Running a World-Wide Web Service

Brian Kelly
Running A World-Wide Web Service

This handbook gives an introduction to running a World-Wide Web service.

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Minor changes have been made to this edition.
About This Handbook
This Handbook was produced using Word For Windows version 2. The graphics were captured using Paintshop Pro. Paintshop Pro was also used to reduce the colour depth and to alter the colour of the images so that they were more suitable for inclusion in the printed version of the Handbook. The Handbook was converted to HTML format using the RTFtohtml conversion programs.

About The Author
Brian Kelly is the Head of User Support, Computing Service, University of Leeds. He first came across the World-Wide Web (WWW) at a workshop on Internet tools organised by the Information Exchange Special Interest Group, University of Leeds on 9th December 1992. In January 1993 the Computing Service installed the CERN httpd server on its central Unix system - this was probably the first WWW service provided by a central service in the UK academic community.

Following an unannounced visit from Robert Cailliau, one of the WWW co-developers from CERN in March 1993, the Computing Service became convinced of the importance of WWW. The Computing Service contribution to the University Open Day, held in May 1993, was centered on the World-Wide Web: for example the Open Day programme was available on WWW.

Brian has given presentations about WWW at the universities of Aberdeen, Bangor, Bradford, Kent, Oxford, Sussex and Manchester Metropolitan University. He gave a poster presentation at the first WWW '94 conference in Geneva and gave a paper on Becoming An Information Provider on the World-Wide Web at the INET 94 / JENC 5 conference in Prague in June 1994. He ran a WWW Tutorial at the Network Service Conference in London in November 1994. He was cochair of the "WWW A Strategic Tool For UK Higher Education" workshop.

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The author, of course, accepts responsibility for any errors in this handbook.

Feedback
The author welcomes constructive comments and feedback on this handbook, which should be sent to the email address B.Kelly@leeds.ac.uk The author is unable to provide individual assistance.

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Obtaining Copies Of This Handbook
This handbook is part of the SIMA subscription series of reports. For subscription details contact A.M.Mumford@lut.ac.uk Additional copies of the handbook can be purchased from the University of Leeds. Please contact B.Kelly@leeds.ac.uk for pricing details.

The Handbook is available on the World-Wide Web at a number of locations including http://www.leeds.ac.uk/ucs/WWW/handbook/handbook.html Consult the README file for further information.

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1 Introduction

Aim of this Document

This handbook, *Running A World-Wide Web Service*, has been funded by the Advisory Group On Computer Graphics (AGOCG) through the Support Initiative for Multimedia Applications (SIMA) to provide support for UK academic institutions who wish to run a World-Wide Web service. The objectives of the document are to provide the reader with:

- An understanding of the history of the World-Wide Web (WWW).
- Examples of how WWW is currently being used in a number of areas.
- An understanding of the role of a WWW browser and examples of some of the popular browsers.
- An understanding of the Hypertext Markup Language (HTML) and examples of popular HTML authoring tools, document converters and quality tools.
- An understanding of the use of graphics on WWW and a review of some of the popular graphical tools.
- Examples of some of the popular searching tools which are available on WWW and a review of some of the popular indexing tools.
- An overview of WWW server software and a review of the main functions carried out by a server.
- Examples of extensions to the basic WWW architecture, including the use of external browsers, running client-side and server-side applications.
- An awareness of the legal and ethical aspects of providing a WWW service.

The handbook also gives a number of examples of the use of WWW in the following areas:

- Campus (or community) wide information systems (CWIS).
- Teaching and learning.
- Collaboration.
- Libraries.
- Books and magazines about WWW.

The handbook also provides pointers to a variety of sources of further information including:

- WWW mailing lists.
- WWW resources.
- National UK WWW services.

Target Audience

This document is intended primarily for the UK academic community. It should be suitable for computing service or administrative staff responsible for managing a World-Wide Web service, and for academic staff who wish to run a departmental service.
2 About The World-Wide Web

History

The World-Wide Web (which is often referred to as W³, the Web or, as used in this document, WWW) is a distributed multimedia hypertext system. What is meant by this?

- **Distributed**: information on WWW may be located on computer systems around the world.
- **Multimedia**: the information held on WWW can include text, graphics, sound and even video.
- **Hypertext**: access to the information is available using hypertext techniques, which typically involve using a mouse to select highlighted phrases or images. Once a phrase or image is selected it can result in information being retrieved from around the world.

The World-Wide Web was initially developed by Tim Berners-Lee and Robert Cailliau of CERN Laboratories, Geneva to provide an infrastructure for particle physicists throughout Europe to share information. Since the physicists were located in various organisations and used a variety of computer systems and applications software (including various word processing and text markup programs for producing reports) the World-Wide Web was developed using the **client-server architecture**, which ensured cross-platform portability.

Client-Server Architecture

The World-Wide Web is based on the **client-server architecture** which is illustrated in Figure 2-1.

The end user accesses the World-Wide Web using a browser client, typically on a desktop machine such as a PC, Macintosh or Unix workstation. The client will display hypertext links in some manner, such as underlining the links. Selecting a link (by clicking a mouse button with a graphical client, typing the number following the link using a simple text-based client or using speech or foot pedals, for example, with browsers for disabled users) to send a request over the network (which could be a local network, a national network such as JANET, or over the global network which can be referred to as the Internet). The request is sent to a World-Wide Web server, which typically runs on a powerful computer system. The server will retrieve the file which has been requested and deliver it to the client.

Once the client has started to retrieve the file it can display it on the local machine. If the client cannot display the file (many clients, for example, cannot view video clips) the client can pass the file on to an external viewer which can process the file.

This is a very simple overview of the WWW client-server architecture. Many other features are available: for example the server could send a message to the client, saying that the user is not authorised to access the file. However an understanding of this model will help you to see how the WWW can develop.
Early Browsers

One of the first browsers to be developed was the CERN command line browser. This can be accessed by using the command:

```
telnet telnet.w3.org
```

from a computer system which runs the telnet software. An example of use of the CERN command line browser is illustrated below.

![CERN Command Line Browser](image)

**Figure 2-2** The CERN Command Line Browser.

Notice that in the CERN command line browser in order to select a hypertext link you need to type the number which follows the link.

The CERN command line browser is a very simple client. The first WWW browser was developed by Tim Berners-Lee, the father of the World-Wide Web, for the NeXT system. However the NeXT hardware was not a commercial success and is no longer manufactured.

One of the earliest graphical browsers was the Viola client which was developed for the X windows environment. Viola is illustrated in Figure 2-3.

![Viola Client](image)

**Figure 2-3** The Viola Client.

Notice that in the Viola client the hypertext links are identified by the use of underlining.
Growth In Popularity

As shown in Figure 2-4 use of the WWW has grown tremendously since 1993. This chart, which compares the growth of WWW with a simpler distributed information system known as Gopher, is available at the URL ftp://ftp.isoc.org/isoc/charts/networks-gifs (the term URL will be explained later in this chapter). Much of this growth in popularity was due to the release of browsers for the X Windows, PC and Macintosh environments by the National Center For Supercomputing Applications (NCSA) at the University of Illinois.

Since CERN's remit was research in particle physics the WWW development team realised that they needed to involve other organisations in WWW development work. The involvement of NCSA in the WWW development programme resulted in the NCSA Mosaic For X, which was released in early 1993. An illustration of a pre-release version of Mosaic For X is shown in Figure 2-5.
As can be seen from Figure 2-5 NCSA Mosaic For X provides access to a number of types of resources, including WAIS, Gopher, FTP, Usenet, Hytelnet, TeXinfo, X.500 and Whois resources. NCSA Mosaic was developed by a group of programmers at NCSA led by Marc Andreessen. NCSA Mosaic For X became such a success because:

- It was a professional looking product from its initial release.
- It used the Motif toolkit and was available on workstations platforms widely used in academia.
- It benefited from NCSA's expertise in scientific visualisation.
- It introduced inline images.

In November 1993 NCSA released versions of Mosaic for the Microsoft Windows and Apple Macintosh environment. These browsers, which are freely available to the academic community, provided access to WWW for people who did not have access to Unix and X-Windows systems.

**Examples of Usage**

A number of examples of how the World-Wide Web is currently being used are given below. These are just a few examples of the many thousands of WWW services which are currently available.

**Publishing Research Information**

Figure 2-6 illustrates how CERN (the European Particle Physics Laboratory) makes its technical papers available on the World-Wide Web. The URL for the paper illustrated is http://www1.cern.ch/ALICE/ENGINEERING/engineering.html

![ALICE Engineering Information](http://www1.cern.ch/ALICE/ENGINEERING/engineering.html)

This tool allows you to view and retrieve technical drawings and layouts of the Alice detector.

The ALICE detector has been divided into the following subdetectors:

- **General Layout & Integration**

Figure 2-6 Example of Scientific Information Held At CERN.
Campus Wide Information Systems

The Honolulu Community College Campus Wide Information System (CWIS) was the first multimedia CWIS on the World-Wide Web. The URL for this CWIS is http://www.hcc.hawaii.edu/

![Figure 2-7 The Honolulu Community College CWIS.](image)

Teaching Applications


![Figure 2-8 A Distributed Teaching Application.](image)
Publicity

The School of Computer Studies at the University of Leeds was one of the first departments to use the multimedia capabilities of WWW to market its courses to potential students. The URL is http://agora.leeds.ac.uk/WWW/MSc/MSc_text/leeds.html

![Image of University of Leeds Prospectus Information.]

Virtual Libraries

Many virtual libraries, art galleries and exhibitions are available on the World-Wide Web. One of the first was the Vatican exhibition. The URL for this virtual exhibition is http://sunsite.unc.edu/expo/vatican.exhibit/Vatican.exhibit.html

![Image of Vatican Exhibit Main Hall.]

Figure 2-9 University of Leeds Prospectus Information.

Figure 2-10 The Vatican Exhibition.
Commercialisation Of WWW

The World-Wide Web is increasingly being used by commercial companies. For example the URL for the Pizza Hut ordering service is http://www.pizzahut.com/

![Pizza Hut screenshot](image1)

Figure 2-11 A Commercial Application On WWW.

Government Use Of WWW

The World-Wide Web is also being used by governmental agencies. For example the URL for the CCTA is http://www.open.gov.uk/

![CCTA screenshot](image2)

Figure 2-12 The CCTA Government Information Service.
Terminology

The following terms are used in this document:

**Browser:** An interactive program which is used to access information held on the World-Wide Web.

**Client:** Often used as a synonym for *browser*. A client is the software which normally runs on the local desktop machine (such as a PC, Apple Macintosh or Unix workstation). The client sends requests to the server software.

**Server:** Software which is used to deliver information to a *client*. Note that this term can also refer to the computer system on which the server software is running.

**URL:** Uniform Resource Locator. Can be regarded as the address of a file on the World-Wide Web. It includes the protocol (rules) for retrieving the file, the domain (name) of the computer system on which the server software runs and the file name to be retrieved. For example the URL http://www.cern.ch/hypertext/WWW/TheProject.html uses the http protocol to retrieve the file TheProject.html in the directory hypertext/WWW/ from the computer called www.cern.ch.

**HTML:** Hypertext Markup Language. The native language for documents held on the World-Wide Web. HTML is an SGML (Standard Generalised Markup Language) application.

**HTTP:** Hypertext Transport Protocol. The protocol (set of rules) used to define the communications between the client and WWW server software.

Note that these terms are, for reasons of clarity, in some cases over-simplified.
3 World-Wide Web Browsers

In order to access the World-Wide Web you will need to use a browser (or client). A wide range of clients are available for many different platforms: although the Mosaic client is very popular you should not think that Mosaic is the World-Wide Web.

Publicly Available Telnet Browsers

A number of browsers are publicly available which can be accessed using the telnet protocol. These include:

```
telnet.w3.org
dir.mcc.ac.uk
rsl.ox.ac.uk
```

These browsers can be accessed by giving the command `telnet address` (for example `telnet dir.mcc.ac.uk`). In some cases you will automatically be logged in, in other cases you must enter a username (which is often `lynx`).

An example of the use of the telnet browser at the Radcliffe Science Library at Oxford University is illustrated in Figure 3-1.

```
telnet rsl.ox.ac.uk

Radcliffe Science Library & Bodleian Library WWW Server (pl of 6)

RADCLIFFE SCIENCE LIBRARY & BODLEIAN LIBRARY WWW SERVER

UNIVERSITY OF OXFORD

Welcome! At present this WWW server is still feeling its way. This page is intended primarily as a starting point for Oxford users wishing to explore Internet services and information sources. From this home page you can also access some of our Local WWW applications which are for the most part still under development. For newcomers to the Web, one good introduction is Entering the World-Wide-Web: A Guide to Cyberspace by Kevin Hughes. Another is CERN's WWW FAQ (list of Frequently Asked Questions).

Apologies to our regular Lynx users. We have phased out the old lynx opening page and you will now commence with this one. If you would like to voice your opinions or your feelings, please feel free to use the comments form below.

-- press space for more, use arrow keys to move, '?' for help, 'q' to quit
```

![Figure 3-1 The Client At Radcliffe Science Library.](image)

It should be noted that the organisations running these publicly available clients do not guarantee to provide the service on a long term basis.

Text-Based Browsers

The browser illustrated in Figure 3-1 is a text-based browser (which is sometimes referred to as a command-line browser). Text-based clients run on a text-based operating system environment (e.g. DOS rather than Microsoft Windows, or Unix rather than X Windows). Command line clients place less demands on the local computer system, but do not provide the ease-of-use or range of functionality provided by graphical clients.
Lynx

The most widely-used text-based browser is probably Lynx. Lynx was developed at the University of Kansas, originally for Unix. An example of the Unix implementation is illustrated in Figure 3-1.

Lynx has been ported to the MS DOS environment. DosLynx, as the implementation is known, will run on a PC with 512 K of RAM, running MS DOS 3 or later. It provides access to the World-Wide Web from an entry level PC which has the appropriate networking capability. DosLynx is illustrated in Figure 3-2.

