

Netatalk

Linux on the Mac Desktop

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ABSTRACT

Sun workstations, PCs running Windows 3.x/95/NT/Linux, FreeBSD, and many more, must be able to communicate seamlessly and share data whether they are in an engineering, business, or home environment. Multiple computer platforms on a network are a fact of life. Fortunately, with programs like netatalk, getting Apple Macintosh computers and Linux systems to coexist and share resources is easy. This paper describes what netatalk is, what it does, where to get it, how to install it, configure it, and test it. Also included is a short technical description of how netatalk works.

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Introduction

If you have a Mac and want to use Linux, there is **MkLinux** (LJ Nov. 96, page 55). If you have a PC and want to run MacOS, there is **Executor** (LJ Nov. 95, page 40). However, if you have both machines and want to let Linux do what it does best, and the Macintosh do what it does best, now there is **netatalk**. Netatalk will allow you to keep the systems separate, yet still allow you to transfer files and share printer resources seamlessly.

I paid my dues to be able to wear a Linux T-shirt; I love Linux. However, I also love my Mac, but for different reasons. I use the Linux system for different purposes than the Mac, so there is often not a need for them to communicate. However, when it is necessary to transfer files it is accomplished with a floppy disk (a.k.a. SneakerNet). That works for small files, but when they exceed the 1.44MB floppy limit, the floppy solution fails. The solution is then ftp, which is fast and efficient, but cumbersome when you wish to move multiple directories, each containing subdirectories.

The ideal solution is to be able to mount the Linux file system on the Mac desktop and then drag and drop files and directories as you would under the normal MacOS. That is exactly what netatalk lets you do. However, that is only part of the story since you can also send print jobs to the Linux printer from the Mac thereby sharing other system resources.

This article is an introduction to **netatalk**. It provides information on where to get it, how to install, configure, and test it. Several fine web sites have been developed by netatalk aficionados which provide additional information and these are also included in the references for those ready to take the plunge.

