10.1 Successful Large-Scale Project Development

Large-scale projects are not completed by only one or two individuals. They are created by a group of people working together as a team. The job roles of project manager, information architect, marketing representative, copywriter, editor, graphic designer, database administrator, network administrator, and Web developer are usually needed for large projects. In smaller companies or smaller organizations each person can wear many hats and juggle his or her job roles. In a smaller-scale project, one of the Web developers may double as the project manager, graphic designer, database administrator, and/or information architect. Job roles necessary for successful projects are discussed in this section.

Project Manager

The **project manager** oversees the Web site development process and coordinates team activities. The project manager creates the project plan and schedule. This individual is accountable for reaching project milestones and producing results. Excellent organizational, managerial, and communication skills are required.

Information Architect

The **information architect** clarifies the mission and goals of the site, assists in determining the functionality of the site, and is instrumental in defining the site organization, navigation, and labeling. Web developers and/or the project manager sometimes take on this role themselves.

Marketing Representative

The **marketing representative** handles the organization's marketing plan and goals. The marketing representative works with the Web designers to create a **Web presence**, or look and feel, that aligns with the marketing goals of the organization. The marketing representative also helps to coordinate the Web site with other media used for marketing, such as print, radio, and television marketing.

Copywriter and Editor

The **copywriter** prepares and evaluates copy. When material from existing brochures, newsletters, and white papers will be used on the Web site, it must be repurposed or reworked for the Web media. The content manager or **editor** may work with the copywriter to check the text for correct grammar and consistency.

Content Manager

The **content manager** participates in the strategic and creative development and enhancements of the Web site. He or she oversees changes in content. The skill set of a successful content manager includes editing, copywriting, marketing, technology, and communication. The person in this dynamic job role must be able to facilitate change.

methodologies have their roots in the System Development Life Cycle (SDLC), a process that has been used for several decades to build large-scale information systems. The SDLC comprises a set of phases, sometimes called steps or stages. Each phase is usually completed before beginning the activities in the next phase. The basic phases of the standard SDLC (see Figure 10.1) are systems investigation, systems analysis, systems design, systems implementation, and maintenance.

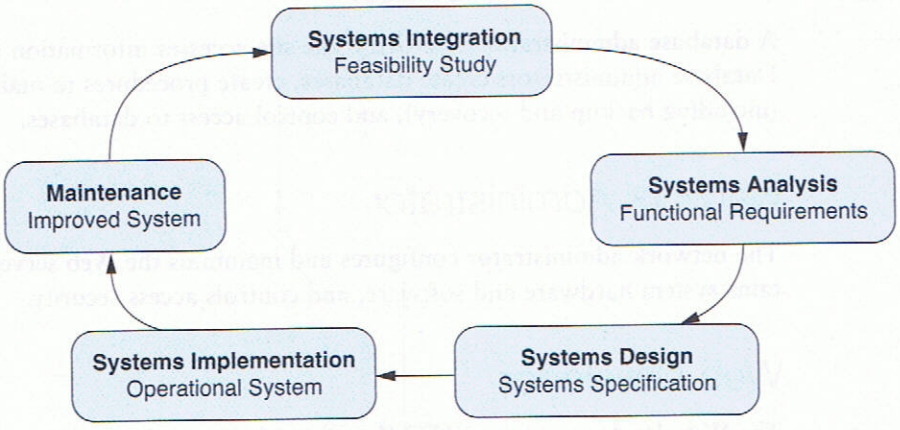

Figure 10.1
The System Development Life Cycle (SDLC)

Web sites are often developed using a variation of the SDLC that is modified to apply to Web projects. Large companies and Web design firms usually create their own special methodology for use on projects. The Web Site Development Cycle is a guide to successful Web project management. Depending on the scope and complexity of a particular project, some steps can be completed in a single meeting; other steps can take weeks or months.

The Web Site Development Cycle, shown in Figure 10.2, usually consists of the following steps: Conceptualization, Analysis, Design, Production, Testing, Launch, Maintenance, and Evaluation.

