FUNDAMENTALS OF TCP/IP NETWORKING

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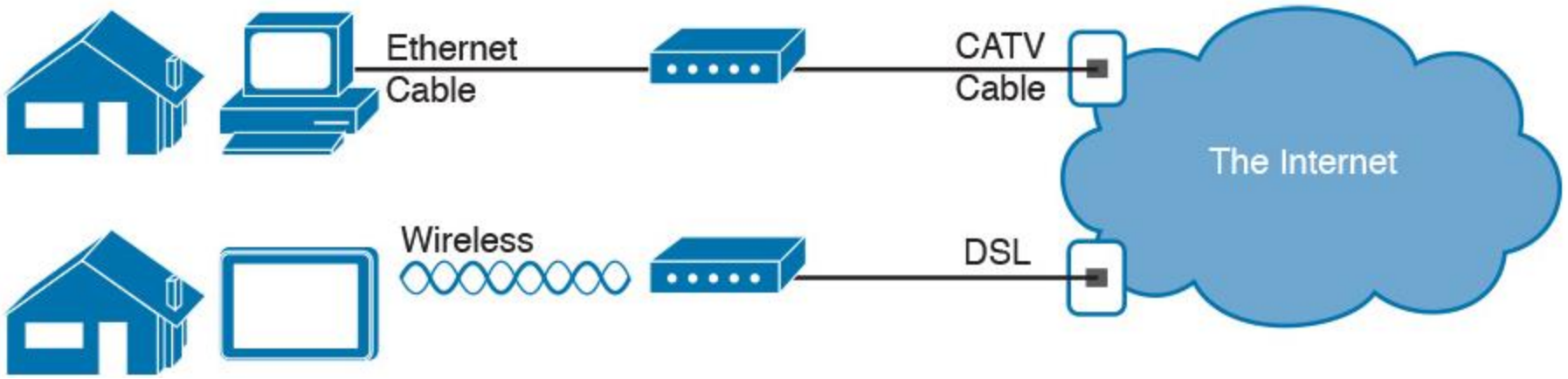
PERSPECTIVE ON NETWORKING
(HOME-BASED)



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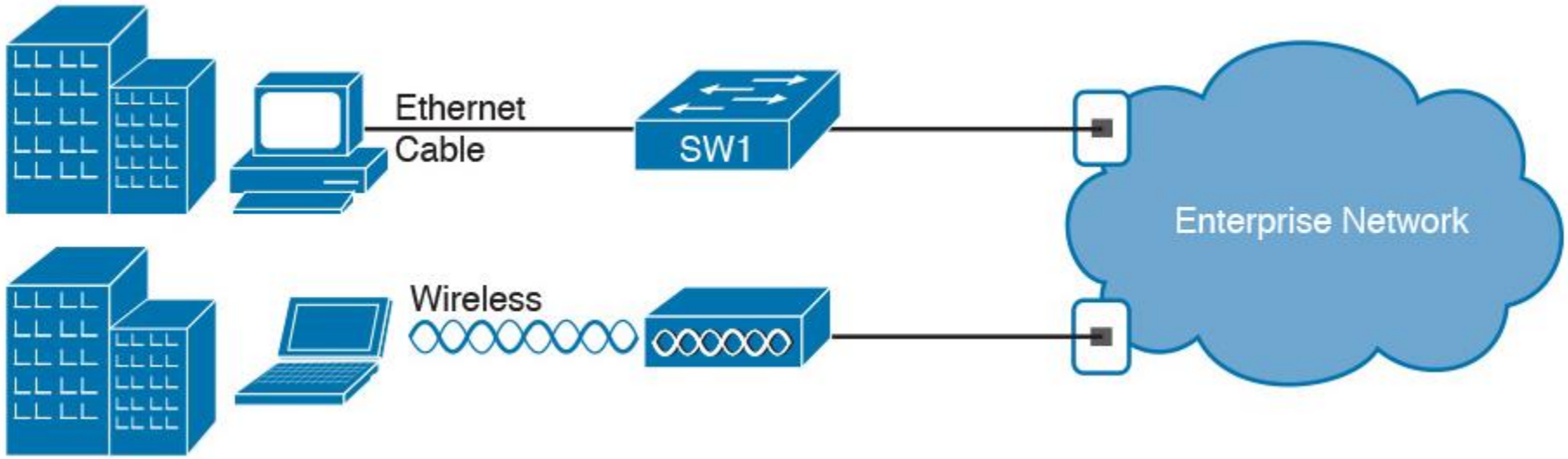
PERSPECTIVE ON NETWORKING
(ENTERPRISE NETWORKS)



