

The Waite Group

UNIX[®] Communications

Bart Anderson, Bryan Costales,
and Harry Henderson



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Preface

Two years ago, at the height of the MS-DOS® and IBM® PC revolution, mentioning “UNIX” and “communications” in the same breath would have elicited a rather large yawn from the vast majority of desktop computer users. Most people, including myself, would have guessed that *UNIX communications* referred to some incredibly complicated collection of devices, connecting expensive mainframe computers and running the esoteric, RAM-eating, user-unfriendly, and nongraphic UNIX operating system. Ugh. Only students, professors, and super scientists could use UNIX. Right?

Things seem to change fast in the computer field. Suddenly, UNIX, which has always had its devoted followers, is big time. Super low-cost 80286/80386 computers—running inexpensive versions of UNIX that are fully AT&T approved and accredited clones—are the rage. “UNIX offers more bang for the buck than MS-DOS” is heard. “Now everyone can use UNIX.” Coincident with this UNIX explosion is the evolution of MS-DOS towards UNIX—though MS-DOS isn’t there yet. UNIX is moving out in front and has the potential to become King of the operating systems. Will UNIX make it?

Hard to say, but one thing is definitely true: UNIX comes with communications facilities that you can use today, not years from now (as is the case with IBM’s new OS/2 operating system). As you will see when you read this book, UNIX systems, from corporate mainframes to the AT clone on your desk, come with facilities for electronic mail (e-mail), worldwide news distribution, and program-mable file transfer. It is UNIX’s sophisticated and elegant set of communications tools and methodologies that this book is about.

I started playing with UNIX about three years ago. I probably would never have found out about it if not for Stewart Brand, who had the vision to set up the first public-access, regional-based UNIX conferencing system in the San Francisco Bay Area, called *The WELL*. The WELL is based on a 100-megabyte VAX 780 and a commercial user-friendly “shell” called *PicoSpan*. Pico, as the hackers call it, allows people who are not computer sophisticated to use The WELL as a bulletin

board. It works great, is friendly, and keeps the complexity of UNIX away from the average user.

But the real magic for me came underneath the covers of PicoSpan. Typing `unix` at the Pico prompt put me in pure, wonderful UNIX (in Bourne or C Shell flavors). Now from the UNIX shell I could use e-mail to communicate with people in the regional area of San Francisco. I could use all of mail's fabulous features, like saving and loading files from the shell, running shell commands, sending group mail, and so on. I started using e-mail for communicating with my editors and authors and discovered that it allowed high-quality communications between people on wildly different schedules. For example, authors could upload and e-mail stuff to me late at night to save money on their phone bills. Mail replaced endless rounds of telephone tag and "while you were out" messages. But, and there is always the but, I had a lot of trouble learning to use the full features of the mail programs, mostly because the AT&T manuals were so unfriendly.

From the e-mail messages I received, I discovered that The WELL was a node in the wonderful UNIX USENET network. Here, I had access to thousands of professional people working every day in software, hardware, computer technology, and science—all connected together in a large "sharing" network that also had a bulletin board. This USENET network was INTERNATIONAL; it connected hundreds of UNIX computers all running the same "Netnews" software throughout the world. This was a much larger bulletin board than The WELL, and had a different type of user and a different caliber of information. It had tens of megabytes more information than I could ever sift through or find on The WELL. And the UNIX Netnews software had a great set of tools for reading and posting news items that was completely compatible with the UNIX shell, pipes, and scripts. The news software, like the shells, came in several flavors. As with UNIX mail, however, I had to struggle with the limited and rather cryptic documentation. It took me a long time to figure out everything it could do, and I'm still learning.

Finally, I grew more and more curious and bold about the technical side of UNIX communications. How does the Netnews software work? When I'm reading news and want to send a reply, how is the Netnews software integrated so that I end up in the editor of my choice? How can the e-mail program forward a message to a user located in Podunk, Iowa just by "looking" at the complex address I type in? How can I move files between the Macintosh™ on my desk and The WELL or other UNIX computers by using the *xmodem* or *kermit* programs? These and other questions led me to investigate the "UUCP" collection of programs, as well as other widely used file-transfer programs.

