A system for the application of computer mediated communication to scholarly discourse

Bruce Duane Faw

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A SYSTEM FOR THE APPLICATION OF COMPUTER MEDIATED
COMMUNICATION TO SCHOLARLY DISCOURSE

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Interdisciplinary Studies

by
Bruce Duane Faw
September 1996
A SYSTEM FOR THE APPLICATION OF COMPUTER MEDIATED COMMUNICATION TO SCHOLARLY DISCOURSE

A Project
Presented to the Faculty of California State University, San Bernardino

by

Bruce Duane Faw
September 1996

Approved by:

C. E. Tapie Rohm, Chair, Information Management
Fred Jandt, Communications
Rowena Santiago, Education
ABSTRACT

This project will lead the publisher of a scholarly journal through the maze of electronic publishing—specifically, implementing a journal on the World Wide Web (WWW). It includes a step-by-step procedure, beginning with establishing a clear project concept and continuing through resource evaluation and allocation, selection of an Internet Service Provider (ISP), identification and selection of other critical products and services—and culminating with the full implementation and maintenance of an on-line journal.

This document is reproduced in hypertext format on the companion CD-ROM and is indexed via a detailed, hyperlinked outline. The hypertext version also uses hyperlinks to access referenced materials—both locally and via the WWW. In addition, the CD-ROM contains additional reference materials and a large selection of utility software, icons and images—including public domain freeware, shareware and commercial demonstration software.

Many of the included resources are also cross-linked to Internet sites containing additional documentation, registration and support information and software upgrades.
ACKNOWLEDGEMENTS

I would like to thank Dr. C. E. Tapie Rohm, who suggested this project and who has been an invaluable guide through the maze which is the scholastic publication process. I would also like to thank Dr. Fred Jandt, who has been an understanding, but firm, mentor in the field of communications and Dr. Rowena Santiago, who had to stretch herself a great deal to participate so intensely in my education. Between the three of them, I received both the challenges and the necessary guidance to achieve a truly interdisciplinary education--while being allowed to reach far beyond my own comfort zone to challenge the horizons of my abilities.

I would especially like to thank my parents, Duane and Lucile Faw, for their support, encouragement and proof reading skills. They have been subjected to many challenges of their patience and understanding over the last few years, but have always been supportive. Without their love and support I would not have been able to complete this phase of my education.

--Bruce Duane Faw, September 1996
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INTRODUCTION

Statement of Problem

The Global Internet and its subset known as the World Wide Web, or WWW, are rapidly transforming the way that information is stored and transferred. With the advent of instantaneous global information exchange via the Internet, researchers no longer can afford to wait the months or even years required for publishing in traditional scholarly journals. Yet the need remains for rigorous, peer review of detailed research results. The major delay in the journal publication cycle usually occurs between editorial approval of a set of papers and delivery of printed, bound hard copy for distribution. Paper and transportation costs may adversely effect the number of papers that can be published in a given journal, the number of individual copies printed and the total number of different journals published within a particular discipline.

In the rapidly changing, modern research environment, publication delays could significantly retard peer review and the process of cascaded development—where other researchers build upon the published discoveries of their predecessors. Long publishing lead times increase the probability of parallel or subsequent research being
published in an alternate, but more efficient publication—thus rendering the original paper obsolete or trivial.

By shifting from printed hard copy to electronic media, the journal publisher receives three simultaneous benefits: a significant reduction in publication cost, virtual elimination of transportation (delivery) cost and a significant reduction of publication lead time.

In addition, if the editor also requires electronic submission of manuscripts, the pre-publication cycle is greatly reduced—both in time and redundant effort. Manuscript retyping—which adds inherent errors and increases the overhead of proof reading—is virtually eliminated.

Current trade publications and guides to Internet publishing cover a wide variety of topics and generally fall into one of two categories: they are either written primarily as comprehensive, general guides to the vast resources available for Web publication—or they are detailed, specific manuals on one aspect of Website creation, such as Hypertext Markup Language (HTML) coding.

Because of this industry focus, journal publishers must review an enormous stream of information—most of which is far beyond the scope of their current needs—in order to determine the tools and skills best suited for their individual publishing project. Then they must acquire or subcontract for specific skills required to
design, construct, install and maintain a World Wide Website.

Project Definition and Scope

The purpose of this project was to provide the journal publisher with a step-by-step guide to publishing a scholarly journal on the Internet—whether or not a printed version of that journal exists. Although it contains a great deal of technical information which is essential to a well-planned implementation, it is written primarily for the publisher or project manager, and is not intended to be a universal reference manual for the technical work force. Human and budgetary resources are also considered, along with hardware and software needs.

This procedural guide is divided into two parts. The first part is a step-by-step algorithm, which is further divided into three chapters—each covering a separate, distinct phase of the publication process. These chapters are described in greater detail in the following section. The second part details the companion CD-ROM, which demonstrates the technology and contains many of the resources referenced in the text. The CD-ROM also contains a hypertext-linked (or hyper-linked) version of this entire document, with links to software programs and many related Internet resource sites.
CHAPTER I: THE PRE-IMPLEMENTATION OR PLANNING PHASE

Before beginning the arduous process of implementing an electronic journal, publishers must first define exactly what will be the format and content of the new journal. Many of the critical decisions—both technical and managerial—which must be made early, are examined here.

After defining the desired journal format, publishers need to review all available resources and compare them with those needed for the new publication. To better understand these needs, this chapter examines the hardware, software and services required to publish an electronic journal—including those specific to publishing on the Internet.

CHAPTER II: THE IMPLEMENTATION PHASE

Once the journal is defined and the essential resources identified and allocated, the publisher is ready to select an Internet Service Provider (ISP). Care is taken to identify and examine the most important criteria for selecting a provider, and to evaluate each criterion for relevance to the needs of the journal publisher. Then providers are evaluated for cost, availability, convenience and support—to finally arrive at an optimum selection of one or more providers to house the journal and provide editorial access to, and support software and services for the new Website.
References (and links in the electronic version) are provided to other resources—software, hardware, and support—to expand and enhance the basic Website and complement those resources provided by the new ISP(s). The various pricing and distribution methods for software products (freeware, shareware and demonstration versions) are also covered in this section.

CHAPTER III: THE POST-IMPLEMENTATION OR MAINTENANCE PHASE

Journal publication does not stop with the successful delivery of the first on-line issue—unless it was a one-time publication, with no feedback expected or desired. Since most journals are published on a preset schedule, editing the subsequent issue is often already in progress—before the current issue is activated on-line.

This chapter deals with the ongoing process of editing and managing an on-line publication. Important considerations include: how to deal with corrections and updates; what level of electronic mail integration, if any, will be used; whether electronic manuscript submissions will be allowed or even required; and, how to initially announce and continue to publicize the new journal.

CHAPTER IV: THE COMPANION CD-ROM

In addition to this printed document, a complete, hypertext linked version is included on the companion CD-ROM. This electronic version links the user to guides,
procedures and sample software, images and libraries which are referenced in the print version. It demonstrates the flexibility of electronic publishing and should be invaluable for assisting the journal publisher in the following stages of Website design:

- Evaluating existing resources and determining site requirements and electronic distribution methods
- "Make or buy" decisions. What services are already available and which need to be subcontracted?
- Evaluation criteria for selecting an Internet Service Provider (ISP)
- Selection criteria for platform-specific software packages
- Site layout and design decisions: balancing content vs. aesthetics
- Off-line development and testing of the Hyper-linked journal
- Creating the initial Website using a set of basic journal Web page templates which will allow rapid development of a prototype electronic journal
- Transferring the completed site to the ISP host server
- Final on-line testing and debugging
- Publication release and announcements (distribution)

**Project Limitations**

Many of the resources for this project are published or distributed electronically and are constantly undergoing revision, relocation and replacement. At the time of this reading, some resources may no longer be available at the Internet addresses specified. Many other resources appear
daily and may not all be included here. This guide is intended to be an extensive, but not exhaustive, treatment of available resources and techniques. The software included on the accompanying CD-ROM, the electronic mail (e-mail) addresses and Universal Resource Locators (URLs) specified herein and any pricing referenced in this document or the companion CD-ROM are the most current available as of May 1, 1996. Many are even more recent, as changes and updates continue until the final disk is pressed. To maintain long term accuracy and currency, updated URLs in the form of a Web browser bookmark file, named \textit{jrn1-bm.htm}--as well as a complete, unabridged version of this document and the current issues of the magazines referenced in the text--are published at the Internet addresses shown in Table 1. The bookmarks may be downloaded for use on the reader's own system. (Please note that Internet addresses are case sensitive. All addresses in Table 1 are in lower case.)

Many developmental resources--especially various software packages--have been included and/or classified for the more common operating systems. Consideration has been given to include information on all of the popular platforms--Unix, Macintosh, PC-DOS, and Windows. However, many software titles are only available for one or two of these environments.
Care has been taken to include as much current information as practical on each package, but this is a very volatile industry and changes occur constantly. When available, external links to reference and support sites and downloadable reference libraries have been included on the companion CD-ROM and will be archived separately in a regularly updated bookmark file on the Internet (see Table 1).

<table>
<thead>
<tr>
<th>Resource</th>
<th>Universal Resource Locator (URL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated Bookmarks</td>
<td><a href="http://www.eee.org/bobfaw/web/cd/jrn1-bm.htm">http://www.eee.org/bobfaw/web/cd/jrn1-bm.htm</a></td>
</tr>
<tr>
<td>Author's Home Page</td>
<td><a href="http://www.eee.org/bobfaw/">http://www.eee.org/bobfaw/</a></td>
</tr>
<tr>
<td>Author's Mirror</td>
<td><a href="http://www.iia.org/~fawb/">http://www.iia.org/~fawb/</a></td>
</tr>
<tr>
<td>CSUSB S.O.E.</td>
<td><a href="http://soe.csusb.edu/">http://soe.csusb.edu/</a></td>
</tr>
<tr>
<td>J.I.I.M.</td>
<td><a href="http://bpal.aic.csusb.edu/pages/students/info479/bfaw/jiim/">http://bpal.aic.csusb.edu/pages/students/info479/bfaw/jiim/</a></td>
</tr>
<tr>
<td>American Wine</td>
<td><a href="http://www.foodwine.com/food/wine/">http://www.foodwine.com/food/wine/</a></td>
</tr>
</tbody>
</table>

Due to limitations in readily available resources for CD-ROM development and software evaluation, this project was developed on a Microsoft Windows (3.1) platform and the
enclosed CD-ROM is in Windows/PC-DOS format. Most of the sample software is DOS or Windows based, but links are provided to sources for all of the major platforms.

Many of the technical terms used in this work are too new to have been absorbed into the language and included in reference lexicons. Although they might be considered by many to be "jargon", they are essential to any discussion of the topic and are included by necessity.

Some of these terms have several currently acceptable forms, and standardization may still be several years away. The spellings and capitalizations used herein reflect the most accepted general usage by the industry, itself, with additional weight--via capitalization--placed upon the Internet, the World Wide Web and their common derivatives: Web, Website, Webmaster, and Internet Service Provider.
PART ONE

IMPLEMENTING A SCHOLARLY JOURNAL ON THE WORLD WIDE WEB:
A STEP-BY-STEP ALGORITHM
CHAPTER I
THE PRE-IMPLEMENTATION OR PLANNING PHASE

Before an on-line journal can be implemented, the publishers must complete a substantial amount of planning. They must define the publication as to format and content and determine what resources will be required to complete the project.

Each publication has its own, specific needs. As previously stated, the following information is intended to be extensive, but not exhaustive. Few, if any, publishers need to be concerned with every item, while some will have a question or two which is not covered here.

The author intends for the system presented here to be a dynamic, expanding project with periodic updates. The Universal Resource Locators (URLs) referenced here and elsewhere in this project have been collected into "bookmark" or "hotlist" format for easy reference and use with most Web browsers. These links will be periodically updated to reflect normal movement of suppliers, software and document revisions and newly available Internet resources. The updated bookmark file will be maintained on an Internet Website (table 1), where it may be used directly or downloaded for use on a local system. That
Website will also provide a means for reader feedback. The author welcomes any comments, corrections or suggestions.

**Project Definition**

**Is There an Existing Journal?**

If the journal is new and there is to be no print version, then this sub-section will not apply and the reader may disregard it and proceed to the next section entitled "Features to Include in the Electronic Version."

If, on the other hand, a print version exists, consideration must be given to matching formats, graphics and features between the different media versions of the same issue. This is important in order to maintain a consistent identity and "feel" for the joint publication. If the print version is a staid, formal journal, then the on-line version should not be a fancy, flashy demonstration of the multi-media capabilities of the Internet—unless that happens to be the topic of the journal. It is important for the site designer to keep in mind the desired audience.

**Synchronizing Publishing Cycles**

Another prime consideration is the publishing cycle of each medium. The very nature of print publication calls for long lead times between final copy approval and distribution of complete volumes. When delivery time is
sacrificed as a trade-off for cost reduction, this lead time can be many months—perhaps a year or more.

On the other hand, when the approval process includes electronic formatting, that copy becomes an electronic "galley proof" and can be published on the web instantly. This leads to significant variances in potential publication dates between two media versions of what is, in fact, a single issue. The publisher must then make a policy decision, choosing between several options.

Delay the electronic version to coincide with the print version. While this ensures publishing coordination, it also defeats one of the major benefits of electronic publication—the elimination of significant delays in publishing time-critical information. If this option is chosen, an additional decision must be made whether to update the published journal electronically and, if so, when?

Publish the electronic version immediately and the print version when available. The best use of the combined media, this could severely impact subscriptions to the print version and thus the underwriting of print costs. Although there will always be a demand for the print version for libraries, reference shelves and the decreasing number of subscribers who lack Internet access, the committed subscriptions could very likely fall below the
minimum level needed to cover publication and distribution costs.

Try to find a balance between electronic and print publication dates. In other words, delay electronic publication by some set portion of the print publication lead time. This compromise appears to adopt the drawbacks of each medium without providing definitive benefits. It is not recommended—but is included for rigor, as a possible consideration.

Self-publish the print version in a fast, vanity-style manner to allow semi-synchronous distribution with the electronic version. This results in a lower quality print medium, but can be produced faster and more economically if the journal circulation is relatively low. This technique acknowledges the electronic medium as the primary publication and the print version as a hard copy, permanent reference version. The lower quality print version may, however, negatively impact journal prestige. It is also an impractical solution for periodicals with a large circulation, because of the high per-copy cost of this kind of printing. This option should only be considered by publications with relatively low-volume print runs.

