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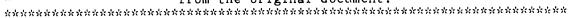   *Internet; *Local Area Networks; Modems
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ABSTRACT
            Internet e-mail is becoming more accessible to K-12
teachers. Many colleges and universities will give accounts to
teachers for the price of asking. Unfortunately, many of these
university systems are hard to use and are usually not offered to
K-12 students. Also, most schools do not have phone lines in
classrooms. This paper discusses two systems that will enable
teachers to use their schools' local area network to give an Internet
e-mail account to anyone they like. The necessary software is either
inexpensive or free. The two systems described are Waffle, an MS-DOS
bulletin board system, and Linux, a free Unix-like operating system
that can act as an IMAP (Internet Message Access Protocol) and POP
(Post Office Protocol) server for programs like PC-Pine, NUPOP
(Northwest University Post Office Protocol), and Eudora. Both systems
use a UUCP connection to exchange mail with an Internet host. A
benefit of using UUCP (Unix-to-Unix Copy Program) is that only one
modem is needed (users of the system don't need direct access to the
modem), and that modem is controlled by a computer, minimizing time
online. Included in this paper are FTP sites where these programs can
be found and other sources of information about UUCP, Linux, and
Waffle. (Author/AEF)

Paper (W3-202B)

Inexpensive E-mail Systems for LANs and Dial-up

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Abstract

Access to Internet E-mail is becoming easier to find for K-12 teachers. Many colleges and universities will give accounts to teachers for the price of asking. Unfortunately, many of these university systems are hard to use and are usually not offered to K-12 students. Most schools do not have phone lines in classrooms. This paper will discuss two systems that will enable you to use your school's LAN and a 386 with one modem to give an Internet E-mail account to anyone you like. The necessary software is either inexpensive or free. The two systems discussed are Waffle, an MS-DOS bulletin board system, and Linux, a free Unix-like operating system that can act as an IMAP and POP server for programs like PC-Pine, NUPop, and Eudora. Both use UUCP to exchange mail with an Internet host. UUCP packages are available for a number of other BBS and E-mail systems.

What You Need

This paper is for those who have a local area network (Novell, MacTCP, or other ethernet) and know why you want to use E-mail. Once a UUCP connection is set up, it will need little maintenance, but you will want someone at hand who can help solve problems that crop up, since an organization can quickly grow dependent on an E-mail system.

A machine running Linux can additionally handle many dial-up users using Eudora on a Macintosh or NUPop on an MS-DOS machine. Eudora and NUPop are mail readers which make phone calls and send and receive mail at the touch of a key. Such a solution is especially good for a rural district wanting to give E-mail accounts to all of its teachers, since it minimizes expensive long distance charges.

Both of the systems discussed here, Waffle and Linux, use a transport protocol called UUCP to exchange mail with an Internet connected computer. There are a number of other programs for DOS, Windows, and Macintosh that also support

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UUCP. UUCP works very much like FIDOnet, but its headers follow conventions of the Internet. There are a number of other UUCP packages, free and commercial, for MS-DOS, Macintosh, and many other BBS and E-mail packages.

What You are Getting

Some teachers who want their students to participate in on-line projects upload messages for students at home, sometimes even re-typing them. With Linux or Waffle each student can have an account, so students get to see what it is like to send E-mail themselves. Students are excited even by sending a message across the room; sending them across the globe is even better. Also, an E-mail system can be a valuable means of communication among teachers in different buildings or with different schedules.

A UUCP connection can give you access to Internet E-mail over a UUCP link. (Actually, USENET E-mail is more correct since the machines are not IP connected to the Internet.) You will be able to send E-mail to anyone on the Internet as well as those using services like CompuServe and America Online, and networks like FIDOnet and FrEdMail. You will also be able to send and receive USENET news. There are currently over 2,000 newsgroups on topics from astrology to zymurgy. Many newsgroups are inappropriate for students, but you will have complete control over which groups you receive, so there is no danger of students reading alt.sex.

The systems described here provide E-mail and news access only, not a live Internet connection. The good news is that you need only have part-time access to a voice-grade phone line. If a line dedicated to the system is unavailable, the software can be configured to use the phone line only after school hours. The bad news is that this kind of connection does not support interactive Internet applications like Gopher, Mosaic, telnet, and ftp. (You *can* use these applications, but only to connect to your own server.) There are ways to access much of the same information using only E-mail, but it is not as fun, as fast, or as convenient.