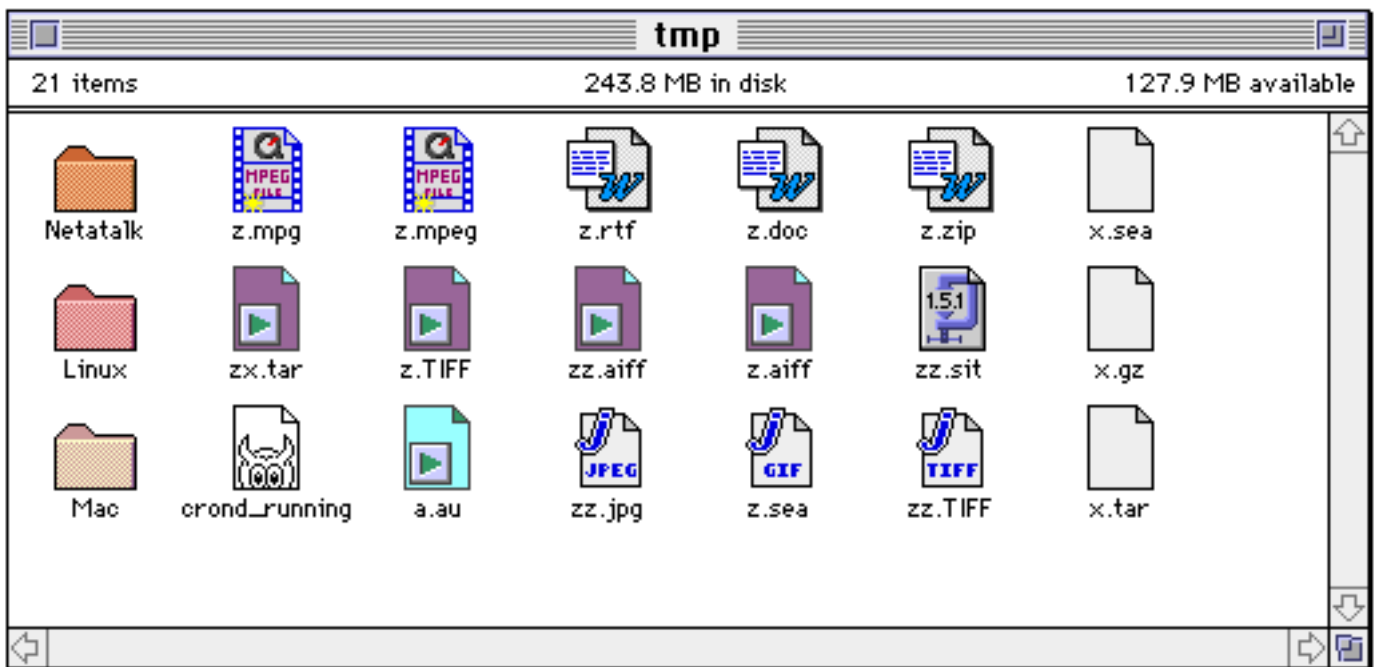


Figure 1. Linux files and directories on the Macintosh desktop

Installation

At this writing (Nov. 96) the most recent version of Netatalk is 1.4b2. Don't let the beta suffix scare you, netatalk is stable, especially for the PC platform. Current development emphasizes new platforms such as FreeBSD and Solaris, hence the beta appellation. The primary netatalk host site and directory is:

```
ftp://terminator.rs.itd.umich.edu/unix/netatalk
```

From there all you need do is download a single file:

```
netatalk-1.4b2.tar.gz
```

Netatalk is uncompressed and untarred with normal Linux commands such as:

```
gunzip netatalk-1.4b2.tar.gz
```

```
tar xvf netatalk-1.4b2.tar
```

