ECOMMERCE TECHNOLOGY INFRASTRUCTURE

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THE INTERNET: TECHNOLOGY BACKGROUND

- Internet
  - An interconnected network of thousands of networks and millions of computers, linking businesses, educational institutions, government agencies, and individuals
- World Wide Web (Web)
  - One of the Internet's most popular services, providing access to billions of Web pages

THE EVOLUTION OF THE INTERNET 1961—THE PRESENT

- History of Internet can be segmented into three phases:
  - Innovation Phase
  - Institutionalization Phase
  - Commercialization Phase

BASES FOR INTERNET

Three important concepts that are the basis for understanding the Internet:

- Packet switching
- TCP/IP communications protocol
- Client/server computing

PACKET SWITCHING

- Packet switching: Method of slicing digital messages into packets, sending the packets along different communication paths as they become available, and then reassembling the packets once they arrive at their destination
  - Uses routers (special purpose computers that interconnect the computer networks that make up the Internet and route packets) and routing algorithms to ensure packets take the best available path toward their destination

PACKET SWITCHING

I want to communicate with you.	Original text message
00101101100010011011110001101	Text message digitized into bits
01100010 10101100 11000011	Digital bits broken into packets
0011001 10101100 11000011	Header information added to each packet indicating destination, and other control information, such as how many bits are in the total message and how many packets

TCP/IP

- Transmission Control Protocol (TCP):
  - Establishes the connections among sending and receiving Web computers, handles the assembly of packets at the point of transmission, and their reassembly at the receiving end
- Internet Protocol (IP):
  - Provides the Internet's addressing scheme
- TCP/IP divided into four separate layers:
  - Network Interface Layer
  - Internet Layer
  - Transport Layer
  - Application Layer

