Introduction to Web Development

Chapter 1

Chapter 1

1 A Complicated Ecosystem

2 Definitions and History

3 The Client-Server Model

4 Where is the Internet?

5 Working in Web Development

6 Summary

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A Complicated Ecosystem

Chapter 1

|	
1 A Complicated Ecosystem	**2** Definitions and History
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Definitions and History

A Short History of the Internet

- Telephone Network

- Packet Networks
  - ARPANET (1969)
  - X.25 (1974)
  - USENET (1979)
  - TCP/IP (1983) ← INTERNET

Definitions and History

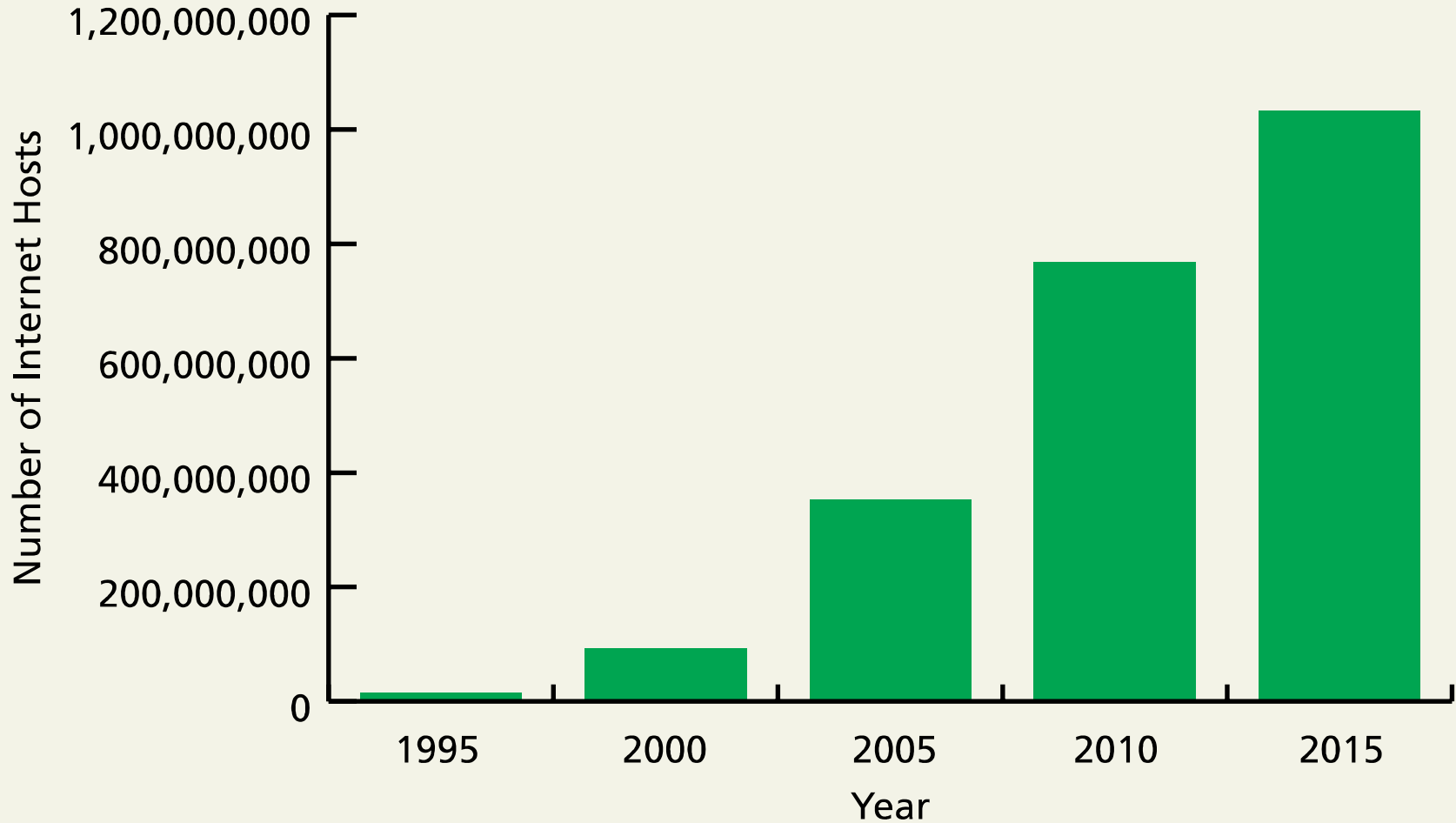The Internet and WWW are different (but related) things
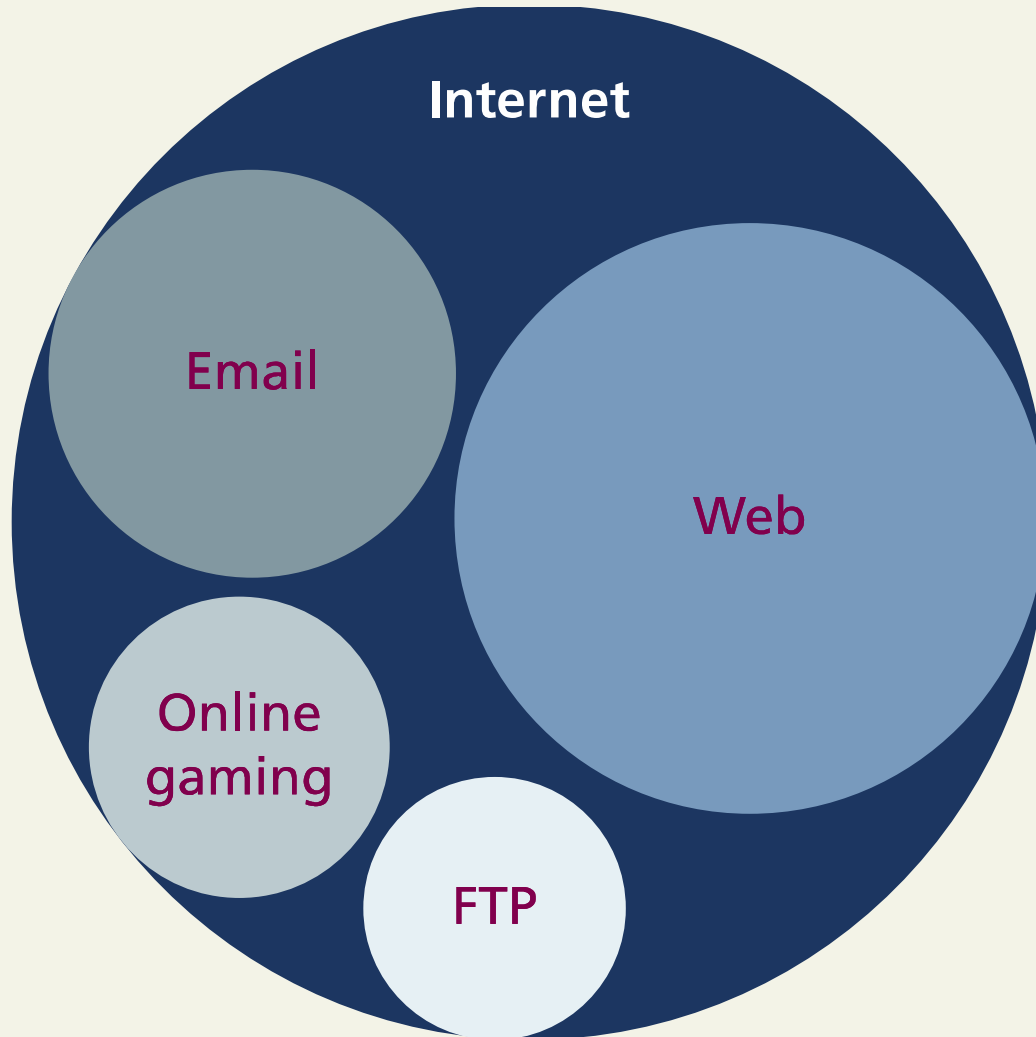
Definitions and History