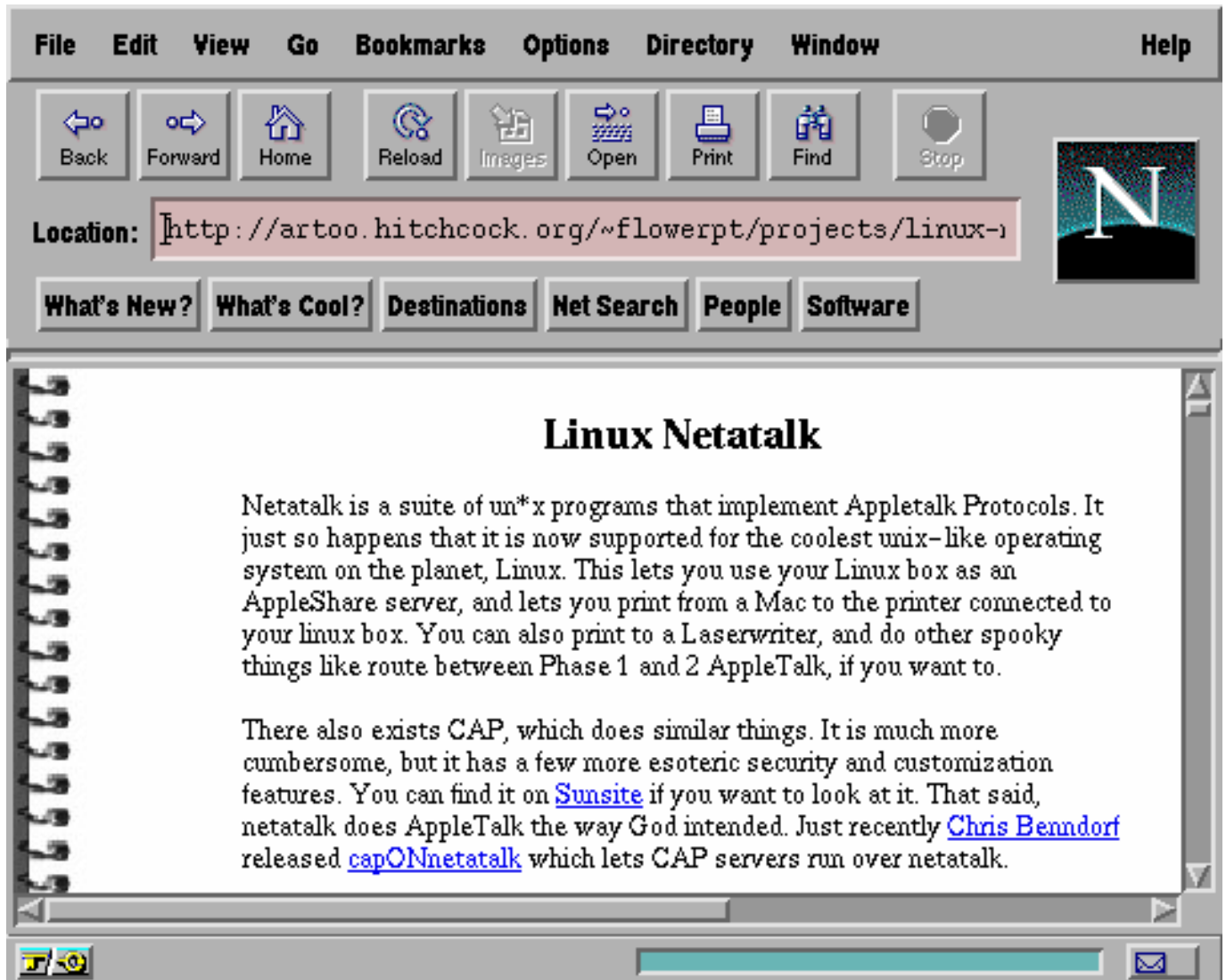


Figure 2. One of several netatalk web pages (see references for URL)

Note that prior to the release of Linux 2.x, installation of netatalk required the Datagram Delivery Protocol (DDP) software to be integrated into the kernel. Now that DDP is part of the Linux kernel, all you need do is make sure that you turn on Appletalk during kernel configuration. This is done by specifying the kernel configuration option with:

```
CONFIG_ATALK=y
```

The README files that accompany the netatalk distribution should always be used as the ultimate authority for installation instructions. However, with that caveat, let's look at the installation process you can expect.

Since netatalk is offered for several platforms as shown in Table 1, there are actually several different README files. Each operating system has its own defaults where files can or should be placed. For this reason, the Makefile that comes with netatalk provides user defined variables that may be changed to alter the installation and ultimately the file structure. For the Linux installation, I stuck with the defaults and it worked flawlessly.

OS	Version	Hardware / comment
Solaris	2.5	Sparc
Linux	1.3.x,2.x	PC
FreeBSD	2.2-current	PC after 12 Sept. 96
SunOS	4.1+	VDDRV installed
Ultrix	4.[1-4] 3100,5000	

Table 1. List of platforms that netatalk supports

The DESTDIR variable in the Makefile points to the directory where binaries will be placed. The default is /usr/local/atalk which does not need to be altered. Note that setting it causes all installation-relative pathnames to be set correctly. The other variable of importance is MANDIR. It allows the user to specify the location for the man pages. The default is /usr/man and again does not need to be changed.

Installation to make all binaries begins with the ubiquitous command:

```
make
```

To install the binaries at the root of the source tree, type:

```
make install
```

Pretty easy! Now on to configuration.

Configure Appletalk

Begin by adding the contents of the sample services.atalk file which accompanies the netatalk distribution to your /etc/services database by using any editor. The lines to be added should look like this:

```
rtmp 1/ddp # Routing Table Main. Protocol
nbp 2/ddp # Name Binding Protocol
echo 4/ddp # AppleTalk Echo Protocol
zip 6/ddp # Zone Information Protocol
```

Now assuming that your physical connection between Linux and the Mac is Ethernet, edit the /usr/local/atalk/etc/atalkd.conf file so that it contains the single line:

```
eth0
```