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NETWORKING MODELS

- TCP/IP Networking Model
  - Standard model

- OSI Networking Model
  - Reference model

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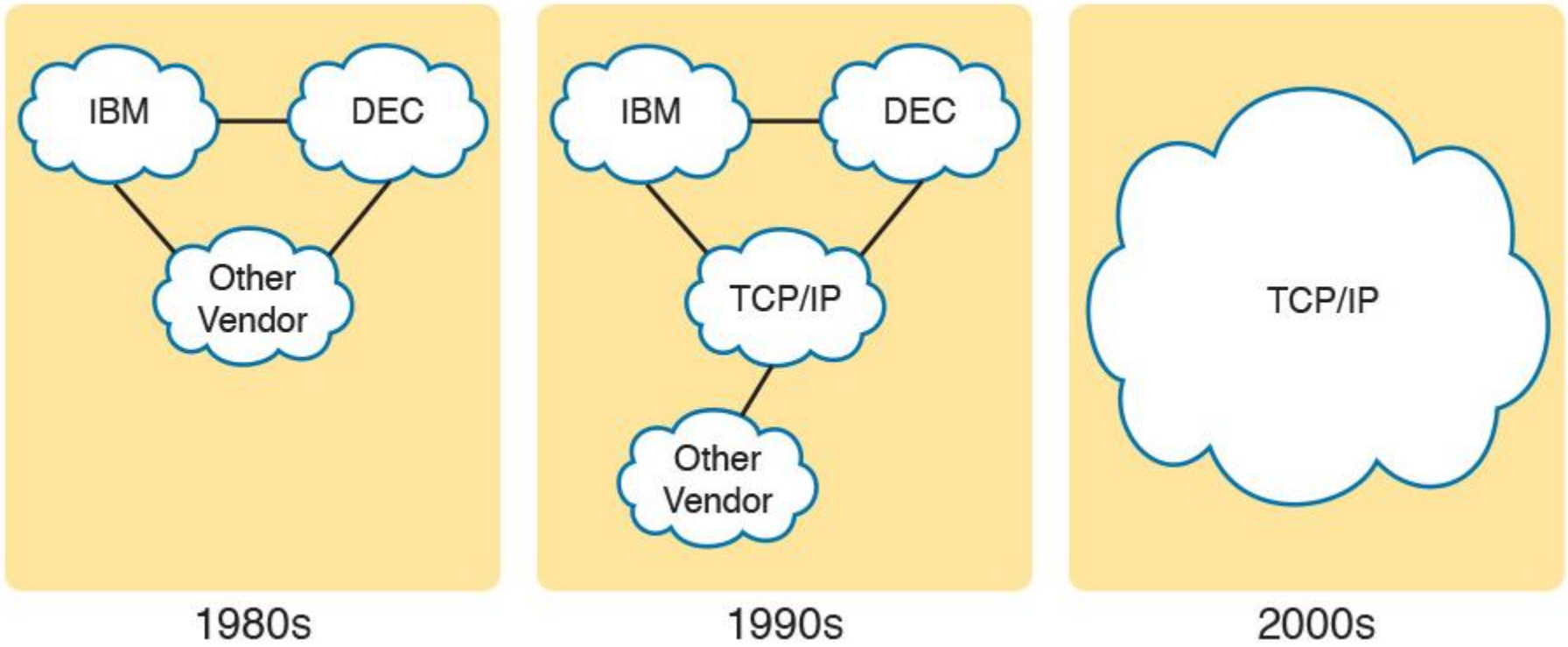
HISTORY AND OVERVIEW OF TCP/IP MODEL



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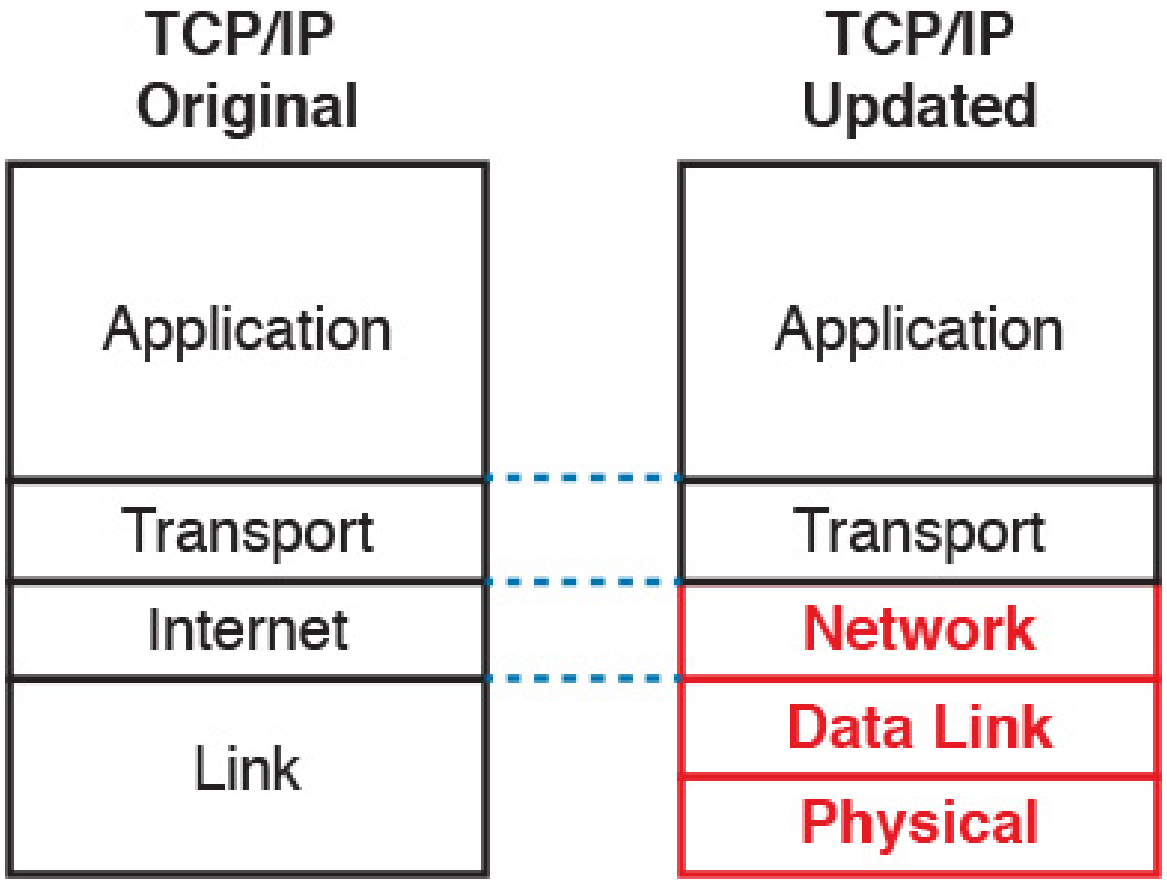
TCP/IP MODEL LAYERS



