

My Computers

JULIUS O. SMITH III

*Center for Computer Research in Music and Acoustics (CCRMA)
Department of Music, Stanford University, Stanford, California 94305 USA*

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Abstract

This online article describes my personal computers and their associated peripherals and software. Consider it my “home-office sysadmin BLOG,” if you will, which I post here for anyone who might have similar systems. I routinely refer to it when I need to remember what happened with various machines at various times, or when setting up a new machine. It is also therapeutic to record here my unvarnished opinions regarding various software headbutts. (☺)

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1 When Was This Stuff Written?

To keep track of my various machines, I add a line in this file whenever I install something, noting any special considerations, etc. As a result, the *time of writing ranges over years*. Normally, “bulleted list” can be assumed ordered chronologically. However, when going from one bulleted list to the next, there is usually a large step *backward* in time. In particular, OS upgrades and hardware upgrades are logged most-recent first, and within each upgrade section, the entries progress forward in time. Lately I’ve been adding more dates to entries when it might not be obvious when they occurred.

2 Introduction and Overview

For my desktop PCs, I use a Mac Pro and two computers built from components, running

- Red Hat Fedora Linux (on the home-built machines)
- Mac OS X (on the Mac Pro)
- Microsoft Windows XP Professional (within VMware Fusion on the Mac Pro)

The details of these software set-ups are outlined below, and the specific hardware is described in later sections. I also have a MacBook Pro that runs basically the same software as the Mac Pro, plus VMware Fusion for running Windows XP and Fedora virtual machines. In principle, I can run all three systems on my MacBook Pro in this way, and in fact I no longer maintain a physical Windows machine, but the audio performance of Fedora under VMware Fusion is not useful (see Mac section below). The other problem is that it is not yet possible to buy an internal SSD hard drive for the MB Pro that is large enough for my needs.

3 Why Three Operating Systems?

My favorite quote about computers is

A computer makes it possible to do, in half an hour, tasks which were completely unnecessary to do before.

Each operating system in your life requires a large time investment. If at all possible, you should stick to only one. Here is why I run three:

3.1 Why Linux Alone is Not Enough

I would like to do everything in some Linux distribution because it is free and open source, and I wish to support that, and to try to contribute any enhancements I feel are missing (especially in my field). However, this is not yet possible for me, for the following reasons:

- Quicken and TurboTax are not available for Linux. (I don’t have time to write replacements for those!)
- Beyond Compare is a great tool for comparing and merging source trees. If there is a Linux tool that’s as good, I don’t know what it is (`diff` does not fill the bill). I find this to be an indispensable tool, and I use it also on my Linux filesystems via Samba.

- Xenu is the best tool I am aware of for checking website links, and as far as I know it's a Windows-only application. (This would pertain only to people maintaining lots of hyperlinks at some website.) Surely there is a good tool for this on Linux by now, but I haven't found it (nor looked very hard).
- There is a lot of commercial music software that requires a Mac or Windows. From time to time I try to track developments on all major platforms, both commercial and free.
- I often need to try out some demo under Windows.
- Often someone sends me a Microsoft Word or Power Point document that I need to open. LibreWrite or OpenOffice will these on Linux or the Mac, and compatibility is pretty good in general. However, I consistently find that I have to reopen the document under Windows (e.g., when there is math in the Power Point doc, or sound examples—I have not been able to get media files to play from a click in the Office counterpart of Power Point). For Excel spreadsheets, I have had good luck converting between Excel and Google Docs spreadsheet format. In place of Power Point, I use the “`powerdot`” class file in \LaTeX to create hyperlinked PDF files (see FC5 section below). (Others use the `beamer` class file in \LaTeX , which comes standard with most \LaTeX distributions.
- Apps for which I *prefer* Windows include MS Word and Power Point.
- Historically, commercial software products support Windows first, the Mac second, and Linux/UNIX a distant third or not at all. However, there is a lot of free software aiming to fill these holes on the UNIX front.

In summary, I need Windows mainly for “random compatibility” and a few key applications not available under Linux, and I generally use Linux for all development work. When I need to work in Windows for extended periods, the Cygwin distribution helps immensely (UNIX tools compiled for a windows environment).

