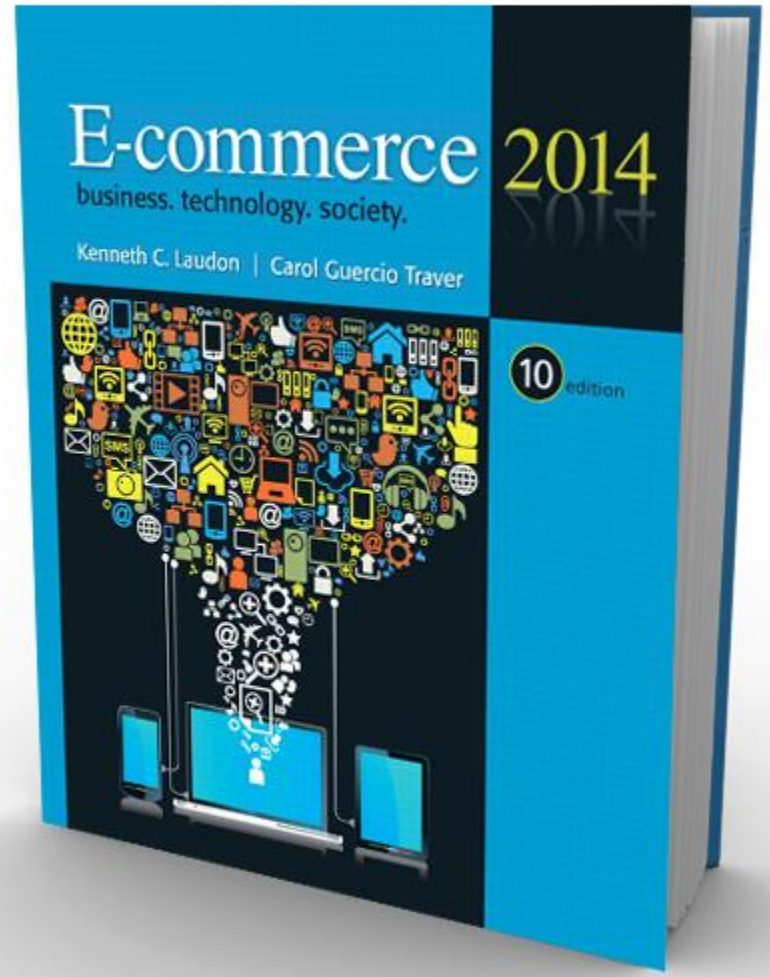

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Carol Guercio Traver

Chapter 4

Building an E-commerce Presence: Web Sites, Mobile Sites, and Apps

e Commerce Course :

Parts of Chapters
1.1 & 1.2,
5.1
8.1, 8.2 & 8.3
10.1

Complete Chapters
2, 3, 4, 6, 7 and 9

Agenda

- Imagine Your E-commerce
- Building an E-commerce Presence: A Systematic Approach
- Choosing Software
- Choosing Hardware
- Other E-commerce Site Tools
- Developing a Mobile Website and Building Mobile Applications

Imagine Your E-commerce

USA Today Redesigns

- What were *USA Today*'s objectives in redesigning its e-commerce presence?
- What considerations, if any, unique to the newspaper business were involved?
- What did *USA Today* do to meet the needs of mobile device users?

Imagine Your E-commerce Presence

- **What's the idea?** (More detail will follow)
  - Vision includes:
    - Mission statement
    - Target audience
    - Intended market space
    - Strategic analysis (SWOT)
    - Internet marketing matrix
    - Development timeline and preliminary budget

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
  - Revenue model(s):
    - Advertising, subscriptions, transaction fees, sales, and affiliate revenue

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 (consumer actions on the web)
    - Content creation patterns (blogs, Facebook)
    - Buyers' personas and characteristics

Imagine Your E-commerce Presence (cont.)

- **Characterize the marketplace**
  - Demographics
  - Size, growth, changes
  - Structure
    - Competitors
    - Suppliers
    - Substitute products
- **Where is the content coming from?**
  - Static or dynamic web pages?

Imagine Your E-commerce Presence (cont.)

- **Know yourself—SWOT analysis**
- **Develop an e-commerce presence map (Fig 4-2)**
- **Develop a timeline: Milestones**
- **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

