

# The OSI Model

# Why do we need the OSI Model?

To address the problem of networks increasing in size and in number, the International Organization for Standardization (ISO) researched many network schemes and recognized that there was a need to create a network model that would help network builders implement networks that could communicate and work together and therefore, released the OSI reference model in 1984.

# Don't Get Confused.

ISO - International Organization for Standardization

OSI - Open System Interconnection

~~IOS Internetwork Operating System~~

The ISO created the OSI to make the IOS more efficient. The “ISO” acronym is correct as shown.

To avoid confusion, some people say “International Standard Organization.”

# The OSI Reference Model

7 Application

6 Presentation

5 Session

4 Transport

3 Network

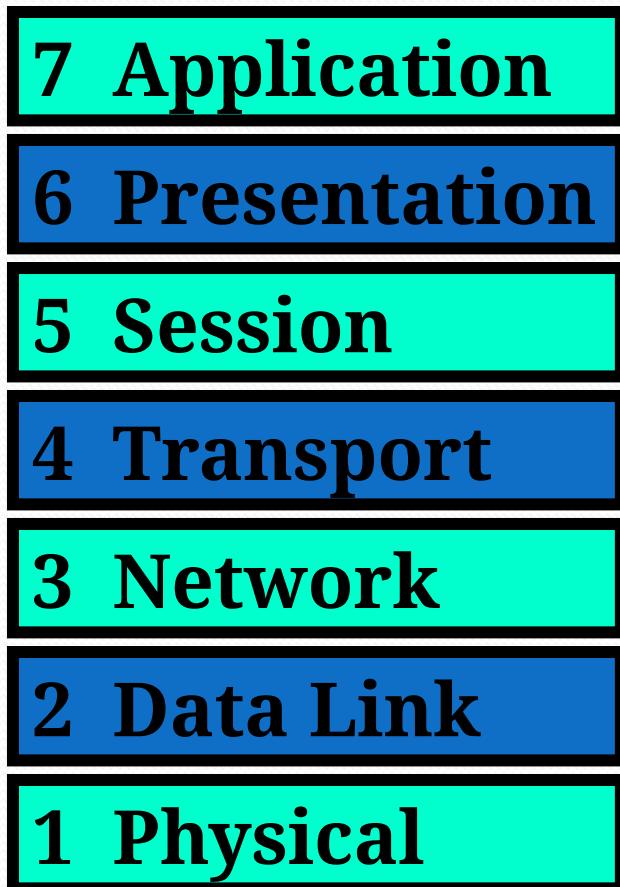
2 Data Link

1 Physical

The OSI Model will be used throughout your entire networking career!

Memorize it!

# Layer 7 - The Application Layer



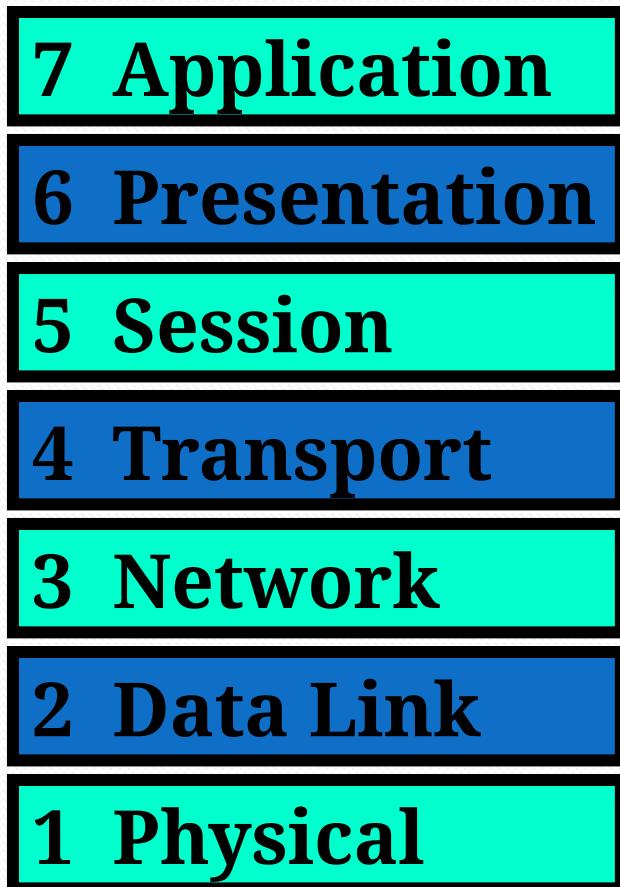
This layer deal with networking applications.

Examples:

