

Thinking It Through

A practical guide for planning a successful
Web site, for publishing, marketing, and
new media professionals

By Informing Arts

For Apple Computer, Inc.
Publishing & New Media Markets Group

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Preface

Why this white paper?

The purpose of this white paper is to provide publishing and new media professionals with an inspiring but practical guide to planning, designing, and building a successful World Wide Web site using Apple® and third-party tools.

Why, you may ask, another guide to cyberspace? Isn't there enough information out there already? Huge new sections in bookstores sag under tomes on HTML tagging. Magazine stands bulge with Internet publications flaunting psychedelic covers. Direct mailings for Web seminars, conferences, and workshops overflow in-baskets—and wastebaskets.

Yet despite this cornucopia of information, there's little that specifically addresses the needs of creative, production, and business people in the publishing and new media industries. Nor is there much that describes how technology can serve business, instead of the other way around.

And many of these resources, no matter what their intent, foster anxiety rather than inspire confidence: in emphasizing the Internet's novelty, they exaggerate both its mystery and its complexity. Fundamentally, the Internet is simply a newly popularized medium for communicating and distributing information. This is a world that publishers already understand, and better than anyone else: after all, communicating and distributing information is your business.

Companies are stampeding onto the Internet impelled—not by wise gambling instincts—but by fear. They set up a Web site because they feel they have to, and because everyone else is. Many have no clear understanding either of the opportu-

nities or of the risks. Few take the time to really think it through.

We believe the wisest course for publishing and new media companies—now—is to launch an incremental, scaleable Web strategy that balances careful thinking, common sense, and appropriate caution with a willingness to take risks and learn from them. And we also believe you already know more about this business than you may think when browsing a bookstore or a magazine stand—or bushwhacking across the Internet itself.

This guide is intended to provide you with a structured framework for thinking through why and how to set up and maintain a successful Web site. As you'll notice from the table of contents (really a “site map”), it's organized around a series of planning tasks and questions, beginning with *Why do it? How will a Web site serve your business?* We believe that effective commercial Web sites arise from sound business analysis tempered by a spirit of experimentation. We hope to minimize your anxiety, inspire your confidence, and foster your wise gambling instincts.

Why Apple and the Internet?

We hope this guide will help *anyone* who wants to establish an effective presence on the World Wide Web. But we've written it especially for current and prospective Apple publishing, marketing, and new media customers. This is not just because Apple's co-sponsoring this paper. It's because we're convinced that Apple is uniquely well-suited to provide tools and technology for authoring and serving creative content on the Internet.

Why Apple and the Internet? The ultimate promise of the Internet lies in enabling people to communicate, collaborate, and create using digital media in new and powerful ways. What's the greatest obstacle to this promise? The Internet's overwhelming complexity. What better opportunity for Apple Computer, its third-party developers, and its customers? Meeting these challenges:

- supporting communication,
- enabling collaboration,
- fostering creativity,
- integrating media,
- making technology accessible, and
- simplifying complexity

... is precisely where the Macintosh® community has always excelled.

Based on our professional experience in the publishing and new media industries, we believe Apple provides a superior set of “whole product” solutions for *creating, delivering, and accessing media-rich content*. Apple computers (including the Macintosh, Newton®, and Pippin™ platforms), the Mac™ OS, and the hundreds of applications that they support, offer the best combination of built-in cross-media capabilities, ease of use, and power available today. And by providing a hugely successful, truly platform-independent distribution channel, the Internet extends the reach of Macintosh-based creative development to any computer system anywhere.

As a strategic business investment for would-be Web publishers in the media business, the Macintosh has rivals—but no peers. For more information on Apple's Internet strategy refer to page 12.

Why us?

We've participated for over ten years in the convergence of the publishing, computer, and, most recently, communications industries.

Where have we been? On the high-tech side of the publishing industry since the earliest days of desktop publishing (and before). At Apple, Agfa,

Aldus, Hewlett-Packard, Scitex, and on our own.

What have we done? In functions ranging from product and marketing management, to consulting, to training, to writing, to designing—we integrate, interpret, organize, and clarify information about the creative and business applications of technology. We're communicators, not technologists.

Our customers, clients, audience, and trainees? Creative, production, and business people from the publishing and new media industries.

Hatsy Thompson is a Seattle-based freelance writer who has performed marketing and product development roles at Aldus, Scitex, and Agfa. As a consultant in the late 80s, she helped companies such as Simon & Schuster make the transition from traditional to electronic publishing.

Christine Thompson has worked for over twenty years in product development, marketing, and sales at companies such as Apple, Hewlett-Packard, Aldus, and VisiCorp. At Apple in the 1980s, she's credited with building the foundation for Apple's worldwide publishing business. She currently runs a Seattle-based strategic marketing consulting firm called Informing Arts.

Jane McLaughlin has spent fifteen years in the computer industry as a specialist in communications and information design. In the 1980s, she spent several years at Apple managing marketing activities that helped launch the Macintosh in the publishing and business worlds. She and her husband currently run an Olympia, Washington-based multimedia firm called JRA Interactive.

Why is this white paper already out of date?

Ironically, the Internet itself is the only medium fluid enough to keep pace with the breathtaking speed of its own evolution. Even if the ink on this page is still slightly tacky as you read it, some of the information printed here is obsolete. For the most up-to-date information, visit Apple's Web site at <http://www.apple.com>, as well as other Web sites

1. What is the Internet? What is the Web?

The Internet can be explored on many levels, ranging from the purely physical to the philosophical. Far from its origins as a defense communication technology capable of withstanding war, the Internet has become a sprawling, vital, democratic social force.

Within the Internet, the World Wide Web itself has sprung up like an outpost on a major trading route, a thriving marketplace of ideas and commerce. As you “approach” the Web through cyberspace, the crowds thicken, the hubbub of voices swells, the energy rises. With so many people making so many new connections—with new ideas and new people—the world will never be quite the same.

Before descending into pragmatics, let’s briefly explore the Web in the following ways, as . . .

- A mass communication medium
- A distribution channel
- A vehicle for collaboration
- An arena for new business opportunities

The Web as a mass communication medium

As a mass communication medium, the Web shares many attributes of other mass media—and social institutions.

Like a book or a magazine, a Web site can

deliver timely, focused information shaped by a particular editorial point of view and the traditions of a particular genre, to a particular audience.

Like a CD-ROM, a Web site can combine a variety of media in a single “document” to provide information and entertainment rich with music, voices, moving images, and interactive experiences. Text, graphics, video, sound, animation, and hyperlinked navigation can each be used for what it does best.

Like a radio, a Web site can deliver time-critical information “hot off the press.” Web pages can be updated moment-to-moment with breaking news, stock prices, and sports scores.

Like the telephone, Internet-based e-mail enables you to communicate immediately, directly, and personally. Less intrusive than the telephone but more immediate than the letter, e-mail is resurrecting old connections and fostering new ones at astonishing rates. (At the same time, Internet-based telephony is moving from the laboratory into the marketplace.)

Like a library, a Web site can offer information to a broad audience at relatively low cost. The easy access provided by the Internet enables people to pursue interests and develop knowledge they might not otherwise have the time or money to indulge.

Like an opinion poll or a focus group, a Web site with interactive features can solicit feedback on anything from voting intentions to product design. Publishers and marketers can learn about their audience, as individuals and groups, in real time.

Like a park bench, a Web site can foster a “community of interest.” Visitors can join on-going conversations about everything from marketing on the Web to fly fishing in the Adirondacks. Some sites even provide “graffiti walls,” where people can post and review pithy thoughts and sometimes subversive commentary.

Like a frontier town, the Web fosters a pioneering and creative (if sometimes lawless) exploration of new possibilities—of “place,” and of social and commercial interactions.

(Paradoxically, given the utterly disembodied landscape of cyberspace, a Web site *does* provide a sense of place. Web lingo reflects this: a Web site is a “place” where people “visit”—not a book they read or a movie they watch.)

Companies that take time to contemplate and explore the unique potential of the Web will be those whose Web sites set much-admired standards.

The Web as a distribution channel

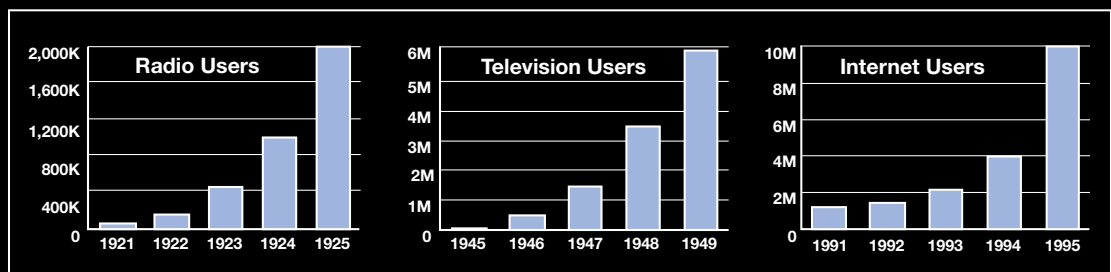
A Web site can provide on-demand information for nearly any business application—24 hours a day, 365 days a year. And for some companies, a Web site can deliver not only information but actual products: fonts, stock photographs, research

How big is the opportunity and how fast is it growing?

The Internet is following a familiar pattern for adoption of a new mass medium. Looking at history, says Rob Glaser, President and CEO of Progressive Networks, Inc. (makers of Real Audio), we see that roughly twenty years elapses between technical feasibility and commercial viability. During this period, development occurs gradually and largely out of public awareness. Once commercial viability is achieved, however, business models get worked out relatively quickly, followed by widespread adoption. What once seemed an improbable novelty becomes a ubiquitous mass medium.

To provide the flavor of historical perspective, Glaser repeats a 1921 quote from Secretary of Commerce Herbert Hoover, “The American people,” Hoover opined, “will never stand for advertising on the radio.” Whether or not purists approve, commercial arrangements that early Internet pioneers may find equally improbable are inevitable and imminent.

So just how big is the opportunity? Tallying Internet users is big business these days. How to define an Internet user (someone who sends e-mail? uses a Web browser? spends five hours weekly on-line?) and what to count (computers? people? file transfers?) are hot topics of discussion.



If radio and TV are any predictors, we're nearing the end of the typical gestation period when a new mass media technology suddenly flourishes.

reports, and other digital material can now be widely purchased—and delivered—on the Web.

The Web as a vehicle for collaboration

The Internet can serve as an “off-the-shelf” wide area network, facilitating collaboration by enabling file transfer and video conferencing. Service-oriented businesses, such as design firms and production houses, can build a Web site that functions as a shared file server on which each client has their own folder. And on-line surveys, discussion groups, and chat forums enable publishers and marketers to involve readers and customers as partners in guiding editorial direction or product development.

The Web as an arena for new business opportunities

New business opportunities are too numerous to explore in real depth in a document this concise. Instead, since no one is better-suited than you to determine the best fit between Web-based opportunities and your particular business goals, we'll invite you to draw on your own resources.

First of all, ask yourself, *What compelling needs and objectives does our business have that a Web site might meet—better than the alternatives?*

This question encourages practical, goal-oriented thinking within known boundaries. For example, can a Web site generate leads to help you meet your current sales target? Can a Web site provide detailed information to prospects in ways that you can't afford to do now?

Not surprisingly, different surveys draw different conclusions. CyberAtlas, an Internet research Web site (<http://www.cyberatlas.com>), provides a summary of the current Internet usage estimates. They include an October 1995 Nielsen estimate of 23 million North Americans 16 years or older who'd used the Web during the previous three months, a January 1996 FIND/SVP estimate of 9.5 million people in the United States who use any Internet service except e-mail, and a May 1996 International Data Corp. estimate of 23 million worldwide Web users.

More compelling than the number of Internet users at any single moment is the rate at which that number is growing. The FIND/SVP survey reports that nearly half the people using the Internet in January 1996 used it for the first time in 1995. The NPD Group, Inc.'s most recent poll found four times more US households reporting home-based Web usage home than six months earlier. The Internet Society believes 120 million computers, up from today's 9.5 million, will be connected to the Internet by the year 2000. They will afford Internet access to 250 million people (slightly less than the current population of the United States). Morgan Stanley projects a more modest figure of 150 million users.

Whether the projection is 150 million or 250 million users by the end of the century, the Internet is clearly not a passing fad.

While census totals vary, there's little disagreement on today's typical Internet user: a white male in his early 30s earning roughly \$60,000 a year in a technical occupation. (Men currently outnumber women two to one, although the rate at which women are adopting the Internet is increasing dramatically.)

Fortunately or unfortunately, this is probably a pretty typical profile of any early adopter of electronic technology. No doubt the Internet audience will grow more heterogeneous as content quality increases and price of access drops. Products such as Apple's Pippin “Internet appliance” and Newton Personal Digital Assistant (PDA) will liberate Internet users from the desktop computer, enabling them to tune in from the family room and anywhere else they choose to carry their mobile communication devices.

Our conclusion? Ubiquitous access to people and information will slowly transform our lives. The Internet, in some form or other, is here to stay. And the time to start shaping its (and our) future is now.

Secondly, ask yourself, *What opportunities—beyond, or apart from, our current stated business goals—might a Web site offer?*

This question encourages speculative, inventive thinking that responds to new possibilities rather than current requirements. For example, could a Web site create a “community of interest” among your customers that would reduce your customer

support costs? Could a Web site provide a dialogue with your editors so they can adapt their editorial coverage to the changing interests of your readers? Could you host interactive events between your leading advertisers and your subscribers? Could you adapt materials from your archives and deliver them profitably as new products from your Web site?

What is the Internet? Nuts and bolts and acronyms

No reference on the Internet would be complete without at least one page peppered generously with acronyms. While we’ve tried to keep acronyms to a minimum in this guide, we can’t avoid them altogether. Here we offer a simple overview of the technical structure of the Internet, along with brief explanations of some of the more commonly used technical terms. Acronyms in this context are unavoidable.

On a physical level, the Internet is simply a vast network of networks, a set of physical connections and linguistic conventions that enables virtually any computer anywhere—no matter what its “native language”—to talk to any other computer.

Physically, the Internet is **connections** between...

network nodes, such as...computer systems and networking hardware such as routers and gateways. Each network node is identified by a unique Internet Protocol (IP) address, the equivalent of a mailing address or phone number.

and...

network interfaces, such as...modems, ISDN connections,

and...

high-speed **communication links** comprising the Internet “backbone,” such as...ATM, T1 lines, and satellite and microwave circuits.

Logically, it’s **communication protocols** and other conventions that establish the rules of conversation between network nodes, such as...

TCP/IP Transmission Control Protocol/Internet Protocol describes rules for packaging and transferring data across the Internet. TCP/IP also refers to the software running on both clients and servers that handle these functions.

and...

DNS The Domain Name System is a service that maintains the unique address(es) of each Internet node, and translates numeric identifications into “user friendly” addresses. The Internet equivalent of Directory Assistance.

The Internet also includes **Internet applications** that operate over the physical connections using the communication protocols. Internet applications include electronic mail, file transfer (FTP), network news, “chat” messages for written “conversations,” bulletin boards, “gopher” search systems, etc. Most of these Internet applications transfer simple text-based information.

The greatest growth and interest in the Internet has arisen rapidly in the last few years from the introduction of the...

World Wide Web A system of combining text, hypertext links, graphics, and other media-rich information in a format understandable by any computer system. As the Web’s popularity has grown, many of the other, earlier Internet applications, such as e-mail, have been incorporated and extended by the Web.

The World Wide Web uses a **client/server model**, in which a...

client A computer system and software which requires information from a server to perform its intended function. There are typically many clients for each server.

running a...

browser An application that requests information from a server, and can receive it in a variety of agreed-upon formats, such as a document or a streaming audio broadcast file.

communicates with a...

server A computer running communication protocols and software applications that enable it to provide information to clients. Some have special provisions for security, user authentication, protecting electronic commerce, recording information about clients, etc.

The Web consists of its own protocols, conventions, and file formats, including...

HTTP HyperText Transfer Protocol describes rules for structuring and serving pages on the World Wide Web.

and...

HTML HyperText Markup Language. A document structuring language comprised of tags for formatting text and other media types, and for creating hyperlinks within and between Web pages. Information tagged with HTML can be viewed through Web browsers.

and...

Web page A document tagged with HTML that can contain text, graphics, additional media types, and hyperlinks to other Web pages.

and...

URL Uniform Resource Locator. An address that defines the location of computers serving as clients and servers, as well as files contained on those computers. See diagram below.

And it's **formats and standards**, conventions for describing different kinds of data, **and programming languages and technologies** that were either developed explicitly for the Web or have found new applications on it, such as those described below (Apple technologies are described on page 12).

GIF Graphic Interchange Format. A compressed graphic file format for all types of images, supported by HTML.

Java Sun Microsystems' cross-platform programming language, which enables programmers to write "applets," small applications that are downloaded from the Internet to the client computer, where they can perform a variety of interactive functions.

JPEG Joint Photographic Experts Group. A highly compressed file format for photographic images, supported by HTML.

Macromedia Shockwave A cross-platform multimedia file format that can be generated with Macromedia's Afterburner application from any of Macromedia's authoring applications, including Director, Freehand, and Authorware. Requires a Shockwave browser plug-in for viewing.

PDF Portable Document Format. Adobe's cross-platform format for describing electronic documents. A PDF file can be generated using Adobe Acrobat from any word-processing, page layout, or graphics application.

VRML Virtual Reality Modelling Language, a cross-platform, industry-standard language for describing three-dimensional scenes or "worlds."

http:	//	www.domainname.com	/	folder or directory name	/	documentname.html
Internet protocol required to transfer the requested information		server's IP address		file folder or directory on server		file name and file-type suffix

Apple and the Internet: Creating, Delivering, and Accessing Media-Rich Content

Just as the Macintosh enabled the desktop publishing revolution that put affordable tools in the hands of hundreds of thousands of would-be communicators, so Apple hopes to foster the adoption and evolution of the World Wide Web as the next great forum for the democratic exchange of ideas and information. Apple intends to define for the Internet the same media-rich experience that has made Macintosh the platform of choice for creating, learning, and communicating.

In recent statements, Apple has described a strategy for helping the Internet evolve towards greater simplicity and usefulness. Apple has said it will focus on these key objectives:

Enabling access

All hardware products, whether based on Macintosh, Newton, or Pippin technology, will ship “Internet-ready” out of the box. This means not only plug-and-play Internet connectivity built in to the Mac OS, but also software tools that enable people to customize their Internet environment and integrate Internet access into their daily computing activities. Apple currently offers three options for getting connected:

- America Online software for Internet access ships with all new models of Performa, Power Macintosh, and PowerBook computers in North America. For people relatively new to using computers who prefer a solution that manages the experience for them.

- The Apple Internet Connection Kit, a retail software product, includes Netscape Navigator and other software tools for simplifying and enhancing Internet access. For seasoned computer users who want a direct connection to the Internet through an ISP (Internet Service Provider).
- Cyberdog is an easy-to-use suite of tools that provides a range of Internet services and is freely downloadable from Apple’s Web site. For experienced Internet users who wish to customize their Internet environment.

Apple will continue these and other efforts to simplify, demystify, and enrich the experience of getting and staying wired.

Facilitating creation

Already the number-one choice of people engaged in content creation for publishing and multimedia, the Macintosh promises similar appeal for Internet content developers. With built-in support for multimedia playback through the QuickTime Media Layer (QTML), the Mac OS will continue to support evolving industry standards for Internet activities such as HTML editing and Java dynamic page creation. Apple also intends to work closely with third-party development partners to develop solutions that take full advantage of the Internet’s potential.