SWOT Analysis

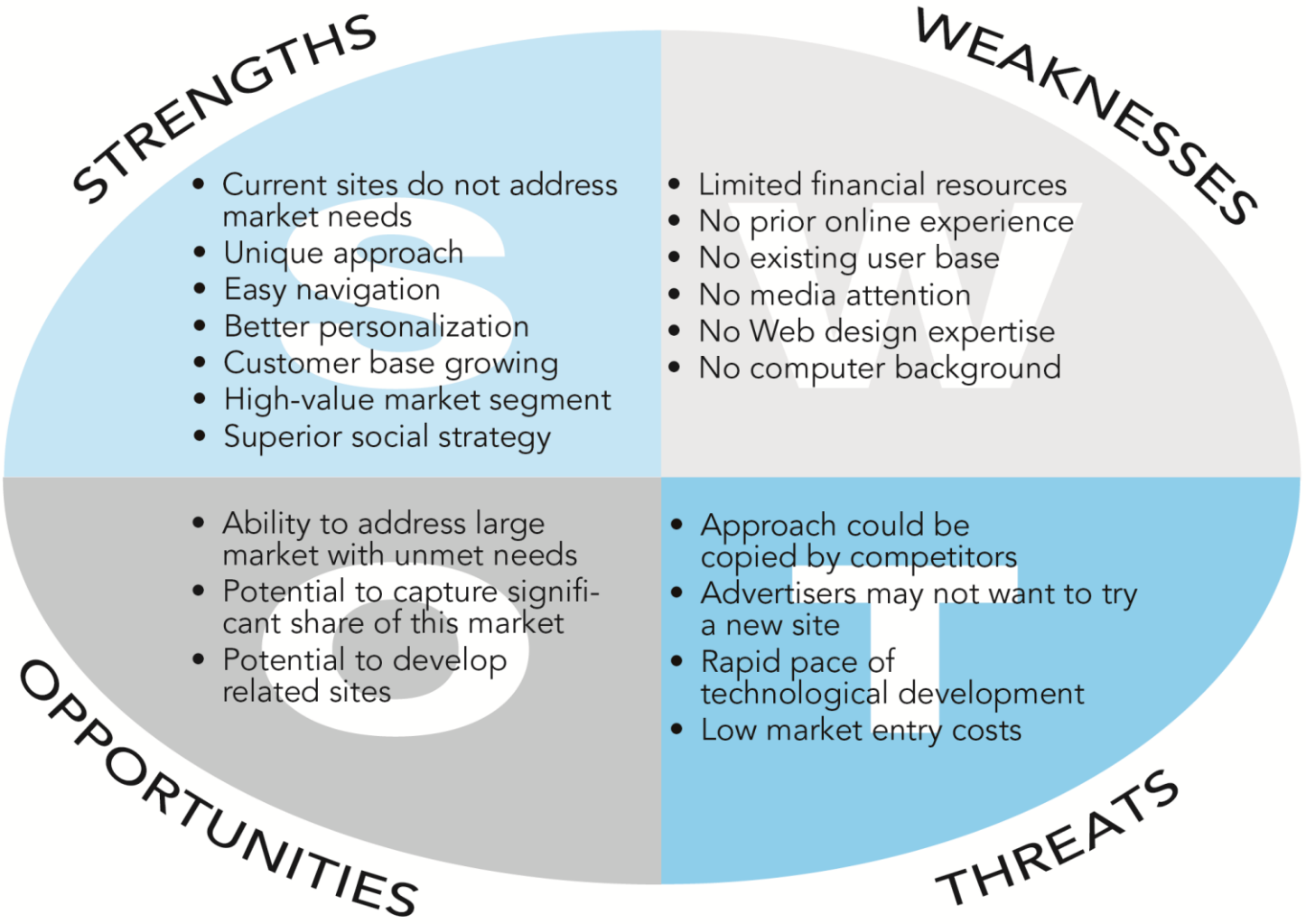


Figure 4.1, page 189

E-commerce Presence Map

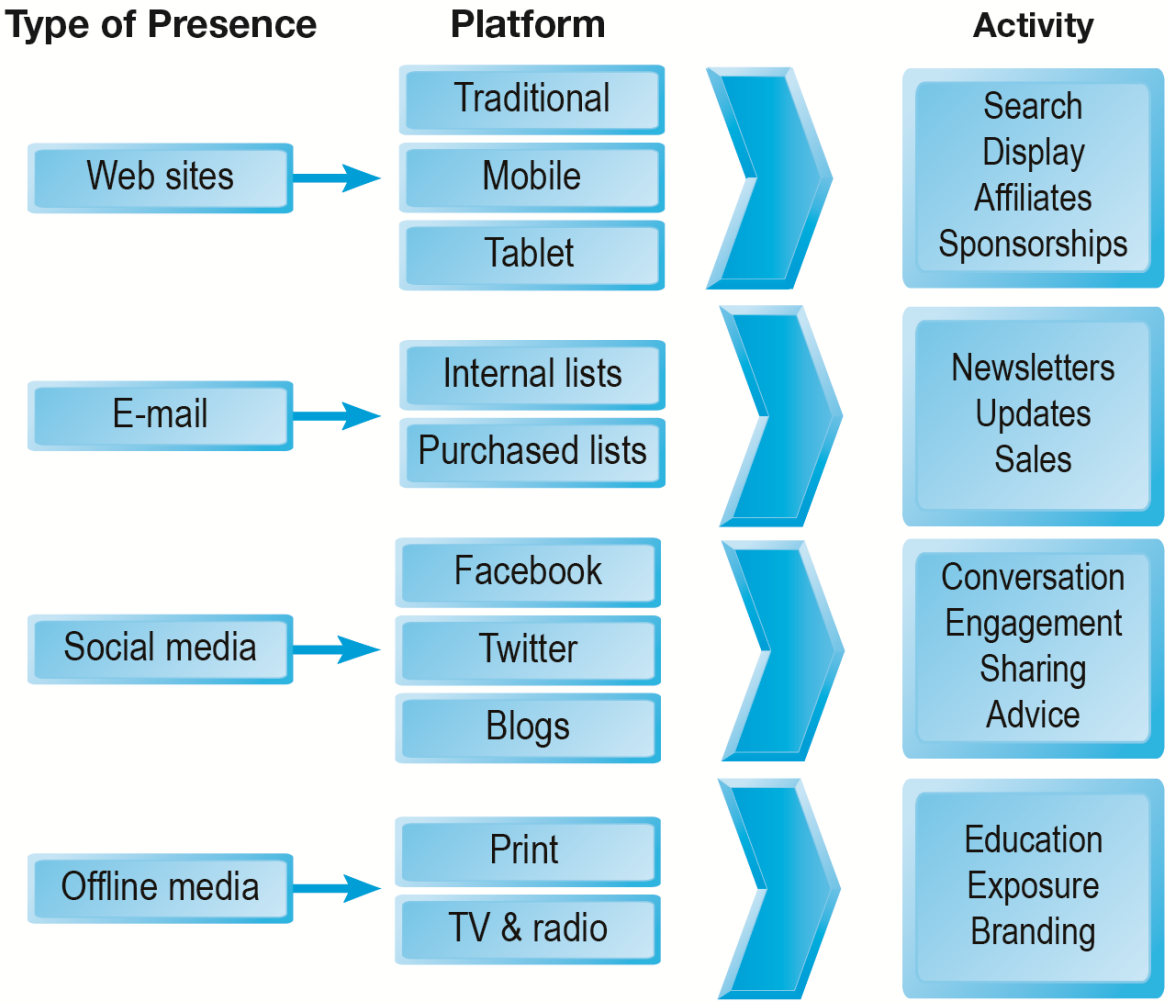


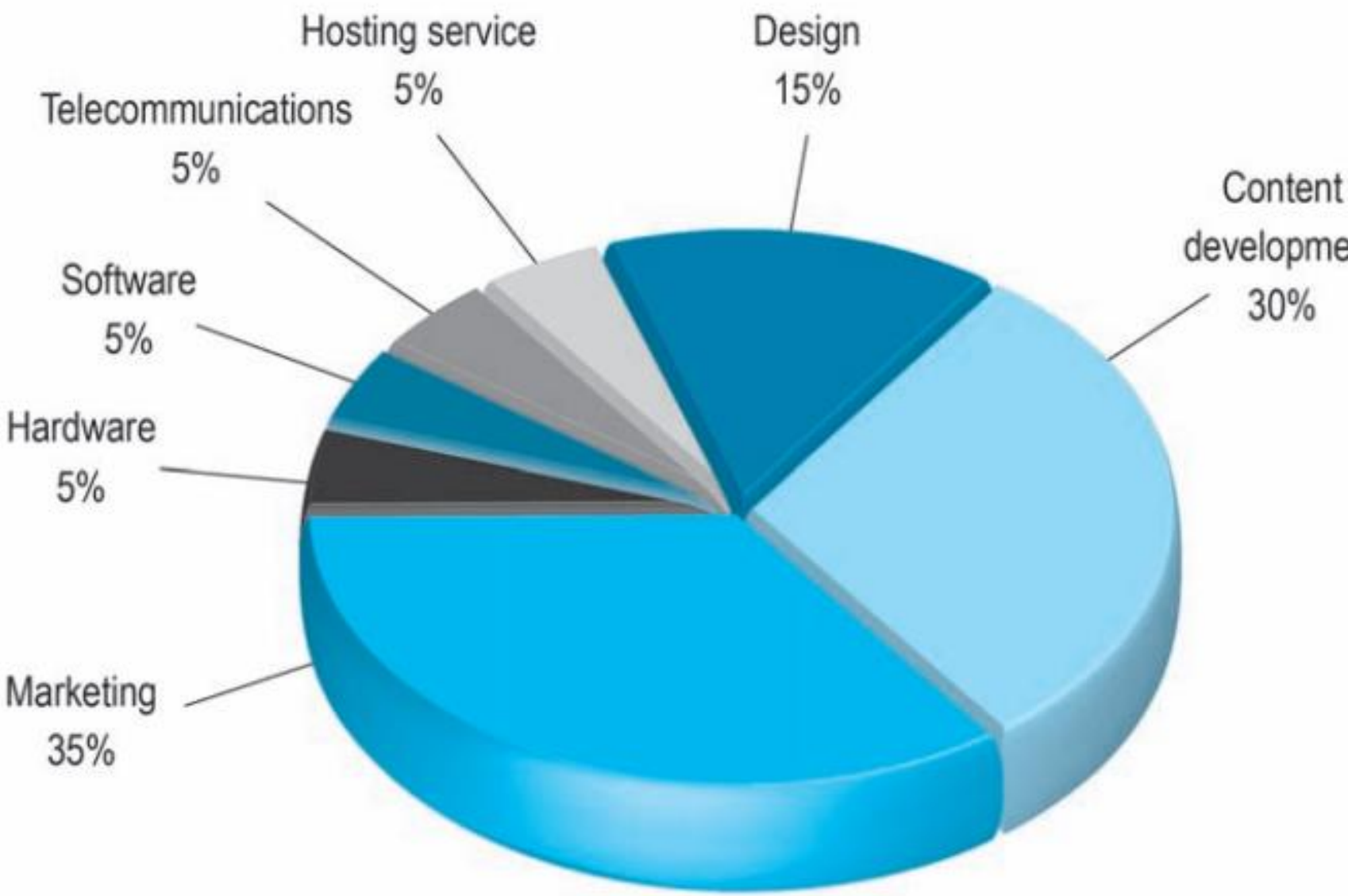
Figure 4.2, page 190

Time Line

TABLE 3.1 E-COMMERCE PRESENCE TIMELINE

PHASE	ACTIVITY	MILESTONE
Phase 1: Planning	Envision e-commerce presence; determine personnel	Mission statement