- ↳ Email
- ↳ Web browsers

PDU - User Data

# Layer 6 - The Presentation Layer

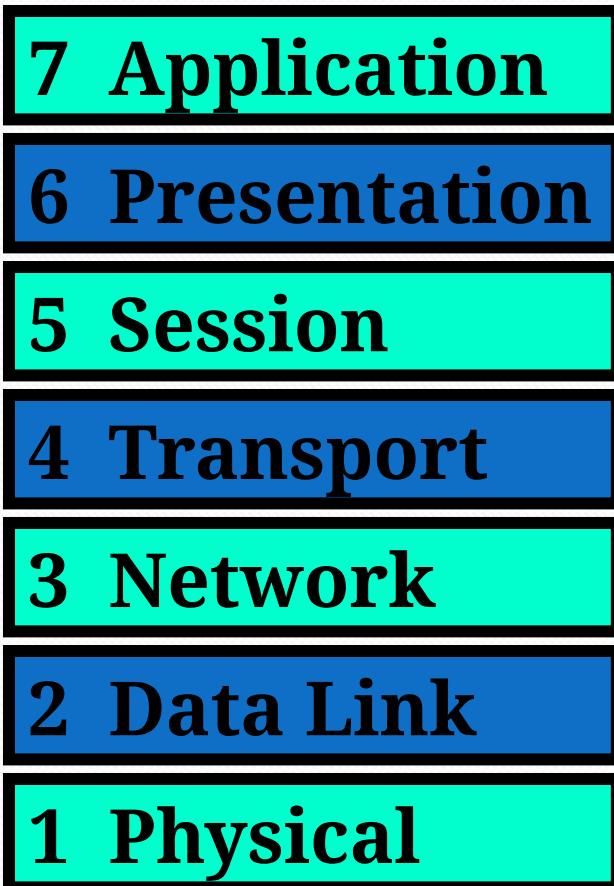


This layer is responsible for presenting the data in the required format which may include:

- ↳ Encryption
- ↳ Compression

PDU - Formatted Data

# Layer 5 - The Session Layer



This layer establishes, manages, and terminates sessions between two communicating hosts.

Example:

↳ Client Software  
(Used for logging in)

PDU - Formatted Data

# Layer 4 - The Transport Layer

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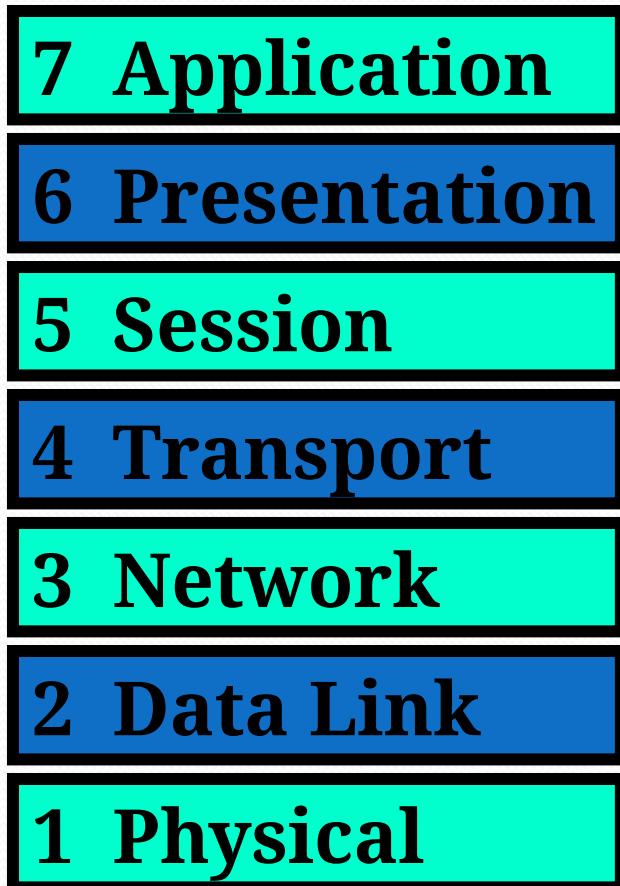
1 Physical

This layer breaks up the data from the sending host and then reassembles it in the receiver.

It also is used to insure reliable data transport across the network.

PDU - Segments

# Layer 3 - The Network Layer

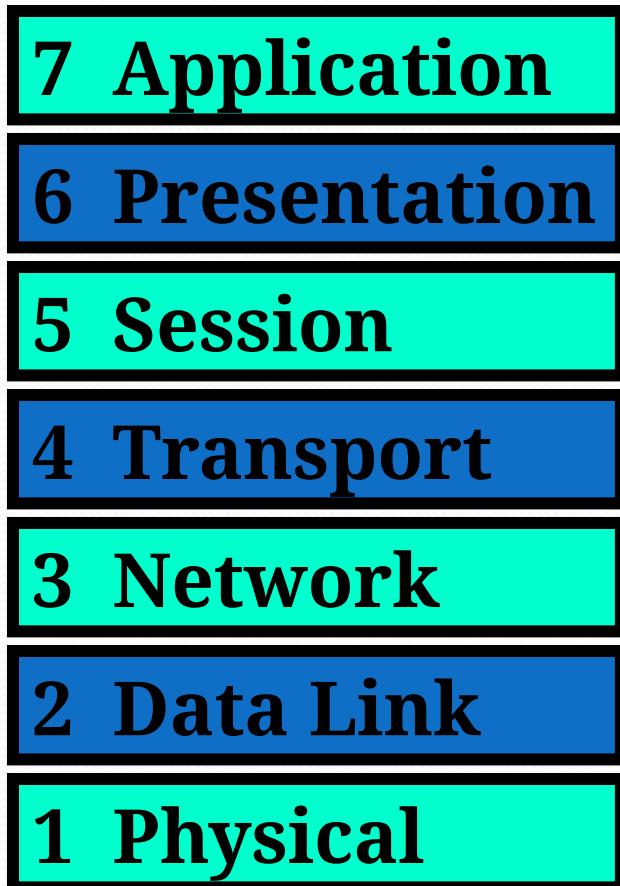


Sometimes referred to as the “Cisco Layer”.

Makes “Best Path Determination” decisions based on logical addresses (usually IP addresses).