"Buy down" publishing lead time by paying for expedited printing and delivery services. This is a particularly attractive option for moderate sized journals, whose total circulation is too small to allow the
substantial savings that long lead time publication options can offer larger volume periodicals—but too great to allow for economical short-run printing. In addition, slight changes in format, cover and binding methods, and other printer-dependent variables, plus reevaluating freight options may significantly reduce publication lead time with little, if any, impact on delivered cost. A local small press may produce an acceptable issue with substantial savings in lead time and transport charges. They may even include free delivery to local customers.

Eliminate the print publication entirely. This expedient, cost effective option may destroy the credibility and prestige of an existing scholarly publication. On the other hand, many modern publications are available only in electronic form. A complete discussion of the drawbacks and benefits of this option is beyond the scope of this document.

A combination of the above factors. Perhaps the optimum solution can be found by a limited implementation of two or more of the above suggestions. For instance, a publisher may find optimal benefit from a combination of immediate electronic publication; providing a short-run, quick turn-around self or vanity published hard copy version—by special order, at a higher price, for those who are not willing to wait—and then printing a longer lead time, standard reference version to be distributed to
libraries and scholars. This is similar in some ways to the standard publishing practice of releasing a combination of trade hard cover, trade paper and book club editions of the same book.

Another option--limiting availability of the full electronic edition to subscribers of the print version--may alleviate all of the problems. If so, the contents page, abstracts, and other basic support materials should still be available to the casual browser at no cost.

Publishing Cycle

With the advent of electronic publishing and some concessions to reduce print lead time as discussed above, some consideration should be given to the publication period of each. For instance, a quarterly print publication may now be able to provide monthly electronic versions with quarterly or annual hard copy publication. Many variations of this are possible for the imaginative publisher.

Multi-media Editions

Electronic publication automatically lends itself to disk format distribution. Individual issues may be distributed on diskette, or collected in a single compressed file for downloading. Complete volumes may be distributed on CD-ROM or high density removable media, such
as "Zip" (100,000,000 characters per disk) and "Jaz" (1,000,000,000 characters per disk) disks. Costs for electronically distributed issues and collections would vary with media type as well as content.

Features to Include in the Electronic Version

The current print journal, if any, must be reviewed feature-by-feature to decide which must be included in the electronic version and which (if any) should be omitted or modified. Also, consideration should be given to any new features, such as electronic mail submission forms and online discussion groups, which might be desirable additions to the electronic version. There are several additional factors to consider when making this decision.

Forms are handled in several ways over the Internet. They may be printed locally and then faxed or mailed back; they may be downloaded or screen-copied into a word processor and then printed and returned as above—or e-mailed or otherwise electronically submitted back to the appropriate person or department; or, they may take advantage of the electronic forms submission options of most Web browsers to collect input online, format it and submit it to an electronic processing robot for reformatting and integration into a database.

Graphics present few problems to a print medium, but become a major bottleneck for electronic transfer. Large,
multi-color images and logos should be evaluated for possible reformatting and color/shade optimization. A more complete analysis of these decisions is included in the following section.

Tables are handled differently on the World Wide Web. If they are included as a graphic, they will load slowly and will impede the flow of information. Most browsers allow some form of internal table construction and presentation that loads quickly is quite presentable. Alternatives may be presented for text-only browsers as discussed in the next section.

The Overall Journal Image: Content vs. Aesthetics

It is of paramount importance that the publisher decide at the start of the pre-publication process what exact image the on-line journal will present to the reader. This will effect many of the other decisions related to format and readability. If a print edition exists, the publisher must determine whether or not the electronic edition will emulate the "look" of the printed version--and if not, why? This is not a trivial decision. It will affect the overall image of the combined publications as perceived by the public.

Scholarly journals are often aesthetically challenged and can benefit greatly from the aesthetic enhancements
available from electronic publication. However, these 'enhancements' may be viewed as unnecessary and unscholarly frivolity by the publishers, contributors and/or readership of that journal.

Graphics

Many of the available enhancements may be trendy, but detract and distract from the actual content of the journal. As mentioned previously, graphics—while adding significantly to the aesthetics and presentation of materials—are a significant bottleneck to the overall data transfer rate. Images should be kept to a minimum, and optimized by one or more of the following methods.

Cropping. Most illustrations benefit aesthetically by well considered cropping. The process not only reduces, often significantly, the amount of non-essential image data presented, it may result in a substantial improvement in aesthetic presentation of the image itself.

Size Reduction. Is the image or graphic larger than required for comprehensive understanding? Many graphics are just as informative and presentable when reduced by half or more. Since graphic size is an area or square function, reducing both dimensions of an image by half actually reduces the file size (and therefore the download time) by a factor of four.
**Color and Gray Scale Reduction.** Most color graphics look fine as 256 color files, especially if optimized as explained below. Some graphics, particularly those created with paint or draw programs, are quite acceptable as sixteen-color images. The more colors enabled, the larger the graphics file and the longer it takes to load. A 256 color file is twice as large as a sixteen-color file. Increasing resolution to 64,000 colors doubles the file size again, while the "millions of colors" or "true colors" option increases it even more.

In black and white images, additional space may be saved by converting them to gray scale files—similar to newspaper and magazine files. Reducing the resolution to eight-bit gray scale saves additional space, and often has little, if any, effect on the final image. For line drawings and other non-shaded figures, reducing to single-bit threshold resolution not only reduces the file size still further, it may actually increase the clarity of the image by sharpening edge definition. This technique can result in larger, clearer images with a smaller file size than the original drawings.

**Color Palette Adjustment.** By selecting or optimizing the color palette used while finishing or modifying an image, an amazing range of colors can be displayed with a fairly small color palette. One optimized 216-color
"browser safe" palette is provided by Lynda Weinman, author of *Designing Web Graphics*. It may be downloaded free from her Website at [http://www.lynda.com/](http://www.lynda.com/) and omits the forty colors that differ between Macintosh and Windows browsers—hence the label "browser safe".

Posterization. Another technique for reducing colors is called posterization and is featured by most modern graphics editors. Posterization merges similar shades into a single optimal color by reducing the number of bits per color channel. This reduces the numbers of colors used by the image, allowing a much smaller color palette to provide reasonable resolution.

To be effective, posterization must be used in conjunction with reduction of the images' allowable colors. Posterization has a larger impact on GIF files than on JPEG files, and may actually increase the size of JPEG files (see below).

Table 2 shows the relationship in GIF files between bits per channel, colors allowed by the file format, colors actually used by the image and file size. The original file was a four bit-per-channel, sixteen million color image labeled "post4.GIF". It was then posterized and saved at different resolutions and color depths. Notice that posterization alone is not enough to significantly reduce the file size, but a balance between posterization
and color reduction can result in a substantially smaller file.

Figure 1 shows the visual effects of each method on image resolution. Notice that the optimum combination between screen resolution, colors, and file size is not necessarily a direct relationship.

TABLE 2
Interrelationship of Various Factors in GIF Format Graphics Files

<table>
<thead>
<tr>
<th>File Name</th>
<th>Bits per Channel</th>
<th>Colors Allowed</th>
<th>Colors Used</th>
<th>File Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>post1.GIF</td>
<td>1-bit</td>
<td>16M</td>
<td>8</td>
<td>26045</td>
</tr>
<tr>
<td>post1256.GIF</td>
<td>1-bit</td>
<td>256</td>
<td>8</td>
<td>5052</td>
</tr>
<tr>
<td>post116.GIF</td>
<td>1-bit</td>
<td>16</td>
<td>8</td>
<td>4190</td>
</tr>
<tr>
<td>post2.GIF</td>
<td>2-bit</td>
<td>16M</td>
<td>43</td>
<td>26045</td>
</tr>
<tr>
<td>post2256.GIF</td>
<td>2-bit</td>
<td>256</td>
<td>43</td>
<td>11232</td>
</tr>
<tr>
<td>post216.GIF</td>
<td>2-bit</td>
<td>16</td>
<td>15</td>
<td>7557</td>
</tr>
<tr>
<td>post3.GIF</td>
<td>3-bit</td>
<td>16M</td>
<td>138</td>
<td>26045</td>
</tr>
<tr>
<td>post3256.GIF</td>
<td>3-bit</td>
<td>256</td>
<td>138</td>
<td>18200</td>
</tr>
<tr>
<td>post316.GIF</td>
<td>3-bit</td>
<td>16</td>
<td>15</td>
<td>8834</td>
</tr>
<tr>
<td>post4.GIF</td>
<td>4-bit</td>
<td>16M</td>
<td>247</td>
<td>26045</td>
</tr>
<tr>
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<td>4-bit</td>
<td>256</td>
<td>247</td>
<td>25092</td>
</tr>
<tr>
<td>post416.GIF</td>
<td>4-bit</td>
<td>16</td>
<td>15</td>
<td>9482</td>
</tr>
<tr>
<td>post7.GIF</td>
<td>7-bit</td>
<td>16M</td>
<td>251</td>
<td>26045</td>
</tr>
<tr>
<td>post7256.GIF</td>
<td>7-bit</td>
<td>256</td>
<td>251</td>
<td>25977</td>
</tr>
<tr>
<td>post716.GIF</td>
<td>7-bit</td>
<td>16</td>
<td>16</td>
<td>9725</td>
</tr>
</tbody>
</table>

GIF versus JPEG file format. Although most modern graphics browsers will display Joint Photographers Exposition Graphic (JPEG) format files, early Hypertext Markup Language (HTML) 1.0 specifications did not require them to do so--and some still do not. The early specifications did require compliance to the CompuServe
Graphics Interchange Format (GIF) specifications, so GIF files will be displayed by all graphics browsers. If compatibility with the greatest number of readers is a priority, the publisher should consider restricting images to GIF files.

On the other hand, for highly complex, subtly shaded photographic quality images, where the image resolution is critical, JPEG files have better resolution and—with compression ratios of from 20:1 to 50:1 or greater—may be considerably smaller, and load much faster, than their GIF equivalent files.

But, since the JPEG specification is for 24-bits per pixel, in cases where the actual shading and color complexity of an image is limited, a JPEG file may be considerably larger than the GIF equivalent. Figure 2 illustrates the effect of manipulating the JPEG test file "test-16m.jpg". This file was created in Paint Shop Pro by printing text in different colors on a shaded background—randomly selected from a 16 million color universe to represent red, green, blue, yellow and orange.

Table 3 shows that simply saving the image as a GIF file reduced its size by nearly a third. Reducing the color palette to 256 colors made very little difference in the image resolution, except for background shading, but cut the file size by half again. Further reduction to sixteen colors had no detrimental effect on resolution, but
caused the colors to shift slightly to align with the available palette. If time were taken to create a palette from the original image and to include a solid background color (or none) in this palette, then reducing the palette to sixteen colors would result in exactly the same image resolution and shading as the sixteen million color file, but with a file size of a quarter of the sixteen million color GIF and only seventeen per cent of the original JPEG file.

TABLE 3

<table>
<thead>
<tr>
<th>File Name</th>
<th>Bits per Channel</th>
<th>Colors Allowed</th>
<th>Colors Used</th>
<th>File Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>test-16m.jpg</td>
<td>4-bit</td>
<td>16M</td>
<td>10829</td>
<td>13666</td>
</tr>
<tr>
<td>test-16m.GIF</td>
<td>4-bit</td>
<td>16M</td>
<td>97</td>
<td>9227</td>
</tr>
<tr>
<td>test-256.GIF</td>
<td>4-bit</td>
<td>256</td>
<td>93</td>
<td>4195</td>
</tr>
<tr>
<td>test-16.GIF</td>
<td>4-bit</td>
<td>16</td>
<td>15</td>
<td>2342</td>
</tr>
</tbody>
</table>

As shown in Table 4 and Figure 3, posterizing a JPEG file actually resulted in larger files of increasingly poorer quality. The file "post4.jpg" was created from the same source as "post4.GIF" in table 2, but saved as a JPEG file, instead of a GIF file--and then posterized in the same manner as the GIF files in table 2. Note that with a complex image like this, just saving it in JPEG format
resulted in a file half the size of the equivalent GIF file—with no discernable loss of resolution.

### TABLE 4

Results of Posterizing Complex JPEG Files

<table>
<thead>
<tr>
<th>File Name</th>
<th>Bits per Channel</th>
<th>Colors Allowed</th>
<th>Colors Used</th>
<th>File Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>post1.jpg</td>
<td>1-bit 16M</td>
<td>8</td>
<td>16526</td>
<td></td>
</tr>
<tr>
<td>post2.jpg</td>
<td>2-bit 16M</td>
<td>43</td>
<td>15448</td>
<td></td>
</tr>
<tr>
<td>post3.jpg</td>
<td>3-bit 16M</td>
<td>138</td>
<td>14761</td>
<td></td>
</tr>
<tr>
<td>post4.jpg</td>
<td>4-bit 16M</td>
<td>247</td>
<td>13941</td>
<td></td>
</tr>
<tr>
<td>post7.jpg</td>
<td>7-bit 16M</td>
<td>251</td>
<td>13944</td>
<td></td>
</tr>
</tbody>
</table>

**Interlaced Files.** Although they do not actually load any faster, interlaced files appear to do so because they load in segments, allowing other text and image files to share multiplexed load cycles. This gives the impression of simultaneous, parallel loading.

What actually happens with an interlaced file, is a sequenced loading of a coarse resolution version, followed by sequentially increasing resolution updates until the specified resolution is reached. This allows for early identification of graphics with only a small percentage of their actual file size transferred. It also allows text to load so that it can be read while the rest of the image is loading.

The end result is a Web page that appears to load much faster than it actually does, while allowing the user to
absorb the entire contents of the page long before the full resolution images are finished loading. This will often hold the interest of an impatient reader who would otherwise tire of a blank or incomplete screen and leave the page.

Interlacing is usually an option for files in the GIF format. Progressive JPEG files load in a fashion that resembles interlaced GIF files, but most browsers do not yet support the progressive JPEG format at the time of this writing.

The `<IMG>` Tag Width/Height Specification. Part of the benefits of interlaced GIF files can be achieved by using the `HEIGHT=`, `WIDTH=` specifications in the HTML `<IMG>` tag. This tells browsers that comply with Netscape HTML extensions exactly what area an image will take so that space can be reserved for it and the rest of the page can then be loaded concurrently. Not all browsers currently support these extensions.

The `HEIGHT` and `WIDTH` specifications can also be used to scale an image—presenting it in one size, although it was formatted for another. This is generally used to reduce and image for presentation. However, the entire image loads in its original size before any scaling occurs, so no time is saved by scaling down.

The proper place to resize a graphic is in the graphics editor. It is best to use a correctly sized image
with accurate height and width specifications, rather than relying on scaling by the browser.