My business is developing thorough but friendly software guides, so I was interested in creating books that would share the excitement and power of UNIX communications with both new and advanced UNIX users. The bottom line was that I saw three potential books here—electronic mail, USENET, and UUCP—but no one subject was quite large enough to make a whole book. So I created *UNIX Communications*, which contains all three subjects in it (plus file transfer and conferencing). (Indeed, as you might have noticed, *UNIX Communications* is writ-

ten by three authors.) I think you will find this to be a really helpful and useful book. I sure wish that I'd had it when I first discovered UNIX.

Mitchell Waite
The Waite Group

About the Authors



Bart Anderson left high-school teaching and newspaper reporting to work as a technical writer for The Waite Group, Racal-Vadic, Commodore-Amiga, and Hewlett-Packard. He is the coauthor of The Waite Group's *PC Lan Primer*.



Bryan Costales is senior systems programmer at EEG Systems Laboratory. He is the author of *C from A to Z* and of numerous articles on computer applications. He is a member of USENIX and ADPA, and is an award-winning art director of motion pictures. An avid volleyball player, he lives in northern California with his dog Zypher.



Harry Henderson is a free-lance technical writer and editor. He has edited, and contributed to, computer books for The Waite Group, Atari, Blackwell Scientific, Benjamin/Cummings, Wadsworth, and other publishers. He has a special interest in the UNIX operating system, and is the series editor for The Waite Group's *Tricks of the UNIX Masters*, *UNIX Bible*, and *UNIX Papers*.

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I extend my sincere appreciation to Harry Henderson, who edited a manuscript that was sometimes delivered electronically in incompatible word processing formats; who put up with constant e-mail queries while calmly asking for more clarity, more illustrations, and more information; and who accomplished all this while keeping up with Waite Group editing projects.

I would also like to thank The WELL computer conferencing system in Sausalito, California, and the entire community of UNIX users who created, and continue to maintain, e-mail, USENET, and the UUCP software. Indeed, these programs have allowed this book to be planned and executed almost completely electronically.

Finally, I give my sincere thanks to the people behind the scenes at Howard W. Sams who took our manuscript and turned it into a polished, marketable product that we are proud of: Jim Hill for understanding the potential of a communications book in the UNIX market and for taking the risk of acquiring the book, to Wendy Ford and Kathy Stuart Ewing for managing the book's production and for putting

up with a potential logistical nightmare, to Diana Francoeur for her diligent editing and patience in dealing with three different authors, to Kevin Caddwell for his wonderful cover painting, to Glen Santner for turning my ideas into something Kevin could understand, and to all the other people at Howard W. Sams who one way or another were involved in making UNIX Communications a success.

*Mitchell Waite
The Waite Group*

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Bryan Costales

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Introduction

What does the phrase “UNIX Communications” mean to you? If you are a new UNIX user or someone who uses a UNIX system only casually, UNIX communications may simply mean keeping in touch with other users through electronic mail (e-mail), or perhaps chatting on-line using the *write* or *talk* program. If you are a more experienced user, UNIX communications for you probably includes access to *USENET*, the UNIX bulletin board system, which you can use to keep up with events and communicate with many other UNIX users by reading and posting “news” articles.

If you are a UNIX programmer, UNIX communications for you includes mastering the collection of programs, tools, protocols, and methods that make up the UUCP software. The UUCP facility provides the system support for mail, news, and other communications applications. Starting with the *uucp* program (*UNIX to UNIX CoPy*), the UUCP software and related programs allow transfer of text, binary, encoded, and encrypted files. There are also programs for the scheduling and management of file transfer jobs.

Finally, if you are a UNIX administrator (or “sysop”), UNIX communications also means the ability to install and maintain the Netnews software used to run the USENET bulletin board. It also means the regular cleaning up of mail and news directories, and the maintenance of links to other systems. In general, you as system administrator are responsible for meeting your users’ needs for dependable communications and the regular flow of information. This requires a sound understanding of the UUCP software and the configuration options for the mail and news programs.

Of course, many of you belong in more than one of these categories—many system administrators, for example, write shell scripts and C programs to set up and maintain UNIX communications. Regardless of which categories currently describe your experience and interests, this book is designed to meet your present and future needs to master UNIX communications. Here is how *UNIX Communications* is organized.