3.2 Why I need UNIX/Linux

- UNIX or Linux is generally a superior development environment for open-source software tools. However, I will say that MacPorts does very well for me on the Mac along these lines.
- Windows does not support true *symbolic links* in the file system. (“Shortcuts” don't work the same way at all.) My files are organized logically in a hierarchy, and then I have a flat set of symbolic links in the directory `/1`. Thus, I can refer quickly to `/home/me/Projects/Active/Music/Clarinet/Makefile` as `/1/cla/Makefile`. I have not been able to come up with an alternate shortcut mechanism under Windows which works (1) in a shell, (2) in a program, (3) in any open-panel, or (4) while browsing files in Windows Explorer. Environment variables, for example, only work in a shell. In the Cygwin environment, symbolic links work correctly within a Cygwin shell. However, these “link files” just behave as regular files in Windows and don't function as true UNIX-style symbolic links.

3.3 Why I need Mac OS X

I didn't really *need* to get a Mac Pro, but I really *wanted* to get one. It was time to upgrade my Windows machine, and I thought it would be neat to migrate that machine to Windows running under VMware Fusion on a Mac Pro, and so far, my experience along these lines has been excellent (details below in §5.4). Since it includes UNIX-compatibility support, and since more and more major commercial applications (such as Microsoft Office and Adobe Acrobat) are being ported to the Mac, it is conceivable that OS-X can eventually replace both Windows and Linux for my needs. In the meantime, since OS-X now runs on Intel hardware, it is possible to boot up Windows, Linux, or Mac OS-X on the same hardware. However, for now, I'm using VMware Fusion to host Windows and Linux within the Mac OS X environment. I also run Linux on separate hardware (details below) to achieve maximum performance for music/audio systems work.

Since I started with Mac OS X, the percentage of my time spent on “system administration” has plummeted. (For Linux, I like to keep up with the Fedora releases and plug in new hardware, etc.—a sure recipe for plenty of sysadmin fun.) While I do enjoy duking it out with an “unfinished” system, I also enjoy having more hours for other things. For me, it's best to go back and forth, with the Mac always ready and stable for “mission critical” work, while my Linux boxes can lie in pieces for any amount of time. In this spirit, I tend to run the latest `git` versions of the main software distributions I use (not counting Fedora itself, where I avoid even the testing versions).

3.4 Why I need more than one OS (and machine) in general

- While I prefer to develop software in UNIX-style environments, there are still companies that provide product-support software for Windows only.
- I have had *many* instances where a problem on one system is easily bypassed on the other system.
- It is good education for a “software engineer” or “computer hobbyist” to keep up with the leading operating systems and user software.
- All machines get busy once in a while, and instead of staring at an hourglass or beachball cursor, it's great to be able to pop over to another machine that's idle. One's tablet and/or smartphone can similarly be used on the road as a “something-to-do computer” while waiting for a laptop to come back.

4 Software for Windows

I use the following Windows software having no sufficiently good counterpart running on Linux, for my purposes:

- Adobe Acrobat (for creating PDF files from PostScript and MS Word files)
- Beyond Compare (excellent directory/file compare shareware, \$30)
- Xenu (excellent website link checker, *free*)
- Eudora¹

¹I am slowly moving my email over to Thunderbird, and there is a great tool called EudoraRescue that can port its mboxes to Thunderbird. One reason I want to leave Eudora is that I find it disruptive that every single email

- Microsoft Office XP (Word, Excel, PowerPoint)
- Quicken
- TurboTax
- Various software that came with hardware add-ons (see below)

All of the above are available for Mac OS X except Beyond Compare and Xenu. Beyond Compare will *probably* be ported to Mac OS X at some point (and FileMerge/`opendiff` are available in the meantime), while Xenu will probably never be ported (judging from remarks on its website).