Phase 2: Website development	Acquire content; develop a site design; arrange for hosting the site	Website plan
Phase 3: Web implementation	Develop keywords and metatags; focus on search engine optimization; identify potential sponsors	A functional website
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 website to smartphones	A mobile media plan

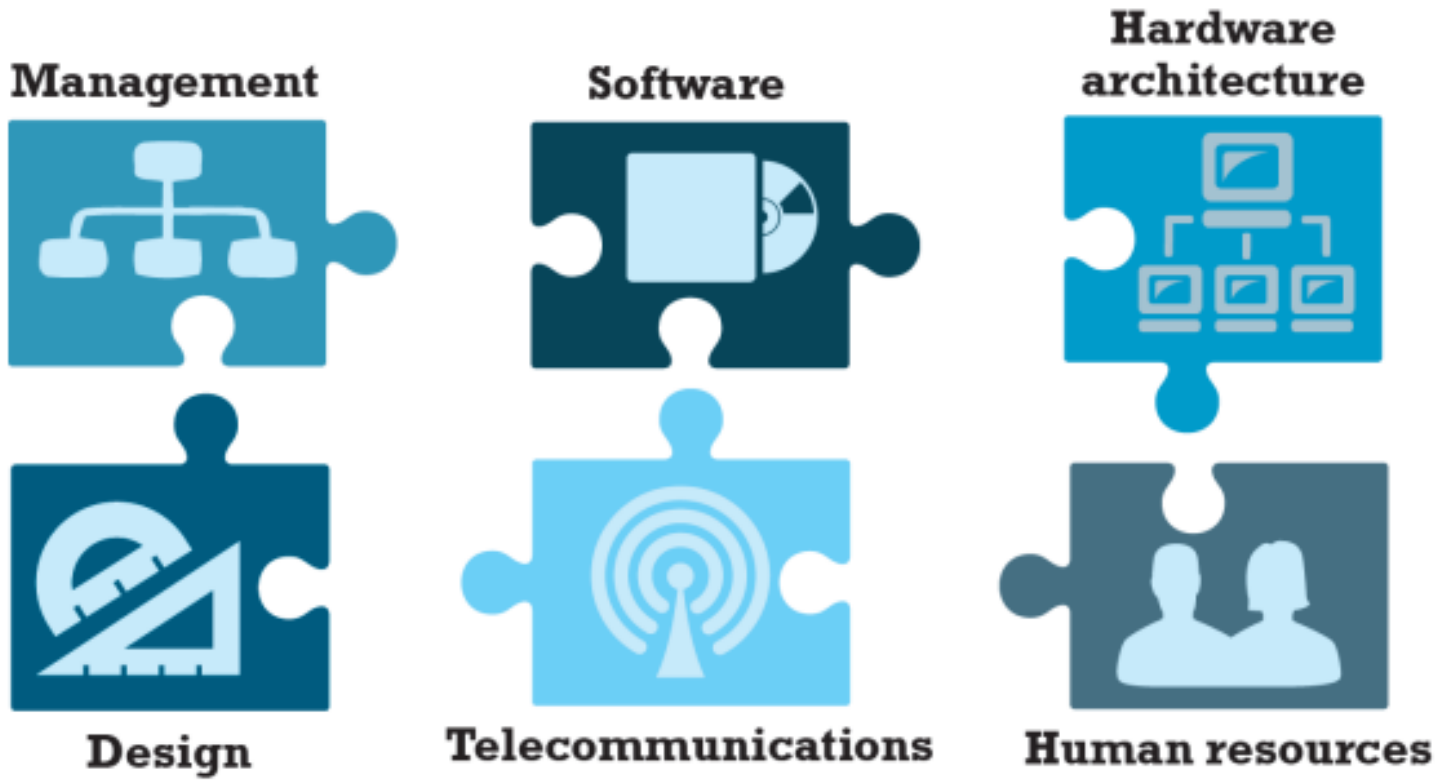
FIGURE 3.3 **COMPONENTS OF A WEBSITE BUDGET**