The Birth of the Web (1990)

1. URLS

2. HTTP

3. SERVERS

4. BROWSERS

5. HTML

Definitions and History

The Growth of the Internet

Definitions and History

Web Applications in Comparison to Desktop Applications

Advantages:

- Accessible from any Internet-enabled computer.
- Usable with different operating systems and browser applications.
- Easier to roll out program updates
- Fewer security concerns about local
- Storage.

Definitions and History

Web Applications in Comparison to Desktop Applications

Disadvantages:

- Requirement to have an active Internet connection
- Security concerns about sensitive private data being transmitted over the
- Internet.
- Concerns over the storage, licensing, and use of uploaded data.
- Problems with certain websites not having an identical appearance across all
- browsers.
- Restrictions on access to operating system resources
- Clients or their IT staff may have additional plugins added
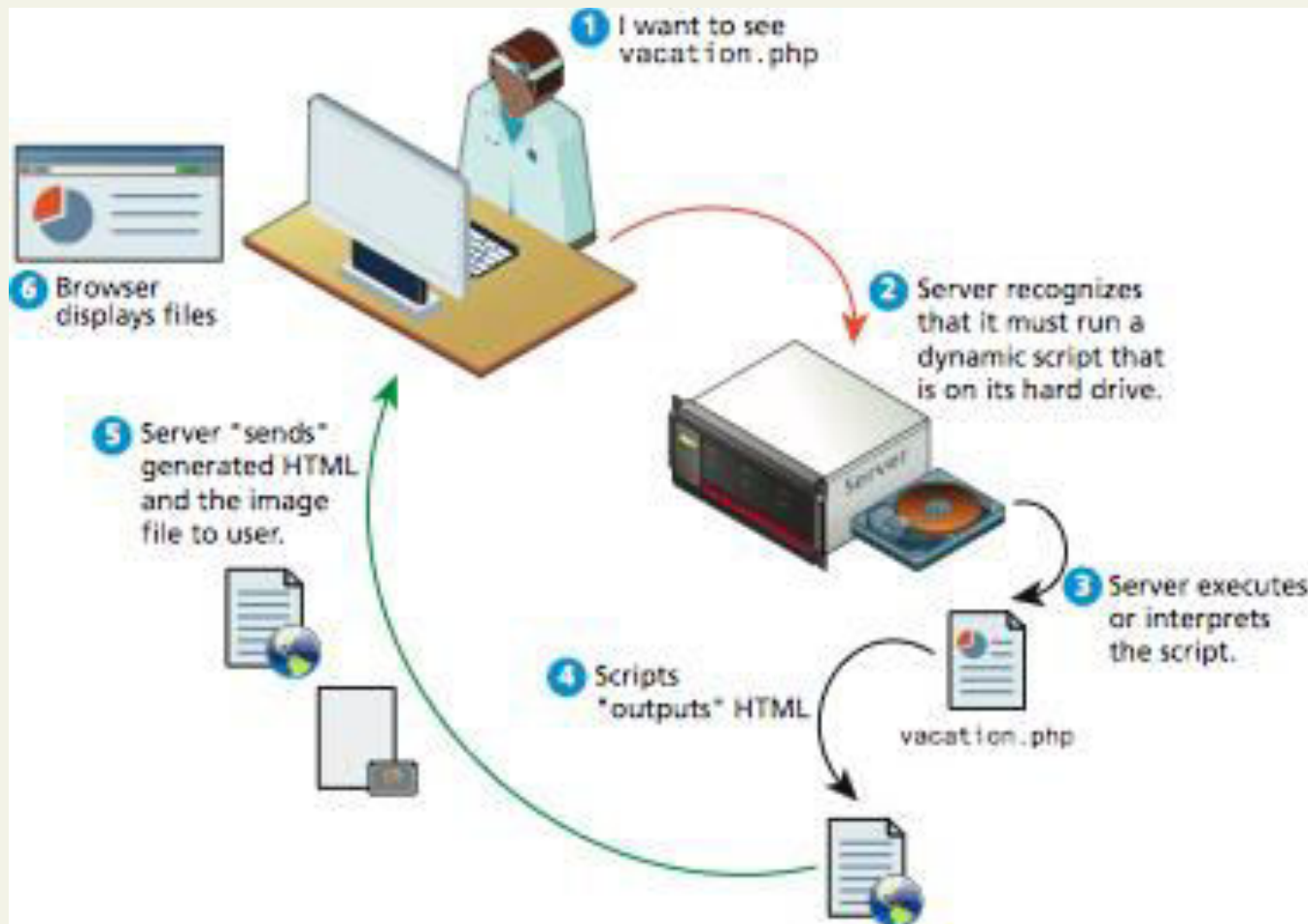- to their browsers