I use the following Windows software having perfectly fine (or superior) counterparts in the Linux world, for my purposes:

- GNU Emacs (most critical for my quality of life under Windows)
- Cygwin Tools (for providing UNIX commands in an Emacs shell — *very important*)
- `ctrl2cap` (for switching Ctrl and Caps-Lock — *very important* for Emacs users)
- Audacity (excellent free sound editor/player)
- Ghostscript
- Ghostview
- `psutils`
- Mozilla Firefox web browser
- Various browser extensions
- Winamp (classic sound player)²
- Adobe Acrobat Reader (for reading PDF files)
- MiKTeX (very nice $\text{T}_\text{E}\text{X}/\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$ distribution for Windows)
- MP3ToWaveConverter (shareware, \$15)
- DiskPie (decent shareware pie-chart disk-usage analyzer)
- ActivePerl
- Tera Term Pro and `ttssh` (secure telnet shell)³
- WinZip
- `ws_ftp`

5 Life with Mac OS X

5.1 Adapting to Mac OS X Mavericks

The Mavericks and new Xcode update hit me around November 1 2013, and while most things continued to work, some things got broken, such as `gitk` and `osascript`. After some research that should not have been necessary, I figured out that I had to download and install (again) the Xcode command-line tools. This is basically an installation bug at Apple. You don't uninstall things when upgrading a system. There was no indication that functionality had been removed!

filter insists on opening its folder when new mail for it arrives. (It is time-consuming to close all those windows.) To partially address this, I have moved infrequently searched email folders to gmail, leaving only active “work folders” in Eudora. Thank you Google for gmail! Another problem is that you cannot set any “personality” to be “dominant,” which is a pain. You have to edit the properties of “dominant” the hard way.

²Winamp is the only sound player I have found for Windows that will play a sound file without moving a window to the foreground. This is important when clicking on PDF “run:soundfile” links in presentation. (I use PDF files generated by $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$ and `powerdot` instead of PowerPoint.)

³<http://www.vector.co.jp/authors/VA002416/teraterm.html>

`osascript` still does not work.

For much more, see <http://trac.macports.org/wiki/MavericksProblems>.

5.2 Life on Mac OS X 10.8.4

As of August 2013, I am very well adapted to the MacBook Pro, and do essentially all of my work there except for Linux audio software work, which still requires a real Linux desktop machine. (I could dual boot, but would rather not due to insufficient disk space and the inevitable headbutts that would ensue.)

My primary working tools on the MacBook Pro are Carbon Emacs, Octave, Faust, Xcode developer tools, Logic Pro X, and countless MacPorts packages (installs logged below in later sections).

If VMware Fusion ever becomes usable for Fedora Linux audio work (i.e., no constant xruns from JACK), and if SSD disk sizes roughly double again, I'll actually be able to do everything I am currently doing on the MacBook Pro alone.

5.3 Adapting to Mac OS X Mountain Lion

Initial Mac set-up is described in §5.4 below.

In the summer of 2012 I was forced to upgrade from Snow Leopard to Mountain Lion in order to run an Xcode version ≥ 4.2 which is required to compile code for present-day iPhones and iPads. (Yes, it appears to be impossible to create an iPhone/iPad application using Snow Leopard.) The initial install (7/25/2012) went smoothly, although I was surprised that some of my personal settings were lost (which were easily re-entered). Overall, the experience has been a regression for me since many MacPorts ports do not compile on Mountain Lion as of this writing, UI changes are in a sideways direction for me, and so far I have not identified a single new feature that I care about. One annoying new development was that for several days I could essentially *never* eject my external hard drive (cleanly) without powering down (even after disabling Spotlight, which I believe to be the source of the problem). More significantly, I am experiencing a decline in general performance (responsiveness of apps, especially within VMware Fusion), even though I have 8GB of memory that is not being filled, according to Activity Monitor. Perhaps my old dual-core MacBook Pro is underpowered for this OS. Unfortunately, upgrading to a new MacBook Pro would mean losing a quarter of my disk space, since they don't offer a 1TB disk option, and one can no longer upgrade disks later. (I hear the memory and disk drives are now permanently mounted on the logic board so they cannot be upgraded.)

So, I'm in the common situation of having upgraded software to the point that a hardware upgrade is also needed, but there is no way I can do that (presently) without regression in disk space. My old Mac Pro is even more long in the tooth, and I've found no obvious upgrade path for it at all, so I plan to abandon that line and stick to Linux for desktop computing.

In my opinion, Apple is not providing nearly enough hardware-upgrade support for its computers. They are great if you treat them as disposable, but that seems like a waste. Maybe there are reliable upgrade alternatives I haven't yet discovered.

I would like to try out life on a maxed-out Lenovo Linux laptop. My main question is whether I can get all my Windows stuff running under wine (which I can pursue in advance on a Linux desktop). For Xcode, I'll have to keep using my old MacBook Pro, which isn't so bad. It is the performance of Eudora/Windows under VMware Fusion 4.1 that I find intolerable (frequent very

long pauses). [This issue was resolved in VMware Fusion 5, so as of summer 2013 the performance is great.]