Building an E-commerce Presence: A Systematic Approach

Important Factors

FIGURE 3.4 FACTORS TO CONSIDER IN DEVELOPING AN E-COMMERCE PRESENCE



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

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

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

Web Site Systems Development Life Cycle

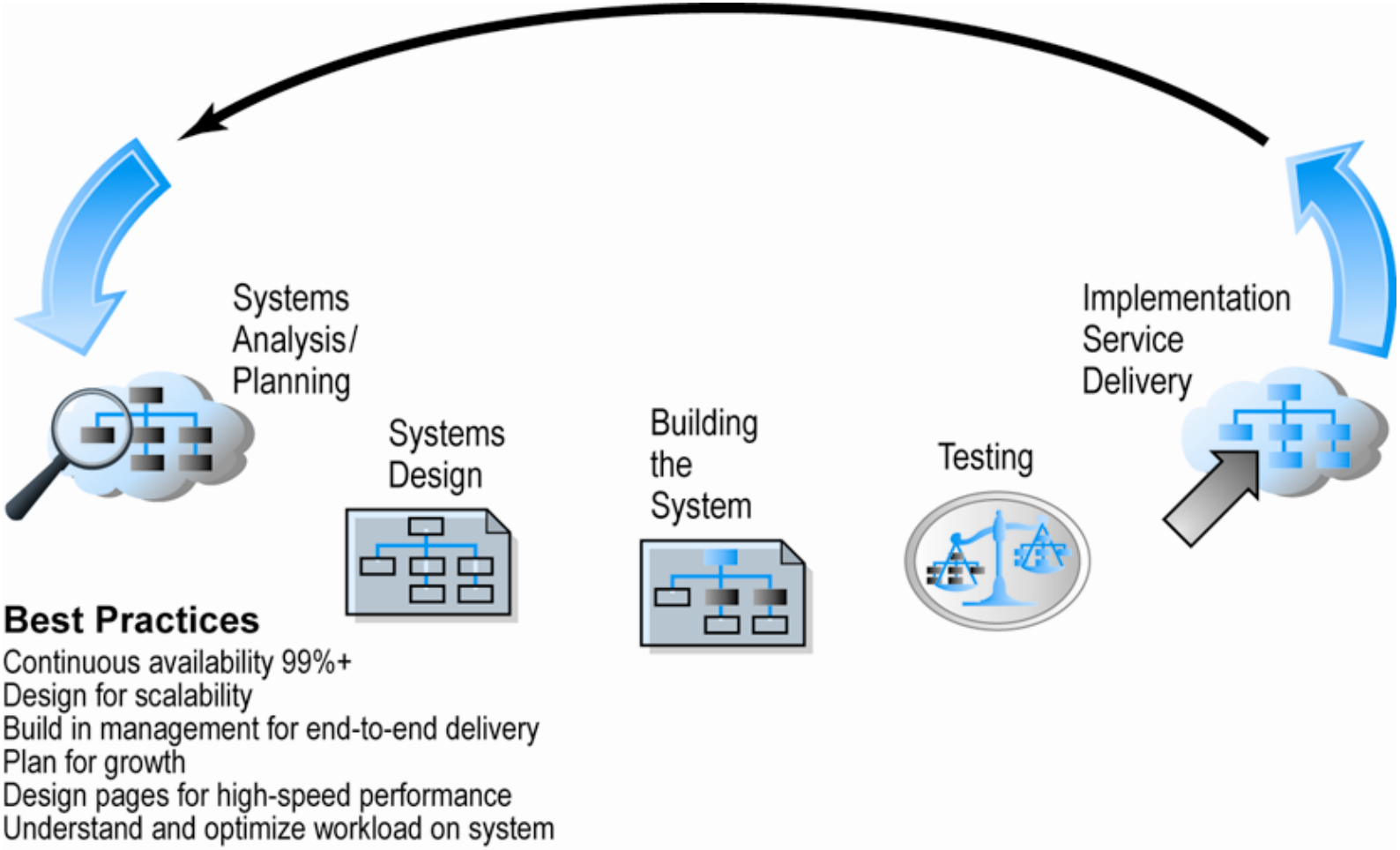


Figure 4.5, Page 194

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 the system must produce in order to achieve business objectives

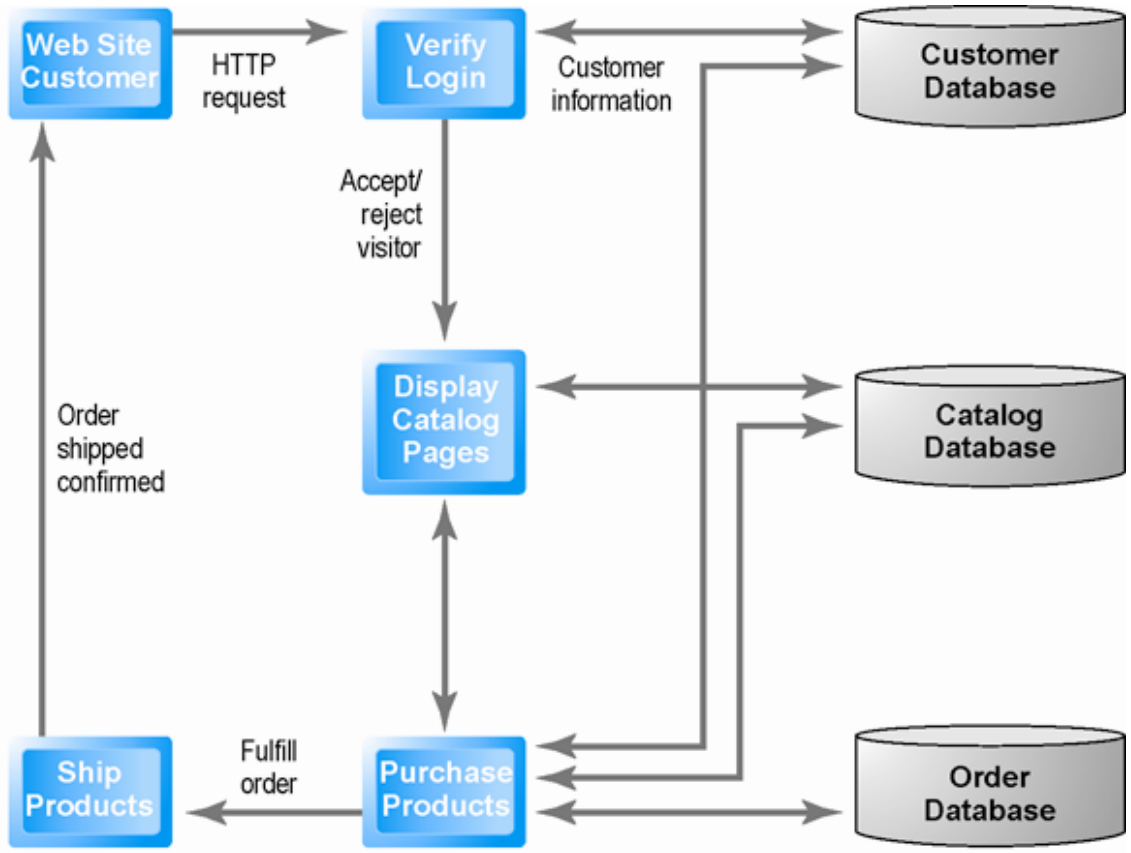
TABLE 4.2 SYSTEM ANALYSIS: BUSINESS OBJECTIVES, SYSTEM FUNCTIONALITIES, AND INFORMATION REQUIREMENTS FOR A TYPICAL E-COMMERCE SITE