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TCP/IP PROTOCOLS

TCP/IP Architecture Layer	Example Protocols
Application	HTTP, POP3, SMTP
Transport	TCP, UDP
Internet	IP
Link	Ethernet, Point-to-Point Protocol (PPP), T1

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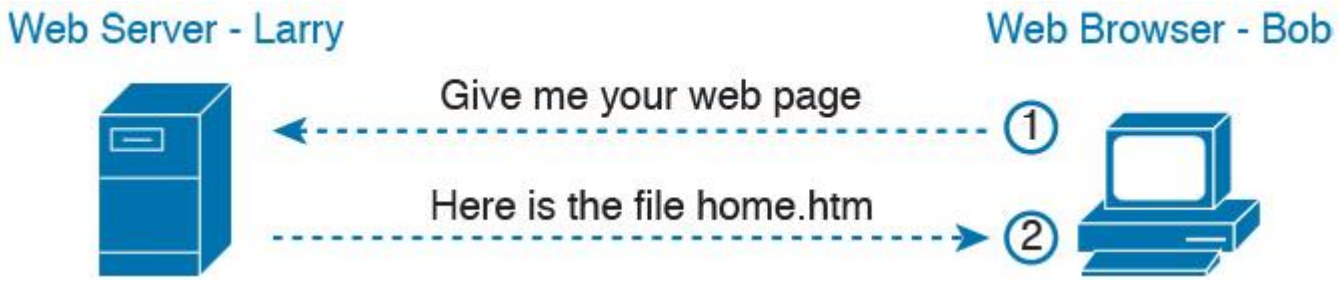
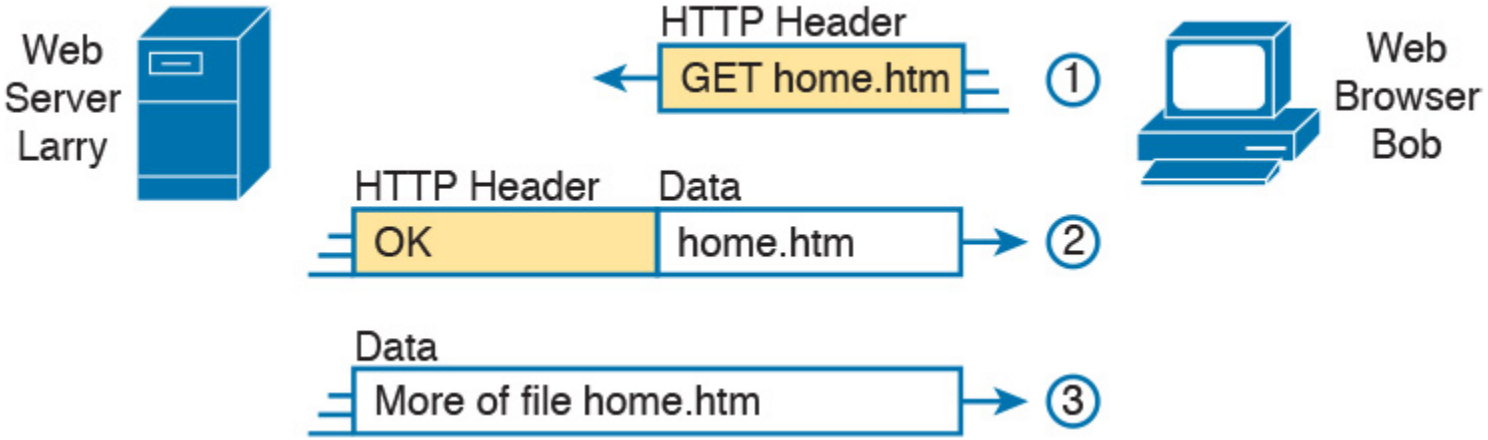
TCP/IP APPLICATION LAYER





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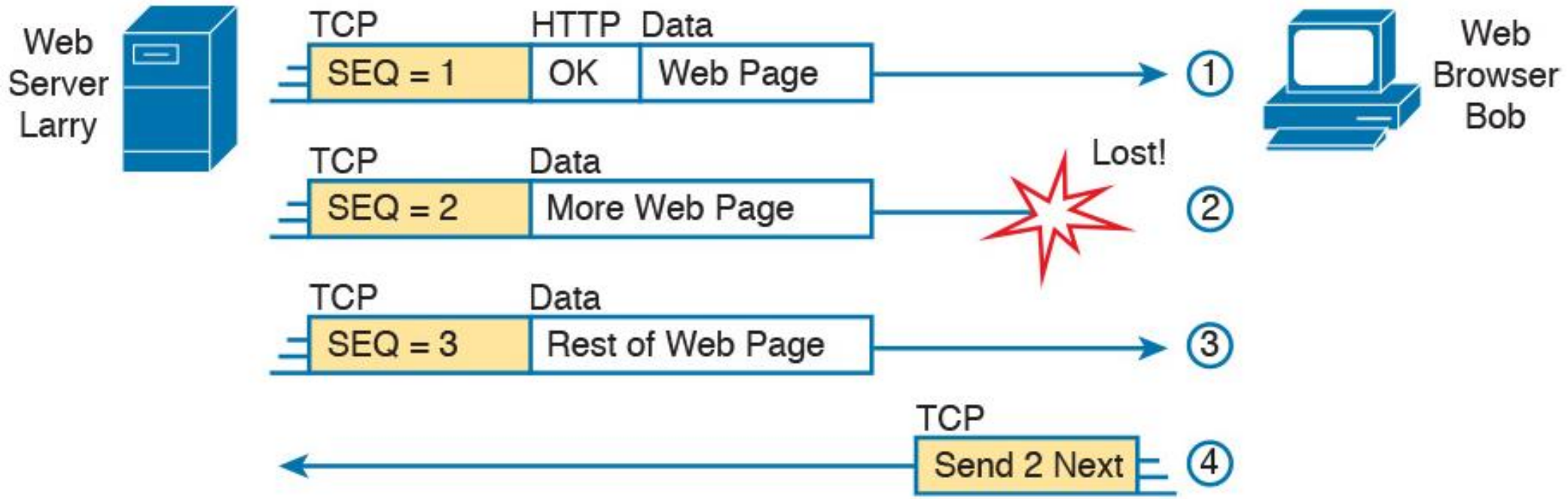
TCP/IP TRANSPORT LAYER