![Figure 3-2 DOS Lynx.](image)

**Availability**

The Lynx browser software is available at the URL
ftp://ftp2.cc.ukans.edu/pub/Web/ In the UK it is also available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/lynx

The DosLynx software is available at the URL ftp://ftp2.cc.ukans.edu/pub/WWW/DosLynx/

Details of the system requirements for DosLynx are available at the URL ftp://ftp2.cc.ukans.edu/pub/WWW/DosLynx/readme.htm. A Listserv mailing list exists at the address DosLynx-Dev@ukanaix.cc.ukans.edu for the distribution of DosLynx related information, updates and development discussions. To subscribe send an email request to listserv@ukanaix.cc.ukans.edu to be added to the list. All new releases will be announced on this list.

### NCSA Browsers

The NCSA Mosaic browser is available for the X Windows, Microsoft Windows and Apple Macintosh environments.

### NCSA Mosaic For X

Although it was not the first graphics browser, NCSA Mosaic For X helped to popularise the Web. At the time of writing version 2.4 is available, although a beta version of 2.5 is also available (which includes support for a number of new features including hierarchical hotlists).
NCSA Mosaic For Windows and the Macintosh

If NCSA Mosaic For X helped to popularise the Web, NCSA Mosaic For Windows and for the Macintosh made it available to a much larger number of people.

Figure 3-3  NCSA Mosaic For X.

Availability

The NCSA Mosaic browser software for the X, Microsoft Windows and Apple Macintosh platforms is available at the URL ftp://ftp.ncsa.uiuc.edu/pub/Web/ In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/Mosaic/

Further information about NCSA Mosaic For Windows is available at the URL http://www.ncsa.uiuc.edu/SDG/Software/WinMosaic/HomePage.html

Further information about NCSA Mosaic For the Macintosh is available at the URL http://www.ncsa.uiuc.edu/SDG/Software/MacMosaic/

Further information about NCSA Mosaic For X is available at the URL http://www.ncsa.uiuc.edu/SDG/Software/XMosaic/
Cello Browser

Cello was one of the first WWW browsers to be developed for the Microsoft Windows environment. It was written by Thomas R Bruce of the Legal Information Institute, Cornell University.

![Cello Browser](image1.png)

**Availability**

The Cello browser software for Microsoft Windows is available at the URL ftp://ftp.law.cornell.edu/pub/LII/Cello/

EINet Browsers

EINet have developed the WinWeb and MacWeb browsers for the PC and Apple Macintosh platforms.

![EINet Browsers](image2.png)

**Availability**

The EINet browsers software for the X, Microsoft Windows and Apple Macintosh environments are available at the URL ftp://ftp.einet.net/einet/
Netscape Browsers

Netscape Communications Corporation (MCOM) was set up by Jim Clark, founder of Silicon Graphics. MCOM recruited the developers of NCSA Mosaic to develop a WWW browser. A beta release of Netscape was released in October 1994. It generated a tremendous amount of interest, because of its speed and functionality. However it also caused concern, since it included extensions to the HTML standard which had not been part of the HTML standardisation process.

Air Mosaic Browsers

Air Mosaic is another commercial browser which is based on the NCSA Mosaic source code.
GWHIS Browsers

GWHIS is a commercial WWW browser marketed by Quadralay. GWHIS (Global-Wide Help and Information System) consists of a WWW browser, an application program interface (API) for integrating GWHIS into applications and a search engine.

Figure 3-9 The GWIS Browser For X Windows.

Availability
An evaluation copy of the GWHIS browser software for the X, Microsoft Windows and Apple Macintosh environments is available at the URL ftp://ftp.quadralay.com/pub/gwhis Further information is available at the URL http://www.quadralay.com/

Other Browsers

Many other browsers are available or are currently being developed. Some of the browsers are aimed at the business community. Of particular interest to the academic community are the Internet browsers which are being developed by Microsoft (for inclusion with Windows 95), IBM, Apple and Novell.

Figure 3-10 The Warp OS/2 Browser.
Future Developments

A browser known as Arena is currently being developed which will handle HTML 3. HTML 3 is a new version of HTML which contains a number of facilities which are not available in HTML 2, including table handling and mathematical formulae.

![Figure 3-11 The Arena Browser.]

Availability

Arena is currently a beta program. It can be obtained from the URL ftp://ftp.w3o.org/ In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/www/arena/

Further Information

A list of browsers is available at the URL http://info.cern.ch/hypertext/WWW/Clients.html

Another list, which includes a brief summary of known bugs, is available at the URL http://www.hotwired.com/browsers.html

A third list is available at the URL http://www.charm.net/~web/Vlib/Users/Clients.html

Conclusions

Which is the best browser? There is no longer a simple answer to this. The growth in the number of browsers, the different licensing arrangements and different areas they address is making it difficult to adopt an institutional policy on choosing a browser. At the time of writing the Netscape browser looks very attractive. However it was developed primarily to address the needs of commercial users, many of whom requested greater control over the appearance of HTML pages in order to reflect a corporate identity. Will Netscape, however, be as quick to support mathematical equations, which will be of interest to most academic institutes? Will it be the best browser for providing control over external applications - an area which is likely to be of interest to academics who wish to develop distributed teaching materials?

Perhaps the only conclusion to be made at this point is that academic institutions should avoid being locked in to a particular browser.
4 HTML

About HTML

Native documents on the World-Wide Web are written in HTML, the HyperText Markup Language. HTML defines the structural elements in a document (such as headers, citations, addresses, etc.), layout information (bold and italics), the use of inline graphics together with the ability to provide hypertext links.

A simple HTML document is illustrated in Figure 4-1.

```
<TITLE>The World-Wide Web</TITLE>
<H1>About The World-Wide Web</H1>
<P>The World-Wide Web is a <EM>distributed multimedia hypertext</EM> system.</P>
```

**Figure 4-1 A Simple HTML Document.**

Structural elements in the document are identified by start and end tags. For example the `<TITLE>` and `</TITLE>` tag is used to specify the title of the document, which is often displayed by a client. The `<H1>` and `</H1>` tag is used to define the first level heading. Clients will normally display headers differently from the body text: for example, a graphical client could display the header using a larger or different font, whereas a text-based client could display a header as centred text or in all capitals.

Figure 4-1 also illustrates the `<EM>` container. Text held in the container (which is defined by the `<EM>` start tag and the `</EM>` end tag) will be emphasised in some way. A graphical browser could render the emphasized text by displaying it in italics, whereas a browser with audio capabilities for the visually impaired could render the emphasis by a change in the tone of the voice output.

Figure 4-1 also shows the paragraph container. It is important to understand that the `<P>` tag is part of a paragraph container and is no longer a paragraph separator (as many people mistakenly believe). If the `</P>` is not used the existence of the next `<P>` tag will imply a `</P>`. In future versions of HTML it will be possible to specify paragraph attributes: for example `<P ALIGN=Centred>`.

Although browsers will display the HTML document shown in Figure 4-1, for reasons of performance and upwards compatibility it is strongly recommended that HTML documents contain additional elements including the `<HTML>`, `<HEAD>` and `<BODY>` tags, as shown in Figure 4-2.

```
<HTML>
<HEAD>
<TITLE>The World-Wide Web</TITLE>
</HEAD>
<BODY>
<H1>About The World-Wide Web</H1>
<P>Information about the World-Wide Web is available at CERN</A>.</P>
</BODY>
</HTML>
```

**Figure 4-2 A Simple HTML Document.**

The `<HTML>` container is used to define the extent of the HTML document. Within the HTML document there are two other containers: `<HEAD>` and `<BODY>`. The `<HEAD>` container provides information about the document itself. This can include the title of the document (as illustrated) copyright information, keywords and expiry dates (for use by caching software). It is important to make use of the `<HEAD>` tag since, for example, an automatic indexing program which wishes to index the title of HTML documents can parse only the
information contained in the <HEAD> container. If the <HEAD> container is not present the entire document may have to be parsed, which will place unnecessary extra load on the server.

Figure 4-2 also illustrates the use of the anchor <A> container. This tag is used to provide hypertext links. In the example the text at CERN which is contained between the <A> and </A> tags will be highlighted in some way by the browser. Selecting this highlighted phrase will cause the client to send a request for http://info.cern.ch/hypertext/WWW/TheProject.html. This request will use the http protocol and will be sent to the server running on the system at info.cern.ch

**HTML Authoring Tools**

Initially information providers on the World-Wide Web used standard editors such as vi and emacs to create HTML documents. As WWW grew in popularity authoring tools were developed to assist information providers. This section describes three authoring tools which are available for the Microsoft Windows environment: HTML Assistant, HTML Hyperedit and HTMLEd.

**HTML Assistant**

HTML Assistant is a simple authoring tool which can be used to create and edit HTML documents. Frequently Asked Questions about HTML Assistant is available at the URL http://cs.dal.ca/ftp/htmlasst/htmlafaq.html. HTML Assistant is available at the URL ftp://ftp.cica.indiana.edu/pub/pc/win3/misc. In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/tools/editing/ms-windows/html-assistant

Figure 4-3 HTML Assistant.

**HTML Hyperedit**

HTML Hyperedit (which was developed using the Toolbook authoring system) not only provides an environment for producing HTML documents, but also contains a tutorial which gives an introduction to HTML. HTML Hyperedit is available at the URL ftp://info.curtin.edu.au/pub/internet/mswindows/hyperedit. In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/tools/editing/ms-windows/win-htmledit
HTMLed

HTMLed is a simple authoring tool which can be used to create HTML documents. In the UK it is available at the URL 
ftp://src.doc.ic.ac.uk/packages/WWW/tools/editing/ms-windows/

Word Processing Tools

HTML Assistant and HTML Hyperedit are self-contained authoring tools. Another approach is to develop authoring tools which work within a word processing environment. These tools are normally implemented as macros for popular word processing packages, such as Word For Windows or WordPerfect. This section describes three tools which have been developed for use within Word For Windows: the GT_HTML, CU_HTML and ANT_HTML macros.

Word processing tools have the advantage that they provide a consistent environment for existing users of word processors. However they do have their disadvantages. Because they are normally implemented as macros, they can be very slow, especially when used with large or complicated documents. There is also a danger that HTML markup which is embedded as hidden text could cause conflicts with other word processing tools if, for example, the word processed document was used by other users.
GT_HTML

One of the first word processing macros which could be used to create HTML documents was the GT_HTML macro. This macro, written for Word For Windows, was developed at the Georgia Technical Research Institute. In the UK the software is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/tools/editing/macros/ms-winword

Figure 4-6 The GT_HTML Macro.

CU_HTML

CU_HTML is a template designed to work within Word For Windows. The template was written by Anton Lam (mailto:anton-lam@cuhk.hk) The software is available at the URL ftp://ftp.cuhk.hk/pub/www/windows/util

Figure 4-7 The CU_HTML Macro.
ANT_HTML

ANT_HTML is a template designed to work within Word For Windows 6.0. The template was written by Jill Swift (mailto:jswift@freenet.fsu.edu) The software is available at the URL ftp://ftp.einet.net/einet/pc/ANT_HTML.ZIP

Figure 4-8 The ANT_HTML Macro.

Browser Editing Tools

Another approach to editing HTML documents is provided by browsers which are integrated with editing tools. The Arena browser enables an external editor to be invoked to edit the displayed HTML document. Figure 4-9 illustrates the Arena browser used in conjunction with the Emacs editor.

Figure 4-9 Editing A Document From Arena.
HTML Document Conversion Tools

Authoring tools are normally used to create new HTML documents. Document conversion tools, on the other hand, can be used to convert existing documents to HTML format.

LaTeX2html

One of the first sophisticated document conversion tools to be developed was the LaTeX2html conversion program. This program was written by Nikos Drakos, Computer Based Learning Unit, University of Leeds. It and set the standard for document converters, providing a wide range of feature including:

- Automatic generation of hyperlinks at user-defined section breaks.
- Automatic conversion of graphics and formulae to embedded graphics.

Figure 4-10 illustrates a document which has been converted by the LaTeX2html conversion program.

LaTeX2html is available at the URL
ftp://src.doc.ic.ac.uk/packages/WWW/tools/translators/latex2html
Further information is available at the URL
http://cbl.leeds.ac.uk/nikos/doc/www94/www94.html

RTFtohtml

The RTFtohtml conversion program enables RTF files (which can be produced by word processing packages such as Word For Windows) to be converted to HTML. The program was written by Chris Hector(Cray) based on RTF parsing software developed by Paul DuBois.

RTFtohtml is available as a command line tool for a number of Unix platforms. In addition an Apple Macintosh implementation is available. A beta version of an MSDOS implementation was announced in November 1994.

An extension of the RTFtohtml program is known as RTFtoweb. This provides a number of additional features, including creation of hypertext links at user defined section breaks. Figure 4-11 illustrates a document on Exploring The World-Wide Web Using Mosaic For Windows which is available at the URL
http://www.leeds.ac.uk/ucs/docs/tut50/tut50.html
In Figure 4-11 it should be noted that the document is automatically split into a number of files. A hypertext table of contents is automatically generated. Chevrons (>>) and (<<) are also generated automatically which can be used to move to the next or previous section.

Further information about RTFtohtml is available at the URL:
The software is available at the URL:
In the UK it is available at the URL:
ftp://src.doc.ic.ac.uk/packages/WWW/tools/translators/rtftohtml
RTFtohtml is available at the URL:

**HTML Quality Tools**

The HTML specification states that "**HTML parsers should be liberal except when verifying code. HTML generators should generate strictly conforming HTML.**" Put simply this means that browsers should be capable of displaying documents which contain invalid HTML, but HTML authoring tools and document converters should generate HTML which conforms strictly to the standard.

A number of HTML validation tools are available which can validate HTML documents. A number of popular tools are described below.

**HoTMetaL**

HoTMetaL is an HTML authoring tool and validator. It will provide feedback if it encounters invalid HTML, as illustrated in Figure 4-12.

