Chapter 3

Building an E-commerce Presence

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Learning Objectives

- Understand the questions you must ask and answer, and the steps you should take, in developing an e-commerce presence.
- Explain the process that should be followed in building an e-commerce presence.
- Identify and understand the major considerations involved in choosing Web server and e-commerce merchant server software.
- Understand the issues involved in choosing the most appropriate hardware for an e-commerce site.
- Identify additional tools that can improve Web site performance.
- Understand the important considerations involved in developing a mobile Web site and building mobile applications.

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3.1 IMAGINE YOUR E-COMMERCE PRESENCE

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Imagine Your E-commerce Presence

- **What's the idea?**
  - Vision
  - Mission statement
  - Target audience
  - Intended market space
  - Strategic analysis
  - Marketing matrix
  - Development timeline
  - Preliminary budget

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Imagine Your E-commerce Presence

- Vision

Securities and Exchange Commission. For Amazon, it's to become the largest marketplace on earth. For Facebook, it's to make the world more open and connected. For Google, it's to organize the world's information and make it universally accessible and useful. The

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Imagine Your E-commerce Presence (cont.)

- **Where's the money?**
  - Business model(s):
    - Portal, e-tailer, content provider, transaction broker, market creator, service provider, community provider (social networks)
  - Revenue model(s):
    - Advertising, subscriptions, transaction fees, sales, and affiliate revenue

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Imagine Your E-commerce Presence (cont.)

- **Who and where is the target audience?**
  - Describing your audience
    - Demographics
      - Age, gender, income, location
    - Behavior patterns (lifestyle)
    - Consumption patterns (purchasing habits)
    - Digital usage patterns
    - Content creation preferences (blogs, Facebook ….)
    - Buyer personas (profile of your typical customer)

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Imagine Your E-commerce Presence (cont.)

- **Characterize the marketplace**
  - Demographics of the market
  - Size, growth, changes
  - Structure
    - Competitors
    - Suppliers
    - Substitute products

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Imagine Your E-commerce Presence (cont.)

- **Where is the content coming from?**
- The content is why your customers visit your site and either purchase things or look at ads that generate revenue for you
  - Static or dynamic?

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Imagine Your E-commerce Presence (cont.)

- **Know yourself—SWOT analysis**
- Once you have conducted a SWOT analysis, you can consider ways to overcome your weaknesses and build on your strengths