PDU - Packets

# Layer 2 - The Data Link Layer



This layer provides reliable transit of data across a physical link.

Makes decisions based on physical addresses (usually MAC addresses).

PDU - Frames

# Layer 1 - The Physical Layer

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2 Data Link

1 Physical

This is the physical media through which the data, represented as electronic signals, is sent from the source host to the destination host.

Examples:

- ↳ CAT5 (what we have)
- ↳ Coaxial (like cable TV)
- ↳ Fiber optic

# OSI Model Analogy

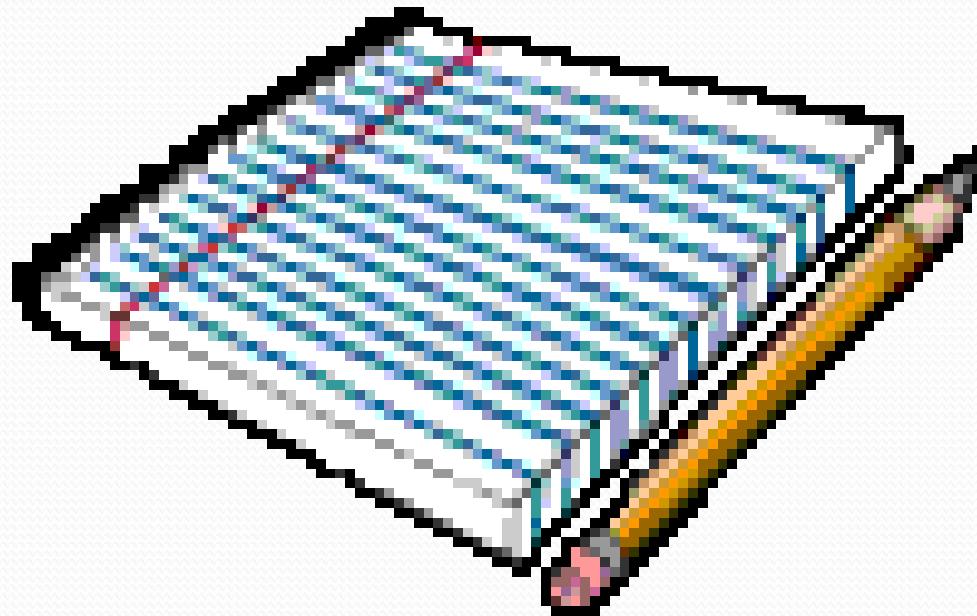
## Application Layer - Source Host



After riding your new bicycle a few times in New York, you decide that you want to give it to a friend who lives in Munich, Germany.

# OSI Model Analogy

## Presentation Layer - Source Host



**Make sure you have the proper directions to disassemble and reassemble the bicycle.**

# OSI Model Analogy

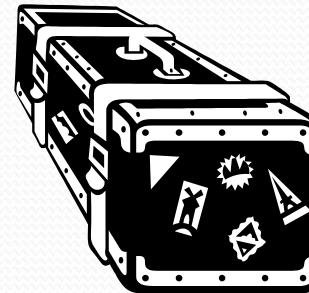
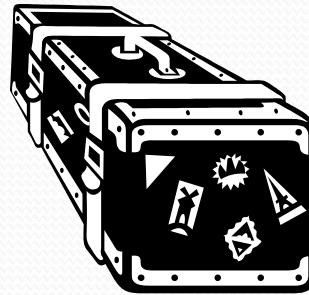
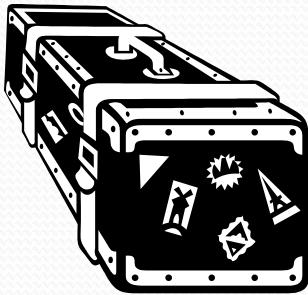
## Session Layer - Source Host



Call your friend and make sure you have his correct address.

# OSI Model Analogy

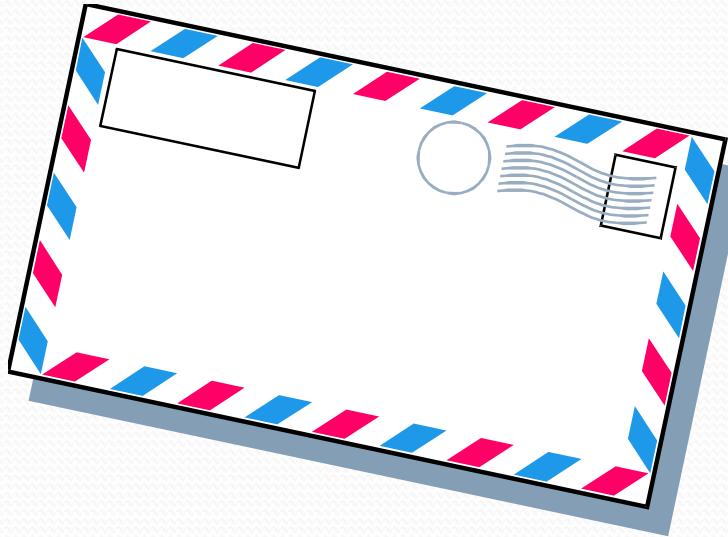
## Transport Layer - Source Host



**Disassemble the bicycle and put different pieces in different boxes. The boxes are labeled  
“1 of 3”, “2 of 3”, and “3 of 3”.**