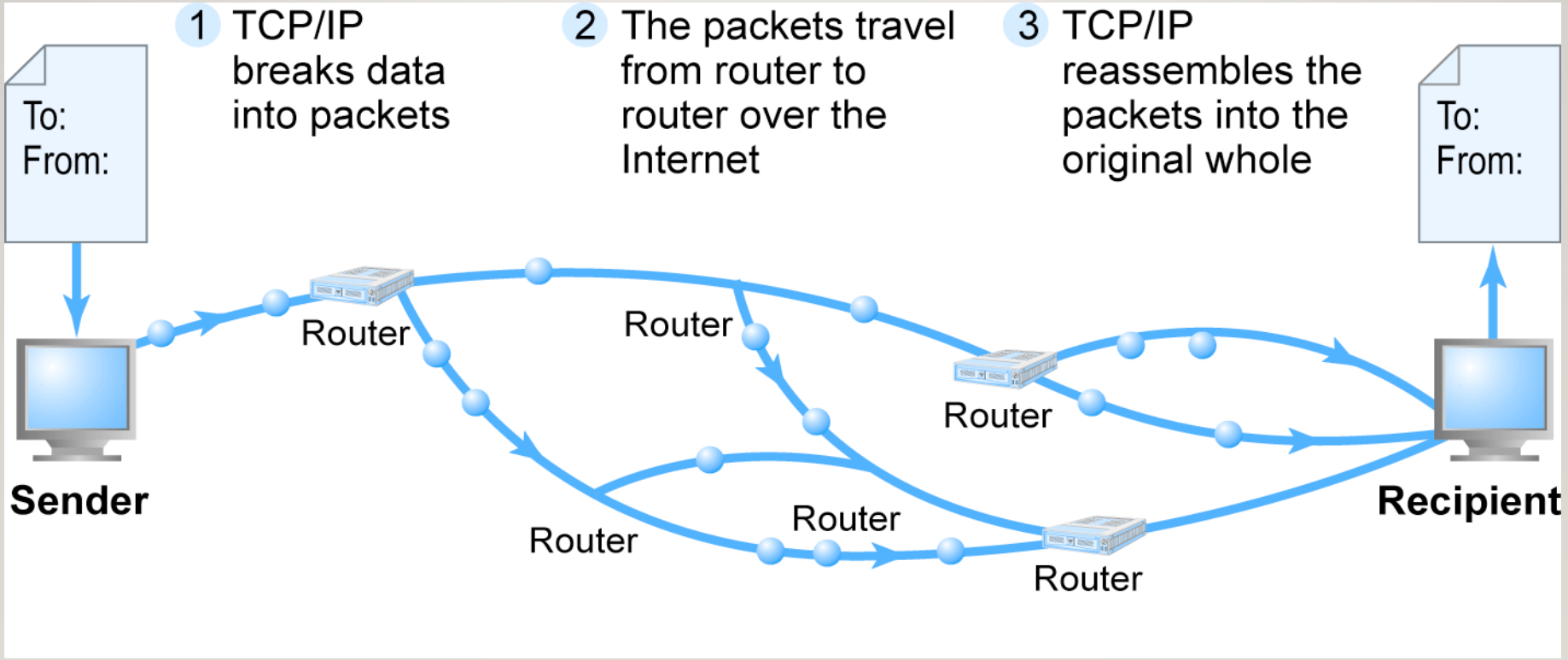
INTERNET (IP) ADDRESSES

- IPv4:
  - 32-bit number expressed as a series of four separate numbers marked off by periods, such as 201.61.186.227
- IPv6:
  - 128-bit addresses; able to handle up to 1 quadrillion addresses (IPv4 can only handle 4 billion)

https://www.paessler.com/it-explained/ip-address

ROUTING INTERNET MESSAGES: TCP/IP AND PACKET SWITCHING

Figure 3.5, Page 131



DOMAIN NAMES, DNS, AND URLS

- Domain name
  - IP address expressed in natural language
- Domain name system (DNS)
  - Allows numeric IP addresses to be expressed in natural language
- Uniform resource locator (URL)
  - Addresses used by Web browsers to identify location of content on the Web

CLIENT/SERVER COMPUTING

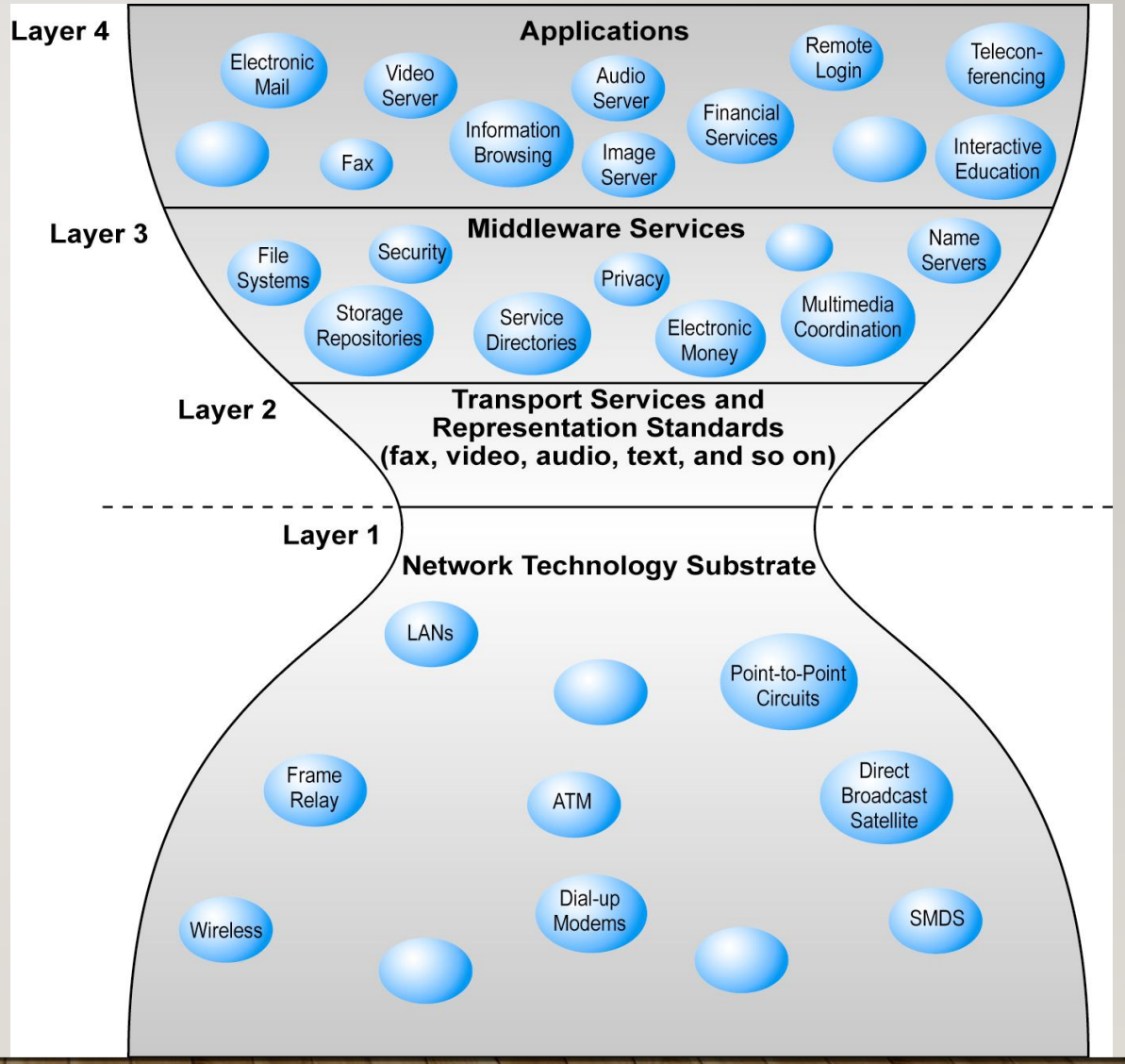
- Model of computing in which very powerful personal computers (clients) are connected in a network with one or more server computers that perform common functions for the clients, such as storing files, software applications, etc.