**Text Only Browsers**

Many Internet users are still relying on terminal-based accounts with text-only browsers, such as the popular program, Lynx. These accounts are primarily on Unix or DOS-based systems which lack high speed graphics support (SLIP or PPP). Text-only browsers, as their name implies, display no images but show the tag "[IMAGE]" where a graphic would normally be placed. Many users disable graphics auto-loading to reduce page downloading time while searching the Internet. When they wish to see a specific image or page of images, they then manually initiate the load cycle by selecting the appropriate icon on their browser. Graphics browsers operating in text-only mode, display a small icon to signify the presence of a loadable image. Selecting this icon generally loads that individual image.

In order to communicate fully with both methods of text browsing, the Website designer should always use the "ALT=" specification in the <IMG> tag to identify the image contents to text-only browser. Alternatively, a separate caption may describe the image.
Text Formatting

Care should be taken when specifying fonts, point sizes and other text attributes, as there are different presentation techniques used by the various Web browsers. Presentation formats may vary widely between different stations using the same browser software, due to differences in user-specified display preferences. Unless elaborate fonts are a critical part of the message being presented, it is best to avoid them--because they will be displayed quite differently by each of the various Web browsers.

Should the Journal Register a Unique Domain Name?

What is a Domain Name?

A domain name is the unique text identifier for a specific Internet address. Virtually anyone can register an internet domain name with Internic, the entity responsible for allocating unique Internet Protocol (IP) addresses and domain names. In the United States, these domains usually end in .com (Commercial and personal accounts), .org (Organizations), .edu (Schools and other educational entities), .net (Internet Service Providers) or .gov (Government entities).

Internic charges an annual fee for maintaining a .com or .edu domain. In addition, if the publisher chooses to rent a Website from another host, the journal may be
charged a setup fee by that host for filing the paperwork—
and an additional annual fee for domain hosting services.
There may even be an additional charge if a virtual domain
name is used. Each of these charges may range from free to
$600.00 per year or more, so it pays to shop around and to
look for hidden costs. There is a detailed discussion on
these costs in the section on selecting and evaluating a
service provider.

The two requirements for registering a domain name
are: (1) it is available (not taken by someone else) and,
(2) the applicant has some right to that name. Bill Smith,
president of Tasty Burgers can no longer register
"McDonalds.com", but he can register "Smith.com",
"Tasty.com" or even "bill.com" or "burgers.com", assuming
that no one else owns that name. A good choice might be
"TastyBurgers.com", although this has the drawbacks of
being both a little long and using capital letters. Most
host servers run under some version of the Unix operating
system—which is case sensitive. It is best to use shorter
domain names, because domain names are an integral part of
each Universal Resource Locator (URL), the basic WWW
address. Longer domain names result in cumbersome
addresses—and greater chance on mis-keying or misreading
an address.
Why Would a Journal Want a Private Domain Name?

A private domain name offers a journal several benefits. One extremely important benefit is name recognition. If the domain name is MyJournal.com, it is much easier for a subscriber to locate the publication Website than if the journal address were:

http://www.someplace.com/~fred/resale/journals/your.kind/My journal/index.html. It is also looks more appealing on business cards, brochures and advertisements to have a short, memorable, identifiable Web address.

In addition to being more recognizable, individual domain names are usually shorter, easier to remember and offer less opportunities for keypunch errors. Busy people might be more likely to skip a long, complex URL than a short, concise one.

If the journal desires a personalized domain name, the implementation manager should make sure that any potential provider offers this service, and should establish in writing the total cost for any domain related services before contracting with an ISP.

Virtual Domain Addressing

An attractive alternative to the expense of creating a dedicated domain server is known as a Virtual Domain. The domain name must still be registered with Internic, but it can then be used as a redirection address that points to
another specific URL anywhere on the Internet—even a subdirectory of another domain, and even if that URL is the target of other domain names. The target URL would typically be the "Home page" or cover page for the journal. Virtual addressing allows the publisher to have a short Internet address, an to change providers or servers without changing the journal address.

In the above example, browsers selecting the virtual address "http://MyJournal.com" will be forwarded to "http://www.someplace.com/~fred/resale/journals/your.kind/Myjournal/index.html", transparently. They need only be concerned with the shorter, personalized address—the network takes care of the translation.

Personnel

Web publishing requires several special skills in addition to the skills required for traditional publishing. HTML coding, graphics processing, file transfer, forms design and processing, CGI programming and electronic mail (e-mail) are just a few of the skills a Web-based publication may require.

After determining the parameters for the new Web site and defining the publication itself, the publisher should prepare a complete list of skills required to complete the project. These skills should then be combined into job
descriptions for the key personnel. The topic of utilizing existing personnel will be covered in a later section.

Inter-Site Linking

A much wider base of new readers may be achieved by selectively exchanging links with related sites. A link is an embedded address in a hypertext document that transfers the browser to a different location. The linking address can be visible or hidden and the linked-to location may be an anchor (reference point) on the same page; a different page on the same server; or a completely different page, file, or document on a remote server--perhaps one in another country. The electronic (hypertext) version of this document is navigated by selecting links, which automatically redirect the browser to the next item of desired information.

There are advantages and disadvantages to cross-linking pages to other Websites. A link to another site is often considered a passive endorsement and any detrimental content on that site may reflect negatively back to the referring page. If not clearly specified as an external link, the linked-to site may even be mistaken for a part of the original journal. Also, since site addresses and their contents change often, and sites close for various reasons, care must be taken to police any external links diligently. Unsuccessful linkages or unexpected contact may say to the
reader that the host site is careless, uninformed, or incompetent.

In addition, permission to link to a remote site must be granted by that site's content administrator. If it is a site which is related to journal subject matter—as it should be to inspire a link—then it may be advantageous for both sites to exchange links, so that each will get the benefit of increased, new traffic from the other.

Linking to competitors offers conflicting benefits and problems. On one hand, a journal may lose readers to a more attractive or informative competitor. On the other hand, if a collection of external links covers a field of interest well, that site may become a reference site for the topic and serve as a "launching point" for researchers exploring that topic. This is a highly desirable situation, as it significantly increases traffic, which in turn increases the exposure to the journal's "message". This is part of the circulation of an electronic publication—not just paid subscribers—and offers a great deal of free advertisement for the journal.

Where applicable, advertising rates are directly related to traffic—especially when the customers are in a narrowly defined field of interest.
Will Back Issues be Archived?

If desired, past issues can be easily archived for future reference—especially if the site is initially designed to facilitate this. For instance, by the simple expedient of publishing the current issue in a subdirectory such as "/current/", each new issue will have the same address. This is important, as search engines run from weeks to months behind. A decision to maintain a permanent directory for the current issue will ensure that the search engines always point to the current issue.

An issue may be tested in a temporary on-line subdirectory, and then copied into the current directory—after copying the former issue into its own archival directory, such as "/spring96/". If relative addressing is used in HTML coding, the archive will run from the new directory without further editing.

With each separate issue residing in a unique subdirectory, access to an individual issue may be controlled by assigning user privilege levels. This is essential for publications where there is to be a charge for access to back issues.

Remember that every issue takes up a certain amount of space—which must also be allocated to each back issue. This additional space can be reduced significantly by relegating common graphics, forms and reference pages to a
shared directory or set of directories and using relative addressing to access them.

If the new electronic journal represents an existing print publication, the decision must be made whether to archive pre-electronic issues. If so, what is the oldest issue to be archived, and what will be the implementation schedule? Archiving each of these issues will entail the same efforts required to publish a new issue, and will require a significant allocation of resources.

**Existing Publishing Resource Evaluation**

If sufficient capital is available to finance a complete new project, this entire section may be omitted. However, even with adequate financing, it is a good idea to review the sub-section relating to personnel, as re-assigning existing employees often reaps significant benefits in terms of employee development, productivity and morale.

If, on the other hand, the project requires the project manager to keep a close watch on the purse strings, utilizing existing human resources may result in substantial savings in time and money, as well as contributing to employee retention.
Computer Hardware

The first step in evaluating existing resources is to inventory all available computer equipment—whether it is currently being used or not. Particular attention should be paid to both the potential capacity and the utilized capacity of each system. This process may identify hidden resources that have been previously overlooked. Even an obsolete computer might be upgraded for less money than a new purchase. In addition, powerful resources may be significantly under-utilized by untrained staff. Shifting of existing resources could provide all of the equipment needed for the new project.

Software

A similar inventory should be taken of software available, as well as the individual controlling each copy. Often, one person will inherit a software package from a previous employee in the same position, but have no use for it. Even if a software package is in use, the employee using it may be available for part time assignment or permanent transfer. Personnel usage is covered in the next section. A side benefit of a properly performed software inventory is a simultaneous software skills inventory, which is also covered below.

Software that can be useful in preparing for Web publication includes word and text processors; programs for
creating, editing, and converting graphic images and photos; communications packages; and a variety of Internet access and utility software. Much of this is either public domain 'freeware' or inexpensive 'shareware' that can be duplicated and used with little or no additional cost. Information on the specific costs and license fees, if any, is usually included in each downloadable package.

Personnel

Before a new Web publication project is launched, the publisher should take stock of existing human resources. Often existing personnel possess many of the required skills. Distributing a list of required skills often results in the discovery of unexpected abilities in employees. Sometimes it is more desirable to train an existing key employee in new skills than to hire or contract outside the company for those skills alone.

If required skills are not readily available, then the decision must be made to hire, subcontract, or use a temporary agency to obtain the desired skills. This decision is primarily one of corporate policy and financial status, and is beyond the scope of this guide.

Facilities

One of the benefits of electronic publishing—especially over the Internet—is that it facilitates performing various functions in widely diverse locations
and then transferring the results instantly to a central location, Webmaster or editor. Because of this flexibility, the publisher could create an entirely new division, staffed with people and equipment, without impacting existing physical facilities at all. Existing employees may be allowed to work from their current locations, while subcontractors or new employees may be able to telecommute from their own offices or homes.

Even when close proximity is required, existing facilities may often be used at minimal expense by shifting personnel within them. This, again is beyond the scope of this document.

Adaptability of Existing Resources

Although the bulk of this topic was covered within the individual sections dealing with evaluating these resources, a couple of points must be considered in relation to overall resource allocation.

What Portion of Present Resources May Be Applied to the Current Needs of the New Journal?

Can any of the identified surplus resources be diverted to, or shared by, this project? Is it within the company policy to do so? What chains of command must be followed to minimize interdepartmental friction? Are there any external restrictions (contractual obligations, union
rules, government regulations, etc.) on utilizing any of the existing resources?

What Resources Must Be Bought, Rented, Hired or Subcontracted?

Once available resources are applied to those required, what remains are acquisition needs. Company policy and the project budget must be weighed against the project manager's preferences and available resources to determine which capital items should be purchased, rented or leased.

Likewise, personnel requirements may be filled by hiring full-time or part-time employees, using temporary services, or job shops, subcontracting to independent contractors, or deferring this work to the Internet site provider—or a combination of these options. The decision is again primarily one of policy and economics.

Budget Evaluation

Although the majority of budgetary discussions lie beyond the scope of this guide, in order to ensure rigor as a step-by-step implementation guide, the key items must at least be identified.

Resources Transferable from Other Areas

As discussed previously, hardware, software, and personnel may be transferred or borrowed from other
departments or functions within the company—thereby having little, if any, impact on the overall net budget.

Additional Overhead Available

In addition to allocated—but surplus—resources, many companies have reserve funds, empty office space, warehoused equipment, clerical pools, and other unused—but budgeted—overhead items. Identification and utilization of these resources will also have little, if any, impact on overall budgeting.

Funds for New Resources

When all of the existing resources are consumed or eliminated, a source for new funds must be identified. Only after the complete availability of funds has been established can the final project budget be set and the project moved into the implementation phase.

In-house Versus Out-of-house Ratio

When acquiring goods or services, the decision must eventually be made to rely on in-house (internal) or out-of-house (external) resources. In-house resources are full-time and part-time employees; capital and expensed equipment; software; and company owned or controlled facilities. Out-of-house goods and services include the entire range of temporary help and subcontractors, plus rental equipment and the use of other services, equipment
and facilities provided by a third party—such as an Internet Service Provider.

In-house services offer the greatest amount of direct control over a project and—for extensive, long term projects—may also be the most cost effective.

External services generally call upon mature resources—trained and equipped personnel; complete, outfitted facilities; fully functional and initialized equipment and software; established communications systems; trained management and so forth. Through judicious use of external, skilled services, entire projects or selected portions of projects can be implemented with little or no start-up delays or capital expenditure. Getting the publication on-line in days or weeks, instead of months.

Unless an extensive Website is needed, it is usually both efficient and economical to rent space on an existing server. This eliminates the cost and lead time of setting up a private server; buying, installing and debugging software; and hiring new or training existing personnel. In a few days and for a few tens or hundreds of dollars—a journal could be on-line and functioning, rather than waiting months and costing thousands of dollars.

For one-time services such as set up and training, an outside contractor or consultant is usually the best choice for the money. There are advantages and disadvantages to both in-house and the various out-of-house options. Final
selection should be made based on each individual situation.

Attributes of In-house Resources

Since in-house resources are either employed, owned or controlled by the company, they offer the highest degree of direct control, fastest response, and greatest accountability.

They also require the greatest budgetary commitment to overhead. As mentioned earlier, company owned and operated equipment in company facilities often represents the most cost-effective solution to long-term, major undertakings, but can be prohibitively expensive and create unacceptable start-up delays for smaller projects.

Employees' time, capital equipment and office space must be paid for, even when they are idle. Although capital equipment and real property can be depreciated to offset some of this expense.

Attributes of Subcontractors and Consultants

Subcontractors and consultants offer a fair degree of control—especially when the work is done on-site at the publisher’s office. This control is limited, however, by the Internal Revenue Service’s ruling that having direct control over the hours of a contractor is sufficient cause in most cases, to change the relationship to that of employer-employee.
Contractors may be selected for a very narrow range of expertise, specialized equipment and software owned, industry contacts, or other specific factors. Because of these factors, they may deliver superior results in considerably less time and at an overall lower cost than an existing or potential employee.

Contractors can usually be scheduled with a great degree of flexibility, therefore allowing the publisher to use contract services only as needed, and just pay for the time used.

However--because of a combination of specialized knowledge and equipment, self-managed benefit programs, overhead, and uncertainty of business continuity--contractors often charge several times the hourly rate of an equivalent employee. Even so, a contractor may still provide the most cost effective solution to specialized services needs.

Attributes of ISP Provided Resources

When the Internet Service Provider (ISP) provides hardware, software and/or services to the publisher, that publisher has minimal control over the actual work done. After specifying what is required of the ISP and when that is due, the publisher is then at the mercy of the ISP, whose work schedule is totally independent. The publisher has very little influence over who works on his project, or
when and for how long. The ISP may even refuse a project or schedule. Much depends upon a combination of the original agreement, the ISP's intention to honor it and the publisher's ability to enforce compliance or otherwise motivate the ISP.