![Figure 4-12 HoTMetaL](image-url)
HoTMetaL is available for the X and Microsoft Windows. Two versions of the software are available: a public domain version and a licensed version. HoTMetaL Pro, the licensed version, can be used to import and validate an existing document. The public domain version will give an error and refuse to load a document which contains invalid HTML.

HoTMetaL is available at the URL
ftp://src.doc.ic.ac.uk/packages/WWW/Mosaic/html/hotmetal

Weblint

A tool called weblint can be used to check for invalid HTML documents. This software is available from the URL ftp://ftp.khoros.unm.edu/pub/perl/www/weblint-1.0.00.tar.gz. In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/tools/weblint

SGMLS

sgmls is a tool which can be used to validate SGML documents. It is available at the URL ftp://sgml1-ex.ac.uk/pub/SGML/sgmls/. sgmls is used in a number of HTML validation services, such as those mentioned above. Information on installing sgmls and also pgmls (an SGML mode for emacs) is available at the URL http://web.nexor.co.uk/users/mak/doc/html/sgml-lib/html-sgml.html

HTML Validation Service

An HTML validation service is available at the URL http://www.hal.com/~Econnolly/html-test/service/validation-form.html. This service makes use of HTML forms and a CGI script which runs a HTML validation program. The service can be used to check HTML syntax by entering the HTML markup to be checked. It can also be used to check an existing HTML document by entering the URL of the document.

![HTML Validation Service](image)

Figure 4-13  HTML Validation Service.
A variation on this service is available at the URL

These services make of the sgmls validation program.

The software can be installed on your local Unix system. It is available at the URL

**HTML Check Toolkit**

The HTML Check Toolkit is another HTML validation program. The software can be installed using a WWW browser. The installation service, illustrated below, is based on the EIT Webmaster Starter's Kit. HTML Check Toolkit is available at the URL http://www.hal.com/~markg/HaLSof.html-check/

![Installation Options](image)

**Figure 4-14 Installing The Check_HTML Script.**

**Review of HTML Tools**

Before choosing HTML authoring tools, document converters or quality tools for institutional use the following issues should be considered:

**Support** Who wrote the software - an experienced software developer or a student as part of a computer project? Will the software continue to be developed and supported?

**Quality** Does the software produce valid HTML?

**Functionality** What facilities does the software provide?

**Other Issues** If the software is based on a word processing package, what happens if the word processed document needs to be used by another word processor?
Writing Style

Writing styles for WWW documents are still developing. However there are a number of guidelines which can be provided:

- Avoid saying "Click on the option". This is browser specific: with a command-line browser, such as Lynx, it is not possible to click to select hypertext links.
- Avoid saying "Select here".
- Avoid saying "Back to University Home Page". If the reader has gone directly to the page, the word back is not appropriate.
- Avoid saying "University Home Page". Which University? Try to give the reader some context to where they are in cyberspace.

Finding Out More About HTML

This document does not provide an in-depth tutorial on HTML. Many WWW resources are available which give details on writing HTML. Some of these are listed below:

- A Beginner's Guide To HTML is available at the URL http://www.ncsa.uiuc.edu/demoweb/html-primer.html
- The Elements Of HTML Style is available at the URL http://bookweb.cwiss.uci.edu:8042/Staff/StyleGuide.html
- HTML Documentation is available at the URL http://www.utirc.utoronto.ca/HTMldocs/NewHTML/intro.html
- Marc Andreessen's HTML Primer is available at the URL http://www.ncsa.uiuc.edu/demoweb/html-primer.html
- Peter Flynn's Online Guide to HTML is available at the URL http://www.ucc.ie/info/net/htmlindex.html
- How to Write HTML files is available at the URL http://curia.ucc.ie/info/net/htmldoc.html
- Spinning the Web: An Introduction to HTML is available at the URL http://scholar.lib.vt.edu/reports/soasis-slides/HTML-Intro.html
- Composing Good HTML is available at the URL http://www.willamette.edu/html-composition/strict-html.html
- A Crash Course in HTML is available at the URL http://www.ziff.com/~eamonn/crash_course.html
- An HTML Tutorial is available at the URL http://www.charm.net/~web/Tutorial/HTML/

In addition to these documents the following resources are also available.


A list of HTML tools is available at the URL http://info.cern.ch/hypertext/WWW/Tools/Filters.html

Dan Connolly's HTML Design Notebook is available at the URL http://www.hal.com/%7Econnolly/html-design.html

The HTML specification is available at the URL http://www.hal.com/%7Econnolly/html-spec.html
5 Graphics

The World-Wide Web is, of course, a graphical system. This section describes how graphical objects can be incorporated in an HTML document, how external graphical files can be used and how to create and use interactive maps. The section also considers the performance aspects of using graphics.

HTML Graphical Tags

Inline images are defined in an HTML document using the <IMG> tag. For example:

```html
<IMG SRC="portrait.gif">
```

The full syntax for the <IMG> tag is:

```html
<IMG SRC="source file" ALT="textual description"
ALIGN="option">
```

The SRC attribute is used to specify the URL of the graphical file. At the time of writing graphical files should normally be in GIF format, although support for other graphical file formats may be available in certain browsers. The SRC attribute is mandatory.

The ALT attribute is used to specify text which should be displayed by a browser which cannot display graphics, or a browser which has the display of inline images option switched off. Use of the ALT attribute is highly recommended.

The ALIGN attribute can take the values TOP, MIDDLE or BOTTOM. It is used to define whether the top, middle or bottom of the graphic should be aligned with the text. Use of the ALIGN attribute is optional.

Using External Viewers

You can use the <A> anchor tag to refer to a graphical file. When the link is selected the graphical file is normally passed to a graphical viewer (such as xv or LVIEW) for displaying.

One common use of the <A> tag is to provide a link to a large colour graphic from a small thumbnail image. For example:

```html
<A HREF="full-image.jpeg"><IMG SRC="thumbnail.gif" ALT="Portrait of John Smith"></A>
```

It is also possible to use this technique to provide links from thumbnail images to video clips. For example:

```html
<A HREF="fluidflow.mpeg"><IMG SRC="fluidflow.thumb.gif" ALT="Video clip of fluid flow"></A>
```

Active Maps

An active map (also sometimes referred to as a clickable image) is an inline image in an HTML document. An area of the image can be selected, usually by clicking with a mouse. The coordinates of the image that has been selected are sent to a program which can then process the information. An active map can be used to provide a graphical menu, in which selecting a menu option will retrieve a specified HTML document. Active maps can also be used in developing teaching and learning software - for example a medical student could be asked to click on an area of an xray which shows a cancerous growth. If an incorrect area is selected a HTML document giving further information can be displayed.

An active map can be specified as shown in the HTML document below.
Please select an area of the xray showing cancerous growths.
<a href="cgi-bin/htimage/xray.config"><img src="xray.gif" ismap></a>

Figure 5-1 HTML Document Containing Markup For An Active Map.

The file xray.config will contain the coordinates of regions in the image, as illustrated below.

| rectangle (100,100) (500,500) cancer.html |
| circle (50,50) 25 homepage.html |

Figure 5-2 Configuration File For Active Map.

When the user clicks on an area of the image the coordinates are sent to the cgi-bin/htimage CGI program. The name of the configuration file for the image (in this case xray.config) is also sent to this program. The htiimage program will then retrieve the HTML document specified in the configuration file. If, for example, the user has clicked in a circle defined by the centre at position 50,50 with a radius of 25, the file homepage.html will be sent to the browser. If the user has clicked in a rectangle with vertices at the position 100,100 and 500,500 the file cancer.html will be sent to the browser.

Mapedit

Mapedit is an editor for creating image map files. Image map files are a feature of NCSA and CERN servers; they enable you to turn a GIF image into a clickable map by designating areas using polygons and circles within the GIF and specifying a destination URL for each area. The software is not public domain. Commercial users must pay a licence fee; non-profit and educational users are asked to send the author a postcard. The software is available from the URL ftp://sunsite.unc.edu/pub/packages/infosystems/WWW/tools/mapedit

In the UK it is available at the URL ftp://src.doc.ic.ac.uk/packages/WWW/mapedit Mapedit was written by Thomas Boutell (mailto:boutell@netcom.com).
Graphical Tools

Paintshop Pro

Paintshop Pro is an example of a Microsoft Windows tool which can be used to manipulate graphics files for use on WWW. Paintshop Pro can be used to convert file formats, to reduce colour depth and to convert colours.

Figure 5-4  Paintshop Pro.

The image being manipulated by Paintshop Pro contains information for 256 colour (as shown in the bottom left of the screen). The colour depth of the image should be reduced to decrease the size of the file to an appropriate level (e.g. a line drawing should not contain 256 colours), and thus reduce the network traffic when the image is retrieved on WWW.

Other Graphical Tools

Imagizer can generate high-quality thumbnail images, among other things, on-the-fly. It is available for SunOS, Solaris, and HP/UX, and soon for Windows and NT. Further details are available at the URL http://pc.inrird.com/imagizer.html

San Diego Supercomputer Center's intools package converts many file formats, including GIFs.

ImageMagick is a multi-purpose raster converter and manipulation package. The convert program handles many file formats including GIF. The software is available at the URL ftp://ftp.x.org/contrib

Graphics Workshop from Alchemy Mindworks is a DOS package for converting graphical files.

Appropriate Use Of Graphics

Novice information providers may be tempted to fill their HTML documents with inline graphical images. More experienced computer users will remember the large numbers of poorly designed paper documents which were produced once desktop publishing packages became widely used.

Before making use of graphics you should consider the following points:

- Will the image look attractive and be readable on computers with monochrome or limited colour capabilities?
- Since many computers currently used have limited colour maps, images which contain many colours may not be displayed correctly.
- Since the http protocol needs to reestablish a connection for every image, using many small images (such as coloured balls for bullets) can be inefficient.
- The use of images to compensate for deficiencies in the current version of HTML can limit the effectiveness of browsers for the disabled (e.g. a browser for the visually impaired which provides audio output will not be able to handle graphical instructions and navigational aids).
- The use of the same image (such as a logo) but held on different departmental servers results in unnecessary traffic, since the image will not be cached in the client.
- Excessive use of graphics can act as a barrier to people in developing countries who may have to pay for their network traffic.

Look at the following URL. See how long it takes for the information to be delivered. Note that if you retry the URL it is likely to be quicker if it is cached by your client or by your server (if your server supports caching).

http://www.leeds.ac.uk/ucs/people/BKelly/uniras94/uk_logos.html

![UK University Logos](image.png)

**Figure 5-5 UK University Logos.**

This page contains pointers to logos on institutional UK university WWW servers. Details of the numbers of colours and the file size are also provided.

**Further Information**

A tutorial on imagemaps is available at the URL

http://wintermute.ncsa.uiuc.edu:8080/map-tutorial/image-maps.html

A good example of use of graphics is the Xerox Parc Map viewer which is available at the URL http://pubweb.parc.xerox.com/map
The tremendous growth in the numbers and extent of information services on WWW has made net-surfing an ineffective way of finding useful information. Fortunately sophisticated indexing tools are being developed. Figure 6-1 shows a page which contains pointers to a number of searching tools.

A collection of WWW search engines is available at the URL
http://cuiwww.unige.ch/meta-index.html Some of the main searching tools are listed below:

CUI WWW Catalog
http://cuiwww.unige.ch/cgi-bin/w3catalog

Yahoo
http://akebono.stanford.edu/yahoo/

Globewide Network Acadamy
http://uu-gna.mit.edu:8001/cgi-bin/meta/

EINet's Galaxy
http://galaxy.einet.net/

Aliweb
http://web.nexor.co.uk/public/aliweb/aliweb.html

Lycos
http://fuzine.mt.cs.colorado.edu/mlm/lycos-all.html

World-Wide Web Worm
http://www.cs.colorado.edu/home/mcbryan/WWW.html

WebCrawler

RBSE URL
http://rbse.jcs.nasa.gov/eichmann/urlsearch.html

Nikos
http://www.rns.com/cgi-bin/nomad

Jumpstation Robot
http://www.stir.ac.uk/jsbin/js

World-Wide Web Wanderer
http://www.mit.edu:8001/cgi/wandex
Robots, Spiders and Worms

During 1993 many WWW users discovered resources by net-surfing: going to one WWW server, exploring what was available, and then following links to other WWW servers. A number of software developers produced software which automated this process, so that a program went from server to server, indexing information, such as contents of the <TITLE> tag or the contents of server home pages. Such programs became known as robots or spiders; one robot was called WWWW, the World-Wide Web Worm.

There are a number of problems with this approach to global indexing:

- **Server performance** When a robot arrives at your server it can place a heavy load on the server.
- **Network performance** Robots can place heavy loads on the network infrastructure.
- **Quality** Robots index all files. They are unable to differentiate between valuable information resources (such as a collection of research reports) and low quality, transient information (such as an undergraduate's personal interests).
- **Maintenance** The robot will not know if an information source that has been indexed is withdrawn from service.

A number of these issues have been addressed. Martijn Koster's Guidelines For Robots, which is available at the URL http://web.nexor.co.uk/mak/doc/robots/robots.html provides guidelines for developers of robots.

A list of robots is kept at the URL http://web.nexor.co.uk/mak/doc/robots/active.html

Aliweb

Aliweb (Archie Like Indexing In The Web) provides another approach to the indexing of WWW resources. With Aliweb each site is responsible for indexing files. The server administrator is responsible for choosing and describing the services to be indexed.

Further information about Aliweb is available at the URL http://web.nexor.co.uk/aliweb/doc/aliweb.html. The paper ALIWEB - Archie-Like Indexing In the Web, which was presented at the WWW 94 conference in CERN, is available at the URL http://web.nexor.co.uk/mak/doc/aliweb-paper/paper.html

SWISH

SWISH, which stands for Simple Web Indexing System for Humans, was announced on 16 November 1994. It is a program that allows you to index your Web site and search for files using keywords in a fast and easy manner. Documentation is available at the URL http://www.eit.com/software/swish/swish.html. The software is available at the URL ftp://ftp.eit.com/pub/web.software/swish/

WAIS

WAIS (Wide Area Information Server) is another mechanism for indexing resources. WAIS is used by the Computing Service, University of Leeds to index its documents and newsletters. An example of how the WAIS server and WAIS indexing software is used is given below.