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SWOT Analysis

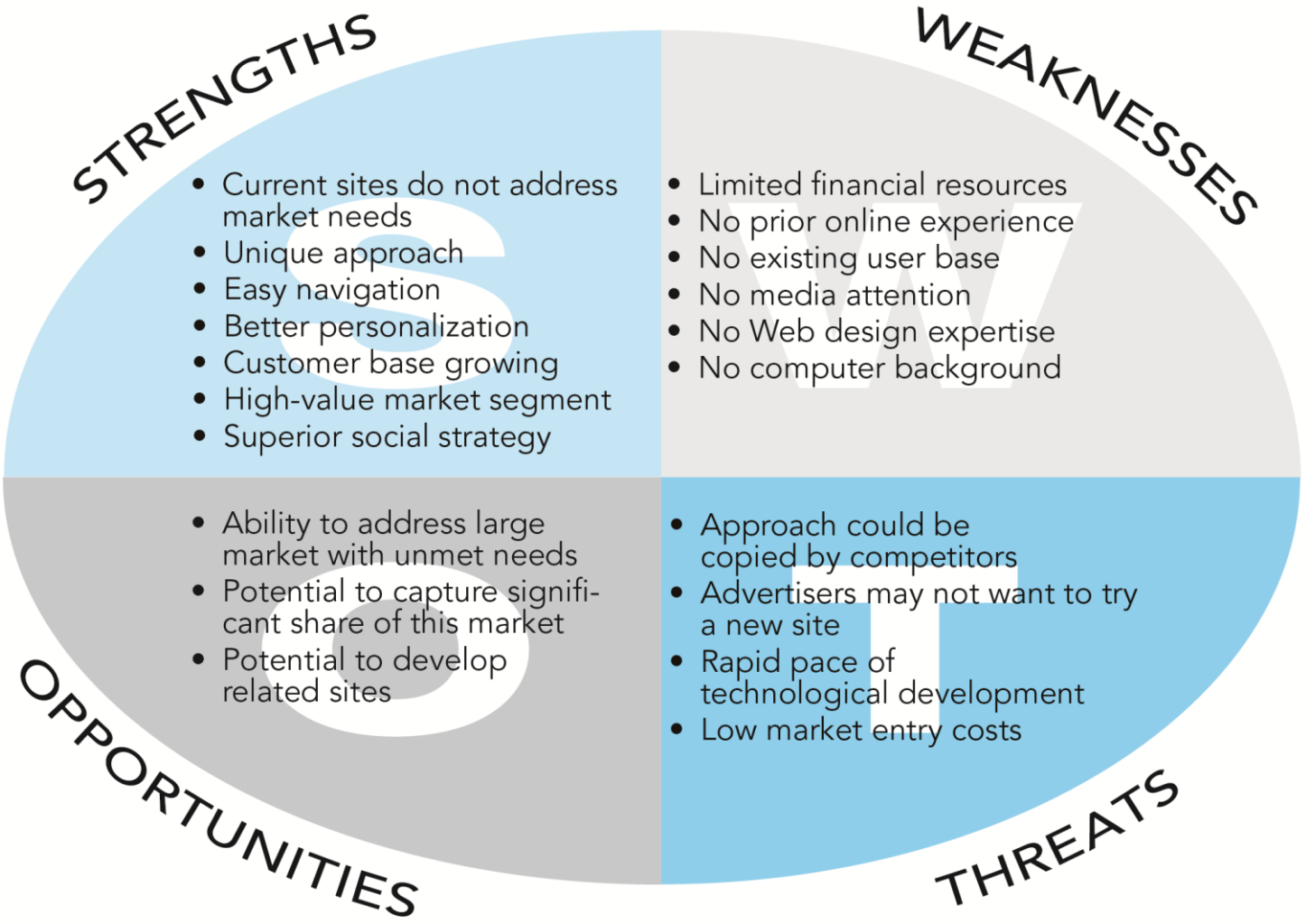

Figure 3.1, page 179

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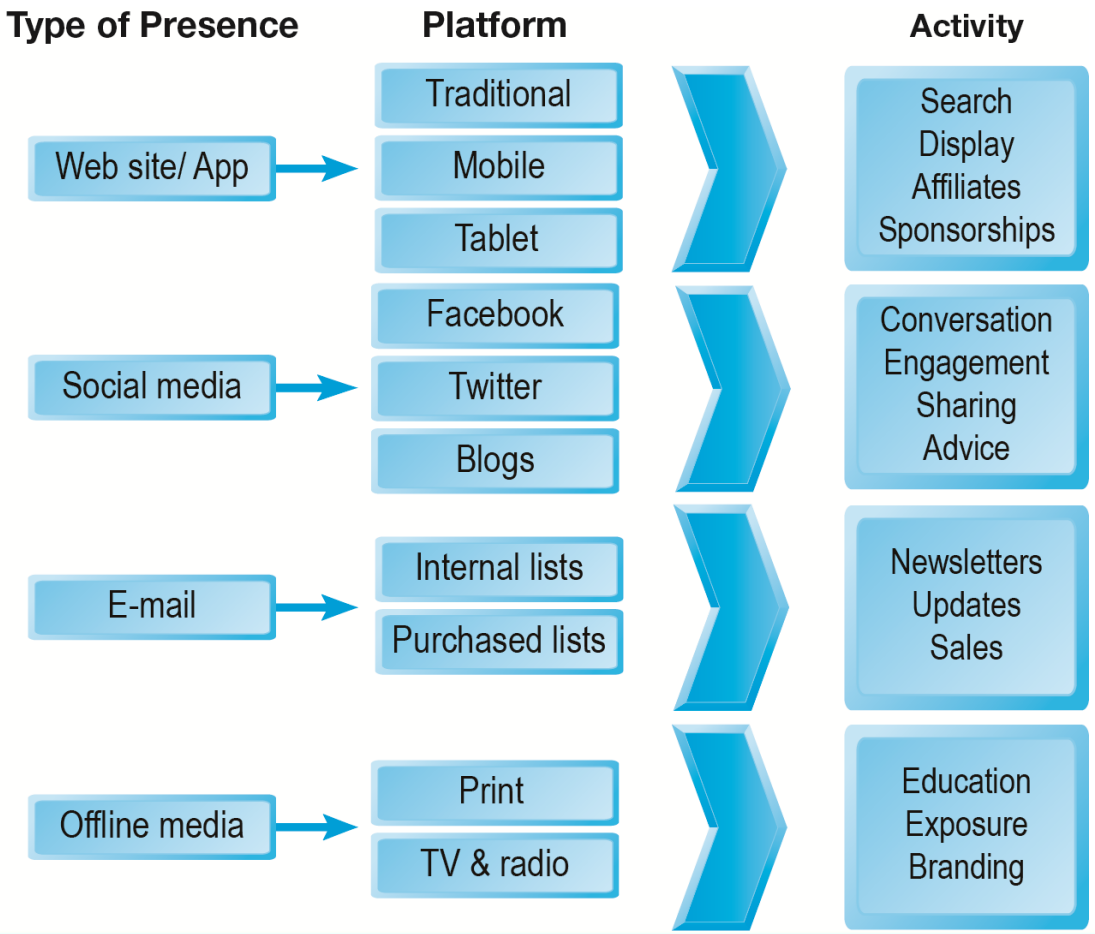
Imagine Your E-commerce Presence (cont.)

- **Develop an e-commerce presence map**



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Imagine Your E-commerce Presence (cont.)

- **Develop a timeline: Milestones**
- You should break your project down into a small number of phases that could be completed within a specified time.

TABLE 3.1 E-COMMERCE PRESENCE TIMELINE

PHASE	ACTIVITY	MILESTONE
Phase 1: Planning	Envision e-commerce presence; determine personnel	Mission statement
Phase 2: Web site development	Acquire content; develop a site design; arrange for hosting the site	Web site plan
Phase 3: Web Implementation	Develop keywords and metatags; focus on search engine optimization; identify potential sponsors	A functional Web site
Phase 4: Social media plan	Identify appropriate social platforms and content for your products and services	A social media plan
Phase 5: Social media implementation	Develop Facebook, Twitter, and Pinterest presence	Functioning social media presence
Phase 6: Mobile plan	Develop a mobile plan; consider options for porting your Web site to smartphones	A mobile media plan

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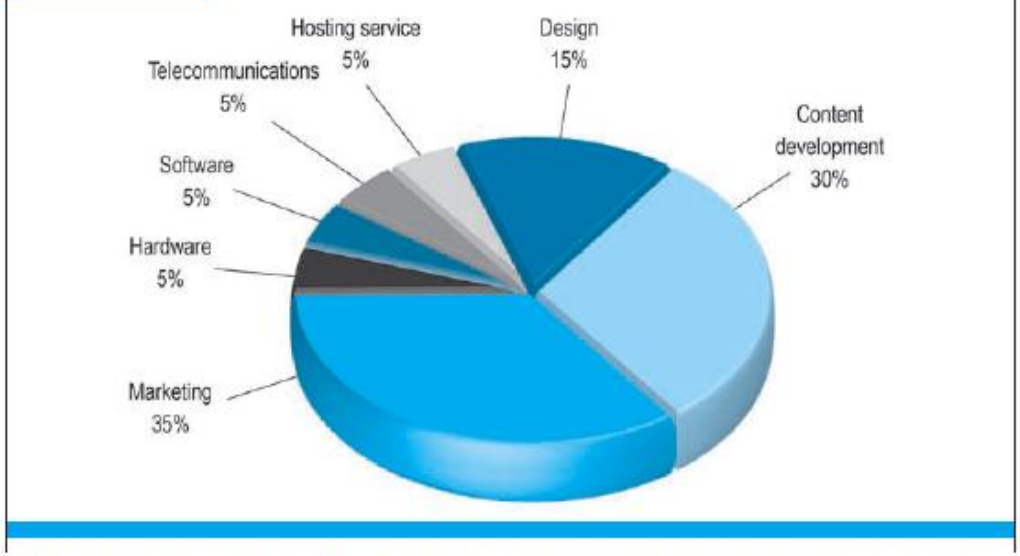
Imagine Your E-commerce Presence (cont.)

- **How much will this cost?**
  - Simple Web sites: up to $5000
  - Small Web start-up: $25,000 to $50,000
  - Large corporate site: $100,000+ to millions

FIGURE 3.3 COMPONENTS OF A WEB SITE BUDGET



While hardware and software costs have fallen dramatically, Web sites face significant design, content development, and marketing costs.