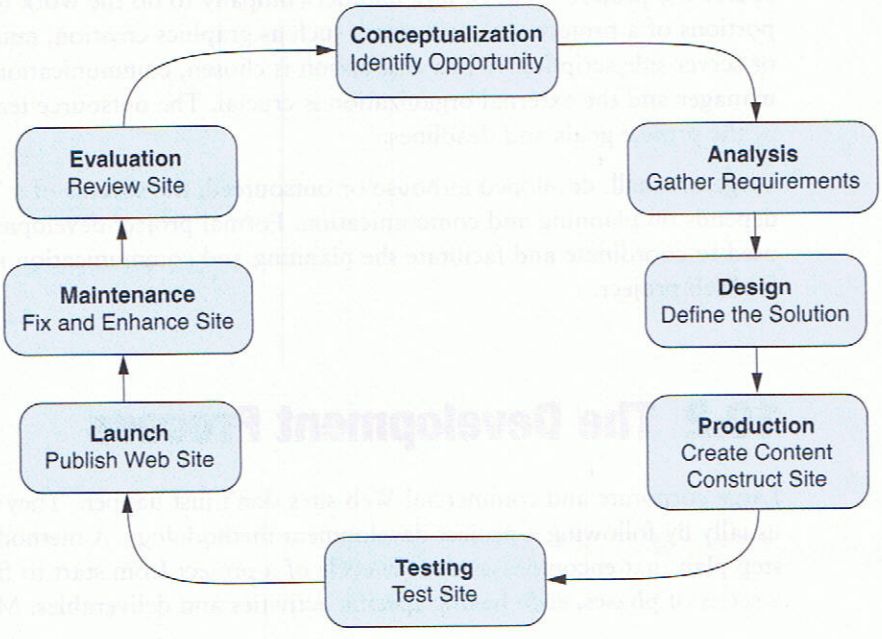

Figure 10.2
The Web Site Development Cycle

Analysis

The Analysis phase involves meetings and interviews with key client personnel. **Analysis** is usually completed by the project manager, information architect or other analyst, and the client's marketing representative and related personnel. The network administrator and database administrator may be interviewed depending on the scope of the project. Common tasks completed during the Analysis phase follow:

- **Determine Information Topics.** Organize the information to be presented on the site into categories and create a hierarchy. These **information topics** will be used later as a starting point for developing the site navigation.
- **Determine Functionality Requirements.** State what the site will do, not how it will do it. For example, state "the site will accept credit card orders from customers," not "the site will perform order processing using Active Server Pages to look up each price and sales tax information in Oracle databases and use real-time credit card verification supplied by somewebsite.com." Note the difference in the level of detail of these **functionality requirements**.
- **Determine Environmental Requirements.** What **environmental requirements**, such as hardware, operating system, memory capacity, screen resolution, and bandwidth will your site visitors be using? What type of hardware and software requirements will the Web server need? (See Section 10.3 Web Hosting and Section 10.4 Choosing a Virtual Host for help with this question.)
- **Determine Content Requirements.** Does content already exist in another format—brochures, catalogs, white papers? Determine who is responsible for creating and repurposing content for the site. Does the client company or marketing department have any **content requirements** that must be met? For example, is there a specific look and feel or corporate branding component that must be present on the site?
- **Compare the Old Approach to the New Approach.** Perhaps you are not creating a new Web site, but modifying an existing one. What benefits or added value will the new version provide?
- **Review Your Competitors' Sites.** A careful review of your competitors' Web presence will help you design a site that will stand out from the crowd and be more appealing to your shared customer base. Note the good and bad components of these sites.
- **Estimate Costs.** Create an estimate of the costs and time involved to create the site. A formal project plan is often created or modified at this point. Often, an application such as Microsoft Project is used to estimate costs and plan project schedules.
- **Do a Cost/Benefit Analysis.** Create a document that compares the costs and benefits of the site. Measurable benefits are the most useful and most appealing to clients. In a formal project environment, a document that details the results of this **cost/benefit analysis** must be approved by the client before the team can proceed.