A benefit of using UUCP is that you need only one modem; that modem is controlled by a computer, minimizing time online, and users of the system do not need direct access to the modem. You will not have to worry about students launching missiles or making long distance calls. You will not have to worry about training everyone to use modems. And you will not have to worry about begging a university administrator or paying a commercial service every time you want another account. You will also gain the power to set up your own mailing lists and newsgroups.

How Does it Work?

First you arrange for a "feed." A feed is a computer connected to the Internet that agrees to accept mail for your computer and hold it until your computer calls to pick it up. Often schools can get a free connection from a local college, university, or business. Your computer will call (or "poll") your feed as often as you can afford, from hourly to daily. When your computer connects to your feed, the mail written at your site is sent to the Internet and mail from the Internet is transferred to your computer. It all happens automatically. No one needs to be there to watch or even press a key.

A user on either of these systems will access their E-mail with a program running on a computer on the LAN, not over a modem to a mainframe. The user can then read and write E-mail and USENET news without using a modem and without concern that a clock is ticking. Since the program is running on your computer, it responds immediately, not delayed as over a modem. When a user "sends" a message it actually waits on your server until the next time your server polls. Messages sent to others at your site are delivered immediately.

Waffle

Waffle is a BBS that runs under MS-DOS. It is designed to be used as a dial-up system—it can answer the phone and let people log in. It can also be used on a Novell (or other) LAN. Its standard interface is somewhat old-fashioned, but it is probably no more so than other BBS or university systems that you may be using now. There are also several easy to use add-on programs that provide a friendly user interface.

If you use Windows, you can replace Waffle's command line oriented user interface with a program called Helldiver. Helldiver allows users to use familiar mouse movements and menus to select and read E-mail messages.

Waffle can be licensed by K-12 schools for $30. Helldiver is free.

Linux

Linux is a Unix-compatible operating system developed by Linus Torvalds of Finland and several hundred others on the Internet. It completely replaces MS-DOS and has all of the features one would expect of a Unix system—from multitasking to networking to cryptic commands like "ls," "rm," and "login." Linux is developed by people in several countries who are able to work together because they have access to the Internet. Version 1.0 should be out by the time this paper is presented; in

spite of what a version number of "1.0" often suggests, many have been using Linux as their primary computing environment for over a year now, and it is already a quite stable system. Linux is not a commercial system, but is quite reliable and is continually improving. Several commercial vendors distribute and support Linux.

All of the PC (and Mac) programs discussed here are free unless explicitly stated otherwise. The client programs discussed here will work with any TCP/IP software currently in place. Sites using ethernet need not have any other networking software to use these programs.

LAN Client Applications to Use with Linux

For most people the best way to use Linux is to use Pine, Eudora, or NUPop, client programs that run on computers (MS-DOS, Windows, or Mac) on your LAN and communicate (usually unnoticed by the user) with the server (the Linux machine) with protocols like POP-3 and IMAP. These programs have the advantage of behaving like local applications on the PC, since they are. They do not require logging in to a strange system and learning a new set of commands. Those who want to log in and learn how to use UNIX, may; some students will be excited to learn about a new and powerful operating system. Though some programs support other networking environments, all of the MS-DOS programs discussed here work using "packet drivers" a standardized networking interface. Free packet drivers are available for most ethernet cards.

PC-Pine

PC-Pine is an MS-DOS IMAP client. IMAP is an acronym for Interactive Mail Access Protocol which allows access to a mailbox over a network. Unlike the POP protocol (discussed below) it keeps mail on the server and allows remote access to the mailbox and folders where messages can be filed. This is a plus in situations where people often use a different computer (as in a lab) or are not allowed to store information on local disks.

Pine was originally based on another mail program called Elm. It was developed by people at Washington University who wanted an easy-to-use mail program for their students and faculty. It has a full screen editor, simple menus, and can make use of a mouse on a PC. It also allows files to be attached so that word processing or database files may be included with all formatting information intact.

NUPop

NUPop is an MS-DOS POP-3 client. POP is an acronym for Post Office Protocol. It allows for a program to manipulate a mailbox on a remote computer. NUPop was developed at Northwestern University, and has been in everyday use there. It has the menu and multi-window interface that people have come to expect and makes good use of a mouse. It allows messages to be stored in folders for easy access later and has a full screen editor that users find intuitive.