Being, by definition, an independent business, crises that arise effecting the ISP's own business will take precedence over those effecting the publisher's business. A strong, enforceable contract is a must when relying on a third party provider.

Many of the publisher's needs are limited by and dependent upon the ISP's own resources such as staff, expertise, software, hardware, and communications lines—as well as available time and, to some extent, finances.

On the other hand, many of the services that would normally be billable by third party developers, may be included by the ISP as part of a services package—and therefore quite cost-effective. Other services may be discounted compared to third party contractor prices.

Equipment provides by the ISP is effectively rented or leased by the publisher. It is often only a small, prorated portion of a larger system. Leasing equipment minimizes start-up costs and spreads them over a longer period of time—often without obligation to continue beyond a short, minimum, initial time period.
The ISP may offer a fast, complete, plug-and-play solution to the publisher with a running and tested journal on a local, off-line system.

Combinations of Two or More of the Above May Provide an Optimized Balance

Rarely does a single approach offer the optimum, long term solution to all of a publisher's requirements. Usually the best solution is a combination of in-house and out-of-house services.

A balanced solution may include hiring a public relations firm to design an overall journal image; a Web consultant to translate this image into practical, integrated, Internet page design and provide initial HTML coding; a secretarial service to keypunch manuscripts or a document service to scan them and convert them to text; and a full-featured ISP to host and publicize the initial site.

Once fully operational, HTML coding can be brought in-house using existing personnel or even trainees, and reviewed and debugged by a Web consultant or the ISP. New features and enhancements can be attempted in-house or bid out to the ISP, consultants or Web oriented marketing companies.

As the site grows in size, complexity and traffic, it may eventually become economical to bring it in-house by buying, building, or leasing a proprietary server.
Sometimes a server may be leased directly from the ISP, and housed at their main facility.

**Personnel**

Personnel issues have been adequately discussed elsewhere, but some benefit may be realized by summarizing them here.

1. Determine What Skills Are Needed
2. Determine What Skills Are Currently In-house
3. Establish Which Skills Must Be Hired and/or Contracted For?
4. Locate a Source for the Required Outside Skills
5. Continue to Review the In-house versus Out-of-house Balance Periodically

**Platform Selection**

The term "platform" refers to the combination computer/operating system on which a specific set of software runs or a database is stored. Since most operating systems are somewhat hardware dependent--but are installed to appear to be hardware independent to the casual user--the term "platform" often refers to just the operating system.

For instance, when a software package is said to be for the "Win95 platform," it actually means that it was designed to run on an IBM-PC compatible computer, operating under the current version of the Microsoft Windows 95
operating system—which in itself implies a certain minimum hardware configuration.

When designing a Website, two separate platforms must be accommodated. These are the developmental platform (or platforms), and the operational platform. The same platform may be used for both functions, or each may use a different one. When several development systems are used, they may even be using multiple platforms. When more than one platform is used in the development/operations cycle, careful attention must be paid to the issue of compatibility or inter-operability. Finished HTML coded pages are—by specification—platform independent. In other words, no matter where or how they were developed, they should run, unmodified, on any other platform.

In practice—or what is commonly referred to as "the real world" by the experts—this is not always the case. The more use made of advanced features, such as IMAGE MAPS and embedded forms, the more that platform dependent software, such as CGIs, must be used. By using remote server-side programs, platform independence may be retained, but at a cost of speed and reliability, and a dependence upon an often uncontrollable third party.

The industry trend is moving toward client-sided solutions, which integrate special processing into the end user's computer, thereby speeding up the process and
increasing reliability—while restricting the compatibility problem to the user and his browser software.

Several particulars must be considered and evaluated before selecting a developmental platform or platforms and an Internet Service Provider.

What Platforms (Macintosh, DOS, Windows NT, Unix) Are Currently In-house?

If the company uses only Macintosh systems, running Macintosh software and with operators that are primarily Macintosh oriented, it makes little sense to start development on a Windows system, unless there is a strong reason—such as hiring a Web designer who only has Microsoft Windows expertise. In that case, the manager must arrange for the software and hardware to support that platform.

On the other hand, Macintosh Web software and consultants are as plentiful as are those for Windows. The closer the developmental system matches existing in-house systems, the easier it will be to convert the extant magazine input (text and graphics files, etc.) to a finished Website.

What Platform Does the Preferred ISP Use?

Although not essential, matching the developmental platform with the operational platform, will minimize compatibility problems and gain the ability to test server-
sided software off-line by installing it on the in-house developmental system. Duplicating the server-sided functions with software which runs on a different type of local system is a less desirable, but usable solution. However, this is a major cause of "glitches" or unexpected compatibility problems. When platforms can be matched with minimal trade-offs, it is always better to do so to ensure compatibility.

The platform used by the ISP is one of the minor considerations addressed later in the section about selection criteria for ISPs.

What Is the Optimum Platform for Project Development?

In addition to being compatible with existing platforms at the offices of the publisher and the ISP, there are other important considerations in selecting a development platform. If plans include hiring an outside developer or Web consultant, consideration must be given to their own development platform, or a lot of valuable time might be wasted chasing down small compatibility "glitches" in addition to having to support multiple versions of "equivalent" software.

There are also many special-function utility software packages that do not run on the full spectrum of the popular platforms--often running on only one or two of them. Even the multi-platform packages may not support all
of their features on all platforms. If a special software package--such as a database manager or proprietary software package--is to be used, or a platform dependent utility package is essential to the operation, then the developmental and/or operational platform may already be selected by default.

If this is the case, it should be realized in the pre-implementation phase--before resources are committed to a platform that must be replaced or, worse, require continual translation of data from one platform to the other.

Platform Acquisition Cost and Ongoing Hardware and Software Maintenance Overhead

There is an extremely wide gap in price and performance between the various developmental and operational platforms. At one end, developers are quite successful using a used Macintosh SE-30 purchased for a couple of hundred dollars. If it breaks, it can be replaced in its entirety quickly and cheaply.

At the other end of the spectrum are the big "Unix boxes" like the work stations sold by Sun Microsystems. Extremely powerful and fast, they run on the versatile Unix operating system, but both the hardware and the software maintenance costs of these systems are considerably higher than the acquisition costs of many lesser systems. Unless the publisher is planning to host many other clients, this
Windows NT and Macintosh operating systems are relatively inexpensive to maintain—as are the hardware platforms that host them. Unix, however, is an older, terminal based, "mainframe" operating system that has been ported down for use on cheaper hardware. While it is extremely powerful, Unix gains much of its power from its complexity and therefore is quite expensive to support. The hardware required for efficient operation is also expensive—as are spare parts and technical support labor.

Many of the major ISP servers are "Unix boxes", but their acquisition costs, programming and maintenance are already calculated into the competitive pricing that the ISP is quoting. Their maintenance is the ISP's problem, and not the client's. The only concern of the publisher here is compatibility, and many of the CGI and PERL programming libraries are available for the Unix platform only. Availability of script libraries and the platforms those libraries operate on are other factors that might influence the selection of an ISP.

**Project Scheduling**

Once the project is firmly defined and the resources allocated, scheduling becomes very important. An entire project can be stalled, waiting for the output from a
single vendor or programmer that represents a critical path. Lack of attention to scheduling concerns at this point could endanger the entire project.

What Issue to start with?

If this an on-line version of an existing journal, choosing the first issue to take on-line is a critical decision. If an issue is selected that has a publication deadline critically close to the worst case operational estimate of the project schedule, then as that date approaches (and it will), a tremendous amount of stress is applied to a team that is probably already working at their maximum capacity. The result is generally a missed deadline and general disaster.

What Is the "Drop-Dead" On-line Date for The First Issue?

Once the first issue is selected, then a reasonable deadline should be selected, allowing plenty of margin for unexpected delays and problems. There will be many of each with the first issue—even if this guide is followed completely.

Schedule Other Benchmarks From There

Start at the deadline date and work backwards, choosing both a date and a responsible party for each benchmark. An excellent technique is to create a Programmed Evaluation and Review Technique (PERT) chart
diagraming the schedule and illustrating parallel processes and critical paths. This is especially helpful in identifying over-allocated resources, such as two separate parallel tasks planning to use the same personnel or equipment. Be sure to include in the schedule, any delivery or review lead times. Also add several review points early enough in the schedule to allow any accumulated problems to be detected and corrected—before they impact the final delivery date.

The following is a list of suggested benchmark items, listed in the approximate order encountered. It is neither necessary to include all of these steps, nor wise to omit items that may be pertinent to a specific publication. These guidelines are included as stimulus for thought and discussion and to help minimize overlooked steps.

a. Finalize basic issue design, departments, features and artwork
b. Article selection for the issue
c. Create basic HTML skeleton for issue and any features to be included, including cover, table of contents, authors data, graphics, subscription/submission forms, feedback methods and procedures (e-mail), index, and external links
d. Edit articles for content/format--order rewrites if needed
e. Finalize figures and tables for each article
f. Copy edit articles
g. Initial HTML coding of edited text
h. Integration of text, graphics, and tables into a homogeneous Web page set
I. Integration of individual articles into the complete issue
j. Final test of issue at off-line site
k. Issue a preview press release and distribute it
1. Move issue to remote server
m. On-site (un-announced) testing at a hidden URL
n. Move issue to final URL and enable it
o. Final global announcement of publication

Critical Path Monitoring

Critical paths are project or process stages that determine the starting points of subsequent stages. They are prerequisites which must be completed before another step may begin. Once critical paths are identified, each critical task should be assigned to a person who will be responsible for monitoring and, ultimately, ensuring that they are completed on schedule. These tasks can all be assigned to the same person or a variety of people—just as long as the person responsible also has the authority to take necessary action. Each task monitor should meet with the project manager periodically to ensure that all paths are open and on schedule.

Concurrent Operation

If both a paper and electronic version are to be published and the publishing cycles of each have been established as described above, then there are still three more items to be considered.

What Is the Data Flow of Materials Between Paper and Web Versions?

Since most of the source material will not only be shared, but will go through several edit and review cycles,
it is critical to establish flow control and establish a point at which the issue is declared "set" and no further changes allowed without the Project Manager's approval. At this stage the journal can be duplicated, with copies going to both publishing departments. Until this time, it is very important to maintain a single "master file", which contains all of the latest changes as soon as they are made. Multiple masters lead to inevitable and embarrassing mistakes.

Who Has Final Say On Content and any Policy Variances?

Although the ultimate authority lies with the Project Manager--usually the managing editor--authority may be delegated, but must reside in exactly one individual who has the final say in any conflict regarding content or policy variances in each journal issue.

In the Case of Conflicting Requirements for Shared Resources, Which Medium Gets Priority?

Since the paper version usually has longer lead time, there may not be any conflicts. By the time the electronic publishing team goes to work, the paper team should be finished. However, this is not always the case, so a priority order should be established before the implementation phase to avoid any such conflicts before they materialize.
CHAPTER II.
THE IMPLEMENTATION PHASE

Once the project has been defined, scheduled, and allocated resources, it is time to begin project implementation. For an electronic journal, this is the actual publication process. Until this point, interaction has been primarily within the publisher's own company, school or department. Project implementation requires dealing with--and depending upon--third party vendors for software, hardware, technical services and connection to the Internet.

Choosing an Internet Service Provider (ISP)

The most critical decision--the one that has the greatest impact on the schedule and success of the publication--is the selection of the Internet Service Provider, usually referred to as the ISP. A good ISP can be a strong asset to a first time Web publisher--providing services, suggestions and assistance to expedite the move on-line. A poor ISP can present an almost insurmountable barrier to an unsuspecting publisher. The Project Manager must consider many factors relating to resources--
availability, location, cost, server type and even management personality—when selecting an ISP.

Prioritization of Selection Criteria

Sometimes, the decision is already made and the ISP selection process becomes moot. Many companies and most institutes of higher education have their own dedicated servers, complete with domain name and Webmaster. Policy may dictate that the publication use this domain or create a separate sub-domain from it—even if this is not the ideal solution. Even in such cases, however, many of the factors discussed in this section—such as whether to set up a separate slaved server, or choosing a Webmaster—should still be considered.

In most instances, ISP selection is not a simple process. There are many factors to be considered when selecting an ISP. Some of these factors are far more important than others—while still others may not apply at all. By this time, the Project Manager should have already defined the publication's needs and prioritized them. The next step is to review the characteristics and criteria for selecting an ISP. Some of these become critical, while others are insignificant.

For instance, if the journal is published by a department of a major university, the publisher and his staff may already have a direct Internet connection at
their desks and, even though they must go outside for a host for their publication, they have no need for dial-up access.

Another journal may be headquartered in an isolated area, and dial-up access may become a major cost. Therefore, inexpensive access and local dial-up numbers become critical factors in choosing an ISP.

Each publication will have a unique set of circumstances to deal with, so it is the responsibility of the project manager to prioritize the selection criteria for their specific situation.

Provider Type

There are several categories of provider, as well as different types of services provided. Not all categories of provider are available to all journal publishers. In the United States, a provider may be identified by type from the last group of letters in their domain name. The following paragraphs detail the most common of these.

Schools and Educational Facilities (.edu)

Scholarly Journals are often associated with institutions of higher learning. Because of this, they often have the resources of their associated school available at little or no cost. School policy (or government regulations for state schools) may forbid use of
educational facilities for this purpose, however—particularly if the journal is run for profit.

Often, a scholarly journal that is not directly affiliated with a university may find a home on an educational server provided by a school or department in a closely related field. The association between them may provide benefits and added prestige for both.

Educational servers are often available without charge, but may be inaccessible or even shut down during school holidays or between sessions. Even if they are left on-line, maintenance and support services may not be available.

One local educational provider (GINA) serving several thousand teachers and students, uses the California State University Network (CSUNet) as an Internet connectivity provider in San Bernardino, California. When the dial-up server failed in mid-December 1995, the school was closed for Christmas break, leaving a large number of customers without local dial-up service for several weeks, until returning maintenance personnel repaired it in early January. Problems like this must be foreseen and avoided when considering an educational provider.

Organizations (.org)

Many journals are the house organs of, or are otherwise related to, various professional or scientific
organizations and societies. These organizations may already have their own Internet presence, including a dedicated server and enough resources to house the new journal. Before seeking the more expensive commercial servers, some effort should be made to find out whether or not one of these servers is available for the publication at no--or substantially reduced--cost. Often organizational dues might cover some or part of the cost.

**Government Servers (.gov)**

Government publications may be able to use some of the existing government Web servers. This is one of the faster growing segments of the WWW, with intense effort by the current administration focused on getting the government on-line. An excellent window into the world of government on the Web is the server at fedworld.gov.