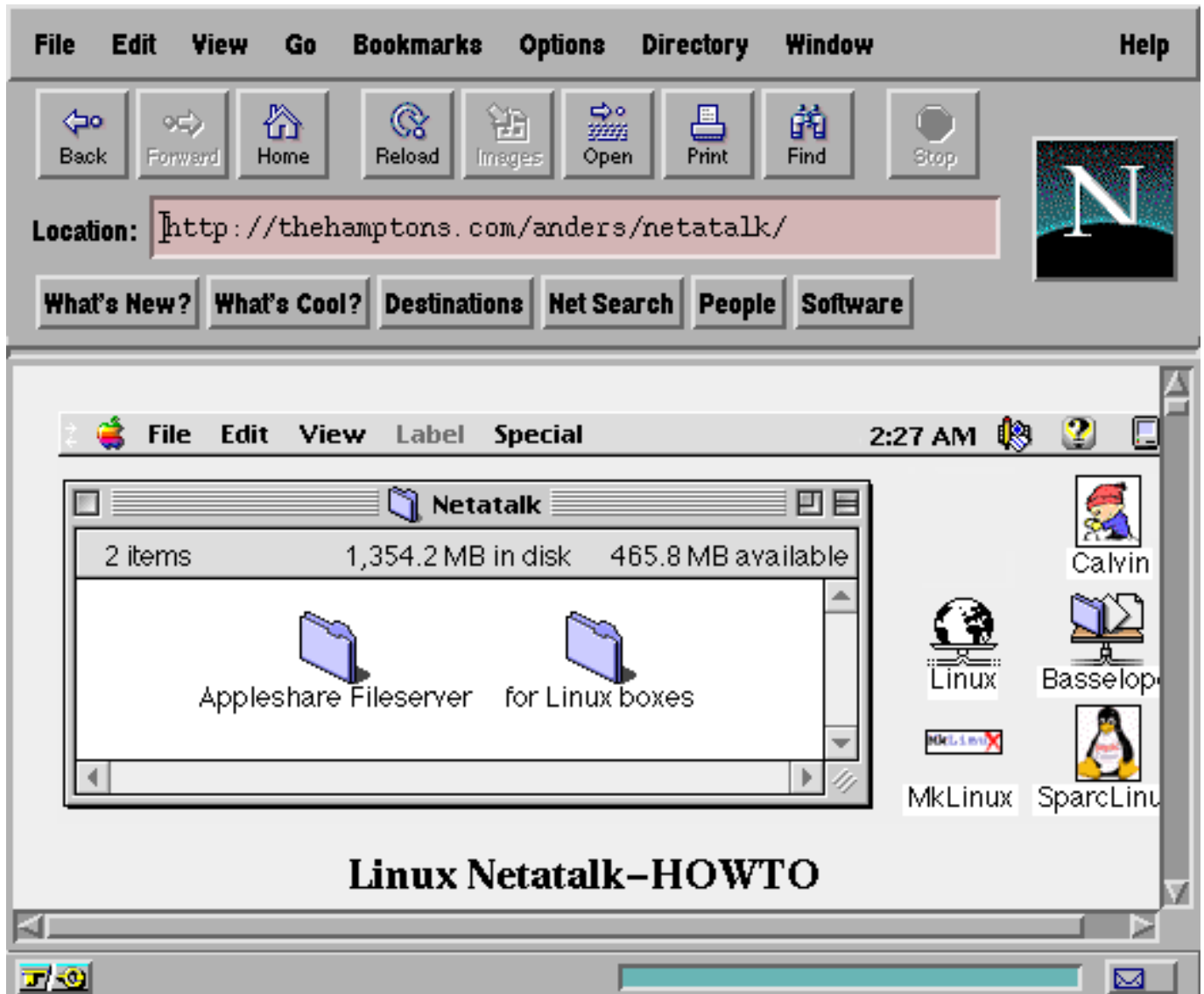


Figure 3. Your eyes aren't deceiving you, netatalk really works

This will automatically change as the system is placed into service. For example, I started with the above single line and when actually connected to the network, the file configuration was changed automatically by the Appletalk daemon to:

```
eth0 -phase 2 -net 7540-7544 -addr 7544.197 -zone "Outer-Limits"
```

Exporting Linux

The netatalk distribution provides three sample configuration files which need to be configured. Those files are:

```
AppleVolumes.default
atalkd.conf
papd.conf
```

These files are normally placed in the `/usr/local/atalk/etc` directory. The files contain instructions in the form of comments within the file to aid the user. Additional information may be obtained from the man pages.