- Same-Layer Interaction on different computers
- Different-Layer Interaction on the same computer

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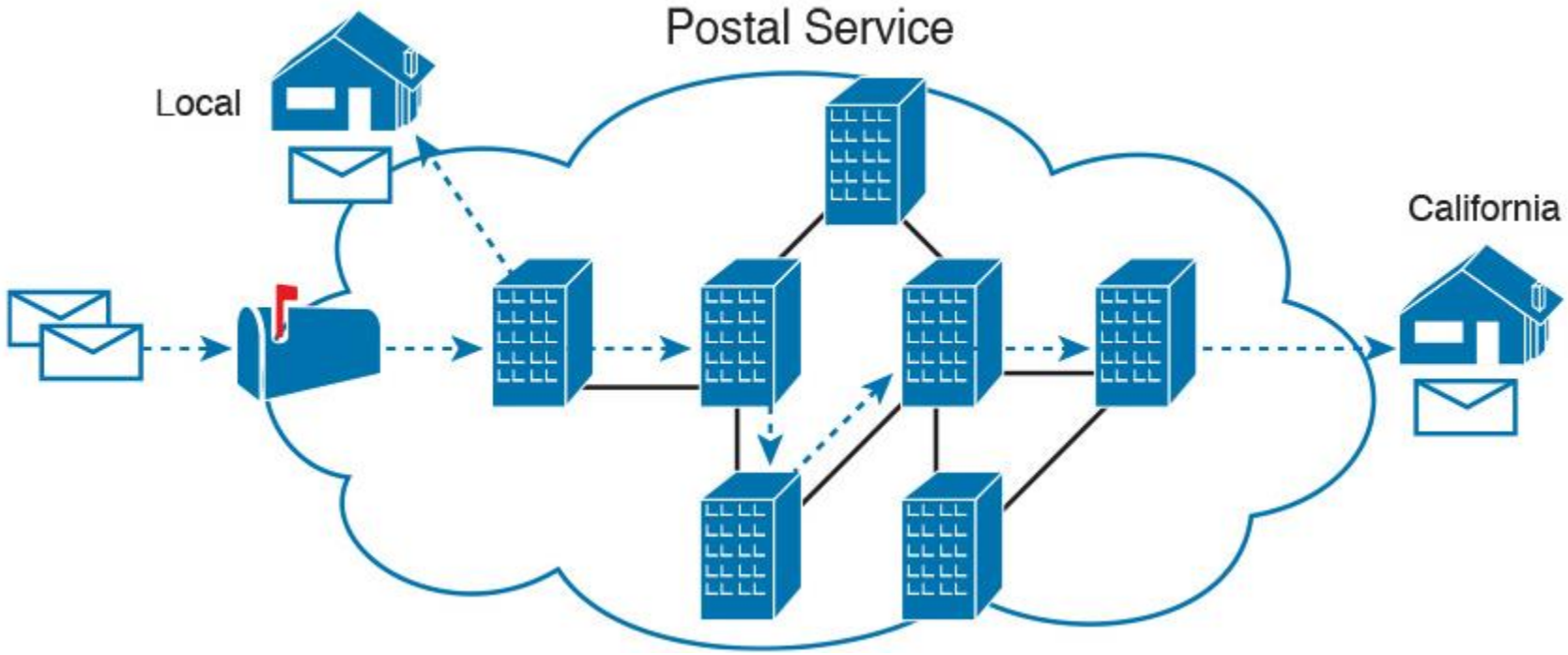
TCP/IP NETWORK (INTERNET) LAYER