The command:

```
waissserver -p 210 -d /apps/info/WWW/WAIS
```
is used to start the WAIS server software. The -p 210 argument specifies the name of the port on which the server runs while the -d argument gives the name of the directory which will contain WAIS databases. Note that since the WAIS server will normally be running continuously it will normally be initiated by the system administrator.

Newsletters are indexed by giving the command

```
waissindex -export -d /apps/info/WWW/uces/newsletter/wais-sources/computing-service-newsletter -T HTML *.html
```

The name of the WAIS database is computing-service-newsletter. This long name is used since a single directory is used for all WAIS databases - it will save confusion if other departments wish to index their own departmental newsletters.

The WAIS database can be accessed by a dedicated WAIS client or by a WWW browser which contains support for the WAIS protocol. The WAIS database can be accessed by giving the URL wais://www.leeds.ac.uk/computing-service-newsletter

**WAIS Utilities**

A number of utilities are available which can post-process the output from WAIS.

*waiss.pl* is a CGI script which is distributed with the NCSA httpd server.

*Son of waiss.pl* is a CGI script which is based on the waiss.pl script.

*SFGate* is a CGI script which interfaces to WAIS servers. SFGate provides a forms interface which can be used to access a number of WAIS databases. It is available at the URL http://ls6-www.informatik.uni-dortmund.de/SFGate/SFGate.html. A demonstration is available at the URL http://ls6-www.informatik.uni-dortmund.de/SFGate/multiple.html.

*wwwwais* is a small ANSI C program that acts as gateway between waisq or waissearch (programs that search WAIS indexes) and a forms-capable World-Wide Web browser. With the freely distributable freeWAIS package, this program, and your local Web site, you can:

- Create searchable databases of the information on your Web site
- Allow users to search multiple databases via their Web browser with customizable options
- Create a custom pop-up menu of servers to search through
- Produce hypertext search results, with file information and links directly to the relevant HTML documents
- Retrieve WAIS source descriptions and files
- Specify URLs and filters to map results to
- Only allow users from certain sites to search documents

Documentation is at the URL http://www.eit.com/software/wwwwais/wwwwais.html

You can FTP the source and related files from the URL ftp://ftp.eit.com/pub/web.software/wwwwais/

You can see how it looks at the URL http://www.eit.com/cgi-bin/wwwwais

**A WAIS Application**

One interesting application of the use of WAIS is the multimedia archive prototype developed by Andy Walker, formerly of the CBL/Multimedia Unit, University of Leeds. The prototype was developed to investigate the feasibility of providing a archive of multimedia objects for use in CBL applications by members of the University of Leeds.

A directory is created for each multimedia object. The directory contains the multimedia object itself (e.g. a graphical file, video clip or sound file) together with a keyword file which
describes the object. The keyword files are indexed using WAIS. A WWW browser which supports forms is used to run a CGI script. The CGI script invokes the `waisq` command to search the WAIS database. The output from `waisq` is then used to create a HTML file which contains a pointer to a thumbnail image of matching multimedia objects.

Figure 6-2  Multimedia Archive.

Which WAIS?

A number of WAIS servers are available. The `freeWAIS` software is currently used at the University of Leeds. This software is maintained by CNIDR, the Clearinghouse For Networked Information Discovery and Retrieval. The `freeWAIS` software, however, is based on the 1988 version of the Z39.50 protocol. An implementation of WAIS based on the 1992 version of Z39.50 is also believed to be available from CNIDR. `freeWAIS` is available at the URL `ftp://ftp.cnidr.org/pub/NIDR.tools/freewais`

`freeWAIS-sf` is an implementation of WAIS developed at Dortmund University. It is available at the URL `ftp://ls6-www.informatik.uni-dortmund.de/pub/wais/freeWAIS-0.2-sf-beta.tar.gz`

CNIDR Isite

CNIDR Isite is an integrated software package including a text indexer, search engine and Z39.50 communication tools to access databases. Isite includes the CNIDR ZDist, Isearch and Search API distributions.

A mailing list has been established to discuss Isite. To join, send an email message to `listserv@vinca.cnidr.org` with the body of the message as `subscribe ISITE-L your name`. To post messages to the list, send to `isite-l@vinca.cnidr.org`.

Further information is available at the URL `http://vinca.cnidr.org/software/Isite/Isite.html`

Further Information

A tutorial on `Mosaic and WAIS` is available at the URL `http://wintermute.ncsa.uiuc.edu:8080/wais-tutorial/wais.html`

A WAIS overview is available at the URL `http://info.cern.ch/hypertext/Products/wais/sources/Overview.html`

A list of resources about the Z39.50 information discovery protocol is available at the URL `http://ds.internic.net/z3950/z3950.html`
7 WWW Servers

If you wish to make information available you will need to run a WWW server. The server software is known as httpd - the hypertext transport protocol daemon. Just as their many WWW browsers available there are also many servers, including ones for Unix, MS Windows, Windows NT and the Apple Macintosh.

This section gives an example of how to install and run a server for the Microsoft Windows environment. The section then goes on to illustrate a number of server management issues which are based on the CERN server for the Unix platform.

Example of Installing A Server On A PC

An example illustrating how easy it is to install a WWW server is given below. The example assumes that you have access to a networked PC.

Connect to the NCSA server software from the anonymous FTP server at ftp.ncsa.uiuc.edu Then change directory to /Web/httpd/Uni/ncsa_httpd/contrib/winhttpd Finally retrieve the file whttp13p1.zip An example of how to do this using the FTP software is illustrated below.

```
ftp src.doc.ic.ac.uk
image
cd /Web/ncsa/httpd/Windows/winhttpd
get whttp13p1.zip
```

Create a directory called C:\HTTPD on the C: drive of your PC and then move to the directory using the CD \HTTPD command. Then uncompress the file by giving the command:

```
PKZUNIP -D WHHTTP13P1.ZIP
```

The -D option will preserve the directory structure from the compressed file.

Run Microsoft Windows and create a program icon using the New option on the File menu. The icon should point to the file C:\HTTPD\HTTPD.EXE

Set the time zone in the AUTOEXEC.BAT file so that TZ=GMT.

Run the server program. The window shown below should be displayed.

![Figure 7-1 Running The Windows HTTPD Server.](image)

Run a World-Wide Web browser and then enter a URL containing the IP address of your PC. For example if your PC has an IP address of 192.11.1.1 you should enter the address:

```
http://192.11.1.1/
```
The following diagram illustrates NCSA Mosaic for X accessing a server running on a PC.

This example is meant to illustrate the installation of a WWW server. In practice the server software is likely to run on a more robust system than a PC running MS DOS, such as a Unix or Windows NT system.

## Server Configuration Files

World-Wide Web server software will normally have a configuration file which is used to:

- Specify an area of the file store on the server machine from which files can be retrieved.
- Restrict access to certain files.
- Specify caching, which enables remote files to be stored on the local server for a period of time.
- Act as a proxy gateway, which provides a means for unauthorised machines to access resources on WWW.

As WWW develops, additional features will be provided in the server software and the configuration files are likely to grow in complexity. An example of a simple configuration file is shown below.

```plaintext
map / file:/apps/WWW/homepage.html
map /* file:/apps/WWW/*
pass file:/apps/WWW/*
fail *
```

**Figure 7-3 A Simple httpd.conf Configuration File**

Figure 7-3 shows a simple configuration file for the CERN httpd server. Line 2 specifies that files located under the directory `/apps/WWW` should be available to the WWW server software. Line 1 specifies that file `/apps/WWW/homepage.html` is the default file to be displayed when the WWW server is accessed.
Figure 7-4 shows another configuration file (this is for illustrative purposes - some options may have been superceded). The various features are summarised below:
Parts 1 and 2 provides a mechanism for ensuring that the proxy gateway cannot be accessed from outside the local domain. Without these options it would be possible for a browser on an external system to use the proxy gateway to gain access to files which are restricted to local use.

Part 3 passes requests for the httpd, gopher, wais and ftp protocols.

Part 4 specifies the location for CGI files.

Part 5 specifies the area of the filestore which can be accessed by the server.

Part 6 describes the location and format of the server log file.

Part 7 specifies that server caching is to be available, and gives the location of the cache and the cache log files, together with the size (in Mbytes) of the cache.

Part 8 specifies the purging frequency for files in the cache.

An example of a typical httpd.log file is shown below.

```
abc.nt.com - - [21/Nov/1994:22:00:03 +0000] "GET /music/NetInfo/MusicFTP/ftp_sites.html HTTP/1.0" 200 13175
```

Figure 7-5 Example of a httpd.log File.

Note that the names of the machines accessing files from the server have been altered in the diagram. This has been done because it could be argued that such information should be confidential.

**Caching**

Many clients provide client-side caching. This means that if you retrieve a file and then retrieve another file, when you return to the initial file it will be retrieved from the client's cache, thus saving a subsequent network transfer.

A number of servers also support caching by the server. This is illustrated in Figure 7-6.

![Figure 7-6 Caching By The Server.](image)

Caching can improve the performance of a WWW service by ensuring that frequently requested files will tend to be stored in the local cache. There is, of course, a danger that if the
file on the remote server is updated that an out-of-date file will be retrieved from the cache. In practice, however, httpd server software which supports caching can deal with this issue by, for example, looking at the date of the file on the remote server and, if the remote file is newer than the file in the cache, replacing the file in the cache with the new version of the file.

```plaintext
[Proxy Information]
http_proxy: www.leeds.ac.uk
gopher_proxy: www.leeds.ac.uk
wais_proxy: www.leeds.ac.uk
```

Figure 7-7 Client Configuration File To Support Caching.

It order for a client to make use of a cache on a server, the client configuration file (e.g. the MOSAIC.INI file) must be suitably configured. Figure 7-7 illustrates the relevant options for the MOSAIC.INI file.

Accesses of the cache are recorded in the cache log file. A typical log file is illustrated in Figure 7-8.

```plaintext
xyz_pc77.leeds.ac.uk - - [21/Nov/1994:00:43:35 +0000] "GET http://white.nosc.mil/gif_images/NM_Sunrise_s.gif HTTP/1.0" 200 18673
xyz_pc77.leeds.ac.uk - - [21/Nov/1994:00:43:38 +0000] "GET http://white.nosc.mil/gif_images/glacier_s.gif HTTP/1.0" 200 6474
xyz_pc77.leeds.ac.uk - - [21/Nov/1994:00:43:40 +0000] "GET http://white.nosc.mil/gif_images/rainier_s.gif HTTP/1.0" 200 18749
```

Figure 7-8 The httpd_cache Log File.

Note that the names of the machines accessing files from the cache have been altered in the diagram. This has been done because it could be argued that such information should be confidential.

Caching Strategies

As well as using a local server cache, it is also possible to use a national caching service. The Unix HENSA service at the University of Kent at Canterbury run a national caching service. To use this service the local client should define www.hensa.ac.uk as the proxy. Another national caching service is available at sunsite.doc.ic.ac.uk Further information is available at the URL http://src.doc.ic.ac.uk/WWW-Cache.html

An institution will need to decide whether to use a caching service and, if so, whether to have caching services running on a number of departmental system, to have an institutional caching service, or to use the national caching service at HENSA. In the future it may be possible to chain caches. The possibility in the long term of having institutional, metropolitan, national and continental caches should be considered.

Proxy Gateways

In many academic institutions off-campus access to the Internet is restricted to authorised computers. Depending on the institution’s local policy, authorisation may be restricted to computers located in offices in which there is an individual who is responsible for use of the machine. Such a policy may be enforced in order to provide some means of security against hacking remote services. However this policy would appear to prevent students from accessing remote information services from computers in open access cluster areas.

In practice there is a technique known as proxy gateways which can be used to provide access to services off-campus, without compromising local security. With a proxy gateway a trusted system (typically a Unix system which is more secure to hacking than a desktop machine) will have Internet access. Machines in open access cluster can point to the proxy gateway, which will then retrieve information from off-campus services.

It should be noted that with increasing usage of Internet services such as the World-Wide Web, the author believes that the provision of security mechanisms, such as proxy gateways, will be increasingly important.
Further information

Further information on caching and proxies is available at the following URLs:
http://www.hensa.ac.uk/www94/
http://info.cern.ch/httpd/Proxies/ManyProxies.html
http://www.hensa.ac.uk/new.cache.html

Security

The httpd server also handles a number of security issues. It is common practice to restrict access to a certain area of the filestore. For example if the server configuration files contains the lines:

```
map /* file:/apps/WWW/*
pass file:/apps/WWW/*
fail *
```

Figure 7-9 Server Configuration File.

then clients will only be able to access files held under the directory /apps/WWW/.

Note  This statement refers to clients running on remote machines. If the client is running on the same machine as the server, the client will normally be able to access files on the server to which it has read access.

Additional levels of security can also be specified:
- Restricting access to specified computer systems.
- Restricting access by username and password.

The method of implementing such security tends to be server dependent, and will not be described in this document.

Summary of Server Software

A brief summary of server software is given below. This summary is based on Thomas Boutell's WWW FAQ.

