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Office Hours: 10:00 a.m. - 11:00 a.m Friday

Quiz 1	Fri 04/22 (Week 4)
Quiz 2	Fri 05/27 (Week 9)

ECE-357 Lecture1.1 Review

Networks are complex, with many "pieces":

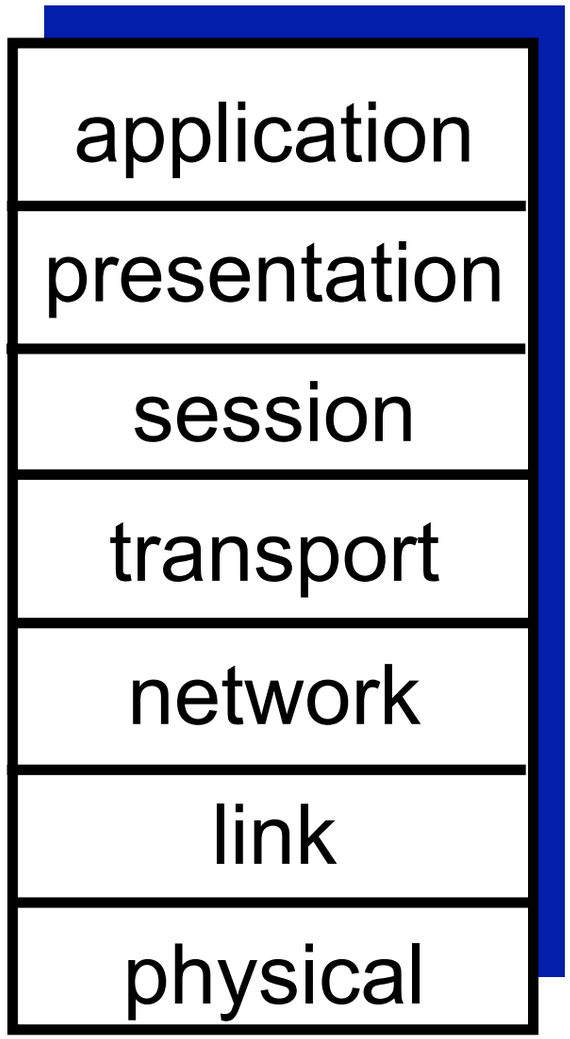
- hosts
- routers
- links of various media
- applications
- protocols
- hardware, software

Question:

is there any hope of *organizing* structure of network?

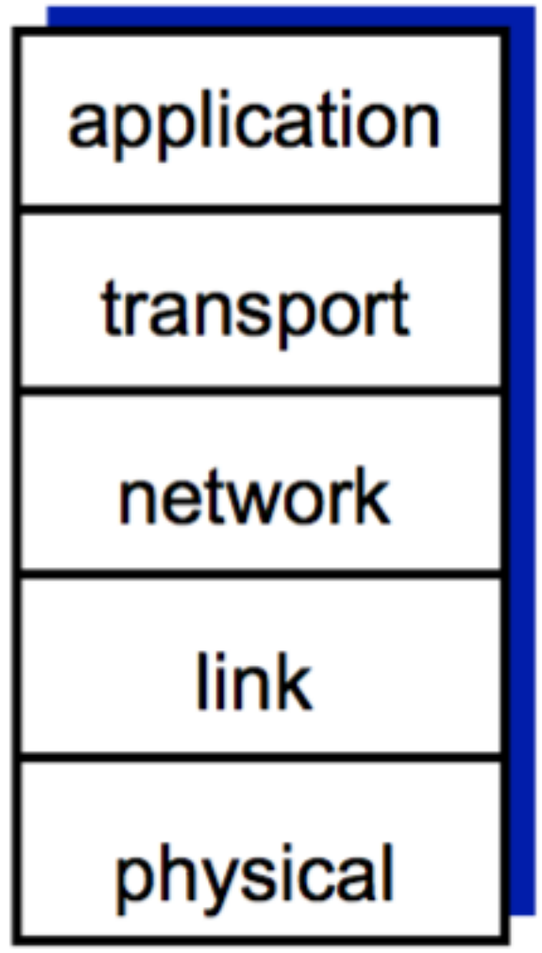
…. or at least our discussion of networks?

