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World Wide Web and Mosaic: User's Guide

Craig I. Schlenoff

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards
and Technology
Gaithersburg, MD 20899

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World Wide Web and Mosaic: User's Guide

Craig I. Schlenoff

This document was written to provide a mechanism for new users to become more familiar with the World Wide Web and the Mosaic software package. Although primarily intended for the National Institute of Standards and Technology (NIST) staff, this document may be helpful to new users outside of NIST.

If you are reading this document in paper format, you may also wish to access it in electronic format through the following URL:

<http://elib.cme.nist.gov/fasd/pubs/schlenoff94.html>

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Introduction

The National Institute of Standards and Technology (NIST) is moving forward in providing and accessing information through the World Wide Web by using the Mosaic software package, among other tools. The World Wide Web is a seamless world in which all information, from any source, can be accessed in a simple and consistent manner. Mosaic, developed at the National Center for Supercomputing Applications (NCSA), is a networked information discovery, retrieval, and collaboration tool used to view documents available through the World Wide Web.

This document was created for the following purposes:

- to help new users become more familiar with the World Wide Web concept
- to demonstrate how to use Mosaic and its capabilities
- to provide a pointer to other documents further describing the World Wide Web and Mosaic

Overview of the World Wide Web and Mosaic

The World Wide Web (also referred to as W3, WWW, and the Web) is a seamless world in which all information, from any source, can be accessed in a consistent way. The WWW works on the principle of universal readership, which states that once information is available, it should be accessible from any computer, in any country, and any (authorized) person should only have to use one simple program to access it.

The WWW has the ability to support many transfer methods (protocols), including HTTP, WAIS, network news, gopher, telnet, anonymous FTP, techinfo, X.500, and whois. To achieve this, the protocol is specified in the URL (Uniform Resource Locator). An explanation of when each protocol should be used is discussed later.

The WWW is an open, non-centralized system of information repositories. Anyone can publish information and any authorized person (as determined by the local system administrator) can read it. Users can publish information by running a server and can read information by running a client such as Mosaic. All clients and servers are connected through the Internet, and communicate using a variety of protocols.

To access information stored in WWW repositories, a client or browser must be used. Mosaic is one of the most popular browsers, both in industry and at NIST. Mosaic operates on the concept of hypertext – which consists of text with links. With hypertext, the computer makes following references as easy as turning the page. This allows readers to escape from the sequential organization of pages and pursue topics which interest them. Hypertext is discussed later in this document.

A document can be retrieved through Mosaic by specifying its URL, which includes the transfer protocol, server, port number, path, and file name. Every file has a unique URL and every URL has a unique file which it points to. In most cases, a document's URL must be known to view it.

The World Wide Web

Background

The concept of the WWW was first implemented by Tim Berners-Lee of CERN (European Laboratory for Particle Physics) in March, 1989. Berners-Lee intended to create a wide-area hypermedia information retrieval system giving universal access to a large universe of documents. Originally aimed at the High Energy Physics community, it has spread to other areas and attracted much interest in user support, resource discovery, and collaborative work. Currently, it is the most advanced information system deployed on the Internet, and is equipped to embrace many future advances in technology, including new networks, protocols, and data formats.

Although the WWW was originally intended only to link documents, recent advancements have expanded this concept. It is now possible to transmit picture files, audio files, and even movies stored in a variety of different formats (assuming the user has software to support the different files). In addition, the WWW can support documents written in PostScript, ASCII, and HTML among others.

Over the past few years, the WWW has grown at a phenomenal rate. As of January 1993, the WWW was ranked 127th of all network services in terms of sheer byte traffic. That August, the WWW was ranked 13th. In addition, the amount of byte traffic across the National Science Foundation's North American network attributed to WWW use multiplied by 414 times during this period ("Entering the World Wide Web: A Guide to Cyberspace", Kevin Hughes).

The Big Picture

Imagine thousands of computers worldwide wishing to view the same group of documents. Without any type of communication system, these documents would have to be located on each computer, thus requiring tremendous disk space and numerous copies of each document. Now imagine a system of common links connecting all of these computers together (the Internet). These computers can now "talk" to each other, and can be given access to the same documents without needing to store a copy on their own computer. But how do they get these documents? There are many transfer methods (protocols) to choose from, but each computer would need to have access to every protocol to obtain every available document. Or, they could have access to only one information system which could support almost every protocol available (The World Wide Web). This is why the WWW was created.