We have already discussed the configuration of `atalkd.conf` during Appletalk configuration. Now we need to specify what files and/or directories will be made accessible to the Macintosh. This is done by editing the file `/usr/local/atalk/etc/AppleVolumes.system`. A sample configuration is shown below.

```
# default translation --
# note that CR <-> LF translation
# is done on all TEXT
# Next three lines will
# export directories
/tmp tmp
/pub pub
/home/user/X XWindows

.      TEXT  UNIX

# sounds
.mod  STrk  STrk
.mid  Midi  ttxt
.aiff AIFF  SNDM
.wav  WAV   SNDM
.au   ULAW  SNDM

# video
.moov MooV  ttxt
.mov  MooV  ttxt
.mpg  MPEG  mMPG
.mpeg MPEG  mMPG

# formatted text
.html TEXT  MOS!
.rtf  TEXT  MSWD
.doc  WDBN  MSWD

# compressed archives
.bin  BINA  MB2P
.zip  ZIP   ZIP
.tar  TARF  TAR!
.gz   Gzip  Gzip
.Z    ZIVM  LZIV
.sea  ????  SITx
.cpt  PACT  CPCT
.sit  SIT!  SIT!
.hqx  TEXT  SITx

# graphics
.tiff TIFF  JVWR
.tif  TIFF  JVWR
.bmp  BMPp  JVWR
.pct  PICT  ttxt
.pict PICT  ttxt
.jpeg JPEG  JVWR
.jpg  JPEG  JVWR
.gif  GIFf  JVWR
```

The configuration shows that the directories `/tmp` and `/pub` are made available to the network. On the Macintosh, a directory will be displayed as a folder with its own name, in our example `tmp` and `pub`. However, the directory `/home/user/X` is also accessible from the Macintosh but under the name `Xwindows`. The ability to show an exported directory as a different name on the Mac than Linux, is provided by specifying a different second parameter such as `/home/user/X Xwindows` in the example.

With regard to deciding which directories to export to the network, a word of caution is advised. The netatalk daemon `afpd` (Apple Filing Protocol Daemon) creates additional files for house keeping. Specifically, in each of the exported directories, two invisible files (e.g., files beginning with period) are created; they are `.AppleDesktop` and `.Appledouble`. It is important to mention the existence of these files since they will be created in all Linux directories and subdirectories that are exported and accessed. Normally this is not worth mentioning, however, if you export the entire file system such as `/`, you will find your Linux system cluttered with `.AppleDesktop` and `.Appledouble` files.

Note also that the file `/usr/local/atalk/etc/AppleVolumes.system` above shows a list of file extensions. These are not necessary, however, they provide a means for the appropriate icons to be displayed on the Macintosh desktop. For example, referring to Figure 1, you will see that the files `z.mpg`, `z.rtf`, and `zz.jpg` are displayed with the correct Macintosh application icon. This functionality is provided by the configuration of the extensions as shown.

Sharing the Linux Printer

If you have a printer connected to your Linux system, you can make it available to the Appletalk network. This ability is provided by the Appletalk Printer Access Protocol Daemon, `papd`, normally started when booting Linux. The daemon accepts printing requests from the Macintosh and spools the job to the local line printer daemon. To configure, the file `/etc/local/atalk/etc/papd.conf` needs to be edited. The syntax is the same as used by the Linux `printcap` file found on most Linux systems in `/etc/printcap`. A sample file may look like this:

```
# sample papd.conf file to allow
# printing on the Linux printer over
# the Appletalk network.
```

```
MyLaserW:\
    :pr=lp:op=cg:
```

Netatalk Startup

The file `rc.atalk` located in the directory specified by the variable `ETCDIR` (normally `/usr/local/atalk/etc`) needs to be called at startup. There are several ways to do this. On a Linux system in which one wishes to keep the `rc` files in one place, copy `/usr/local/atalk/etc/rc.atalk` to the `/etc/rc.d` directory. Now, using a text editor, insert the following line in the `rc.local` file.

```
sh /etc/rc.d/rc.atalk
```

For more information on what this script does, consult the netatalk man pages.