Definitions and History

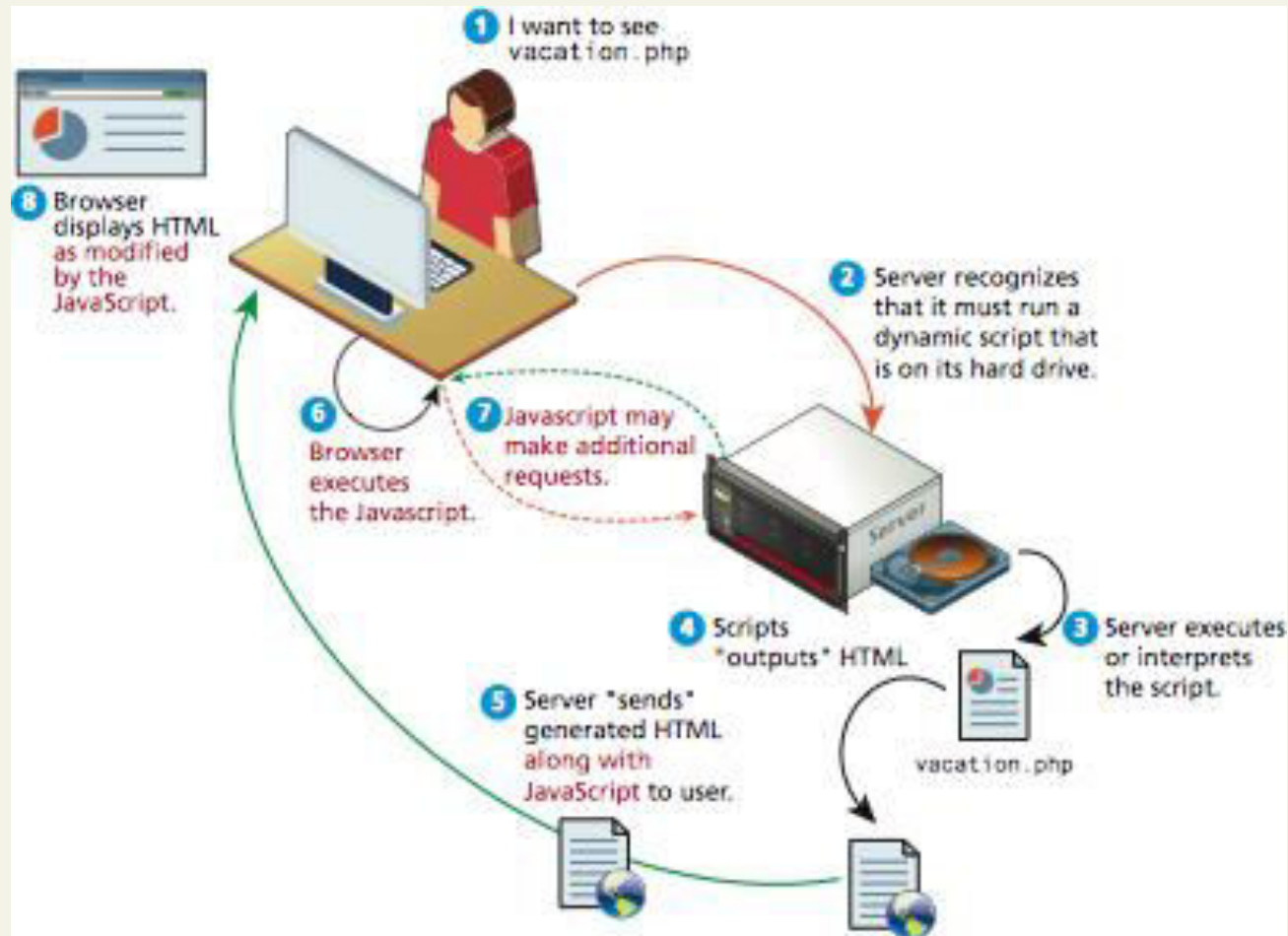Static Websites versus Dynamic Websites

Definitions and History

Static Websites versus Dynamic Websites

Definitions and History

Static Websites versus Dynamic Websites

Definitions and History

Web 2.0 and Beyond

- Web 2.0 Dynamic

- Web 3.0 Semantic

- Web Science

- ...