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

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
    - Data flow diagrams, processing functions, databases
  - Physical design
    - Specifies actual physical, software components, models, 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 4.6 (a), Page 197

Physical Design for a Simple Web Site

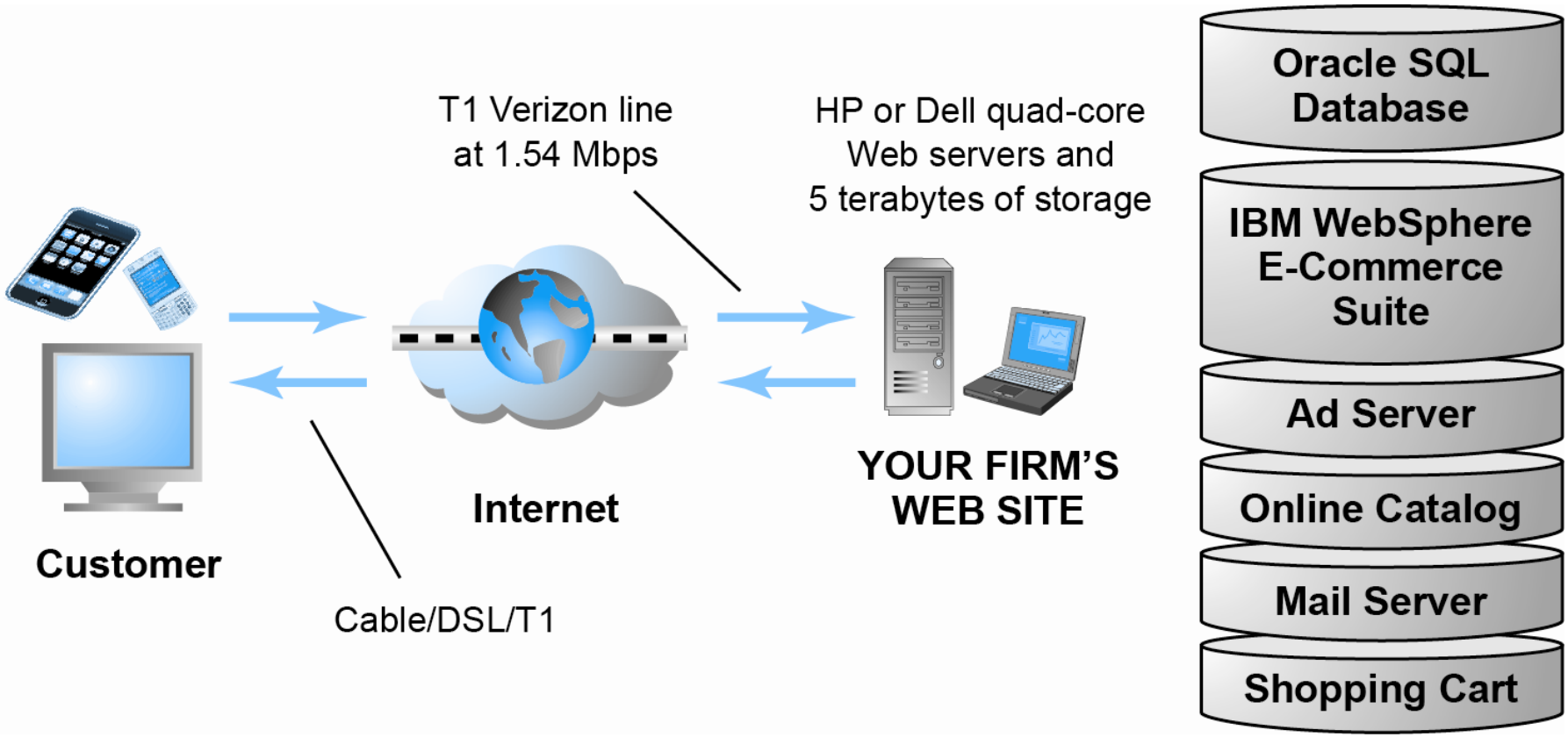


Figure 4.6 (b), Page 197

Build/Host Your Own vs. Outsourcing

- **Outsourcing: Hiring vendors to provide services involved in building site**
- **Build own vs. outsourcing:**
  - Build your own requires team with diverse skill set; choice of software tools; both risks and possible benefits
- **Host own vs. outsourcing**
  - **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