ISO Model (7 layers)



Internet Layer Model

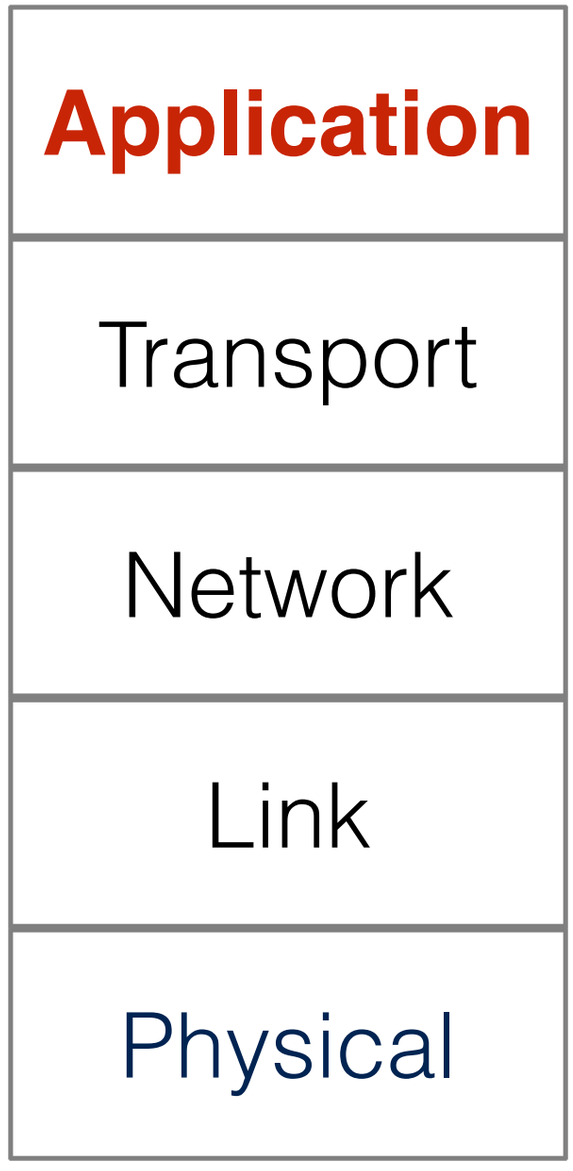
(Top 3 layers have been
combined into application layer)



Protocols that...
are implemented
within processes
running on a host

i.e. web browsing
mail exchange
file exchange

Examples:
ftp, http

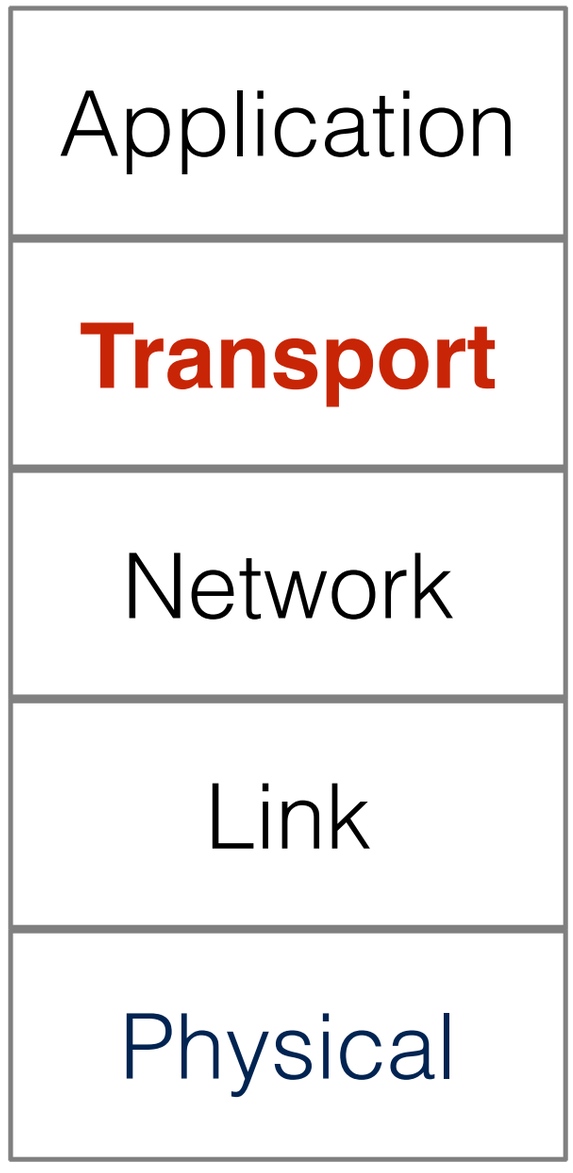


Protocols that...