Protocols Supported by the WWW

The first things to decide, when making information available, is which protocol to use. Different protocols have various strengths, relative to intended use and data formats, for instance. The following is a list of the protocols supported by the WWW, a description of their capabilities, and a suggestion of when each should be used.

WAIS

Description: The Wide Area Information Server (WAIS) automates the search and retrieval of many forms of electronic information over wide area networks. Its primary use is to search through documents for keywords and display any matches occurring in its database.

Information Retrieval: WAIS is very useful to find available documents relating to a certain subject in a particular database.

Information Dissemination: WAIS should be used when a person wishes to make a document available and expects the user will locate this document using a keyword search.

Network News

Description: The Network News protocol provides a list of Internet newsgroups sorted by area of interest. A newsgroup is a group of articles written by various users throughout the Internet on a specific topic.

Information Retrieval: Network News allows users to browse or read available news articles by simply clicking on them.

Information Dissemination: Network News is used only for newsgroups and does not support any other forms of information dissemination.

Gopher

Description: Gopher, also known as the "Internet Gopher" allows users to browse for resources using menus. When users find something they like, they can read or access it through Gopher without having to worry about domain names, IP addresses, etc.

Information Retrieval: Gopher is used when the geographical location of a document or group of documents is known. For example, to view "*The Guide to NIST*", first click on **North America** from the main menu, then **USA**, then **Maryland**, then **NIST**, then **NIST General Information**, and then **Guide to NIST**.

Information Dissemination: Gopher should be used when it is anticipated that the user will be accessing a document by its geographical location. Gopher can also support directory hierarchies, which allow documents to be grouped and therefore be easier to locate in a directory structure.

Telnet

Description: Telnet allows users to connect to a specified remote machine and appear as if they were working from that machine. The user must have the necessary permissions (as determined by the system administrator) to telnet successfully.

Information Retrieval: Telnet is primarily used to run applications on remote machines that are not available on a user's machine. Some possible applications are archie, gopher, WAIS, and veronica. Specific logins are needed for different applications.

Information Dissemination: Telnet should be used to make an application available to the public. It should not be used to make non-executable files, such as publications, available.

Anonymous FTP

Description: File Transfer Protocol (FTP) transfers files to and from a remote network site. Anonymous FTP is an anonymous version of FTP; the available directories are generally restricted through user permissions. In this instance, users would login as *anonymous* instead of using their actual login name. This is permitted only when the remote site is set up for such a login.

Information Retrieval: FTP is used to transfer a file when the exact location of the file is known. Navigating through a directory structure and listing of the files in a particular directory are supported. Viewing the contents of a file is not supported. FTP should only be used to transfer a file from one location to another.

Information Dissemination: Anonymous FTP should be used to make a file or group of files available to the public to copy. It should not be used when the user may wish to view the file before copying it.

Whois

Description: Whois is a simple internet telephone book system. A list of colleges and organizations is provided as an entry menu, each linked to their respective electronic telephone listing. Once a location is selected and a name is entered, a keyword search is performed to find the telephone number of the person requested.

Information Retrieval: Whois is used to find out information about a particular person when their organization is known.

Information Dissemination: Whois should be used only to make information about staff (email address, phone numbers) available.

HTTP

Description: Hypertext Transfer Protocol (HTTP) is used to transfer documents written in Hypertext Markup Language (HTML). It has the lightness and speed necessary for a distributed collaborative hypermedia information system.

Information Retrieval: HTTP should be used with a WWW browser to access documents written in HTML when the URL is known.

Information Dissemination: HTTP is used for documents written in HTML. Such documents must reside on a server that supports HTTP access.

Clients, Servers, and How They Are Related

Overview

Computers communicate with each other by various methods. One method is the client-server method. One system serves the request(s) of another (client) system. This model has been adopted in information dissemination and retrieval processes.

Clients

A client is a software package located on the user's machine which allows access to documents in the WWW. Clients usually provide an attractive user interface that allows movement through documents to be as easy as a touch of a button. Although Mosaic is a popular WWW client, there are many other clients available. Different clients (also known as browsers) are available for different platforms.

