WINDOWS AND TCP/IP FOR INTERNET ACCESS

Mr. Kriz has graciously permitted WindoWatch to print his latest revision of his timely paper <u>Windows and TCP/IP for Internet Access.</u> Release 06 of December 1994.

INTRODUCTION

Internet, the world-wide network of computer networks, has captured the imagination of the general public. Eighteen months ago, the Internet was barely mentioned in the popular computing magazines. Now it is the topic of articles in national news magazines, local newspapers, and grocery-store tabloids.

Awareness of the Internet has spread primarily by word of mouth. Computer pundits were not discussing the Internet in Spring 1993 when I first began investigating the Internet in my work as a librarian. Indeed, most pundits seem to have acquired Internet access only in the Spring of 1994. Thus, computer magazines have not been helpful for those wishing to learn about the Internet.

Now, in December 1994, there is something of a feeding frenzy of interest in the Internet. Bookstores are flooded with guides to the Internet. Software vendors are rushing to market with collections of software designed for navigating the resources on the Internet. It is almost as if the crest of the Internet wave has passed. Pundits who did not have access to the Internet last year are already writing negative opinions about the difficulties of navigating Internet resources, and about the uselessness of those resources.

Complaints about the Internet are many. Certainly it can be difficult to find information and resources on the Internet. A great deal of information is unvalidated, non-authoritative, or otherwise questionable. Some resources should not be available to children. Some would argue that some of the information should not be distributed even to adults.

It is important to remember that the Internet is not a service. Rather, it is a means of gaining access to services and of retrieving information and other objects that can be represented electronically. In considering complaints about the Internet, one might draw an analogy between the Internet and New York City.

New York is big, complicated, and disorganized. The city's myriad resources can be hard to find. Some of what happens or what is available in New York should not be seen by children. For those wishing to navigate the complexity of New York, there are guidebooks, phone directories, magazine articles, and individuals with expert knowledge about areas of particular interest. One can navigate the

ww

complexity of the city by subway, taxi, and bus. One can even hire a private guide to conduct a tour of the city.

The Internet can be compared to the streets of New York City. The services available on the Internet have their analogies in the city's libraries, department stores, bookshops, art galleries, street vendors, and street-corner zealots passing out literature or lecturing the passing crowds. It is safe to assume that somewhere on the streets of the city there will be found information and services of interest to almost anyone. However, finding that information might take some time for someone who is new to the city and its resources. Similarly, somewhere on the Internet there also will be found information and services of interest to almost anyone.

Traveling on the Internet requires only a few basic tools. First is a computer with a network connection to the Internet. A direct connection using a PC equipped with a network interface card that interfaces with a local area network linked to the Internet is common at universities, and becoming more common in businesses. If a direct network connection is not available, an alternative is to connect to the Internet through the computer's serial port. This involves a telephone connection to a terminal server that offers SLIP (Serial Line Internet Protocol) or PPP (Point to Point Protocol) service. Any of these connections can be used with a variety of commercial or shareware software to make your personal computer a host on the Internet and to access services and information from the entire earth. This paper will emphasize the use of freeware and shareware versions of software running under Microsoft Windows.

INTERNET SERVICES

The Internet services of interest to most people consist of four basic functions. These are electronic mail (e-mail), Internet news, file transfer between computers (FTP), and remote login to another computer (telnet). Access systems like Gopher and World Wide Web now supplement these basic Internet functions by assisting the user in searching for and retrieving relevant information in a user-friendly manner.

Until recently, Internet functions were accessible primarily through character-based interfaces using a variety of complex command sets. Thus, until recently, best-selling books on the Internet contained page after page of screen displays or command sequences captured from UNIX-based systems executing basic Internet functions.

Affordable Internet software for Windows first became available in Spring 1993. Prior to that time, Windows users were dependent for Internet access on expensive, proprietary, commercial products in which each vendor's offerings were mutually incompatible with every other vendor's offerings. Publication of

ww

the Winsock applications programming interface provided a way for individual client software (such as a telnet or FTP client) to be compatible with every vendor's networking products. As a result, beginning in 1993 there was a blossoming of freeware, shareware, and commercial Internet software for Windows.

Of special interest has been the development of Windows interfaces to the World Wide Web. Mosaic is the best known Web browser. Other choices include Cello, Netscape, and WinWeb. The Web was developed by the high energy physics community to distribute technical papers and other forms of data. WWW is now widely viewed as a means for educators, businesses, and hobbyists to distribute multimedia information to a world-wide audience. Graphical WWW clients enable publication of data over the Internet in a manner which allows the user to view text, color graphics, sound, and video in a manner that approaches the usability, and surpasses the functionality, of a printed magazine. Those interested in publishing WWW documents may find it useful to read my paper "Teaching and Publishing in the World Wide Web." A plain text version is available by anonymous FTP from:

nebula.lib.vt.edu in directory /pub/www under the name websrv01.asc.
A hypertext version is available through the Web at
http:/learning.lib.vt.edu/webserv/webserv.html.

E-MAIL

Electronic mail is probably the most widely used Internet function. A commonly used configuration requires that a user have an account on a POP (Post Office Protocol) mail server. The e-mail client software accesses the server and downloads any incoming messages to the user's PC. Mail composed at the user's PC is transmitted to the Internet through the mail server.

