing (Voice, Video, Data)
Others

- **User Interaction**

Summary

- **OSI reference model describes building blocks of functions for program-to-program communications between similar or dissimilar hosts**
- **Layers 4–7 (host layers) provide accurate data delivery between computers**
- **Layers 1–3 (media layers) control physical delivery of data over the network**