UNIX Communications Fundamentals

Chapter 1 is a general introduction to UNIX communications. It shows the many ways you can communicate with UNIX, the different kinds of systems that can be used to run mail and other communications programs, and the ways in which the systems can be connected. This chapter also covers the basic concepts and conventions that will be used throughout the book. Even if you decide to skip a particular part of the book, you should read the discussion of concepts and conventions because it will help you to better understand the other chapters.

Chapter 2 presents a refresher course on the basic UNIX tools and ideas that you should know about in order to use UNIX mail and other communications programs. It quickly gets the beginner up to speed and provides a useful reference for the intermediate or casual user.

Part 1: Electronic Mail

Chapters 3 through 5 make up a complete tutorial on electronic mail for UNIX systems. Electronic mail under UNIX allows you to exchange letters and other text documents with other users, whether they are on the same UNIX computer or on one thousands of miles away.

The tutorial teaches you how to use the most advanced (as well as the most commonly used) UNIX e-mail program, called *mailx* (for System V) or *Mail* (for Berkeley UNIX). Chapter 3 presents the commands needed to perform all the basic e-mail functions, such as sending, reading, saving, and replying to mail. The following chapters (4 and 5) take you deeper into the more powerful capabilities of the mail program, showing you how to create folders, access shell commands, load files into mail documents, and much more. In addition, you are shown how to send remote mail to other UNIX systems, using the system of network addresses.

Part 2: USENET and Netnews

The second part of this book is an introduction and tutorial that will show you how to read and write news articles on USENET. USENET is a network of interconnected UNIX computers. These computers are found mostly in universities, scientific and engineering laboratories, and other technically oriented companies. USENET is not a commercial enterprise, such as Compuserve® or MCI Mail™, but rather is paid for by the companies and universities that make up the major “backbone” sites of the network.

USENET is easy to join. All it takes to connect to this network is to find another site willing to let you hook up! But to use USENET properly, you have to learn the “rules of the road” that the USENET community has devised for conserv-

ing resources and improving the quality of communication. This self-regulation has resulted in a unique, efficient, and useful bulletin and news program that is available anywhere in the world. The caliber of people using UNIX is high: in general, they are academic and professional users with a serious interest in UNIX and other technical topics. In addition, they are ready to share with you their opinions and ideas on philosophy, religion, politics, games, and hobbies.

This second part of *UNIX Communications* starts with a general introduction to USENET's history, structure, and operation (chapter 6). You will gain an overview of how USENET works and where you as a UNIX user fit in. Next, you'll find out through many examples just what kinds of information are available on USENET. The incredible variety ranges from conference notices and ads for rooms to rent, to philosophy and culinary arts, public-domain programs and source-code patches, reviews of the latest books and movies, and much more.

Chapters 7 through 10 cover the specific programs for reading and sending news in USENET, starting with the fairly simple news reading program *readnews*. Full discussions of the more powerful *rn* news reading program and the screen-oriented *vnews* program follow. Each of these chapters is stand-alone, so you can skip *readnews* and start with *rn* or *vnews* if you desire. Chapter 10 then shows you how to use *postnews*, the UNIX program for posting (sending) news on the USENET bulletin board. More than that, however, chapter 10 provides guidelines for effective communication, including how to respond to other users' articles and how to post your own articles courteously and responsibly.

Part 3: UUCP

If you are a programmer, system administrator, or someone who wants to know more about UNIX file transfer, you need to understand the UUCP software that underlies most mail, news, and other UNIX communications programs. Part 3 of *UNIX Communications* discusses all of the programs that make up the UUCP software.

Unlike the mail and news programs, which are interactive and command-driven, the UUCP software is used mainly in shell scripts and other programs to provide the needed communications facilities. Since the documentation for the UUCP programs in the standard UNIX manuals is often skimpy and lacks examples, many people have had trouble learning how to write file transfer programs. Chapters 11 through 17 discuss all of the important options for each of the UNIX communications tools in the UUCP package. These chapters give many clear, useful examples. They also provide some useful shell scripts to extend the power of the UUCP software and to serve as models for your own programming efforts. The discussion of UUCP is aimed at the intermediate to advanced UNIX user, with emphasis on learning to use the UUCP programs.

Finally, to help you see how the UUCP facilities fit together in a real-world communications process, chapter 18 follows an electronic mail message from its

originating site to its remote destination, showing how the UUCP programs are called into play.