**Direct Access Providers (.com, .net)**

Most publications do not have ready access to free or subsidized-cost Web sites, and must seek services from a commercial provider. The number of providers of direct connect and dial-up Internet access have increased from a few dozen in 1994 to several thousand in May of 1996, and the number continues to grow. As the numbers increase, so do the areas served. Many small cities and even some rural areas are becoming home to direct access internet providers.
There is no standardization for pricing as yet, and the field is literally wide open. A Website which might cost less than $5.00 per month with one provider could conceivably cost over $1000.00 per month for the same services from another provider. It is best to know what type of usage is expected from the site, and then add in all of a provider's applicable charges to prevent a nasty surprise later.

Many providers do not allow any home pages (Web sites) at all on their servers--while others offer personal, but not business hosting. Those that do allow business Web sites often charge several times as much for them as they do for personal pages but usually bundle business accounts into "packages" containing many of the more popular "addons" for advanced Websites--such as an FTP download directory and large amounts of storage (disk) space. These considerations are also covered in greater detail later in this chapter.

Commercial Dial-up Services (.com)

Where direct access services are still not available, most areas have access to one or more of the well established commercial dial up services, some of which--like CompuServe--have been offering other on-line communications for years. Recently, CompuServe and their competitors America on Line (AOL), Delphi and Prodigy
started offering limited Internet access in addition to their historical services.

The rapid proliferation of direct access providers has substantially reduced the geographic regions where commercial dial-up providers are the only practical solution--forcing them to continuously struggle to upgrade the level of services offered, while controlling and even reducing the charges to the customers.

With little or no start-up fees, one month free access and up to 15 free hours on the Internet each month, these commercial dial-ups offer a fast, inexpensive way for an individual or small organization or business to gain Web access and experience--as long as the users manage to keep their access time under the maximum free hours. Once that point is crossed, the charges start rising rapidly. Some providers charge as much as three dollars an hour for "excess usage" fees. A heavy user could end up paying several hundred dollars a month with this type of provider.

Although each of these accounts offers some combination of local or toll free (800 or 888 number) access, electronic mail, and access to the World Wide Web via a graphical browser, most of these features are still limited in some ways, and most still do not allow personal--let alone commercial--home pages.
Account Type

There are several basic types of accounts, usually related to the type of provider. In this section, accounts will be classified by the types of service charges the providers levy. This is often directly related to the source of either their initial or operational funding.

Freenet and Organizational Accounts

While many Freenets are free to some segment, if not all, of their local community, others charge a nominal fee—to those that can afford to pay. Even the hosts which are completely free to local residents are usually also open to the general public—regardless of user location—for a very small and reasonable fee which is often paid one year at a time, in advance. Freenets are generally experimental Websites funded with a combination of public (government) money and donations by private foundations or corporations. Many times the donations are 'in kind' (ie. time, goods and services).

Services provided and related costs vary between freenets. Some allow commercial sites; some host home pages and journals; many do neither. There is some kind of Freenet in or near many major population centers in the United States and Canada.

In addition to Freenets, some Internet service organizations such as the International Internet
Association (IIA) and Nyx, offer free dial-up access, e-mail and personal home pages. Most of these do not allow commercial sites, but may allow a scholarly journal that is not run for profit. As low cost commercial Internet providers continue to proliferate, it is reasonable to expect freenets to eventually dwindle and vanish.

School Accounts

As mentioned earlier, many universities, K-12 schools, and school districts now have at least one server where they allow faculty and/or student accounts. Often considered "free", these are usually included in the registration fees that accompany tuition.

Schools rarely allow commercial use of these systems--especially if they are supported in any part by public funds (taxes). Non-profit and scholarly journals may have access to these servers, especially if there is a direct relationship of some sort between the journal and the hosting school.

Personal Accounts

Most of the direct access and commercial dial-up providers offer basic personal access accounts for very reasonable rates. Some offer home page hosting and others do not. Those that do, vary in the amount of space available and charges for additional space--when allowed. They also vary in the number of hours and times of day.
included in the "standard" rates. Extra charges for exceeding allowable time limits may also vary—from nothing to several dollars per hour. All of these factors are covered in greater detail later in this chapter.

Most personal accounts do not allow conducting business, piggy-backing (allowing someone else to use a sub-page of an account owner's space), or publishing periodicals, such as journals—although small vanity publications are common.

**Business or Commercial Accounts**

Most direct access (and a few commercial dial-up) providers sell commercial or business accounts. These accounts usually cost more than personal accounts, but have fewer restrictions and usually are larger. Most, but not all, of the direct access providers offer some form of Web page hosting, but as mentioned before there is a wide range of variance in the cost/service ratios between providers. This will be covered in greater detail later.

Two additional questions should be considered when evaluating a commercial account: first, do they provide a secure server (usually for an additional fee)? Secure servers are highly desirable when transferring personal and financial information over the Internet, due to the relative ease of capturing and decoding non-secured transmissions.
The other question or issue is whether or not they allow reselling (subletting) portions of the business Web site. A shopping mall may want to set up a site and charge each of its stores for Web space. A consulting firm may wish to sublet space to their clients. A journal may wish to provide pages for its staff or contributors, or even for the underwriters (sponsors).

Services Needed

Before comparing services offered by the various Internet Service Providers, it is essential to establish exactly which services are required by the publication. Some features, such as local, toll-free telephone dial-up access for their staff, Web page hosting, and electronic mail (e-mail), are essential for a journal, while others like nation-wide toll free access, credit card processing, and membership to a local enterprise group may not be of interest.

A publisher cannot make an informed decision without understanding what services are available and to what extent, if any, those services are required for their specific needs.

Basic Access Method

One way of defining an Internet account is by the manner in which it is accessed. There are three basic methods for accessing an Internet account:
Direct access accounts are those where the computer or terminal is hard-wired into the server—either directly or via some kind of network, such as a Local Area Network (LAN) or a Wide Area Network (WAN). Many school and corporate accounts are direct access.

Dial-up accounts require a telephone line and a modem to dial a remote computer for access. Dial-up providers usually offer local (toll free) access for some areas, but these may carry a local telephone company "message unit" fee. It is always best to compare dial-up access numbers with the local calling group (free) numbers in the front of the local phone book to determine if there is an additional charge for these calls. Some providers offer an "800" or "888" toll free number for remote access, but charge an hourly fee for its use. However, these fees usually translate into substantial savings over long distance rates charged by the telephone company.

Telnet-only accounts. An ISP may reduce the capital expense—and often high maintenance costs—of providing dial-up access, by only offering access to telnet users. Telnet is a method of communicating between two computers over the Internet. Each computer must already be connected to the Internet. Account privileges may vary from unlimited to very restricted.
Why would anyone want a Telnet account, if they already had internet access? To access a wider range of features, services, and other resources not provided by—or costing too much from—the local service provider. Many dial-up providers offer only very restricted, if any, Web page hosting services. The bulk of their resources are used for providing basic Internet access and e-mail—and perhaps offering their own, non-Internet services and databases. Few allow commercial Web pages and those that do, often offer only very limited services for high prices.

At the time of this writing, an individual may obtain a freenet account from the Los Angeles Freenet (LAFN) for $20.00 per year, with unlimited, 24 hour per day/seven day a week access and no toll charges. This provider focuses on inexpensive connectivity and e-mail services for the masses, and offers no home page hosting. They do, however, restrict access to one hour blocks, but a user can dial back in immediately, for another hour.

Providers in other areas—such as Nyx at the University of Denver—offer similar services for little or no cost. Nyx offers dial-up and telnet access, e-mail and a 100,000 byte (100kb) personal home page for free—but only has Denver telephone numbers. Los Angeles users can eliminate expensive long distance charges by opening an account at both sites, dialing into the LAFN and then telnetting to Nyx. Their only charge is the $20.00 per
year they pay LAFN for that account. For an additional $15.00 per year, the LAFN now offers SLIP and PPP (high speed graphic) accounts.

Many seemingly direct access accounts are actually telnet accounts. The user is connected to a local server via a local area network, or "LAN". When requesting access to an authorized Internet account, the user's software will transparently instruct the server to telnet to a remote host, log in, and then release the line to the user. The user appears to be directly connected to the remote host.

One way for a publication to charge for their journal is to provide a unique "user id" for each subscriber, and maintain a circulation database which only allows access to paid subscribers via the telnet "login" process.

Access Usage Considerations

Before choosing a provider, publishers need to know their approximate monthly dial-up usage, broken down by time of day. Although some providers offer unlimited access for one flat rate, many restrict the hours included in this rate and charge for any usage outside those hours. These excess usage charges may be a flat rate, or may use a rate schedule based on time-of-day and day-of-week, similar to telephone company charges. As noted earlier, choosing the wrong dial-up provider could cost hundreds of dollars a month for the unwary publisher.
The publisher must also establish internal policy on personal use of the publication's Internet access account. It is often necessary to allow some employees to access the system from home, and policy on access for personal use should be established before this begins.

If personal access is allowed, will employees be allowed unique e-mail accounts or share a central account? If home access is allowed, who pays for the toll charges, if any, for official use? For personal use? How are they kept separate? Often, if personal and/or home access is permitted, it is wise to find a provider that has enough local access ports so that most, if not all, of the expected usage is free of toll charges.

Electronic Mail (E-mail)

An important part of electronic communications is electronic mail, generally referred to as e-mail. One of the first uses of remote, electronic, computer mediated communications (CMC), e-mail allows fast, reliable "hard copy" communications between two or more persons which does not require the senders and recipients to be available at the same time. The nature of e-mail itself, and of modern e-mail processing programs, makes it simple to follow the time management technique of "answering on the original."

E-mail is a standard feature of most Internet accounts, but many providers only offer a single e-mail
address per account—requiring an internal "mail clerk" to receive, sort, and distribute the e-mail. This injects significant delays into electronic communications—along with the possibility of errors.

Some providers offer multiple e-mail address as part of a standard package, while others offer extra accounts for an additional fee—often per e-mail account.

Before choosing a provider, the publisher should establish a definite policy on e-mail usage—including the number of unique account names, or "aliases", to be used, who is to have them and who will service the e-mail. Care should be taken to provide for future expansion.

Choosing the account names themselves at this time could save more time later, when actually setting up the accounts. Several users may receive e-mail addressed to different mailboxes, but forwarded to a single e-mail address, allowing central processing with easier mail sorting—while giving the impression of unique addresses. This is called "virtual addressing" of e-mail.

Basic Website (Home Page) Size Requirements

Once the journal "image" is established and a basic format and size has been defined, the publisher can get a fairly accurate estimate of the amount of disk space—measured in Megabytes (MB) or millions of characters—-that each issue will require. Text-intensive journals, with few
figures or non-HTML coded tables may only require a few hundred kilobytes (KB) of space. Text only publications just require one byte per character (including spaces) of their finished journal--plus approximately ten percent overhead for HTML formatting.

Publications that rely heavily on graphics--especially those that are not optimized for Web use as described earlier--may require several megabytes per issue. If multiple issues are to be available from the same site, the total storage space required can be reduced by sharing common images, logos, documents and forms as detailed in Chapter I.

Since most providers place a maximum site size limit on each account, it is critical to accurately estimate the maximum size the account may reach over the next year or so. Once the maximum account size is reached, a provider may take one of the following actions:

**Ignore the excess usage.** This is not very likely, and if it does happen, cannot be expected to continue--and may result in eventual back-billing, if such is allowed by the service agreement. It is mentioned primarily to ensure complete enumeration of all possible options and warn the unwary of the folly of counting on the situation to continue, should it occur.
Charge an additional fee per megabyte used. This is a common policy, and excess usage charges are usually included in the standard pricing information. These fees may range from a few cents to many dollars per megabyte and may be negotiable prior to signing the final site agreement. If there is a stated limit—but no excess charges mentioned—a direct inquiry should be made to establish ISP policy and fees for excess site size. Otherwise, the publisher may eventually be presented with a very unpleasant and expensive surprise in the form of a bill for past services rendered.

Keep in mind that—at the time of this writing (May 1996)—the hard disk drives used for storing these accounts may be purchased for 20 cents or less per megabyte (the author just purchased a 1,080 MB SCSI interfaced drive for $220.00, and an IDE interfaced 1,600 MB drive was only nine dollars more). To then rent that space for any more than a dollar per megabyte per month seems ludicrous.

Make sure that the journal’s planned space requirements leave plenty of room for expansion. Also determine whether any excess storage fees are based on maximum or average daily site size. The account size may double for a few days while a new issue is being moved on-site, and then go back to normal when the old, non-archived issue is removed.
Upgrade the account. When a provider offers different sized accounts in different packages, bundled with other features, they may choose to upgrade an oversized account to the appropriate package. This may be done automatically or by notifying the account holder of the excess usage and giving them the option of deleting the excess, paying an overage charge, or upgrading the account type. Care should be taken when upgrading, since sometimes the accompanying options are different—but not necessarily better. One package that increases size may limit something else, such as allowable traffic.

Terminate the account. Some providers enforce their account size limits rigorously—terminating oversized accounts with little or no warning. This must obviously be avoided.

Expected Monthly Traffic (Usage)

For most sites, increased traffic means increased revenues and prestige. Attempting to limit traffic is usually counterproductive. Having established that, it is important to note that many providers monitor site traffic and establish a maximum monthly access volume per account, by account type.

ISP actions and fee structures for excess site traffic are similar to those for excess space usage, already described.
Sometimes it is desirable for a publication to reside at more than a single site. One site may allow unlimited traffic, but severely restrict disk space. This might be the ideal location for a single issue.

Archives might need to be stored on a different server, which might have low-volume traffic restrictions, but allow large Websites. These archives—and perhaps full-sized versions of smaller graphics from the current issue and complete documents which were only referenced at the basic site—may be transparently linked from the smaller Website—while appearing to actually be on the original server. Then, these larger files are only sent to subscribers who have specifically requested them—thereby greatly reducing the daily volume of traffic.

Domain Name Registration

Once a publisher has determined to register their own domain name, they must then decide who will do so—both within their organization and without. In addition to the internal responsibility for ensuring that it is completed satisfactorily, someone must actually contract with Internic and a Web site provider to register the new domain name. A domain name must reference a specific machine, either real or virtual, with a unique Internet Protocol (IP) address. This address is dependent upon several factors, including where the system is located and by what
route it is accessed. If the journal is not providing its own server, then the IP address will be dependent upon which provider is finally chosen.

Some providers may not allow any client domain names (or sub-domains), while others charge different fees—both one time set-up fees and recurring monthly or annual maintenance fees. In addition, Internic will directly bill the new domain name holder for the annual registration fee. Formerly a free service, domain name registration currently costs $50.00 per year, with Internic requiring the first two years' payment in advance.