# OSI Model Analogy

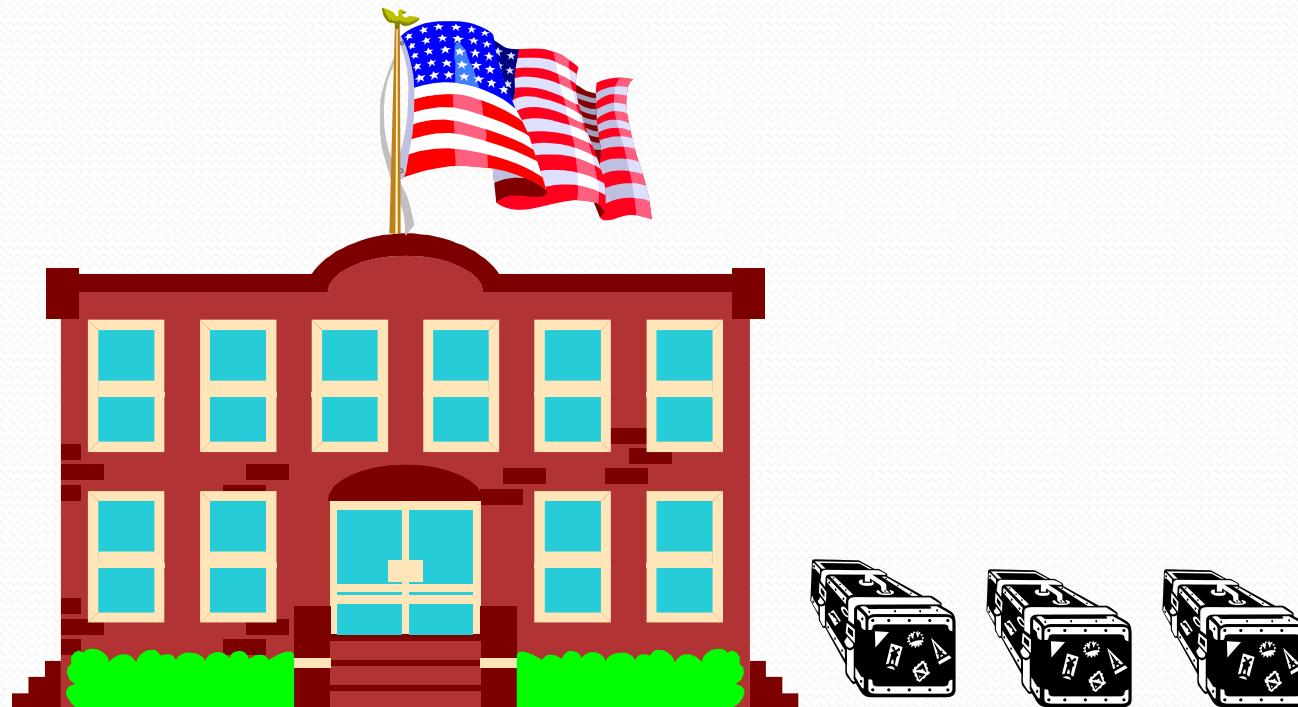
## Network Layer - Source Host



**Put your friend's complete mailing address (and yours) on each box. Since the packages are too big for your mailbox (and since you don't have enough stamps) you determine that you need to go to the post office.**

# OSI Model Analogy

## Data Link Layer – Source Host



New York post office takes possession of the boxes.