control data transfer from a host's process to another host's process

i.e. packetization
sequencing
“ports”

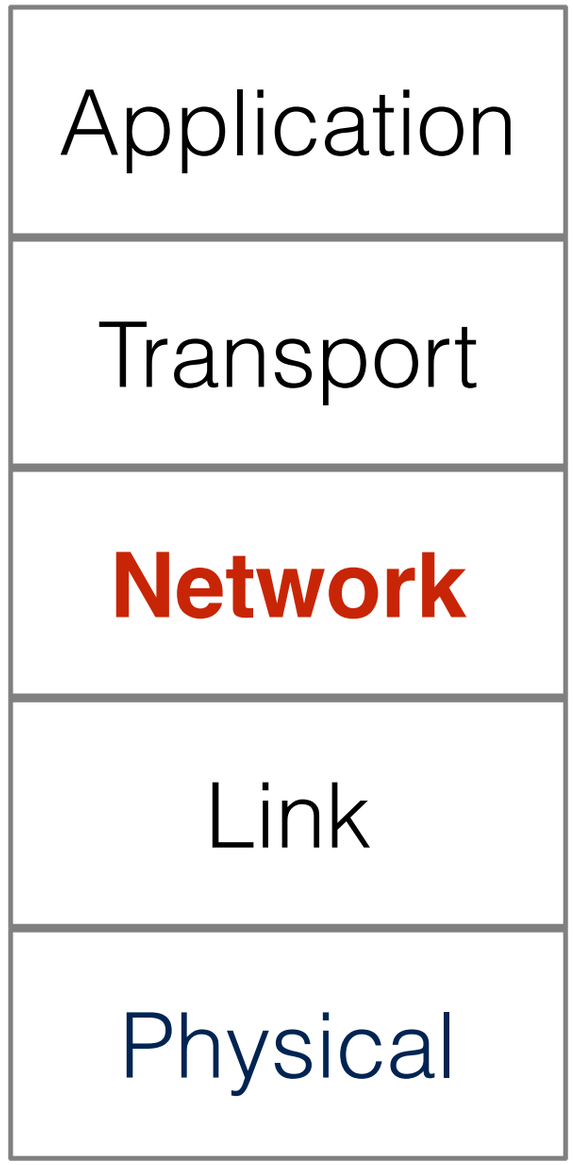
Examples:
TCP, UDP



Protocols that...
handle routing packets through the network

i.e. routing

Examples:
IP



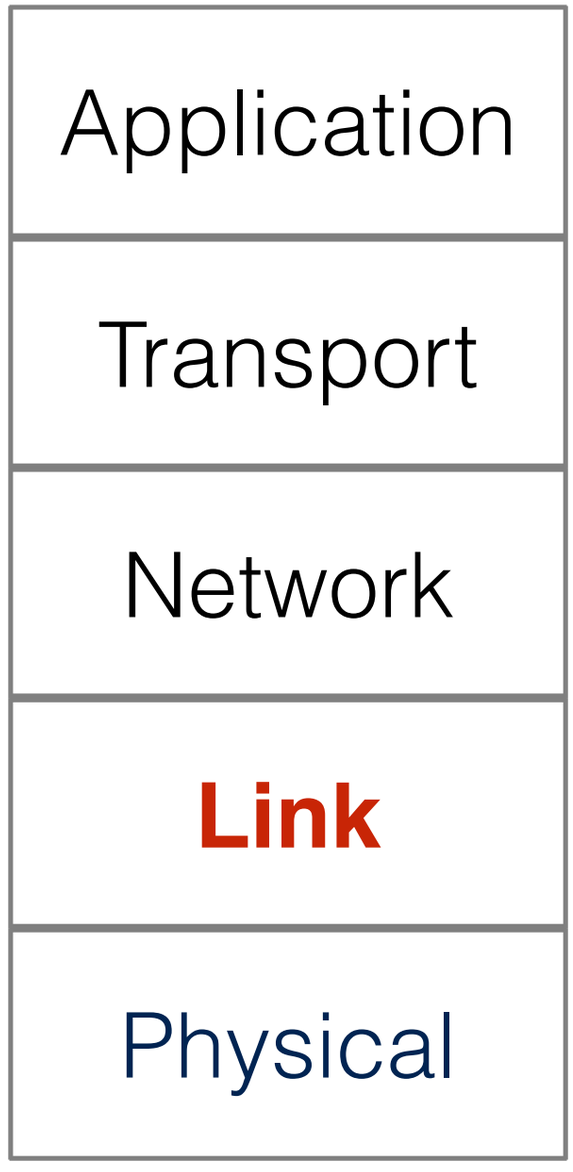
Protocols that...