Before applying for a domain name, it is a good idea to perform a cursory check for an existing domain using a program called "ping", or the "whois" server at telnet://whois.internic.net. The domain should be tried both with and without a "www." prefix. That prefix was initially used to identify a World Wide Web site within the superset of Internet domains. Although many currently feel that it is extraneous and just lengthens the final URL, it is possible that some search engines will skip over addresses without it and thus limit the ability of the general public to find it. This omission can be alleviated by directly notifying those search sites about the new journal.
Virtual Domains

Even if a provider refuses to allow sub-domains on their server, a unique domain name may be used for that site via the expedient of virtual domain addressing. A separate service company--such as pobox.com--which offers domain name registration services--may also offer virtual domain addressing. For a one time set-up fee plus an annual service fee, they will forward any traffic addressed to the virtual domain name on to the actual Web site of the journal. This is an instantaneous transaction and is transparent to both the user and the hosting server.

A simple virtual addressing scheme puts the browser into the root (home) directory of the server's domain, which can be inconvenient to someone who is trying to find the site through just the domain name, but does not know its unique subdirectory name. It also tarnishes the illusion of a proprietary server, which having a personalized domain name provides.

To overcome this, complete virtual addressing is usually available for a slightly higher fee. With this feature, a browser addressed to http://MyJournal.com/ would actually be forwarded to the absolute Web location which might look like:

http://www.someplace.com/~fred/resale/journals/your.kind/Myjournal/index.html
The casual browser would not know the difference. With full domain virtualization, a publisher can provide subdirectory and/or file name information as part of their virtual address. Thus, a Web browser seeking the URL:

"http://MyJournal.com/june96/pic.gif"

would look in the "june96" subdirectory of the physical Web site to find and return the graphic file "pic.gif."

**Required Support Utilities and Libraries**

For many applications, some support services are required at the server and others are desirable for convenience and expediency. There are several families of support utilities and resource libraries.

**Editors.** If a local text editor--such as "Pico" or "vi"--is available, minor editing may be done on-site--saving the many steps which downloading, editing, and file transfer normally requires. If on-site editing is allowed, however, care must be taken to retrieve the on-site edited master before remote editing is again attempted. Use of on-site editors requires a working knowledge of what are often complex, Unix-based software packages, and should be left to those with adequate knowledge and experience.

**File transfer support.** Once an issue has been tested in the local developmental environment, it must then be
transferred to the Website for final testing and formal publication. Getting the files that comprise a complete journal from the development site to the publishing Website is done using file transfer software.

If the server is either direct access, telnet, or a dial-up using a high speed graphics protocol—such as a Serial Line Internet Protocol (SLIP) or Point-to-Point Protocol (PPP), then files are generally transferred to and from the Website using a program type called File Transfer Protocol (FTP). There are several vendors of different FTP software for each of the various platforms. The National Center for Supercomputing Applications (NCSA) provides public domain versions of many types of programs—including FTP—for most platforms.

Users with terminal-type (text-only) dial-up accounts usually need some kind of communications software on their own computer that in turn uses one of the popular serial file transfer protocols, such as Kermit, X-modem, Y-modem, or Z-modem. In addition, the dial-up host must not only support that specific protocol—both systems must be using the same sub-version and options settings. It often takes a good deal of time to establish reliable communications and file transfer from these types of accounts (often called "shell" accounts, because the user has at least limited access to the Unix shell). Whenever possible, a minimum of a SLIP account should be used for dial-up
purposes--with a PPP account being even better. These are usually a lot faster and more powerful interfaces than the standard shell dial-ups provide.

Not all providers allow their customers file transfer capabilities and some that do, insist on receiving and reviewing all files via e-mail or magnetic media (diskette, tape, etc.) prior to installation. Providers usually charge for this "service" and consider themselves to be the site's Webmaster. These types of providers should be avoided, if possible, as long as there are other competent vendors available to do the work. Providers are usually more expensive, and primarily concerned with the priorities of their own site. A change that may only take the journal's Webmaster moments to complete via FTP, could take days to implement with this type of arrangement.

CGI support/libraries. Many advanced features, such as "forms" and "image maps", require a feature called Common Gateway Interface (CGI) support from the host system. This support can range anywhere from a simple subdirectory location in which to store user generated CGIs (Usually named "/cgi-bin/"), to providing libraries of generic CGIs and PERL and/or C++ scripts and programming support.
Some sites do not allow CGI usage at all, so if CGIs are required, site policy must be established prior to selecting an ISP.

**ISMAP support.** Image maps, often called ISMAPs after the HTML tag that defines them, are images—usually larger ones—that provide a graphic interface for links to other pages and sites. Using a pointing device such as a mouse, the user selects a specific portion of the image. "Clicking" the mouse button calls a CGI script to link the user's browser to a URL determined by the position of the cursor within the image, or ISMAP, when the selection button was pressed.

Since image maps are generally large graphics, they tend to load slowly, and their aesthetic appeal is often negated when the user becomes impatient and aborts the page loading process before the complete image has loaded. If an alternative text-only method of navigating is not also provided, many visitors to the site either can not or will not continue browsing that site.

Image maps can either be server-sided, where the decoding program is a remote CGI (generally programmed using PERL or C++) and resident in the binary subdirectory in the host server, or client-sided, where the decoding is inherent in the HTML coding for that page and requires the user's (or client's) browser to do the decoding.
Server-sided image maps have been used longer and are more widely supported than the client-sided maps, but they require substantial software support on the host Web server. Since all transactions go back and forth over the Internet, server-sided image maps take more Internet bandwidth, resulting in slower overall performance than the client-sided implementations.

Since client-sided maps are decoded on the user's own system, they translate faster and offer minimum Web loading. They also display the referenced link in most browsers, before it is selected—while the server-sided map only displays the coordinates of the pointing device within the image map, itself. Only the most recent versions of Web browsers support client-sided image maps—so if they are to be used in the journal Web pages, an alternate text-only method of navigating the site should also be supplied. This is a good general policy for all sites—even those without image maps.

Forms support/libraries. Again, some providers do not support forms—which require CGIs to decode and forward the information. Effective forms are difficult to create and require special handling of the output. However, when properly designed and interfaced with a data base manager program, they can greatly simplify the gathering and processing of huge amounts of information.
Many sites provide libraries of both simple and complex forms—as well as generic CGIs to process them. A few locations will even allow other Websites to link to their CGIs—alleviating the problem of Website designers not having local forms support. This works well with basic forms, but becomes a problem when extensive customization is required.

Other. Many other features are available on a wide variety of sites—and more are being offered almost daily. While very few of these features will concern the publisher of a scholarly journal, it is always a good idea to browse the World Wide Web regularly to stay familiar with the current trends in Web page design.

Some current fads—such as animated GIFs, Hot Java animations, and complex audio and video features—tend to waste an extraordinary amount of network bandwidth while providing very little real content. Unless the publication deals directly with such issues as multi-media or Internet trends, scholarly journals would do well to avoid such trendy temptations. They not only slow down page loading immensely, but they also detract from the actual content of the journal, adding a circus-like air to an otherwise serious publication.
Technical Support

Any service related company--especially an ISP--is only as good as their technical support performance. Even if the publisher has an in-house, fully qualified and experienced Webmaster, there will often be matters of interface and compatibility that need to be resolved with the ISP. There will also be times when the system is malfunctioning and the ISP is unaware of it, and must be notified by a user.

It is imperative that the ISP provides both a tech support phone line and an e-mail address where they can be reached. In addition, they must man these stations and provide prompt response—even if the response is just to acknowledge receipt and to defer full solution to a later, but specified, time.

For most publishers, support needs to be available twenty-four hours a day, seven days a week. This is referred to as "24/7" support. Even though normal office hours may be nine to five, Monday through Friday, deadlines do not respect convenience—and emergencies occur at all hours. Technical support should also be included as part of the normal monthly service fee and should not incur any additional charges—including long distance telephone charges.
Telephone Access Methods

Does the ISP provide sufficient local dial-up numbers so that all required journal personnel can access the account without incurring either long distance charges or paying for local message units? If they have a toll-free 800 or 888 number, or use a third party dial-up service such as SprintNet, is there an additional charge for this service? These hidden communications charges can add several hundred dollars to the monthly expenses.

Are the telephone numbers provided actually available when needed? During peak hours, many dial-up access numbers return "busy" signals. This is alleviated by the ISP committing to providing sufficient dial-up ports to cover all peak traffic. Even a commitment to a 95% service level allows them to be unavailable for over an hour a day. This is extremely likely to be the hour that they are most needed.

A possible solution to this may be to arrange for a second dial-up provider for back-up service. A no-frills, no-home page, unlimited access, local dial-up PPP account, with telnet access to the main Website, may cost as little as $10.00 per month--a very reasonably priced insurance policy, often with the added benefit of an additional e-mail address.

When employees are permitted (or required) to access the server from home or while traveling, and communications
charges accrue, what is the company policy about reimbursement: (1) when these calls are for company business? or (2) when they are for personal use? This policy should be established and published before such charges become a problem.

Services Available from the ISP and Related Costs

Once the publishers establish what services they require of an ISP, they are finally ready to start evaluating the various potential providers. The best place to locate service providers is on the Internet, itself. One good starting point is Yahoo's Providers list, at http://www.yahoo.com/Business_and_Economy/Companies/Internet_Services/Internet_Access_Providers/. Another is provided by Iworld at http://thelist.iworld.com/areacode/areacode.html which allows you to select providers by telephone area code.

Many ISPs provide an auto-mailer robot at a set e-mail address like "sales@provider.com" or "info@provider.net," where "provider.xxx" is the domain name of the provider. Any e-mail addressed to that address will automatically trigger the transmission of a standard rate and pricing sheet by return e-mail. These documents are often very confusing and usually incomplete. They usually do include an address for human contact, however.
The publisher should use these standard price sheets--in combination with the analysis just completed--to fill in the data asked for in this section. First, cross off any items determined irrelevant or non-applicable by the analysis in the previous section, then fill in the data provided by the robot, leaving blank any questions and concerns needed to be addressed by the human contact. Only when all of these issues have been adequately addressed by the top few candidates, can an informed choice of ISP be made.

**Basic Account Costs**

How much does a basic account cost? The definition of a "basic account" will vary, not only between providers, but between "packages" offered by a single ISP. When multiple packages are offered, the publisher must analyze each package as if it were a separate provider--in order to achieve an independent, objective evaluation of that service.

A basic account may entail many different services. Most of these services will be covered individually, later. This sub-section will outline considerations for a basic account--which should include dial-up and/or telnet access, File Transfer Protocol (FTP) support and at least one e-mail account. The project manager should also note any hourly limitations that may placed upon this access and
calculate the total estimated monthly access costs, based upon expected hours of service determined in the earlier analyses. The industry trend is moving toward providing unlimited Internet access for a single monthly rate.

Unless the publisher is already connected directly to the Internet, both dial-up and telnet access are required. They may be provided by a single ISP, or by a combination of providers. This guide will assist in determining the optimum choice.

Telnet access is needed for general maintenance and FTP support is required for transferring files to and from the remote site. Even with a local dial-up directly into the site, it is easier to use FTP than other communications protocols to access the account. In addition, if the publisher wisely subscribes to an alternate dial-up provider for emergency access, then telnet and remote FTP support will be essential to accessing their Website.

While a Website can be adequately maintained by a text-only terminal-based shell account, doing so takes an extra level of Webmaster expertise—and considerably more time—than maintenance via a high-speed, graphically interfaced, SLIP or PPP account. Therefore, it is highly recommended that publications restrict their searches to providers that offer a minimum of Serial Line Internet Protocol (SLIP) and, preferably the more efficient Point-to-Point Protocol (PPP). For that reason, the additional
requirements for maintaining a Unix shell account will only be minimally addressed in this guide.

As noted earlier, a critical item for analyzing the cost of a dial-up account is the total number of hours included the basic charge. If these hours are limited by the provider, then what limits are placed on "free" access, and at what times of day or week? Also, are additional charges imposed for exceeding these limits? A quick analysis of projected usage will translate this information into reasonably expected access charges.

Because of these hidden charges, an America Online (AOL) account that seemingly costs around ten dollars a month, may actually cost the heavy user several hundred dollars a month--while an equivalent account with AT&T would only cost around twenty dollars for the same usage; the Enterprise for Economic Excellence (EEE) would charge fifteen dollars and the LAFN would charge less than three (based on their annual fee of $35.00 for unlimited usage). It is extremely important to chose a dial-up provider carefully.

Electronic Mail (E-mail)

E-mail is an essential part of a journal's Internet presence and must be included in any Internet access account (or at least one of the providers, when multiple
accounts are used). E-mail is the direct link between the on-line publisher and their customers, the subscribers. If the earlier needs analysis determined that multiple e-mail accounts are needed, will they be provided by the ISP? If so, is there an additional cost for extra accounts? These questions should be answered for both multiple aliases directed to a single e-mail account and for multiple individual addresses, when available.

E-mail forwarding is another—often desirable—service. Can incoming e-mail be forwarded to another account, if required? If so, is there any additional charge for this service?

An excellent source of multiple aliases for a single e-mail account is the forwarding service provided by pobox.com. For an annual fee of $15.00 for the first three aliases, and $7.00 per year for each additional three aliases, they will forward all mail—with headers intact—to any single specified e-mail address. They also allow unlimited modification of the "forwarded to" account—thus providing their clients with complete freedom to change providers at will, while maintaining a consistent, short, personalized e-mail address.

**Home page/Basic Website**

The home page is where a publication resides. If an otherwise ideal dial-up service does not offer home page
hosting services, then the publisher should find another provider who does offer them--while also providing telnet access and FTP support so that the site may be maintained remotely from the more ideal dial-up site.

By now, the project manager should have an excellent idea of how much actual space will be required by each issue (plus archives, if required, and any basic information about the publication and/or publisher that may be placed on-site).

The next step is to ensure that any provider being considered offers sufficient space for the first year--and to establish the projected cost for that space, plus a reasonable margin for both error and growth.

If the maximum size of a basic account is less than these projections, then the price for additional space must be added in--calculated to the next higher storage increment (in MB) offered by the provider. If three megabytes are required and the provider only allows two, but charges a set fee for each additional five megabytes, the account must be costed based upon the total price for seven (2+5) megabytes--although only three will actually be used. This is an area that may be open to negotiation with the ISP, prior to finalizing an agreement.

This is also the time to establish whether there is a traffic limit on the account, along with an excess traffic charge to be levied when this limit is exceeded. If so,
calculate the worst case charges, based upon the most optimistic projections of circulation and growth for the coming year. Traffic estimation should also consider the sizes of the different pages to be viewed—including the graphics—as this is an integral part of calculating traffic. Remember also that an excess traffic charge literally taxes the journal for success, and as such, is counter-productive.

Domain Name Registration

If domain name registration has been decided on, then the project manager must either select an ISP that provides those services, or contract with a third party provider, such as pobox.com, who provides virtual domain addressing for a fee. Virtual domain addressing is often the fastest, most economical solution. The publisher must remember to add the third party set-up fee, plus any annual fees for this service to those charged by the ISP when comparing site costs between providers. A provider may also charge extra when the domain name is hosted elsewhere—unless that location is addressed virtually from the remote site.