Supporting delivery

Apple has already demonstrated its ability to support delivery by providing two well-designed lines of Web servers. For people who prize Macintosh ease of use, Mac-based Apple Internet Servers offer a fast-start, low-cost solution. For people who need the ultimate in performance, UNIX-based Apple Network Servers can handle the demands of the most heavily trafficked sites. Apple Web servers have proven reliable and cost-effective solutions for hundreds of thousands of Web sites worldwide.

Future directions for Apple Internet delivery include fast, context-sensitive search engines for Apple Internet servers, as well as “personal Internet services” that enable virtually anyone to create and deliver Internet content.

Contributing open, cross-platform technology

As part of its commitment to facilitate the accessibility and enrichment of the Internet, Apple is contributing many of its most innovative software technologies, such as QuickTime[®], QuickTime VR, and QuickDraw[™] 3D, as open, cross-platform standards for creating and delivering Internet content (see below). For example, Apple’s three-dimensional objects file format (3DMF) formed the basis for the recently announced VRML 2.0 industry standard for describing virtual “moving worlds.” Many of the technologies and products described below are available, free of charge either to developers or to end users, from Apple’s Web site.

Here are some of the innovative technologies and products with which Apple intends to support Internet access, content creation, and delivery:

QuickTime Media Layer

QuickTime has already become the de facto standard for multimedia content, and is now spreading rapidly throughout the Internet. Simply put, when QuickTime content appears on a Web site, more people visit more often—and stay longer. Long part of the Mac OS, QuickTime ensures built-in capabilities for playing video, animation, and sound on hundreds of thousands of computers worldwide.

The QuickTime Media Layer (QTML) serves as a universal, cross-platform “container” for several individual QuickTime technologies, including:

- **QuickTime (for creating video, sound, and animation)**

In addition to basic QuickTime support for time-based media, Apple has recently introduced a “fast-start” QuickTime movie playback technology, which enables people to begin viewing a movie while it’s still downloading. Creating fast-start movies involves only simple processing using the Apple Internet Movie Tool, and playback requires no special server software.

- **QuickTime VR (QTVR) (for creating interactive, photographic panoramas)**

One of the hottest topics on the Web today is the creation of three-dimensional, interactive virtual reality environments. Apple's virtual reality technology, called QuickTime VR, allows photographic images to be "stitched" into 360-degree panoramic environments, enabling you to test drive a virtual car, tour a virtual hotel, or engage in virtual clothes shopping. You can also embed QuickTime movies and 3D animated "sprites" in QuickTime VR panoramas.

Apple currently provides a QuickTime VR Authoring Tools Suite, as well as a Netscape plug-in that allows QuickTime VR panoramas to be played back directly within the browser window.

- **QuickTime Conferencing (for Internet-based collaboration)**

QuickTime Conferencing turns the Internet into a shared workspace, equipping you to collaborate using video, audio, and/or an electronic whiteboard. Work sessions can be recorded as QuickTime movies for subsequent review.

- **QuickDraw 3D (QD3D) (for creating three-dimensional computer-generated objects)**

QuickDraw 3D integrates three-dimensional graphics capability into the Mac OS, enabling people to create, manipulate, and incorporate three-dimensional graphics into Web pages as easily as two-dimensional graphics. QuickDraw 3D provides a consistent file format and a standard, extensible, cross-platform application programming interface (API) and guide for developers.

- **Apple Speech Technologies (for speech-based interaction with the Internet)**

The Internet offers intriguing new possibilities for Apple's speech synthesis and voice recognition technology, PlainTalk[®]. Tags embedded in HTML files can instruct a PlainTalk-enabled Macintosh to read a file's content aloud, adding speech capabilities to Web pages. And you can use your voice, instead of your mouse, to direct your computer through a maze of Web links and pages. Finally, new technology promises to replace the flat, robotic tones of synthesized voices with realistic, inflected speech: first you type a paragraph, then you read it aloud. The computer studies the intonations of your rendition, and marries them with the text for a much more human reading. For information on PlainTalk-based browser plug-ins, consult www.browserwatch.iworld.com.

The QuickTime Media Layer enables content developers to mix and match these QuickTime components—embedding a three-dimensional object in a QuickTime movie, for example, or "wrapping" a live QuickTime movie around the surface of a three-dimensional object, or playing a QuickTime movie on the wall of a QuickTime VR 360-degree interior panorama.

Not only does QuickTime support innovative content creation, its ubiquity ensures a widespread audience for QuickTime content. Netscape recently announced its intention to include a QuickTime plug-in with every Navigator 3.0 browser (whether Macintosh or Windows)—the only third-party plug-in to be bundled with Navigator. This strategy effectively assures QuickTime content developers an installed base as broad as the universe of Navigator 3.0 (and CyberDog) users, and will go a long way toward achieving Apple's goal of making QuickTime the Internet multimedia standard.

Live Objects™, Cyberdog, and Apple Support for Java

OpenDoc/Live Objects

OpenDoc is a multi-platform technology that is changing the way people create and use software. Instead of large, do-everything software applications, OpenDoc supports the creation of Live Objects, specialized software modules that you can combine to accomplish particular tasks, the same way you might build a custom stereo system from individual components. All Live Object “applets” share a standard interface and work together seamlessly. OpenDoc development is being jointly supported by an alliance of industry leaders, including Apple, IBM, Adobe Systems, and others. CyberDog, Apple’s Internet browsing environment, is one example of using Live Objects to create a flexible, focussed set of software tools.

Cyberdog

Cyberdog is an integrated software suite of Live Objects that gives you easy, intuitive access to Internet resources. Cyberdog’s browser, mail reader, news reader, and Internet address notebook are completely unified, with a single common interface, and offer drag-and-drop control of Internet services. CyberDog works with Java, affording you Java interactivity within the Cyberdog browser.

Cyberdog’s integration with the Mac OS and Macintosh applications makes Internet resources immediately and directly available, turning Internet connectivity into an extension of the desktop.

As Larry Tesler, Apple vice president of Internet platforms, sees it, “Instead of putting everything into the browser, Cyberdog puts the Internet into everything.”

Innovative Internet solutions such as Cyberdog will transform the Internet from a web of daunting complexity to a resource as familiar and as easily

used as people’s current software tools.

Mac OS Runtime for Java

Apple plans to embed Java across a range of Apple products and technologies, including Mac OS, OpenDoc, Cyberdog, HyperCard®, Newton, Pippin, and Apple Web servers. Mac OS Runtime for Java, based on Sun Microsystems’ Java technology which has been licensed by Apple, will be bundled with future versions of the Mac OS, and will make Mac OS desktops and Internet servers Java-enabled. Thus Apple customers will have ready access, both as Internet subscribers and as content creators, to the dynamic, interactive content that Java makes possible.

AppleScript™

AppleScript, Apple’s built-in scripting language, can be used to automate content development workflows, as well as write CGI scripts that enhance and customize Web server functions. In addition, a new Netscape plug-in can embed an AppleScript in an HTML page for downloading and local playback.

Mac OS 8 Graphics

Most of the graphics currently moving across Internet networks today use bitmap technologies that describe images in uneconomical pixel-by-pixel fashion. Because of the amount of data required to render a bitmap image, images must be small or Internet bandwidth must be high. By contrast, vector technology describes images concisely using algorithms that result in smaller file sizes.

Electrifier is a tool based on Apple’s Mac OS 8 graphics technology that will enable users to view large vector graphics and animation in as little as 1k, allowing rapid downloading over the Internet. Such low-bandwidth vector animations can be hundreds of times smaller than equivalent bitmap animations. For more information, visit

<http://www.electrifier.com>.

Web site or resource	Location
Apple Computer, Inc.	http://www.apple.com
Masters of Media	http://masters.media.apple.com
Apple Computer, Inc. Macintosh Software Guide	http://devworld.apple.com/mkt/thirdparty.html
Apple CyberTech Development	http://www.cybertech.apple.com
Apple Internet Products	http://product.info.apple.com/productinfo/datasheets/internetproductsmatrix.html
Apple Internet Solutions	http://www.solutions.apple.com/internet/
Apple Multimedia Program	http://www.amp.apple.com
Apple Publishing and New Media	http://www.media.apple.com
AppleScript & HyperCard	http://www.applescript.com
Cyberdog	http://cyberdog.apple.com
Mac OS and Apple System Software Technologies	http://www.macos.apple.com
Mac OS Runtime for Java	http://www.devtools.apple.com/mrj/
Pippin	http://www.pippin.apple.com
QuickDraw 3D	http://quickdraw3d.apple.com
QuickTime	http://quicktime.apple.com
QuickTime VR	http://qtvr.quicktime.apple.com
White paper: Apple and the Internet: The Macintosh Advantage	http://product.info.apple.com/productinfo/tech/wp/aisswp.html
White paper: Compelling Reasons Why the Apple Internet Server Solution Should be Your Next Web Server	http://www.solutions.apple.com/internet/compell/default.html
White paper: Getting Your Apple Internet Server Online: A Guide to Providing Internet Services	http://product.info.apple.com/productinfo/tech/wp/internetwp.html
White paper: Hot Web Tips for Cool Web Sites	http://www.solutions.apple.com/internet/hottips/default.html
White paper: Why Macintoshes Make the Best Internet Servers	http://www.solutions.apple.com/internet/advantages.html

To find out more about Apple strategies, products, and technologies, visit or consult the following Apple resources.

Web site	Location
AppleScript	http://www.scriptweb.com
BrowserWatch	http://www.browserwatch.iworld.com
Joint Solutions Marketing	http://www.jointsolutions.com
MacInTouch	http://www.macintouch.com
MacUser Web Edition	http://www.zdnet.com/macuser/
MacWorld Online	http://www.macworld.com
Nathan's Everything Macintosh	http://www.hsp.co.jp/~knakahig/mac/NathansEM.html
The Evangelist Web Site	http://www.evangelist.macaddict.com
The Well Connected Mac	http://www.macfaq.com
TidBITS	http://www.tidbits.com

2. Why Do It? Business Analysis and Planning

Few people know much about running a profitable business on the World Wide Web. And how could they? Web-based businesses simply haven't been around long enough for there to be much accumulated wisdom. You can't take an MBA course on "Proven Techniques for Web Entrepreneurs." But all this is simply a matter of time.

First of all, we're all just starting to discover what the Web is really good for (and not good for). How can the Web be used to expand a business? Increase a subscriber base? Grow a market? Build a community? Support customers? Can a Web site educate? Entertain? How effectively, and in what ways? Until we understand, both as users and as business people, what benefits we're deriving and providing, we're operating on hunch instead of fact.

Studies of "early adopters" (to borrow a term from Geoffrey Moore's *Crossing the Chasm*) are beginning to clarify the Internet's appeal and future direction. According to the most recent FIND/SVP American Internet User Survey (<http://etrg.findsup.com>), seventy percent of current Internet users view the Internet as a source of information, sixty-eight percent as a communications tool, fifty-seven percent as an educational resource, and thirty-five percent as a source of

entertainment. The same survey reported that the Internet increasingly serves as a replacement for television and long-distance telephone calls. No doubt these early benchmarks will give way to a richer understanding as Internet technology matures and the Internet community grows more heterogeneous.

Not only are we exploring what the Internet can mean, we're frequently doing it in spite of the technology itself. Bandwidth is narrow, demand is high, and slow, erratic connections are common. Even the content itself is often disappointing once its novelty has worn off. We're all still figuring out how to make it work.

No doubt we will. Relatively low-cost Internet "appliances" such as Apple's Pippin and the Newton PDA will broaden the appeal of the Internet, especially for consumers looking for entertainment. And this in turn will stimulate demand for new varieties of content. "Content providers" and communicators are taking over from technologists, shaping Web site offerings with their expertise on what makes for a good "story."

Telecommunications companies have awoken to the promise of the Internet and are moving quickly to offer access along with basic long-distance phone service. Ease of use, accessibility, and habituation will soon make the Internet an integral

part of the lives of more and more of us. The Internet will no longer be fed chiefly by the enthusiasm of “early adopters” but by the more sustained energy of the “early majority” and those that follow them.

So, given all the uncertainty, what’s a company to do? Our advice? If you want the comfort of a proven formula for success, wait a few years until the path is well-worn by others (and recognize that the price of entry will have risen). But if you’re willing, marry your pioneering spirit to careful business analysis, then take a calculated risk. We assume if you’ve read this far, you consider yourself more of a pioneer.

How will a Web site serve your business? Define your business objectives.

To research this white paper, we spoke to numerous Web designers and design firms. “When people ask for your help,” we wanted to know, “what do they typically say? What do they know—and what don’t they know—about what they need?” What we heard was that companies too often launch a Web site in a burst of enthusiasm or

anxiety. Someone in a position of power says, “We need a Web site.” And so a Web site happens—sometimes at huge expense—just for the sake of it. Then budget season comes round. Because there was no specified goal, there’s no way to evaluate success. Interest falters, the Web site is neglected, dust gathers, visitors stop coming. . . .

As with any new venture, your Web site’s business goals should be carefully thought through, clearly articulated, and, where possible, tied to specific outcomes. Set goals in quantifiable terms, e.g. xx visitors per month, \$xx in on-line sales, or xx new subscribers per month. Only then can you evaluate your success and decide whether to withdraw or commit more resources in the future. Taking risks doesn’t mean abandoning the discipline of business planning.

Careful analysis won’t just help you evaluate whether a Web site makes sense in the first place, it’s critical to your site’s future. After all, if you don’t know why you’re doing it in the first place, how will you know if you’ve succeeded? And if you don’t know whether you’ve succeeded, how can you justify continuing to invest?

Marketing on the Web

Interactive marketing is in its infancy: formulas for success are emerging through trial and error, and the vocabulary for communicating in cyberspace is still evolving. As bandwidth increases and technology supports more expressive and experiential capabilities, the distinction between the World Wide Web’s role as a communications mass medium and a sales channel is blurring. Conventional marketing wisdom and cookie-cutter tactics won’t pay off in the world of cyberspace marketing.

A Web site can serve as a very effective marketing vehicle—as long as you rethink your “tried and true” marketing formulas and make your site an integral component of your overall marketing campaigns, sales

support and customer satisfaction programs. If you’re a savvy interactive marketer, you’ll look at your Web site as an opportunity to evolve from “one size fits all” mass marketing to a more personalized form of relationship marketing, more relevant to the needs, preferences and interests of your customers and prospects. You’ll partner with your associates in sales, product management, and customer service to reinvent your relationship with customers and prospects throughout the sales cycle (and post-sale).

As the following two infographics explain, you can take advantage of your Web site to increase your marketing impact throughout the cycle of acquisition marketing and customer retention.

Customer Acquisition Marketing Tactics

Awareness

Place banner or marquee ads at other related sites

Promote your Web site URL in print ads, TV ads, marketing collateral, product packaging, etc.

Post your Web site's URL in WWW directories and online Yellow Pages

Promote your products and services in directories and interactive catalogs at other sites

Publish your press releases and provide links to bylined stories elsewhere

Interest

Provide deep, detailed online ads that let your prospects control how much information they get, and when

Provide detailed, hyper-linked product literature for onscreen viewing and/or print on demand

Publish an interactive catalog of all your products and services, along with companion products and services

Publish FAQ documents

Provide case studies, testimonials or success stories

Provide automated e-mail for common inquiries

Education

Provide pricing and cost-of-ownership information, configuration details

Publish white papers and reports on related subjects at your site

Provide opportunities for direct interaction with staff experts via e-mail, surveys, etc.

Publish FAQ documents

Provide pointers to users groups or affinity groups or related topics

Host chat sessions and special events where prospects can interact with current customers and your staff members

Trial

Offer trial subscriptions or free product samples

Offer limited-time evaluation copies or introductory services

Provide "guided tours" and animated demos to simulate product usage

Use virtual reality to help prospects visualize your product or service.

Channel Contact

Online promotions

Online, personal direct sales; offer support for electronic commerce

Provide clickable maps and directories to help prospects locate resellers, consultants or post-sale service providers

Cross-sell and upsell at the time of electronic purchase

Merchandise related products and services, from you or third party allies

Provide sales tools to channel partners via protected parts of your Web server

Customer Retention Marketing Tactics

Purchase	Post-sale Honeymoon	Indifference	Renewed Loyalty
Online registration triggers automatic acknowledgement of purchase or subscription	Provide links to additional training and post-sale support products and services	Offer free subscription to online newsletter	Offer trade-ups, upgrades or subscription renewals
Send thank-you fax or e-mail to customer	Provide tech support and FAQ online	Sponsor membership in online user groups	Offer incentives for frequent buying or referrals
Promote extended warranty or other aftermarket services	Provide hyperlinked tips and tricks to increase user's proficiency with product or service	Publicize special online events for customers and subscribers	Cross-sell related products and services
	Provide opportunities to interact via e-mail or chat session with advanced users and staff experts	Publicize company's participation in regional or local events and activities	Survey customers on product likes and dislikes
	Offer membership clubs and/or merchandise accessories	Promote aftermarket books and related services	Seek feedback on new product feature trade-offs
	Create interactive galleries where customers can show off their work	Provide incentives for customers to interact with you and provide feedback	Provide online e-mail hotline to company management
		Explore "best practices" and share the learning	Publish white papers on company's longer range vision and future product directions

How will you pay for it? How much will it cost? Develop budget and cost justification.

A Web site can perform business functions ranging from “overhead” activities, such as marketing and customer service, to revenue-generating activities, such as publishing and product sales. How you cost-justify and budget your site will follow from your overall business intent.

Using a Web site to reduce costs

Cost reduction strategies are relatively easy to understand, implement, and evaluate. Substituting bits for paper can be an excellent place to start, since the cost of paper, printing, warehousing, and distribution consumes the lion’s share of most marketers’ and publishers’ budgets.

Providing on-line versions of printed material can enable you to shorten print runs and thereby save costs. For example, let’s say you typically print 50,000 four-color brochures at \$2 apiece. And let’s assume at least ten percent of your target audience would be willing to read the information on-screen instead of on paper. A ten percent decrease in your print run (5,000 pieces) saves \$10,000, considerably more than cost of an Apple Internet Server Solution that could easily “serve” those 5,000 requests for information—in a single day. Since electronic documents need only a computer from which to be served up, you save the costs of warehousing pallets of printed materials. And since your customers foot the bill for access to your site, you pay no mailing costs to put your information in their hands.

A couple of additional suggestions: Can your Web site solicit feedback that enables you to target your printed material more effectively and thereby reduce printing and distribution costs? Can your Web site enable customers to serve themselves? For example, both Federal Express and UPS now enable customers to track their own packages on-line, and some hotels and airlines equip travelers to make their own reservations.

Using a Web site to generate revenue

Revenue strategies are the furthest frontier of the Internet. While more and more companies are devising business models that turn a Web site into a profit center, two significant obstacles remain. First, the Web was incubated within the Internet’s tradition of free access, a tradition which many people have been reluctant to relinquish. Second, on-line transactions are not yet perceived as being sufficiently secure to inspire confidence in Web commerce. Third, commercial sites are generally more complex and expensive to implement, requiring more software and more programming, than non-commercial sites.

Fortunately or unfortunately, resistance to commercial use of the Web is weakening, in part because of the tidal wave of commercial interest and resources being directed toward it. And barriers to commercial transactions are giving way, as evidenced by the recent Secure Electronic Transactions (SET) standard agreed upon by Visa, MasterCard, and other key players (Netscape, IBM, and Microsoft).