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3.2 BUILDING AN E-COMMERCE PRESENCE: A SYSTEMATIC APPROACH

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Building an E-commerce Site: A Systematic Approach

- **Most important management challenges:**
  - Developing a clear understanding of business objectives
  - Knowing how to choose the right technology to achieve those objectives

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Pieces of the Site-Building Puzzle

- **Main areas where you will need to make decisions:**
  - Human resources and organizational capabilities
    - Creating team with skill set needed to build and manage a successful site
  - Hardware/software
  - Telecommunications
  - Site design

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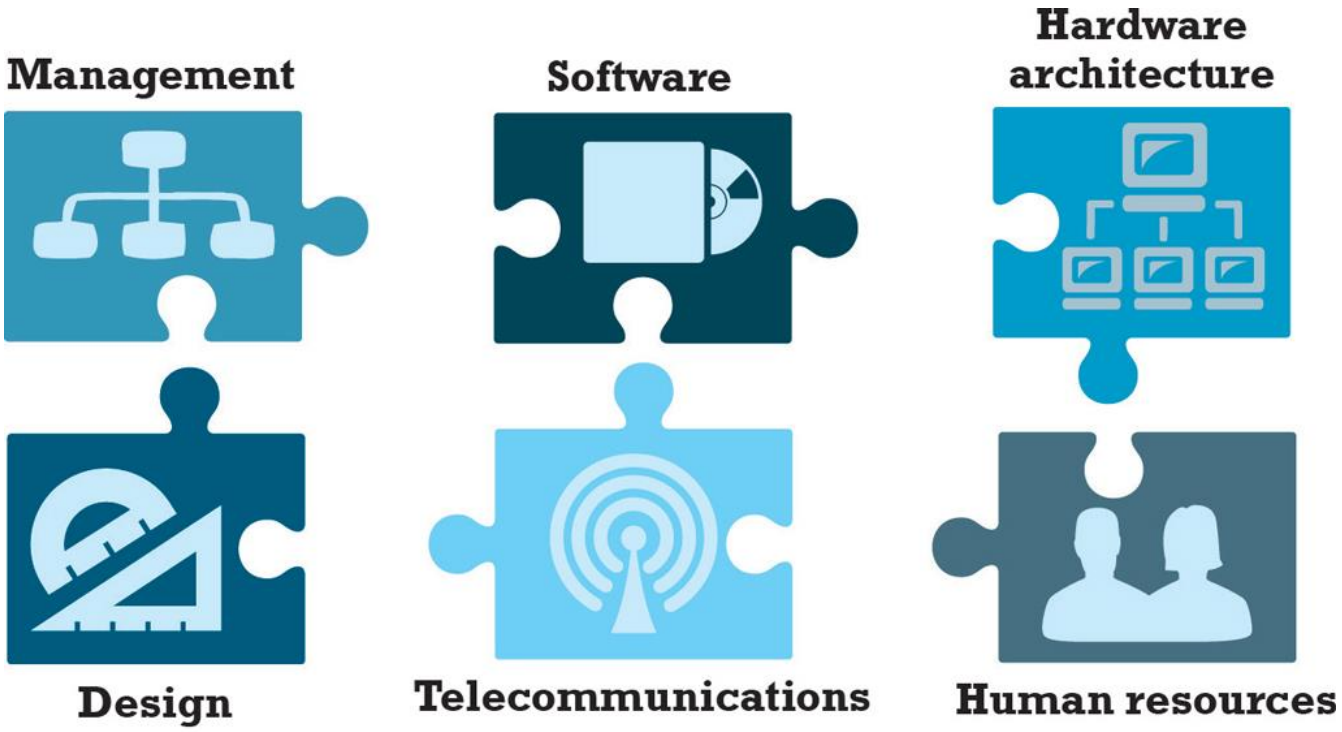
Pieces of the Site-Building Puzzle



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Building an e-commerce presence requires that you systematically consider the many factors that go into the process

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Planning: The Systems Development Life Cycle

- **Methodology for understanding business objectives of a system and designing an appropriate solution**
- **Five major steps:**
  - Systems analysis/planning
  - Systems design
  - Building the system
  - Testing
  - Implementation and maintenance

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Web Site Systems Development Life Cycle

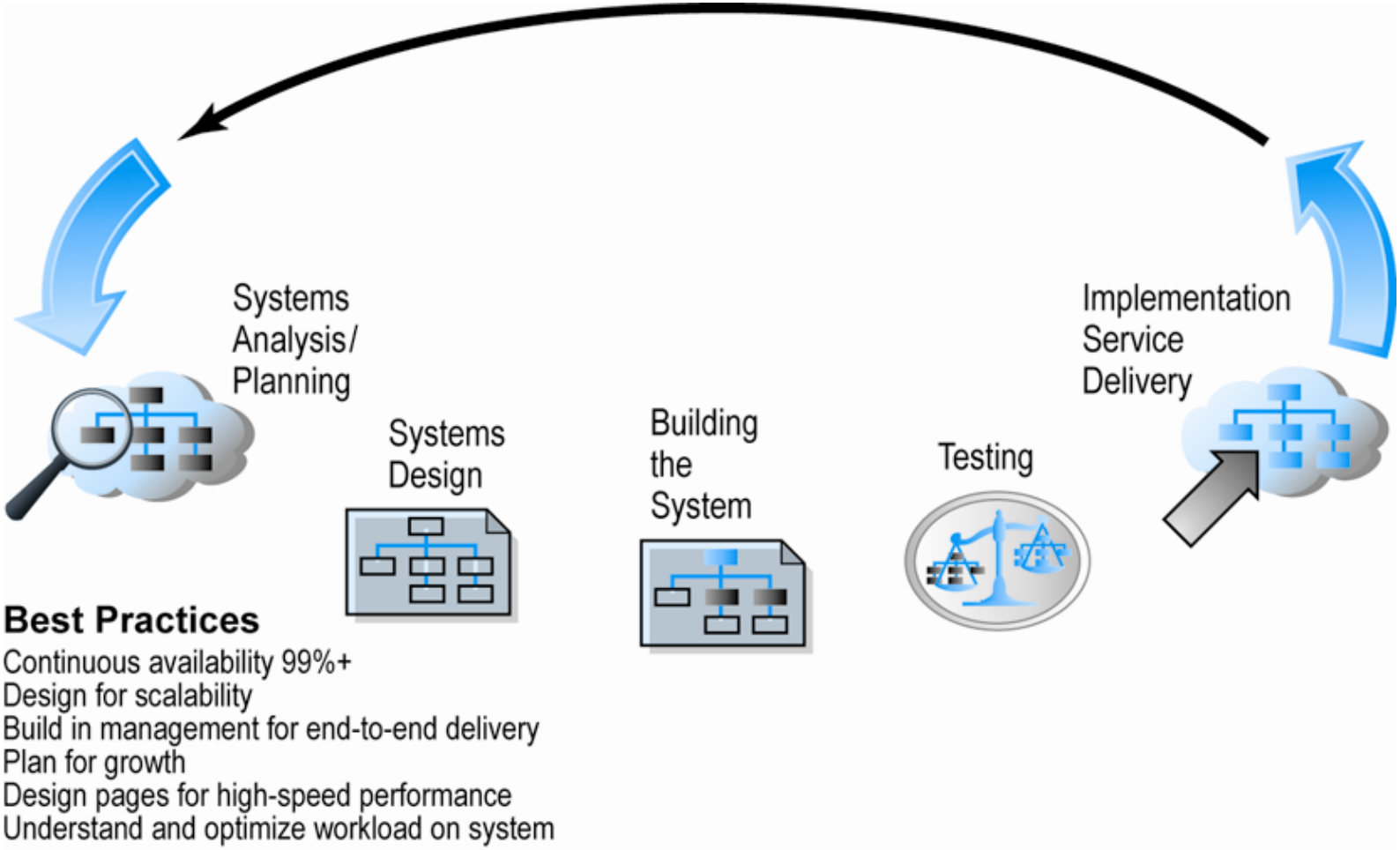

Figure 3.5, Page 182

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System Analysis/Planning

- **Business objectives:**
  - List of capabilities you want your site to have
- **System functionalities:**
  - List of information system capabilities needed to achieve business objectives
- **Information requirements:**
  - Information elements that system must produce in order to achieve business objectives