INTERNET NEWS

Internet news, also referred to as USENET news, is a conferencing system made up of thousands of topical conferences known as news groups. Those familiar with electronic bulletin board systems will compare Internet news to echo conferences. Others will draw an analogy to mailing lists such as listserv on BITNET. The user reads the news by using client software to subscribe to a selection of news groups. When the client software accesses an NNTP (Network News Transfer Protocol) server, the server downloads to the client a list of subjects for all unread messages stored on the server for the selected news group. The user can then select any message for reading, post a response to the message to the group, or reply directly to the original poster of the message. The client software maintains on the user's PC a list of all available groups on the server, along with records of which messages have been read or skipped over. Only the messages selected for reading are actually downloaded to the user's PC.

ww

FTP

FTP (File Transfer Protocol) allows the transfer of files between any two computers of any type. Files can be transferred from PC to PC, PC to mainframe, PC to Mac, PC to UNIX machine, and vice versa. Any kind of computer file, whether it be a text file or a binary file representing software, graphics images, or sounds, can be transferred. Of course, whether the file is usable on the receiving machine depends on the nature of the file and the availability of software to make use of the file.

TELNET

Telnet enables the user of a PC to login to a host computer at another site on the Internet. The user's PC then acts as a dumb terminal attached to the remote host. Such access usually requires that the user have an account on the remote host. For instance, a student or faculty member at one university might have an account on a computer located at another university. An increasing number of commercial services are becoming available via telnet, including services such as the Dow Jones News Service and the Lexis/Nexis service. In addition, some services are available without charge. For example, hundreds of libraries in all parts of the world allow free remote access to their computerized catalogs and to some specialized databases.

GOPHER

Gopher is a system that enables the user to find files and other Internet services by navigating a system of text menus and submenus. As a corollary, it provides a means for information providers to publish information on the Internet in a discoverable manner. Prior to the development of Gopher at the University of Minnesota, information on the Internet was located by asking friends and strangers where to look.

The first step in using a Gopher client is to "point" the client at the address of a known Gopher server. The client then retrieves that Gopher's menu of topics. Typically, many of the topics on a Gopher menu are pointers to yet other menu items on other Gopher servers. The fact that items in the sequence of selections might come from different Gopher servers in widely scattered parts of the world is transparent to the user. The Gopher client software presents the many different Gopher servers as if they represented a single application on a single machine. Navigating such menus can lead the user to skip from one Gopher server to another, literally retrieving information from servers scattered around the world in just a few minutes.

Items on Gopher menus can be of many different data types in addition to menus listing choices of topics. When an item such as a text, graphics, or sound file is selected, the Gopher client transfers the file to the user's PC. Then, as an option,

ww

it may load the file into an appropriate "viewer" selected by the user. A simple text file could be loaded into Windows Notepad. A graphics file in GIF or JPEG format might be loaded into LVIEW, a popular freeware graphics viewer for Windows. A binary program file would simply be downloaded into a designated directory for use at some other time. Finding relevant Gopher menu items is facilitated through the use of Veronica, which is a database of the text of Gopher menus. Most Gopher servers will include Veronica access as a menu selection.

WORLD WIDE WEB

World Wide Web (WWW) is a system that enables users to find and retrieve information by navigating a system of hypertext documents. In a hypertext document, selecting a highlighted word or phrase causes a new document to be retrieved and displayed. Thus, WWW leads the user to skip from one document to another, retrieving information from servers scattered around the world.

Viewing a WWW document with a Windows graphical client such as Cello, Mosaic, Netscape, or WinWeb is similar to reading a magazine. Information is displayed with typographic fonts and color graphics. Unlike a magazine, the static display can be supplemented by sound and video clips that are played by clicking an icon embedded in the document. Clicking on a highlighted word or phrase in the document may cause the reader to skip to another part of the displayed document, or it may cause yet another document to be retrieved.

TECHNICAL DETAILS

It is helpful to know some Internet terminology when working with your local network specialist or Internet service provider to make your PC a host on the Internet. The two common modes of Internet access are through a direct network connection or through a serial connection to a SLIP or PPP server.

A direct network connection involves installing a network interface card (NIC) in your PC. Most likely this will be an ethernet card. This card in turn is connected to your organization's local area network. Wiring usually consists of coaxial cable (as in thin-wire ethernet) or twisted pair telephone wiring (as in 10Base-T ethernet). The local network in turn must be connected to the Internet, and it must be capable of handling TCP/IP data packets.

TCP/IP (Transmission Control Protocol/Internet Protocol) is the method by which data on the Internet is divided into packets of bytes. Each packet is delimited with header information that includes the destination address where the packet is to be routed when it is transmitted over the Internet. The local network and your PC may also be using other network protocols simultaneously with TCP/IP. For instance, your PC may already be connected to a network using Novell, LANtastic, or Windows for Workgroups network protocols.

ww

SOFTWARE LAYERS

Several layers of software are involved in implementing a direct network connection. A commonly used method is to first install a piece of software called a packet driver that deals directly with the network interface card. This is loaded under DOS from the AUTOEXEC.BAT file as a TSR (terminate and stay resident) program. A packet driver should be included with the software that comes with the card. If the manufacturer of the card does not supply a packet driver, free packet drivers are available in the Crynwr Packet Driver Collection as described at the end of this document.

The next layer of software is the TCP/IP driver, which can be implemented in a variety of ways. Until recently, this was often another DOS TSR program loaded from the AUTOEXEC.BAT file. Increasingly this layer of software is implemented as a Windows dynamic link library (DLL) or virtual device driver (VxD). The DLL and VxD implementations do not require any modification of the boot files on the PC.

The TCP/IP driver that implements TCP/IP functionality for the system is referred to as the TCP/IP protocol stack. The driver may be written to work with a specific network card, or it may be written to interface with a packet driver. In the latter case, a single TCP/IP driver can be used with any network card for which an associated packet driver is available. Thus, the packet driver specification eliminates the need for software vendors to customize their TCP/IP protocol stack for every network card with which it is used. When using a packet driver with Windows applications, another DOS TSR referred to as a virtual packet driver may be required to interface between the Windows-based TCP/IP protocol stack and the DOS-based packet driver.