Choices in Building and Hosting

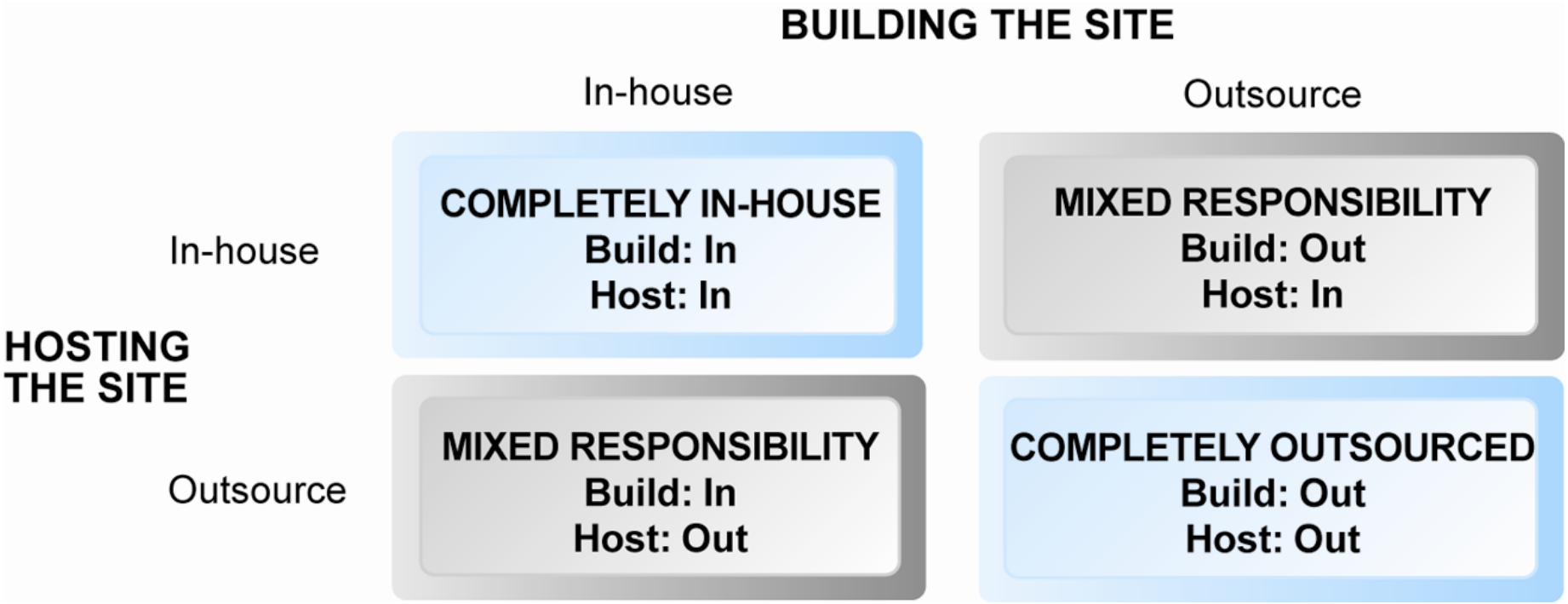
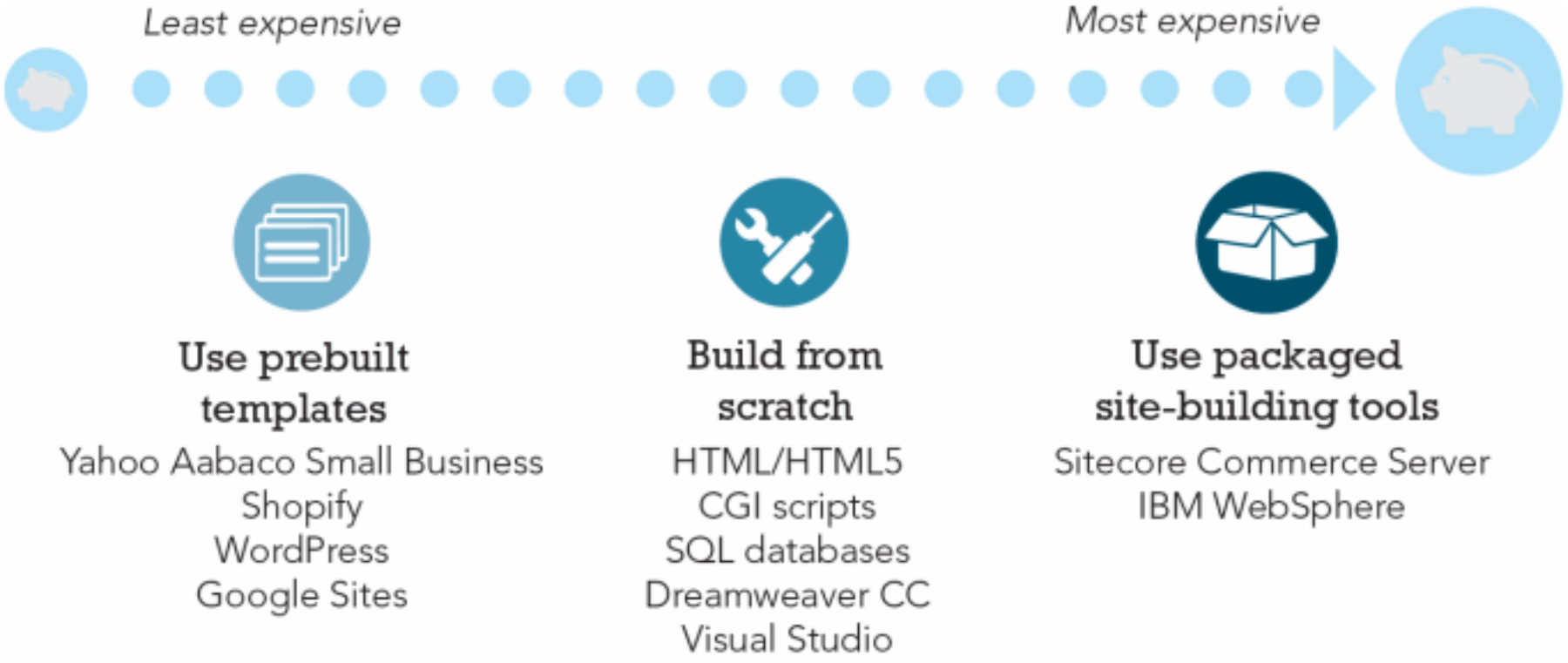


Figure 4.7 Page 198

Tools for Building E-Commerce Site

FIGURE 3.8 THE SPECTRUM OF TOOLS FOR BUILDING YOUR OWN E-COMMERCE SITE



Key Players

TABLE 3.3	KEY PLAYERS: HOSTING/CO-LOCATION/CLOUD SERVICES
Amazon Web Services (AWS) EC2	Microsoft
CenturyLink	SoftLayer (IBM)
Digital Realty Trust	Rackspace
Fujitsu	Verizon Cloud
Joyent (Samsung)	Virtualstream

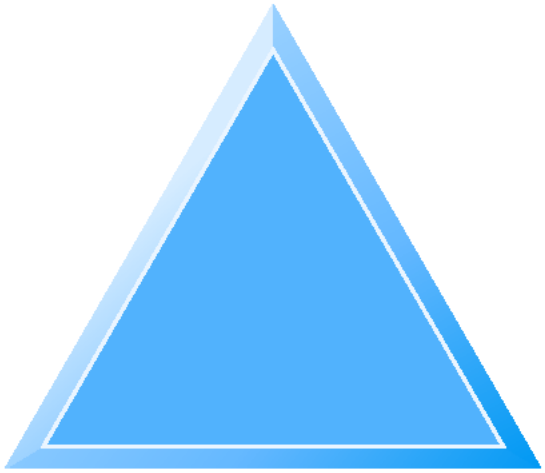
Testing, Implementation, and Maintenance