Internic charges for domain name registration and ongoing maintenance are billed separately and must be included in calculating the total annual site cost—but are only involved in comparing providers if an ISP includes them in the account fee. If an ISP charges $100.00 or more
for domain name registration and an annual fee of $50.00 or more, ask specifically whether this includes the Internic charges—it probably does not.

Even when all services are purchased from a single provider, it may be desirable to use virtual domain addressing. It is usually cheaper than maintaining an absolute domain, and allows both the ISP and the publication to make structural changes—such as moving or renaming subdirectories—without impacting links on other pages, search engines, or subscribers' bookmarks. If virtual addressing is desired, the availability and cost—including setup and annual maintenance fees—must be established prior to selecting an ISP.

Available Support Utilities and Libraries

Even when the publishing staff are trained, experienced and well provided with development software, it is often important that an ISP offers specific software, libraries and support utilities on-site. When the publisher lacks any of these resources, it becomes even more important to be able to call upon the ISP for support.

Any utilities, libraries, CGIs, etc. that are not provided by the host, may or may not be allowed on-site. It is critical to establish whether or not any needed support items will be forbidden. Items that are allowed—but not provided—are often included in the user's
allowable storage, displacing actual content or increasing monthly overhead.

Most of these considerations have been covered in detail in the preceding section. Table 5 is an example of a blank checklist the publisher may use to ensure that needed services are available and that any additional cost is figured into the final ISP pricing.

TABLE 5
Available Services And Related Costs

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<tr>
<th>Service or Utility</th>
<th>Available Y/N?</th>
<th>Program or File Name(s)</th>
<th>Extra Costs</th>
<th>Who Pays for Space?</th>
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<td>Local Editor</td>
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<td>FTP Support</td>
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<td>Telnet Dial-up</td>
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<tr>
<td>Other:</td>
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Technical Support

Is technical support included in the basic price? Is it "24/7" support? Is there a local or toll free voice number for support? If so, are there any additional or hidden charges for using it? Is there an e-mail address for technical support? What assurances does the provider offer that support will always be available when needed? What compensation will they offer for unacceptable support?

Alternate Sources for Services

Does the ISP recommend any alternate source for support services, if they should decline to respond or are too busy to respond quickly? Will they pay for or subsidize all or some portion of the fees when outside services are required? If not, will the outside service offer a discount or accept the existing provider's rates?

Have arrangements been made with third party service providers, as a safety backup for all critical functions?

Required Software and Licenses

Internet access requires a specialized set of software programs. Internet publishing and Web site preparation requires additional software packages. Much of the available software is either in the public domain as "freeware" or offered by the copyright holder for limited use at no charge. Limitations vary between copyrighted packages, but are usually clearly stated in a "readme" text
file accompanying the programs. A large percentage of downloadable software is "shareware."

Shareware is software that relies on the honor system for distribution and payment. Shareware is copyrighted, commercial software, but a copy is made available for a specified time—without charge—either on diskette or via download from a Bulletin Board System (BBS) or the Internet. Shareware is offered on a free-trial basis for a fixed period of time—usually 30 days—after which the user must either register and pay for the software or delete it. There is no active enforcement of this time period, although some publishers "time-restrict" their software in the source code, and most of them offer incentives—such as free upgrades, hard copy manuals, additional features or technical support—to registered users.

One of the best sources to find and download freeware and shareware is provided by C|NET and can be found at http://shareware.com.

Some publishers—such as Qualcomm, Incorporated—publisher of the popular Eudora e-mail program—offer one version as unsupported, limited-featured freeware (their 100 series) and another (their 200 series) as fully supported, full-featured commercial software. Even the freeware version finds limited user support via USENET newsgroups and special interest e-mail lists.
Some of the very best and most powerful software is only available as commercial software. Many modern commercial software packages are marketed, demonstrated, sold and supported via the Internet.

Software Suites Bundled with Internet Access Account

Most Internet Service Providers (ISPs) offer their new clients an integrated "suite" of Internet software. This usually contains a minimum of a communications dialer with TCP/IP stack support, a World Wide Web (WWW) browser, and an electronic mail (e-mail) program. Most suites include other selected programs such as Gopher, Archie, Internet Relay Chat (IRC), Telnet and File Transfer Protocol (FTP).

Many of the programs offered in these ISP suite packages are limited in their functions--thus restricting the capabilities of the subscribers. Fully functional program capacity can be achieved by using one of the stand-alone software products available by either downloading them or through commercial distribution.

World Wide Web Browsers

Most of the expansion and growth of the Internet since 1994 has been in the World Wide Web (WWW). To navigate, or 'browse' the WWW, requires Web browser software. This may be text-only for terminal based systems--such as the popular Lynx program available for DOS and Unix platforms--or one of the more popular graphics browsers, like Mosaic.
Netscape, Chameleon, Internet Explorer and others. Even terminal-based shell accounts can emulate graphics browsers via software like TIA running on a Unix system or Slipknot running under Microsoft Windows.

File Transfer Protocol (FTP) Software

To facilitate file transfer over the Internet, File Transfer Protocol (FTP) was created. FTP packages for virtually all Internet platforms are downloadable from the National Center For Supercomputer Applications (NCSA), an important resource center for the Internet and the World Wide Web. Large portions of their software were developed with public funds (taxes) and thus are available as freeware over the Internet. Many other publishers provide FTP software for various platforms—from the WS FTP for Windows to Fetch for the Macintosh and just plain FTP for Unix.

Many popular Web browsers, such as Netscape 2.xx, now offer integrated FTP capabilities.

Telnet Software

The Internet, being simply a network of networks, effectively links every node to every other node instantaneously. Once an individual is connected, they theoretically have access to virtually every other computer on the Internet—instantly. All that is needed is an account to log into on the target computer and a software
package called **Telnet** to handle the communications between the two systems. The NCSA, mentioned above, publishes a freeware version of Telnet for most platforms, which can be downloaded via FTP or a modern browser.

Web Page Creation: Hypertext Markup Language (HTML) Editors

The foundation of the WWW is the hypertext document, with its hyperlinks—usually just called "links." A hypertext document is one written in Hypertext Markup Language (HTML). Each hypertext document is a self-contained whole—containing both legible text, called "content," and special browser handling information, called "tags." One popular type of tag is the "HREF" or link. A link is a gateway to another hypertext document or to a browsable object, such as a graphics file or animation. All HTML documents are written in plain ASCII text and can be created or modified with any text editor.

Many of the HTML tags get very complex—so special software packages have been written to facilitate Web page creation. These fall into two basic categories: (1) stand-alone programs—which run independently on whatever platform they were compiled for—and (2) add-on program extensions which attach to, and expand, existing word processor programs.

Each type of HTML editor is platform-dependent, but may be available for more than one platform. Popular
stand-alone HTML editing programs include *HotDog Pro*, *HoTMetaL* and *HTML Assistant Pro* for Windows and *Web Weaver* for the Macintosh. Add-on extensions include Quarterdeck's *WebAuthor* for Microsoft's *Word* and Corel's SGML extension for their own *WordPerfect*.

There are many freeware and shareware editors in addition to the commercial packages. A neophyte would do well to try several of the downloadable packages—to determine what features are available before purchasing an HTML editor. There are also many reviews and personal evaluations of the various editors available from newsgroups, listservers and individual Home pages—all on the Web.

**Graphics Software**

An integral part of the World Wide Web are the graphics that accompany HTML documents. Graphic items (or objects) may be very simple—like background colors, solid colored logos and emblems, and simple and detailed photographs—or they may be quite complex, like full-motion video, animated GIFs and the more intense animations, such as *Java* applets.

Graphics software covers a similar range. The simplest and most universal programs are the converters—which simply take an image in one format and create the identical image (or as close as they can get to it) in a
different format. Many simple converters can not even display the graphic being converted.

More complex, are the graphic editing programs. These programs usually offer conversion as well, and may even include simple creation tools. Graphics editors usually allow re-sizing, cropping, simple rotations, plus resolution and color control. Some of the more complex editors offer advanced features such as posterization and solarization, as well as complete palette replacement.

Farther up the spectrum are the graphics creation programs that usually include both conversion and editing features. These features, however, may not be as complex--or provide as many options--as the single-function programs offer. Graphics creation programs include either paint (bitmap) or draw (vector) tools that allow creation of complex graphics from scratch. Some of the more advanced programs may offer both capabilities.

Utility Software

A catch-all category, utility software includes any program that facilitates the use or improves the function of computer hardware or other software. This includes, but is not limited to diagnostic and communications programs, file compression and decompression software, menu programs and a wide variety of other software--both simple and complex--that facilitates the use of a computer system.
Utility software often includes software programs that may also fall into other, specific categories, such as graphics utilities. When this occurs, those programs are generally indexed by their main category.

CGI Generation

Many of the advanced capabilities of the HTML environment require external programs or routines to process their information. This transfer of data for processing, storage, return and/or forwarding is generally done by means of a Common Gateway Interface (CGI). CGIs are typically binary programs customized to run on the host platform and fulfill a single, specific function—such as processing the output of an entry form for submission to a database manager or converting cursor position on an image map graphic into a unique link address.

As mentioned earlier, CGIs are written in a programming language, such as PERL or C++. They are compiled specifically for the target platform and are usually designed to process a single specific object, like an image map, or generic family of objects, like a family of forms that gather the same type of information. CGIs are usually server-sided software.

The Application Programming Interface (API)

Similar to CGIs, the API acts as an interface between HTML documents and external programming applications—such
as Java (animation), RealAudio (live sound) and CuSeeMe (video conferencing). APIs are generally "client/server" applications, requiring both server-side and client-side software to work. Many modern browsers, such as Netscape 2.xx, use API integration to automatically load and run an application—thereby appearing as if the application were an integral art of the browser, itself. This type of application is referred to as a "plug-in".

Search Engines

One of the most popular categories of Internet software is the search engine. Most of the popular search engines use a "worm" or "robot"—technically a type of "friendly" computer virus—to search the Web extracting information from key words in the HTML header and/or body of each Web page. These worms then return the information to a central database on their host system for future rapid processing of user search queries.

There are many search engines on the Internet, the most popular of which may be reached via links on Netscape's search page and also from various other sites around the Internet. The journal publisher may elect to include a link to a popular search engine from their own site—both to aid their subscribers and to encourage casual traffic and "bookmarking" of that page.
There are HTML coding techniques to either facilitate or reject search engine inquiries. A new site may speed up the search engine inclusion process by "registering" or "submitting" their site information to the home sites of the respective search engines.

Several companies also publish internal site search engines which a database content provider may use to allow customers to search that provider's own Web site database. The presence or absence of this feature may determine whether or not a client will use that particular database service.
CHAPTER III.
THE POST-IMPLEMENTATION OR MAINTENANCE PHASE

Once the first issue has been published and the appropriate announcement services and search engine sites have been notified, the journal enters the post-implementation phase of the project. This includes the ongoing business of maintaining a journal on-line, supporting the current issue and preparing and publishing subsequent issues.

Updates and Corrections

The first detail to be resolved is determining what level of on-line support to maintain. Maintenance of an existing issue and/or complete Website requires a commitment to all of the necessary resources--human and otherwise.

Corrections

Web publication offers a unique opportunity to detect and correct errors in published materials, allowing virtually instantaneous correction of identified errata. Prompt correction of erroneous data is essential in maintaining reliability in an on-line publication.
The term "corrections", as used here, refers to any modification of published copy due to errors in content or presentation—whether they occurred in the original material, final formatting or are merely typographical errors. Corrections usually are required to maintain accuracy and credibility of the original material.

A policy must be established and followed as to whether (and if so, when) corrections will be made—as well as establishing the process for receiving, verifying, and implementing corrections suggested by third parties, typically readers. Resources allocated for corrections should be concentrated in the first few days after publication, but some time should be allocated each week for newly detected errors. If archives are kept, errata may be reported many months after the original publication date.

Updates

In many modern disciplines, changes occur so rapidly, that some material becomes obsolete, incomplete or superseded before the actual distribution cycle is complete. Web publishing offers several alternatives for eliminating—or at least minimizing—the impact of recent developments.
Soft-set Publications

In print publications, once the galleys are edited and approved, an issue is "set" into plates and may not be modified, except under the direst circumstances. In electronic publishing, type is only "set" by way of editorial policy. Even after an article has been hard coded into HTML and installed on the Web, additional information may be added, or the complete article replaced or deleted, with minimal expenditure of time or effort.

However, to do so without a firm, established and enforced policy is to invite constant disruption and chaos. It may also be confusing to a subscriber to read an article one week and then return for reference--only to find it completely different. If there is to be any reliability in references made to electronically published articles, books, theses and dissertations, then soft-setting an issue should be avoided, as it could seriously damage the utility of a journal as a permanent reference source.

Hard-set Publications

The other extreme is to fully emulate a print publication and declare an issue "set" some specified time prior to the actual publication date, and then allow no changes at all in that issue. Due to the flexibility of electronic publishing, this deadline date can be considerably closer to the actual publication date than
with a print publication. Typical "hard-set" lead times could be from a few hours to a few days (or even weeks)—depending upon the individual publisher's policies and publishing environment. In actuality, this policy may change several times during the first few months that a journal is on-line—as actual conditions confirm or contradict theoretical expectations.

While hard-setting an issue can simplify the final phase of the on-line publishing process by eliminating several feedback loops—and completely eliminating the update process—it defeats two of the major benefits offered by electronic publication: fast response time and flexibility.

Firm-set Publications

A workable compromise, "firm-setting" a journal establishes a deadline for new and corrected copy, similar to the "hard-set" journal above. This allows the production staff to complete an issue without the constant interruptions of changing copy. Critical corrections—such as a misspelled name or incorrect phone number—can still be dealt with by an established procedure and designated decision maker.

Where the firm-set publication differs from the hard-set journal, is in its ability to accept added material, updates, and corrections after it has formally been
published. Additions and updates should be in a separate section and clearly marked as such, while all errata and corrections which might effect external references should be summarized in an appropriate section.

In the more rigorous environments, a running log of revision levels should be maintained, and the current revision level should be marked clearly on the issue. This ensures that each issue remains a reliable reference document.

Responsible Party

As in other phases of the project, it is important to have a well defined chain of command and a single, clearly identified individual who makes the final decisions as to which corrections and updates will be made, by whom, and under what circumstances. All changes should be coordinated through this party. Disputes need to be dealt with through the chain of command. To do otherwise invites chaos on a "live" medium.