Unix Servers

**CERN httpd**
Information about CERN's server is available at the URL http://info.cern.ch/hypertext/WWW/Daemon/Status.html

**NCSA httpd**
NCSA's server is available at the URL ftp://ftp.ncsa.uiuc.edu/Web/ncsa_httpd

**EIT httpd**
EIT have created a Webmaster's Starters Kit which installs their server using a forms interface from a WWW browser. Further information is available at the URL http://wsk.eit.com/wsk/doc/

**GN Gopher/http**
The GN server can serve both WWW anbd Gopher clients. It may be useful for sites wishing to migrate from Gopher to WWW, although it does not have the server-script capabilities of the CERN and NCSA servers. Further information is available at the URL http://hopf.math.nwu.edu/

**Plexus perl server**
The Plexus server is written in Perl. Further information is available at the URL http://bsdi.com/server/doc/plexus.html
WebWorks Enterprise server
The is a commercial server marketed by Quadrailay Inc. Further information is available at the URL

Netsite Communication Server and Netsite Commercial Server
These servers have been developed by Netscape Communications Corporation. Further information is available at the URL
http://home.mcom.com/MCOM/products_docs/server.html

Macintosh Servers

MacHTTP
Information about the MacHTTP server for the Apple Macintosh is available at the URL
http://www.biap.com/

Novell Netware Servers

httpd nlm
The httpd NLM server for Novell Netware is available at the URL

Microsoft Windows and Windows NT Servers

https
HTTPS, developed at Edinburgh University, is a Windows NT server which runs on Intel, MIPS and Alpha CPUs. It is available at the URL
ftp://emwac.ed.ac.uk/pub/https/

NCSA httpd For Windows
The NCSA httpd for Windows server provides most of the features of the Unix version, including scripts (which generate pages on the fly). It is available at the URL
ftp://ftp.ncsa.uiuc.edu/Web/ncsa_httpd/contrib/

SerWeb
SerWeb is a Microsoft Windows server. It is available at the URL
ftp://emwac.ed.ac.uk/pub/serweb/

Web4Ham
Web4Ham is a Microsoft Windows server. It is available at the URL
ftp://ftp.informatik.uni-hamburg.de/pub/net/winsock/

Server Strategies

An institution needs to decide on its server strategies. For example, should it support:

1. A central server
2. A number of departmental servers

If option 2 is chosen then how is indexing across servers to be achieved, and what caching strategy is to be adopted. What are the skills levels needed by the server administrator? An institution, such as a university, needs to recognise that adopting a server strategy is more than simply installing the server software.

Which Server?

The most widely used servers are probably those developed at CERN and NCSA for the Unix platform. Unix is probably the best platform for running an institutional WWW service, since it is a mature, pre-emptive multi-tasking operating system. In addition, Unix provides a wide
range of tools which can be used to assist in system administration. Servers are available for
the PC and Macintosh platform, but, due to the inherent deficiencies in the operating system
environments which are currently used on the platform, such servers are probably not
recommended if you wish to run a large-scale, stable service.

Servers have been developed for the Windows NT environment. This may provide a robust
operating system environment which can be used for providing a WWW server on an Intel
platform.

Further Information

Further information about HTTP is available at the URL
http://info.cern.ch/hypertext/WWW/Protocols/

Information about HTTP/NG is available at the URL
http://info.cern.ch/hypertext/WWW/Protocols/HTTP-NG/http-ng-status.html

The HTTP/1.0 specification has been submitted as an Internet-Draft and is available for
comment at the following URLs:

The document Setting up a World-Wide Web Server, which is available at the URL
http://scholar.lib.vt.edu/reports/Servers-web.html, gives advice on
setting up a server.

A collection of utilities intended especially for WWW system administrators is available at
the URL ftp://src.brunel.ac.uk/WWW/managers/

A list of server software is available at the URL
http://www.cern.ch/hypertext/WWW/Daemon/Overview.html

A list of server software is available at the URL
http://www.charm.net/~web/Vlib/Providers/Servers.html

A list of server software is available at the URL
http://akebono.stanford.edu/yahoo/Computers/World_Wide_Web/HTTP_Servers/

A hypermail archive of the HTTP-WG mailing list is available at the URL
8 Extending WWW

External Viewers

Access to WWW can be achieved by using a client such as NCSA Mosaic to display HTML documents and inline images in GIF format. However the World-Wide Web is an extensible system: clients can access information which is in other formats than HTML.

When a client receives a file from a server it checks on the file type. If the file type indicates that it is an HTML document, the file will be displayed by the browser. Otherwise the browser's configuration file can specify an external viewer which can be used to display the file. A list of widely used external viewers is given in Table 8-1.

<table>
<thead>
<tr>
<th>File Format</th>
<th>Viewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG</td>
<td>LVIEW (MS Windows) xv (X Windows)</td>
</tr>
<tr>
<td>Postscript</td>
<td>Ghostview</td>
</tr>
<tr>
<td>DVI</td>
<td>xdvi (X Windows)</td>
</tr>
<tr>
<td>MPEG</td>
<td>mpeg_play (X Windows and MS Windows)</td>
</tr>
</tbody>
</table>

Table 8-1 Popular Viewers.

The association between the file type and the viewer is given in the browser's configuration file. A typical configuration file for Mosaic for Windows is given in Figure 8-1.

```
[Viewers]
TYPE0="audio/wav"
TYPE1="application/postscript"
TYPE2="image/gif"
TYPE3="image/jpeg"
TYPE4="video/mpeg"
TYPE5="video/quicktime"
TYPE6="video/msvideo"
TYPE7="application/x-rtf"
TYPE8="audio/x-midi"
TYPE9="audio/basic"
TYPE10="image/x-action"
TYPE11="application/x-w3launch"
application/postscript="L:\winapps\ghost\gsview %ls"
application/x-w3launch="n:\windept\bmb\w3launch\w3launch %ls"
image/gif="L:\winapps\mosaic2\lview %ls"
image/x-action="n:\windept\bmb\action25\playact %ls"
image/jpeg="L:\winapps\mosaic2\lview %ls"
video/mpeg=""
video/quicktime=""
video/msvideo=""
audio/wav=""
audio/x-midi="mplayer %ls"
application/x-rtf="write %ls"
```

Figure 8-1 Part of a MOSAIC.INI File.

Running Client Applications

If a Postscript file is retrieved from a WWW server the browser program normally responds "I don't know what to do with a Postscript file - but I know a program that does. I'll pass the Postscript file on to the Ghostview program". If, for example, an Excel spreadsheet is retrieved from a WWW server the client could be configured to respond "I don't know what to do with an Excel spreadsheet file - but I know a program that does. I'll pass the spreadsheet
file on to the Excel program”. This technique extends the functionality of the World-Wide Web from acting as a distributed file viewer to acting as a distributed program manager.

Security Implications

Unfortunately there are a number of security concerns with such an approach. For example an application developed using the Toolbook authoring system could be delivered using WWW. The application could then be launched using a local copy of Toolbook. The application could have a button marked Start. Clicking this button could then result in files held on the local machine being deleted! Even associating a word processed document with Word For Windows holds dangers, as many Microsoft applications, including Word For Windows, support the use of macros, including autostart macros, which could also cause files to be deleted.

As a general principle there are dangers in automatically invoking applications from WWW clients.

Implementing Security - W3Launch

There are security problems in using a WWW browser to download and run software from the Internet. It is generally not considered wise to configure a browser so that it recognises file types which contain programs. Jon Maber, Biochemistry and Molecular Biology, University of Leeds has developed a launching program for the Bionet TLTP project which provides a simple and secure method of launching only authorised software.

Further details on the W3Launch program is available at the URL http://www.leeds.ac.uk/bionet/student/pre-stud.htm

![Figure 8-2 W3Launch.](image)

It should be noted that W3Launch is an application developed at the University of Leeds - it is not part of WWW itself.

Server-side Extensions

Example

The previous section described how it is possible to run applications on the client machine. It is also possible to run software on the server. A simple application running on the server is shown in Figure 8.3.
#!/bin/sh
echo Content-type: text/html
echo
if [ $# = 0 ]
then
    echo "<HEAD>"
    echo "<!-- Script written by Brian Kelly --!>"
    echo "<TITLE>Search University Phone Directory</TITLE>"
    echo "<ISINDEX>"
    echo "</HEAD>"
    echo "<BODY>"
    echo "<H1>Phone Directory</H1>"
    echo "Enter surname of the person you are searching for.<P>"
    echo "Script written by <A HREF=http://www.leeds.ac.uk/ucs/people/BKelly/bk.html>Brian Kelly</A>." 
    echo "</BODY>"
else
    echo "<HEAD>"
    echo "<TITLE>Results Of Search</TITLE>"
    echo "</HEAD>"
    echo "<BODY>"
    echo "<H1>Results of Search for $* </H1>"
    echo "<PRE><TT>
    grep -i "$*" /apps/data/Telephone_Directory
    echo "</PRE><TT>"
    echo "</BODY>"
fi

Figure 8-3  Script To Generate An HTML Document.

The program, which is a C shell script which runs on the Unix server system, can be executed by selecting the URL http://www.leeds.ac.uk/ucs/cgi-bin/phone

When the URL is selected since no arguments are provided, the first part of the if statement is run. This will generate the following HTML document:

<HEAD>
<!-- Script written by Brian Kelly --!> 
<TITLE>Search University Phone Directory</TITLE> 
<ISINDEX>
</HEAD>
<BODY>
<H1>Phone Directory</H1>
Enter surname of the person you are searching for.<P> 
Script written by <A HREF=http://www.leeds.ac.uk/ucs/people/BKelly/bk.html>Brian Kelly</A>.
</BODY>

Figure 8-4  Virtual HTML Document.

The <ISINDEX> tag generates a search dialogue box. The HTML document is rendered as shown below.

Figure 8-5  Running The Script.
When text is entered in the Search box and the <Enter> key pressed, the script in Figure 8.4 is executed again. This time, since the program will be given an argument, the second part of the if statement will be executed. This will generate the HTML tags and then invoke the Unix grep command to search a file for lines containing the search string.

Figure 8-6 Output From The Script.

CGI Programs

The example described above is known as a CGI program. CGI stands for the Common Gateway Interface. It is a standard which has been adopted by a number of server developers (primarily developers of the CERN and NCSA server software) for running programs on the server machine. A definition of CGI is available at the URL http://hoohoo.ncsa.uiuc.edu/cgi/examples.html

Examples of the use of CGI programs are available at the URL http://hoohoo.ncsa.uiuc.edu/cgi/examples.html

A tutorial on CGI is available at the URL http://www.charm.net/~web/Tutorial/CGI/

A CGI Programmer's Reference is available at the URL http://www.halcyon.com/hedlund/cgi-faq/

An archive of useful CGI programs is available at the URL ftp://ftp.ncsa.uiuc.edu/Web/httpd/Unix/ncsa_httpd/cgi/

Forms

Forms are often used to collect the information from a user which is used as input to a CGI program. A description of forms is given below.

Creating A Form

A form consists of areas of the screen in which the user can input data. The data is sent to the HTTP server, which can run a script or program to process the data in some way. One common use of forms is to provide feedback on a WWW service. Input to the form can be emailed to the service administrator. Forms can also be used to input search criteria to be input to a search engine, or to specify parameters for distributed teaching and learning services.

A form is defined by the <FORM ...> and </FORM> HTML tags. The <FORM> tag has the syntax:

<FORM METHOD="method" ACTION="url">

For example:
<FORM METHOD="post" ACTION="http://leeds.ac.uk/ucs/cgi-bin/myscript">

will send the input data to be processed by myscript.

An example of a form is shown below:

<TITLE>Fill-Out Form Example #7</TITLE>
<H1>Fill-Out Form Example #7</H1>
This is another fill-out form example, with toggle buttons. <P>

<HR>

<FORM METHOD="POST" ACTION="http://hoohoo.ncsa.uiuc.edu/htbin-post/post-query">
<H2>Godzilla's Pizza -- Internet Delivery Service, Part II</H2>
Type in your street address: <INPUT NAME="address"> <P>
Type in your phone number: <INPUT NAME="phone"> <P>
Which toppings would you like? <P>
<OL>
<LI> <INPUT TYPE="checkbox" NAME="topping" VALUE="pepperoni"> Pepperoni.
<LI> <INPUT TYPE="checkbox" NAME="topping" VALUE="sausage"> Sausage.
<LI> <INPUT TYPE="checkbox" NAME="topping" VALUE="anchovies"> Anchovies.
</OL>
How would you like to pay? Choose any one of the following: <P>
<OL>
<LI> <INPUT TYPE="radio" NAME="paymethod" VALUE="cash" CHECKED> Cash.
<LI> <INPUT TYPE="radio" NAME="paymethod" VALUE="check"> Check.
<LI> <I>Credit card:</I> 
<UL>
<LI> <INPUT TYPE="radio" NAME="paymethod" VALUE="mastercard"> Mastercard.
<LI> <INPUT TYPE="radio" NAME="paymethod" VALUE="visa"> Visa.
<LI> <INPUT TYPE="radio" NAME="paymethod" VALUE="americanexpress"> American Express.
</UL>
</OL>
Would you like the driver to call before leaving the store? <P>
<OL>
<LI> <INPUT TYPE="radio" NAME="callfirst" VALUE="yes" CHECKED> Yes.
<LI> <INPUT TYPE="radio" NAME="callfirst" VALUE="no"> No.
</OL>
To order your pizza, press this button: <INPUT TYPE="submit" VALUE="Order Pizza">. <P>
</FORM>

Figure 8-7 HTML Document Defining A Form.

This example is available at the URL
http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/fill-out-forms/example-7.html

The way in which form is displayed is illustrated below.
Processing A Form

Once the form is submitted the data which has been entered is appended to the end of the URL given in the ACTION attribute of the FORM tag. This information is then processed by the script.

Further Information About Forms

Forms tutorials are available at the URL
http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/fill-out-forms/overview.html,
http://hoohoo.ncsa.uiuc.edu/docs/cgi/forms.html,
http://www.webcom.com/html/tutor/forms/start.html and
http://kuhttp.cc.ukans.edu/info/forms/forms-intro.html

A forms testing suite is available at the URL
9 Utilities

A number of useful utility programs have been developed which will assist systems managers and information providers.

**w3new** is a program which will extract a list of URLs from the Mosaic client hotlist file or extract URLs from a HTML document. It will then retrieve the modification dates for each document listed and output a HTML file with the URLs sorted by their last modification date.

Information about the program is available at the URL http://www.stuff.com/~bcutter/home/programs/w3new/w3new.html

The utility was written by Brooks Cutter (mailto:bcutter@stuff.com).

**wusage** is a WWW server usage meter which produces weekly activity reports in HTML. In addition it provides graphical displays of server usage.