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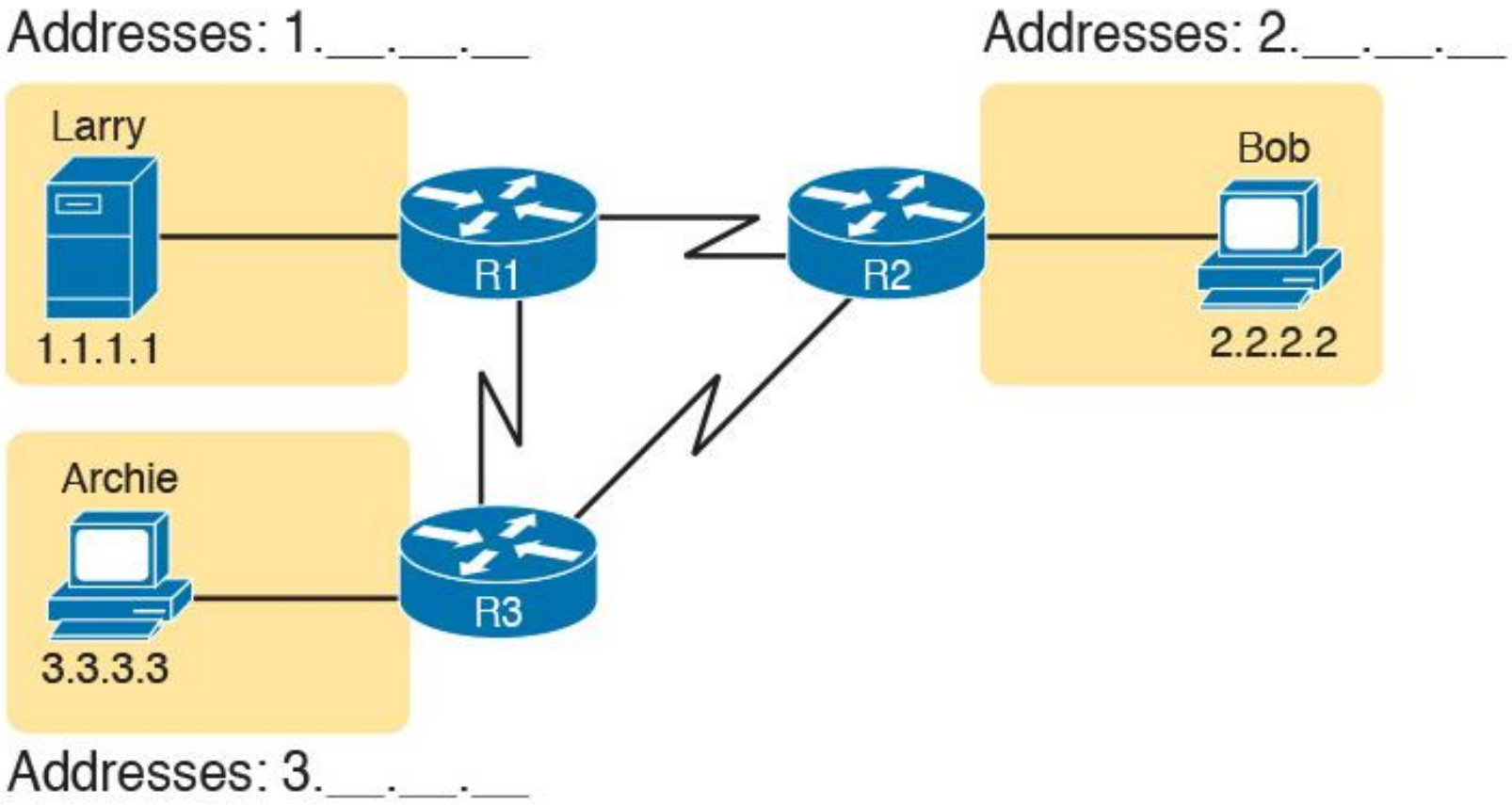
INTERNET PROTOCOL (IP) ADDRESSING



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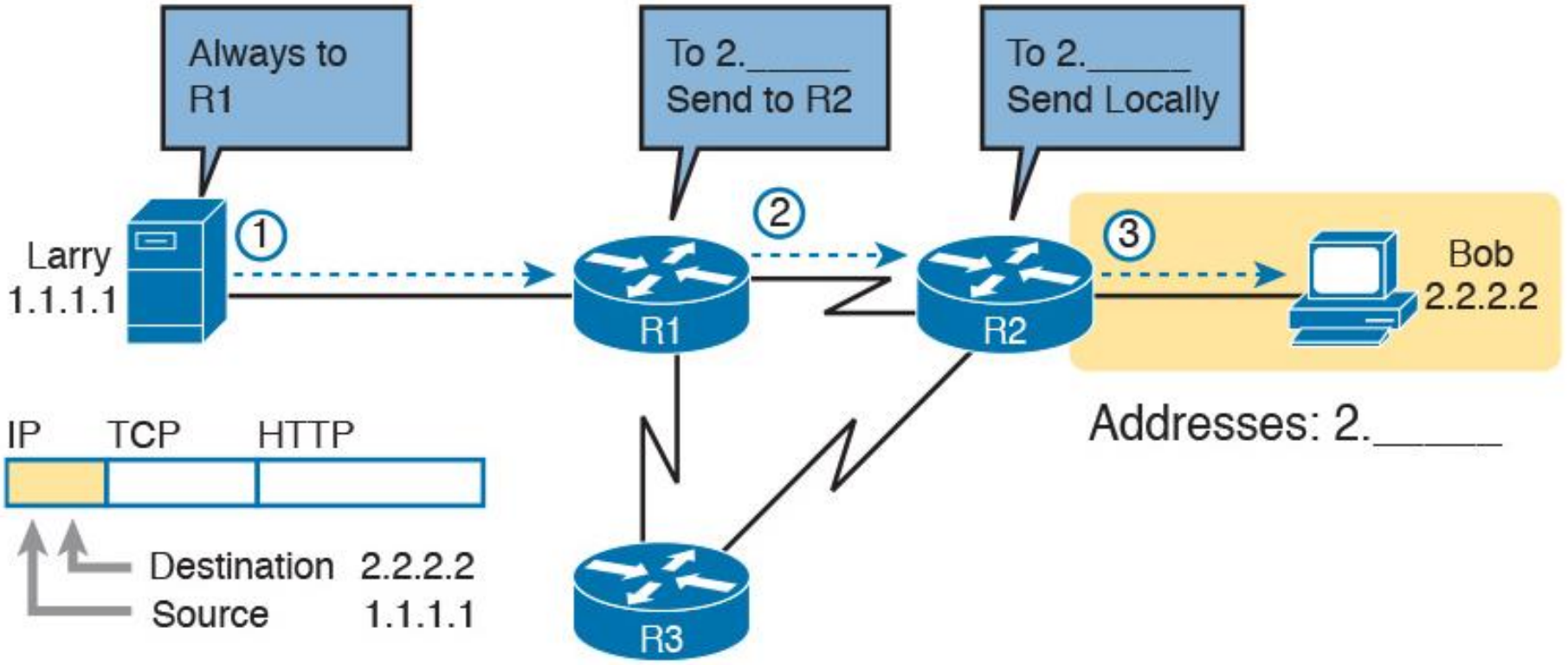
INTERNET PROTOCOL (IP) ROUTING