When a direct network connection is not available, Internet TCP/IP software can be used over serial lines to connect to a SLIP (Serial Line Internet Protocol) or PPP (Point to Point Protocol) server that provides a connection to the Internet. SLIP and PPP do not require the software drivers that are necessary with a direct network connection. The Trumpet Winsock shareware package to be described later has all SLIP and PPP functions included in the TCP/IP driver, which is configured through a Windows dialog box.

SLIP and PPP are less transparent to the user than a direct network connection. The user first obtains an account on a SLIP or PPP server. Connecting to the Internet involves dialing the server using normal serial communications software and establishing a SLIP or PPP session. Once the session is established, TCP/IP software running on the PC can be used just as if the PC was connected directly to the Internet through a network card. SLIP and PPP users are well advised to settle for nothing less than transmission at 14,400 bits per second. World Wide Web especially transmits a great deal of data when images or sound are involved.

ww

Slow modems and slow connections will discourage anyone but the most dedicated user from exploring the possibilities of the Internet.

TCP/IP client applications work at the top of the layers of software so far described. Client software runs independently of the type of connection to the Internet. TCP/IP applications frequently are referred to as clients because they access a corresponding server (a daemon in UNIX terminology) on another machine. An FTP client, for instance, is the application on the user's machine that accesses the FTP server running on a host computer located elsewhere on the Internet.

Until recently, each TCP/IP client had to be written to interface with a particular vendor's TCP/IP protocol stack. Clients that worked with one vendor's TCP/IP driver would not work with a driver from another vendor. This restriction was eliminated with the development of the Windows Sockets Application Programming Interface, otherwise known as the Winsock API, or more simply Winsock. Winsock works in the layer between the TCP/IP client and the TCP/IP protocol stack.

WINSOCK

"Winsock" is the buzzword that dominates discussion about TCP/IP and Windows. All of the software to be described here is based on Winsock. The implementation of Winsock is transparent to the user, but it is helpful for the end-user to know how it supports Windows applications.

Winsock (short for Windows sockets) is a technical specification that defines a standard interface between a Windows TCP/IP client application (such as an FTP client or a Gopher client) and the underlying TCP/IP protocol stack. The nomenclature is based on the Sockets applications programming interface model used in Berkeley UNIX for communications between programs.

When you launch a Winsock compliant client like WSGopher, it calls procedures from the WINSOCK.DLL dynamic link library. These procedures in turn invoke procedures in the drivers supplied with the TCP/IP protocol stack. As described earlier, the TCP/IP driver communicates with the computer's ethernet card through the packet driver.

The WINSOCK.DLL file is not a generic file that can be used on any system. Each vendor of a TCP/IP protocol stack supplies a proprietary WINSOCK.DLL that works only with that vendor's TCP/IP stack.

The advantage of Winsock to the developer of a client is that the application will work with any vendor's Winsock implementation. Thus, the developer of an application such as a Gopher client has to understand the Winsock interface, but he does not have to know the details of each vendor's TCP/IP protocol stack in

ww

order to make his client application compatible with that stack. Winsock also eliminates the need for an application developer to include a custom TCP/IP protocol stack within the application program itself. This was a common means of implementing TCP/IP clients under DOS, and some early Windows TCP/IP clients also used this method. The use of protocol stacks internal to the client results in conflicts when two clients try to access the single packet driver that is communicating with the network card. The ability to create applications compatible with any vendor's Winsock compliant protocol stack resulted in a blossoming of Winsock compliant shareware applications beginning in Summer 1993.

The Winsock standard also offers advantages to the end-user. One advantage is that several Winsock applications from different vendors can be used simultaneously. This is a marked improvement over earlier packet driver applications in which each application contained a built-in TCP/IP stack. Such applications cannot share the packet driver except through the added complexity of a packet multiplexer such as PKTMUX. A second advantage to the user is that any Winsock compliant application will run with any vendor's TCP/IP protocol stack and accompanying WINSOCK.DLL.

Unfortunately, some commercial vendors of TCP/IP clients are not yet taking advantage of Winsock capabilities. There are still TCP/IP clients that require dedicated access to the packet driver, and there are clients that will run only with the TCP/IP protocol stack supplied by one particular vendor. Fortunately, the trend is for all commercial vendors to make their applications more usable and portable through the use of the Winsock standard.

SOFTWARE DESCRIPTIONS

Once the required networking hardware is installed and an IP address is assigned, or once an account is obtained on a SLIP or PPP server, the user needs to install a TCP/IP protocol stack and a selection of TCP/IP clients. The remainder of this paper describes such software.

For each application, I briefly outline the installation procedures. I do this primarily to illustrate the simplicity of using Windows for Internet access. Please be sure to read any text files included with each package in order to complete the configuration and to learn about all functions of the software.

I have installed all the software described here for many of my colleagues in the Virginia Tech Libraries. With some practice I have found that I can install a complete suite of TCP/IP applications in about half an hour. Some individuals who read the previous versions of this document were up and running in less than an hour after obtaining the software. They expressed their delight at the ease of networking with Windows.

ww

DISCLAIMERS AND LIMITED WARRANTIES

I am not an expert on anything. I am just an enthusiastic end-user of these products in my daily work. I have used all of the client software with a direct connection to an ethernet network using a Western Digital or SMC ethernet card with the Trumpet Winsock shareware TCP/IP protocol stack and WINSOCK.DLL. In addition, I have used most of the clients with FTP Software's commercial package PC/TCP version 2.2.

In the latter case I obtained the most recent version of FTP Software's WINSOCK.DLL file by anonymous FTP from ftp.ftp.com in directory /support/ftpsoft/winsock under the name winsock.exe (a self-extracting ZIP file)(November 16, 1994 | 46,375 bytes).