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TABLE 3.2 SYSTEM ANALYSIS: BUSINESS OBJECTIVES, SYSTEM FUNCTIONALITIES, AND INFORMATION REQUIREMENTS FOR A TYPICAL E-COMMERCE SITE

BUSINESS OBJECTIVE	SYSTEM FUNCTIONALITY	INFORMATION REQUIREMENTS
Display goods	Digital catalog	Dynamic text and graphics catalog
Provide product information (content)	Product database	Product description, stocking numbers, inventory levels
Personalize/customize product	Customer on-site tracking	Site log for every customer visit; data mining capability to identify common customer paths and appropriate responses
Engage customers in conversations	On-site blog	Software with blogging and community response functionality
Execute a transaction	Shopping cart/payment system	Secure credit card clearing; multiple payment options
Accumulate customer information	Customer database	Name, address, phone, and e-mail for all customers; online customer registration
Provide after-sale customer support	Sales database	Customer ID, product, date, payment, shipment date
Coordinate marketing/advertising	Ad server, e-mail server, e-mail, campaign manager, ad banner manager	Site behavior log of prospects and customers linked to e-mail and banner ad campaigns
Understand marketing effectiveness	Site tracking and reporting system	Number of unique visitors, pages visited, products purchased, identified by marketing campaign
Provide production and supplier links	Inventory management system	Product and inventory levels, supplier ID and contact, order quantity data by product

Table 3.2, page 183

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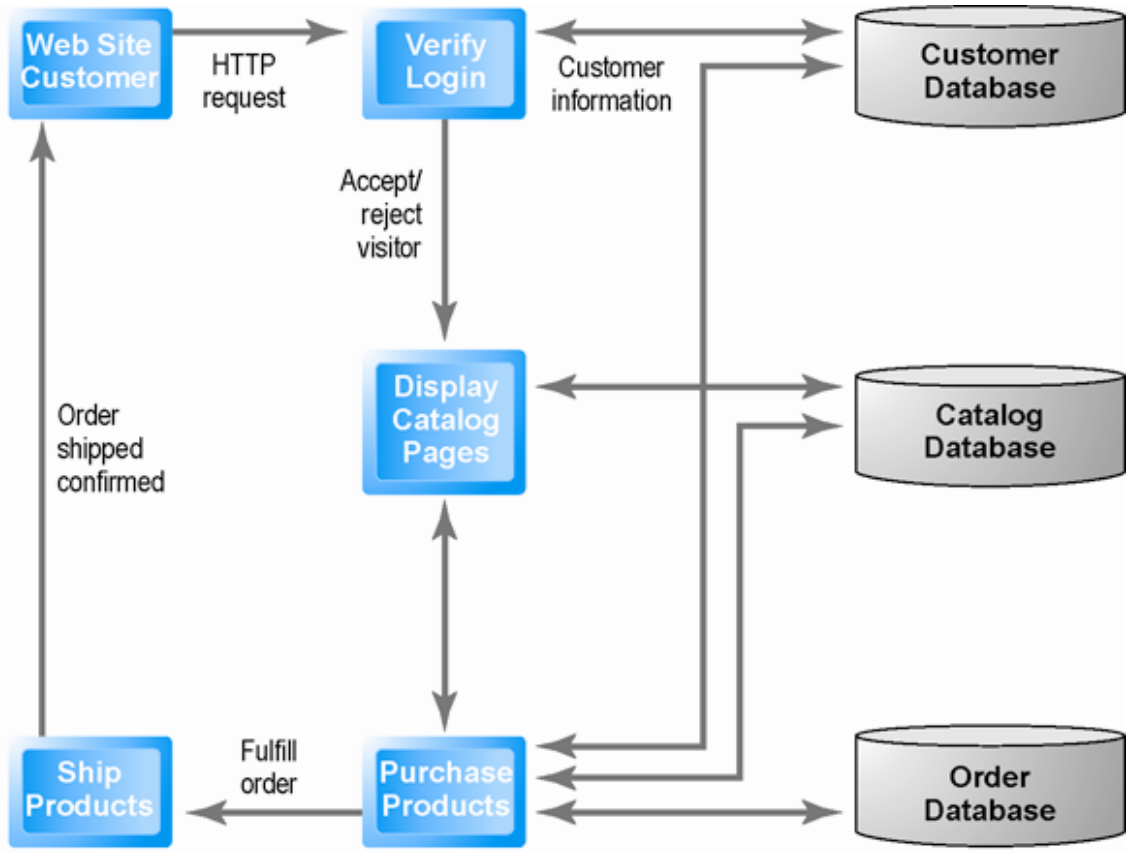
Systems Design: Hardware and Software Platforms

- **System design specification:**
  - Description of main components of a system and their relationship to one another
- **Two components of system design:**
  - **Logical design**
    - includes a data flow diagram that describes the flow of information at your e-commerce site, the processing functions that must be performed, and the databases that will be used
  - **Physical design**
    - translates the logical design into physical components. For instance, the physical design details the specific model of server to be purchased, the software to be used, the size of the telecommunications link that will be required, the way the system will be backed up and protected from outsiders, and so on.

Logical Design for a Simple Web Site



(a) Simple Data Flow Diagram

This data flow diagram describes the flow of information requests and responses for a sample Web site