As content quality increases and people grow accustomed to the idea of using their computer to purchase goods and services, Internet commerce will take off. In fact, some interactive marketing experts surveyed early this year predicted \$600 million in revenues from goods sold on the Internet in 1996.

Nonetheless, building big Web revenue numbers into your projections for the upcoming fiscal year may be risky. A prudent strategy would be to build your short-term financial case using cost-reduction tactics while at the same time testing revenue-generating strategies. For most companies, developing a relatively low-cost, scaleable, entry-level strategy probably makes most sense for the near term (6-18 months).

Here are some revenue-based approaches worth considering. We’ve included URLs to sites that demonstrate these strategies in action.

Advertising

Advertising dollars are beginning to flow towards the Internet. For example, Electronic Marketplace Report, a biweekly newsletter published by SIMBA Information Inc. (<http://www.simbanet.com>), reported that April 1996 advertising revenues from 18 leading Web sites (including Yahoo!, InfoSeek, excite, Lycos, and Netscape, among others) totaled \$11.7 million. With some of the most sought-after sites reporting millions of “hits” per day, advertisers are beginning to recognize that a Web ad’s reach may soon rival that of a spot on prime time television.

But advertising on the World Wide Web is tricky business. Visitors to a Web site are not “captive” in the way that television or radio audiences are. Choosing *not* to follow a hyperlink to an advertiser’s home page or clicking the mouse to *avoid* a banner ad is even easier than pressing the *Mute* button on a remote control device. Given the voluntary aspect of the Internet, advertisers must reexamine their “cost-benefit” assumptions about what will make viewers sit still (or take action) to learn more about (or buy) an advertised product or service.

On the other hand, Web advertisers can calibrate the effectiveness of their efforts with unprecedented precision. Add-ons to Web servers can document the number of visitors, at what time of day, for how long, as well as where they came from and where they go next—the exact “click-stream” paths that visitors take through your Web site (imagine a radar homing device tracking a consumer through a huge mall). Coupled with tactics that exchange demographic and lifestyle information for access or promotional offers, you can gather as much information for potential advertisers as your ingenuity will persuade your visitors to provide.

If you intend to sell advertising, you’ll need to design your site to demonstrate a targeted audience, a high volume of traffic, or other attributes that appeal to potential advertisers. This will

ultimately affect your editorial content and how often people return to your site to check for new information. As with “traditional” advertising, your site’s editorial objectives may be jeopardized by your efforts to attract advertisers.

Advertising standards are emerging quickly, including pricing structures that reflect size, placement, frequency and timing of rotations, time of day, number of exposures, and other traditional advertising maneuvers. While there’s not yet an independent audit firm on which to base reliable advertising CPM rates, no doubt this is only a matter of time.

However, few Web sites today can support themselves on advertising alone. We suggest you experiment with advertising now if it seems potentially promising, but base your business justification on another strategy, at least for the present.

Examples: The best examples of how advertising is currently being used on the Internet can be found by going to major search sites, such as Yahoo (<http://www.yahoo.com>), Lycos (<http://www.lycos.com>), Infoseek (<http://guide.infoseek.com>), and excite (<http://www.excite.com>).

Sponsorship

Traditionally, sponsorship affords the sponsor a benign and supportive presence rather than an opportunity to deliver a specific commercial message. A funding strategy often used by public television and arts organizations, it provides the benefits of mutually rewarding association by linking organizations and/or causes in the public mind (think of Newton’s Apple and DuPont, or Mobil Masterpiece Theater). Some sites, such as iVillage’s Parent Soup, are experimenting with new forms of sponsorship, including how to work as strategic partners with their sponsors. Sponsors provide funding in exchange for contributing editorial content that’s consistent with the overall purpose and sensibility of the site. The perennial challenge, of course, is to balance the potentially conflicting interests of editor (freedom) and

sponsor (control).

Examples: iVillage (<http://www.netresponse.com/ivillage/home.html>), TidBITS (<http://www.tidbits.com>), National Public Radio (<http://www.npr.org>).

Subscription

The subscription model is a familiar one for print publications. Web-based business-to-business publications have been among the first to adapt it to cyberspace; consumer magazines are following close behind. When an on-line publication provides timely, focused information and a trusted, engaging editorial point of view (and especially when the cost is borne by an employer or can be written off as a business expense), readers are willing to pay. Subscription fees for on-line publications range from \$10 monthly to \$300 annually, generally paralleling the cost of equivalent printed subscription publications.

Examples: NewsPage Direct (<http://www.newspage.com>), Seybold, The Wall Street Journal Interactive Edition (<http://www.wsj.com>), ESPN SportsZone (<http://www.sportszone.com>), Slate (<http://www.slate.com>).

Membership dues

Customers or consumers pay a fixed monthly or annual fee for access to your Web site (or a particular section of it). Usually, this model works best for Web sites intended to foster “communities of interest,” gatherings of like-minded people looking for valuable information and/or social contact. For example, joining the IBM infoSage service entitles you to receive twice daily customized newsletters, as well as gain access to other premium information services.

Example: IBM infoSage (<http://www.infosage.ibm.com>), Apple Media Program (<http://www.apple.com>).

Pay per view

The prevailing wisdom is that once technology

supports it, customers will pay small amounts (50 cents to \$2) for access to an on-line product or service, just as they’ll pay the telephone company a dollar or two to dial a 900-number. Credit card companies and others are working hard to develop systems that can profitably process a continuous flow of small transactions. A variation on this strategy is to provide metered debit cards against which charges are made until the card’s total is used up.

Examples: NewsPage Direct (<http://www.newspage.com>), IBM infoMarket Service (<http://www.infomarket.ibm.com>), Infoseek Professional (<http://professional.infoseek.com>).

Sales transaction

In this model, the Web site essentially serves a cash register. Off-the-shelf commerce servers from Netscape, Open Market, and Quarterdeck (among others) provide services ranging from a “shopping cart” feature to credit card authorization and verification. Technology and public perception are evolving towards greater support and acceptance of sending (and spending) money through cyberspace. Initial acceptance seems to be highest for computer-related products such as fonts, stock images, and CD-ROMs, as well as time-critical services such as travel reservations. But others are joining the ranks: Simon & Schuster plans to sell electronic books, for example, and Nolo Press sells self-help legal books and software.

Some sites are experimenting with combining editorial material and merchandising in ways that might make yesterday’s “gentleman publishers” turn in their graves. “In situ merchandising,” as it’s called, operates on the assumption that people are most likely to buy when they’re inspired—to pick up a T-shirt during halftime, for example, or a book after they’ve heard its author read an excerpt. Unlike a printed magazine, a Web site can enable someone to instantly place an order for a product or service they’ve just finished reading about.

Examples: Simon & Schuster Interactive (<http://www.mcp.com/musoft/ssint>), Nolo Press (<http://www.nolo.com>).

www.nolo.com), Westin Hotels and Resorts (*http://www.westin.com*), Alaska Airlines (*http://www.alaskaair.com*), PhotoDisc (*http://www.photodisc.com*).

Who will do what?

Identify resource requirements and assign accountability.

You may be embarking on a grass-roots initiative to persuade your company to invest in a Web site, or you may have top management endorsement and generous start-up funding. In either case, careful resource analysis and planning will help ensure an efficient, successful Web site launch. You'll need to consider both what's required to get your site up and running, and how to keep it going.

What resources do you need to set up your Web site?

The Web design firm

Web design firms vary widely in expertise and quality of work. Many of the first Web design firms were started by people with strong technical skills but little training in the art and craft of developing, packaging, and delivering information. Increasingly, however, "traditional" media firms are venturing into Web design, bringing with them their expertise in visual communication, typography, navigation and sequence, and information design.

Since the discipline is so new, no one has much of a track record in designing explicitly for the Web. Some Web design firms are staffed by skilled print designers, others by people seasoned in multimedia or user interface design. Web designs will probably reflect the designer's background: print design firms may handle typography and white space well, and produce clean but relatively static designs, for example, while multimedia design firms may produce highly visual, interactive work rich with bandwidth-clogging media. When evaluating design firms, visit sites they've designed and form your own impressions. Then ask for a guided

tour to learn what they think of their own work.

Design firms also differ in their ability and inclination to help you think through business goals. If you have clearly defined goals of which you're confident, you may want a firm that's strong on design and implementation. If you need a strategic business partner, you may wish to turn to a firm that weds business and marketing planning to design.

Here are some additional questions to consider in assessing a web designer's capabilities:

- If your Web site will require sophisticated interactivity or database programming, does the design firm have the appropriate resources on staff, or do they work closely with trusted partners who provide those services?
- What will the design firm deliver to you? A complete set of files, ready for uploading onto your Web site? A "style guide" containing design guidelines for you to implement? Templates, so that future content can be "poured" into readymade formats? If they provide templates, will they teach someone in your company how to use them effectively?
- Will they take you only as far as your site's launch, or will they provide ongoing production services?
- Will they conduct usability testing to make sure their designs work well in a variety of audience environments (using different browsers, at different connection speeds, etc.)?
- What mechanisms and processes can they supply for on-going maintenance and design tuning?
- Who will maintain hyperlinks, making sure none point to obsolete addresses or dead ends?
- If your workflow is complex, can they help automate it using tools such as AppleScript?

The Web consulting/programming firm

Depending on the complexity of your site's content, you may choose to enlist the services of a Web consulting and programming firm. If you

intend to solicit information from your visitors, provide on-line search capabilities, or support discussion groups, for example, you may need specialized expertise.

A Web programming firm can write custom CGI (Common Gateway Interface) scripts that link the HTML pages on your Web site to specialized applications that run on your server. Many such firms are experts in database design and implementation as well as custom scripting and programming in a variety of languages. In addition, many Web consulting firms will help you configure your Web server, combining off-the-shelf hardware and software solutions with custom programming to provide functionality that meets your Web site's goals.

For best results, consider the consulting firm a member of your Web development team. Bring them in early, so that they can contribute to the site's design and ensure that form and function work seamlessly together.

The electronic commerce systems integrator

If you plan to conduct electronic commerce—selling goods and services directly from your site—you'll need an electronic commerce Web server to handle order entry, payment processing, credit card authorization, inventory management, and shipping logistics. Depending on the scale of your operation and the complexity of your requirements, you may want to retain a systems integrator who specializes in electronic commerce solutions. Electronic commerce systems range from relatively low-cost bundled solutions based on the Apple Internet Server Solution (such as Pacific Coast Software's WebCommerce Solution for Macintosh [<http://www.pacific-coast.com>] or iCat's Electronic Commerce Suite [<http://www.icat.com/>]) to complex, custom-designed systems that can top \$1,000,000.

The Internet service provider

Depending on the size of your company, you may have an MIS group that's already taken care of your Internet connection. You may already have one or more dedicated T1 or ISDN lines that link your company's network to the Internet.

If you're a smaller firm, however, you'll probably need to consult an Internet service provider (ISP), a network consultant skilled in Internet connectivity, and/or your local phone company. ISPs vary widely in their ability and willingness to provide consultation and hand-holding. Many work closely with network consultants and/or Macintosh VARs to provide one-stop shopping for servers, routers, and Internet connectivity.

Who will pay for it? Own it? Control it? Maintain it?

Depending on your company's size and organizational structure, setting up a Web site may require cross-departmental coordination and may lead to interdepartmental strife. A Web site that starts out as an orphan may suddenly find itself with too many parents or, conversely, a site that starts out as a well-tended child may find itself abandoned. Although answers may need to evolve over time, questions of authority and responsibility must be addressed from the beginning, including:

- Who will pay the start-up costs?
- Who will provide staffing?
- Who will pay for sustaining costs?
- Who has editorial control and responsibility?
- Who has design/interface control and responsibility?
- Who has technical control and responsibility?

Territorial conflicts

Because a Web site depends on technology that's typically "owned" by an MIS function, tension can arise about who's in control of the site—including its content. In particular, clearly defining the role of the Web master (see below) and his or her relationship to editorial and design functions

can help minimize confusion about who owns what. In most companies, collaboration between MIS and marketing, or among Web master, editorial director, and art director—along with clearly defined roles and responsibilities—will produce the best results.

Quality control and authorized spokespeople

In the early days of desktop publishing, design and typographic standards declined when people lacking expertise were handed publishing and production tools. Similarly, Web sites can provide an easy platform for would-be authors—with or without the required writing and editorial skills. This can be risky.

Identify one person (in an editorial or marketing position) who's ultimately responsible for Web site content. Clarify who in your company is authorized to “speak” (by posting content on your site) on your company's behalf. Then institutionalize a review-and-approval procedure to ensure that everything that's published serves your site's intended purpose. If anyone in your organization is allowed to publish, you may find yourself embarrassed. Content accuracy, appropriateness, point of view, tone, grammar, and spelling should be reviewed using the same high standards you would apply to any printed external communication (say, your annual report).

Pay especially close attention to the legal impact of your site's content. The legal ramifications of Internet “broadcasting” are currently the subject of close Congressional review. Stay abreast of legislative changes, and make sure your site is in compliance.

What resources do you need to maintain your Web site?

A Web site is an ongoing commitment, not a one-shot deal. For periodical publishers and people who come from television or radio, a sustained publishing or programming model will be familiar. But for others, it may require an effort of imagina-

tion to realize that a Web site requires constant tending to meet its goals. Launching a Web site that sets certain expectations for “freshness” and fails to meet them can damage your company's image. Depending on your site, maintenance may mean anything from monthly updating to daily or even hourly publishing.

Many companies begin their venture onto the Internet by “borrowing” existing resources. While this strategy may work when start-up enthusiasm is high, it's not a sustainable solution. Figure out how much money, time, and attention, of what kind, your Web site will require on an on-going basis, and negotiate or hire dedicated resources. Otherwise your Web site will be vulnerable to fluctuations in enthusiasm and to being held hostage to other projects. Ask yourself,

- Whose budget will supply sustaining funds?
- Who will provide on-going staffing?
- How much of the content will change? How often? Will your site primarily provide access to archival materials? Or are you publishing news?
- How much of the content can be published using existing designs? How much new design will be required?
- Who will maintain the content and the hyperlinks? Who will ensure that content meets appropriate standards for “freshness”?
- Who will evaluate the success of your current strategy and “tweak” it for optimum return on investment?

And so forth. Here are some of the human resources to consider:

Managing editor/business director/creative director

Someone must be primarily and ultimately responsible for your site's progress toward your business goals. Whether that person is a managing editor, a business director, a product manager, or a creative director will depend on the nature of your business. Whatever their actual position, they must direct the on-going creation of appropriate con-

tent, help refine the site's technical requirements, and look for opportunities to experiment and improve the site's performance. For example, if you're gathering a significant number of sales leads, is it time to experiment with on-line commercial transactions? If your editorial content is stimulating lots of conversation in the form of e-mail, should you set up an on-line discussion group?

Marketing/editorial/creative resources

Who will actually create your content? Who will write the copy? Create the illustrations? Refine the market positioning? Identify these people.

Consider ways of "automating" content creation, so that it comes to you instead of you going after it. For example, are visitors to your site a good source of appropriate content? Are there other sources within your company? Can you set up an internal e-mail address or location on your corporate server for contributions to the Web site? How will you balance internal talent with freelance expertise?

Production resources

Depending on the frequency with which material on your site changes, on-going production and server maintenance may require a few hours a week or a full-time staff. Identify how many people, with what skills, and how much time, will be needed to meet your commitment to your site. Consider ways to automate production, for example by creating scripts that automatically pour new content into existing templates and move them into the appropriate location on your server.

The Web master

Every new technology gives birth to new professions. The Web master (along with the ISP) is one of the "children" of the Internet. The Web master is a combination of programming whiz and doctor on call. If the server goes down, who's responsible for fixing it? Who's responsible for upgrading server software? For tracking usage and

optimizing performance? For administering the mailing list? For managing security and access control? For maintaining the folder and directory structure on your server? For making sure that your site's content is delivered in the most efficient and functional technical form?

Depending on your site's complexity, the Web master may be someone who works for your ISP, someone in your MIS group, or a technically knowledgeable designer or production staff member. Whoever it is, their responsibilities are critical and must be clearly spelled out.

What's the worst that can happen, and how can you prevent it?

Assess and minimize risk.

Being a pioneer means taking risks. But taking risks doesn't mean acting blindly or being taken utterly by surprise. Here is a summary of the major risks faced by Web entrepreneurs, and how you can minimize their effect.

Biting off more than you can chew

Start small, develop a phased implementation plan, do a thorough cost analysis (searching for hidden costs), then do a "worst-case" scenario. Don't commit your organization to an elaborate venture unless you're pretty sure it will pay off. Instead, consider smaller "guerrilla" approaches that enable you to experiment, learn, change course, and remain flexible. Think of yourself as a pioneer setting up a trading post in a frontier town, not as an old-world aristocrat building a summer castle.

Instead of purchasing a Web server that can handle millions of visits or hit per day, start with one that can handle 50,000 and add more servers as traffic grows. Not only does this minimize your start-up costs, it can provide a more flexible solution even for a larger site. If you're starting with a pilot project, consider using an older Macintosh as a server as long as it has a big hard drive, lots of memory, and a reasonably fast processor.

Alternatively, you can “rent” 20 megabytes of space on your Internet service provider’s Web server.

Failure to meet audience expectations

Don’t be afraid to set modest expectations for your visitors. Far better to set—and meet—modest expectations than to make ambitious promises and fail to keep them. If you say the content will change weekly, make it so. If you say your editorial point of view will be hard-hitting, ensure that it is. There’s enormous competition on the Web. Getting people to visit you once is nowhere near as hard as inspiring them to return and rewarding them for doing so.

Consider inviting your visitors in as development partners. Say, for example, “Here’s our plan, we’re under construction, we’d value your feedback.” This can be a good way to get expert direction as well as foster ownership, interest, and loyalty.

Insufficient commitment

The clearer your initial analysis and planning, the stronger your own editorial commitment to your site is likely to be. On the one hand, if your Web site isn’t linked to quantifiable business goals, neglecting or closing it down will be easy if the going gets tough. On the other hand, you may

find it difficult to know when to revise your strategy or pull the plug. A Web site backed by a clear commitment to a reasonable, quantifiable business goal is much more likely to succeed than one that’s grandly but vaguely conceived and intermittently supported.

Insufficient resources

Don’t treat your Web site like a hobby. Even if you can’t hire dedicated staff until the site is a going concern, make sure interim resources are dedicated unequivocally. Asking your editorial director to write for the site in her free time is dooming the site to mediocrity and your employee to frustration. If dedicating internal resources is impractical, find skilled outside contractors and put them under the direction of a reliable internal champion (and adjust that person’s priorities accordingly).

Poor design and implementation

You won’t let just anybody design your annual report. Don’t let just anybody design your Web site. That includes your MIS director: even if they’re brilliant when it comes to the technical side of managing information, it doesn’t mean they know anything about the design and presentation of information. Your Web site is a visible, risky, public extension of your organization’s

3. For Whom? Audience/Market Analysis

Any seasoned business person realizes that market analysis (for product planning) or audience analysis (for communication planning) is critical. This is no less true for building a Web site than for planning a product launch, designing a book/CD-ROM product, or developing an advertising campaign.