The Trumpet and FTP products both use a packet driver interface to the network card. I have also used most of the clients on a Windows for Workgroups network using Microsoft's add-on TCP/IP package. This package is available by anonymous FTP from ftp.microsoft.com in the directory /peropsys/windows/public/tcpip under the filename WFWT32.EXE (November 29, 1994 | 680,621 bytes), a self-extracting archive file. I also have used most of the client software through a SLIP server using the Trumpet Winsock. Both a dialup connection to the SLIP server and a modemless connection through an IBM/ROLM digital switch were used at various times.

I have no experience with PPP connections.

As discussed above, the client software described here should run with any TCP/IP protocol stack that offers Winsock support. If your PC is already using a network operating system that does not include Winsock support, you should check with your vendor to find out if Winsock support is available. If Winsock support is not available from your vendor, then it may be possible to install the Trumpet Winsock TCP/IP protocol stack over your existing network drivers using a small program known as a packet driver shim. Instructions for this configuration are included in the Trumpet Winsock documentation.

In the following descriptions, information about version numbers, file sizes, and dates was verified on December 20, 1994.

TRUMPET WINSOCK (TCP/IP protocol stack and basic clients,) (including telnet, ping, and Archie)

*Comment: You need this package (or some other TCP/IP protocol stack that supports Winsock)
before you can use any of the client software described later. Trumpet Winsock does not require any additional network software. Its TCP/IP functions can be installed over other network software such as Novell or Windows for Workgroups using a packet driver shim. Instructions for such installations are included in the ZIP file.

Author: Peter Tattam, Trumpet Software International
Fee: $25 shareware fee.
Version: 2.0 Revision B

ww

File name: twsk20b.zip   (November 3, 1994 | 179,015 bytes) (includes the TCP/IP protocol stack)

winapps2.zip   (November 29, 1994 | 162,023 bytes) (includes basic clients)

Available by anonymous FTP from: ftp.trumpet.com.au in directory /ftp/pub/winsock
          or by Gopher from gopher.trumpet.com.au under menu item winsock.

The Australian hosts can be slow. An alternative gopher site is biochemistry.bioc.cwru.edu under the menu item CWRU Biochemistry FTP Archive/trumpwsk. You can also FTP to this address and access the directory /gopher/pub/trumpwsk. However, only one anonymous FTP user is permitted weekdays during normal working hours from 9:00 AM to 5:00 PM local time. Note that this site may not contain the latest version of the files. For example, at this writing it did not contain the most recent winapps2.zip file.

INSTALLATION:
1.) Create directory C:\TRUMPWSK and unzip TWSK20B.ZIP and WINAPPS2.ZIP into this
     directory.
2.) Install software drivers.
   Ethernet network:
   a.) Install packet driver for your ethernet card. The entry in my AUTOEXEC.BAT file is
     C:\ETHERNET\8003PKDR.EXE /B:240 /R:D000 /I:10 /E:6b.) Install WINPKT.COM virtual
     packet driver included in TWSK20B.ZIP. The entry in my AUTOEXEC.BAT file is:
        C:\TRUMPWSK\WINPKT.COM 0x61

SLIP or PPP:

No special drivers are needed because SLIP and PPP support are built into the Trumpet Winsock TCPMAN.EXE program.

 3.) In Program Manager, create a program group named Network. Use File Manager to drag and
      drop the EXE files in C:\TRUMPWSK into the Network program group.
4.) Edit the PATH statement in AUTOEXEC.BAT to include C:\TRUMPWSK. This enables
     Winsock applications to find WINSOCK.DLL when they are launched.
5.) Reboot the computer and start Windows.
6.) Launch TCPMAN from the Network program group.
    Select Setup on the menu bar. Enter your IP address, gateway address, and nameserver address
    as assigned by your local network administrator. (Some SLIP and PPP servers, as well as some
    direct network connections, do not use permanent IP addresses. Instead, the server assigns a
    temporary IP address at the start of each session. If the server provides a bootp service, then
    enter the text "bootp" (without the quotes) in place of the IP address. On some servers it may be
    necessary to enter the dummy IP address 0.0.0.0. Some servers report the assigned IP address
    during session startup, requiring the user to manually enter the assigned address in the Setup
    dialog box before proceeding into SLIP mode.) If you are using ethernet, enter the software
    interrupt used by the packet driver. If you are using SLIP or PPP, check the appropriate box and
    enter the appropriate COM port number in the SLIP port box. Exit from TCPMAN. The file
    TRUMPWSK.INI will be created in the C:\TRUMPWSK directory.

ww

7.) Launch any Winsock compliant application. TCPMAN.EXE will start automatically if it is not already running. (If you are using SLIP or PPP, you must first connect to the server and start a

session. This can be done with the dialing function in TCPMAN.) Several clients are included with the Trumpet Winsock, including TRMPTEL.EXE version 0.07 for telnet, WINARCH.EXE

for searching Archie databases, and PINGW.EXE to ping another machine on the network. PINGW provides the simplest means of verifying that you have a network connection. Launch PINGW and enter the name of an Internet host at the prompt. For example, you might try to PING ftp.trumpet.com.au. If your connection is working, and if the host is operating, you will receive a response from the remote host.

Note: The WINSOCK.DLL file for the Trumpet Winsock remains in the C:\TRUMPWSK directory. Some vendors may require that their WINSOCK.DLL be copied to the C:\WINDOWS directory. If you have used Winsock software from another vendor, but now want to try the Trumpet Winsock, be sure to remove the other vendor's WINSOCK.DLL so that it will not interfere with the Trumpet Winsock implementation.

Tip: The WINARCH client for Archie searching that is supplied in WINAPPS2.ZIP defaults to searching the Archie server at archie.au. You can access a different Archie server by using a command line argument. For instance, to use the Archie server run by AT&T, use the command line
winarch.exe -archie=ds.internic.net.

SLIP or PPP usage:
Trumpet Winsock includes a simple dialing function. You can connect to your server by manually issuing the dialing commands. You can also write a script that will dial and start your session automatically.