Figure 3.6 (a), Page 185

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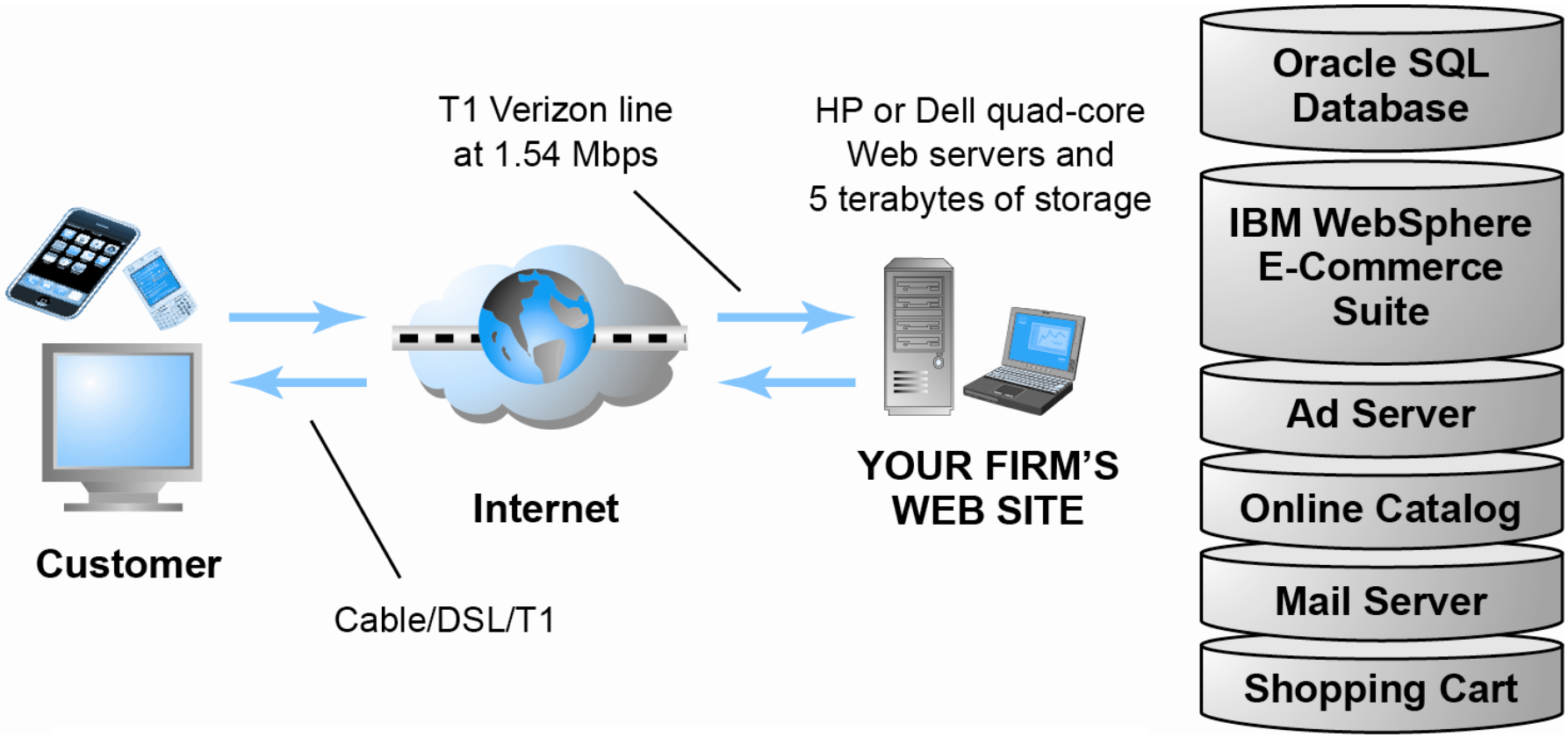
Physical Design for a Simple Web Site



(b) Simple Physical Design.
A physical design describes the hardware and software needed to realize the logical design.

Figure 3.6 (b), Page 185

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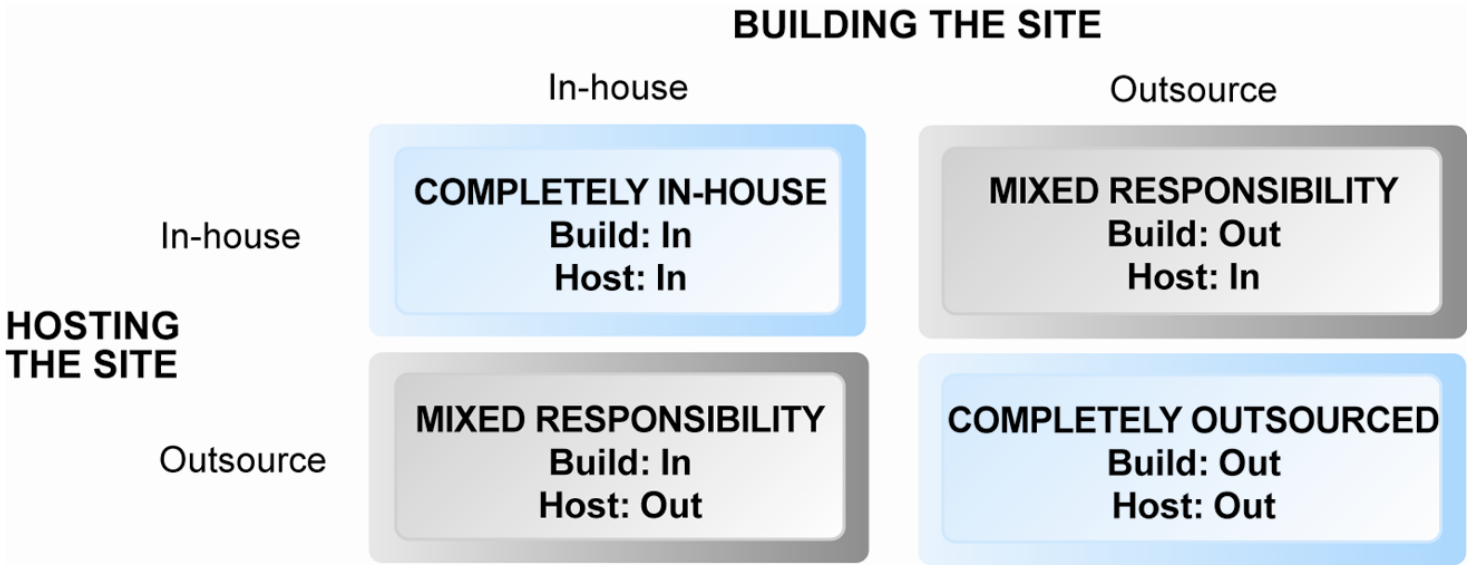
Build/Host Your Own vs. Outsourcing

In-house vs. Outsourcing

- **Outsourcing:** hiring an outside vendor to provide the services involved in building the site rather than using in-house personnel



Choices in Building and Hosting

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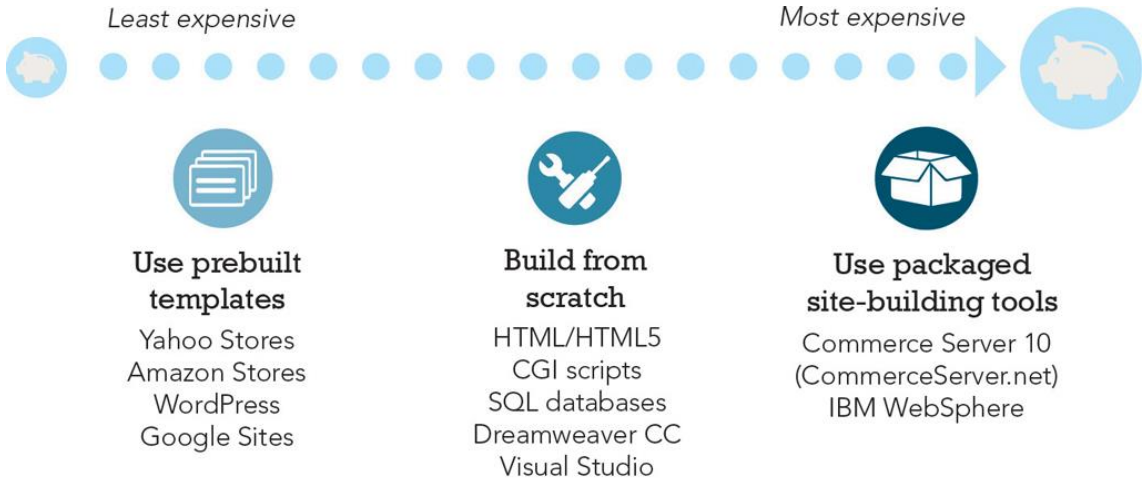
Build/Host Your Own vs. Outsourcing