Design

Once everyone knows what is needed, it is time to determine how it can be accomplished. The Design phase involves meetings and interviews with key client personnel. **Design** tasks are usually completed by the project manager, information architect or

Production

During **production** all the previous work comes together (hopefully) in a usable and effective Web site. During the Production phase, the Web developers are on the critical path—their work must be done as scheduled or the project will be late. The other project members are consulted as needed for clarification and approval. Common tasks of the Production phase follow:

- **Choose a Web Authoring Tool.** The use of a Web authoring tool such as Adobe Dreamweaver or Microsoft Expression Web can greatly increase productivity. Specific productivity aids include designer notes, page templates, task management, and Web page check-in and check-out to avoid overlapping page updates. The use of an authoring tool will serve to standardize the XHTML used in the project pages. Any standards related to indentation, comments, and so on should be determined at this time.
- **Organize Your Site Files.** Consider placing images and media in their own folder. Also, place server-side scripts in a separate folder. Determine naming conventions for Web pages, images, and media.
- **Develop and Individually Test Components.** During this task the graphic designers and Web developers create and individually test their contributions to the site. As the images, Web pages, and server-side scripting are developed, they are individually tested. This is called **unit testing**. On some projects, a senior Web developer or the project manager will review the components for quality and standards compliance.

Once all components have been created and unit tested, it's time to put them together and begin the Testing phase.

Testing

The components should be published to a test Web server. This test Web server should have the same operating system and Web server software that the production (actual) Web server will be using. Some common site **testing** considerations follow:

- **Test on Different Browsers and Browser Versions.** Many Web pages look fine on Internet Explorer but will not even display on Netscape Navigator. It is very important to test your pages on commonly used browsers and versions of those browsers.
- **Test with Different Screen Resolutions.** Although as a Web developer, you may use a very high screen resolution, not everyone uses 1600×1200 screen resolution. The most commonly used screen resolutions at the time of this writing are 1024×768, 1280×1024, and 800×600. Be sure to test your Web pages on various resolutions—you might be surprised at the results.
- **Test Using Different Bandwidths.** If you live and work in a metropolitan area, everyone you know may have broadband access to the Internet. However, many people still use dial-up connections to access the Web. It is important to test your site on both slow and fast connections. Images that look great over your school's T3 line may load very slowly over a 56K modem.

Automated Testing Tools and Validators. The Web authoring tool your project is using will have some built-in site reporting and testing features. Web authoring applications such as Adobe Dreamweaver and Microsoft Expression Web provide functions such as spell checks, link checks, and load time calculations. Each application has unique features. Dreamweaver's reporting includes link checking, accessibility, and code validation. There are other **automated testing** tools and **validators** available. Some are free, such as the W3C Validator and HTML Tidy. The W3C Validator (http://validator.w3.org) can be used to validate both HTML and XHTML. HTML Tidy (http://sourceforge.net/projects/tidy) will convert an HTML page to an XHTML page—correcting the tag syntax and replacing font tags with formatting using Cascading Style Sheets. An online version of HTML Tidy is available at http://valet.htmlhelp.com/tidy. Other testing tools that offer additional features such as page load time and broken-link checking are available from http://www.netmechanic.com/ and others. See http://www.softwareqatest.com/qatweb1.html for a partial list.

In addition to validating HTML and testing for broken links, consider using a tool such as HP Runner to load-test the Web server. The scope and complexity of your site will determine the amount of testing needed. For a simple site, validation and link checking will probably suffice. Other types of sites will benefit from more rigorous testing.

Focus on Accessibility

Accessibility Testing. In the design and coding process your team should have followed recommended techniques to provide accessibility. In fact, if your Web site will be used by an agency of the federal government, you are required to do so by law (Section 508 of the Rehabilitation Act). State governments have also begun to legislate accessibility requirements. For example, the recently passed Illinois Information Technology Act requires Illinois state agencies and universities to ensure that their information technology (including Web sites) is accessible. Prove your compliance by performing **accessibility testing** on your site. There are a variety of accessibility checkers available. Adobe Dreamweaver includes a built-in accessibility checker. Visit http://firefox.cita.uiuc.edu/ to download an accessibility extension for the FireFox browser. Popular online accessibility tests include Watchfire's WebXACT (http://webxact.watchfire.com) and Cynthia Says (http://www.cynthiasays.com).