PITFALL: After dialing with TCPMAN.EXE and establishing the SLIP or PPP session, you must press the <ESC> key to escape from dialing mode and to re-enable the TCP/IP mode in TCPMAN.EXE.

You may want to dial your server automatically without writing a custom dialing script for TCPMAN.EXE. A utility named DIALER can be set up to automatically issue the commands and passwords needed to start a session on your server. DIALER version 2.0A is available by anonymous FTP from:
                    ftp.demon.co.uk
                    /pub/ibmpc/windows/utilities/dialexe.zip
                    (May 27, 1994 | 31,072 bytes)

WSGOPHER (Gopher client)

Comment: A fast client with a useful system for saving bookmarks in a subject classified arrangement and a good help system. Author: Dave Brooks

License: Free
Version: 1.2
File name: wsg-12.exe (December 13, 1994 | 367,860 bytes) Available by anonymous FTP from:
          dewey.tis.inel.gov in directory /pub/wsgopher
Installation:
          1.) Create the directory C:\WSGOPHER and copy the file WSG-12.EXE to this
directory.
                    This file is a self extracting ZIP file.

ww

2.) Execute WSG-12.EXE. The files will be extracted to the directory.
3.) Create a new program item in the Network program group for the program
   C:\WSGOPHER\WSGOPHER.EXE.
4.) Launch WSGopher and read the Help file.
5.) Select the Configuration menu and set the various parameters and options as desired.
   The WSGOPHER.INI file and bookmark files are kept in the C:\WSGOPHER
   directory.

TRUMPET FOR WINDOWS (Internet news reader and POP mail client)
Comment: To read Internet news, you need access to an NNTP (Network News Transfer Protocol) server. To use the mail functions, you need an account on a POP (Post Office Protocol) mail server. (I have not tested the mail functions in this application because I prefer to use PC Eudora for mail.)
Author: Peter Tattam, Trumpet Software International
Fee: $40.00 shareware fee. TSI has extended the free
trial period until the final release of version 1.0B, which is in beta testing at this time.
Version: 1.0 Revision A

File name: wtwsk10a.zip   (August 28, 1993 | 167,601 bytes)
Available by anonymous FTP from: ftp.trumpet.com.au in directory /ftp/pub/wintrump
  or   by   Gopher from gopher.trumpet.com.au under menu item wintrump.
Installation:
1.) Create the directory C:\WINTRUMP and unzip WTWSK10A.ZIP into this directory.
2.) Create a new program item in the Network program group for the program
   C:\WINTRUMP\WT_WSK.EXE.
3.) Launch the program.
4.) Supply the address and other information in the dialog boxes for the menu selections File Setup
   and File Network Setup. NEWS.PRM and other configuration files will be created and stored in
   C:\WINTRUMP.

PITFALL: The list of available news groups on your news server is stored by Trumpet in the file NEWS.GRP. At times, Trumpet fails to fully update this file as new groups become available from the news server. You can force Trumpet to create a new and complete list of available groups by erasing NEWS.GRP before starting Trumpet.

EUDORA FOR WINDOWS (full featured mail client)

Comment: You will need an account on a POP mail server to send and receive mail at your PC. QUALCOMM sells a commercial version of Eudora for both Windows and the Macintosh.
Author: Jeff Beckley, Jeff Gehlhaar, and Mark Erikson,
        QUALCOMM, Inc.
License: Shareware version is free. The author, Jeff Beckley, requests that you send him a postcard at QUALCOMM, Inc., 6455 Lusk Blvd., San Diego, CA 92121-2779 USA if you find the program useful. Information about the commercial version is available through QUALCOMM's QUEST group World Wide Web page at http://www.qualcomm.com/quest/QuestMain.html or from QUALCOMM's FTP server at ftp.qualcomm.com in directory /quest/eudora/windows Questions about Eudora can be sent by e-mail to eudora-sales@qualcomm.com

Version: Shareware: 1.4.4
File name: eudor144.exe   (December 7, 1994 | 292,942 bytes) (self extracting archive file)
Available by anonymous FTP from: ftp.qualcomm.com in directory /quest/windows/eudora/1.4

ww

Installation:

1.) Copy the file EUDOR144.EXE to the directory C:\EUDORA.

2.) Execute EUDOR144.EXE to unarchive the program files.

3.) Create a new program item in the Network program group for the program
   C:\EUDORA\WEUDORA.EXE.

4.) Launch the program.

5.) Select Special Configuration from the menu bar and supply the required information.

6.) Select Special Switches and set characteristics as desired.

7.) Create mailboxes and nicknames to taste.

8.) The file EUDORA.INI and other configuration files will be created in the C:\EDUORA
   directory.

WS_FTP   (FTP client)

WS_PING   (ping client)

Author: John Junod

License: Free to individuals for any non-commercial use and for any U. S. Government
Organization. Others should contact Ipswitch, Inc., 669 Main Street, Wakefield, MA, 01880,
                              (617)246-1150, info@ipswitch.com.

Version: 94.10.18 (WS_FTP)
                 94.10.20 (WS_PING)

File names: ws_ftp.zip   (October 20, 1994 | 113,252 bytes)
          ws_ping.zip   (October 21, 1994 | 60,496 bytes)

Available by anonymous FTP from ftp.usma.edu in directory /pub/msdos/winsock.files

Installation:

1.) Create the directory C:\WS_.

2.) Unzip WS_FTP.ZIP into this directory.

3.) Unzip the file WS_PING.EXE from its ZIP file into this directory also. (Full source code for
   WS_PING is included in the ZIP file with the name WSPI_SRC.ZIP. Source code for the
current
   version of WS_FTP is not distributed. However, source code for the 93-12-05 version of
WS_FTP
   can be downloaded from directory /pub/msdos/winsock.files under the name ws_ftp_s.zip.)