Servers

A server is a program normally located on a remote machine which responds to incoming connections by a client and provides a service. There are many varieties of WWW server software to serve different forms of data.

Relationship

Any user wishing to access information through the WWW must use a client. In addition, any information made available must be done so through a server. When users type the URL of the document they wish to view, the client searches for the server which handles that URL and "asks" for the document using the specified protocol. The server finds the document and "hands" it to the client for viewing. The document only resides on the client's machine while being viewed. This entire process happens relatively quickly (between a couple seconds and a couple minutes) – even if the connection stretches to the other side of the world!

Further Reading

There are many other references which go into further detail regarding what the WWW and the Internet offer. Many of them are located online. Some books that were used to help write this document are:

The Whole Internet: User's Guide and Catalog *written by: Ed Krol*

The Internet Guide for New Users *written by: Daniel P. Dern.*

Complete citations are available in the references section.

Mosaic

Background

Mosaic was developed at the National Center for Supercomputing Applications (NCSA) as an Internet-based, global, hypermedia browser which allows users to discover, retrieve, and display documents and data from all over the Internet. Global hypermedia means information located around the world is interconnected in an environment which allows users to travel through the information by clicking on hyperlinks (items in documents which point to other related files). NCSA Mosaic can run on three platforms – X Window System, Apple Macintosh, and Microsoft Windows. Information about all three versions is available online through the Mosaic entry page.

The Mosaic Window

A series of documents are available through Mosaic which describe how to navigate through the WWW. Separate documentation exists for each of the three available Mosaic versions: X Window System, Apple Macintosh, and Microsoft Windows. The following is a general description of the Mosaic window that applies to all three versions.

Navigating with Mosaic

Mosaic is based on the concept of hyperlinks. A hyperlink is designated by underlined text linked to another document. Thus, to view the attached document, single-click on the underlined text. Mosaic also keeps a window history on every document viewed. Clicking the **Back** button will travel back through the window history. Likewise, clicking the **Forward** button will travel forward through the window history.

Clicking on the **Window History** feature displays the list of documents viewed. Double-clicking on any document title jumps to that document. The first document on the list is the home page – the document viewed when first entering Mosaic. Clicking on **Home** or **Home Document** button jumps to this document.

Using Mosaic

To open a particular document for viewing, users can click on the **Open Local** button if the document is located on your own server or on the **Open URL** button if the document is located on another server. If a document transfer is taking too long, users can abort by clicking on the Mosaic icon in the upper right corner of the window. Once a document is retrieved, it can be searched to find the occurrence of a word or group of words. To search a document, click on the **Find** or **Search** key and enter the phrase for which you are searching.

A document can also be printed or saved. To print a document, click on the **Print** key and enter the printer name and the format for the file. To save a file, click the **Save** or **Save As** key and enter the location for the saved file.

Configurations

There are numerous options to choose from when Mosaic is started. They include: colors of the Mosaic window; font types; location of Mosaic files; system commands, and external viewers. These options can be specified or they can take on their own default settings. To find out information about setting these configuration variables for each version of Mosaic, please see the documentation provided for the X Windows, Apple Macintosh, and Microsoft Windows systems.

Creating an Alternate Home Page

Most people using Mosaic prefer to have a specialized home (entry) page appear when they start Mosaic instead of viewing the default home page. A home page is the page that appears when Mosaic is first executed. By creating a HTML document containing the items which will appear on their home page and including links to other files that wished to be accessed, this can be accomplished. To learn the particulars of how to do this, please see the relevant documentation for the X Windows, Apple Macintosh, and Microsoft Windows systems.

Concepts and Terminology

This document contains a number of terms which were only vaguely explained. This section clarifies the definition of some of these terms.

URL

When Mosaic attempts to retrieve a document, it needs to know where to look. Therefore, users must provide an "address" which tells the computer the location of the file. This address can point to any file in the world which resides on the Internet. It must include the transfer protocol, the server's name where the file resides, the port number, the path, and name of the file. This address is known as a URL (Uniform Resource Locator).