THE INTERNET TODAY

- Client/server computing model, coupled with hourglass, layered architecture has allowed Internet to handle explosive growth without disruption
- Hourglass/layered architecture – 4 layers:
  - Network Technology Substrate
  - Transport Services and Representation Standards
  - Middleware Services
  - Applications

THE HOURGLASS MODEL OF THE INTERNET

SOURCE: Adapted from Computer Science and Telecommunications Board (CSTB), 2000.



DEVELOPMENT OF THE WEB

- 1989–1991: Web invented by Tim Berners-Lee at CERN
- 1993: Marc Andreesen and others at NCSA create Mosaic, Web browser with GUI that runs on Windows, Macintosh, or Unix
- 1994: Andreessen, Jim Clark found Netscape; create first commercial Web browser, Netscape Navigator
- August 1995: Microsoft introduces Internet Explorer, its version of Web browser

HYPERTEXT

- A way of formatting pages with embedded links that connect documents to one another, and that also link pages to other objects such as sound, video, or animation files
- Uses Hypertext Transfer Protocol (HTTP) and URLs to locate resources on the Web

MARKUP LANGUAGES

- Generalized Markup Languages (GMLs) include:
  - Standard Generalized Markup Language (SGML)—early GML
  - Hypertext Markup Language (HTML)—GML that is relatively easy to use; provides fixed set of markup "tags" used to format Web pages
  - eXtensible Markup Language (XML)—new markup language specification developed by W3C; designed to describe data and information; tags used are defined by user