Further information is available at the URL http://siva.cshl.org/wusage.html

The software is available from the URL ftp://isis.cshl.org/pub/wusage wusage was written by Thomas Boutell (mailto:boutell@netcom.com).

**getstats** (formerly called getsites) is a versatile WWW server log analyser. It is available at the URL http://www.eit.com/software/getstats/getstats.html

**weblint** is a Unix utility for checking the syntax of HTML documents. The checks include illegally nested, overlapped, unclosed and obsolete tags. Further details are available at the URL http://www.khoros.unm.edu/staff/neilb/weblint.html

The software can be obtained from the URL ftp://ftp.khoros.unm.edu/pub/perl/www/. The utility was written by Neil Bowers, Khoral Research Inc. (mailto:neilb@khoros.unm.edu) The email list weblint@khoros.unm.edu provides announcements of new versions of Weblint. Email Neil Bowers if you wish to be added to the list.

**Verify_links** is a robot which performs link verification. Further information is available at the URL http://wsk.eit.com/wsk/dist/doc/admin/webtest/verify_links.html

**MOMspider** (Multi-Owner Maintenance spider) is a tool which can be used to help information providers and system managers to maintain links to documents. MOMspider is available at the URL http://www.ics.uci.edu/WebSoft/MOMspider/

**Hypermail** is a program that converts a file of email messages to a hypertext WWW form. It is available at the URL http://gummo.stanford.edu/html/hypermail/hypermail.html

The following utilities are available at the URL ftp://src.doc.ic.ac.uk/pub/packagesinfosystems/WWW/tools

**checkweb** looks for dead links in your Web

**html+tables.shar** creates preformatted text tables from HTML+ Table definitions

**mosaic-wais-cli.pl** does a WAIS search using Mosaic from the command line

**newslst/** compiles an HTML page of links to all newsgroup on your server

**simon/** URL database to replace NCSA Mosaic's Hotlist

**test-cgi/** sets up HTTP environment for a CGI script

**url-get.pl** a perl script which brings in any document given its URL

**w3get.pl** retrieves a HTML page named by a URL and all HREFs and IMGs in it
10 Legal and Ethical Issues

Is your WWW service legal? Who is legally responsible for the contents of a WWW service? Is pornography acceptable on a WWW service? If not, who defines what is pornographic and what is art? How do you reconcile control over the contents of a WWW server with intellectual freedom?

The author does not know the answer to these questions. Fortunately WWW is attracting the interests of lawyers, philosophers and artists who are starting to address these issues. Many of the papers which have been published address issues which affects WWW providers in the USA. The American Constitution, and in particular the amendment on free speech, means that much of the work published in the USA in this area is not relevant to the UK.

A future edition of this handbook may contain information relevant to UK legislation and culture. This edition covers a number of issues are raised which WWW service and information providers should consider.

**Liability**

It could be argued that the contents of a WWW service are the responsibility of the organisation which runs the service. So if an undergraduate has been granted to publish information and publishes libellous information the University may be legally responsible. An editorial in the Times Higher Education Supplement suggested that if the organisation has published guidelines covering acceptable and unacceptable use the organisation will have a strong defence if a case is brought to law.

**Computer Misuse Act**

It is likely that any material which incites, encourages or enables others to gain unauthorised access to a computer system would be found illegal under this act.

**Pornography**

Are pictures of naked women acceptable on a WWW service? It could be argued that similar guidelines which govern the contents of a University library should be developed for the WWW. Are pictures of naked women acceptable in books in the university library? The answer is probably "yes", especially if the university has a fine art department. Similar arguments could be made for textual pornography.

However even the most liberal individual is likely to be offended by some of the pornography which is believed to be available on the Internet. In addition UK legislation on computer pornography is likely to be introduced shortly. This could mean that universities have a legal obligation to concern itself with computer pornography.

**Copyright, Designs and Patents Acts**

In general the Copyright, Designs and Patents acts require that the permission of the owner of the intellectual property must be sought before any use of it is made whatsoever.

A WWW manager may have the responsibility to ensure that copyright materiel is not made available unless the copyright holder has granted permission. This may affect research papers which have been submitted for publication. It may also affect the use of photographs, drawings and maps, for which the copyright may be owned, for example, by the photographer or the organisation which commissioned the photograph.
Data Protection Act

Information about individuals which is available on WWW may have to be registered with the Data Protection Officer. The information provider may have to abide by regulations to ensure the accuracy of the information.

Equality Of Access To Information

WWW can provide global access to a wide range of information services. However including large logos and graphical icons on pages can act as a barrier to access to the information, especially for readers in developing countries will limited network access. In some developing countries access may be provided over local telephones lines. A health worker in a hospital in Africa who wishes to retrieve information about public health services may have to pay the additional in retrieving unnecessary graphics. If the local telephone company is owned by a multinational telephone corporation then accessing the information will result in a transfer of money from the developing country to the multinational corporation.

Advertising

As shown in Figure 10-1 some WWW service providers have sponsors for their pages. Is this currently acceptable within the UK academic community? Should it be acceptable?

![Figure 10-1 The "What's New On Mosaic" Page.](image)

JANET Acceptable Use Policy

UK universities which make use of JANET (the Joint Academic Network) must abide by the rules and regulations governing the use of JANET. The following point should be noted.

JANET may be used for any legal activity in furtherance of the aims and policies of a connected organisation, subject to a number of rules. For example, the following uses are not permitted on JANET:

- Use for offensive, indecent, etc. purposes.
- Use for unsolicited mail.
- Deliberate unauthorised access to connected services.
What Is Your WWW Service For?

Formulating an institutional acceptable use policy for WWW information providers may not be a simple task. There are likely to be lively discussions over censorship and control. The formulation of the policy will be helped if the institution has a clear idea of what it expects from its WWW service. Is it:

- To provide easy access to high quality information?
- To enable students to gain experience in multimedia publishing?
- To provide researchers with a test bed for their research?
- To provide members of the University with access to cultural services and to enable them to publish cultural services?

Further Information

An interactive document called *Sex, Censorship and the Internet* is available at the URL http://www.eff.org:80/CAF/cafuiuc.html This document asks questions such as should universities carry alt.sex Usenet groups and should students be punished for using vulgarities on the Net. The document provides pointers to case studies.

Cranfield University have published guidelines for information providers which is available at the URL http://www.cranfield.ac.uk/docs/publish_code.html

Information about the Data Protection Act is available at the URL http://www.open.gov.uk/dpr/dprhome.htm
WWW is an ideal system for developing a campus (or community) wide information system (CWIS). The world's first multimedia CWIS was developed at the Honolulu Community College and officially announced at the end of May 1993. It is available at the URL http://www.hcc.hawaii.edu/

The HCC CWIS was developed to support its goal of becoming the "Technological Training Centre of the Pacific". The most important aspects of developing and managing an effective CWIS are managerial and not technical. Formulating the objectives of a CWIS, resourcing it and developing a training programme are key issues which an institutional needs to address.

The Universities and Colleges Teaching, Learning and Information Group (UCTLIG) are producing a CWIS Manager's Handbook which will address many of these issues.

Finding Out More

Papers by Judy Hallman about CWISes are available at the URL ftp://sunsite.unc.edu/pub/docs/about-the-net/cwis/cwis-l and ftp://sunsite.unc.edu/pub/docs/about-the-net/cwis/hallman.txt

Polly-Alida Farrington's listing of CWISes is available at the URL http://www.rpi.edu/Internet/cwis.html

Lists of (global) CWISes are available at the URLs http://www.rpi.edu/Internet/cwis.html and http://kawika.hcc.hawaii.edu/ws94/cwis.html

The CWIS-L Listserv mailing list provides a forum for the discussion of topics related to campus-wide information systems. To subscribe send the message SUB CWIS-L your name to the address LISTSERV@MSU.EDU

A Framework for Administering NASA's Web Information Hypermedia is available at the URL http://naic.nasa.gov/www-framework.html
12 Teaching And Learning On WWW

Although WWW was initially used as a distributed multimedia system techniques such as CGI scripts meant that interaction could be built into WWW applications. Much of the interest in the WWW within the academic community is based on its potential for developing distributed teaching and learning software rather than simply delivering information.

Examples of Teaching And Learning On WWW

An early example of a distributed multimedia teaching prototype was developed by Ben Whitaker, School of Chemistry, University of Leeds in 1993. As can be seen in Figure 12-1 this prototype is a simple hypertext application. It is of interest because it illustrates how distributed teaching applications can be developed.

![Figure 12-1 Early Example Of A Distributed Multimedia Teaching Application.](image1)

A more sophisticated teaching application was developed by the School of Chemistry in conjunction with Imperial College. The example illustrated in Figure 12-2 makes use of a chemistry MIME type.

![Figure 12-2 Using a MIME Chemistry Type.](image2)
In this example the WWW client is configured to associate the MIME type with the RasMol program. For example in NCSA Mosaic For X the line:

```
chemical/x-pdb; rasmol %s
```

is included in the .mailcap file. When a URL with the extension .pdb is selected the file will be downloaded and the Rasmol program launched, as illustrated in Figure 12-2.

Further information on this project is available at the URL http://chem.leeds.ac.uk/Project/MIME.html

The **Globewide Network Academy (GNA)** is a consortium of educational and research organisations. Its mission is to provide a central organisation in which students, teachers, scholars and researchers can meet and interact. Further information about GNA is available at the URL http://uu-gna.mit.edu:8001/uu-gna/

Mark Cox, Department of Industrial Technology, University of Bradford presented a paper at the *Mosaic and the Web* conference on *Robotic Telescopes: An Interactive Exhibit on the Web*. This paper is available at the URL http://www.eia.brad.ac.uk/mark/wwwf94/wwwf94.html

Mark also has a collection of pointers to hardware control services over the Web which is available at the URL http://www.eia.brad.ac.uk/mark/fave-inter.html

A **Virtual Frog Dissection Kit** has been developed at the LBL. It is available at the URL http://george.lbl.gov/ITG.hm.pg.docs/Whole.Frog/Whole.Frog.html

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**Figure 12-3  Frog Dissection.**

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**CD ROM Facilities**

Providing teaching and learning services on WWW does not necessarily deny access to those who do not have a network connection. Teaching and learning services developed on WWW can be transferred to a CD ROM and used on a standalone system. Such systems are typically developed so that there is a closed set of links. The files (which could include HTML documents, image, sound and video files) and the WWW browser software can then be transferred onto a CD ROM. This approach provides an updateable service for users with network connectivity together with a fixed service for users with access to a PC or Macintosh with a CD ROM player.
National Resources

A number of TLTP (Teaching and Learning Technology Programme), CTI (Computers in Teaching Initiative) and ITTI (Information Technology Training Initiative) projects are using WWW to disseminate information about their projects or, in some cases, to deliver their courseware.

CTISS is available at the URL http://www.ox.ac.uk/cti/

CTI Centre For Biology is available at the URL http://www.liv.ac.uk/ctibiol.html

CTI Centre For Chemistry is available at the URL http://www.liv.ac.uk/ctichem.html

CTI Centre For Law is available at the URL http://crocus.csv.warwick.ac.uk/WWW/law/default.html

CTI Centre For Psychology is available at the URL http://ctipsych.york.ac.uk/

CTI Centre For Sociology is available at the URL http://lorne.stir.ac.uk/departments/cti_centre/

CTI Centre For Textual Studies is available at the URL http://www.ox.ac.uk/depts/humanities/

BioNet Project is available at the URL http://www.leeds.ac.uk/bionet.html

CLIVE Project is available at the URL http://www.vet.ed.ac.uk/

Insurrect Project is available at the URL http://av.avc.ucl.ac.uk/

Institute Of Computer Based Learning, Heriot-Watt is available at the URL http://www.icbl.hw.ac.uk/

INTERACT Project is available at the URL http://medusa.eng.cam.ac.uk/~interact/

Interactive Learning Centre, University of Southampton is available at the URL http://ilc.ecs.soton.ac.uk/welcome.html

ITTI is available at the URL http://www.hull.ac.uk/Hull/ITTI/itti.html

PsyCLE Project is available at the URL http://ctipsych.york.ac.uk/Psycle/PsyCLEinfo.html

STILE Project is available at the URL http://indigo.stile.le.ac.uk/

TLTP is available at the URL http://www.hcbl.hw.ac.uk/tltp/

TLTP Archaeology Consortium is available at the URL http://www.brad.ac.uk/acad/archsci/homepage.html

TLTP Mathematical Project is available at the URL http://othello.ma.ic.ac.uk/

Further Information

Further information about a mailing list for teaching and learning is available at the URL http://tecfa.unige.ch/edu-ws94/ws.html

Pointers to global uses of WWW for teaching is available at the URL http://wwwhost.cc.utexas.edu/world/instruction/index.html

13 Collaboration On WWW

WWW was originally envisaged by Tim Berners-Lee as a groupware tool. In practice it grew in popularity as a publishing tool. However software developers are now working on tools which will facilitate collaboration on WWW. A brief summary of some of the collaborative tools is given below.

Asynchronous Systems

WIT

WIT, the WWW Interactive Talk system, was announced shortly after the WWW 94 conference in CERN. WIT can be accessed at the URL http://info.cern.ch/wit

Access To Usenet

The Netscape browser can be used to post to Usenet newsgroups.
Hypermail

Hypermail is a utility which can be used to convert mail archives to hypertext format on WWW. An example of a hypermail archive is illustrated below.

![Figure 13-3 A Hypermail Archive.](image)

Mailserv

Mailserv provides a forms interface to a number of mailing list servers. The software is available at the URL [http://iquest.com/~fitz/www/mailserv/](http://iquest.com/~fitz/www/mailserv/) The software was written by Patrick M Fitzgerald (mailto:pmfitzge@iquest.com)

![Figure 13-4 The Mailserv Interface To Mailing List Servers.](image)
Synchronous Systems

Video conferencing facilities are being developed which can be integrated with WWW.