5.3.1 Specific Mountain Lion Annoyances

- Applications often place themselves automatically in an alternate “space”, and only Control-1 and Control-2 seem to work to select Space 1 or Space 2. There seems to be no way to set key equivalents for spaces in “Mission Control” [not]. To reach higher numbered spaces, I have to use Command-RightArrow multiple times. Compared to Spaces on the Mac, xmonad-gnome on Linux feels light-years ahead.
- There seems to be no way to view the iPhone simulator and the full-screen Xcode window simultaneously, even with two physical screens. In the two-screen case, Xcode takes over a higher-numbered space on the large screen, and my laptop is also forced to a corresponding screen that is blank. There seems to be no way to place the iPhone simulator on the blank laptop screen, and the full-screen Xcode will not let it display there at all. Maybe there is an “always on top” checkbox in the Xcode preferences that I haven’t found yet. In the meantime, I have to avoid full-screen mode for Xcode. (I should mention that I am an Xcode newbie, though I was comfortable with ProjectBuilder in the old NeXTSTEP days.)

5.3.2 Specific Mountain Lion Headbutts

- To get X11 back, which is no longer included in Mac OS X, I was advised to install XQuartz, which went fine.
- Xcode command line tools had to be located and downloaded separately (<https://developer.apple.com/do>) in order to get basic development utilities such as `make`.
- MacPorts was completely broken initially. I tried following <http://theengguy.blogspot.com/2012/03/inst> (with svn changed to `/opt/local/bin/svn`, since root does not have `/opt/local/bin` in its path):

```
sudo su -
mkdir -p /opt/mports
cd /opt/mports
/opt/local/bin/svn checkout https://svn.macports.org/repository/macports/trunk
cd /opt/mports/trunk/base
./configure --enable-readline
make
make install
make distclean
/opt/local/bin/port -v selfupdate
/opt/local/bin/port edit libxml2
:%s/reinplace/reinplace -locale C/g
:w
:q
/opt/local/bin/port upgrade outdated ;; FAILED at libunwind-headers
/opt/local/bin/port upgrade subversion ;; more progress but failed at ncurses
sudo port -cup upgrade outdated ;; more progress - '-p' critical here
```

- `sudo xcodebuild -license`
- Various MacPorts ports failed to build - by Sept. 19 2012 all were fixed (with `octave` being the last to build).
- The USB 3.0 driver isn't "there yet" (as of Oct. 13, 2012). Often my external USB 3.0 hard drive is not recognized at all, even after unplugging and replugging it, and I have to reboot to see it again. It also spontaneously dismounts itself, with an OS complaint that it was disconnected improperly. Disk drives connected to my USB 3.0 hub are *never* recognized—a problem that is attributed to Apple on the product reviews page.
- Avoid "Unity mode" in VMware (also as of Oct. 13 2012) — it frequently gets confused leading to wedged windows and reboot time.
- After a few Mac OS X and VMware updates, Windows windows no longer get stuck at the wrong size when toggling between a large external display and the normal Macbook display.
- Gnuplot.app no longer works. What's worse, its utility `pdftotext` doesn't work ("dyld: Library not loaded: /tmp/gnuplot-i386/lib/libpoppler.13.dylib") which means my PDF filter for FileMerge.app no longer works, which means "opendiff file1.pdf file2.pdf" no longer works. I could not fix this in 20 minutes or so of trying to find updated software.