You'll find we've used the words *audience*, *market*, *visitor*, *reader*, *viewer*, and *customer* somewhat interchangeably throughout this paper. Although these terms reflect different points of view (editorial, business, broadcasting), they all refer to people—the people whom you hope to influence, inspire, and serve. The diversity of this vocabulary reflects the convergence of disciplines on the Web.

Sound planning requires reflecting on the following questions and activities:

- Whom do you want to reach? Why might they want to come? *Profile your target audience/market segments.*
- Based on your business objectives, what action do you want your audience to take? *State your desired outcome.*
- How will you serve and inspire your audience most effectively? *Profile your assumptions about their communication and learning preferences.*

- Within what technical constraints must you implement your Web site? *Profile their viewing environment.*

The results of this analysis will guide the editorial content, design, and technical implementation of your Web site.

Whom do you want to reach? Why might they want to come? Profile your target audience/ market segments.

Even though the universe of visitors to the World Wide Web is in continual flux, you'll need to make and test at least some beginning assumptions about the people you hope to attract to your site. The most basic question is whether they're already regular visitors to the Web. Consider the "whole product" universe in which your Web site exists. If your customers can't or won't get on-line, it won't matter how cool your site is—no one will line up at your door.

If your target audience isn't on-line, what can you do to help bring them into the fold? Perhaps you develop a direct mail piece that not only touts the benefits of your site, but also directs would-be visitors to the resources they'll need to go on-line. Or you might do a cross-promotion with a local ISP, offering a three-month promotional access

rate to people who visit and/or purchase something from your Web site. Obviously your stationery, sales and marketing literature, and advertising should point to your Web site.

Next, be sure to ask yourself that classic marketing question: how homogenous or heterogeneous is your audience? Should you consider segmenting your audience by:

- Stylistic preferences (for editorial content, media types, color, typography, information or entertainment?)
- Where they are in the sales cycle (what kind of information do they need, in what form, to make what kind of decision?)
- Language requirements
- Venue (are they surfing the Web at home, at work, at school, at a cybercafe or a library?)

Depending on the outcome of this analysis, you may choose to focus on the single segment that's most likely to meet your business objectives, or you may build different "locations" within your site for different kinds of visitors. The point, as always, is to think clearly about whom you want to attract and what they need. Taking a one-size-fits-all approach will doom your site to an early closing.

Based on your business objectives, what action do you want your visitors to take?

State your desired outcome.

A well-designed Web site isn't just a pleasant public place for people to come and go, like a park through which people stroll in their leisure time. Why do you want to attract people to your site in the first place? What business benefit will those visitors provide? What will they want from you? For example, you may want them to:

- Read a product description with detailed, up-to-date information
- Complete a reader survey
- Request an introductory subscription to a magazine
- Participate in an on-line discussion group

- Add your Web site's URL to their list of bookmarks
- Select your Web site as their browser's default home page
- Visit your site once a week, twice a week, or daily
- Purchase a product

State your goals, wherever possible, in quantifiable terms: how many? how often? how long? Your answers will drive your site's design and provide a benchmark for its success.

If you want your visitors to subscribe to your Web newsletter, your design will be quite different than if you want them to browse product literature or purchase an airline ticket. If you want people to visit your site daily (for example, to support your advertising rates), you'll need to make sure there's fresh news to lure them. And if you set fifty visitors a day as your goal and only ten actually come, you'll have good feedback that you need to "tweak" the design.

How will you serve and inspire your audience most effectively? Profile your assumptions about their communication and learning preferences.

What are your visitors' preferences for how information is presented to them? Questions of audience taste must be asked and answered in order to guide decisions about:

- Media mix (text, static graphics, animation, sound, video, etc.)
- Typography (big and bold, ornamental, elegant and restrained, etc.)
- Design and graphic style (award-winning avant-garde, friendly and reassuring, "in-your-face," etc.)
- Color palette (earth tones, psychedelic colors, soothing pastels, etc.)
- Balance of text and graphics (reading with illustrations, or pictures with captions, etc.)

Here are some questions to consider:

- Are your visitors engineers looking for technical information? Eighteen-year-olds eager for entertainment? First-time homebuyers anxious for reassuring advice?
- Do they prefer words or pictures? Do they learn by reading, looking, or doing? Do they like to puzzle things out themselves, or would they prefer a self-running demo?
- How will they consume the information you provide? Will they read it on-screen? Save it to read later? Print it immediately? Or later? Or never? Will they want to cut and paste information into their own documents? Will they want to forward information to others on paper or electronically?
- Do they appreciate elegant design and fine typography? Or will “average” clean design be sufficient?
- Will they be unimpressed by good writing but thrilled by sound and animation? Or will they love well-made copy and feel overwhelmed by things that move?
- Are they likely to trust you with demographic information?
- How patient are they? Will they wait for a meaningful graphic to download, or do they browse with graphics turned off?

Within what technical constraints must you implement your Web site? Profile their viewing environment.

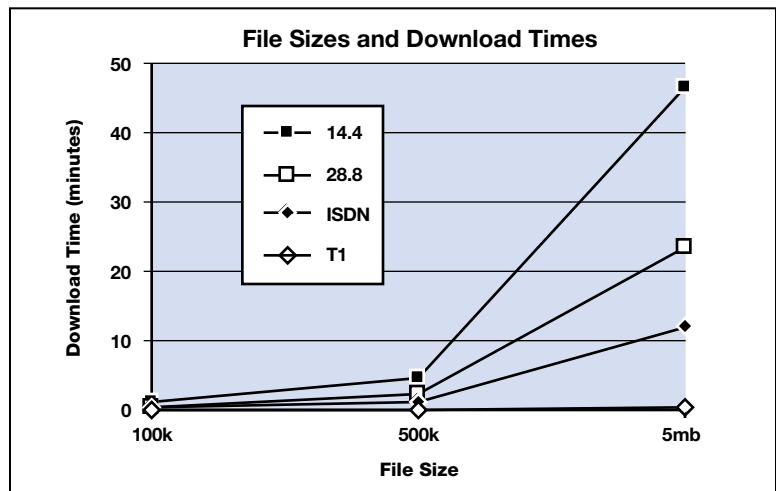
The spread of personal digital assistants (PDA) such as Apple’s Newton, and “Internet appliances” such those based on Apple’s Pippin technology, will likely contribute to a gradual standardization of Internet computing environments. For the time being, however, Web publishers must make no untested assumptions about the their visitors’ technical capabilities.

Here is a short list of questions to consider:

At what bandwidth are your visitors connecting to your Web site?

Current connection technologies range from “pipes” that dribble information at the rate of 14.4 kilobits per second (kbps) to T1 lines that gush at over 1,544 kbps, more than a hundred times as fast. A graphic that zips along and delights one visitor may infuriate another by clogging their connection.

According to a recent survey, nearly 60% of people accessing the Internet do so at speeds of 28.8 baud or less. If your Web site is aimed at a business-to-business or internal corporate (“Intranet”) audience, you may be able to include fat files, but if your viewers are accessing your Web site from their homes, design for 28.8 or less. Savvy Web designers keep total Web page size low, say 40k or so, divvying up that maximum among HTML text, GIF graphics, and other Web page



component files.

This chart shows you what’s at stake. One way to read it is that a 5mb video clip theoretically takes about the same time to download over a T1 line as a 100k text file does using a 28.8 baud modem. The 5mb video clip takes about 23 minutes to download with a 28.8 baud modem—all this for a few brief moments of video playback. A

500k graphic takes about 2 1/2 seconds over a T1 line, and nearly 5 minutes (over 100 times longer) using a 14.4 baud modem. Note that these are theoretical times: actual times may be much longer. As a rule of thumb, the larger the file, the bigger the difference in downloading time between low and high bandwidth.

What browser do they use?

Three factors determine how your content will be viewed (or not viewed) by visitors to your site:

- What HTML tags or features their browser software recognizes
- What additional media types they're capable of viewing using browser plug-ins such as Shockwave or separate helper applications
- How they've set their browser preferences for graphics, fonts, and color

HyperText Markup Language, or HTML, is—at least in theory—a universal standard for tags that control the appearance of Web pages. However, it was originally designed to exchange simply formatted text and simple graphics, not the variety of designs and media types it's now being called on to support. As a result, the number of HTML tags has expanded rapidly: there are currently three different levels of HTML, plus Netscape's own HTML tags.

To complicate matters, competition among browser developers is fierce, leading to incompatibilities among browsers. One browser may support features that another browser does not. As a result, there really is no single, well-defined standard for Web publishers.

What's a Web designer to do? Some provide two or more versions of their content for different types of browsers. Some rely on custom programs that can detect which browser is being used by each visitor and serve up HTML documents with tags and features appropriate to that browser. Still others optimize for one particular browser while minimizing the negative impact of viewing through other browsers. More and more sites provide a

mini "user's guide" on their home page that lists guidelines for optimal viewing.

Many software vendors are developing plug-ins that enable browsers to support content generated by their authoring applications. Macromedia, for example, distributes Shockwave plug-ins that enable Netscape browsers to display and interact directly with files from Director, Authorware, and FreeHand. Apple provides a plug-in that plays QuickTime movies in place on a Web page. Adobe's PDF Viewer adds Acrobat interface elements to the browser window for viewing PDF files. Plug-ins turn an HTML browser into a "host" for a variety of media types. In many cases, browser developers end up building support for functions once provided by plug-ins directly into their browsers.

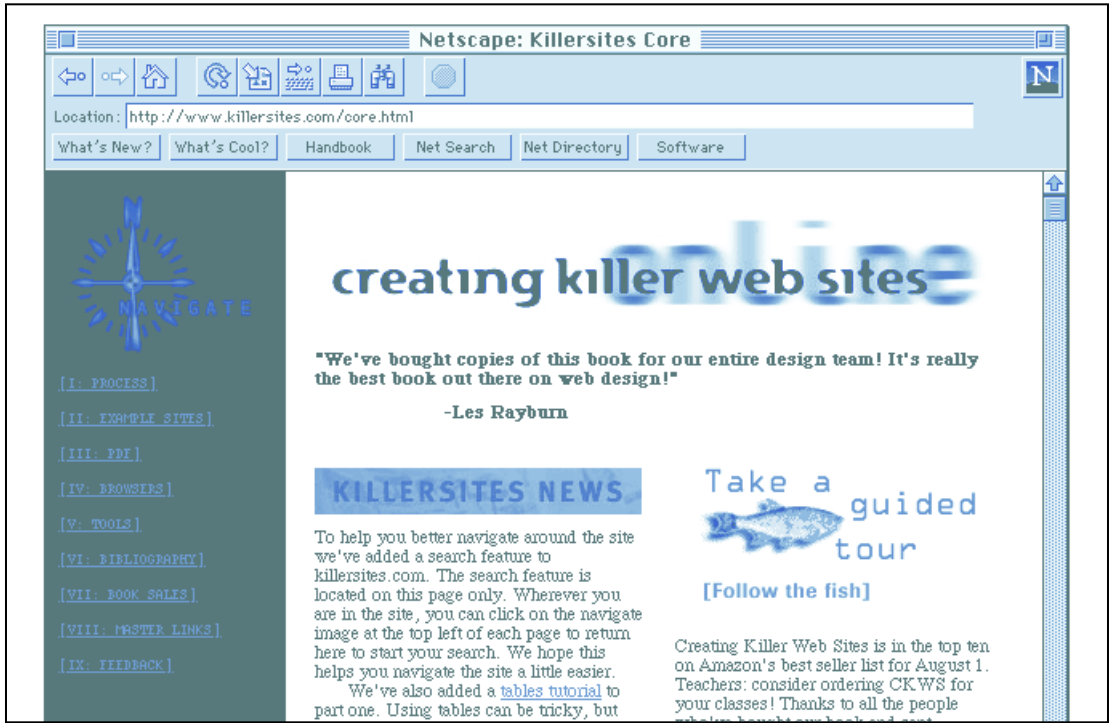
While acquiring browser plug-ins and helper applications is relatively simple and inexpensive (in most cases free), consider whether people not already equipped to view your content will be motivated to download a required plug-in. Many sites provide clear instructions on their home page about what's required to view and/or optimize the site's contents, and some sites actually provide a download button for direct access to the required tools.

Netscape's Web site (<http://www.netscape.com>) maintains a list of helper applications and plug-ins for different content types.

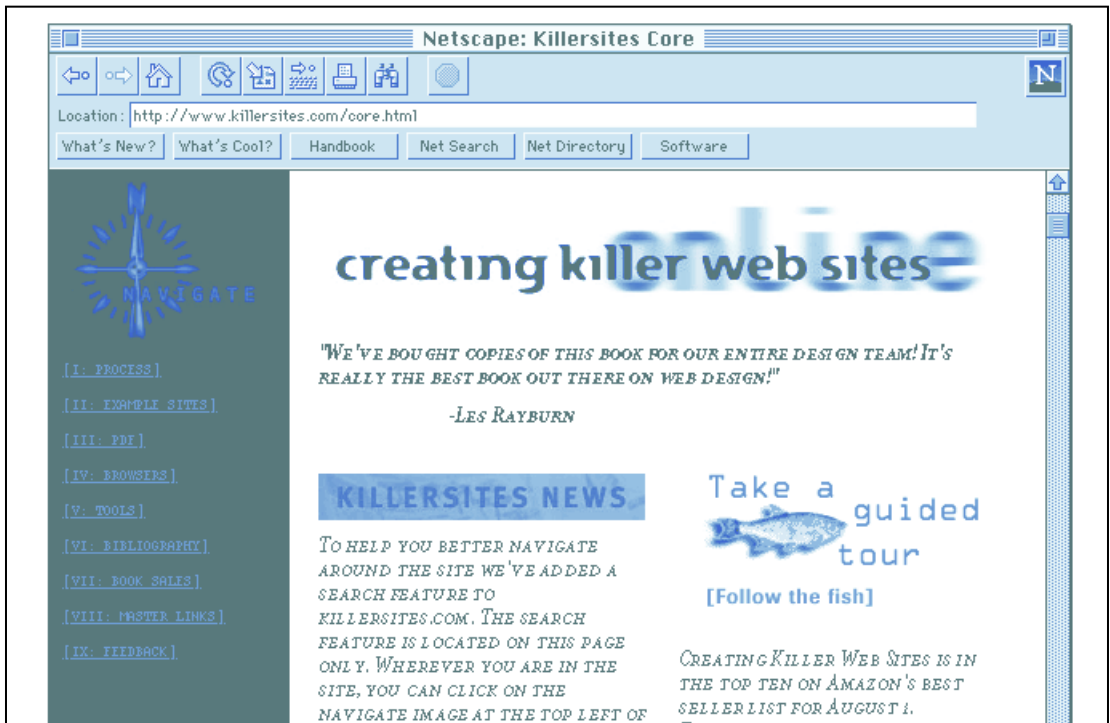
How large is their screen?

Screen "real estate" varies from a meager 640 x 480 pixels (or less) on up to 1280 x 1024 pixels and beyond. Are your visitors viewing your home page on a laptop or on a 19-inch production monitor? A PDA such as Newton or an Internet appliance that uses a TV screen for display?

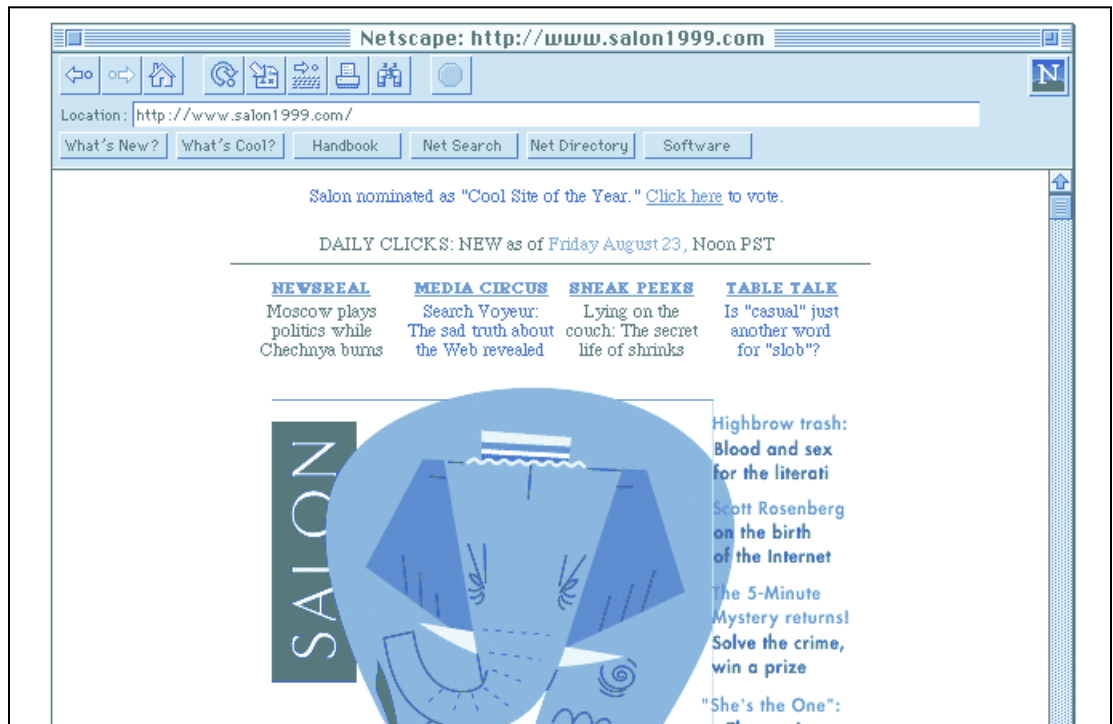
If you serve primarily HTML text files which wrap to fit the current window size, differences in screen sizes may produce only unwieldy long lines of text on larger screens. But if you serve up pages



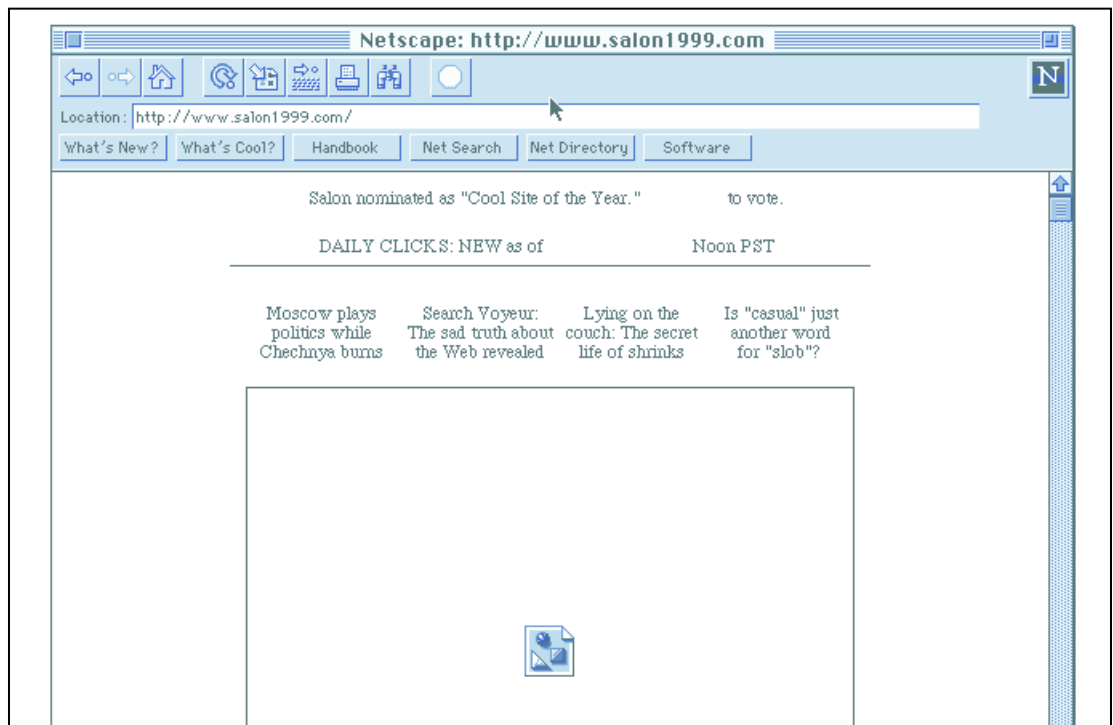
http://www.killersites.com viewed with standard Netscape font preferences.