4.) Create new program items in the Network program group for the programs
   C:\WS_\WS_FTP.EXE   and   C:\WS_\WS_PING.EXE.

5.) Launch the programs.

6.) The WS_FTP.INI file remains in the C:\WS_ directory. A file named WINSOCK.INI is
created
    by WS_PING in the C:\WINDOWS directory.

CELLO (World Wide Web browser)

**Comment: Despite its age, Cello version 1.01a performs well. It continues to be more stable than
Mosaic, and it is the best client for printing. It includes a useful Help system. Configuration is
done from within the application, not by directly editing the CELLO.INI file. Unfortunately,
Cello does not understand forms. Users of Diamond Stealth video cards report problems with the
mouse cursor, which virtually disappears while the mouse is moving. The listserv CELLO-L is
busy with messages about CELLO development and about shareware for creating HTML
documents for use on Web servers. Instructions for subscribing to CELLO-L are included in the
Cello Help file. Version 2.0 is now in the hands of alpha testers.**

ww

Author: Thomas R. Bruce
License: Free
Version: 1.01a
File name: cello.zip   (March 17, 1994 | 328,429 bytes)

Available by anonymous FTP from: ftp.law.cornell.edu in directory /pub/LII/Cello

Installation:

1.) Create the directory C:\CELLO and unzip CELLO.ZIP into this directory.
2.) Create a new program item in the Network program group for the program
    C:\CELLO\CELLO.EXE.
3.) Launch the program.

NCSA MOSAIC for Microsoft Windows (World Wide Web browser)

Comment: Users should note the alpha version designation and use caution about saving work in any other running applications before launching Mosaic. As in previous versions over the past year, simply launching and then exiting from Mosaic permanently reduces by some 3 percentage points the Windows user.exe resources on my machine. Launching Mosaic and exiting several times can lead to conditions that require you to restart Windows. However, Mosaic's previous problem of overwriting text when displaying large files seems to be fixed in this version.
Mosaic is a 32-bit application that will run under Windows NT, Microsoft's advanced workstation operating system. Most users
will be using Windows 3.1 or Windows for Workgroups, which are 16bit applications. To use Mosaic with these systems, you must first install Win32s version 1.20 with OLE or later. This addition to the Windows operating system enables current versions of Windows to run 32-bit code that is not Windows NT specific.
NCSA recommends a 33MHz 486 with 8MB of RAM for running this version.
Authors: NCSA (National Center for SuperComputing
                        Applications)
License: Free
Version: 2.0.0a8
File name: mos20a8.exe (December 20, 1994 | 955,546 bytes) w32sole.exe (December 20, 1994 | 2,240,650 bytes)
Available by anonymous FTP from:
        ftp.ncsa.uiuc.edu in directory /Web/Mosaic/Windows
Installation:
1.) Copy W32SOLE.EXE to a temporary directory and execute the program. This will extract the two component files INSTALL.BAT and WIN32DSK.EXE. The latter is another self extracting archive file.

        2.) Execute INSTALL.BAT.
                (This batch file issues the command
                WIN32DSK.EXE -d
to extract the component files into the subdirectories DISK1, DISK2, and DISK3. These subdirectories will be created below the temporary directory containing INSTALL.BAT.)
3.) Change to the DISK1 subdirectory and execute SETUP.EXE. This will install Win32s version 1.20 with OLE. Many of the files will be installed in the directory
C:\WINDOWS\SYSTEM\WIN32S. If you have an older version of WIN32S already installed, it will be removed. You should allow installation of the game FreeCell in order to test that Win32s

ww

is properly installed on your machine. Once this is verified, you can erase the files and directories in the temporary installation directory.

4.) Copy MOS20A8.EXE to the temporary installation directory. Remember to erase any files and subdirectories left in the temporary directory from the installation of Win32s.

5.) Execute MOS20A8.EXE to extract the component files, including SETUP.EXE.

6.) Execute SETUP.EXE to install Mosaic version 2.0 alpha 8 in the directory of your choice. MOSAIC.INI will be copied to the C:\WINDOWS directory.

7.) Launch the program. Read the files README.WRI and RELNOTES.HTM to learn how to fully configure Mosaic to your needs.

8.) When installation is complete, you can remove the temporary installation directory.

NOTE: You can avoid the added complexity of installing Win32s and the substantial demands it places on your PC by using the older Mosaic version 2.0 alpha 2 (June 27, 1994 | 243,749 bytes).
****
NETSCAPE (World Wide Web browser)
Comment: Netscape Navigator is generating enormous interest at this writing as the logical successor to Mosaic. FTP sites designated as sources for Netscape frequently are inaccessible.
Author:Netscape Communications Corporation
License: Free for academic or not-for-profit use. Others, including government users, should contact Netscape Communications Corporation.
Version: 1.0N
File name: ns16-100.exe   (December 17, 1994 | 706,929 bytes)
Available by anonymous FTP from:
        ftp.mcom.com in directory /netscape/windows or
        ftp2.mcom.com in directory /netscape/windows
Frequently it is impossible to connect by anonymous FTP to servers distributing Netscape. The best mode of access is to use a World Wide Web browser and load the URL http://home.mcom.com/info/how-to-get-it.html.
Installation:
1.) Copy the file NW16-100.EXE to a temporary directory and run it. This will extract the component files, including SETUP.EXE.
2.) Run the program SETUP.EXE by selecting the file in File Manager or by using the menu selection File Run in Program Manager. SETUP will install Netscape in a directory of your choice, and it will create a program icon in the group you designate.
3.) Launch the program. Configure Options and Preferences to taste. The file NETSCAPE.INI is kept in the Netscape program directory.
******
WINWEB (World Wide Web browser)
Comment: A fast and easy browser from EINet.
Author: MCC-EINet (Microelectronics and Computer Technology
                                               Corporation)
License: Free
Version: 1.0 Alpha 2.2
File name: winweb.zip   (December 19, 1994 | 598,873 bytes)
Available by anonymous FTP from:
             ftp.einet.net in directory /einet/pc
Installation:
1.) Create the directory C:\WINWEB and unzip WINWEB.ZIP into
                              this directory.
2.) Move the included file VBRUN300.DLL to the windows system directory, usually C:\WINDOWS\SYSTEM. (This file is a runtime library for Microsoft Visual Basic. If you already have a copy installed from some other application, you can simply delete it from the \WINWEB directory.