- **If you decide to Build Your Own website:**
  - Options:
    - pre-built template
    - build the site yourself "from scratch."
      - Tools that help you build everything "from scratch,"
      - Site-building packages



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Build/Host Your Own vs. Outsourcing

- **If you decide to host your website outside your company:**
  - **Options**:
    - **Outsource Hosting:** Hosting company responsible for ensuring site is accessible 24/7, for monthly fee
    - **Co-location:** Firm purchases or leases Web server (with control over its operation), but server is located at vendor's facility
      - Co-location prices , ranging depending on the size of the Web site, bandwidth, storage, and support requirements
    - **Cloud service providers:** renting virtual space in your provider's infrastructure

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Build/Host Your Own vs. Outsourcing

List of some of the major hosting/co-location/cloud providers.

Amazon Web Services (AWS) EC2	Softlayer (IBM)
Bluehost	Rackspace
CenturyLink	ServerBeach
Digital Realty Trust	Verio
GoDaddy	Verizon/Terremark

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Testing, Implementation, and Maintenance

- **Testing**
  - Unit testing
  - System testing
  - Acceptance testing
- **Implementation and maintenance:**
  - Maintenance is ongoing
  - Maintenance costs: Similar to development costs

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3.3 CHOOSING SOFTWARE

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Simple vs. Multi-tiered Web Site Architecture

- **System architecture**
  - Arrangement of software, machinery, and tasks in an information system needed to achieve a specific functionality

- **Simple Two-tier** **(Client Server architecture)**
  - Web server and database

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Two-Tier E-commerce Architecture

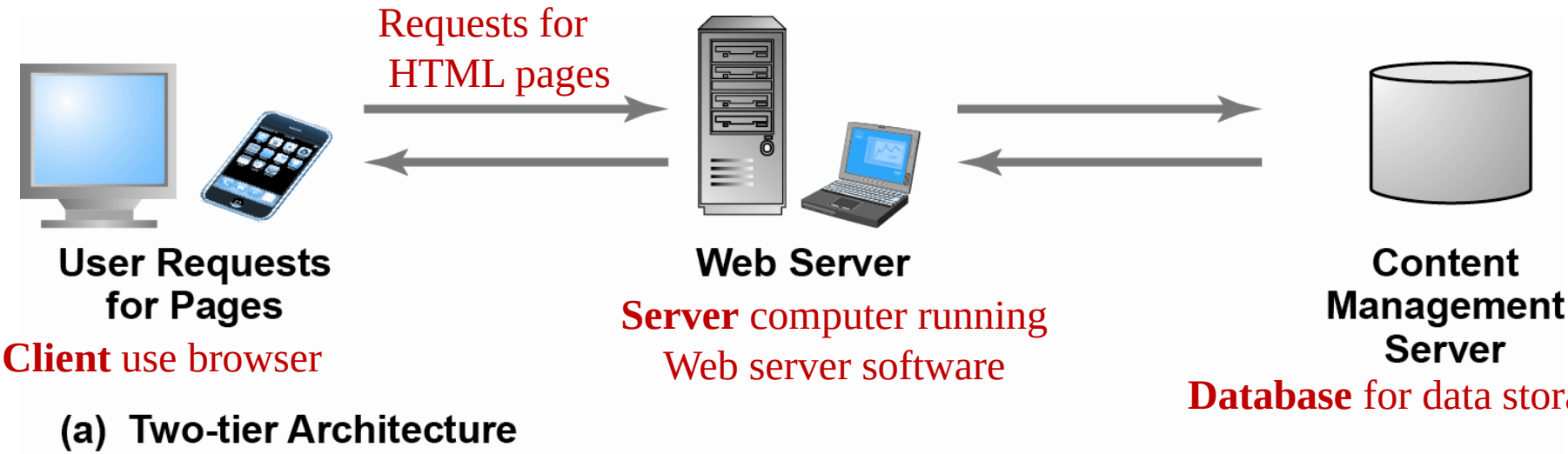

Figure 3.11(a), Page 195

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Simple vs. Multi-tiered Web Site Architecture

- The development of e-commerce required more interactive functionality, such as:
  - The ability to respond to user input,
  - Take customer orders
  - Make credit card transactions,
  - Retrieve data from product databases
  - Advertising based on user characteristics

to handle this different processing loads ➡

- **Multi-tier system architecture (Web application servers)**
  - Web application servers: specialized software programs that perform a wide variety of transaction processing required by e-commerce.
  - Backend, legacy databases