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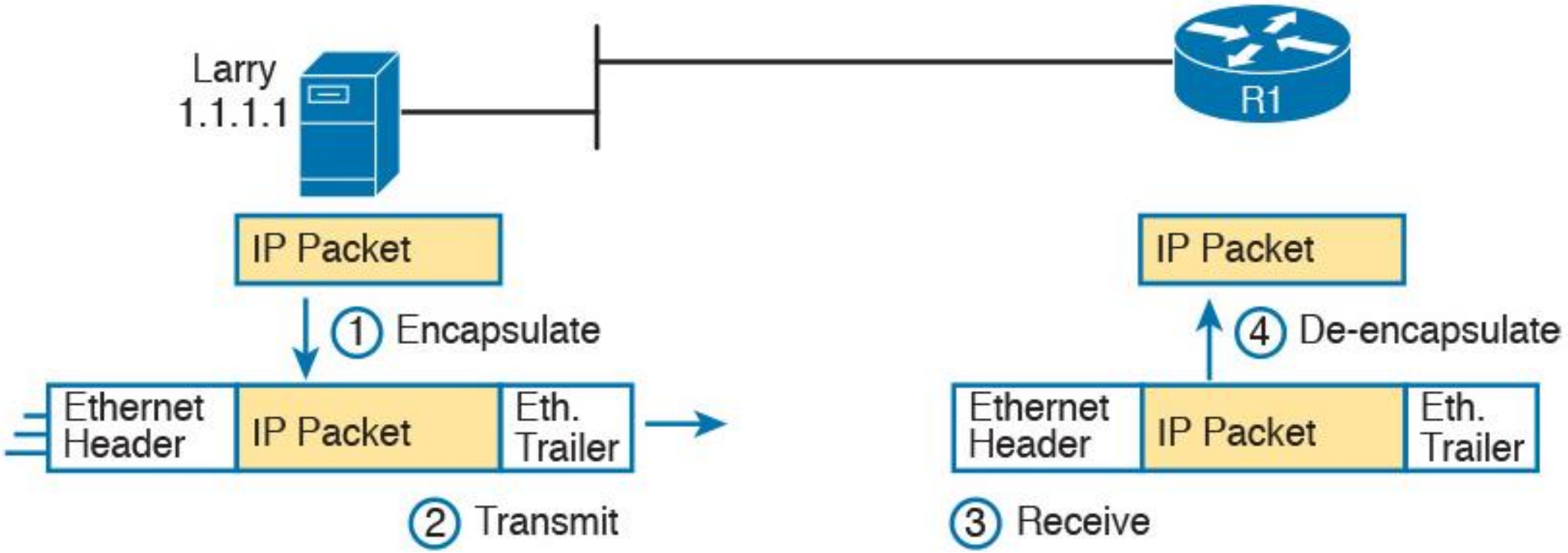
TCP/IP LINK LAYER (DATA LINK & PHYSICAL)



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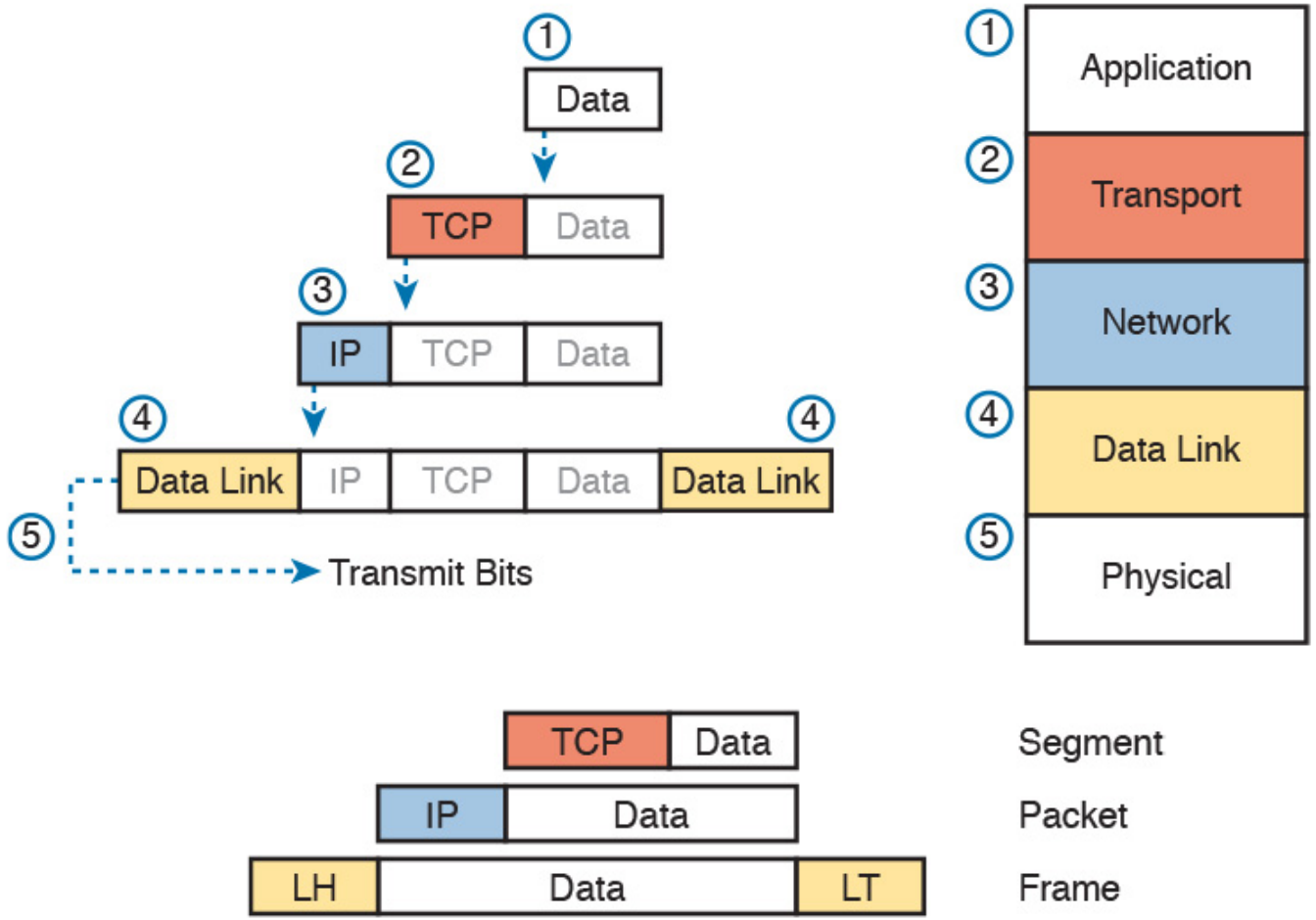
TCP/IP DATA ENCAPSULATION