5.3.3 Additional Installs on Mac OS X Mountain Lion

```
port install bonnie ;; disk benchmarks - would not compile before 9/2012
port install odt2txt
port install time-track-cli ;; time_track.tcl start|stop|status|summary
port install qt octave-mac ;; trying out front end to octave: qt octave
;; Work around a bug in the Faust distribution (10/5/12):
cd /usr/local/include/faust/gui/
ln ../audio/meta.h .
ln -s /Applications/Utilities/XQuartz.app /Applications/Utilities/X11.app
port install git-extras
port install lftp ;; how did I only now learn of this?!
port install texlive-pstricks
copy enumitem.sty subfigure.sty boxedminipage.sty epic.sty eepic.sty vmargin.sty from 2010 texlive
port install gnome-utils ;; => gnome-panel evolution-data-server gnuregex libgnome-keyring gnome-terminal
port install imaxima ;; use from Emacs
;; failed: port install wxMaxima
;; workaround:
;; get Portfile patch from
;; http://trac.macports.org/attachment/ticket/37344/Portfile.diff
;; and put it in /opt/local/var/macports/sources/rsync.macports.org/release/tarballs/ports/math
;; cd there and type
patch Portfile Portfile.diff
port install wxMaxima +wxWidgets30
;; This gets it built and installed, but then maxima crashes:
;; > maxima
```

```

;; fatal error encountered in SBCL..:
;; can't load .core for different runtime, sorry
;; After reading http://trac.macports.org/ticket/37214
;; and https://trac.macports.org/wiki/howto/InstallingOlderPort
;; and finding https://trac.macports.org/log/trunk/dports/lang/sbcl/Portfile
;; I tried this:
svn co -r 98354 http://svn.macports.org/repository/macports/trunk/dports/lang/sbcl
cd sbcl
port install
port -f uninstall maxima
port install maxima
;; However, this did not work for me. Trying a yet older version (1.0.58):
cd ..
mv sbcl sbcl-1.1.0_0
svn co -r 96403 http://svn.macports.org/repository/macports/trunk/dports/lang/sbcl
;; reinstall maxima as above
;; still no luck
;; Since gdb is haywire in emacs:
;;   sudo port deactivate imaxima
;;   sudo port deactivate emacs
;; (using latest
port install mplayer2 ;; working on class-video compression
;; pulls in a52dec enca fribidi libass libdca libdv libdvnav libdvread libdvcss libquvi lib
;! sudo port install ffmpeg +nonfree
port install octave-specfun ;; for besseli(alpha,x,opt)
port install swig      ;; for faust2android
port install swig-java ;; for faust2android
port install f2c ;; fortran-to-c translator - for octave build from source
;; tried g95, but it was incompatible with libblas.dylib
;; manually install http://fossies.org/linux/misc/old/fort77-1.18.tar.gz
;; Had to add the following lines at line 191 or so:
;;   push(@includes, "-I/opt/local/include");
;;   push(@lopts, "-L/opt/local/lib");
port install atlas ;; for octave build - pulled in clang-3.3,llvm-3.3
;; No luck: 64-bit architecture mismatch - giving up on this path for now..
;; Next following advice at http://wiki.octave.org/Octave\_for\_MacOS\_X
port install octave-devel +atlas+docs
port install octave-signal ;; pulls in octave-control octave-optim octave-miscellaneous octave-
port install octave-plot ;; not sure this was needed (had a plot problem)
port install octave-audio ;; failed to install
port install octave-data-smoothing ;; looking for butter, actually
easy_install latex2markdown ;; for latex to mathjax conversion
    USAGE: python2.7 -m latex2markdown file.tex file.markdown
;; begin for git:
curl -s -O http://github-media-downloads.s3.amazonaws.com/osx/git-credential-osxkeychain

```

```

chmod u+x git-credential-osxkeychain
mv git-credential-osxkeychain /usr/bin
;; end for git

;; Really need octave-audio now - web search =>
;; Problem appears to be no ObjC support in gcc-mp - must force clang/llvm-gcc:
;; Modified (6/8/13) from http://trac.macports.org/ticket/37761
mkdir /var/tmp/oct-5kFozQ
cd /var/tmp/oct-5kFozQ/
tar -zxvf /opt/local/var/macports/distfiles/octave-audio/audio-1.1.4.tar.gz
cd audio-1.1.4/src/
sh autogen.sh
setenv CC clang
./configure
make
make install

;; During upgrade, hit warning during octave-devel upgrade:
;; WARNING: Dependency 'arpack' is installed with the +accelerate
;; variant, using Apple's Vector Libraries which have known bugs that can
;; cause Octave to crash if using certain functions in arpack. The
;; +atlas variant does not have these issues with Octave, and is
;; considered by Octave developers a better way to go.
;; Also hit error: arpack: Variant openmpi conflicts with gcc43 =>
port install openmpi +atlas
port uninstall openmpi @1.7.2_0+gcc43
port uninstall gcc43
port install arpack +atlas
port uninstall octave-plot ;; shadows ginput, which is not yet working
port uninstall gnome-utils ;; need to upgrade bison =>
port uninstall libpanel-applet2
sudo port uninstall libgdata webkit-gtk yelp
port uninstall libquvi VLC avahi
port uninstall gnome-panel evolution-data-server gnuregex libgnome-keyring gnome-keyring libgw
port uninstall gstreamer1 gstreamer010 gstreamer1-gst-plugins-base
port uninstall bison
port uninstall py27-nose py27-roman py27-numpy py27-docutils
port clean all
port install octave-devel +fltk +gcc47
;; Now, FINALLY, "graphics_toolkit fltk" works in octave and I can use uimenu and such in plots
svn checkout http://svn.pyyaml.org/libyaml/branches/stable libyaml ;; need for smsPrint
sudo port install python27 ;; for mercurial
port install py27-docutils ;; for mercurial
svn checkout http://svn.code.sf.net/p/docutils/code/trunk docutils ;; mercurial still not happy
cd docutils/docutils