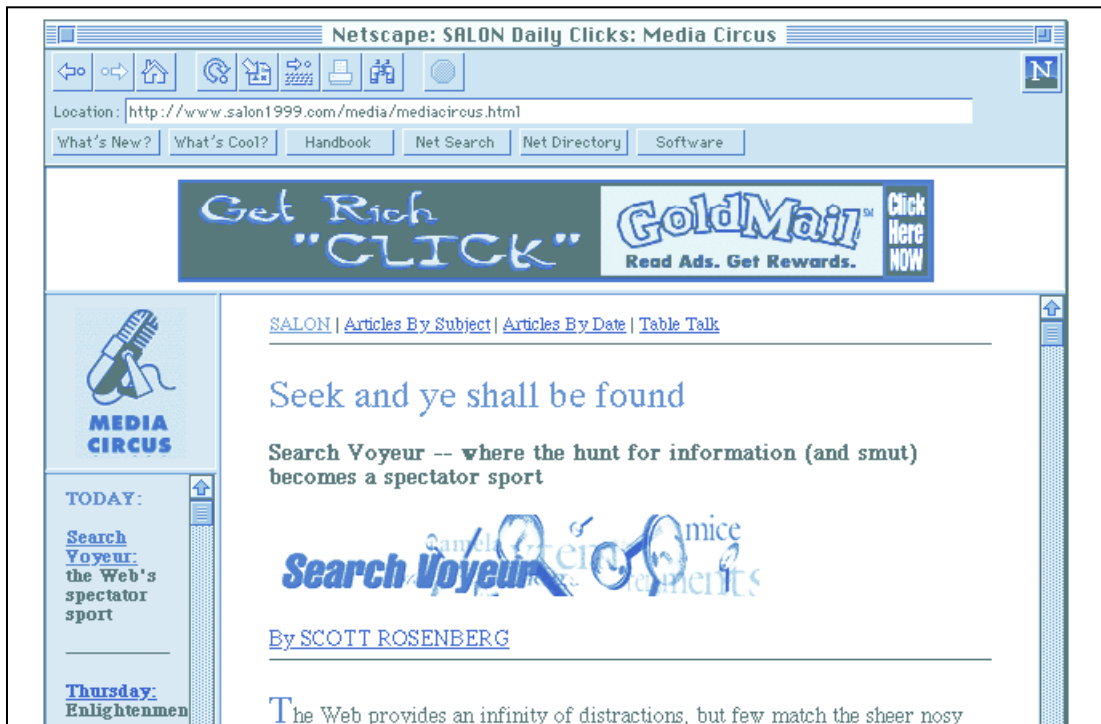
http://www.killersites.com viewed with font preferences set to a swash caps font.



http://www.salon1999.com viewed with graphics on.



http://www.salon1999.com viewed with graphics off.



<http://www.salon1999.com> viewed with frames.



<http://www.salon1999.com> viewed without frames.

with fixed dimensions (using GIF or PDF files, for example), you may unwittingly require your visitors to adjust their screen size or—worse—hide your content from them.

What to do? Determine your audience's preferences, design for the segment that makes most business sense, and test for all—using a variety of browsers, computer platforms, and screen configurations. Then provide whatever help you can to people whose viewing environment is the exception to your rule. Some sites display a small horizontal bar to indicate optimum viewing width, along with the instructions, "For optimum viewing, open your browser window to this width."

Are they using color?

How will your mauve-and-teal logo and elaborate JPEG collage look on a monochrome screen? Are your visitors likely to browse your content using an 8-bit laptop or a 24-bit color desktop system? Are they using a 256-color Windows machine or a Macintosh with millions of colors? Are they—or will they—use an Internet appliance for which their television screen serves as the display?

Chances are you'll want color to serve at least two very important functions: as a navigational tool (to indicate links and distinguish between those that have and haven't been visited) and as an expressive element. If you anticipate visitors using monochrome systems, make sure your color palette translates meaningfully into black-and-white, gray-scale, and 8-bit color equivalents.

Always an intricate production challenge, color on the Internet is made more complex by the fact that different browsers use their own color palettes, the set of colors which they're capable of displaying. The Netscape Macintosh browser uses a slightly different color palette than the Netscape Windows browser, for example, and Microsoft Internet Explorer uses still another. There are various cumbersome solutions, ranging from composing graphics using the color palette from the browser(s) most popular among your audience, to

creating an 8-bit "adaptive palette" in an application like Adobe Photoshop. Excellent guides to working with color include the book *Designing Web Graphics: How to Prepare Images and Media for the Web* by Lynda Weinman, and Web sites hosted by Adobe (<http://www.adobe.com>), Adobe's on-line magazine Adobe.mag (<http://www.adobemag.com>), and Netscape (<http://www.netscape.com>).

What video capacity do they have?

Is your audience using computers capable of playing video? The current, predominant strategy for handling video on the Web is to serve a file that's downloaded to the client computer and played there. Since the Macintosh operating system (Mac OS) provides built-in software support for video via QuickTime, pretty much any Macintosh is capable of playing video. By contrast, many Windows-based machines require additional hardware to support video playback.

What sound capacity do they have?

Is their computer capable of playing sound? There are currently two major strategies for handling audio on the Web: download an audio file and play it back on the client computer, or "stream" the audio data continuously, providing an immediate, uninterrupted flow of sound.

Since the Mac OS provides built-in support for audio, any Macintosh computer can play sound. Many earlier Windows PCs cannot. Don't make audio an absolute requirement for enjoying your site's content, unless you're confident of an all-Macintosh audience.

Summary

We've heard the comment repeatedly, from Web designers and others, "We're lucky enough to have an Ethernet connection to a T1 line, but we forget that most of our users have dial-up connections through 28.8 baud modems." Do some research to find out under what conditions your

4. What Should Your Web Site Be and Do?

Designing an effective Web site is much more than putting content on a server. As with any communication venture (information publishing or marketing communications), the success of your Web site depends on your ability to match content, form, and function to the needs and preferences of your audience.

Design analysis and planning requires you to reflect on the following questions and activities:

- What content will you provide on your Web site? *Develop a content inventory.*
- How will the site be structured? How will people find their way around? *Draw a site map.*
- How will the content look and feel (and sound)? *Develop a style guide.*
- What functions will it perform? *Develop a functional specification.*
- How often will the contents change? *Develop a publication or programming schedule.*

Depending on the complexity of your Web site, you may not need to produce all the documents we've listed—and some of them may be quite straightforward. Nonetheless, we recommend that you engage in deliberate thinking on each of these subjects.

What content will you provide on your Web site? Develop a content inventory.

Content, as they say, is king. Without it, you might as well have a circus tent with no acrobats or elephants. While you may be tempted to put stuff out just because you have it lying around (“*Hey, let’s put the pictures of the company barbecue up on the Web site!*”), resist the temptation. An experimental spirit is an asset to a Web publisher, but an indiscriminating editorial sensibility is not.

Before posting something on your site, review your business goals and your audience profile, and ask yourself how *this content* will enable *these people* to meet *this goal*. If your audience doesn’t find your content useful and engaging, if it doesn’t spur them to take the action you desire, you might as well redeploy your Web server as a print spooler.

To prepare your content list, ask yourself three questions:

- What appropriate content do you already have, in what form?
- How will it need to be modified or “re-expressed” for the Web?
- What additional content will you need?

What appropriate content do you already have, in what form?

Listing your content systematically will enable you to see patterns suggesting a particular

audience segmentation strategy and/or way of organizing your site into different locations. Here are just a few examples:

Content	Audience	Business goal to be met, and how
Press releases	Press, customers, prospects, shareholders	Foster a sense of connection to and involvement with your company
Product spec sheets	Customers, prospects	Provide in-depth, up-to-date information not available in stores
Interview outtakes	Existing and prospective subscribers	Provide additional rich information that's too long and not well-enough focused to be included in entirety in printed piece
Staff bios, photos	Customers, readers, prospects	Foster sense of personal connection, put a face on the company and the people who work there, emphasize the range and depth of professional experience
Letters to the editor	Readers	Hyperlink letters to the stories they refer to, in order to provide sense of on-going, richer "conversation"
Frequently asked questions	Press, current and prospective customers	Improve customer communication, reduce customer support costs
Price lists	Current and prospective customers	Reduce customer support and marketing collateral costs
Catalogs	Current and prospective customers	Reduce or eliminate catalog printing costs, reduce order processing and fulfillment costs
Stock price information	Current shareholders, prospective investors	Improve shareholder relations
Annual and quarterly reports	Current shareholders, prospective investors, customers	Improve shareholder relations, reduce printing costs
Job openings	Current and prospective employees	Cast wider net for prospective employees, reduce human relations function costs

Once you've prepared a content inventory, you'll need to address questions of ownership, form, and language. Who in your organization "owns" this content? Who has an electronic version? Do you need permission to put the content on the Web? Are there any issues involving rights or licenses? Are there constraints or style guides related to its re-use? Must it be translated into a different language?

How must the content be modified or "re-expressed" for the Web?

Most material designed for other media must be modified for use on the Web. Documents designed for print rarely translate well into content for on-screen consumption with some adaptation. And the average video or animation, uncut, will choke the average Internet connection.

Possible content modifications are listed in the following table.

What's required will depend on the format of the original material and the form in which you intend to deliver it on your site. Because there are so many potential combinations depending on your starting and ending points, this table is not a recipe for an editorial or production workflow; it's meant only to suggest some of the possibilities. Converting PageMaker files into PDF format requires different modifications than translating a Macromedia Director animation into a Shockwave file, or QuarkXPress documents into HTML-tagged pages.

(Depending on whether you deliver text as tagged HTML files or PDF files, you may not need or be able to control all the components listed below.)

Component	Possible modifications
Layout, formatting	Change aspect ratio Adjust amount of white space Redefine spatial relationships between text and graphics Remove or adapt unnecessary elements (page numbers, running headers and footers, tables of contents) Add hyperlinks Add navigational components Adjust typography for on-screen viewing Add HTML tags for formatting or Create PDF file Add buttons, other calls to action, tie-ins to other sites
Text	Edit for faster reading, easier scanning Condense and/or reduce content Convert long linear text flows into shorter, hyperlinked chunks Add headers Add hyperlinks Add navigational components
Graphics	Crop and scale as appropriate Adjust bit depth, color palette Convert to GIF or JPEG Make backgrounds transparent (GIF) Decide on interlace (GIF) or progressive (JPEG)
Video	Edit Optimize for Web delivery and playback Embed in HTML or PDF file
Animation	De-compose, tag as HTML components and/or Write Java applet and/or Create run-time file (e.g. QuickTime movie or Shockwave for Director file)
Audio	Edit Optimize for Web delivery and playback Embed in HTML or PDF file, or build into QuickTime or Shockwave movie
File structure	“Chunk” the information, build file structure, and establish file naming conventions for optimal on-line delivery

What additional content will you need?

Your content inventory will show you what you already have, and will also point out the gaps. What additional content will you need—immediately, for your Web site’s launch, and periodically thereafter?

Re-expressing existing content runs the risk of confining you to certain ways of thinking. A document that starts out as a product data sheet will probably never venture too far from a familiar version of just that. When proposing new material, however, you can really explore the potential of the Web—for completely new content genres, new publishing “events,” and new relationships between content developers (authors) and publishers.

Don’t limit yourself to conventional, “document-centric” problem-solving. For example, if your goal is to provide information that equips prospects to choose your product, don’t assume that a product spec sheet is the only or best way to do this. Challenge conventional equations such as these; given the newness of the Web, you can really invent your own forms.

For example, instead of a publisher of static documents, consider yourself an event planner or a theater director whose job is to oversee an organic, protean “happening”—your Web site—as it evolves over time. How can you employ the tools of suspense, surprise, and delight, so that visitors return to your site just out of curiosity to see what’s there today?

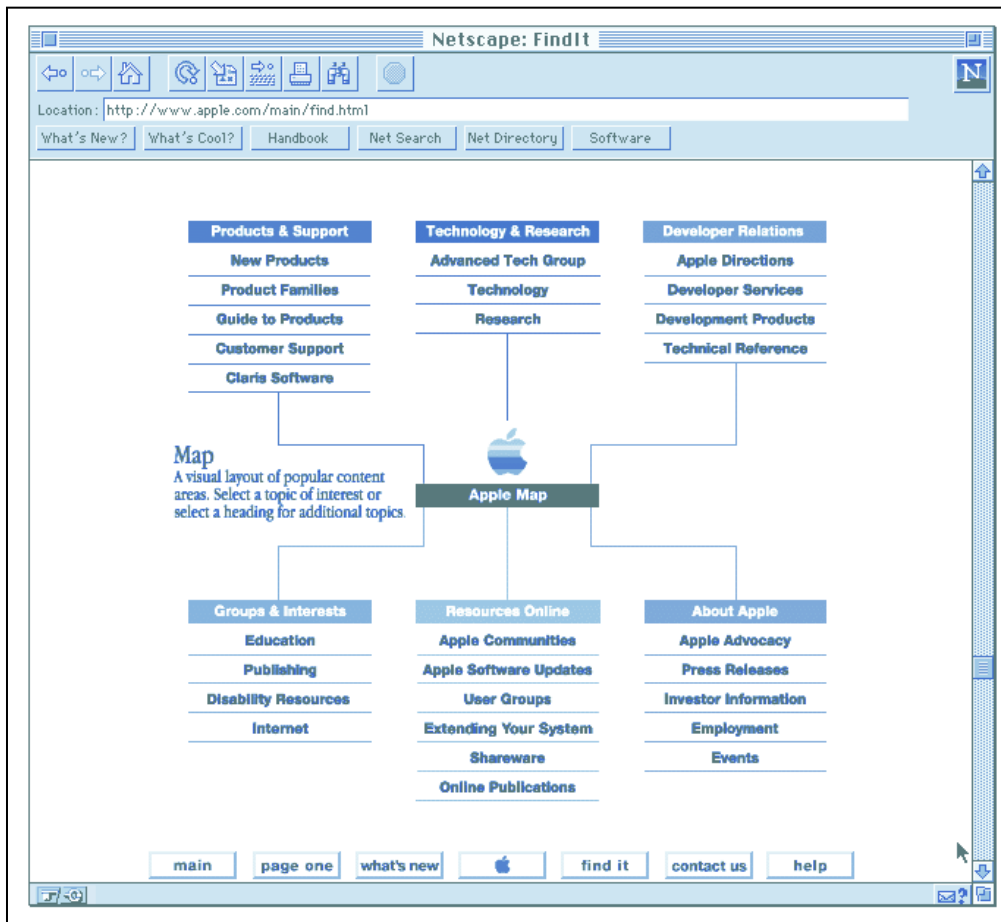
Not only can you experiment with new information genres, you can also step outside the conventional boundaries of your business. For example, if you're an on-line magazine, can you garner additional revenue from syndicating your editorial products to corporate sites? How can you use interactive forms creatively? E-mail? Discussion groups? Interactive games? Or, if you're a clothing manufacturer, why not hire a fashion writer to write a weekly column for your Web site? What about asking customers to send in their measurements and order clothes uniquely designed and tailored for them? Enable customers to choose a wireframe representing their body type and "try on" clothes electronically?

How will your Web site be structured? How will people find their way around? Draw a site map.

A site map is a graphical representation of the structure of a Web site. It's a way of showing the various "rooms" or locations on your site—the choices or paths that your visitor is presented on your home page—and their relationships to each other and to the whole. While there's no established convention for how a site map should look and work, a good one functions as a cross between an architectural blueprint, a street map, and an index.

There are many ways of organizing a Web site—by subject matter, by function, by date or chronology, by audience segment, by geography, etc. For

example, you might organize press releases by date, product literature by product, current news by date, old news by subject matter, events by geographic location and date, and on-line discussions by audience segment. A site map not only helps you organize the file structure on your server, it enables you to plan orientation aids and intra-site navigational links. Whatever organizational scheme(s) you select, make sure your site's logic makes as much sense to your visitors as it does to you.



Orientation and navigation

Most of us, most of the time, prefer knowing:

- Where are we now and how we got here (orientation)
- Where can we go from here and how we can get back to where we've been (navigation)

As a result, for most of our routine navigational journeys—from “embarking” on a book to entering a city—we've established conventions that keep us more or less continually informed about where we are and where we can (and can't) go next.

A glance at a book tells us whether it can be read in a day or a month. Skimming the table of contents helps us decide whether it's worth the commitment. Chapter titles, running heads and feet, and page numbers tell us where we are at any given moment. And the index enables us to escape the book's linear format and go directly to a point of interest. Any well-designed public building includes signs, directories, and numbering schemes (as well as doors and windows and other physical structures) that help us find our way in and about and out.

Your Web site's home page (or a page only one click away) should immediately and clearly answer two sets of questions:

- Where am I? Is this the right place?
- What's here? Is there anything I need? If so, where will I find it?

Some Web sites are packaged like a book: the home page serves like a book's cover to sell the contents. A separate “you are here” page serves as the site's table of contents. Sites that bury their contents run the risk of irritating potential visitors.

Study navigation tools used in well-designed CD-ROMs and other Web sites. Possibilities include interactive site maps, image maps, buttons, and hyperlinks, among others.

Some additional quick tips for effective navigation. This is by no means an exhaustive treatment, just a short list of our pet peeves.

- Don't make people work too hard—more than two or three clicks—to get to their desired

destination. Tunneling for information is generally no fun.

- Be consistent. Use the same small set of navigational tools on all pages, position them in the same location, and make sure they always mean the same thing.
- Avoid clever graphical icons that don't also communicate immediately and clearly. Making people go through an intellectual translation of your navigational icons, as in, “aha, a little cigar, cigar, hmmm. . . makes me think of reading. . . maybe that's a reading room. . . maybe there's hot news there?” Remember, graphical icons require downloading time. Sometimes the best icon is a word.
- Enable people to determine their current location at all times. Provide some sort of “you are here” device.
- Provide quick access to the home page or a site map, so that if people get lost they can re-orient themselves quickly.
- Avoid the “back-up-to-go-forward” phenomenon. Many Web sites break longer documents into small files for fast downloading. At the end of each section, you have to go back to the previous page to select the next page. Don't do this to your readers. If you expect something to be read in a particular order (if it's continuous information) but you want to break it into chunks, provide a link at the bottom of each page that leads directly to the next section.
- Use color, background, and other design elements to establish spatial and topical relationships that orient your visitors.

How will it look and feel (and sound)? Develop a design style guide.

Once you've determined what your site will contain and how it will be organized, you can focus in greater detail on the content's actual appearance. What design style will you use? What typefaces? What background colors? What types of graphics and animations? What naviga-

tional elements?