# OSI Model Analogy

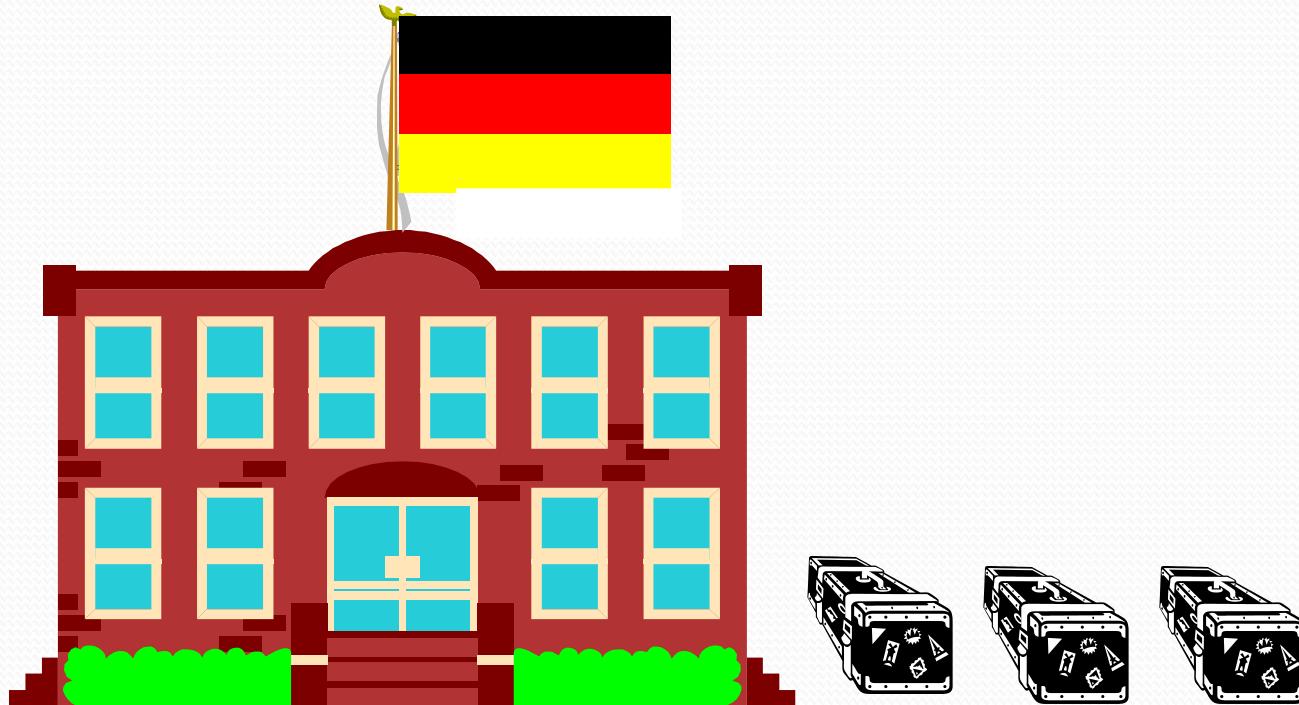
## Physical Layer - Media



The boxes are flown from USA to Germany.

# OSI Model Analogy

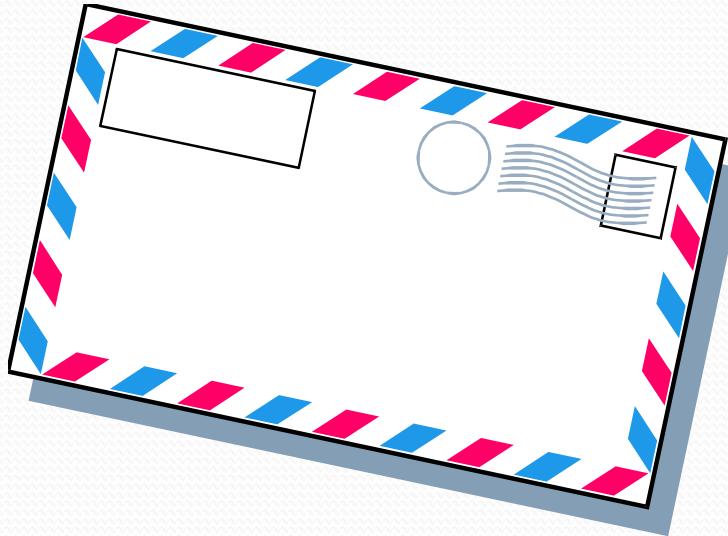
## Data Link Layer - Destination



Munich post office receives your boxes.

# OSI Model Analogy

## Network Layer - Destination



Upon examining the destination address, Munich post office determines that your boxes should be delivered to your written home address.

# OSI Model Analogy

## Transport Layer - Destination



Your friend calls you and tells you he got all 3 boxes and he is having another friend named BOB reassemble the bicycle.

# OSI Model Analogy

## Session Layer - Destination



Your friend hangs up because he is done talking to you.

# OSI Model Analogy

## Presentation Layer - Destination



**BOB is finished and “presents” the bicycle to your friend. Another way to say it is that your friend is finally getting him “present”.**