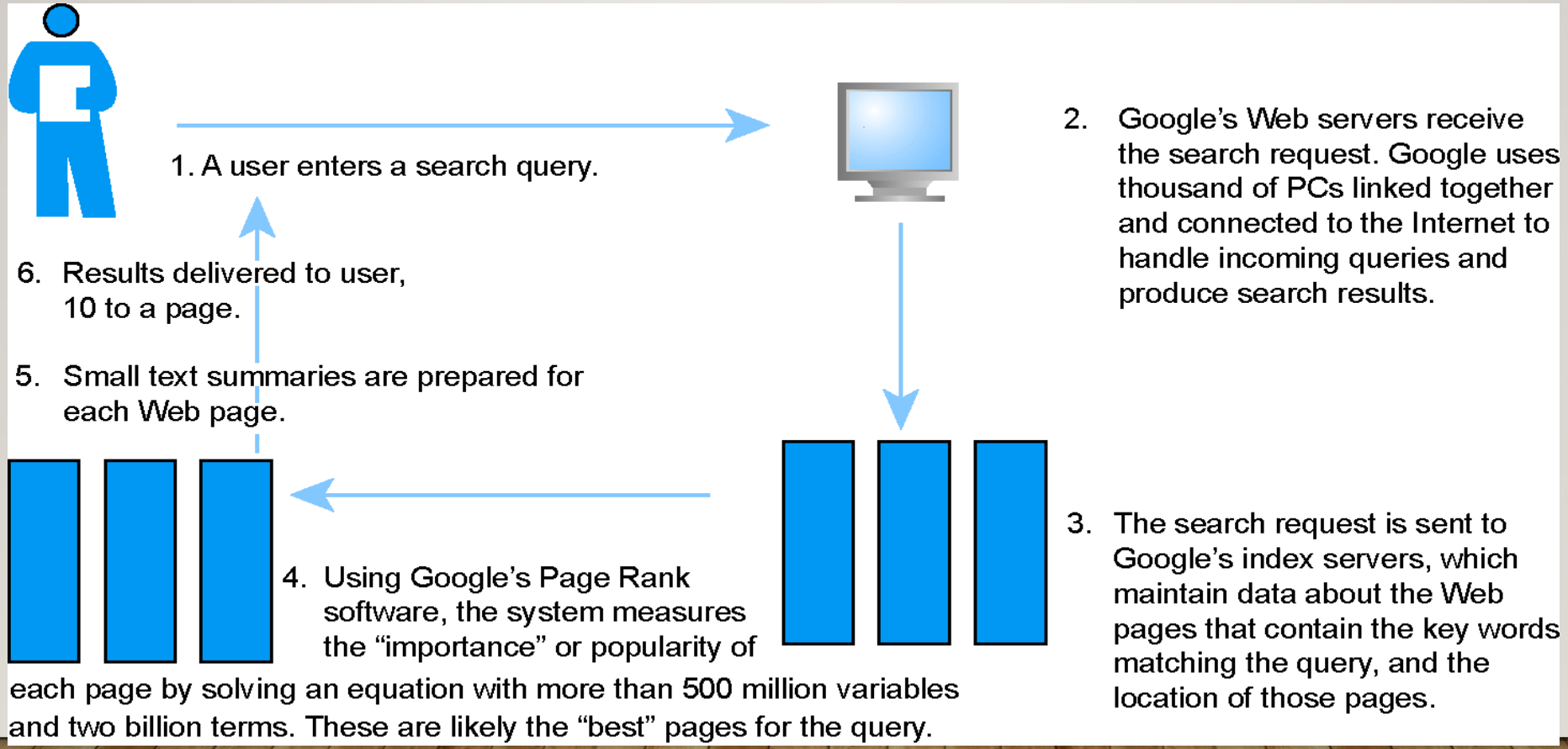
WEB SERVERS AND WEB CLIENTS

- Web server software: Enables a computer to deliver Web pages written in HTML or XML to clients on network that request this service by sending an HTTP request
  - Basic capabilities: Security services, FTP, search engine, data capture
- Term Web server also used to refer to physical computer that runs Web server software
- Web client: Any computing device attached to the Internet that is capable of making HTTP requests and displaying HTML pages

SEARCH ENGINES

- Identifies Web pages that appear to match keywords (queries) entered by a user, and provides list of best matches based on one or more of a variety of techniques
- No longer simply search engines, but also shopping tools and advertising vehicles (search engine marketing)

HOW GOOGLE WORKS



INTELLIGENT AGENTS (BOTS)

- Software programs that gather and/or filter information on a specific topic and then provide a list of results
- Types include search bot, shopping bot, Web monitoring bot, news bot, chatterbot

OTHER INTERNET AND WEB FEATURES RELEVANT TO E-COMMERCE

- Online forums/chat: Enables users to communicate with each other via computer. Online chat occurs in real time (simultaneously)
- Streaming media: Enables music, video and other large files to be sent to users in chunks so that when received and played, file comes through uninterrupted
- Cookies: Small text file stored on user's computer with information about the user that can be accessed by Web site the next time user returns to the site

INTERNET II AND E-COMMERCE: NEW AND DISRUPTIVE WEB FEATURES AND SERVICES

- Blogs: Personal Web page that typically contains a series of chronological entries by its author, and links to related Web pages
- Really Simple Syndication (RSS): Allows users to have digital content automatically sent to them; typically used for news
- Podcasting: Audio presentation stored as an audio file and available for download from Web

INTERNET II AND E-COMMERCE: NEW AND DISRUPTIVE WEB FEATURES AND SERVICES

- Wiki: Allows user to easily add and edit content on a Web page
- New music and video services: Videocasts; digital video on demand
- Internet Telephony: Use Voice Over Internet Protocol (VOIP) and Internet's packet-switched network to transmit voice and other forms of audio communication over the Internet

INTERNET II AND E-COMMERCE: NEW AND DISRUPTIVE WEB FEATURES AND SERVICES

- Internet television (IPTV)
- Video conferencing
- Online software and Web services: Web apps, widgets and gadgets, digital software libraries, distributed storage
- M-commerce applications