Testing

Now the fun part. Just go to the Macintosh *Chooser* and select *AppleShare* as shown in Figure 4. The Linux system hostname will appear on the desktop just like any other Appletalk compatible machine on the network.

Note there is an 8 character password limit on the Mac. The Chooser will not let you type a longer password. So if your Linux password is too long, it needs to be changed.

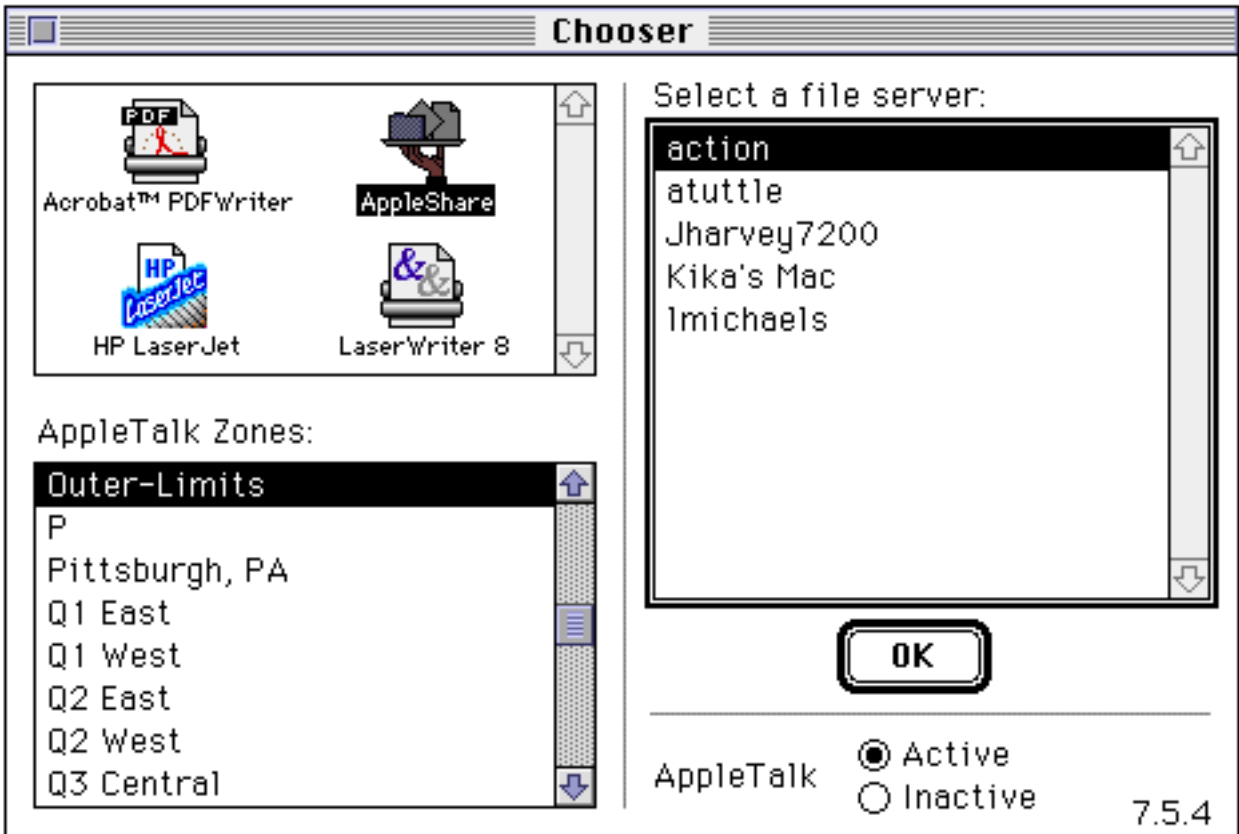
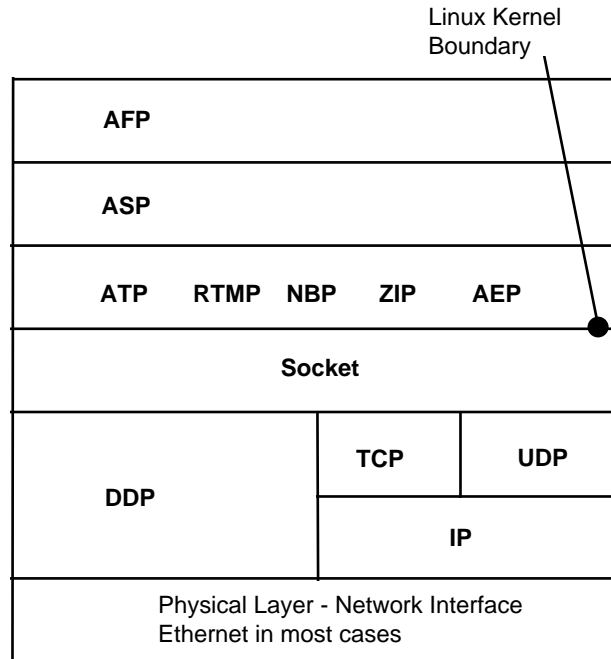