One interesting application of a multimedia desktop conferencing systems is MONET (Meeting on the Network) which is described in Applications of Mosaic in Health Care Delivery by Srivasa et al. This paper, which was presented at the Mosaic and The Web conference, is available at the URL http://www.ncsa.uiuc.edu/SDG/IT94/Proceedings/MedTrack/srivasa/artemis.html

At the time of writing many of these services are experimental. However, given the rapid growth of WWW and the extent of development work which is going on, such services may be mainstream in the near future.
Virtual Conferences

One form of collaboration within the academic community is through conferences, workshops and seminars. Whenever the author gives a paper at a conference or is involved in running a workshop or a course he makes his papers, OHP foils, etc. available on WWW under his personal page (sometimes referred to as a *vanity page*).

About 200 of the papers which were given at the second WWW conference, *Mosaic and The Web*, were available on WWW before the conference began. Perhaps one important question which the academic community should be addressing is whether it should be the standard practice for conference proceedings to be made available on WWW.

Further Information

A collection of WWW collaborative projects is available at the URL http://union.ncsa.uiuc.edu/HyperNews/get/www/collaboration.html

Examples of conference proceedings available on WWW is given in Appendix 5.
14 Libraries And WWW

University Libraries should have a strong interest in WWW developments. This handbook provides a overview of the World-Wide Web which should be of interest to libraries which are considering using WWW.

Example Of A Gateway To A Library Catalogue

In the UK many university library catalogues are held in proprietary systems with old-fashioned user interfaces. It may be possible, however, to use WWW to provide an interface to the library catalogue which is consistent with other information services on WWW. At the University of Leeds a backup copy of the library catalogue is kept on a central Unix system using the BRS free text retrieval system. A gateway program, has been developed by Terry Screeton, Computing Service which provides access to the Library catalogue. This gateway is available at the URL http://www.leeds.ac.uk/library/cats/backup.html

In Figure 14-1 a form is completed. The term Internet is used as a search term. Once the form is submitted the data is sent to a CGI program. In this case the CGI program is a C program which invokes the BRS free text retrieval system. The output from the BRS program is then processed to generate the appropriate HTML markup. The output from the search is illustrated in Figure 14-2.
Resources

**Datalib** provides an interface to a number of online information service hosted at Edinburgh University. It can be accessed at the URL [http://datalib.ed.ac.uk/](http://datalib.ed.ac.uk/)

**SALSER** is an online information service about serials held in Scottish academic and research libraries. It can be accessed at the URL [http://salser.ed.ac.uk/](http://salser.ed.ac.uk/)

The **Clearinghouse for subject-oriented Internet resource guides** is available at the URL [http://http2.sils.umich.edu/~lou/chhome.html](http://http2.sils.umich.edu/~lou/chhome.html)

The **EINet Galaxy** collection of online resources is available at [http://galaxy.einet.net/galaxy.html](http://galaxy.einet.net/galaxy.html)

The **CERN Virtual Library** is available at the URL [http://info.cern.ch/hypertext/DataSources/bySubject/Overview.html](http://info.cern.ch/hypertext/DataSources/bySubject/Overview.html)

The **Boulder Community Network** service is available at the URL [http://bcn.boulder.co.us/](http://bcn.boulder.co.us/) Its policy statement is available at the URL [http://bcn.boulder.co.us/bcn/policy.html](http://bcn.boulder.co.us/bcn/policy.html) The policy statement includes a bill of rights, a freedom to read statement and a freedom to view statement.

The following Library resources may also prove useful:

- [http://www.library.nwu.edu/DOCS/LibResources.html](http://www.library.nwu.edu/DOCS/LibResources.html)
- [http://www.rutgers.edu/lawschool.html](http://www.rutgers.edu/lawschool.html)
- [http://badger.state.wi.us/00/agencies/dpi/www/dpi_home.html](http://badger.state.wi.us/00/agencies/dpi/www/dpi_home.html)
- [http://cyclops.idbsu.edu](http://cyclops.idbsu.edu)
- [http://www.loc.gov/](http://www.loc.gov/)
- [http://alpha.acast.nova.edu/hytelnet.html](http://alpha.acast.nova.edu/hytelnet.html)
- [http://www.arcade.uiowa.edu/arcade-www/gateway/search/library.html](http://www.arcade.uiowa.edu/arcade-www/gateway/search/library.html)

Finding Out More

Web4Lib is a mailing list aimed at library-based WWW managers and developers. To subscribe to the list email listserv@library.berkeley.edu with the message SUBSCRIBE Web4Lib yourname.

15 Future Developments

This handbook describes how to run a WWW service using the technology which is available today. However the technology is developing so rapidly that it is important that WWW managers and information providers are aware of developments which may happen sooner rather than later.

Uniform Resource Identifiers

Uniform Resource Locators (URLs) describe the location of a resource on the Internet and the protocol which is used to access the resource. An object on WWW may be available in many locations: for example popular browsers, such as NCSA Mosaic, are available from anonymous FTP servers in many locations around the world. The mirroring of files helps to minimise network traffic over busy links, such as the trans-Atlantic link. Mirroring also reduces the load on the central server. Uniform Resource Names (URNs) will provide a mechanism for uniquely identifying a resource. In the future it is likely that a browser will request a URN rather than a URL. A URN to URL resolver will locate the nearest object (nearest in network terms).

Uniform Resource Characteristics (URCs) will provide meta-information about a document. This information could include information about the author, keywords, expiry dates (for caching servers), copyright and cost information. URCs could also provide information about the quality of the document. For example a seal of approval (SOAP) could be given by university publications group which confirms, by the use of a digital signature, that the document is a PhD thesis.

Uniform Resource Identifiers (URIs) includes URLs, URIs and URCs. The URI specification is available as RFC 1630. The mailing list uri@bunyip.com is used to discuss URIs. Send email to uri-request@bunyip.com to subscribe to this list. Archives of the list are available at the URL http://www.acl.lanl.gov/URI/archive/uri-archive.index.html

New Facilities

CCI

NCSA Mosaic For X (version 2.5) provides support for CCI (Common Client Interface). This will provide a standard mechanism by which WWW browsers can communicate with external programs. A number of demonstrations of this facility are available, including a slideshow program, which instructs Mosaic to display URLs which are specified in a file. A program called xwebteach provides a mechanism by which a teacher can control the display of Mosaic on student's machines. Further information about the CCI specification is available at the URL http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/ci-spec.html

W3A

W3A (World-Wide Web Applets) is a proposal for a standard API for dynamically linking applets (which can be defined as a piece of software that can be attached to a host program such as a WWW browser). Further information is available at the URL http://www.let.rug.nl/~bert/W3A/W3A
Appendix 1  Mailing Lists

This section contains information on mailing lists and Usenet groups on topics related to the World-Wide Web.

Please note that before sending a message to any of these lists please listen to the discussions first and, where possible, read the information about the list. You should not send simple questions about, say, installing Mosaic on your home PC to a list for developers of the WWW protocols.

Usenet News

comp.infosystems.www.users

comp.infosystems.www.users provides a forum for discussion of WWW client software (such as Mosaic, Cello and Lynx), new user questions, client setup questions, client bug reports, resource discovery questions on how to locate information on WWW that can't be found by the FAQ and comparisons between various client packages are among the acceptable topics for this group.

comp.infosystems.www.providers

comp.infosystems.www.providers provides a forum for the discussion of WWW server software and the use of server software to provide information to users. General server design, setup questions, server bug reports, security issues, HTML page design and other concerns of information providers are among the likely topics for this group.

comp.infosystems.www.misc

comp.infosystems.www.misc provides a general forum for discussing WWW issues which are not covered by the other comp.infosystems.www groups.

comp.infosystems.announce

comp.infosystems.announce is for announcement of new information services (e.g. new WWW sites) and new software products (new server software, new clients, new document converters, etc.) An archive of the comp.infosystems.announce Usenet group is available at the URL http://www.cs.rochester.edu/users/grads/ferguson/announce/

comp.infosystems.wais

comp.infosystems.wais covers WAIS topics, including integration of WAIS with WWW.

comp.text.sgml

comp.text.sgml covers SGML, including HTML.

Archives of These Groups

Archives of the www-announce, net-happenings mailing lists and comp.infosystems.www.* Usenet groups are available at the URL http://cair-archive.kaist.ac.kr/Archive/Announce/
CERN Mailing Lists

To join a list at CERN send electronic mail to listserv@info.cern.ch with the line subscribe www-list your name.

For example if John Smith wanted to subscribe to the www-announce list he would send the message subscribe www-announce John Smith

An overview of CERN mailing lists is available at the URL http://info.cern.ch/hypertext/WWW/Administration/Mailing/Overview.html

Alternatively send an email message to listserv@info.cern.ch containing line lists to receive a list of lists or review list to receive a list of subscribers to list.

www-announce

www-announce is for anyone interested in WWW, its progress, new data sources, new software releases. Please refrain from posting administrivia to this list! The list owners want to keep it low volume, large membership.

www-html

www-html is for technical discussions of the HyperText Markup Language HTML. Design discussions only, please, not newcomer questions.

This list is archived at the URL http://198.92.133.3/menus/6581.htm and at the URL http://gummo.stanford.edu/html/hypermail/hypermail.html

www-rdb

www-rdb is for discussion of gatewaying relational databases into WWW. This list is archived at the URL http://info.cern.ch/hypertext/WWW/Archive/www-rdb

www-proxy

www-proxy is for technical discussion about WWW proxies, caching, and future directions.

This list is archived at the URL http://info.cern.ch/hypertext/WWW/Archive/www-proxy

www-talk

www-talk is for technical discussion for those developing WWW software or with that deep an interest. (Please keep this to WWW technical design only. Not general questions from non-developers, which should go to the newsgroup, nor for HTML topics which should go to www-html.)

This list is archived. A threaded version of the archive is available at the URL http://gummo.stanford.edu/html/hypermail/archives.html.
Other Mailing Lists

atmwww-l

atmwww-l is an open and unmoderated discussion of the impact of Asynchronous Transfer Mode (ATM) technology and networking on the World-Wide-Web. To subscribe to the list send the message subscribe atmwww-l your name to the address listserv@cmuvm.csv.cmich.edu in the To send messages to the atmwww-l discussion list, email: atmwww-l@cmuvm.csv.cmich.edu

cello-l

cello-l is a discussion list for users of the Cello WWW browser. To subscribe to the list send the message sub cello-l your name to the address listserv@cornell.edu Further information is available at the URL ftp://ftp.law.cornell.edu/pub/LII/Cello/default.htm The Cello FAQ is available at the URL Archives of the list are available at the URL gopher://gopher.law.cornell.edu:70/11/listservs/cellol

html-wg

html-wg is a mailing list for an IETF working group which is discussing developments of HTML. To subscribe email html-wg-request@oclc.org with the message SUBSCRIBE html-wg yourname An archive of the list is available at the URL http://www.ics.uci.edu/pub/ietf/html/

http-wg

The HTTP working group (http-wg) will work on the specification of the Hypertext Transfer Protocol (HTTP). HTTP is a data access protocol currently run over TCP and is the basis of the World-Wide Web. The initial work will be to document existing practice and short-term extensions. Subsequent work will be to extend and revise the protocol. Directions which have already been mentioned include:

- improved efficiency,
- extended operations,
- extended negotiation,
- richer metainformation,
- ties with security protocols.

To subscribe email http-wg-request@cuckoo.hpl.hp.com with the message SUBSCRIBE http-wg yourname An archive of the list is available at the URL http://www.ics.uci.edu/pub/ietf/http/hypermail/

libwww-perl

libwww-perl is a library of Perl4 packages which provides a simple and consistent programming interface to the World-Wide Web. This library is being developed as a collaborative effort to assist the further development of useful WWW clients and tools.

A mailing list has been established for technical discussion about libwww-perl, including problem reports, interim fixes, suggestions for features, and contributions. The mailing list address is libwww-perl@ics.uci.edu and administrivia (including subscribe requests) should be sent to libwww-perl-request@ics.uci.edu

A Hypermail archive of the mailing list is also available at the URL http://www.ics.uci.edu/WebSoft/libwww-perl/archive/
mosaic-l

*mosaic-l* is a Listserv list for the NCSA Mosaic WWW browser. To subscribe send the message `subscribe mosaic-l firstname lastname` to the address listserv@uicvm.uic.edu

**NOTE** This list is now believed to be defunct since it was being used for basic Mosaic questions, rather than providing a forum for Mosaic developers.

MacHTTP-talk

*MacHTTP-talk* is a mailing list for MacHTTP users has been set up. It provides an open forum for any questions, answers, suggestions, announcements, etc. about the MacHTTP server software. To subscribe to the list send a mail message to the address MajorDomo@academ.com containing the message `subscribe MacHTTP-talk firstname surname`

Further information is available at the URL http://www.uth.tmc.edu/mac_info/machttp/mailing_list.html

moo-www

*moo-www* is a mailing list to discuss links between MUDs, in particular systems based on Pavel Curtis's MOO server, and the World-Wide Web. Subjects for discussion include:

- In-MOO clients to access the web.
- Web clients that understand how to talk to MUDs.
- Using the Web to provide Multimedia capabilities to MUDs.

The list is at moo-www@maths.tcd.ie Subscription requests should go to moo-www-request@maths.tcd.ie

Netscape

*Netscape* is a Listserv list for the Netscape WWW browser. This list is for the purpose of discussing features and bugs contained in this new browser, as well as the new tags Netscape implements. To subscribe send the message `subscribe netscape firstname lastname` to the address listserv@irlearn.ucd.ie

Quality

*Quality* is a mailing list for the discussion of quality issues. To subscribe to the list send the message `subscribe quality` to the address listmanager@naic.nasa.gov.

An archive is available at the URL http://naic.nasa.gov/naic/archives

unite

*unite* is a Mailbase list which can be used for discussions about a *User Network Interface To Everything*. Based in the UK with an international membership.