Usability Testing. Testing how actual Web page visitors use a Web site is called usability testing. It can be conducted at any phase of a Web site's development and is often performed more than once. A usability test is conducted by asking users to complete tasks on a Web site, such as placing an order, looking up the phone number of a company, or finding a product. The exact tasks will vary depending on the Web site being tested. The users are monitored while they try to perform these tasks. They are asked to think out loud about their doubts and hesitations. The results are recorded (often on video tape) and discussed with the Web design team. Often changes are made to the navigation and page layouts based on these tests. Complete Hands-On Exercise 6 at the end of this chapter and perform a small-scale usability test to become more familiar with this technique.

If usability testing is done early in the development phase of a Web site, it may use the paper page layouts and site map. If the Web development team is struggling with a design issue, sometimes a usability test can help to determine which design idea is the better choice.

10.3 Web Hosting

Where is the appropriate place for your Web project to "live"? Choosing the most appropriate **Web host** provider for your business or client could be one of the most important decisions you make. A good Web hosting service will provide a robust, reliable home for your Web site. A poor Web hosting service will be the source of problems and complaints. Which would you prefer?

Web Host Providers

The types of Web host providers range from local ISPs who have some empty space on their servers and Web developers who host sites on the side, to local hosting companies and national companies that guarantee 99.999 percent uptime. Understandably, the fees and the level of service are different. What does your business or client need? This section looks at needs of various size businesses.

One word of caution: Never consider using a "free" Web host provider for a business site. These free sites are great for kids, college students, and hobbyists, but they are unprofessional. The last thing you or your client wants is to be perceived as unprofessional or not serious about the business at hand.

As you consider different Web host providers, be sure to check references. Also, try contacting their support phone numbers and e-mail addresses to determine just how responsive they really are. It is common for Web host providers to charge a setup fee in addition to the monthly hosting fee. Hosting fees vary widely. The cheapest hosting provider is not necessarily the one to use. Word of mouth, Web searches, the local phone directory, and online directories such as http://webhosts.thelist.com/business are all resources in your quest for the perfect Web host provider.

Hosting Needs

Small- to Medium-Size Web Site. Suggested requirements include unlimited data transfer, 60MB or more of hard disk space, e-mail, and support of server-side scripting such as ASP or PHP. This type of hosting is usually **virtual hosting**. The Web host provider's server is divided into a number of virtual domains, and multiple Web sites are set up on the same computer.

Keep in mind that over time your Web site will grow and your processing needs will increase. Do you have access to your Web site log or will automatic reporting be included? Does the Web host provider offer an e-commerce package that you can use when you are ready? Does it offer CGI or database support? You may not need these technologies now, but keep your options open for the future. Moving a site from one Web host provider to another is not always an easy process. Choose a Web host provider that most likely will meet your future needs as well as your present needs.

Also consider the operating system and Web server application that your host offers. The UNIX operating system running an Apache Web server is quite common and very efficient. However, if the skill set of your organization is mainly Microsoft technologies, your staff will be more comfortable and more productive with a Web host that offers a Microsoft operating system running Internet Information Server as the Web server.

Large, national Web host providers can supply dedicated T1 or T3 Internet access, 24/7 support, network utilization statistics and log access, hardware and media redundancy, and the ability to cluster Web servers, support Web farms, e-commerce, and streaming media delivery. A **Service-Level Agreement** (SLA) that details the level of support and response time is also usually supplied by large, national Web host providers.

For your Web site—small, medium, or large—selecting the right Web host can be crucial to its success.

10.4 Choosing a Virtual Host

A number of factors to consider when choosing a Web host, including bandwidth, disk storage space, technical support, and the availability of e-commerce packages have been discussed. For a handy list of these factors and others to consider in your quest for a virtual Web host, review the Web host checklist shown in Table 10.1.