```

```

python setup.py install
port install mercurial ;; finally!
hg clone https://code.google.com/p/mat-yaml ;; need for smsPrint
cd mat-yaml/mex-src
mkcoffile -I/usr/local/include yaml_mex.c yaml_mex_util.c -lyaml
cp yaml_mex.oct <where needed>
svn checkout svn://svn.code.sf.net/p/freeframe/svn/trunk freeframe-svn ;; messing around
port install tcl
/usr/sbin/apxs -q CC ;; is full of crap - make it work:
cd /Applications/Xcode.app/Contents/Developer/Toolchains
ln -s XcodeDefault.xctoolchain OSX10.8.xctoolchain
sudo touch /var/log/bluetoothAudio.log
sudo chmod 777 /var/log/bluetoothAudio.log
;; flail with bluetooth
open /var/log/bluetoothAudio.log
defaults delete com.apple.BluetoothAudioAgent "Apple Initial Bitpool (editable)"
Install Virtual MIDI Piano Keyboard from .dmg: http://sourceforge.net/projects/vmpk/files/
Install SPAN spectrum analyzer AU plugin: http://www.voxengo.com/product/span/
(Previously installed Blue Cat AU plugin "BC Freq Analyst")
port install octave-nan ;; statistics and machine learning toolbox for Octave
;; Resolve lack of llvm-3.0 support in Mavericks:
port install llvm-3.3
port install ld64 +llvm33
port install cctools +llvm33
port uninstall llvm-3.0
port upgrade outdated
;; octave snafu:
port uninstall octave-data-smoothing
port uninstall octave-optim
port uninstall octave-miscellaneous octave-signal
port uninstall octave-general octave-struct octave-specfun
;; more mavericks / MacPorts lossage:
port uninstall mp3blaster
port uninstall openjpeg
;; rebuild as needed:
port install octave-signal
port list installed | grep octave
;; have optim, misc, general, struct, specfun, leaving only
port install octave-data-smoothing
;; MacPorts stuff updated and error-free on 12/15/2013
port install netcdf ;; Network Common Data Form (NetCDF)
port install netcdf-cxx4 ;; NetCDF new C++ library
port install sox ;; how did I get by for so long?
;; download JACK OSX zip from http://www.jackosx.com/download.html
port install readline ;; for SuperCollider