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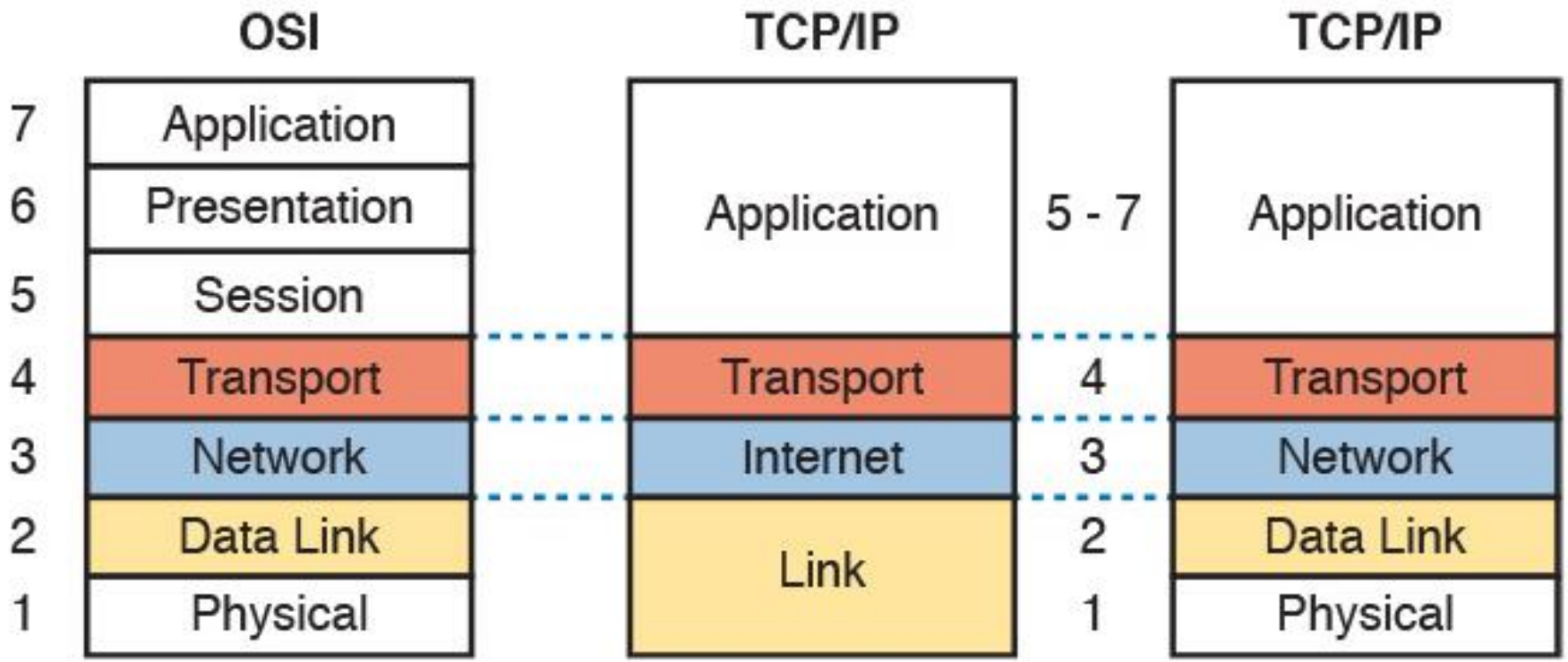
OSI MODEL IN COMPARISON WITH TCP/IP MODEL



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OSI LAYERS FUNCTIONAL DESCRIPTION