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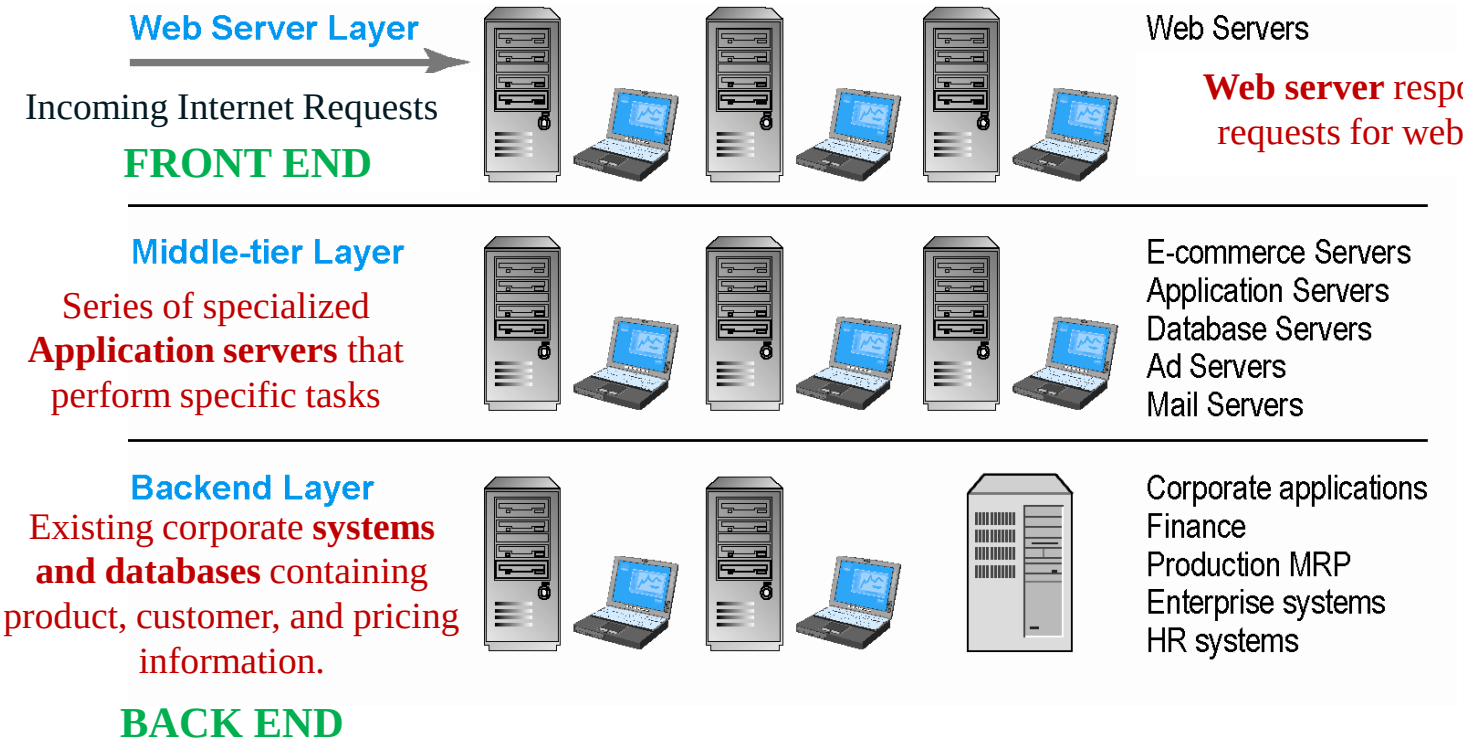
Multi-Tier E-commerce Architecture



(b) Multi-tier Architecture

In a multi-tier architecture, a Web server is linked to a middle-tier layer that typically includes a series of application servers that perform specific tasks, as well as to a backend layer of existing corporate systems.

A multi-tiered site typically employs several physical computers, each running some of the software applications and sharing the workload across many physical computers.

Web Server Software

- All e-commerce sites require basic Web server software to answer requests from customers for HTML and XML pages.
- **Examples:** Apache, Microsoft's Internet Information Server (IIS)

TABLE 3.4 BASIC FUNCTIONALITY PROVIDED BY WEB SERVERS

FUNCTIONALITY	DESCRIPTION
Processing of HTTP requests	Receive and respond to client requests for HTML pages
Security services (Secure Sockets Layer)/ Transport Layer Security	Verify username and password; process certificates and private/public key information required for credit card processing and other secure information
File Transfer Protocol	Permits transfer of very large files from server to server
Search engine	Indexing of site content; keyword search capability
Data capture	Log file of all visits, time, duration, and referral source
E-mail	Ability to send, receive, and store e-mail messages
Site management tools	Calculate and display key site statistics, such as unique visitors, page requests, and origin of requests; check links on pages

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Site Management Tools

- Essential tools if you want to keep your site working, and if you want to understand how well it is working.
- **Included in all Web servers**
  - Verify that links on pages are still valid
  - Identify orphan files
  - Can help you to understand consumer behavior on your website such as monitor customer purchases, marketing campaign effectiveness, and so on
    - Webtrends Analytics 10, Google Analytics

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Site Management Tools

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Using a sophisticated Web analytics solution such as Webtrends Analytics, managers can quickly understand the return on investment of their online marketing efforts and determine how to improve conversion by drilling down
into abandonment paths, product preferences, and successful campaign elements for different types of customers.

SOURCE: Webtrends, Inc., 2014.

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Application Servers

- **Web application servers:**
  - Software programs that provide specific business functionality required for a Web site.
  - The basic idea of application servers is to isolate the business applications from the details of displaying Web pages to users on the front end and the details of connecting to databases on the back end
    - Type of middleware that isolate business applications from Web servers and databases

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Application Servers

APPLICATION SERVER	FUNCTIONALITY
Catalog display	Provides a database for product descriptions and prices
Transaction processing (shopping cart)	Accepts orders and clears payments
List server	Creates and serves mailing lists and manages e-mail marketing campaigns
Proxy server	Monitors and controls access to main Web server; implements firewall protection
Mail server	Manages Internet e-mail
Audio/video server	Stores and delivers streaming media content
Chat server	Creates an environment for online real-time text and audio interactions with customers
News server	Provides connectivity and displays Internet news feeds
Fax server	Provides fax reception and sending using a Web server
Groupware server	Creates workgroup environments for online collaboration
Database server	Stores customer, product, and price information
Ad server	Maintains Web-enabled database of advertising banners that permits customized and personalized display of advertisements based on consumer behavior and characteristics
Auction server	Provides a transaction environment for conducting online auctions
B2B server	Implements buy, sell, and link marketplaces for commercial transactions

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Table 3.5 illustrates the wide variety of application servers available in the marketplace.

The table focuses on "sell-side" servers that are designed to enable selling products on the Web.

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E-commerce Merchant Server Software

- **E-commerce merchant server software:** provides the basic functionality needed for online sales, including an **online catalog**, order taking via an online **shopping cart**, and online **credit card processing**.

  - **Online catalog**
    - List of products available on Web site
    - Merchant server software typically includes a database capability that will allow for construction of a customized online catalog.
  - **Shopping cart**
    - Allows shoppers to set aside desired purchases in preparation for checkout, review what they have selected, edit their selections as necessary, and then make purchase by clicking a button.
  - **Credit card processing**
    - Typically works in conjunction with shopping cart
    - Verifies the shopper's credit card and then puts through the debit to the card and the credit to the company's account at checkout

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E-commerce Merchant Server Software

Merchant Server Software Packages (E-commerce Software Platforms)

- An integrated environment that provide most or all of the functionality and capabilities you will need to develop a sophisticated, customercentric site.

- An important element of merchant software packages is a built-in shopping cart that can display merchandise, manage orders, and clear credit card transactions as mentioned in the previous slide.

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E-commerce Merchant Server Software

- E-commerce software platforms come in **general ranges** of price and functionality:

❖ Options for small firms

1. **E-commerce merchant services provided by sites** such as Yahoo Stores, Bigcommerce, Homestead, endio, and Shopify offer similar services.
2. **Open source merchant server software** is software developed by a community of programmers and designers, and is free to use and modify.