Web designs range from simple text with a graphic or two, to elaborate digital collages featuring audio, video, and animation. Design should be appropriate for your content, your audience's preferences and system configurations, and the content's intended use.

If you're providing copy for on-screen viewing, focus on legibility. Minimize the number of colors and fonts, keep paragraphs and line lengths short and leading or inter-line spacing open. Let the copy "breathe," so that the reader doesn't suffer claustrophobia or fear of too much work. If there's more copy than someone's likely to read at a single sitting, provide a summary or a sample that enables them to decide whether or not to save it for subsequent viewing or printing.

A style guide provides an overall set of rules that:

- Increases production efficiency because you don't have to keep making the same decisions over and over
- Helps you communicate design/style decisions across the organization
- Ensures visual and stylistic consistency within locations of your site and between your site and your company's other publications and products

A style guide might provide rules for the treatment for some or all of the following elements:

- *Headlines*: font, size, color
- *Copy*: font, size, color, leading, line length, inter paragraph spacing and indentation, story or article length, paragraph length, caption treatment
- *Graphics*: size, position, format, transparency, interleaved or non-interleaved, function (headline, illustration, navigation icon, etc.)
- *Color palette*: logo colors, text colors, background color
- *Logo treatment*: colors, position, size
- *"White space"*: open layout or tight
- *Design grids*: number of columns, width

in pixels

- *Navigational elements*: definition, placement

If you're designing material that will be viewed through an HTML browser (as opposed to PDF format), you'll have relatively little control over some of these design and typographic attributes. (For more information on HTML and PDF, see page 51 and 52.)

For one perspective on style guides for the World Wide Web, consult the Yale Center for Advanced Instructional Media style guide (<http://info.med.yale.edu/caim/stylemanual/>).

What functions will your Web site perform? Develop a functional specification.

Your Web site's design should reflect its anticipated use. While this may sound obvious, it's easy to forget—especially if you're entering Web design after years of designing books or magazines. The same sorts of "functional" questions that a print designer asks—Will readers start at the beginning and read through to the end? Will they skim it or digest it whole? Will they read it in the bathtub or on an airplane, or both?—should be asked of a Web site.

In thinking through the functional requirements for your Web site, consider these two broad issues:

- What functions should the site perform?
- How should your content be packaged (HTML, PDF, or both)?

For a discussion of how to package content, see page 51.

A Web site can perform functions as simple as serving Web pages or providing text-only e-mail messages, or as complex as conducting on-line searches, discussion groups, and commercial transactions. As simple as a small lending library or a literature rack or as complex as a research facility, video arcade, shopping cart, and cash register.

The following table lists some of the more common functions that Web sites currently per-

Function	Issues, considerations
Search for information on-line	<p>Will your content be long or complex enough that viewers will want to search rather than browse it?</p> <p>What do they know about what they're looking for? How will they want to search—by key word, date, subject, full text, natural language?</p>
Solicit information	<p>Do you intend to gather information from your visitors—for example, demographics, psychographics, product feedback?</p> <p>Will you want some messages to be sent automatically in response to specific predetermined subjects?</p> <p>Will you provide surveys for voluntary completion? Or will you provide an incentive of some kind?</p> <p>Will you provide password-based access to your site in exchange for demographic information?</p> <p>Will you ask everyone for information once (say the first time they visit your site) or will you want to solicit feedback periodically?</p> <p>How are you likely to use the information you gather? How will you reassure visitors that you'll protect their privacy?</p>
Transfer files	<p>Will you want visitors to be able to transfer files to and from your server?</p> <p>Will each customer need their own location on your server?</p>
Receive and respond to e-mail	<p>Will you want visitors to correspond with you electronically through your Web site? Send you feedback, provide suggestions, request information?</p> <p>How will you respond to mail? How often, in what format? Will you answer each e-mail personally? Will you post answers somewhere on your site?</p> <p>How will you reassure visitors that you won't abuse the privilege of having their e-mail address? Will you ask their permission to include them in future electronic mailings?</p>
Host discussions or newsgroups	<p>Do you intend your Web site as a "community of interest"? Will you host discussions or newsgroups where people can express their opinions, exchange information, find like minds, and so forth?</p> <p>What guidelines, if any, will you provide for participation? Subject matter? Acceptable language? How will you handle offensive behavior?</p> <p>How will you organize and provide access to past discussions? Will you provide a search capability?</p> <p>Will you provide a host or moderator with a personality and an editorial point of view?</p>
Purchase products	<p>Will you provide an on-line catalog from which people can make selections?</p> <p>Will you offer a "shopping cart" feature that enables people to mark desired products as they browse your site?</p> <p>Will you enable encrypted, on-line commercial transactions?</p> <p>Will you calculate price, tax, and shipping fees?</p> <p>Will customers complete the transaction on-line? Will they print out and fax or mail an order form? Will you provide an 800-number as an alternative way to complete the transaction? Will you provide information on local stores or field sales offices?</p>
Distribute products	<p>If your products can be distributed digitally, will you enable people to download products they've purchased on-line?</p>

form, and suggests some of the key issues to consider when deciding what functions your site might perform.

Prepare a functional specification or "spec" that describes in detail what your server must do. What actions will your visitors take and how will the

server respond? If you're gathering information from your visitors, what form will you collect it in, how will it be stored and subsequently used? Write it down, and be as specific as possible. Then you'll be able to hand it off to whoever advises you on server configuration and set-up.

For a discussion of content “packaging” strategies (HTML and PDF), see page 51.

How often will the contents change? Build a publication or programming schedule.

Established forms of media carry expectations about their “periodicity” or how often they’re published, how long they’ll be available, and when they will (and won’t) change.

Most books come out once in hardback, then again in paperback, with occasional reprinting to meet demand. Reference books may be published annually. Newspapers come out once or twice daily. Software applications are “launched” once and updated frequently, sometimes as often as every six months or more. Stock ticker prices change continually, as do displays tallying the earth’s population. Movies are “published” once—sometimes in several versions—but broadcast repeatedly at fixed schedules. Videos make movies available for broadcast on demand.

Web sites are setting their own new and still evolving expectations. Set clear guidelines for the periodicity of the material on your site. There are two reasons for this: first, so you can estimate the resources you’ll need; and second, to manage and meet your visitors’ expectations. How often will people need to return in order to keep up to date?

Tell visitors how current the information is and when they can expect it to change. If your site’s name doesn’t make it obvious (that is, a *weekly* newsletter, or a *daily* news feed), find other ways of managing expectations. Many sites include a tag line that says, “Last updated on...”

Review your content inventory and ask yourself how often the different kinds of content might change. Many Web sites are organized in part around the currency of the content, with one location for information that’s “hot” and another for historical information.

Prepare a publishing or programming schedule that clearly indicates the frequency with which new material will be published. This will help you assess

Web site design and design disciplines

Web sites run the gamut from staid libraries serving modest, text-based HTML files to gaudy “mega-sites” full of sound and motion and ringing cash registers. Some sites are “occasional”: they’re put up for a particu-

lar event (a collision of comets, a presidential election, a royal wedding) and dismantled like a circus tent when their time has passed.

But even the simplest site can call on a variety of design disciplines, as suggested in the table below. We’re not recommending that you hire an architect or an urban planner to build your Web site. We just want to

Discipline	Metaphor, product	Points of view, skills, ways of thinking, approaches to problem solving, areas of concern
Print	Page	Typography: how to make type support the readability and legibility of text White space: how to use white space to support the rhythm and pace of information consumption Relating text and static graphics: how to use images to support the meaning of text (or vice versa) Consistency: how to use design elements to establish a piece’s “rules” and then follow them Information design Navigation
Multimedia	Stage, storyboard	Time-based interactions, sequence and synchronicity Motion Sound Navigation Orientation
Architecture (residential, commercial)	Place, building	Spatial organization Look and feel of a place
Urban architecture, city planning	Public space	Coming and going Traffic Signage, navigational directions
Software programming	Software application	Interactivity Testing Anticipating what can go wrong
Interface design	Electronic interface	Usability Visual presentation and interactions
Community organizing	Community center	Fostering communities of interest Providing a place and activities around which people can gather
Event planning	Launch, opening, event	Fostering excitement, curiosity Gathering people in one location
HyperText design	Web	Information “chunking,” connections, associations, relationships
Theater	Stage	Creating suspense, action over time

5 How Will You Build It? Production Analysis and Planning

Now we're down to the nitty-gritty. How do you actually produce and deliver the well-designed content that will delight your visitors and enable them to help you meet your business goals? What tasks do you perform, in what order, with what tools? When do you serve documents in all-HTML format, when do you use Adobe's PDF format, and when do you mix HTML and embedded PDF in the same document? When do you use HTML editors and when page layout programs? When do you use animation applications and when illustration tools? What about printing? What about Shockwave, and Java, and CGI programming? And how do you choose the right server, anyway?

In this section, we'll take you step-by-step through a thinking process intended to flag key issues, describe current trends, help you get organized, and ultimately equip you to answer these questions for yourself.

A word of caution: nowhere are things changing faster than when it comes to Internet tools and technology. New product announcements, new development alliances, and new technology advances are made nearly every day. No doubt a year from now it will all be easier. Font standards will be in place, authoring tools will have matured, bandwidth will have increased—in general, conditions will be kinder. For now, remember that

you're a pioneer—expect to ford a cold stream or two. Bridges are being built, but you're just a bit ahead of the construction crew—out in front, where things are most exciting.

You'll see our acknowledged bias towards the Mac OS and its third-party developers most clearly in this section. Of course we're aware of the alternatives: there are many good authoring tools for competing platforms (and many of them also run on the Macintosh), and there are times when only a UNIX server will do (Apple also has one). It's just that, overall, when you look at ease-of-use (perhaps we should call it "ease-of-creativity") and elegant integration of rich media types, from drag-and-drop to plug-and-play, the Mac OS holds the gold medal.

In this section, we'll tackle the following questions and tasks:

- Exactly what are you going to make? *Analyze your content's production requirements.*
- What tools will you use? *Choose authoring tools.*
- What production tasks must you perform? *List production tasks.*
- How will you coordinate these tasks? *Plan your workflow.*
- How will you deliver your content? *Design your Web server configuration.*

To get started, let's use a hypothetical example. Imagine you're a publisher of adventure travel books known for high-quality design—elegant typography, beautiful photographs, true-to-life color. You've teamed up with an adventure travel company to co-sponsor an adventure travel Web site. Each week, you'll publish a book-and-trip review package for a new destination. (Your audience will primarily browse your site from their homes, using 14.4-baud or 28.8-baud modems connected to 256-color systems.) The content you'll develop includes:

- A short book review intended for on-screen reading.
- An entire chapter from the book itself, for people to download and read.
- Several photographs of the featured destination.
- A short video clip of the featured destination.
- An animated itinerary.
- An audio recording of the book's author telling one of her travel adventures.
- An order form, so that people can place a book order while they're still inspired by the author's voice.

Eventually, you'll enable people to make trip reservations directly from your site. And eventually, the table of trip costs will update dynamically to reflect changes in airfare and ground transportation costs. But even though it's technically feasible now, you've decided to start modestly, develop your skill and confidence, and take those next two steps in six to twelve months.

How should you proceed?

Exactly what are you going to make? Analyze your content's production requirements.

Producing simple HTML text files (perhaps with one or two graphics) demands a different and simpler set of tools and production strategy than creating complex, media-rich content with interactive forms served up dynamically in response to a visitor's profile.

What do you already have, in what form? What else do you need?

Start by listing the content you'll need to produce or adapt. You may find it helpful to set up a Production Planning Worksheet like the one below. (If you've already taken a "content inventory," as described in the previous section, this should be straightforward.) For content that already exists, list its current format. If it's composed of parts that were integrated in a page layout or multimedia authoring application and that will need to be treated individually, list the parts.

Here's how you might begin to analyze the contents for the hypothetical adventure travel Web site we just described. For now, just focus on the first three columns, Content, Existing format, and Component parts. The remaining five columns will be treated as we go along. Please note that this table is not an actual detailed formula for a production workflow, but rather than an example of *how to think about organizing* for web production

Production Planning Worksheet

Content	Existing Format	Component parts	Intended use	Desired Quality	Tools	Web-ready format	Tasks
Short book review	Microsoft Word file	Headline	Read on-screen	High-quality typography, anti-aliased type	Adobe Photoshop with GIF 89a Export Plug-in	GIF graphic	<ol style="list-style-type: none"> 1. Cut and paste text from Word file to Photoshop file. 2. Apply fonts, color, anti-aliasing. 3. Save as GIF graphic. 4. Add tag in HTML file.
		Body copy	Read on-screen	Legible, fast downloading	Adobe PageMill	HTML file	<ol style="list-style-type: none"> 1. Cut and paste text from Word file to PageMill layout. 2. Apply HTML style tags.
Book excerpt	QuarkXPress file	Chapter title, subheads	One version to read on-screen	High-quality typography, anti-aliased type	Astrobyte BeyondPress	GIF graphic	<ol style="list-style-type: none"> 1. Open QuarkXPress document with Astrobyte BeyondPress XTension.
		Body copy		Legible, fast downloading		HTML file	<ol style="list-style-type: none"> 2. Use the BeyondPress Document Content palette and other controls to map QuarkXPress elements to Web-ready components. Convert chapter title and subheads to anti-aliased GIF images. Convert QuarkXPress style tags to HTML tags.
			Second version to download for subsequent printing	High-quality layout, typography: must preserve book layout	Adobe Acrobat	PDF file	<ol style="list-style-type: none"> 1. If necessary, revise document layout and format in QuarkXPress. 2. "Print" to Acrobat PDF Writer. 3. Insert link to PDF file in HTML document.
Photograph	TIFF file	None	One version to preview on-screen	Small file size for fast downloading	Adobe Photoshop with GIF 89a Export plug-in	JPEG graphic	<ol style="list-style-type: none"> 1. Scale image to preview size. 2. Export as JPEG. 3. Insert link to JPEG graphic in HTML document.
			Larger more detailed version to download for subsequent on-screen viewing	Larger, more detailed	Adobe Photoshop with GIF 89a Export plug-in	JPEG graphic	<ol style="list-style-type: none"> 1. Scale image to desired size. 2. Export as JPEG. 3. Insert link to JPEG graphic in HTML document
Infographic (line art)	EPS file	None	View on-screen	Small file size for fast downloading	Adobe Photoshop with GIF 89a Export plug-in	GIF graphic	<ol style="list-style-type: none"> 1. Scale image to desired size and anti-alias. 2. Export as GIF. 3. Insert link to GIF graphic in HTML document.
Video clip	QuickTime movie	None	View on-screen using QuickTime "fast-start" feature	Small file size for fast downloading	Adobe Premiere, Apple Internet Movie Tool	QuickTime movie	<ol style="list-style-type: none"> 1. Edit movie in Adobe Premiere. 2. Process as "fast-start" movie using Apple Internet Movie Tool. 3. Insert link to QuickTime movie in HTML document.
Itinerary animation	Director file	Will be used as a whole (no need to break into component parts)	View on-screen using Shockwave browser plug-in	Small file size for fast downloading	Macromedia Director with Afterburner	Shockwave file	<ol style="list-style-type: none"> 1. Edit animation in Macromedia Director. 2. Process as Shockwave file using Afterburner. 3. Insert link to Shockwave file in HTML document.
Audio recording	AIFF sound file	None	Listen "in place" in the browser window	Small file size for fast downloading	Macromedia SoundEdit 16 Movie Player	QuickTime movie	<ol style="list-style-type: none"> 1. Edit sound file in Macromedia SoundEdit. 2. Process as QuickTime movie using Movie Player. 3. Insert link to QuickTime movie in HTML document.
Order form	None	HTML page	Complete and submit form on-line	Simple design, fast execution	PageMill	HTML page with CGI script	<ol style="list-style-type: none"> 1. Use Adobe PageMill's form creation tools. 2. Work with programmer to create supporting CGI script.

How will your audience use your content?

Next, review your content inventory and ask yourself, how will people want to use or “consume” the content? Here are some possibilities:

Content for on-screen consumption and electronic distribution:

- View on-screen only
- Save now for on-screen viewing later (“disposable” or “just-in-case” viewing)
- Save for electronic distribution to others
- Cut and paste into other documents
- Content for printing and printed distribution:
- Print directly from the screen to a local printer, read, then toss (“disposable” printing)
- Download, print, and distribute to others in printed form
- Print directly to a remote site, such as a quick printer with short-run color capabilities

How you intend your audience to use the content will influence your choice of Web delivery strategy and production tools. We’ll come back to this issue in a moment. For now, just complete the “Intended Use” column in your *Production Planning Worksheet*, as suggested above.

What level of quality must you meet?

Finally, consider the level of quality required to satisfy your audience and meet your business goals. If you’re a design studio, you’ll want every aspect of your content to reinforce your reputation for fine design while satisfying your audience’s need for usability. If you’re engaged in “cross-media authoring” or integrated marketing across media, you’ll want key elements such as fonts, graphics, and color to reproduce consistently on screen and on paper. On the other hand, if you’re dispensing information in a context where image is unimportant, fine typography and high-quality graphics may not be priorities.

A general rule of thumb is: the higher the quality, the larger the file size—and hence the longer to download, view, and/or print. Production plan-

ning requires making informed decisions that balance quality with speed and convenience. Here are some quality-related variables you may want to consider:

- *Headlines*: Do you want to control font selection, size, leading, and kerning? Do you want headlines anti-aliased? Do you want to control the color?
- *Body copy*: Do you want to control font selection, size, leading, and line length? Do you want body copy anti-aliased? Do you want to control the color?
- *Layout*: How much control do you want over the exact placement of elements relative to each other and to the overall “page” dimensions?
- *Tables*: Must text wrap within cells of a table?
- *Line art*: What resolution do you want? What bit depth (8-bit or 16-bit) do you want? Do you need to provide a custom color palette? Must line art have a transparent background (so it will be silhouetted)? Must line art be anti-aliased? Will you want progressive rendering?
- *Photographs*: What resolution do you want? Will you want to supply both a small, low-res GIF version (for quick on-screen reference) plus a larger, higher-res JPEG or PDF version (for slower subsequent savoring)? Do you need to provide a custom color palette? Will you want progressive rendering?
- *Audio*: What sound quality do you want (sample rate, sampling resolution, compression rate)?
- *Video*: What image and sound quality do you want (spatial and temporal resolution, compression rate)? How large a frame size do you want?
- *Animation*: What color depth do you want? What display size do you want? What resolution do you want? What kind of performance (speed, perception of speed) do you want?

Based on your assessment of how your audience will use your content and the quality they

desire, fill in the “Desired Quality” column in your Production Planning Worksheet. For the hypothetical adventure travel Web site, it might look as shown in the *Production Planning Worksheet*.

Choosing a Web delivery strategy

Now for a very significant decision: Given your content, its anticipated use, and desired quality, what Web delivery strategy should you choose? In other words, what’s the best “substrate” to carry your ingredients (text files, animations, QuickTime movies, hyperlinks, etc.) from your server to your audience’s browser and ensure that your content looks and behaves the way you intend?

There are several approaches, ranging from HyperText Markup Language, to portable document formats such as Adobe’s PDF, to “proprietary” browser schemes such as QuarkImmedia Viewer. Each has its strengths and weakness, which must be matched to your priorities.

We’ll start with HTML.