Definitions and History

Sociotechnological Integration—Web Science

Chapter 1

1 A Complicated Ecosystem

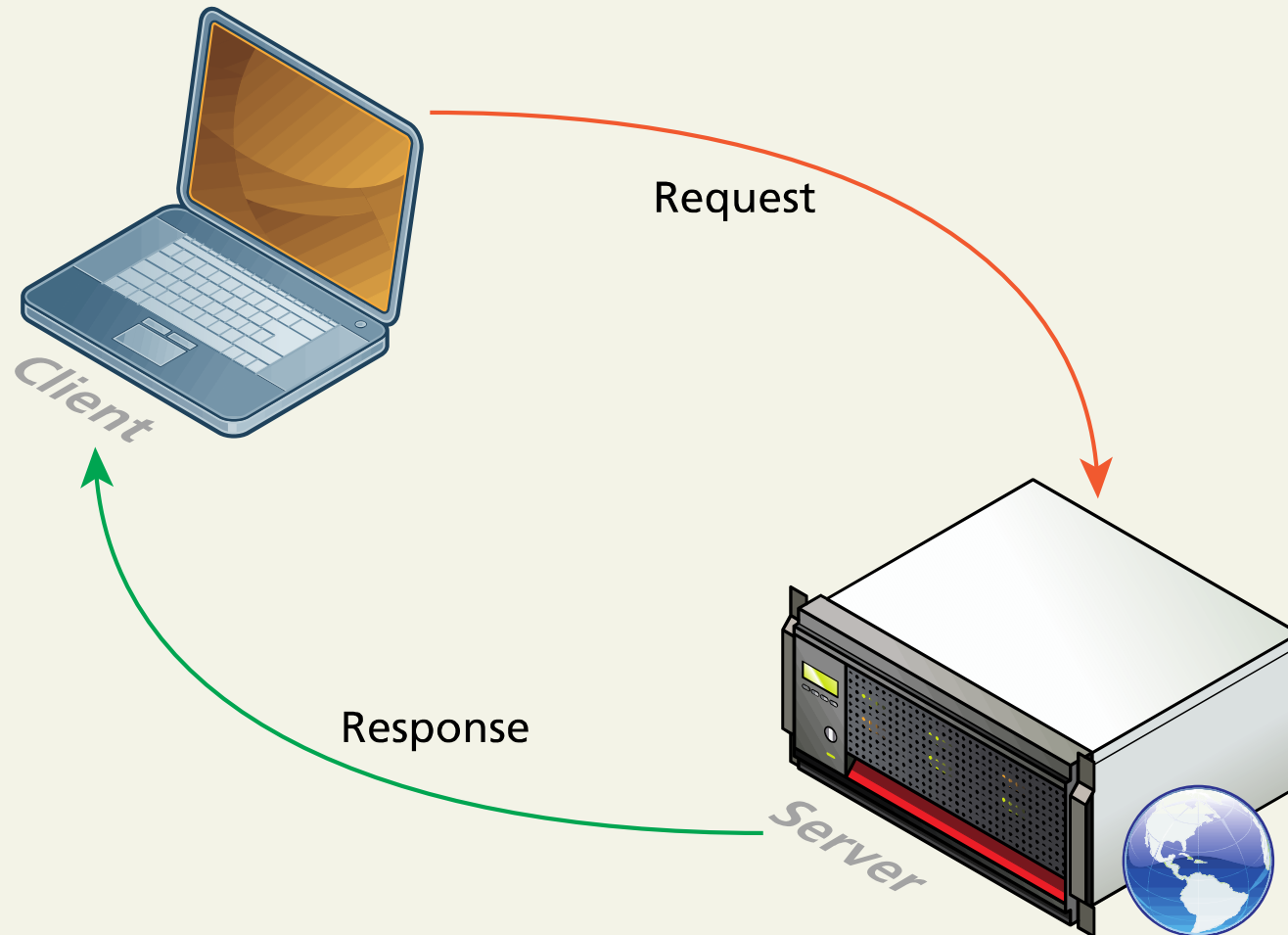**2** Definitions and History

3 The Client-Server Model

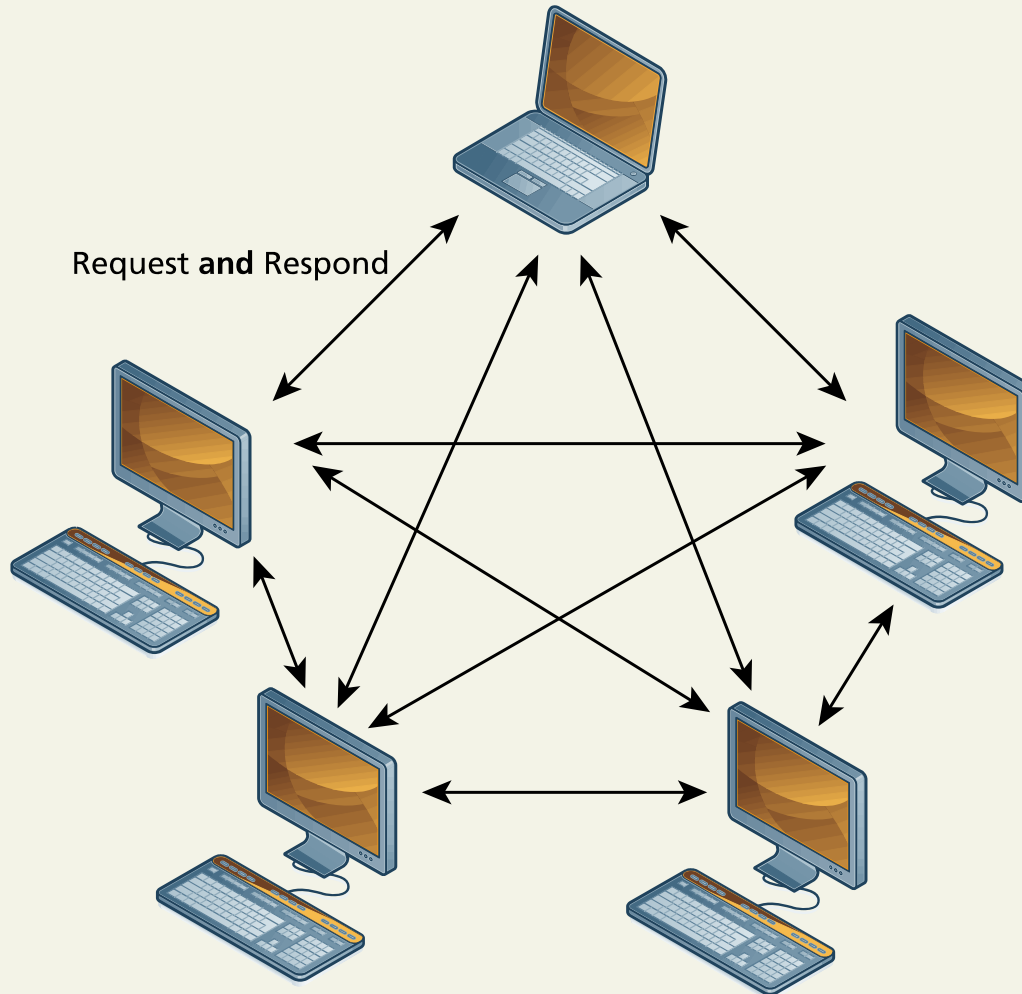**4** Where is the Internet?

5 Working in Web Development

6 Summary

The Client-Server Model

The Request-Response Loop

Request

Response

Client

Server

The Client-Server Model

The Peer-to-Peer Alternative

Request **and** Respond
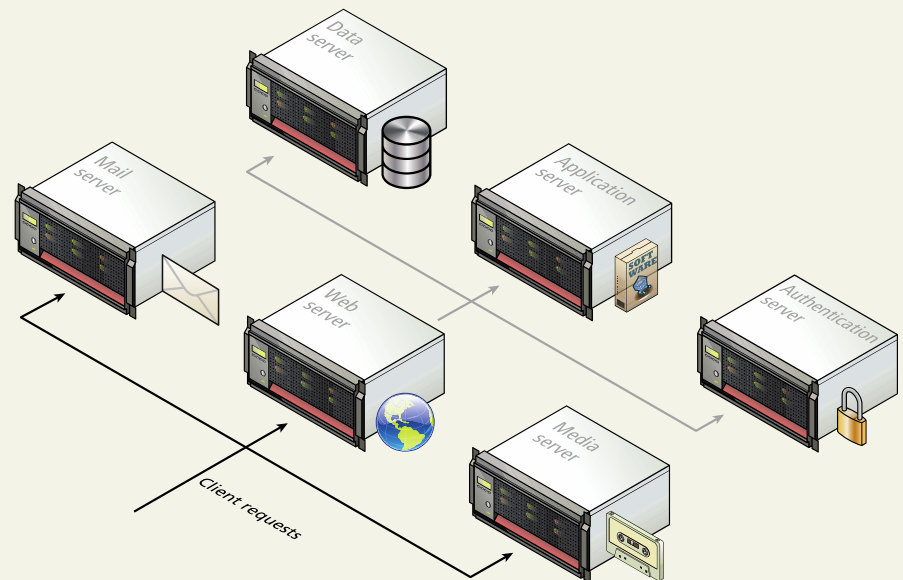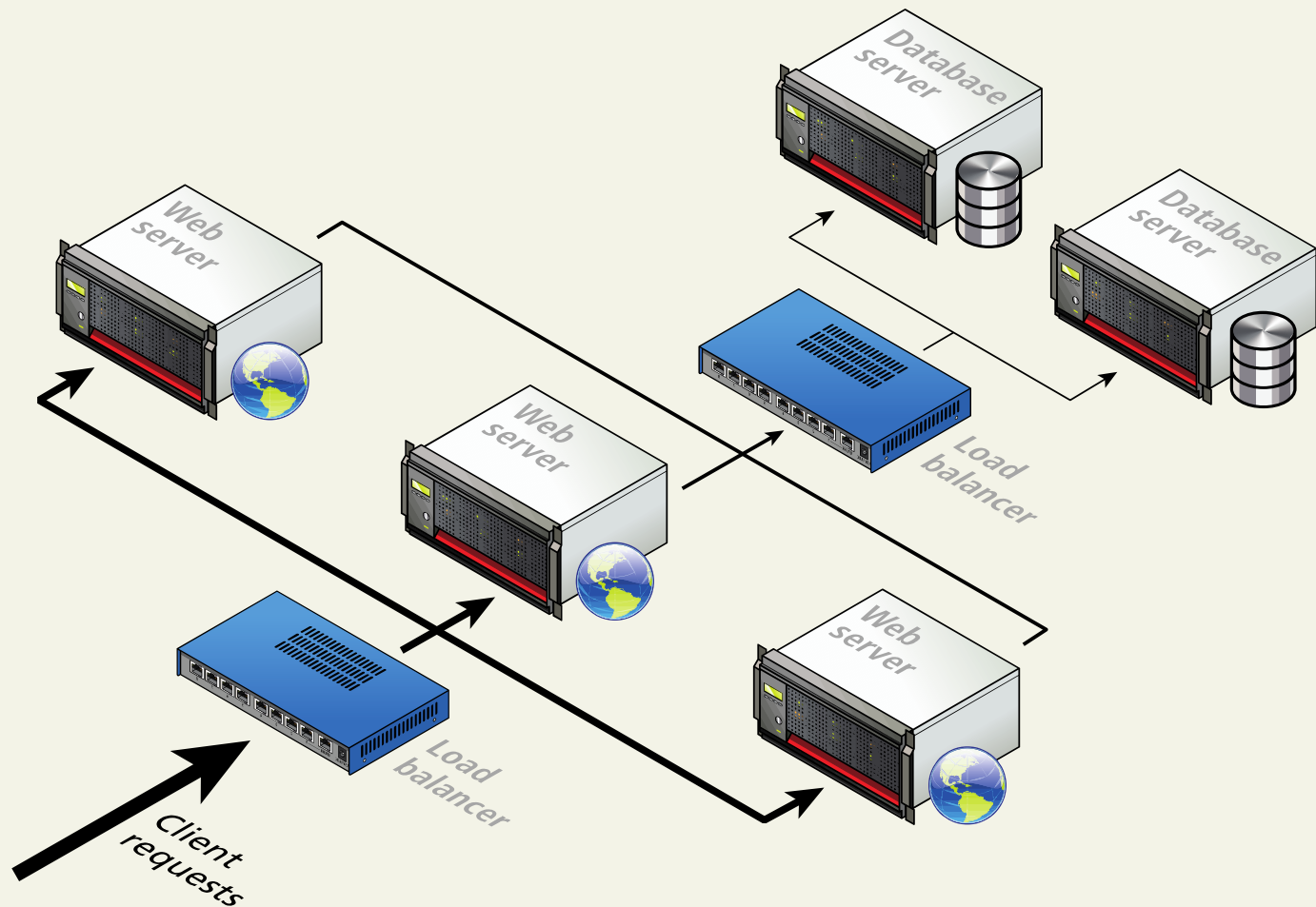
The Client-Server Model