Eudora

Eudora is a Macintosh POP client (there is a windows version as well). It works just like a Macintosh program is expected to, with a familiar editor and the ability to cut and paste. It was developed at the University of Illinois in Urbana-Champaign and is used widely there and at other universities. There are two versions of Eudora, a free version, and a commercial version which can automatically sort incoming mail according to criteria that you choose. For instance, it can put mail from mailing lists that you subscribe to into separate folders, saving you from a cluttered mailbox.

Off-line Reading

In addition to being useful over a LAN, both Eudora and NUPop can be used to dial-up your Linux machine, get your mail, send any mail written off-line, and hang up the phone. Otherwise, the programs function as directly connected to a LAN. Since the phone call is automated, on-line time is minimized (usually less than one minute). These off-line readers are a good solution for a group of people (in a district or school system) who are not connected to a LAN, but want to provide E-mail access for many people. They are also good solutions for rural teachers.

Choosing between Waffle and Linux

Though both Waffle and Linux support UUCP, they are very different systems. Waffle is an MS-DOS program that you can install on your network. Aside from learning about UUCP and Waffle, you will not have to learn about a new operating system or change anything in your current LAN setup.

Installing Linux, however, is a somewhat greater undertaking. You will have to learn a new operating system and how to configure it to work with your current systems. In spite of the increased learning curve for the administrator, there are many advantages to installing Linux. Once you have Linux and your workstations configured, you will be ready to connect to the Internet---just plug in a router and you will be ready to go. The time invested in learning about TCP/IP now will pay off later.

System	Linux	Waffle
Cost	Free (CD-ROM available for $30)	$30
Hardware Requirements	386-16, 4MB Ram, 40MB disk	8088, 640K Ram, 20MB Disk
Recommended Hardware	486-33, 8MB Ram, 200MB disk	386, 4MB Ram, 40MB Disk
Advantages	Uses Internet TCP/IP protocols Supports easy to use clients Can support Gopher, FTP, telnet Includes networking software	Uses DOS & current network software Windows users can use Helldiver Easy to install
Disadvantages	Complex operating system Requires dedicated machine	Interface old-fashioned and hard to use Requires networking software and server

Where to Find These Tools

Below are FTP sites where these programs can be found.

- **Waffle:** waf165.zip at wuarchive.wustl.edu (and other SIM-TEL mirrors) in /mirrors/msdos/waffle, also check the comp.bbs.waffle newsgroup.

- **Linux:** First read FAQ at tsx-11.mit.edu in /pub/linux/docs, also check comp.os.linux.announce newsgroup. Since Linux is rather large, you might prefer to get it on CD-ROM.

- **Eudora:** FTP Eudora1.4.sea.hqx at ftp.qualcomm.com in /mac/eudora/1.4.1, also E-mail eudora-info@qualcomm.com or call 1-800-238-3672 for information. The educational price for Eudora 2.0, which offers features that the free version does not, is $25.

- **Pine:** FTP to ftp.cac.washington.edu and read documentation there for information about which version you need.

- **NUPop:** FTP to ftp.acns.nwu.edu and look in the /pub/nupop.

Other sources of information about UUCP, Linux, and Waffle

Managing UUCP and USENET. O'Reilly & Associates. 1992.

"How_to_become_a_USENET_site" is posted monthly to news.announce.newusers and is available for FTP at rtfm.mit.edu in /pub/usenet-by-group/news.announce.newusers

These documents are available in the comp.os.linux.announce newsgroup and are also available for FTP at rtfm.mit.edu in /pub/usenet-by-group/comp.os.linux.announce

- Linux_Frequently_Asked_Questions_with_Answers

- Linux_Ethernet_HOWTO_(Part_1_2)

- Linux_Ethernet_HOWTO_(Part_2_2)

- Linux_Installation_HOWTO

- Linux_UUCP_HOWTO

- Linux_META-FAQ

The documents at rtfm.mit.edu are also available by E-mail. Send a message to mail-server@rtfm.mit.edu with the word "help" in the body.

Summary

If you are looking for a low-cost E-mail connection to the Internet, a free Unix-like system like Linux, or a BBS system like Waffle, may be an answer. They can offer access over your school's LAN or by dial-up. You will have control and can give E-mail accounts to teachers, students, or other people in your community. Linux is able to act as a POP and IMAP server to support E-mail applications like NUPop and Eudora, which are much easier to use than most mainframe mail programs and have the added benefit of allowing users to work off line.