The URL is constructed in the following format:

protocol://server:port/path/filename

Protocol can be either WAIS, network news, gopher, telnet, ftp, whois, or HTTP. **Server** is the server which provides the document to the client. For example, the NIST server which is available to the public is *www.nist.gov*. **Port** is the network port number (default is 70 for gopher and 80 for HTTP). **Path** is the path where the file resides. **Filename** is the name of the file to be retrieved.

A sample URL is NIST's Mosaic entry page:

http://www.nist.gov/welcome.html

The transfer protocol is HTTP, the server is *www.nist.gov*, the port number is 80, there is no path specified, and the file name is *welcome.html*.

An exception to this rule is when the user is accessing a local file. In this case, only the path and the filename are needed. The URL for a local file is constructed in either of the following formats:

file:/path/filename

/path/filename

This is the format on the SUN platform. The format for the PC and MAC platforms are slightly different.

In both cases **file** is the transfer protocol (either written or implied), **path** is the path in which the file is located, and **filename** is name of the file to be retrieved.

HTTP

HTTP (Hypertext Transfer Protocol) provides a fast, stateless, information retrieval protocol when a large number of references exists between many sources of networked information. This protocol allows users to quickly follow links between sources which are located anywhere on the Internet.

The protocol is stateless – a transaction consists of a connection between a client and a server, a request by the client, a response by the server, and the closing of the connection. The connection uses port 80, by default.

HTML

HTML (Hypertext Markup Language) is a language for creating plain text documents which include hyperlinks to other files located anywhere on the Internet. HTML is a Document Type Definition (DTD) of the Standard Generalized Markup Language (SGML). SGML is a specification for DTD's and HTML is a specialization of SGML.

Tags are used to tell clients how to represent text and are denoted within angle brackets (<>). Tags can denote titles, headers, paragraphs, lists, and preformatted text. Most tags must have an ending tag to denote the end of specified text. The ending tag looks just like the beginning tag except a slash (/) precedes text within the angle bracket.

The advantage of HTML over other DTD's is its ability to link to other documents. Any item in the document can be linked, including text and images. This is done by using the < href> tag. The format is as follows:

```
< href="URL">item</a>
```

where <a is the opening anchor, href= denotes what document to link to, URL is the URL of the document, > points to the text which activates the link, item is the item in the document which serves as the hyperlink, and is the ending anchor. The anchors are important because they denote where hyperlinks occur.

There are many more features which HTML offers. To learn more, please see the document "A Beginner's Guide to HTML" or "HTML TUTORIAL" located on the WWW.

Interesting Documents

There are a number of documents available to help further understand the capabilities of Mosaic. Some include:

Mosaic Demo Document

an interactive hypermedia tour of Mosaic's capabilities

What's New

recent changes and additions to the universe of information available to Mosaic and the WWW

NIST's Homepage

information about NIST – programs, partnerships, awards, and laboratories

Most of these documents can be accessed through Mosaic's default home page.

Finding More Information

Users are encouraged to learn more about Mosaic and the WWW. The following documents may be helpful if this is being read through Mosaic:

- Mosaic for the X Window System
 - help about Mosaic for the X Windows System
- NCSA Mosaic for the Apple Macintosh
 - help about Mosaic for the Apple Macintosh
- NCSA Mosaic for Microsoft Windows
 - help about Mosaic for Microsoft Windows
- NCSA Mosaic Frequently Asked Questions
 - a list of frequently asked questions for NCSA Mosaic

These documents are accessible through Mosaic's default home page.

A newsgroup, *comp.infosystems.www*, was created to discuss issues about the WWW and Mosaic. A subscription is available through any news reader.

Conclusion

The WWW is the emerging leader in Internet information systems. Although its popularity has grown, many original design goals still have not been implemented. Some goals which are expected to be implemented in the future are commercial publishing, collaborative work, object-oriented distributed databases, and access to home and school users.

Searching through the WWW is the best way to find answers to many questions. This document was created in that manner. The pointers included within the document should help start your discovery of the WWW.

When this document was written, no formal support for Mosaic was available at NIST. For questions concerning installation or mounting, users are advised to write to one of the newsgroups mentioned above or to mail the question to the NCSA Mosaic developers. Please read the Frequently Asked Questions document for the Microsoft Windows, Apple MacIntosh or X Windows Systems before writing to the developers.

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