Server Types

- Web Servers

- Application Servers

- Database Servers

- Mail Servers

- Media Servers

- Authentication Servers

- ...

The Client-Server Model

Real-World Server Installations – Server Farm

The Client-Server Model

Real-World Server Installations – Server Rack
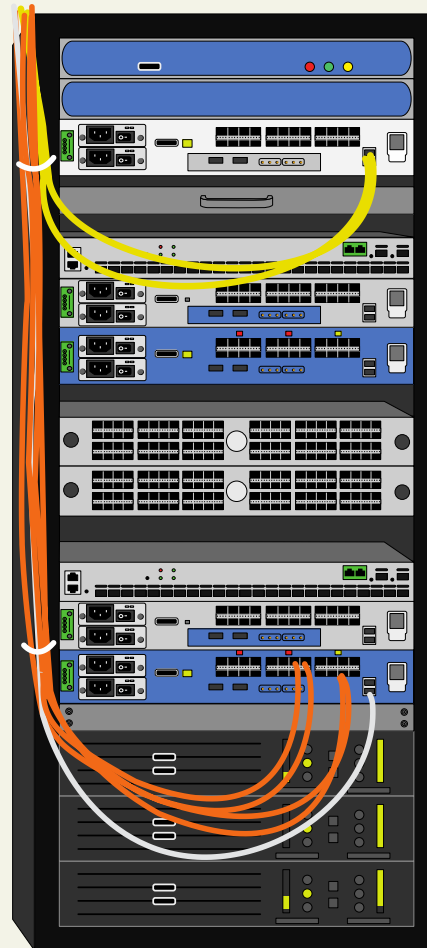
Fiber channel switches

Rack management server

Test server

Keyboard tray and flip-up monitor

Patch panel

Production web server

Production data server

RAID HD arrays

Patch panel

Production web server

Production data server

Batteries and UPS

The Client-Server Model

Real-World Server Installations – Data Center
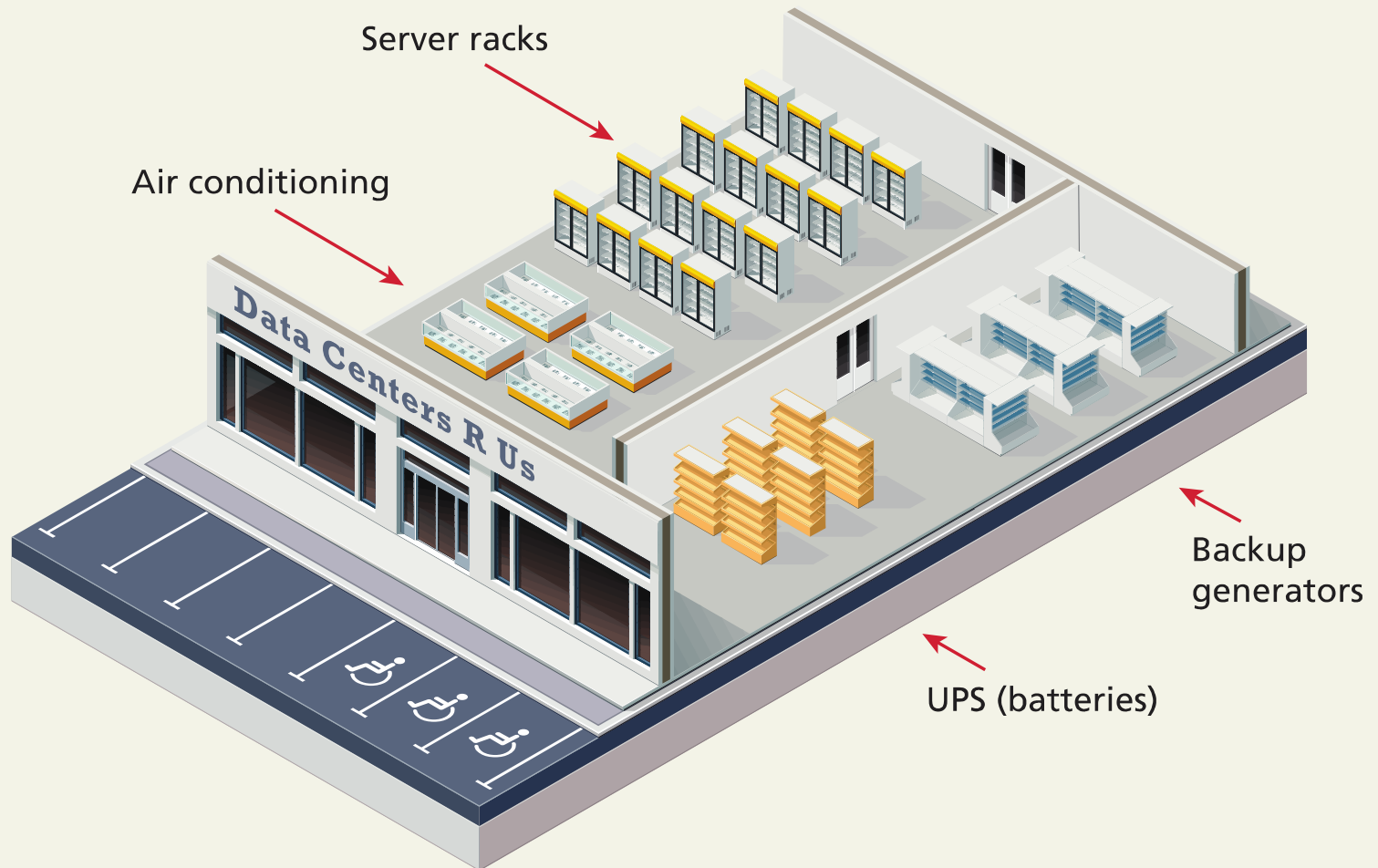
Server racks