handle signal transmission from one physical network adapter to another

i.e. physical addressing

media access control

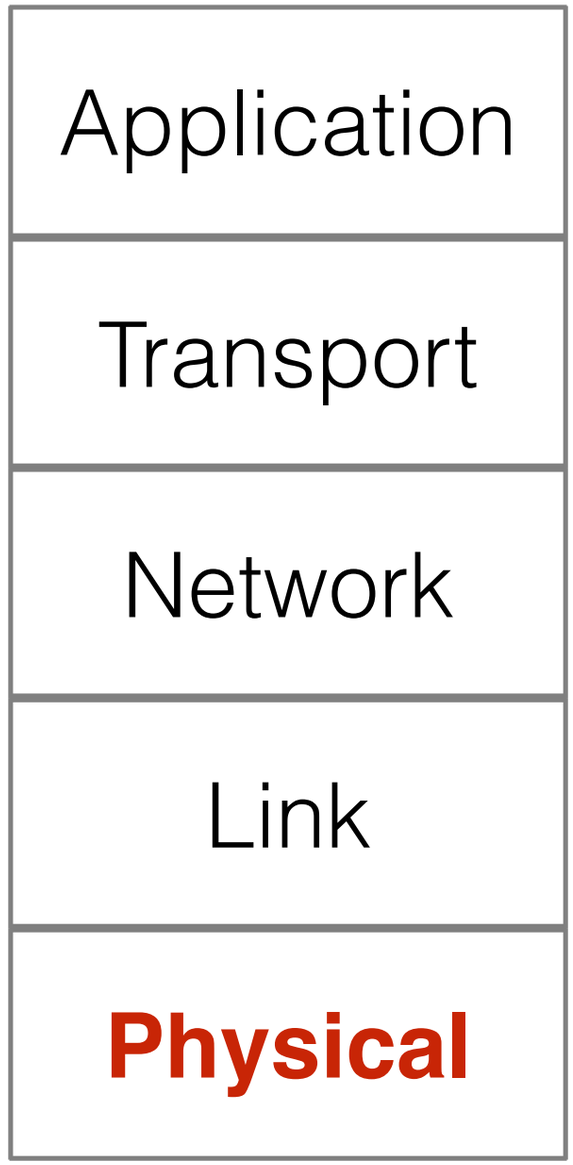
Examples:
802.3 (Ethernet)
802.11(wireless)