❖ Options for Midrange and large firms

3. **Midrange e-commerce software platforms** include IBM WebSphere Commerce Express Edition and Sitecore Commerce Server (formerly Microsoft Commerce Server).
4. **High-end enterprise solutions** for large global firms are provided by IBM Websphere Professional and Enterprise Editions, IBM Commerce on Cloud, Oracle ATG Web Commerce, Demandware, Magento, NetSuite, and others

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3.4 CHOOSING HARDWARE

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Choosing Hardware

- **Hardware platform:** the underlying computing equipment that the system uses to achieve its e-commerce functionality
- **Your Objective:**
  - Enough platform capacity to meet peak demand (avoiding an overload condition) without wasting money.
- **Important to understand the factors that affect speed, and scalability of a site**

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Right-Sizing Your Hardware Platform: The Demand Side

- **Customer demand:**
  - The most important factor affecting the **speed** of your site is the demand that customers put on the site.
- **Factors in overall demand:**
  - Number of simultaneous users in peak periods
  - Nature of customer requests
    - (If users request searches, registration forms, and order taking via shopping carts, then demands on processors will increase markedly)
  - Type of content (dynamic vs. static Web pages)
  - Required security
  - Speed of legacy applications needed to supply data to the Web pages

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Right-Sizing Your Hardware Platform: The Supply Side

- **Scalability:**
  - Ability of site to increase in size as customer demand increase
- **Ways to scale hardware:**
  - **Vertically**
    - Increase processing power of individual components
  - **Horizontally**
    - Employ multiple computers to share workload

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3.5 OTHER E-COMMERCE SITE TOOLS

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Other E-commerce Site Tools

- **Web site design: Basic business considerations**
  - As a business manager your customers will need to find what they need at your site, make a purchase, and leave
  - A Web site that annoys customers runs the risk of losing the customer forever

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TABLE 3.10 E-COMMERCE WEB SITE FEATURES THAT ANNOY CUSTOMERS

- Requiring user to view ad or Flash introduction before going to Web site content
- Pop-up and pop-under ads and windows
- Too many clicks to get to the content
- Links that don't work
- Confusing navigation; no search function
- Requirement to register and log in before viewing content or ordering
- Slow loading pages
- Content that is out of date
- Inability to use browser's Back button
- No contact information available (Web form only)
- Unnecessary splash/flash screens, animation, etc.
- Music or other audio that plays automatically
- Unprofessional design elements
- Text not easily legible due to size, color, format
- Typographical errors
- No or unclear returns policy

Table 3.10, Page 209

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3.6 DEVELOPING A MOBILE WEB SITE AND BUILDING MOBILE APPLICATIONS

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Developing a Mobile Web Site and Building Mobile Applications

- **Three types of m-commerce software**
  - Mobile Web site
    - is a version of a regular Web site that is scaled down in content and navigation so that users can find what they want and move quickly to a decision or purchase.
  - Mobile Web app
    - is an application built to run on the mobile Web browser built into a smartphone or tablet computer
  - Native app
    - is an application designed specifically to operate using the mobile device's hardware and operating system

Traditional Desktop Website

Sand Grain Text

Non-Flexible

Must Zoom-in & Scroll in All Directions

Too Much Information for Mobile Users

File Size too Large Loads Slow

Optimized Mobile Website

Easily Readable Text

Flexible Layout

Only Need to Scroll Up & Down

Content is Reduced to Essential Elements

Smaller File Size Load Fast

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Traditional Web site

Mobile Web APP

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Native App vs Mobile Website

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Planning and Building a Mobile Presence

- **What is the right mobile presence for your firm?**
- **Identify business objectives, system functionality, and information requirements**

TABLE 3.12 SYSTEMS ANALYSIS FOR BUILDING A MOBILE PRESENCE

BUSINESS OBJECTIVE	SYSTEM FUNCTIONALITY	INFORMATION REQUIREMENTS
Driving sales	Digital catalog; product database	Product descriptions, photos, SKUs, inventory
Branding	Showing how customers use your products	Videos and rich media; product and customer demonstrations
Building customer community	Interactive experiences, games with multiple players	Games, contests, forums, social sign-up to Facebook
Advertising and promotion	Coupons and flash sales for slow-selling items	Product descriptions, coupon management, and inventory management
Gathering customer feedback	Ability to retrieve and store user inputs including text, photos, and video	Customer sign-in and identification; customer database

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Planning and Building a Mobile Presence

- **Choice:**
  - Mobile Web site or mobile Web app
    - Easy, Less expensive
  - Native app
    - Can use device hardware, available offline

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Mobile Presence Design Considerations

- Designing a mobile presence is somewhat different from traditional desktop Web site design because of different hardware, software, and consumer expectations.

- The following Table describes some of the major differences.

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TABLE 3.13 UNIQUE FEATURES THAT MUST BE TAKEN INTO ACCOUNT WHEN DESIGNING A MOBILE PRESENCE

FEATURE	IMPLICATIONS FOR MOBILE PLATFORM
Hardware	Mobile hardware is smaller, and there are more resource constraints in data storage and processing power.
Connectivity	The mobile platform is constrained by slower connection speeds than desktop Web sites.
Displays	Mobile displays are much smaller and require simplification. Some screens are not good in sunlight.
Interface	Touch-screen technology introduces new interaction routines different from the traditional mouse and keyboard. The mobile platform is not a good data entry tool but can be a good navigational tool.

Table 3.13, Page 220

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Mobile Presence Design Considerations

- **Platform constraints**
  - Graphics, file sizes, choice boxes and lists
- **Mobile first design**
  - beginning the e-commerce development process with a mobile presence rather than a desktop Web site
  - Desktop Web site design after mobile design

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Mobile Presence Design Considerations

- **Other important trends in the development of mobile Web sites include:**

  Responsive Web design and Adaptive Web design

- **Responsive Web design (RWD)**
  - tools and design principles that automatically adjust the layout of a Web site depending on the screen resolution of the device on which it is being viewed
  - RWD tools include HTML5 and CSS3
  - It use a flexible grid-based layouts and flexible images and media.
  - RDW uses the same HTML code and design for each device, but uses CSS to adjust the layout and display to the screen
  - RDW can be costly, often requiring a complete redesign of the Web site's interface

Mobile Presence Design Considerations

- **Adaptive Web design (AWD)**
  - server-side technique that detects the attributes of the device making the request and, using predefined templates based on device screen size along with CSS and JavaScript, loads a version of the site that is optimized for the device
  - faster load times
  - the ability to enhance or remove functionality on the fly, and typically a better user experience, particularly for businesses where user intent differs depending on the platform being used
    - Example .. Lufthansa

Cross-Platform Mobile App Development Tools

- **Creating from scratch using a programming language such as Objective C, Java**
- **Low cost, open-source app development toolkits alternatives**
  - Appery.io
  - Codiqua
  - PhoneGap
  - MoSynch
  - Appcelerator

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Performance and Cost Considerations

- **Mobile first design: Most efficient**
- **Mobile Web site:**
  - Resizing existing Web site for mobile access is least expensive
- **Mobile Web app:**
  - better graphics, more interactivity, and faster local calculations
- **Native app:**
  - Most expensive; requires more programming

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