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

Factors in Web Site Optimization

Page Delivery

Content delivery networks
Edge caching
Bandwidth



Page Generation

Server response time
Device-based accelerators
Efficient resource allocation
Resource utilization thresholds
Monitoring site performance

Page Content

Optimize HTML
Optimize images
Site architecture
Efficient page style

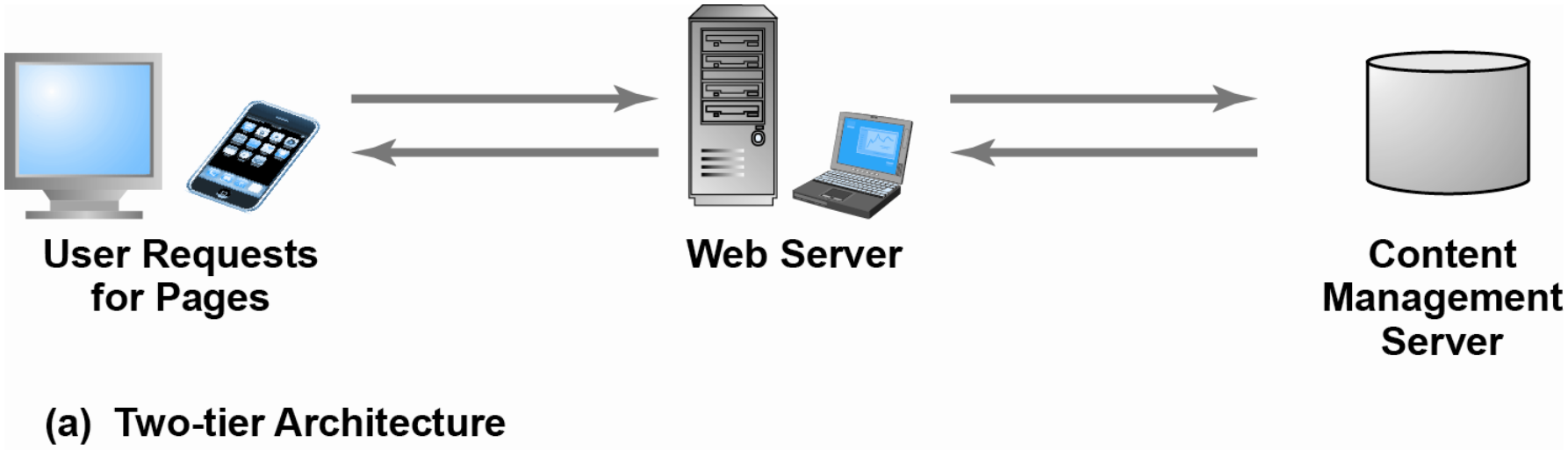
Figure 4.10, Page 205

Choosing Software

Simple vs. Multi-tiered Web Site Architecture

- **System architecture**
  - Arrangement of software, hardware, and tasks in an information system needed to achieve a specific functionality
- **Two-tier**
  - Web server and database server
- **Multi-tier**
  - Web application and other servers
  - Backend, legacy databases

Two-Tier E-commerce Architecture



(a) Two-tier Architecture

Figure 4.11(a), Page 207

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.

Figure 4.11(b), Page 207

Web Server Software

- **Apache**
  - Leading Web server software (52% of market)
  - Works with UNIX, Linux operating systems
  - Comes loaded on IBM systems
- **Microsoft's Internet Information Server (IIS)**
  - Second major Web server software (20% of market)
  - Windows-based

TABLE 4.4 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

Table 4.4, Page 208

Site Management Tools

- **Basic tools**
  - Included in all Web servers
    - Verify that links on pages are still valid
    - Identify orphan files
- **Third-party software for advanced management**
  - Monitor customer purchases, marketing campaign effectiveness, and so on
  - WebTrends Analytics 10, Google Analytics

Dynamic Page Generation Tools

Dynamic page generation:

- Page contents stored in database and fetched when needed
- Lowers menu cost
- Enables market segmentation

Common tools:

- Common Gateway Interface (CGI)
- Active server pages (ASP)
- Java Server Pages (JSP)
- Open Data Base Connectivity (ODBC), a std DB access method allows connections to any DB

Advantages

- Lowers menu costs
- Permits easy online market segmentation
- Enables cost-free price discrimination
- Enables content management system (CMS)

Application Servers

- **Web application servers:**
  - Is a server program in a computer in a distributed network that provides the business logic for an application program. Often viewed as a 3 tier application.
  - It divides the application into
    - 1ST tier: front end – web browser GUI
    - 2nd middle tier: business logic
    - 3rd tier: back end – DB and transaction server

E-commerce Merchant Server Software

- **Provides basic functionality for online sales**
  - **Online catalog**
    - List of products available on Web site
  - **Online shopping cart**
    - Allows shoppers to set aside, review, edit selections, and then make purchase
  - **Credit card processing**
    - Typically works in conjunction with shopping cart
    - Verifies card and puts through credit to company's account at checkout

TABLE 3.5 APPLICATION SERVERS AND THEIR FUNCTION

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 transmission 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

Merchant Server Software Packages

- **Integrated environment that includes most of functionality needed**
- **Key factors in selecting a package**
  - Functionality
  - Support for different business models
  - Business process modeling tools
  - Visual site management and reporting
  - Performance and scalability
  - Connectivity to existing business systems
  - Compliance with standards
  - Global and multicultural capability
  - Local sales tax and shipping rules

Web Services and Open-Source Options

- **Options for small firms**
  - Hosted e-commerce sites
    - Offer site building tools and templates
    - Example: Yahoo's Merchant Solutions
  - Open-source merchant server software
    - Enables you to build truly custom sites
    - Requires programmer with expertise, time
  - See table 3.6: OPEN SOURCE SOFTWARE OPTIONS

TABLE 3.6 OPEN SOURCE SOFTWARE OPTIONS

FUNCTIONALITY	OPEN SOURCE SOFTWARE
Web server	Apache (the leading web server for small and medium businesses)
Shopping cart, online catalog	Many providers: osCommerce, Zen Cart, AgoraCart, X-cart, AspDotNetStorefront
Credit card processing	Credit card acceptance is typically provided in shopping cart software but you may need a merchant account from a bank as well.
Database	MySQL (the leading open source SQL database for businesses)
Programming/scripting language	PHP is a scripting language embedded in HTML documents but executed by the server, providing server-side execution with the simplicity of HTML editing. Perl is an alternative language. JavaScript programs are client-side programs that provide user interface components. Ruby on Rails (RoR, Rails) and Django are other popular open source web application frameworks.
Analytics	Analytics keep track of your site's customer activities and the success of your web advertising campaign. You can also use Google Analytics if you advertise on Google, which provides good tracking tools; most hosting services will provide these services as well. Other open source analytic tools include Piwik, CrawlTrack, and Open Web Analytics.