Air conditioning

Data Centers R Us

Backup generators

UPS (batteries)

Chapter 1

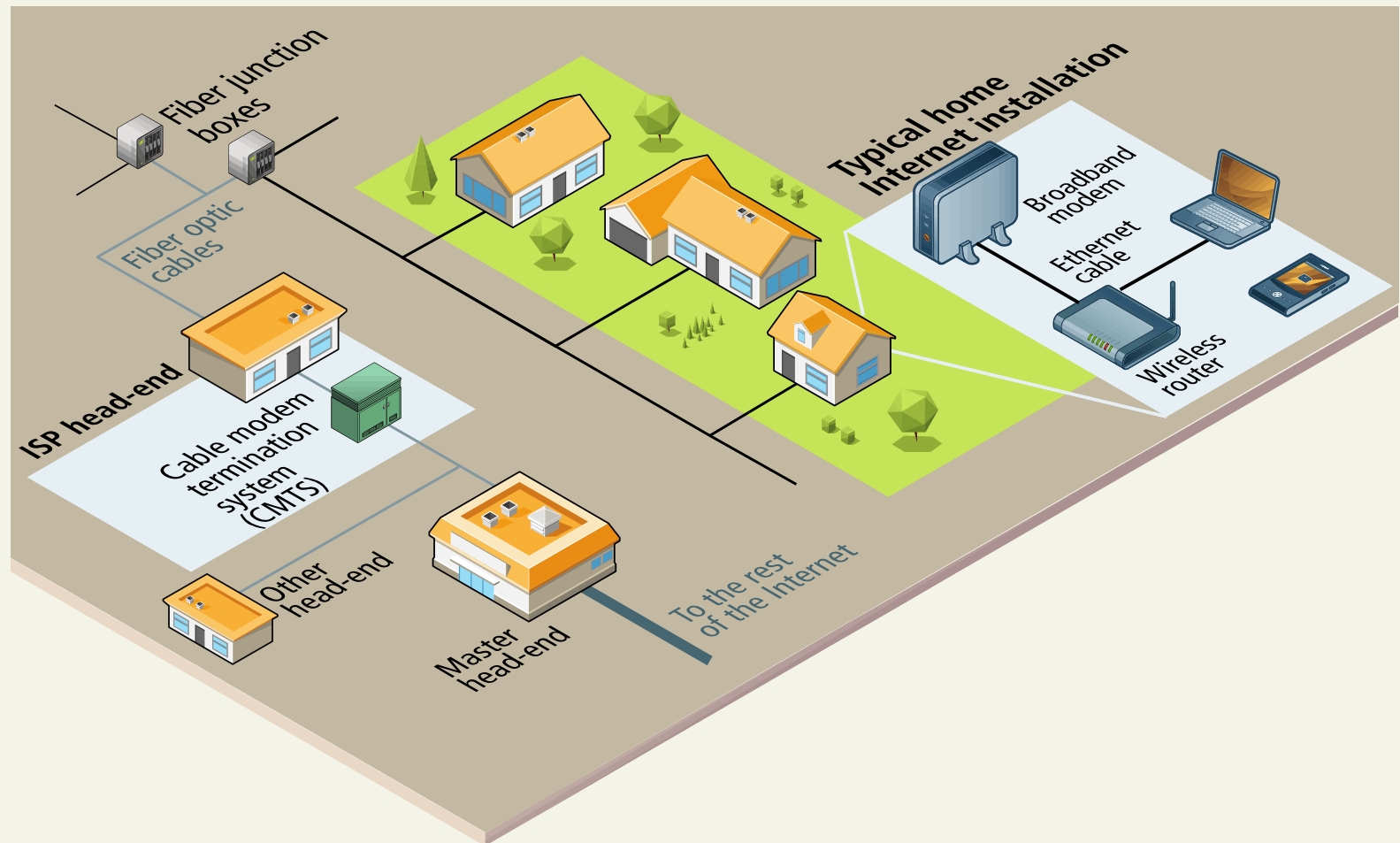|	
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Where Is the Internet?

From the Computer to the Local Provider

Fiber junction boxes

Fiber optic cables

Typical home Internet installation

Broadband modem

Ethernet cable

Wireless router

ISP head-end

Cable modem termination system (CMTS)

Other head-end

Master head-end

To the rest of the Internet

Where Is the Internet?

(Simplified) Routing Tables

Sender address
142.109.149.46

| 142.109.149.46 | 209.202.161.240 | 1 | Thou map of woe, |

Sender address

Destination address

Router address
140.239.191.1

Routing table

Address	Next Hop
0.0.0.0	127.0.0.1
204.70.198.182	65.47.242.9
209.202.161.240	65.47.242.9
208.68.17.3	90.124.1.2
etc.	

Destination address
209.202.161.240

Router address
65.47.242.9

Address	Next Hop
208.68.17.3	140.239.191.1
142.109.149.146	140.239.191.1
66.37.223.130	65.47.242.9
209.202.161.240	66.37.223.130
etc.	

Router address
66.37.223.130

Router address
204.70.198.182

Address	Next Hop
142.109.149.146	65.47.242.9
209.202.161.240	204.70.198.182
etc.	

Address	Next Hop
142.109.149.146	66.37.223.130
etc.	

Where Is the Internet?

From the Local Provider to the Ocean's Edge

Where Is the Internet?

From the Local Provider to the Ocean's Edge –IXP and Data Centers

Where Is the Internet?