Appendices

The five appendices present a variety of important topics. Appendix A covers the simple */bin/mail* program, which you can use if the advanced mail program is not available on your system. Appendices B and C explain how to perform interactive, on-line UNIX communications with the *write* and *talk* programs and how to communicate between UNIX systems and micros with the popular *kermit* and *xmodem* error-checking, protocol-based transfer programs. Appendices D and E present resources for further study and exploration, including bibliographies.

What You Need to Get Started

In general, all you need to get started with this book is access to a UNIX computer. You may have an account on a UNIX computer at your company or at a local school or training center. You may own a UNIX computer and be running just a few terminals. You may even be running UNIX or a UNIX-like system on your personal computer. Any of these systems will allow you to learn how to use electronic mail.

However, in order to use *rn* and *readnews*, or to send e-mail to other UNIX sites, you will need to be connected to the USENET network. Fortunately, this isn't too difficult. If you are a user on a university UNIX system, it's very likely that you already have access to USENET. Some corporate sites also are connected to the net, particularly companies oriented toward research, technology, and software development. If you are taking any university courses, you might check to see if the school will give you an account on its UNIX system.

Another alternative that you may have is to get an account on a commercial, public-access UNIX system. At present, there are only a few public-access USENET machines, but we expect that, as UNIX continues to gain popularity, others will spring up. An example of such a system is The Whole Earth 'Lectronic Link in Sausalito, California (north of San Francisco). Known as "The WELL," this system is one of the first regional telecommunications services, appealing mainly to residents in the San Francisco Bay Area. It was set up by the revered Stewart Brand, publisher of the *Whole Earth Magazine* and the *Whole Earth Software Catalog*. The WELL provides a rich and easy-to-use shell called "PicoSpan."¹ The phone

1. The UNIX system is available to all users by typing `uni x` at the PicoSpan prompt, and the full range of USENET programs is available, in addition to The WELL's own conferencing system.

number for The WELL is (415) 332-6106. (You will need a 300- or 1200-baud modem to sign up on The WELL.)

In addition to public-access conferencing systems, you may also find many companies that offer time-sharing on a UNIX system having access to USENET. This is particularly true near large technological centers, like Silicon Valley, Boston's Route 99, or Austin, Texas.

To practice using the UUCP software discussed in Part 3 of this book, you need a UNIX system that is connected to one or more other UNIX systems. Any system that offers USENET news also has access to other systems through the UUCP file transfer software, since the UUCP network is used to distribute news. But even if the system to which you have access doesn't offer USENET, it may be connected to other sites by modem, so you can still experiment with remote file transfers. UUCP software can also be used to transfer files over a serial cable or a LAN (local area network). Chapter 11 will show you how to find out what your system "looks like" on the UUCP network, and your system administrator may also be able to give you some guidance.

Our System

The authors for this book used various computer and software systems for accessing and using UNIX communications, including a Macintosh™ emulating a VT 100 terminal with a software program called MicroPhone, a COMPAQ® portable running *kermit*, an AT clone running Mirror and a Wyse terminal connected to a VAX® 780. Many example listings were obtained using our terminal programs with The WELL, the public-access UNIX system mentioned earlier. Key programming examples were tested on both System V and Berkeley UNIX.

As you can see, there are many ways to connect yourself to the world of UNIX communications. In our discussions we will always point out any significant differences among the major versions of UNIX, and any places where baud rate or specific terminal capabilities are important considerations.

A Bit of Advice

To communicate with others, you must talk to them, not hide in the closet. UNIX communications is the same way: to master it, you must reach out and communicate with other people. But because UNIX communications consists of words typed on keyboards and sent across phone lines, it has the potential to be an impersonal, cold medium, without the body language of face-to-face communications, or even the inflections of the human voice over the telephone. It is important, therefore, to be sensitive to the fact that at the other end of the terminal is a human being, and at the same time to be aware of, and to follow, some commonly accepted conventions that aid orderly communication. We have included dozens of examples with a

variety of content so that you will be able to get a feeling for the generally accepted format of UNIX communications. Try to follow the advice we give on how to get your ideas across without offending people's feelings. Be an active, experimenting learner. Send messages, post new ideas, respond to questions, download and upload source code. You will find your appreciation for UNIX and its communications facilities will grow quickly.