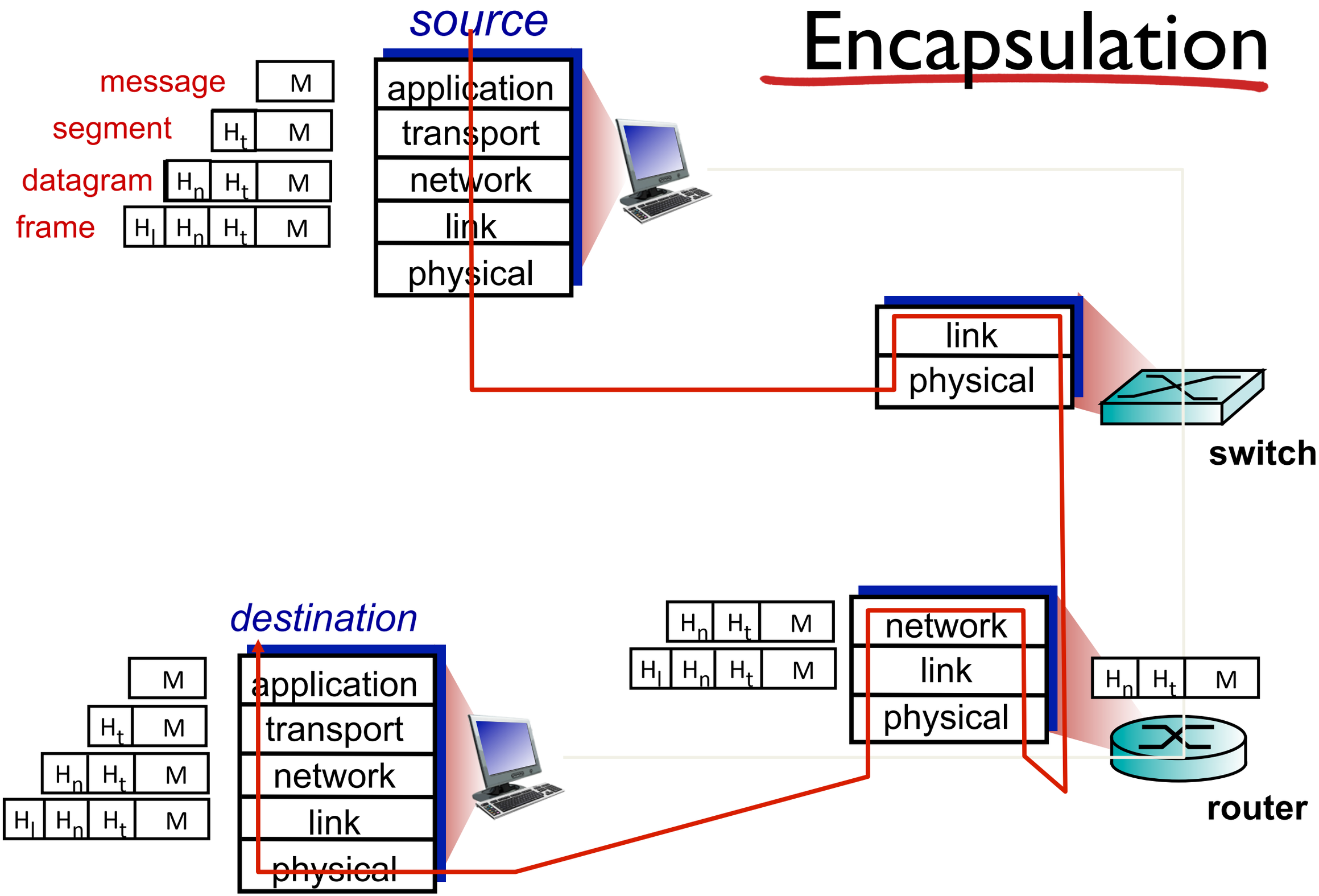
Protocols that...
define electrical and cabling specifications

i.e. voltage

Examples:
802.3



Encapsulation



ECE-357 Lecture1.2 Review

Units

Large Units:

- Kilo (K) X10 ^{3}
- Mega (M) X10 ^{6}
- Giga (G) X 10 ^{9}
- Tera (T) X 10 ^{12}
- Peta (P) X 10 ^{15}
- Exa (E) X 10 ^{18}

Small Units:

milli (m) X 10 $^{-3}$
micro (μ) X 10 $^{-6}$
nano (n) X 10 $^{-9}$
pico (p) X 10 $^{-12}$
femto (f) X 10 $^{-15}$

Memory and disk capacities as well as file size is measured in Bytes (B) = 8 bits (b)

Physical Media

Guided media (“wired” media)

- Twisted pair copper wire
- Coaxial cable
- Fiber optic cable

Unguided media (“wireless” media)

- Terrestrial radio / microwave
- Satellite microwave

General Characteristics of Physical Media

- Velocity of Propagation:

$$v = c/\sqrt{\varepsilon}$$

where ε is the dielectric constant of the medium (>1)
c is the velocity of light in free space = 3*10^8 meters/sec

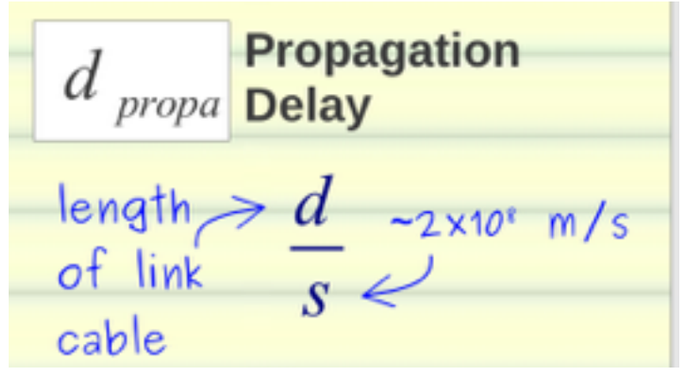
- Typical velocities are:

Copper 2.3*10^8 m/sec
Optical Fiber 2*10^8 m/sec

Example: 200 km optical fiber link between two users

Propagation delay = 200*10^3 m / (2*10^8 m/sec) = 0.001 sec

propagation delay is the amount of time it takes for the signal to travel from the sender to the receiver.



Q&A