

Computer Networks

Reference Models (§1.4, §1.6)





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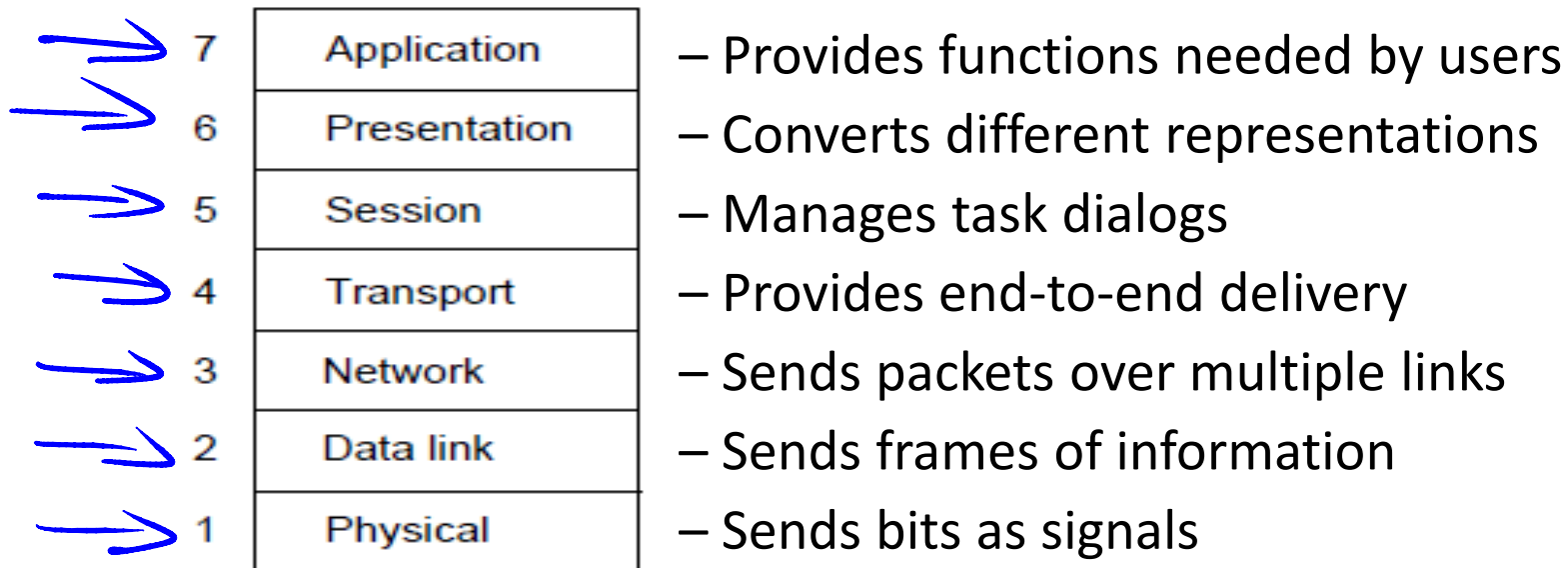
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A Little Guidance Please ...

-  What functionality should we implement at which layer?
 - This is a key design question
-  Reference models provide frameworks that guide us »