Table 10.1 Web host checklist

Operating System	❑ UNIX ❑ Linux ❑ Windows	Some Web hosts offer a choice of these platforms. If you need to integrate your Web site with your business systems, choose the same operating system for both.
Web Server	❑ Apache ❑ IIS	These two Web server applications are the most popular. Apache usually runs on a UNIX or Linux operating system. IIS (Internet Information Services) is bundled with selected versions of Microsoft Windows.
Bandwidth	❑ _____ MB or GB ❑ _____ Charge for overage	Some Web hosts carefully monitor your data transfer bandwidth and charge you for overages. While unlimited bandwidth is great, it is not always available. A typical low-traffic Web site varies between 100 and 200MB per month. A medium-traffic site should be okay with about 20GB of data transfer bandwidth per month.
Technical Support	❑ E-mail ❑ Forum ❑ Phone	Review the description of technical support on the Web host's site. Is it available 24 hours a day, seven days a week? E-mail or phone a question to test it. If the organization is not responsive to you as a prospective customer, be leery about the availability of its technical support later.
Service Agreement	❑ Uptime guarantee ❑ Automatic monitoring	A Web host that offers an SLA (Service Level Agreement) with an uptime guarantee shows that they value service and reliability. The use of automatic monitoring will inform the Web host technical support staff when a server is not functioning.
Disk Space	❑ _____ MB ❑ _____ GB	Many virtual hosts routinely offer 100MB+ disk storage space. If you have a small site that is not graphic-intensive you may never even use 40MB of disk storage space.
E-mail	❑ _____ Mailboxes	Most virtual hosts offer multiple e-mail mailboxes per site. These can be used to filter messages—customer service, technical support, general inquiries, and so on.

CHAPTER SUMMARY

This chapter introduced the system development life cycle and its application to Web development projects. The job roles related to Web site development and issues related to Web hosting were also discussed.

Visit the textbook Web site at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

Key Terms

accessibility testing
analysis
automated testing
co-located Web server
conceptualization
content manager
content requirements
copywriter
cost/benefit analysis
database administrator
dedicated Web server
design
editor
environmental requirements
evaluation
functionality requirements
graphic designer
information architect
information topics
launch
maintenance
marketing representative
network administrator
phases
production
project manager
Service Level Agreement (SLA)
System Development Life Cycle (SDLC)
test plan
testing
unit testing
usability testing
validators
virtual hosting
Web developer
Web host
Web presence
Web server

Review Questions

Multiple Choice

1. Which of the following should testing a site include?
   a. checking all of the hyperlinks within the site
   b. viewing the site in a variety of Web browsers
   c. viewing the site in a variety of screen resolutions
   d. all of the above
2. Which of the following does the role of an information architect include?
   a. being instrumental in defining the site organization, navigation, and labeling
   b. attending all meetings and collecting all information
   c. managing the project
   d. none of the above
3. Which methodology has long been used to develop information systems?
   a. System Development Life Cycle
   b. Service Delivery Life Cycle
   c. System Development Life Chain
   d. none of the above
4. Which methodology is usually used by Web project teams?
   a. the SDLC
   b. a derivative of the SDLC similar to the one discussed in this chapter
   c. decided on as the project is built
   d. no development methodology is necessary

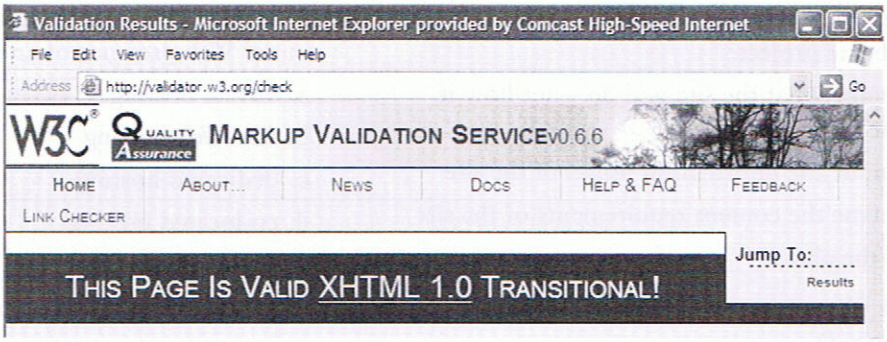

Figure 10.5
Message indicating that the Web page has passed the validation

This page also provides you with some code and an image to display to tell the world that your page validated. Print the browser view of this page to hand in to your instructor.