ww

2.) Create a new program item in the Network program group for
the program C:\WINWEB\WINWEB.EXE.
3.) Launch the program and configure to taste. The file WINWEB.INI will be created in the C:\WINDOWS directory.
*****
WFTPD (FTP server)
Comment: I had not imagined I would want or need to use my PC as an FTP server. However, I have found this product useful on a couple of occasions to transfer files from an IBM mainframe to my PC. This is far easier than trying to FTP to the mainframe from my PC. Note that WinQVT/Net, which is described later, has an FTP server function also. However, the server in WinQVT/Net would not work when I tried to use Fetch on my PowerMac to retrieve a file from my Windows machine. WFTPD had no problems serving files to Fetch.
Author: Alun Jones
License: **$15.00. The unregistered shareware version displays a message to anyone accessing the server that the owner is unable or unwilling to pay the shareware fee. The shareware version is limited to five file transfers per session.**
Version: 1.95
File name: wftpd195.zip **(October 20, 1994 | 147,612 bytes)**
Available by anonymous FTP from:
ftp.cica.indiana.edu in /pub/pc/win3/winsock
or by gopher from:
ftp.cica.indiana.edu under menu item
PC and CICA Windows Files/
CICA Windows Files/
Winsock Compliant Apps
Installation:

1.) Create the directory C:\WFTPD and unzip WFTPD195.ZIP into
this directory.
2.) Create a new program item in the Network program group for
the program C:\WFTPD\WFTPD.EXE.
3.) Launch the program.

4.) Complete the information in the Security dialog box to establish security control using access passwords and restricted home directories for those you authorize to access your PC. The file WFTPD.INI will be created in the C:\WINDOWS directory.

TELNET
The glaring deficiency in the Winsock pantheon of Internet clients is the absence of a good stand-alone telnet client. Here is a brief description of some alternatives I have tried.
****
WinQVT/Net
Comment: WinQVT/Net is an integrated package that includes telnet, FTP, FTP server, mail, and news reader functions. These separate client and server functions are normally launched from a console window. The telnet client is probably the best shareware Winsock telnet client available. You can select terminal emulations and customize the keyboard. The resizable telnet window includes scrollback and session logging. A deficiency is that telnet cannot be launched independently of the console window. However, if WinQVT/Net is already running, then an instance of the telnet client can be launched from another application by invoking the TNSTART.EXE program that comes with WinQVT/Net. This makes it possible to use this telnet client as the telnet viewer or helper with Gopher or World wide Web clients.
Author: QPC Software

ww

License: Shareware registration is $40 ($20 for students).
There has been discussion in alt.winsock and other news groups about the difficulty of getting any response to e-mail and fax messages from the author of WinQVT/Net. Paying the license fee may be difficult as a result.
Version: 3.98
File name: qvtws398.zip (December 16, 1994 | 390,960 bytes)
Available by anonymous FTP from:
biochemistry.bioc.cwru.edu in directory /gopher/pub/qvtnet
or by Gopher from
        biochemistry.cwru.edu under the menu selection

        CWRU Biochemistry FTP Archive/qvtnet.
Gopher access is preferable as only one anonymous user is permitted weekdays during normal working hours from 9:00 AM to 5:00 PM local time.
****
TRUMPET TELNET
Comment: This simple client is my favorite for use as a telnet viewer or helper with Gopher or World Wide Web clients. Unfortunately, it lacks sophisticated features needed by heavy users of telnet.
Author:Peter Tattam
License: Free beta version
Version: 0.07
File name: trmptel.exe (October 13, 1994 | 71,168 bytes)
This file is included in the WINAPPS2.ZIP file distributed as part of the Trumpet Winsock package.
****
EWAN
Comment: EWAN (Emulator Without a Good Name) is a more complete Winsock telnet client than Trumpet Telnet. It allows printing the screen, printing the scrollback buffer, and logging a session to a   file. It can be used as a telnet viewer with Gopher or World Wide Web clients.
Author:Peter Zander
License: Free
Version: 1.04
File name: ewan104.zip (November 23, 1994 | 221,051 bytes)
Available by anonymous FTP from:
            ftp.lysator.liu.se in directory /pub/msdos/windows
****
QWS3270
Comment: Telnet clients usually emulate a VT100 terminal or one of its variations, the standard for connecting to a UNIX host. However, telneting to an IBM mainframe requires emulation of an IBM 3270 terminal. QWS3270 provides this functionality. I was especially pleased with the easily-configured, four-color capability that makes it easier to distinguish protected, unprotected, and highlighted text on a VM screen.

Author:Jim Rymerson
License: Free
Version: 3.2e
File name: qws3270.zip (November 14, 1994 | 73,365 bytes)
Available by anonymous FTP from:
        ftp.ccs.queensu.ca in directory /pub/msdos/tcpip

OTHER SOURCES FOR WINSOCK INFORMATION

It remains true that the best guide to the Internet is the Internet itself. The best software for navigating the Internet is freely available on the Internet.

Considerable information about the Winsock API, along with some application programs, is available by anonymous FTP at sunsite.unc.edu in directory /pub/micro/pc-stuff/ms-windows/winsock.