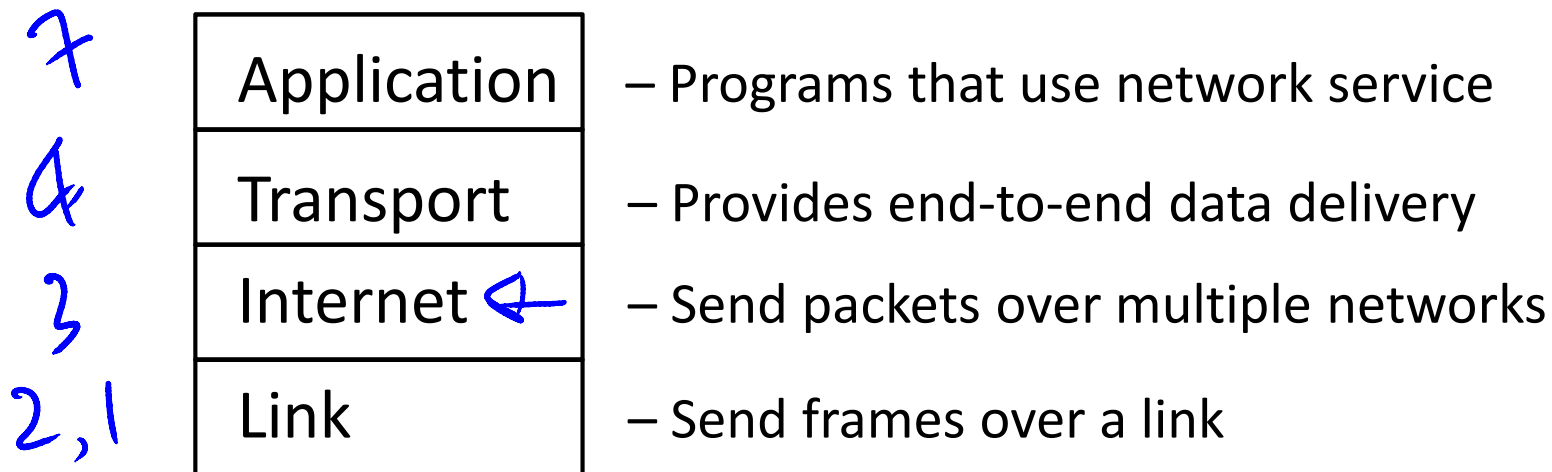
OSI “7 layer” Reference Model

- A principled, international standard, to connect systems
 - Influential, but not used in practice. (Woops)



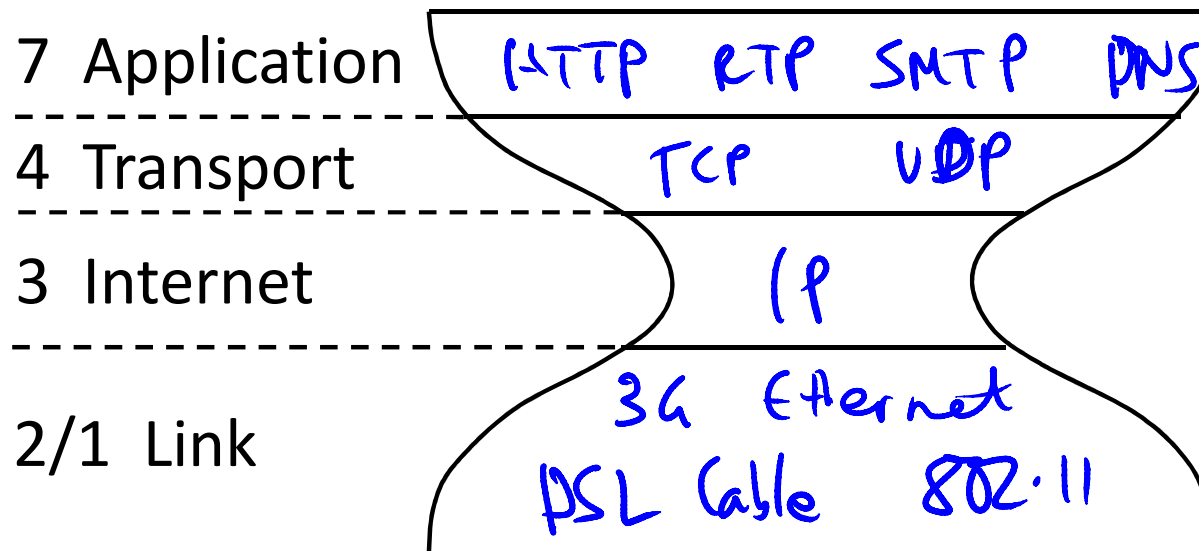
Internet Reference Model

- A four layer model based on experience; omits some OSI layers and uses IP as the network layer.



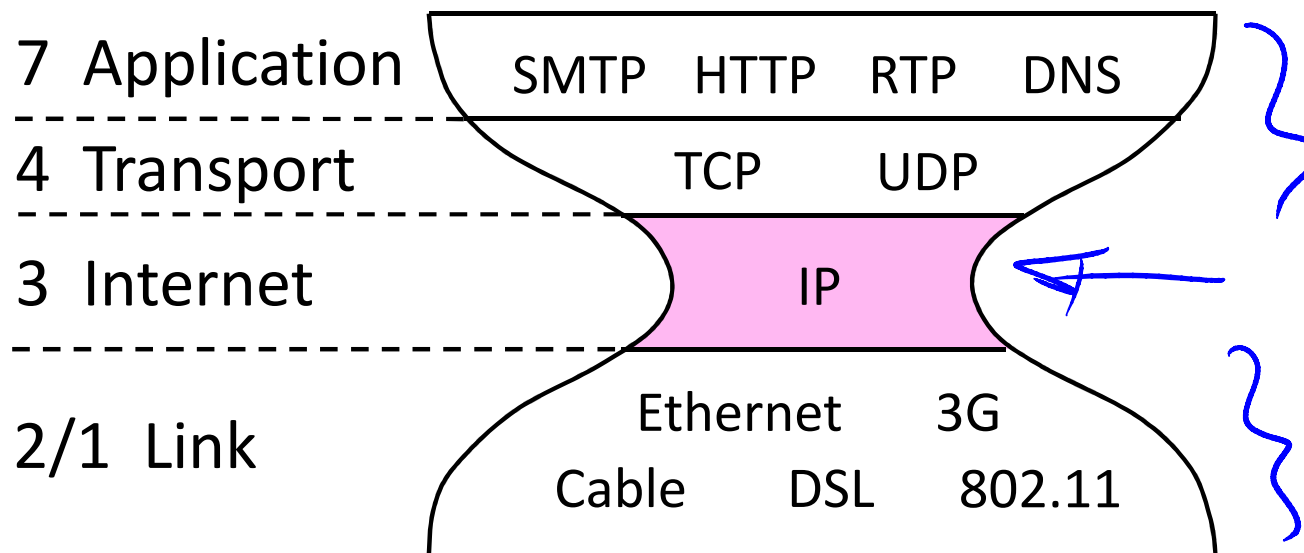
Internet Reference Model (2)

- With examples of common protocols in each layer



Internet Reference Model (3)


- IP is the “narrow waist” of the Internet
 - Supports many different links below and apps above



Standards Bodies

- Where all the protocols come from!