You can also validate pages directly from the Web. Try validating the W3C's home page at http://w3.org, Yahoo! at http://yahoo.com, and your school's home page. Visit http://validator.w3.org and notice the Validate by URL area. Enter the URL of the Web page you would like to validate in the Address text box. Click the Check button. View the results. Experiment with the character encoding and `doctype` options. The W3C's page should pass the validation. Don't worry if the other pages do not validate. Validation is not required for Web pages. However, Web pages that pass the validation should display well in most browsers. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

2. The Cynthia Says site offers free accessibility testing at http://www.cynthiasays.com for your choice of Section 508 and WAI priority levels. Visit this site and test your school's home page for Section 508 compliance. After the Section 508 accessibility test is run, a report is displayed with categories corresponding to those listed at http://www.access-board.gov/sec508/guide/1194.22.htm. Print the browser view of the results page to hand in to your instructor. Were you surprised at the results? Did you notice that some criteria, such as "Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup," cannot be checked automatically and must be verified manually by a person?

   Next, check the Web page according to the W3C's WCAG Priority 1 accessibility criteria. Run the test again and select the WCAG – Priority 1 criteria. After the test is complete, a report is displayed with categories corresponding to those listed at http://www.w3.org/TR/WCAG10/full-checklist.html. Print out the browser view of the results page to hand in to your instructor.

   Generally, it is easier to pass Section 508 validation than the WCAG criteria. Why do you think this is so? (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

3. Watchfire offers a free WebXACT testing application at http://webxact.watchfire.com. Visit this site and test your school's home page. After the test is run, a report is displayed that shows the level of W3C WCAG compliance. In addition, information such as files size, download time, broken links, and so on is provided. Print out the browser view of the results page to hand in to your instructor. (*Note*: If you have

7. See the description of usability testing in Hands-On Exercise 6. In a small group of students, perform usability tests on two similar Web sites, such as the following:
   - http://bn.com and http://powells.com
   - http://accuweather.com and http://rainmaker.wunderground.com
   - http://running.com and http://www.coolrunning.com

   Decide on three scenarios. List them. Decide who will be the "users," the tester, and the observer. Follow the steps listed in Hands-On Exercise 6.
8. Pretend that you are on a job interview. Choose a role on a Web project team that interests you. In three to four sentences, describe why you would be an excellent addition to a Web development team in that role.

Web Research

1. This chapter discussed options for hosting Web sites. In this research exercise you will search for Web host providers and report on three that meet the following criteria:
   - Support PHP and MySQL
   - Offer e-commerce capabilities
   - Provide at least 50MB hard disk space

   Use your favorite search engine to find Web host providers or visit Web host directories such as http://webhosts.thelist.com/business.php and http://www.hostindex.com. Create a Web page that presents your findings. Include links to your three Web host providers. Your Web page should include a table of information such as set-up fees, monthly fees, domain name registration costs, amount of hard disk space, type of e-commerce package, and cost of e-commerce package. Use color and graphics appropriately on your Web page. Place your name and e-mail address at the bottom of your Web page. Print both the source code (from Notepad) and the browser view of your Web page.
2. This chapter discussed the different job functions that are needed to develop large Web sites. Choose a job role that interests you. Search for information about available jobs in your geographical area. Search for technology jobs with your favorite search engine or visit a job site such as http://monster.com, http://dice.com, http://hotjobs.com, or http://careerbuilder.com and search for your desired location and job type. Find three possible job positions that interest you and report on them. Create a Web page that includes a brief description of the job role you have chosen, a description of the three available positions, a description of the types of experience and/or educational background required for the job positions, and the salary range (if available). Organize your findings in a table. Use color and graphics appropriately on your Web page. Place your name and e-mail address at the bottom of your Web page. Print both the source code (from Notepad) and the browser view of your Web page.

Focus on Web Design

The U.S. Department of Health and Human Services offers a free online PDF book, *Research-Based Web Design & Usability Guidelines*, at http://www.usability.gov/pdfs/guidelines.html with PDF downloads for each chapter. The book suggests guidelines for