Send mail to mailbase@mailbase.ac.uk with the message `join unite yourname`

The archives are available at the URL gopher://mailbase.ac.uk/11/lists-u-z/unite

Web4Lib

*Web4Lib* is a list for Library-based WWW managers and developers. To subscribe email listserv@library.berkeley.edu with the message `SUBSCRIBE Web4Lib yourname`
web-support

web-support is a Mailbase list which can be used for discussions about WWW issues. Based in the UK. To subscribe email mailbase@mailbase.ac.uk with the message join \htmladdnormallink{web-support}{mailto:mailbase@mailbase.ac.uk} yourname

The archives are available at the URL \htmladdnormallink{gopher://mailbase.ac.uk/11/lists-u-z/web-support}{gopher://mailbase.ac.uk/11/lists-u-z/web-support} A Hypernews version of the archive is available at the URL \htmladdnormallink{http://www.mailbase.ac.uk/hypermail/web-support/archive.html}{http://www.mailbase.ac.uk/hypermail/web-support/archive.html}

WebServer-NT

The WebServer-NT mailing list is intended as a forum where users of Windows NT can discuss World-Wide Web server issues. Likely topics might include (but are not limited to):

- ideas for novel ways of using WWW servers on Windows NT
- security issues on NT Web Servers (encryption, proxy servers, ACLs)
- integration of Web Servers with NT applications
- CGI scripts wanted/available for Windows NT
- features which people would like to see in future Web Server
- products for Windows NT
- the Freeware Web Server (HTTPS) for Windows NT
- configuration and document management issues for NT-based Web Servers

To subscribe, send message to webserver-nt-request@mailserve.process.com and in the message body type \htmladdnormallink{SUBSCRIBE webserver-nt}{mailto:webserver-nt-request@mailserve.process.com}

To get help on the mailserver commands put \htmladdnormallink{HELP}{mailto:webserver-nt-request@mailserve.process.com} in your message body To receive a list of the available mailing list put \htmladdnormallink{LISTS}{mailto:webserver-nt-request@mailserve.process.com} in the body To receive a list of subscribers in a list put \htmladdnormallink{SEND/LIST webserver-nt}{mailto:webserver-nt-request@mailserve.process.com} in the body.

www-buyinfo

Discussions of issues of commercial transactions of information via the Web take place on the www-buyinfo mailing list. To subscribe send the message subscribe www-buyinfo to the address www-buyinfo-request@allegra.att.com

The archives are held at the URL \htmladdnormallink{http://www.research.att.com/www-buyinfo/about.html}{http://www.research.att.com/www-buyinfo/about.html}

www-courseware

www-courseware is a list dedicated to courseware on WWW. To subscribe send mail to www-courseware-request@eit.com containing the message subscribe

An archive of the list is held at the URL \htmladdnormallink{http://www.eit.com/mailinglists/www-courseware/archive/}{http://www.eit.com/mailinglists/www-courseware/archive/}

www-literature

This is a list dedicated to literature on the WWW. To subscribe send mail to www-literature-request@eit.com containing the message subscribe

An archive of the list is held at the URL \htmladdnormallink{http://www.eit.com/mailinglists/www-literature/archive/}{http://www.eit.com/mailinglists/www-literature/archive/}

www-managers

The aim of this list if to provide a high signal-to-noise, quick turn-around forum for managers of WWW servers and sites to get answers to specific questions about the setup and
maintenance of http servers and clients. The mailing list is managed by a utility called
majordomo. To subscribe send the message subscribe www-managers to the address
majordomo@lists.stanford.edu

www-security

www-security is a list to discuss different methods of providing a secure WWW service. The
list will focus on how to secure HTTP and/or HTTP-like protocols to provide privacy, user
authentication, service certifications and document checking (digital signatures).

To subscribe send mail to www-security-request@nsmx.rutgers.edu containing
the message subscribe www-security

An archive of the list is held at the URL http://www.verity.com/www-
security.html

Information about the www-security list is also available at the URL http://www-
ns.rutgers.edu/www-security/index.html

www-speed

The www-speed list is dedicated to the proposition that the web is just too darned slow, and
that some of its key components have inherent performance problems that cannot be dealt with
without changes to protocols. Topics appropriate to the list are:

- Performance issues in existing implementations
- Managing busy servers
- Benchmarking servers
- High performance Server design
- High speed (130Mbps+) issues
- Client implementation
- HTTP - beyond 1.0
- Other performance and scalability issues

The list address is www-speed@tipper.oit.unc.edu The request address is www-
speed-request@tipper.oit.unc.edu

www-vrml

VRML (the Virtual Reality Markup Language) is an evolving specification for a platform-
independent definition of 3-dimensional spaces within the World-Wide Web. It is designed to
combine the best features of virtual reality, networked visualization, and the global
hypermedia environment of the World-Wide Web.

To subscribe to the Virtual Reality Markup Language (VRML) list send mail to
majordomo@wired.com containing the message subscribe www-vrml

Further information is available at the URL http://www.wired.com/vrml/

www@unicode.org

www@unicode.org is intended for indepth technical discussions of the possibility of
modifying the WWW protocols to support Unicode. It is going along the same lines as some
of the Unicode discussions on www-talk, just a more focused group with no other WWW
issues. If interested in joining this list, send email to to www-request@unicode.org
with a subject line of subscribe, and a message body of subscribe www@unicode.org
your name
Appendix 2  WWW Resources

A wide range of resource materials about the World-Wide Web are available on the World-Wide Web. A number are listed below.

WWW Online Resources

The World-Wide Web Developer's Library is available at the URL
http://www.stars.com/

Spider's Web is available at the URL
http://gagme.wwa.com/~boba/spider.html

Yahoo is available at the URL
http://akebono.stanford.edu/yahoo/Computers/

Computers: World-Wide Web is available at the URL
http://akebono.stanford.edu/yahoo/Computers/World_Wide_Web/

One World is available at the URL
http://oneworld.wa.com/htmldev/devpage/dev-page1.html

Web Weaver's Page is available at the URL
http://www.nas.nasa.gov/RNR/Education/weavers.html

WebStars: Astrophysics in Cyberspace is available at the URL
http://guinan.gsfc.nasa.gov/

Pointer's to WWW resources (Toronto University) is available at the URL
http://www.utirc.utoronto.ca/

PC Week's pointers to WWW resources is available at the URL
http://www.upcweek.ziff.com/~pcweek/pointers.html

Oslonett is available at the URL
http://www.oslonet.no/html/demo/WWWinfo/html

CGI Programmer's Reference is available at the URL
http://www.halcyon.com/hedlund/cgi-faq/

The WWW Locator Guide is available at the URL
http://groucho.gsfc.nasa.gov/Code_520/locator/locator.html

A list of World Wide Web FAQs and Guides is available at the URL

WWW Icons and Clip Art

A list of online resources of icons and clip art which can be used to produce HTML documents containing graphics is given below. Note, however, that before using graphics in HTML documents you should be aware of the additional loads which will be placed on network and servers.

http://white.nosp.mil/images.html
http://guinan.gsfc.nasa.gov/Alan/Richmond.html
http://www.cli.di.unipi.it/iconbrowser/icons.html
http://www.jsc.nasa.gov/~mccoy/Icons/index.html
WWW Conferences

Conference proceedings from the first WWW conference, WWW '94, held at CERN on 25-27 May 1994 are available at the URL http://www.elsevier.nl/

Further information about the second WWW conference Mosaic and The Web, held at Chicago on 17-20 October 1994 is available at the URL http://www.ncsa.uiuc.edu/SDG/IT94/Proceedings/ A searchable index of the papers is available at the URL http://www.verity.com/spidersearch.html

The third WWW conference will be held at Darmstadt, Germany on 10-14 April 1995. Further details are available at the URL http://www.igd.fhg.de/ww95.html

Other Resources

WWW Information At CERN

Information about the World-Wide Web Initiative is available at the URL http://info.cern.ch/hypertext/WWW/TheProject.html

Best of the Web

The Best of the Web awards promotes WWW to new and potential users and helps information providers by demonstrating what can be done on WWW. The award winners and entrants are available at the URL http://wings.buffalo.edu/contest/

WWW FAQ

The WWW Frequently Asked Questions (FAQ) is available at the URL http://sunsite.unc.edu/boutell/faq/www_faq.html

Entering The World-Wide Web: A Guide to Cyberspace


Information Superhighway in the UK

Information about the Information Superhighway in the UK is available at the URL http://tin.ssc.plym.ac.uk/up.html
Appendix 3  National UK Services

Services

The Bulletin Board For Libraries (BUBL) holds a wide range of information of interest to anyone involved with libraries in education. Further information is available at the URL http://www.bubl.bath.ac.uk/BUBL/home.html

The Mailbase mailing list service run a WWW server which is available at the URL http://www.mailbase.ac.uk/

The Micros Hensa service run a WWW server which is available at the URL http://micros.hensa.ac.uk/

The Unix Hensa service run a WWW server which is available at the URL http://unix.hensa.ac.uk/

CTISS run a WWW server which is available at the URL http://www.ox.ac.uk/cti/

The Office for Library and Information Networking (UKOLN) runs a WWW server which is available at the URL http://ukoln.bath.ac.uk/UKOLN/home.html

NISS runs a WWW server which is available at the URL http://www.niss.ac.uk/

A TLTP specific Web Server is available at the URL http://www.icbl.hw.ac.uk/tltp

The Social Sciences Information Gateway is available at the URL http://sosig.esrc.bris.ac.uk/

CCTA, the UK Government computer agency, runs a WWW server which is available at the URL http://www.open.gov.uk/

Directories

A list of United Kingdom Based WWW servers is available at the URL http://src.doc.ic.ac.uk/all-uk.html

A UK tourist guide is available at the URL http://www.cs.ucl.ac.uk/misc/uk/intro.html

A UK sensitive map is available at the URL http://scitsc.wlv.ac.uk/ukinfo/uk.map.html This service is maintained by the School of Computing and Information Technology, University of Wolverhampton (email jphb@scitsc.wlv.ac.uk)

WAIS Resources

The following WAIS services are provided by NISS.

NISS Bulletin Board

A wide range of information of interest to varying sectors of the academic community. This service is available at the URL wais://gopher.niss.ac.uk/NISSBB

World Factbook

Basic details (population, climate, main industries and so on) for the countries in the World. Use a search term such as the name of a country to locate particular records. This service is available at the URL wais://wais.niss.ac.uk/World_Factbook
Roget's Thesaurus

The 1911 edition (enhanced with an additional 1,000+ words not included in the original version) of the ever-useful thesaurus of the English language. Use any word as your search term. This service is available at the URL wais://wais.niss.ac.uk/Roget

JANET News

JANET News contains material about the JANET computer network, such as registered domain names and addresses, and information about gateways to other networks. This service is available at the URL wais://news.janet.ac.uk/JANET.news

CHEST Directory

The CHEST Directory of software is available at the URL wais://wais.niss.ac.uk/CHEST_Directory
Appendix 4 Conferences On WWW

Bruce Altner (mailto:ari@clark.net), the Director of Technical Services of ARInternet Corporation has a vision for gatherings at the electronic meeting hall combines the best features of the WWW (browsing, multimedia and hypertext capabilities, searching and information retrieval, file downloading and e-mail communication, to name just a few) within the format of the traditional poster paper session.

Electronic Conferences and Workshops

Here are some real life examples of Electronic Conferences and Workshops:

- **ChemConf'93** is available at the URL gopher://info.umd.edu:901/11/inforM/Educational_Resources/Faculty_Resources_and_Support/ChemConference

- **NASA High Alpha Conference IV** is available at the URL http://www.dfrf.nasa.gov/Workshop/HighAlphaIV/highalpha.html

- **The HIDEc Electronic Conference** is available at the URL http://mosaic.dfrf.nasa.gov/Workshop/HIDEc/Conf.DIRS/.html/links/ConfWeb.html


- **On-Line Proceedings of ACL-94** is available at the URL http://www.automatrix.com/conferences

Reviews of Electronic Conferences

A discussion of the pros and cons of this type of online gathering, written by the ChemConf'93 organizer Dr. Tom O'Haver, is available at the URL gopher://info.umd.edu:901/00/inforM/Educational_Resources/Faculty_Resources_and_Support/ChemConference/BackgroundReading/OnlineConferencing.txt

And as a wonderful example of self-referencing, a la Douglas Hofstadter's Godel, Escher, and Bach, see the URL http://www.automatrix.com/conferences

An example of an “after-the-fact” online conference is available at the URL http://stardust.jpl.nasa.gov/igarss/

TaTOO '95

TaTTOO '95 On-Line used state-of-the-art technology combining interactive multi-user virtual environments with the World-Wide Web to bring an International Conference and Trade Exhibition to the desktop. In the virtual conference objects such as delegates, rooms, personal business cards and leaflets could all be browsed on the Web. A virtual exhibition took place in TaTTOO/MOO, a virtual environment. The MOO was extended to make the objects in it Web-aware, so it was possible to browse the system using a Web client. TaTOO '95 is available at the URL http://www.cms.dmu.ac.uk/Research/OTG/Online/live-announce.html
Appendix 5 References

Books


"Teach Yourself HTML Web Publishing in a Week" by Laura Lemay, to be published by Sams' Publishing (ISBN 0-672-30667-0). This book discusses not only the various aspects of HTML, Web servers, gateways, forms, and imagemaps, but also focuses strongly on style and structure and navigation. In other words, its not just a reference, its also a style guide.

"HTML For Fun and Profit" by Mary Morris, to be published by Prentice-Hall. It includes forms, clickable images, server includes, indexing, linking and basic formatting. It will have a CD-ROM with examples and tools on it. See the URL http://www.sun.com/smi/ssoftpress/


Magazines

Many magazines are being published which cover various aspects of the Internet. The following list gives some of the main ones, including ones published in the UK.

.net published by Fortune Publishing Ltd. Further details are available at the URL http://www.futurenet.co.uk/home.html or by sending email to netmag@futurenet.co.uk

infoHighway ISSN 1355-2465. For further details send email to p.deacon@eurodollar.co.uk or david@pipex.net

Wired. Further details are available at the URL http://www.hotwired.com/ For subscriptions details send email to subscriptions@wired.com

3W cost £24 for 6 issues. Further information is available at the URL http://www.3w.com/3w/