➔ Focus is on interoperability



Body	Area	Examples
ITU	Telecom	G.992, <u>ADSL</u> H.264, <u>MPEG4</u>
IEEE	Communications	<u>802.3</u> , Ethernet 802.11, WiFi
IETF	Internet	RFC 2616, <u>HTTP/1.1</u> RFC 1034/1035, <u>DNS</u>
W3C	Web	HTML5 standard CSS standard

Layer-based Names

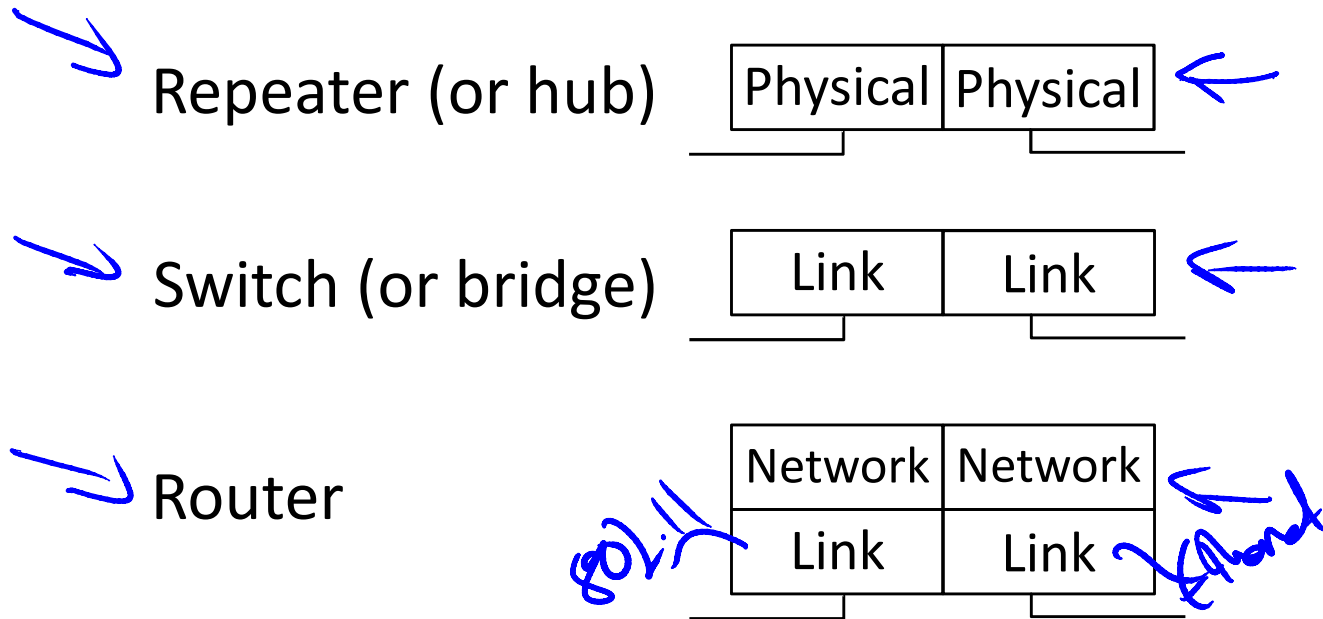
- For units of data:



Layer	Unit of Data
Application	<u>Message</u>
Transport	Segment
Network	<u>Packet</u>
Link	<u>Frame</u>
Physical	<u>Bit</u>

Layer-based Names (2)

- For devices in the network:



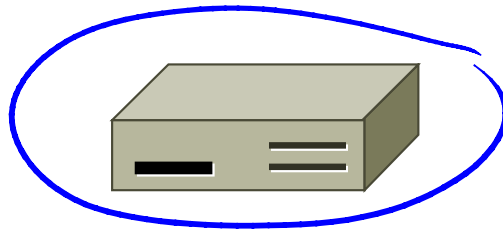
Layer-based Names (3)

- For devices in the network:

Proxy or
middlebox
or gateway

App	App
Transport	Transport
Network	Network
Link	Link

But they all
look like this!



A Note About Layers

- They are guidelines, not strict
 - May have multiple protocols working together in one layer
 - May be difficult to assign a specific protocol to a layer

END

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