Across the Oceans

Chapter 1

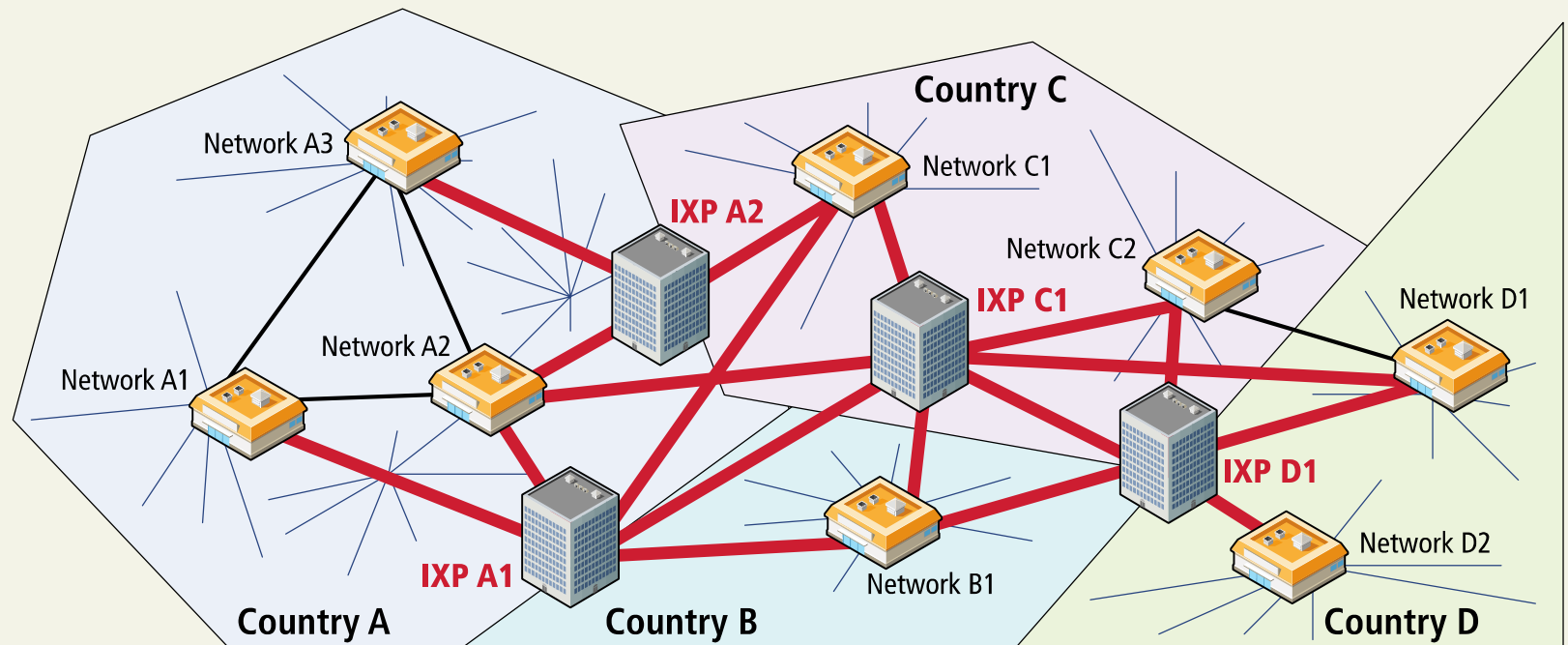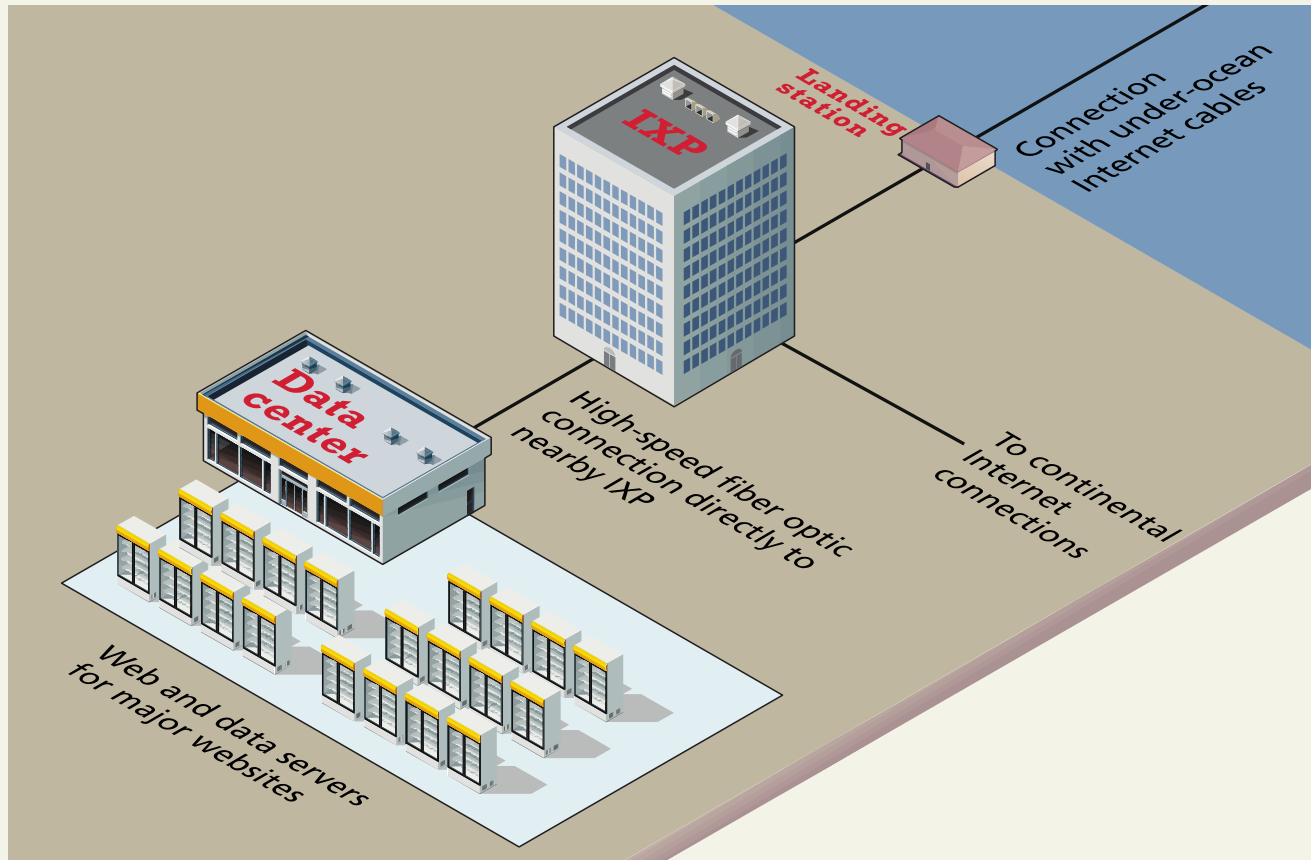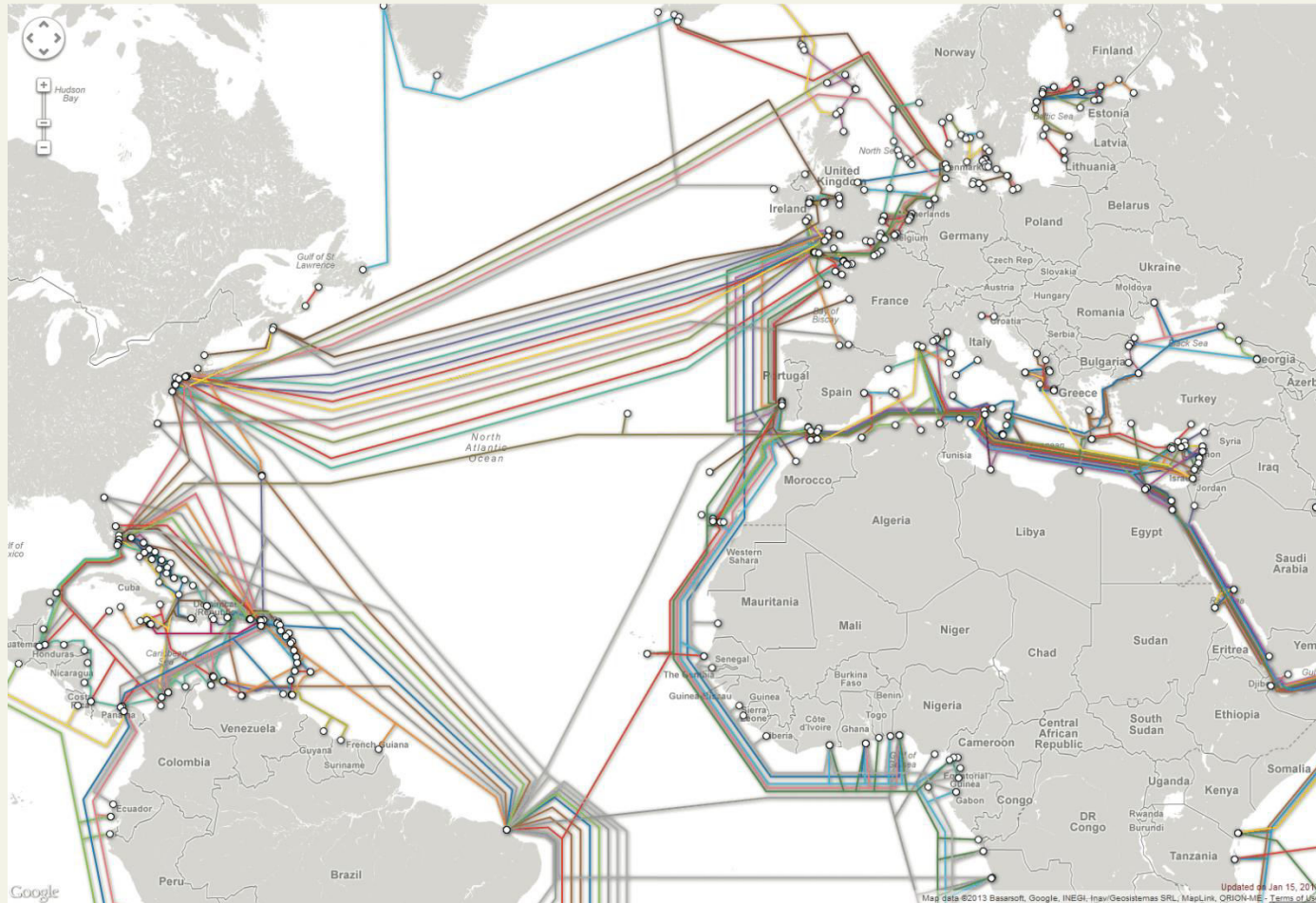|	
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Roles and Skills
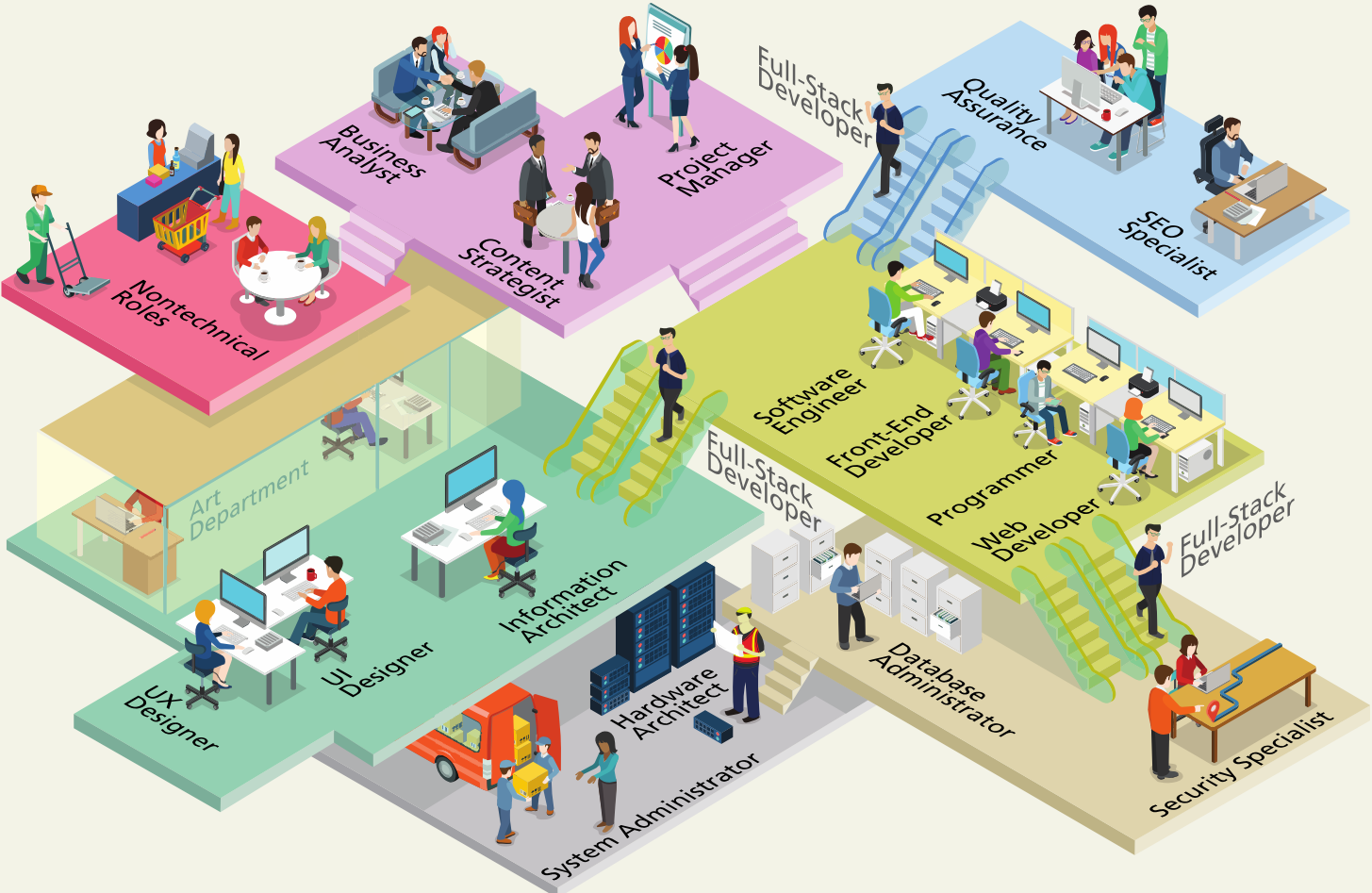
Working in Web Development