Choosing Hardware

The Hardware Platform

- **Hardware platform:**
  - Underlying computing equipment needed for e-commerce functionality
- **Objective:**
  - Enough platform capacity to meet peak demand without wasting money
- **Important to understand the factors that affect speed, capacity, and scalability of a site**

Right-Sizing Your Hardware Platform: The Demand Side

- **Customer demand:**
  - Most important factor affecting speed of site
- **Factors in overall demand:**
  - Number of simultaneous users in peak periods
  - Nature of customer requests (user profile)
  - Type of content (dynamic vs. static Web pages)
  - Required security
  - Number of items in inventory
  - Number of page requests
  - Speed of legacy applications
- **SEE TABLE 4.7 PG 217: FACTORS IN RIGHT-SIZING E-COMMERCE PLATFORM**

Right-Sizing Your Hardware Platform: The Supply Side

- **Scalability:**
  - Ability of site to increase in size as demand warrants
- **Ways to scale hardware:**
  - **Vertically**
    - Increase processing power of individual components – e.g., using multiple processers, faster chips
  - **Horizontally**
    - Employ multiple computers to share workload
  - **Improve processing architecture**

TABLE 4.8 VERTICAL AND HORIZONTAL SCALING TECHNIQUES

TECHNIQUE	APPLICATION
Use a faster computer	Deploy edge servers, presentation servers, data servers, etc.
Create a cluster of computers	Use computers in parallel to balance loads.
Use appliance servers	Use special-purpose computers optimized for their task.
Segment workload	Segment incoming work to specialized computers.
Batch requests	Combine related requests for data into groups, process as group.
Manage connections	Reduce connections between processes and computers to a minimum.
Aggregate user data	Aggregate user data from legacy applications in single data pools.
Cache	Store frequently used data in cache rather than on the disk.

Table 4.8, Page 219

TABLE 4.9 IMPROVING THE PROCESSING ARCHITECTURE OF YOUR SITE

ARCHITECTURE IMPROVEMENT	DESCRIPTION
Separate static content from dynamic content	Use specialized servers for each type of workload.
Cache static content	Increase RAM to the gigabyte range and store static content in RAM.
Cache database lookup tables	Use cache tables used to look up database records.
Consolidate business logic on dedicated servers	Put shopping cart, credit card processing, and other CPU-intensive activity on dedicated servers.
Optimize ASP code	Examine your code to ensure it is operating efficiently.
Optimize the database schema	Examine your database search times and take steps to reduce access times.

Table 4.9, Page 220

Other E-commerce Site Tools

Other E-commerce Site Tools

- **Web site design: Basic business considerations**
  - Enabling customers to find and buy what they need
- **Tools for Web site optimization**
  - Search engine placement
    - Metatags, titles, content
    - Identify market niches, localize site
    - Offer expertise such as white papers, industry analysis etc.
    - Links from other sites to yours
    - Buy Search engine ads
    - Use key words to suggest the location of your e-commerce site

TABLE 4.10 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 4.10, Page 221

TABLE 4.11 THE EIGHT MOST IMPORTANT FACTORS IN SUCCESSFUL E-COMMERCE SITE DESIGN

FACTOR	DESCRIPTION
Functionality	Pages that work, load quickly, and point the customer toward your product offerings
Informational	Links that customers can easily find to discover more about you and your products
Ease of use	Simple fool-proof navigation
Redundant navigation	Alternative navigation to the same content
Ease of purchase	One or two clicks to purchase
Multi-browser functionality	Site works with the most popular browsers
Simple graphics	Avoids distracting, obnoxious graphics and sounds that the user cannot control
Legible text	Avoids backgrounds that distort text or make it illegible

Table 4.11, Page 222

Tools for Interactivity and Active Content

- CGI (Common Gateway Interface)
- ASP (Active Server Pages)/ASP.NET
- Java, JSP, and JavaScript (Sun)
- ActiveX and VBScript (Microsoft)
- ColdFusion (Adobe)
- Web 2.0 design elements:
  - Widgets (small pieces of programming code)
  - mashups (functionality and data from one program used in another)

Personalization Tools

- **Personalization**
  - Ability to treat people based on personal qualities and prior history with site
- **Customization**
  - Ability to change the product to better fit the needs of the customer
- **Cookies**
  - Primary method to achieve personalization

The Information Policy Set

- **Privacy policy**
  - Set of public statements declaring how site will treat customers' personal information that is gathered by site
- **Accessibility rules**
  - Set of design objectives that ensure disabled users can affectively access site

Designing for Accessibility

- **Why might some merchants be reluctant to make their Web sites accessible to disabled Americans?**
- **How can Web sites be made more accessible?**
- **Should all Web sites be required by law to provide "equivalent alternatives" for visual and sound content?**
- **What additional accessibility problems do mobile devices pose?**

Developing a Mobile Website and Building Mobile Applications

Developing a Mobile Web Site and Building Mobile Applications

- **Three types of m-commerce software**
  - Mobile Web site
    - Responsive Web design
  - Mobile Web app built for a mobile web browser of a smart device (phone, tablet)
  - Native app designed specifically for mobile device
- **Planning and building mobile presence**
  - Use systems analysis/design to identify unique and specific business objectives

Developing a Mobile Web Presence

- **Design considerations**
  - Platform constraints: Smartphone/tablet
- **Performance and cost**
  - Mobile Web site:
    - Least expensive
  - Mobile app:
    - Can utilize browser API
  - Native app:
    - Most expensive; requires more programming

Systems Analysis for Mobile

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

TABLE 4.13 UNIQUE FEATURES THAT MUST BE TAKEN INTO ACCOUNT WHEN DESIGNING A MOBILE WEB 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 4.13, Page 231

Building a Mobile Presence

- **What are the key differences between user experience on a Web site and on a mobile device?**
- **Why would a mobile Web site or app from the same merchant need different content or functionality?**
- **In which cases would a merchant want to develop a mobile app over a mobile Web site?**

Thank You!