What HTML does

HTML is a system that enables documents to be viewed on any computer, no matter what its operating system. HTML was originally designed to enable people working in government and academic research to exchange documents with only limited formatting, simple graphics, and “live” cross-references or links.

An HTML document is basically an ASCII text file to which various “tags” have been added.

HTML tags perform three functions:

- Identifies the structure of the document’s contents (first level heading, bulleted list, a phrase requiring emphasis, etc.). These formatting tags are used by a Web browser to determine the actual appearance of content on-screen.
- Identifies any additional media files delivered along with the HTML file (GIF or JPEG graphic, QuickTime movie, RealAudio sound, etc.). If the Web browser does not support an incoming

file type, it hands the file off to a “plug-in” or “helper application” that does. HTML thus serves as a platform-neutral “substrate” for delivering a variety of media types.

- Provides built-in “hot” links to other HTML pages.

HTML provides several significant benefits:

- Since it’s basically just ASCII text with tags, file sizes are small and hence transmission time is fast.
- It can be searched and retrieved by a variety of search engines.
- Virtually all Web browsers can display it.
- Virtually all makes and models of computer platforms, workstations, and “Internet appliances” can display it.

Applying HTML tags is relatively easy (if not very inspiring) work. Most word processing and page layout applications, include PageMaker 6.0, FrameMaker 5.0, and Internet Assistant for Microsoft Word, can generate HTML pages directly using various add-ons and filters. Astrobyte Beyond Press, a QuarkXTension, streamlines generating HTML pages from QuarkXPress documents. Adobe PageMill currently provides drag-and-drop HTML editing, and will soon support tables and embedded PDF files. And tools such as BBEedit enable HTML aficionados to work directly with HTML tags.

What HTML does not do

But HTML may not always be the best solution. Currently, a key limitation is that HTML’s formatting tags do not provide absolute control over many aspects of a document’s appearance—and especially typography—either on-screen or when printed. Many of the instructions it provides are relative rather than absolute: they’re interpreted differently in different browsing environments. For example, not knowing what fonts will be available on a particular system, HTML can only specify the relative emphasis with which some unknown font will be applied.

In effect, all you can say is, “give this lots of emphasis.” This might translate into **14 point Times Roman Bold** on one person’s screen, **12 point Helvetica Bold Oblique** on another, and *14 point Courier Oblique* on still another.

Ultimately, with HTML, how your content appears on your audience’s screen depends—not on *your* intention—but on *their* choice of browser, *their* browser preferences, and *their* font selection.

HTML’s tagging “vocabulary” continues to evolve to meet the demands of design- and media-rich Web content. As for fonts, Adobe and Microsoft have announced their intention to collaborate on a new universal font format called OpenType that will combine and optimize TrueType and Type 1 font technologies for delivery on the Internet. In addition, they have proposed a standard mechanism for embedding fonts in HTML documents, so that Web designers using HTML will no longer be dependent on their audience’s typographic taste. With so much corporate muscle behind it, a solution to the HTML font dilemma is only a matter of time.

PDF and Acrobat 3.0

Adobe has been quick to recognize the Internet as an ideal application for its Portable Document Format (PDF). PDF is a platform-independent language derived from PostScript for describing contents of highly “designed” documents for on-screen viewing and—especially—for printing. To create a PDF file, you use the Adobe Acrobat application (or a tool that can generate PDF directly, such as PageMaker 6.0 or Illustrator 6.0) to translate the document’s contents into PDF. This process is roughly analogous to “rasterizing” a print file or creating a “run-time” animation for CD-ROM. A PDF file preserves nearly all aspects of the original, including fonts, colors, and graphics. PDF also supports hyperlinks both within a PDF document and to external URLs.

Acrobat 3.0, recently released, offers a number of improvements over the previous version. Acrobat 3.0 provides on-the-fly antialiasing and progressive rendering of fonts, as well as progressive image decompression and rendering to speed up delivery and viewing of large bitmapped images. Acrobat 3.0 plug-ins for Netscape 2.0 and Microsoft Explorer 3.0 enable people to view PDF files from within their browser instead of switching to a separate helper application. Adobe has also introduced Web server software that can “byte-serve” PDF files one page at a time instead of downloading all pages before any one page can be viewed. All this currently comes at the price, however, of file sizes larger and transmission times longer than HTML.

HTML and PDF are not mutually exclusive strategies. In fact, you can combine the best features of both: when fast transmission is crucial and design integrity less so, HTML may be the better choice. When you want tight control over design, layout, and typography, either for viewing or printing, PDF will do the trick. And when you need both, use both: many sites provide both HTML and PDF versions of documents that may be first scanned quickly (HTML) and read more carefully later (PDF).

QuarkImmedia Viewer

Quark, Inc. has announced the QuarkImmedia XTension for QuarkXPress. Designed to enable QuarkXPress users to add time-based media and interactivity to QuarkXPress documents, Quark is positioning Immedia as an authoring solution for print, CD-ROM, kiosk, and the Web. Users create “run-time” files for viewing by anyone with the QuarkImmedia Viewer. Although Quark is distributing the viewer for free (and although the Internet enables anything digital to spread like wildfire), the current installed base of QuarkImmedia browsers is vastly smaller than that of HTML browsers with or without Acrobat plug-ins.

While basing a Web site today on QuarkImmedia content might not be a good strategy for the faint of heart, QuarkImmedia may eventually prove to be an excellent tool for Quark aficionados, an intriguing alternative to Director for print-savvy multimedia designers, and a Web design strategy worth experimenting with and watching. In the meantime, QuarkXPress users may be better off using BeyondPress to generate HTML pages, or Adobe Acrobat to make PDF documents, or both.

What tools will you use?

Choose authoring tools.

Selecting Web authoring tools can seem like an overwhelming task all by itself. First of all, there's the choice of authoring *platform*. Secondly, there's the choice of authoring *approach*, from HTML editing to Java programming. And third, there's the choice of individual *applications*.

As for the choice of platform, we've already revealed our preference: for ease-of-creativity, the Mac is unmatched. And authoring on the Macintosh platform doesn't commit you to using a Macintosh server (although there are real benefits to that as well). In fact, the Internet extends the reach of Macintosh-based creative development to pretty much any computer anywhere.

As for the choice of authoring approach and individual tools, we offer the following suggestions.

Leverage your expertise and content

Start with what you already know. You don't need to become an expert in HTML tagging unless you want to (and it's not that hard, if you do). Nearly all vendors of "conventional" design and

production applications, from word processors to page layout applications to multimedia authoring applications to hypermedia scripting tools, provide add-ons or extensions that enable you to prepare most if not all of your content using familiar tools.

If you intend to "re-express" existing content for publication on your Web site, your choice of tools will be dictated by the content's current form. If you have a library of files composed in QuarkXPress, consider using Astrobyte's Beyond Press. This XTension to QuarkXPress "decomposes" document elements and lists them on a palette, matching each element's qualities to appropriate HTML tags. You can either accept or override the proposed HTML codes. PageMaker 6.0 ships with an HTML-conversion utility that provides similar, if less powerful, features. (Limitations of HTML itself prevent many page layout attributes from being preserved in an HTML document.) If you're converting CD-ROM content created with Macromedia Director, use Macromedia's Afterburner application to create a Shockwave file that can be embedded in an HTML document and played back in Shockwave-equipped browsers.

A word of caution: Before you start to convert a document designed for one medium into a document for another, scrutinize it carefully for appropriateness. Should the text be edited, cut? Should the graphics be scaled, their color palettes modified or their bit depth reduced?

Here's a partial list of Web design and production tools that will enable you to build on your existing skills and content. In many cases, you can use these tools either to generate content tagged with HTML tags or you can create a PDF file (or both).

Approach	Application	Method
Print design	Adobe PageMaker 6.0	HTML Author plug-in
	Adobe PageMill 2.0	Build WYSIWYG HTML pages
	FrameMaker 5.1	HTML Export feature
	QuarkXPress 3.3	Astrobyte BeyondPress XTension
Multimedia design	Macromedia Authorware 3.5	Use Macromedia Afterburner application to generate a Shockwave file for embedding in HTML
	Macromedia Backstage	Use WYSIWYG Web page designer to create pages without programming, scripting, HTML coding
	Macromedia Director 5.0	Use Macromedia Afterburner application to generate a Shockwave file for embedding in an HTML page
	PowerProduction Software WebBurst	Build animated, interactive components using WebBurst's drag-and-drop Java applet creation tool, for embedding in an HTML page
Word processing	Microsoft Word 6.0.1	Use Internet Assistant to translate Word styles into HTML tags
	Nisus Writer 4.1	HTML authoring tools for WYSIWYG editing
Scripting	Allegiant Marionet 1.1	Build custom Internet applications
	AppleScript	Write CGI applications to customize Web server functionality; write AppleScripts to automate Web production
	UserLand Frontier 4.0.1	Write CGI applications to customize Web server functionality
Drawing and illustration	Adobe Illustrator 6.0	Use GIF 89a Export Plug-in to save as GIF or JPEG for embedding in an HTML page
	Adobe Photoshop 3.0.5	Use GIF 89a Export Plug-in to save as GIF or JPEG for embedding in an HTML page
	Fractal Painter 4	Save image in GIF or JPEG format or as clickable image map
	Macromedia FreeHand 5.5	Use Macromedia Afterburner application to generate a Shockwave file for embedding in an HTML page

Keep it simple

If you're just starting out, start simply. Match the complexity of your tools to your level of expertise. Don't bite off more than you really want to chew. There will be plenty of time to indulge in ever larger amounts, once you have some experience under your belt.

If you're "authoring" for the very first time in any medium, consider an application like Adobe's PageMill, which provides WYSIWYG, drag-and-drop Web page creation. You copy text from an existing word processing file, paste it into a new HTML document, choose menu-based HTML formatting tags to format the text (and any graphics you want), specify links to other locations, and you're ready to go. Thousands of people have

attended hour-long workshops sponsored by Adobe and Apple at which they've arrived eager but anxious would-be Web publishers and left confident authors of simple home pages.

Review your Production Planning Worksheet and identify tools appropriate for each type of content. In many cases, you'll find your choice being made by the requirements of existing content and your expertise.

What production tasks will you perform? List production tasks.

Web production workflows are analogous to those for print or CD-ROM. You begin by creating and assembling content, generally using tools specialized for individual content types. In fact, many are the same tools you're already using—

word processors, paint and illustration application, multimedia authoring and page layout applications, video and sound editing applications, and so forth.

Depending on the complexity of your content, you may want to spend some time thinking through exactly what tasks will be required in order to create and edit individual components, integrate them, and put them out onto your site.

Walking through the process step-by-step on paper before doing it for real enables you to verify your choice of authoring tools, streamline your workflow, reality-test production schedules, and

identify opportunities for automating repetitive tasks using tools such as AppleScript. It can also help you remember easily overlooked but important details, such as translating special characters into their appropriate HTML character codes (*%ccedil;* for *c*, or *##129;* for the trademark symbol, etc.). It's almost always worth the time and effort.

Here is a simple task list for our hypothetical Web adventure travel site. (Notice that in most cases there's more than one way to produce a given content element. This table is meant to suggest an approach to planning rather than provide a

Web Sites	URL
Adobe Systems, Inc.	http://www.adobe.com/studio/tips/techniques/
adobe.mag	http://www.adobemag.com
Apple Computer	http://www.apple.com
Creating Killer Web Sites	http://www.killersites.com
Macromedia	http://www.macromedia.com
Netscape	http://www.netscape.com
Books	Author (Source)
Designing Web Graphics: How to Prepare Images and Media for the Web	Lynda Weinman (http://www.mcp.com/newriders)
Creating Killer Web Sites: The Art of Third-Generation Site Design	David Siegel (Hayden Books, 1996)
Designing Business: Multiple Media, Multiple Disciplines	Clement Mok (Adobe Press, 1996)

blueprint for particular production tasks.)

For additional guidance on Web design and production, consult:

How will you coordinate these tasks? Plan your workflow.

So now the moment of truth—where to begin? We wish we could present a simple, one-size-fits-all workflow that would work perfectly for your Web site. But of course no two workflows will be alike. Depending on your content, your skills, your tools, and your company's business, you'll organize yourselves and your tasks uniquely.

Look for repeated tasks that can be automated. Look for redundant tasks that can be eliminated.

Make sure you look for routine, repetitive tasks that can be automated using tools such as AppleScript for writing scripts, or Debabelizer for batch file conversions.

How will you deliver your content? Design your Web server configuration.

As you've probably observed, there's far more technical information available about the Internet than there are resources for "thinking it through." In keeping with our mission (and the space constraints of printed material), we've tried to maintain our focus on the conceptual even in this section (which is necessarily technical), and descend into the innards of servers only when absolutely

necessary.

We'll start with a brief, relatively non-technical overview of what a server is. Then we'll review the key issues to consider when selecting this "engine" that will run your Web site. We hope to prepare you for a productive conversation with a consultant, value-added reseller, or systems integrator—whether that person is in-house, an outside resource, or even yourself.

For people who work on the creative or management side, the phrase "Internet server" may cause anxiety, conjuring up the seemingly alien language and culture of the MIS department or the UNIX programming team. But an Internet server really isn't as mysterious and unfathomable as it may sound.

Let's start with the basics. What is an Internet server, anyway? An Internet server is simply a computer—any computer—with a bigger-than-average (usually) hard disk, lots of memory (usually), and a reasonably fast microprocessor (its brain). This computer is connected via a "pipe" (anything from a modem to a T1 line) to the Internet, and runs one or more software applications that provide so-called Internet services.

Web server software packages establish conventions, or common languages (protocols), for handling tasks such as transferring Web pages tagged with HTML tags, looking up domain names and matching them to their corresponding network IP addresses, transferring files, sending e-mail, facilitating discussion groups, handling credit card transactions, etc. What makes a computer an Internet server is simply the software that runs on it. To add new capabilities, you add new software. Much of the software is off-the-shelf; some packages require a higher degree of set up, customizing, scripting, and integration than others.

Understanding the differences between the terms "Internet" and "Web" can be a little confusing. As you probably know, the World Wide Web is to the Internet as a state is to the country—a subdivision. Technically, a Web server is a comput-

er running software that provides the HyperText Transfer Protocol (HTTP), which in turn enables the transfer of pages tagged with HyperText Markup Language (HTML). In fact, you can add any number of additional so-called "Internet services" to your Web server, including:

- Transferring files (using File Transfer Protocol or FTP software)
- E-mail
- Discussion group
- Transaction services, such as "shopping cart" features, credit card authorization, encryption of commercial transactions, etc.

What determines a server's performance are the usual computing metrics: CPU processing power, hard disk space, amount of memory, how the computer's operating system handles certain tasks, etc. In addition, the capacity of the "pipe" that connects the server to the Internet affects its performance.

To choose a server, consider the following key questions:

- What is your budget (for hardware, software, support, and staffing or contract services)?
- What capacity do you need?
- How many people will visit your site per day or hour?
- At what speed(s) will your audience connect to your site?
- How complex is your content?
- How much "back-end processing" (receiving or serving information from a database, searching, handling commercial transactions, etc.) will your server do?
- What level of security do you require?
- How much experience, if any, do you have with system administration, programming, and maintenance? How easy must your server be to set up and administer?

Other things to ask yourself include:

- How easy is it to "re-deploy" a server you've outgrown?

- How costly is good consulting and support for your server?
- How easy will it be to increase your Web site's capacity or add new capabilities?

We'll take these questions one at a time.

What is your budget?

If your server budget (for hardware and software) is \$5,000, your choices are narrower and simpler (but still excellent) than if your budget is \$50,000. Server prices start at \$3,500 or so (for an entry-level Apple Internet Server Solution, including the server itself and an excellent selection of Web server software) and go on up to \$20,000 or more (for UNIX servers).

In putting together your budget, don't forget to add in the costs of whatever consulting or other outside services you might require (which vary more or less directly as the cost of the server). Outside services may be required for set up and configuration (if the server isn't easy to configure out of the box), custom programming (if you need specialized functions not available in off-the-shelf software), and training (especially if you're working with an unfamiliar operating system). You may also need help hooking up routers and setting up your telecommunication connection.

The other major expense for which you must budget are the costs of setting up and connecting your Web server. There are basically four components of these charges:

- one-time equipment purchases (servers, modems, and/or routers)
- one-time communication installation charges (that cover the cost of setting up and configuring whatever "pipe" connects your server to your Internet Service Provider)
- monthly communication charges (paid to the phone company for renting that "pipe")
- monthly ISP charge (paid to your ISP for providing you a connection to the Internet, and possibly for rental of additional equipment such as modems or routers on their end)

For more information on setting up a server,

consult Apple's white paper entitled *Getting Your Apple Internet Server Online: A Guide to Providing Internet Services* (available online at <http://product.info.apple.com/productinfo/tech/wp/aissup.html>).

What performance capacity do you need?

In some ways, this is the biggest, trickiest question of all, in part because there's a fair amount of mystique and misunderstanding both about how to measure performance capacity and about what performance capacity the average Web site requires. On the simplest level, the question to ask is, how many simultaneous connections will you need to provide? That is, at any given time, how many people are likely to try to log on to your server?

Consider what you know about your customers' behavior in analogous situations. For example, how many literature requests does your company receive per week? How many brochures do you hand out during a day at a trade show? What's your publication's current circulation (and how many of these people are wired for the Internet)? And so forth.

Not only will you need to estimate how many visitors you're likely to receive during a given period of time (per hour, per day, per week), you'll want to estimate how many people are likely to log on simultaneously. For example, will all one thousand of your daily visitors log on at 5 pm Eastern Standard Time?

Beware statistics for "hits" and "connections." Always find out exactly what such numbers refer to, and how they translate into an equivalent number of people (after all, it's people you're ultimately concerned with). In general, there's not a one-to-one correspondence between people and hits or connections. A "hit" is usually defined as a request to download a file. Thus, if a single HTML page has three graphics, a request for that page would register as four hits (one for the HTML page and three for the graphics). As for "connections," a

single browser may open several simultaneous connections in order to facilitate quick downloading. (That's why you'll sometimes see different percentages of completion flashing in your browser's status bar.)

Another factor to consider is whether your Web site will need to perform functions beyond handling requests for pages. For example, if you conduct surveys (which requires feeding information *into* a database) or provide a searching function (which requires drawing information *out of* a database), you'll need to increase the overall capacity of your site. This can be done either by purchasing a more powerful server, or by teaming your Web server with a database server that performs these tasks. Additional memory will help too.

Once you've made some assumptions about the potential number of visitors to your site, review what you know about how they're connected, and revisit your intentions for your content's complexity. This should give you some sound parameters within which to start building.

Finally, consider the following: if you anticipate high demand, you might assume you need the biggest, fastest server you can afford. Maybe. But not necessarily. There are pros and cons to the "biggest box" approach. Refer to the sidebar on server philosophy (page 58) for two different

perspectives.

What level of security do you require?

Security comes in several forms. They include:

- Protecting the actual contents of your Web site, both document files and system files, from tampering by idle or malicious visitors.
- Protecting your company's internal network from inquisitive people who might use your Internet connection as a door into your company's inner life.
- Protecting information (such as commercial transactions) transmitted across the Internet.

The best first step in building a secure server is to choose one based on the Macintosh operating system. The Macintosh OS provides no access to information outside the current "tree" of the hierarchical file system. That is, you can only view files and documents below your current position in the hierarchy. You cannot "climb" the tree and work your way into unauthorized areas.