Figure 4. Use the Mac Chooser to mount the Linux file system

Netatalk Techtalk

Technically speaking, netatalk is an implementation of the AppleTalk Protocol Suite. It contains support for EtherTalk Phase I and II, DDP, RTMP, NBP, ZIP, AEP, ATP, PAP, ASP, and AFP. Figure 5 shows a typical stack.

DDP is now provided by the new Linux 2.x kernel. The `atalkd` daemon implements RTMP, NBP, ZIP, and AEP, which is the AppleTalk equivalent of Unix `routed`. There is also a client-stub library for NBP. ATP and ASP are implemented as libraries. The `papd` daemon allows Macs to spool to `lpd`, while `pap` allows Unix machines to print to AppleTalk connected printers. Also provided is `psf`, which is a PostScript printer filter for `lpd` designed to use `pap`. A PostScript reverser, `psorder`, is called by `psf` to reverse pages printed to face-up stacking printers. Lastly, and perhaps most important, is the `afpd` daemon which provides Macs with an interface to the Unix file system.



- AEP - AppleTalk Echo Protocol
- AFP - AppleTalk File Protocol
- ASP - AppleTalk Session Protocol
- ATP - AppleTalk Transaction Protocol
- DDP - Datagram Delivery Protocol
- IP - Internet Protocol
- NBP - Naming Binding Protocol
- RTMP - Routing Table Maintenance Protocol
- TCP - Transport Control Protocol
- UDP - User Datagram Protocol
- ZIP - Zone Information Protocol

Figure 5. The netatalk stack

There are extensive well written man pages that accompany netatalk. Available man pages include:

- aecho.1
- afpd.8
- atalk.4
- atalkd.8
- atalk_aton.3
- getzones.1
- hqx2bin.1
- macbinary.1
- megatron.1
- nbp.1
- nbplookup.1
- nbpmsgstr.1
- nbp_name.3
- pap.1
- papd.8
- papstatus.1
- psf.8
- psorder.1
- single2bin.1

```
unbin.1  
unhex.1  
unsingle.1
```

Conclusion

Netatalk is a well written stable program that makes moving files between the Mac and Linux as easy as drag and drop. In fact, you can install it on almost any Unix-like platform and take advantage of the power it provides. *Now you really do have the power to be your best* - with both the Mac and Linux.

References

1. Primary netatalk web page.
<http://www.umich.edu/~rsug/netatalk/>
2. Other URLs for netatalk.
<http://thehamptons.com/anders/netatalk/>
<http://artoo.hitchcock.org/~flowerpt/projects/linux-netatalk/>
3. While netatalk provides you with the ability to mount the Linux file system on the Mac, hfs allows you to mount Macintosh hard drives, floppies, and even CD-ROMs on your Linux system. Information on this application can be found at:
<http://www-scm.stanford.edu/Students/hargrove/HFS/>
4. A moderated netatalk mailing list which provides a general discussion of netatalk and new releases is <netatalk-admins@umich.edu>. Subscribing or unsubscribing is done by sending mail to <netatalk-admins-request@umich.edu>. As a reminder, the former address is for sending mail to the group at large, and the latter for subscribing and unsubscribing.



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