Roles and Skills

- Hardware Architect/Network Architect/Systems Engineer
- System Administrator
- Database Administrator/Data Architect
- Security Specialist/Consultant/Expert
- Developer/Programmer
- Front-End Developer/UX Developer

Working in Web Development

Roles and Skills (II)

- Software Engineer

- UX Designer/UI Designer/Information Architect

- Tester/Quality Assurance

- SEO Specialist

- Content Strategists/Marketing Technologist

- Project Manager/Product Manager

- Business Analyst

- Nontechnical Roles

Working in Web Development

Types of Web Development Companies

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Summary

Key Terms

application server
authentication server
bandwidth
broadband modem
cable modem termination system
circuit switching
client
client-server model
data center
database server
DevOps
dynamic website
failover redundancy
fiber optic cable
full-stack developer
HTTP
intranet
Internet exchange point

(IX or IXP)
Internet service provider (ISP)
load balancers
mail server
media server
Mosaic
Netscape Navigator
Network Access Points (NAP)
next-hop routing
packet
packet switching
peer
peer-to-peer model
request
Request for Comments (RFC)

request-response loop
response
router
routing table
semantic web
server
server farm
server racks
shared hosting
static website
user experience
virtual server
webmaster
Web 2.0
World Wide Web Consortium (W3C)

Questions?