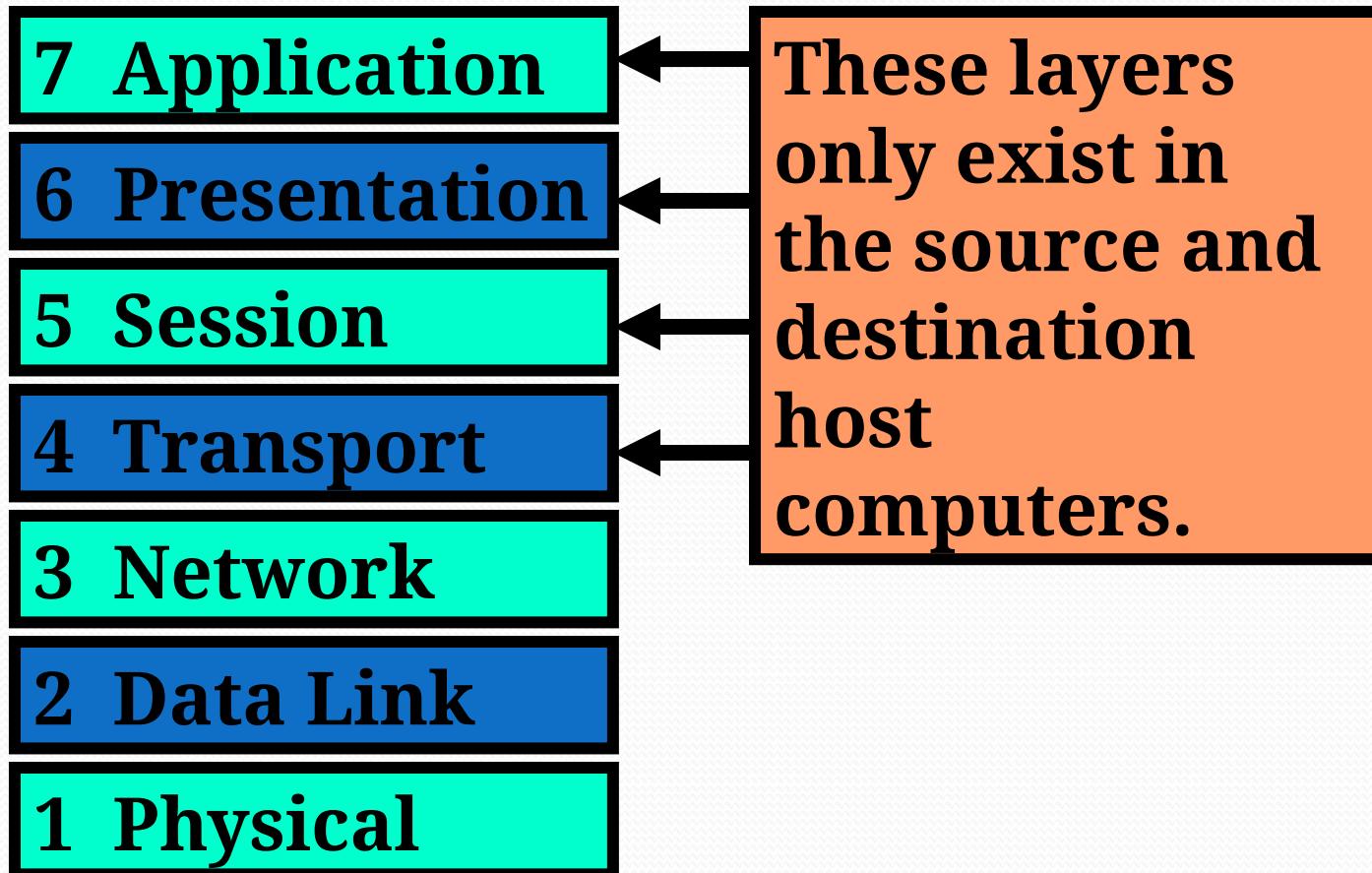
# OSI Model Analogy

## Application Layer - Destination

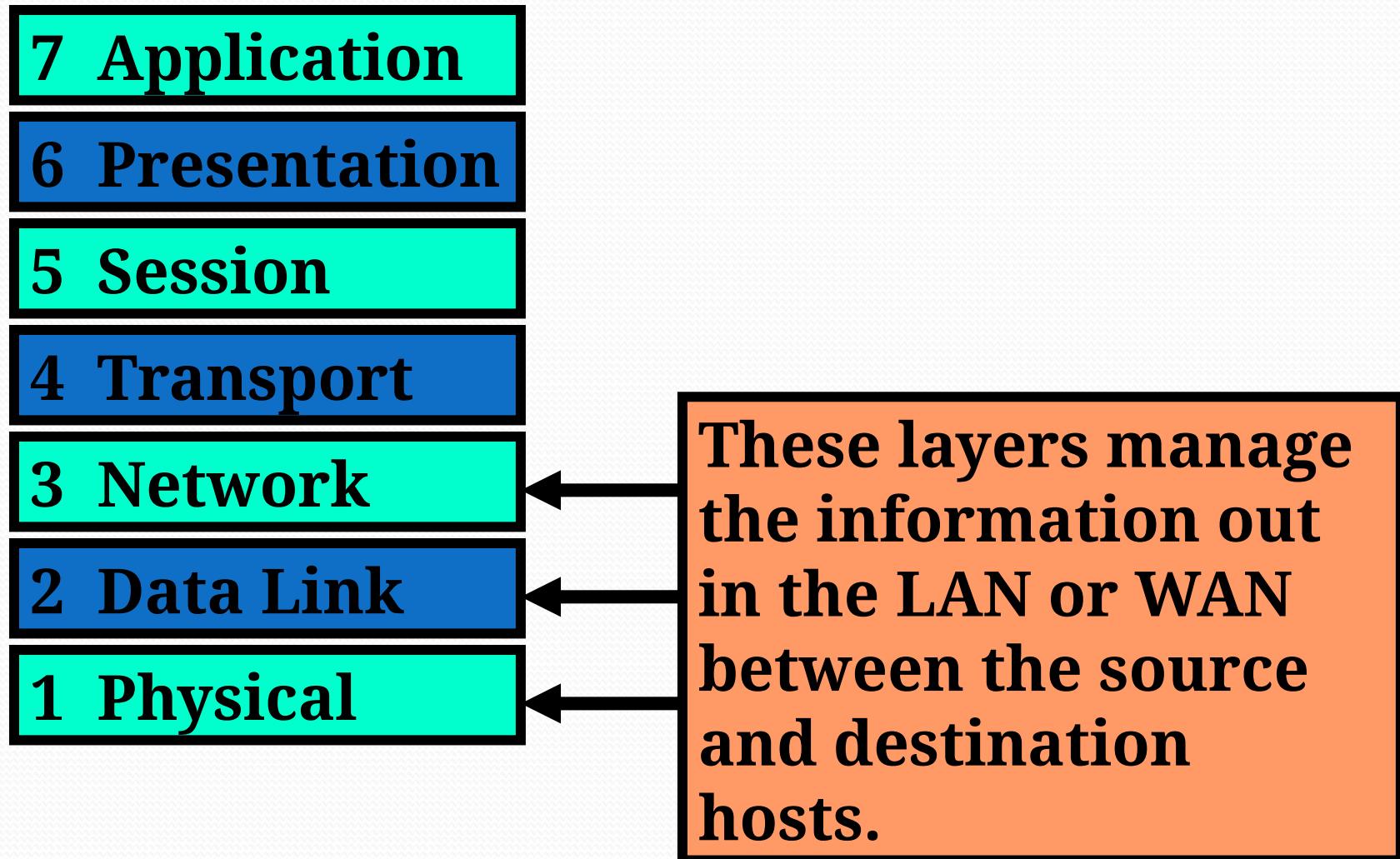


Your friend enjoys riding his new bicycle in Munich.