While the UNIX operation system can be made very secure, it's harder to do—and therefore easier to do only partially or ineffectively. Also, since UNIX's "innards" are widely known (unlike those of the Mac OS), UNIX systems are more vulnerable to hackers. UNIX tends to default toward being open and accessible. Tight control requires consid-

Priming the Pump: Understanding Web Server Performance

A bit of theory to help you think about Web server performance. Building a server with the right capacity involves balancing several factors:

- The number of people who will visit your site per day or hour.
- The speed(s) at which they'll connect.
- The speed at which your server is connected to the Internet.
- The complexity of your content (how much sound, video, and interactivity it contains).
- The back-end processing functions, if any, your server will perform.

How are these factors related? Think of your Web

site as a municipal water pumping station. Your turbine (server) affects how much and how fast you can pump. But that alone doesn't determine how many customers you can serve or what their water pressure will be like.

Let's say your pumping station connects to your customers' houses by two kinds of pipes: those leading from your station to their streets (your Internet connection), and those leading from their streets into their houses (their Internet connections). Let's say that at some times during the day, ten people turn on their taps (connect to your server) and at other times, twenty people try. And, just to throw in one more variable, let's say you're not the average municipal pumping station:

erable work.

The second kind of security, a “firewall,” can be provided by setting your Web server outside your company’s network, and creating an AppleTalk® connection between them. This eliminates the continuity of the Internet TCP/IP protocol, so intruders can’t see the IP addresses of your company’s internal computers. Other firewall strategies include “proxy” servers and “packet-filter” software-based protection.

Additional degrees and kinds of security can be provided by server software. Most Macintosh-based Web server software provides two types of protection: access control and “realm” security. Access control enables you to screen would-be visitors by checking their Internet addresses against list of authorized and prohibited visitors. Realm control lets you divide your site’s contents into different areas or “realms” to which different groups of people have different degrees of access. For example, you could make one part of your site public and another part available only to paying subscribers or people who’ve provided you with demographic information in exchange for a password. Whereas access control manages who has access, realm control governs where they have access.

Finally, when it comes to protecting commer-

cial transactions, the most important recent development is the Secure Electronic Transmission (SET) standard agreed upon by Visa and MasterCard, along with Netscape, Microsoft, IBM, and other key players. SET, along with the evolution of encryption, authentication, and digital signature technology, will continue to advance the feasibility of conducting secure commerce across the Internet.

How much experience, if any, do you have with system administration, programming, and maintenance? How easy must your server be to set up and administer?

As with authoring tools, you’re probably better off working from what you know, if you can. Setting up a server can be as simple as taking the computer out of the box, plugging it in, setting a few configuration settings, and copying your content onto the hard disk. Or as complex as installing extra hardware components and software applications, writing custom programming, running complex set-up and configuration routines, and so forth.

Our advice? Don’t go for complexity unless you absolutely must. If your art director-Macintosh guru has volunteered to run your Web site, don’t

you can pump either water (simple content) or honey (media-rich content). Honey is sweeter, but harder to pump!

In an ideal plumbing world, your turbine’s capacity is perfectly matched to the capacity of the two kinds of pipes, which in turn are well-matched to each other, to the number of customers turning their taps at any given moment, and to the type of product (honey or water) you’re pumping. What you don’t want is:

- a huge engine forcing tons of honey through tiny pipes (either yours or theirs)—the tiny pipes are the constraint; or

- a tiny engine trying to fill huge pipes with water for hundreds of people—the tiny engine is the constraint.

Your server’s capacity must match your customers’ capacity to draw the kind of content you’re providing along connections of a certain capacity. If you’re serving small HTML pages to a small audience of 28.8-baud modems, you probably don’t need a \$20,000 UNIX server. If you’re serving media-rich content along T1 lines to hundreds of people an hour, you need a configuration capable of meeting that demand. So much for basic hydraulic theory.

give them a UNIX server. If all your experience is with graphical interfaces with drag-and-drop simplicity, think twice about an interface that demands entering text-based command lines. On the other hand, if your computing environment is composed of a mixture of Macs and PCs, and if you've already got UNIX expertise on hand, you're well-equipped to consider Apple's AIX Network Server solutions for the Internet, depending on your performance requirements.

How easy is it to maintain the server's content?

When it's time to publish—every hour, day, or week—how will you actually get the new files onto your server? If the server's in the next room, you can walk over with a ZIP cartridge and copy the contents onto the server's hard disk. But if the server's ten miles down the road or in another state, this may (or may not) be harder to do. And supposing several people in different locations are responsible for maintaining different sections

of the site's content? What remote file management features are available, and how easy are they to use?

For a Macintosh server on an Ethernet LAN, a Web master can use the Mac's built-in File Sharing and AppleTalk features to share selected contents of the Web server with a selected group of authoring workstations. To edit that folder's contents, individual authors simply enter a password, mount the server's icon on their desktop, and make the desired changes to the folder's contents. For a server that's not on a local area network, you can use Apple Remote Access or Farallon Timbuktu Pro to dial up the server and establish a connection. Once done, updating content is as straightforward as dragging and dropping file icons.

If you're working in a mixed computing environment, however, or if you're an all-Mac shop considering a UNIX server, you'll need to buy special software for each workstation that needs

Server
philosophy:
One big box
or Redundant
Array of
Inexpensive
Computers
(RAIC)?

In most cases, a Web site can be configured in more than one way. And there are different philosophical approaches to server configuration, arising out of different computing environments and traditions.

One approach, typically associated with UNIX, is to buy the biggest, most powerful box you can afford, and put everything you need on it. While a powerful server may singlehandedly be able to serve all the pages you need without breaking a sweat, this still may not be the best solution. If your one powerful server goes down, so does your whole Web site. And if you eventually outgrow that server's capacity, or add new serving functions to your Web site, reconfiguring a site based on one big box may be more difficult than one based on several smaller boxes.

Another approach, favored by Macintosh Web masters, is to use several smaller computers—a redundant array of inexpensive computers—instead of one huge one. This can be done in a couple of ways.

You can set up two or more identical so-called "mirror" servers, and distribute the load of serving across them. This approach, called "round robin" or "distributing load balancing," eliminates the impact of server failure or of downtime for server administration. If one server goes down, the others continue to function.

Another multiple-box approach involves assigning different functions to different servers. For example, one computer might act as your Web server, handling requests for HTML pages, while another handles back-end processing, responding to search requests and storing demographic information in a database.

Both of these multiple-box scenarios provide flexible scalability. For example, by investing an additional \$3,000-\$7,000 at a time, you can gradually increase your site's capacity. With a single big box, you may have to pay \$20,000 to increase your capacity—by far more than you currently need.

access to the “foreign” file system—that enables a Macintosh to speak to a UNIX server, for example.

As an adjunct, you can add File Transfer Protocol (FTP) software to your Web server, enabling remote file transfer.

How easy is it to redeploy a server you’ve outgrown?

What will you do when you outgrow your server? Can you redeploy it as a multimedia workstation? As a print server? Conversely, do you have existing equipment that could be pressed into service on behalf of your Web site? An advantage of Macintosh desktop computers as Web servers is their ability to perform a variety of roles, from design workstation to database server. Some Web sites serve HTML pages off an Apple Internet Server teamed up with a “recycled” Macintosh SE/30 to handle visitors’ e-mail.

How costly is good consulting and support for your server?

There are a variety of ways to make a computer do your bidding, from scripting tools such as AppleScript, JavaScript, and Frontier Userland on up to full-blown programming languages such as Java, C++ , and VisualBasic. Scripting is generally used to streamline or build on functions that a given application program already provides. By contrast, programming requires building the complete logic of a task from scratch. Scripting is generally less labor-intensive, less technically demanding, and less flexible and powerful. Programs generally take more skill to write, and execute their tasks faster.

A general rule of thumb: the simpler the solution, the less expensive the expertise required to implement it.

How easy will it be to increase your Web site’s capacity or add new capabilities?

How easy is it to increase your Web site’s

capacity—either to handle a greater number of visitors or to provide additional services such as extensive searching or commercial transactions? A component-based configuration—that is, one composed of several smaller computers instead of a single large one—can be easier to upgrade. When the number of visitors increases, simply add a “mirror” server or two to double or triple your capacity. Alternatively, you can move specialized functions, such as database processing, from your main Web server to another computer dedicated to CGI processing.

For more information on setting up a server, consult Apple’s white paper entitled *Getting Your Apple Internet Server Online: A Guide to Providing Internet Services* (available online at <http://product.info.apple.com/productinfo/tech/wp/aissup.html>).

Review and test, test, test

Print publishers are used to reviewing proofs, from “bluelines” to press proofs, to ensure that the right words and pictures are in the right places. Multimedia producers and software developers perform all kinds of tests, from interface testing to functional or “beta” testing, to make sure the CD-ROM or software application does what its designers intended. Usability testing is particularly important. Launching a Web site involves all of this, from proofreading to user testing.

Set up a development server separate from the server you’ll use to actually deliver content. If this isn’t possible, hook up your server and run it “privately” for several days prior to going public. Appoint beta test sites by giving them your URL address, and ask them to put your site through its paces. Solicit feedback on everything from content quality to download time.

Content review

Proofread copy. Print out page proofs and

check for all the same things you would if it were your company's annual report: spelling, copyrights, trademarks, etc. (Fortunately, both PageMill 2.0 and BBEedit 3.5 have built-in spellcheckers.)

Design testing

Test representative content on different computer configurations equipped with different browsers, fonts, and monitors, and at different dial-up speeds to simulate and troubleshoot the likely experiences of your audience. Look at down-

load time, color fidelity, and meaningful translation of color to black-and-white and gray-scale screens. This will provide feedback to overall design guidelines for content complexity, font and color selection, and so forth.

Pre-launch functional testing

Test everything. Can you simulate the anticipated volume of visitors and see whether your server holds up? Do your CGI scripts work? Does incoming information end up where it's supposed to? Do pages get served up exactly as you intend? Are

How Can You Make It Even Better? Maintenance, Evaluation, Evolution

Once your Web site is launched, then what? What does it take to keep it running smoothly? How can you tell if it's doing what you intend it to do, if it's meeting your business goal? How can you identify bottlenecks in order to tune system performance? How can you tell who's visiting your site and how much traffic you're getting? And when all this is old hat, what new frontiers can you explore next?

How will you maintain your Web site?

Maintaining a web site requires attending to:

- Editorial content (information freshness, accuracy, etc.)
- Technical content (link management, etc.)
- Technical infrastructure (connection capacity, etc.)

From a business and editorial standpoint, you must manage—and meet—your audience's expectations for “freshness.” If your business strategy requires that visitors stop by weekly, you must provide an incentive for them: something on your site must be new, not just from time to time or every three weeks, but every week. It's all too easy to launch a Web site and then lose interest—either because it doesn't pay off as soon as you'd hoped or because you bootstrapped the launch and don't have adequate sustaining resources. The Web is

full of sites launched with high hopes and now gathering dust, Web page headlines proclaiming, “New!” over fine print that says, “This page last updated December 12, 1995.”

Part of the promise of the Web as a whole (apart from any particular site) is that it's ideal for providing timely information. Be sure to meet not only your own explicit promises for timeliness (if you say new every week, make it so), but also the Web's implicit promise of currency. Ensure that all the information on your site, unless it's of historical interest, is as current as is feasible. Don't announce a new product or print a new brochure without updating the content on your site accordingly. Delete files that are no longer accurate (or that may have been wrong to begin with). In most cases, your Web site should be the source your readers or customers turn to for the most up-to-date news and information.

As far as the technical aspects of your site's content, maintenance involves making sure that all links are active and up-to-date, and that all back-end processing systems are operating smoothly. Following a link to a dead end does not inspire confidence. Nor does getting an error message when you're trying to submit a survey you've spent 20 minutes completing.

Link management can be tedious. Supposing

you rename, relocate, or delete an HTML page on your site. How do you find and update all the links to that page? Fortunately, there are site management tools, such as Adobe SiteMill, that can catalog the contents of your Web site and prepare a list of all links, incoming, outgoing, and within your site, along with their status. Other routine tasks might include checking and tuning your system's performance, maintaining the list of subscribers to a discussion group, and managing access to secure "realms" within your server's folder hierarchy.

Finally, you'll need to monitor your server's capacity. Are too many would-be visitors encountering a "busy signal" when trying to download a file from your server? If your site's traffic is increasing, is your current configuration—hardware, software, and Internet connection—still adequate? You'll want to plan well in advance, since upgrading your connection may take several months, and purchasing and setting up a server may take nearly as long.

How can you increase the success of your Web site?

Like fishing a new lake for the first time, maintaining a Web site requires active patience—you put on a lure, drop in a line, and see what happens. You may get lucky and immediately start pulling fish out in droves. But more likely you'll have to wait. And while you're waiting, you'll keep checking the line, testing different lures and locations. The point is, if you get bored and go home, you'll have no fish to fry.

So how do you know if your Web site is meeting your business goals? Well, like the fisherman, if you're lucky, your success may be obvious. If sales soar or subscriptions triple because of Web-generated leads, or if advertisers flock to your site, the signs will be clear.

But more likely, the results will be ambiguous. As with any business investment, you'll need to apply both science and art to evaluating and improving the success of your site.

There are several approaches you can take.

First of all, there are site-tracking tools. These range from features built into most Web server software applications that report on number of hits or connections, visitors' IP addresses, and so forth. Unfortunately, these numbers don't reveal much about who these people are: Are the same people coming back? Why? How often? What path do they take through the site? What do they do there? Where do they come from? Where do they go when they leave? Although "hit" statistics can help you adjust your server capacity, they don't provide much guidance for editorial decisions or budgeting considerations.

More sophisticated approaches are being developed rapidly. Some involve what's called "click-stream tracking"—the cyberspace equivalent of banding migratory birds for scientific study. These tools can record an entire visitor's session, from entry to exit, along with their previous location and their eventual next destination. You can use this information to identify the most effective parts of your Web site and "tweak" those that appear to have less draw. It can also help you evaluate the effectiveness of advertising and directory listings—either yours or others'.

Additional tools for evaluating the success of your site include audience surveys and e-mail feedback. Invite visitors to comment, and demonstrate how much you value their input: if possible, respond to each e-mail personally; if not, send an automated response. Consider publishing a "letters to the editor" section. If you conduct a survey, publicize the survey beforehand and publish selected results. (If you say "selected," you can justify eliminating bad news, if any, that wouldn't be useful to publicize.)

These tools work if people are actually visiting your site. Supposing you build it and nobody comes. If you've taken all the usual pains to publicize your site (press releases, mutual linking with appropriate sites, listing with registries and search sites), what do you do? Take a good hard look at

your operating assumptions. Are the people you need to reach on-line? If not, what will it take to get them on-line, and can you facilitate it? Is your content well-suited to electronic form? Is your content well-matched to the needs of your audience? Can people find what they want? If you haven't already, get objective feedback: invite people to be ruthlessly honest. Then go back to the drawing board, refine your plan based on what you've heard, and try again.

Where can you go from here?

Let's say your Web site is a modest (or even a huge) success, and you have a minute or two to consider the future. What will a typical Web site look like in a year? In five years? How will the Internet affect the business of communicating information? How will it affect us—not just our professions, but our daily lives?

First of all, we don't think the Internet is a fad. In time, it will become as widespread as the telephone, and its audience as heterogeneous. Whether what we call the "Internet" today winds up looking the same in five or ten or twenty years is an open question, but the underlying principles—ubiquitous access to people and information, interactive exchange anywhere anytime, virtual communities of interest, etc.—will find themselves realized in some form or other. Their possibilities are too compelling and, frankly, there are too many people investing too much money not to ensure that something comes of all of this.

In this section, we raise a few final questions for us all to ponder, as we collectively invent our future:

- Tools and technologies that extend computer-based communications into new realms will become pervasive. Personal digital assistants (PDAs) such as the Apple Newton will provide mobile Internet access, and extend applications for publishers' offerings. What will that mean for the kinds of information that people want to have?
- Internet appliances, such as those based on Apple's Pippin technology, will move the Internet from the office and the home office into the family room. How will this affect what we do with our leisure time? What impact will this have on television broadcasting? On publishing?
- Member/subscriber-only areas and/or pay-per-use Web sites will increase. What kinds of "communities of interest" can Web sites support? For what kinds of goods and services will people pay small amounts?
- A Web site exists simultaneously anywhere and nowhere. How will the Internet affect our notions of national and local boundaries? Our notions of community, identity?
- Strategies that combine mass storage technologies with fast access (such as the marriage of DVD and the Internet) will provide seamless integration of media-rich sources. How will publishers integrate and unify these various "conduits" of information?
- Our current notions of genre (book, magazine, TV program) and their associated traditions of periodicity (one-shot deal, monthly, weekly, etc.) will give way to a more fluid, less "object-oriented" approach. The traditional world of publishing is focused on the physical artifact (the book, the magazine, etc.) and not on the needs of the reader/consumer. This will change. Multipurpose templates animated with intelligent agents will bring desired information to individual desktops (or TV/tabletops) as it becomes available. How will the Internet affect our notions of genre? Of periodicity?
- As form gives way to content on the editorial side, publishing production will change. Cross-media authoring will become the norm. Publishers will provide a "buffet" of information, held in digital "warming dishes" (digital asset management systems), and ready to be served up by information consumers or their agents. If everyone's "front page" is different,

how will this affect our notions of a commonly held reality?

- Foreign local cultures will become even more susceptible to the blandishments of western commercial culture. Tibetans in Dharamsala, India will browse on-line catalogs for items that cost hundreds of times their annual income. What is our responsibility to use information technology wisely, subjecting our commercial instincts to moral review?

These are just some of the exciting, com-

elling, and sometimes unsettling questions for the very near future.

But we're not quite there yet—fortunately, because we have enough to think about already. Our final advice? Start small enough but start soon enough. Investing in a Web site now ensures that you'll have the experience and insight to take advantage of all the opportunities, predictable and unpredictable, that the next few years will offer—and impose. And look for partners, such as Apple, who understand how to make the complex simple, and how to make technology facilitate creative

About the Authors

Hatsy Thompson has made her living for most of the last fifteen years in the publishing, graphics arts, and high-tech industries. Hatsy currently works as a freelance writer and strategic marketing consultant, through Informing Arts and on her own. As a consultant, she helps high-tech clients recognize and meet market opportunities in publishing and new media. As a writer, she helps people in the publishing and new media markets understand and apply high-tech solutions.

Hatsy made her way into the computer industry in the mid-1980s, when she co-authored a book on desktop publishing to help pay for graduate courses in theology and psychology. Hatsy subsequently held positions in product management and marketing communications at Scitex America and Agfa, and served as a product marketing manager for Aldus' Interactive Publishing Group. Prior experience includes a variety of positions in advertising, graphic design, and television production.

Hatsy pursued graduate study at Harvard Divinity School and received her undergraduate degree with honors from Harvard University's Commission on Extension Courses. She can be reached by e-mail at hatsyt@halcyon.com, by telephone at (206) 522-7906, and by mail at 2318 North 56th Street, Seattle, WA 98103.

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Christine now works full-time in her own independent consulting firm, Informing Arts, which she founded in 1990. Before returning to her consulting practice in 1994, she served as Aldus' Director of Interactive Publishing, a new product development organization focused on emerging technologies for cross-media authoring and interactive publishing. Prior to that she spent four years at Apple, where she is credited with building the foundation for Apple's world-wide publishing business. Her wide-ranging marketing and technology experience includes senior product management positions for Hewlett-Packard and VisiCorp.

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