Total Man Hours Allocated to Maintaining Each Issue

When preparing the budget and manpower allocation, proper consideration must be given to resources required for corrections and updates to each issue. This figure will probably be adjusted several times during the first publication year, as actual historical figures are compared to budgetary projections.
Periodic Review

Both the individual, published issues and the journal update process should be reviewed periodically. Repeated mistakes requiring corrections should be identified as to cause and the causes eliminated or minimized. Reviews should then be conducted to establish the effectiveness of the changes.

The correction and update process should be reviewed periodically to ensure that needed corrections are being made expediently and updates are being processed according to established policy. Any significant deviation from policy or projections should be analyzed and adjustments made to the procedures, as required.

Mail Processing

A critical part of post-implementation journal maintenance is the processing of electronic mail. Whether or not the journal has multiple e-mail accounts, provides on-line forms and response icons, or allows electronic submission, there will be a steady flow of time-critical e-mail. Policy should be established for processing and responding to the various types of mail expected.

Who receives the mail?

Mail processing procedures will depend largely upon the number of unique e-mail addresses created and the
number and types of e-mail related features that have been implemented on-line.

**Single E-mail Address**

When the publication has only one e-mail address, a mail manager should be appointed to be fully responsible for checking and printing the e-mail and distributing it to the appropriate parties. This must be done frequently, by printout or electronic distribution, as appropriate. E-mail should be saved for at least a week before deletion—preferably longer. It is generally a good idea to archive e-mail for at least a year, if space permits. Printouts may be lost and a backup source is always wise. Identifying and disposing of the increasingly popular electronic "junk mail" is an important part of the mail manager's job.

**Multiple E-mail Addresses**

When all persons who are likely to receive electronic mail have their own e-mail addresses, the process is much simpler. If the addresses are departmental rather than individual, then each departmental address should be treated as a single e-mail address as described above. Policy should determine whether response to individual articles is directed to the author, the editor or both. This is especially important if either a 'Letters' feature is published or an on-line forum maintained.
Specialized Processing

Many features—such as electronic submission and reader survey forms—may require special handling. Often a forms handling CGI must be written and installed on the server to parse the submitted data and the result in a pre-defined, usable form. This parsed data then becomes the input to a database manager, an editorial word processor, or both—depending upon the intended function of the form. Processing can be either manual or automatic—via a mail processing software "robot"

Responding to Electronic Mail

No matter how the mail processing system is designed, a policy should be established to quickly and reliably respond to all relevant messages. Autoresponders can be installed to instantly acknowledge mail receipt with a form letter which defers detailed individual response to a future time.

Other policy decisions must be made: (1) Do individuals respond personally or through the central mail manager? (2) If employees have other e-mail accounts, will they be allowed, perhaps required, to respond from those? (3) Will electronic mailing list subscriptions be allowed through a central mail processing center? (4) Who will make these and similar decisions?
When replying to e-mail, care should be taken to avoid becoming cryptic responses. It is tempting to address a point directly or answer a question literally--without sufficient reference to the original. This leads to confusion--especially if some time has elapsed between the original message and the reply. At the other extreme, re-stating or paraphrasing a prior letter often wastes a lot of time and can lead to mis-communication. An efficient solution is to use the management technique of replying on the original, by including relevant parts of the original in the reply, and deleting the rest--especially the complex "headers" used by mail server software and the detailed "signatures" that terminate some users' messages.

Electronic mail is especially convenient for this, as most mail software allows the entire text of an original to be automatically included in the reply. Even when this feature isn't available, "cut and paste" can be used to copy portions of the original onto the reply. Either way, the additional information saves time and often is essential to understanding the reply and identifying mis-communication.

Submissions

Electronic submissions greatly reduce publication lead time, optimizing the publishing cycle. For some reason, most editors are still quite prejudiced against allowing
authors to submit works electronically. Although there is some justification for this due to the added (though minor) expense of printing the submissions locally if hard copy is needed for editing, any such cost is far outweighed by the elimination of the expense, delay and inherent errors of re-keying the material prior to typesetting. Serious consideration should be given to allowing— even encouraging— electronic submissions. A reasonable compromise may be to require a printed manuscript to accompany the hard copy.

If electronic submissions are permitted, then several items must be added to the publisher's submission guidelines. The most important of these are the two types of formats to be used for submission— the file format and the submission medium format.

File Format

The article, once received, must be readable by the editor. It must therefore be in a file format that the editor's word processor can read. Most modern word processors can open files created by their competitor's older software, but the conversions are often imperfect. In addition, many less popular word processors are not included and translators for the recent releases of the major packages are often unavailable.
It is best for the editor to specify—by trade name and version number—which formats are acceptable for submissions. The most universally readable format is a simple text file saved in a manner specified by the American Standard Code for Information Interchange, known as an ASCII text file. However, ASCII text files do not provide for even simple text attributes—such as underlining. A more powerful, generic word processing format, Rich Text Format (RTF), provides many text attributes in a universal interchange format, and can be both read and written by most modern word processors.

Submission Medium

When on-line submissions are accepted, delivery is usually via electronic mail, an HTML submission form or FTP. If FTP is used, a special FTP upload site for receipt of files must be created and maintained. Either an automated icon or a set of detailed submission instructions should be provided to assist the author in transferring manuscripts to the upload site. When FTP submission is used, the author must then notify the appropriate editor via an e-mailed cover letter, which should include (1) the exact file name(s) containing the manuscript(s); (2) an abstract or summary; and (3) all other information required by the publisher's guidelines. This can be facilitated by the publisher on the Website by combining an HTML coded
submission form with a CGI to automatically upload the submission file.

If the publisher accepts disk or tape submissions, the journal's "guidelines for writers" should list all acceptable submission media and size (5-1/4" disk, 1/4" Tape, etc.), density (1.44 mb, Quic-40, etc.) and platforms (Macintosh, IBM-compatible, etc.). The author should insure that this same information is clearly labelled on the submission itself--plus the title of the work and the author's name and contact information. Complete information about the submission should also accompany it in a standard cover letter.

Graphics

It is especially important for the publisher to specify acceptable graphics formats when accepting electronic submissions. Photos and created graphics should be submitted in a format specified in the publisher's guidelines for writers. This should include maximum and minimum image sizes, file format (PCX, GIF, JPEG, etc.), resolution in dots per inch (dpi) and any other appropriate specifications. Graphic material is subject to the same copyright provisions as written text.

Tables, charts and graphs may be submitted in the native format of the program which created them (word processor, spread sheet, paint program, etc.) or as an
image file that has been created, captured or scanned from a printout. Specifying acceptable submission formats is an important policy decision for the editor—as it will effect not only the labor required to process these files, but also the quality of the final result when it is inserted into the appropriate journal article.

If a document containing embedded graphics is submitted, then separate files containing the text and each individual original graphic should also be submitted to facilitate converting the material to HTML formatted pages.

Pre-coded Pages

As HTML coding skills spread, many authors will choose to format their own submissions. Editors may eventually allow or even require submissions to be pre-formatted at a certain HTML specification level. This could greatly reduce the editor’s workload and facilitate final editing.

Scheduling

As with everything else in the publishing cycle, the publisher should establish and enforce a firm timeline—with deadlines for electronic submissions, format verification and subsequent editing.
Search Engines and Notification Services

Regular notification of the release of each issue should be sent promptly to the various lists and services that specialize in announcing new and existing publications—especially those that focus on the journal's specific discipline or field of interest. Any changes in publication site or policy should be submitted to these services. This is similar to regular press releases and serves the dual role of keeping the public informed and providing free advertising.

In addition, each of the popular search engines should be monitored periodically—using key word searches—to ensure that the journal is prominently displayed early in the displayed list search results. If it is not, the "keywords" entry in the "META" tag of the site home page should be modified to optimize search engine selection and prioritization of the journal on the list. Manual notification of all appropriate lists should also be resubmitted. Such optimization by fields of interest will ensure that preference is given to the journal by keyword search engines.
PART TWO

THE COMPANION CD-ROM
CHAPTER IV
USING THE COMPANION CD-ROM

Accompanying this manuscript is a Compact Disk Read Only Memory (CD-ROM) in PC-compatible format. It can be read by any IBM-compatible computer system running under DOS, OS/2 or any Microsoft Windows system with a properly installed CD-ROM drive. No Macintosh version is currently available, but the contents may be accessed over the Internet via the author’s permanent Wide World Web home page at HTTP://www.eee.org/bobfaw/ or one of the addresses listed in table 1.

CD-ROM Contents

The companion CD-ROM contains the entire text of publication in an interlinked, hypertext format. This not only demonstrates the technology detailed in the text, but also provides a convenient medium for navigating the material presented.

In addition to the project report, the disk contains a complete set of hypertext links to the various Internet resources discussed in the body of this work. These links are stored as a Netscape bookmark file, but can be accessed as a standard HTML document by any World Wide Web browser.
Also included are complete, executable versions of many of the HTML and graphic editors covered earlier—plus several Web browsers.

All of the files included are either "freeware" or "shareware" and are clearly marked as to their copyright status and licensing restrictions, if any. Most are either self extracting archive files ending in ".exe", or "zipped" (compressed) files requiring an extraction program to render them functional. One such program, *pkunzip*, is provided in a self-extracting, archived, shareware demo version.

Refer to the "readme.txt" file in the root directory of the CD-ROM for complete instructions on how to load and use the disk, where to find the extraction tools, and how to use them.

**Using the Journal Templates**

The journal template files are in the subdirectory "\templates\" and may be used without royalty, as long as the source is credited. Complete instructions for using the template files may be found in the "readme.txt" file in that subdirectory.
Figure 1. Visual effects of posterization and color reduction on a complex GIF format graphic
Figure 2. Visual effects of JPEG versus GIF file formats with progressive color reduction on a simple graphic
Figure 3. Visual effects of posterization on a complex JPEG graphic
## APPENDIX

ISO8859-1 TABLE

Courtesy of Martin Ramsch (http://www.uni-passau.de/~ramsch/iso8859-1.html)

Used with author's permission—shortened, but unedited

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
<th>Entity name</th>
</tr>
</thead>
<tbody>
<tr>
<td>quotation mark</td>
<td><code>&amp;#34;</code></td>
<td>&quot;quot;</td>
</tr>
<tr>
<td>ampersand</td>
<td><code>&amp;#38;</code></td>
<td>&amp;</td>
</tr>
<tr>
<td>less-than sign</td>
<td><code>&amp;#60;</code></td>
<td>&lt;</td>
</tr>
<tr>
<td>greater-than sign</td>
<td><code>&amp;#62;</code></td>
<td>&gt;</td>
</tr>
</tbody>
</table>

### Description Char Code Entity name

- **non-breaking space**: `&#160;` —> `&nbsp;`
- **inverted exclamation**: `i` —> `i`<br>`&#161;` —> `&iexcl;`
- **cent sign**: `¢` —> `¢`<br>`&#162;` —> `&cent;`
- **pound sterling**: `£` —> `£`<br>`&#163;` —> `&pound;`
- **general currency sign**: `¥` —> `¥`<br>`&#164;` —> `&currency;`
- **yen sign**: `¥` —> `¥`<br>`&#165;` —> `&yen;`
- **broken vertical bar**: `|` —> `&brkbar;`
- **section sign**: `§` —> `§`<br>`&#167;` —> `&sect;`
- **umlaut (dieresis)**: `¨` —> `¨`
- **copyright**: `©` —> `©`<br>`&#169;` —> `&copy;`
- **feminine ordinal**: `ª` —> `ª`<br>`&#170;` —> `&ordf;`
- **left angle quote, guillemotleft**: `«` —> `«`
- **not sign**: `¬` —> `¬`
- **soft hyphen**: `‐` —> `‐`
- **registered trademark**: `®` —> `®`<br>`&#174;` —> `&reg;`
- **macron accent**: `–` —> `–`
- **degree sign**: `°` —> `°`<br>`&#176;` —> `&deg;`
- **plus or minus**: `±` —> `±`
- **superscript two**: `²` —> `²`<br>`&#178;` —> `&sup2;`
- **superscript three**: `³` —> `³`<br>`&#179;` —> `&sup3;`
- **acute accent**: `´` —> `´`
- **micro sign**: `µ` —> `µ`<br>`&#181;` —> `&micro;`
- **paragraph sign**: `¶` —> `¶`<br>`&#182;` —> `&para;`
- **middle dot**: `·` —> `·`<br>`&#183;` —> `&middot;`
- **cedilla**: `ç` —> `ç`
- **superscript one**: `¹` —> `¹`<br>`&#185;` —> `&sup1;`
- **masculine ordinal**: `Ž` —> `Ž`<br>`&#186;` —> `&ordm;`
- **right angle quote, guillemotright**: `»` —> `»`
- **fraction one-fourth**: `¼` —> `¼`<br>`&#188;` —> `&frac14;`
- **fraction one-half**: `½` —> `½`<br>`&#189;` —> `&frac12;`
- **fraction three-fourths**: `¾` —> `¾`<br>`&#190;` —> `&frac34;`
- **inverted question mark**: `¡` —> `¡`
- **capitale A, grave accent**: `Ä` —> `Ä`<br>`&#192;` —> `&Agrave;`
- **capitale A, acute accent**: `Á` —> `Á`<br>`&#193;` —> `&Aacute;`
- **capitale A, circumflex accent**: `Â` —> `Â`<br>`&#194;` —> `&Acirc;`
- **capitale A, tilde**: `¨` —> `¨`
- **capitale A, dieresis or umlaut mark**: `À` —> `À`<br>`&#195;` —> `&Auml;`
- **capitale A, ring**: `ã` —> `ã`<br>`&#197;` —> `&aring;`
- **capitale AE diphthong (ligature)**: `æ` —> `æ`<br>`&#198;` —> `&aelig;`
- **capitale C, cedilla**: `ç` —> `ç`<br>`&#199;` —> `&ccedil;`
- **capitale E, grave accent**: `È` —> `È`<br>`&#200;` —> `&egrave;`
- **capitale E, acute accent**: `É` —> `É`<br>`&#201;` —> `&Eacute;`
- **capitale E, circumflex accent**: `Ê` —> `Ê`<br>`&#202;` —> `&ECirc;`
- **capitale E, dieresis or umlaut mark**: `Ë` —> `Ë`<br>`&#203;` —> `&Euml;`
This table grew out of an [ISO Latin-1 Character Set](https://www.w3.org/International/O-iso-latin1-character-set) overview related to the Hyper-G Text Format (HTF). The entity names &breve; and Đ seem to be unique to HTF. The entity name &hbar; has been supported by X Mosaic but seems to be replaced with ¯. The entity names ¨ and ¨ should be equivalent.

Please note that there is nothing wrong with using characters of ISO Latin-1 above 127: HTTP/1.0 uses the 8bit ISO latin-1 as default encoding. (Thanks to Roman Czyborra for pointing this out!)
REFERENCES