Layer	Functional Description
7	**Application layer.** Provides an interface from the application to the network by supplying a protocol with actions meaningful to the application, for example, "get web page object."
6	**Presentation layer.** This layer negotiates data formats, such as ASCII text, or image types like JPEG.
5	**Session layer.** This layer provides methods to group multiple bidirectional messages into a workflow for easier management and easier backout of work that happened if the entire workflow fails.
4	**Transport layer.** In function, much like TCP/IP's transport layer. This layer focuses on data delivery between the two endpoint hosts (for example, error recovery).
3	**Network layer.** Like the TCP/IP network (Internet) layer, this layer defines logical addressing, routing (forwarding), and the routing protocols used to learn routes.
2	**Data link layer.** Like the TCP/IP data link layer, this layer defines the protocols for delivering data over a particular single type of physical network (for example, the Ethernet data link protocols).
1	**Physical layer.** This layer defines the physical characteristics of the transmission medium, including connectors, pins, use of pins, electrical currents, encoding, light modulation, and so on.

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OSI LAYERS MEMORIZATION TRICK

- APS TN DP
- All People Seem To Need Data Processing (Layers 7 to 1)
- Please Do Not Take Sausage Pizzas Away (Layers 1 to 7)

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OSI MODEL: DEVICES AND PROTOCOL EXAMPLES

Layer Name	Protocols and Specifications	Devices
Application, presentation, session (Layers 5–7)	Telnet, HTTP, FTP, SMTP, POP3, VoIP, SNMP	Hosts, firewalls
Transport (Layer 4)	TCP, UDP	Hosts, firewalls
Network (Layer 3)	IP	Router
Data link (Layer 2)	Ethernet (IEEE 802.3), HDLC	LAN switch, wireless access point, cable modem, DSL modem
Physical (Layer 1)	RJ-45, Ethernet (IEEE 802.3)	LAN hub, LAN repeater, cables

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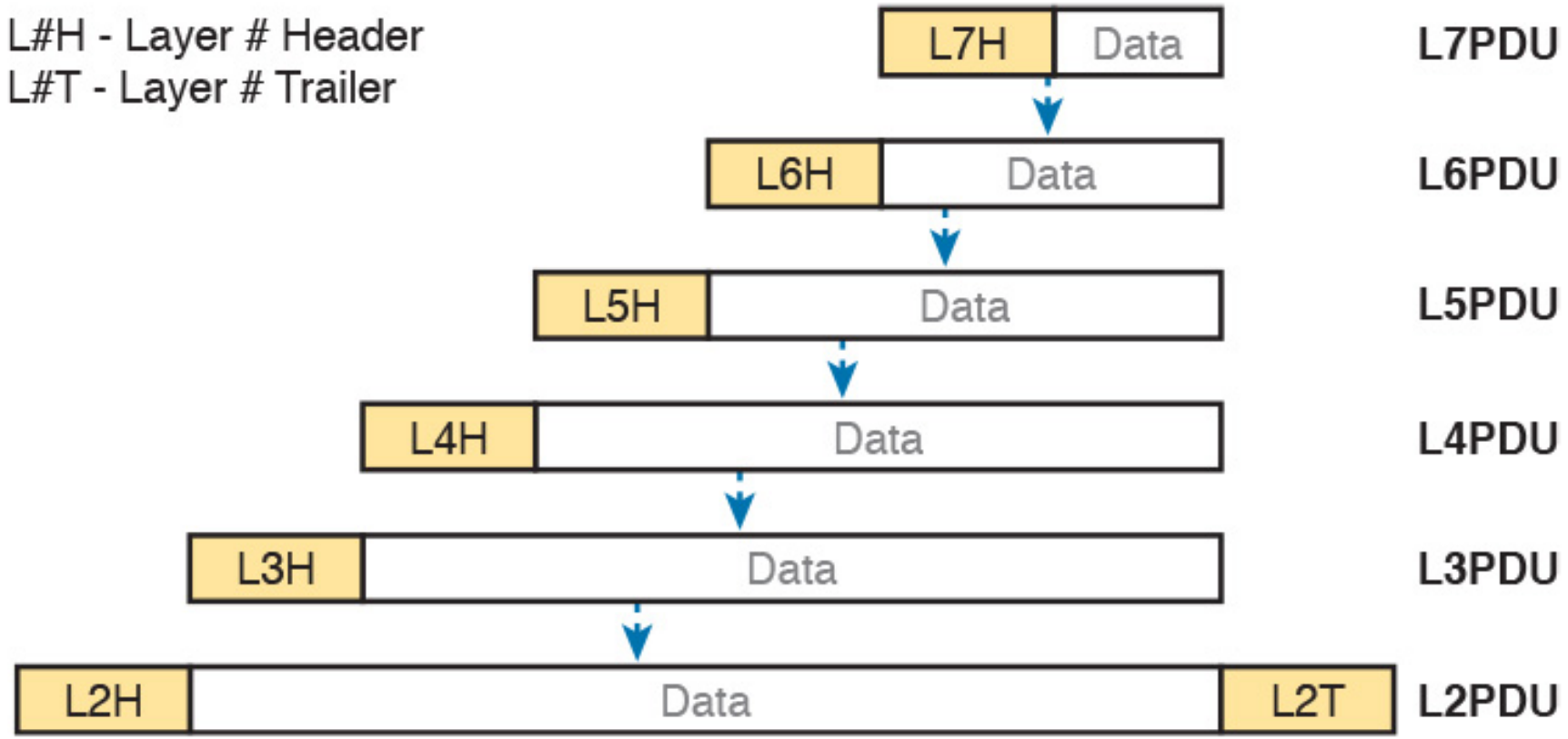
OSI ENCAPSULATION AND PROTOCOL DATA UNITS (PDUs)



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