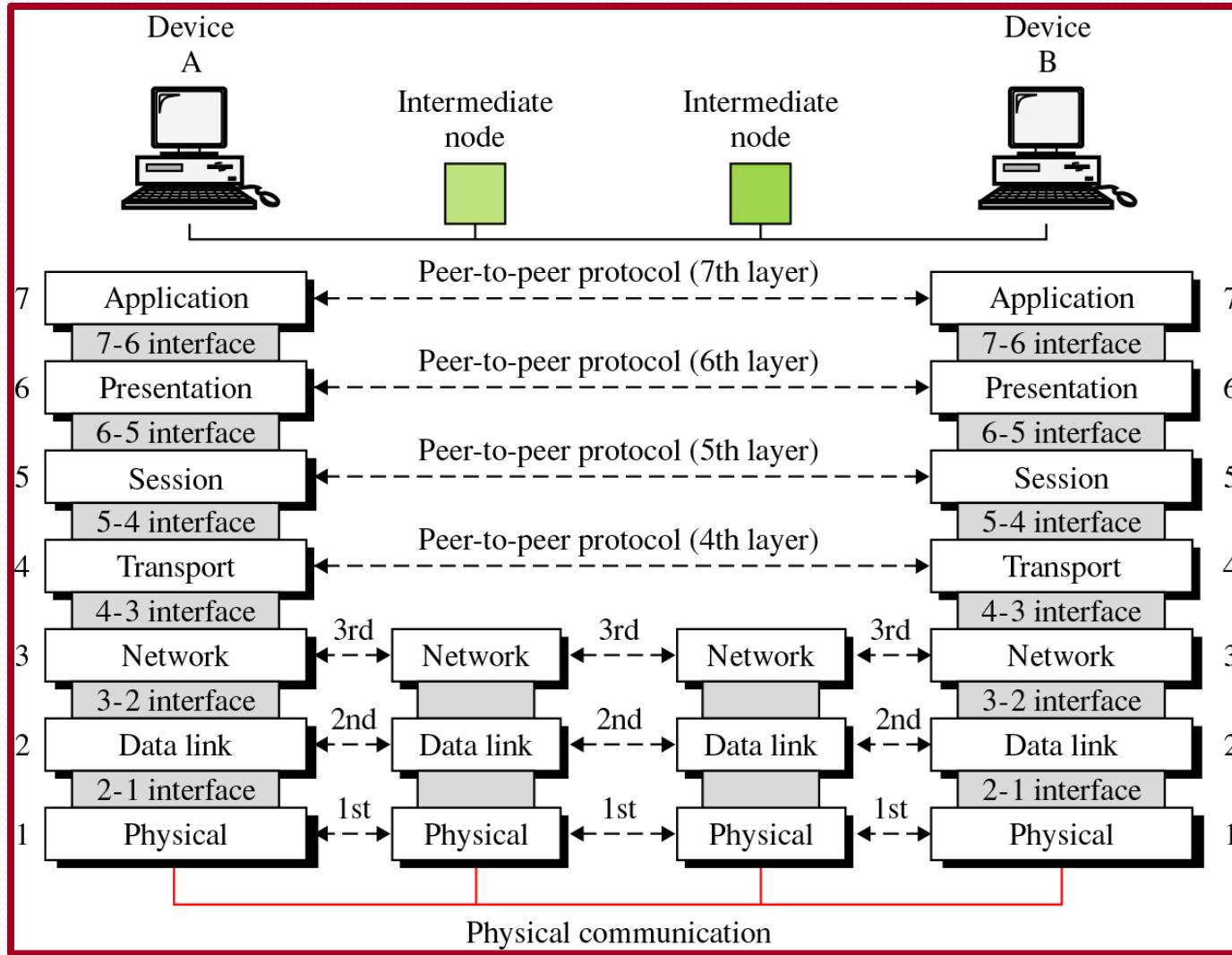
# Host Layers



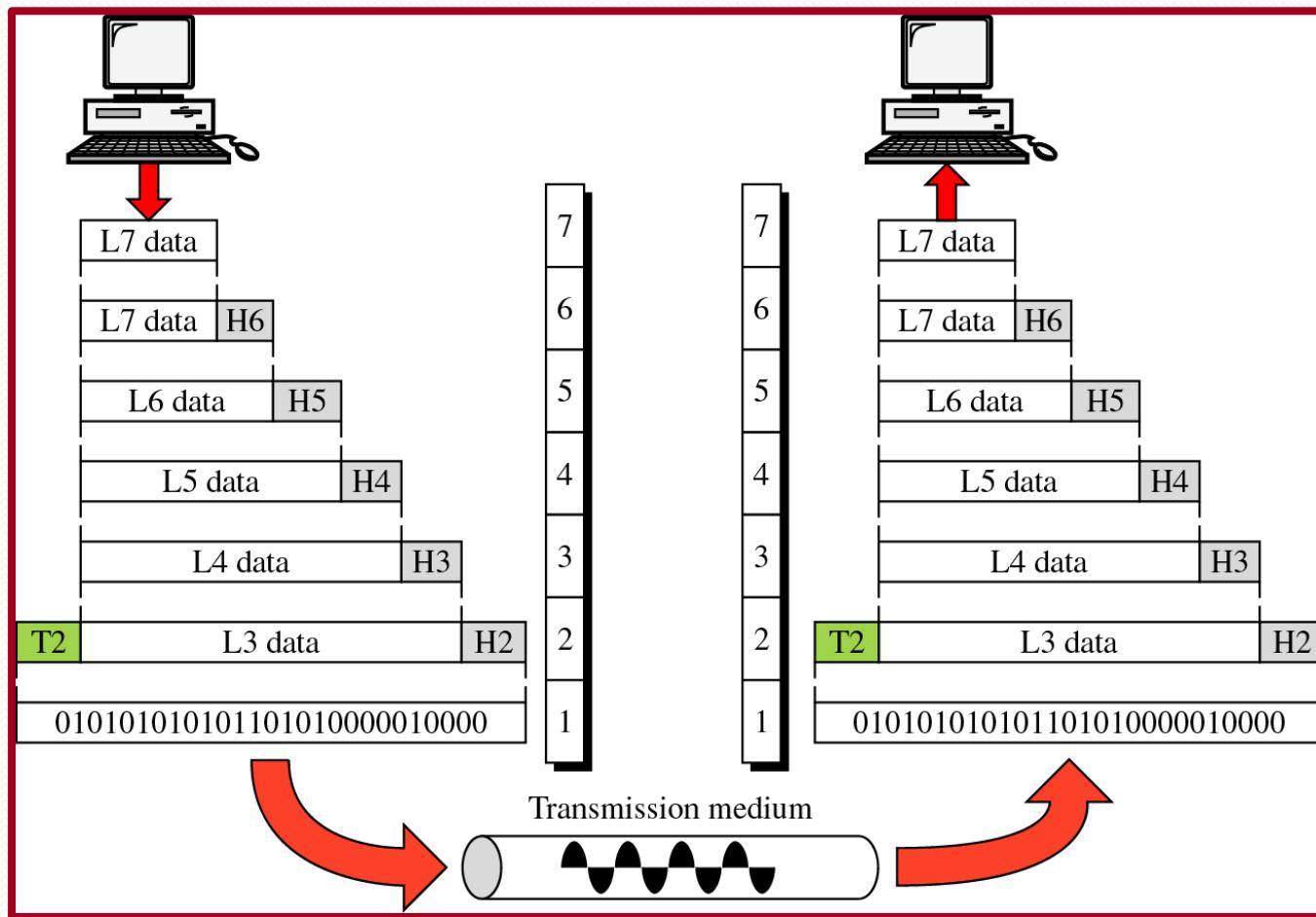
# Media Layers



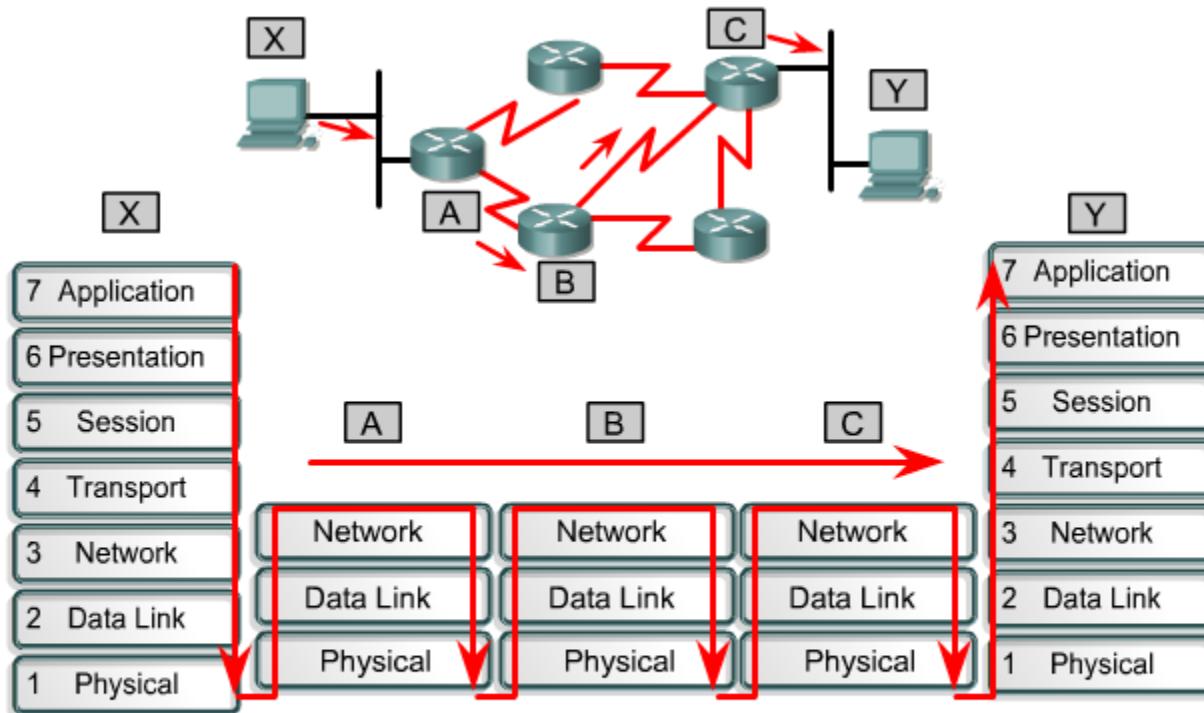
# The OSI Layers Communications



# Encapsulation Process



# Data Flow Through a Network



Data flow in a network focuses on layers one, two and three of the OSI model. This is after being transmitted by the sending host and before arriving at the receiving host.