The anonymous FTP sites that I list throughout this paper as sources for programs are the sites designated by the software authors as their home sites. These sites will always have the latest version of the software. In addition, copies of the software may usually be obtained by anonymous FTP from CICA (Center for Innovative Computer Applications) at ftp.cica.indiana.edu in directory /pub/pc/win3/winsock. Files are also available from this same address using a Gopher client. Gopher access is preferable because the CICA FTP server is the main Internet site for Windows applications. It is usually busy, and you may have difficulty establishing an FTP connection. It is the case that the collection at CICA will NOT always contain the latest version of software, even if a newer version has been uploaded to CICA by the author. CICA does not allow anonymous users to view or download program files from the uploads directory, where the newest version might still be in the holding pattern. Also, the versions at CICA may not have the same file dates as those at the home sites.

There is a listserv that provides a daily listing of new uploads to CICA. Included in the mailing are the content of any text files accompanying those uploads and a list of files that have been moved from the uploads directory to the public directories so as to be available for downloading. You can subscribe to CICAL by sending e-mail with no subject and the message:
sub CICA-L Your Name
to listserv@ubvm.cc.buffalo.edu.

There are several other Internet sites that provide mirror copies of the Windows collection at CICA. These are listed in the message displayed if you are denied access to CICA. The list of mirror sites also is included in the file README in CICA's directory /pub/pc/win3. These mirrors can be just as busy as CICA. As an example, the mirror at polecat.law.indiana.edu was recently removed due to overload on the server. When using CICA, it is helpful to download the file INDEX (ascii, about 285,000 bytes) or INDEX.ZIP (about 122,000 bytes) from the directory /pub/pc/win3. INDEX contains one-line descriptions of each file in the collection.

The news groups alt.winsock, and comp.protocols.tcp-ip.ibmpc carry discussions of the Winsock specification and Winsock compliant applications, as do the groups in the comp.os.ms-windows.networking hierarchy. Trumpet Winsock and related clients are discussed in several news groups in the trumpet hierarchy. Information about specific clients may be found in groups devoted to that class of client. For instance, WSGopher is discussed in alt.gopher and in comp.infosystems.gopher. Cello, Mosaic, Netscape, and WinWeb are discussed in the sections of the comp.infosystems.www hierarchy. The BITNET listserv WIN3-L@UICVM carries discussions about all topics relating to Windows, including Winsock applications. Some news servers carry this listserv under the news group name bit.listserv.win3-l. A comprehensive list of FTP'able Winsock applications is available from Larsen Consulting and Sales, Phoenix, Arizona, USA. To get a copy of the list, send an e-mail message to info@lcs.com with the Subject: FAQ. Nothing else should be in the message. The list is also available on the World Wide Web at http://www.lcs.com/.

ww

Frequently Asked Questions about TCP/IP on PC-compatible computers are answered in a FAQ written by Bernard D. Adoba. The text is posted monthly on the news group comp.protocols.tcp-ip.ibmpc. A copy of the newsgroup posting is available as three separate files from rtfm.mit.edu in the directory /pub/usenet-by-hierarchy/comp/protocols/tcp-ip/ibmpc. The complete text of the files dated November 3, 1994 contains over 214,000 bytes. The filenames are decidedly non-DOS, so you will want to assign filenames if you download from this source. The FAQ is also available as a single ZIP file named ibmtcp.zip (79,454 bytes | October 29, 1994) from ftp.netcom.com in the directory /pub/mailcom/IBMTCP. Each of these sites can be troublesome. They frequently are busy or unresponsive to commands. Finally, the FAQ, and other publications about Internet software for the PC, can be accessed on the World Wide Web page maintained by Bernard Adoba. The page entitled "Internaut: The PC-Internet Connection Update Page" is located at http://www.zilker.net/users/internaut/update.html.

The Crynwr packet drivers collection is available by anonymous FTP in the well-known Simtel20 collection, as well as through a variety of other methods. The primary publicly available site for Simtel20 files is at oak.oakland.edu. The packet drivers are in directory SimTel/msdos/pktdrvr
pktd11.zip   (November 23, 1993 | 435420 bytes)
pktd11a.zip   (November 23, 1993 | 326152 bytes)
pktd11b.zip   (November 23, 1993 | 344847 bytes)
pktd11c.zip   (December 14, 1993 | 81834 bytes).

An early version of this document (dated February 9, 1994) was published in the "Toolkit" section of the March 14, 1994 issue of "Global Network News." GNN is part of the "Global Network Navigator," a World Wide Web publication of O'Reilly Associates. Articles in GNN are aimed at the reader with a general interest in the Internet and networked information. You can read GNN by pointing Mosaic or Cello at http://www.wimsey.com/gnn/gnn.html. The most recent plain text version of "Windows and TCP/IP for Internet access" is available by anonymous FTP from nebula.lib.vt.edu in the directory /pub/windows/winsock under the name wtcpip**.asc. For instance, this version has the name wtcpip06.asc. A more frequently revised hypertext version is available at http://learning.lib.vt.edu/wintcpip/wintcpip.html.

I thank each of you who sent me personal messages following the postings of earlier versions of this evolving document. I have now received e-mail about this document from individuals on seven continents. Thanks to AJO at McMurdo Station for sending me a message from Antarctica. I am grateful that I have been able to help many of you, and I appreciate the suggestions and information you have sent me. My efforts in producing this document can be only a small and indirect repayment of the debt I owe to the developers who produce this software and to the many Internet users who are so willing to share information and expertise.

Please send error reports to me at hmkriz@vt.edu. I would be grateful for suggestions for improvements and additions to this document. Thanks again to everyone who replied to my beginner's questions over the past eighteen months. I greatly appreciate your patience, and your willingness to share your knowledge.

Harry M. Kriz
University Libraries
Virginia Polytechnic Institute and State University
Blacksburg, VA   24061-0434
EMail: hmkriz@vt.edu
WWW: http://learning.lib.vt.edu/authors/hmkriz.html

WW