```

```

port install emacs-w3m-devel ;; "
port install imaxima ;; GUI front-end for Maxima
;; Make faust2caqt and faust2jaqt et al work:
  cd /opt/local/share/qt4/mkspecs
  ln -s macx-llvm macx-clang
;; Alternative in makefiles:
;; test 'qmake --version | tail -1 | sed -e 's/^.*version \([0-9]*\).*$/\1/' -gt 4 && echo ma
;; -
;; git clone https://github.com/andymcd/cmd-key-happy
;; and follow INSTALL instructions [LOVE IT!]
;; Bought and installed KeyNote from the Mac Store ($20)
port install qrencode ;; Faust needs this now [discovered 4/9/14]
octave:1> pkg install -forge control ;; otherwise is_real_matrix is undefined
port install octave-control ;; since the above line failed
octave:1> pkg install -forge control ;; fails still
port install guile ;; for radium
port install lame ;; to convert .mp3 to .wav
;; download and unzip: http://www.amazingnoises.com/amz/product/grain-reverser/
mv Grain\ Reverser.amxd /Applications/Ableton\ Live\ 9\ Suite.app/Contents/App-Resources/Misc/
port select --set python python27
port install fortune ;; for fun: fortune | say
port install p7zip ;; needed to unpack a .7z file (Mellotron.7z for NI); installs 7z, 7za, 7zr
  ;; Installed in /Applications/Native Instruments/Reaktor 5/Library/Ensembles/Classics/Synthes
port install swig-python ;; needed by CMU Sphinx
port install octave-signal ;; needed by CMU Sphinx
pkg install /opt/local/var/macports/distfiles/octave-signal/signal-1.2.2.tar.gz ;; try to fix
port uninstall llvm-3.2 ;; no longer builds - no dependents
port uninstall --follow-dependents octave ;; trying a complete reinstall of Octave
port -u uninstall --follow-dependents ;; more cruft
port install octave-signal ;; brings in octave, octave-control, octave-general
octave
  test('resample')
port install -f octave +fltk +atlas +gcc48 ;; Supplement default = +atlas +gcc48 (needed fltk)
git clone http://git.code.sf.net/p/guitarix/git guitarix
sudo port install liblrdf ;; needed by guitarix
sudo port install slv2 ;; lv2 support needed by guitarix
;; Resolving headbutts with v3.8.1_2:
port list installed | octave
port uninstall octave-control octave-general octave-signal octave-specfun
port install octave-control octave-general octave-signal octave-specfun
;; did not help
port uninstall octave-control octave-general octave-signal octave-specfun octave
;; Apparently had octave @3.8.1_2+atlas+gcc48
port install -f octave +fltk +atlas +gcc48
pkg install -forge control ;; failed

```

```

port uninstall octave-control octave
cd <octave source>
hg -v pull
hg -v update
doit =>
bootstrap
./configure ;; failed - no usable fortran compiler
;; download gfortran.pkg from https://gcc.gnu.org/wiki/GFortranBinaries#MacOS
port install qhull ;; Octave's CONFIGURE wanted it for geometry stuff
port install ql2ps ;; Octave's CONFIGURE wanted it for Open GL printing
port install qscintilla ;; Octave's CONFIGURE wanted it for builtin GUI editor
;; Octave's CONFIGURE can't see qhull or gl2ps - hacked configure file
;; Build failed with 5 errors (generic C++ stuff) - punting
Download 10.9 binary installer from http://wiki.octave.org/Octave_for_MacOS_X#Binary_installer
ln -s /Applications/Octave-cli.app/Contents/MacOS/Octave ~/bin/octave
> octave
  pkg list
  pkg load signal
  pkg load audio
  pkg -forge install control ;; fails
port install octave +fltk +atlas +gcc48
octave
  pkg load signal
  pkg -forge install control ;; fails still
;; downloaded octave-forge control package to /w/octave-forge/control
cd /w/octave-forge/control/src
make ;; fails - clang++ problem, but .oct files build ok it seems, just not the slicot library
port install octave-control ;; appears happy
octave
> tf(1) ;; fails
  not loaded: /opt/local/lib/octave/3.6.4/liboctinterp.1.dylib
sudo port install texlive-fonts-recommended ;;
updmap ;;
port uninstall mplayer2 ;; not using it and port upgrade failed - maybe try MPlayer, mplayer-d
port install octave-signal
port install multimarkdown ;; powerdot is dead
port install pandoc ;; for combining multiple files (pulls in a ton of hs-* (Haskell) stuff and
;; Yosemite upgrade:
xcode-select --install
;; MacPorts dead - website not accessible - trying homebrew:
sh
ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"
;; cf https://github.com/Homebrew/homebrew/tree/master/share/doc/homebrew#readme
brew doctor
brew install octave ;; pulls in pkg-config, gnu-sed, texinfo, fftw, dotwrp, readline, cmake, t

```



```

;; filed to install dependency qupdate:
;; "Error: no implicit conversion of nil into String"
;; Re-install MacPorts from https://www.macports.org/install.php
;;
port -v selfupdate
port -cup upgrade outdated
;; scratch that - follow instructions at https://trac.macports.org/wiki/Migration
;; upgrade VMware Fusion Pro for $80 to fix unuseable screen mangling in vm (ouch)
port install octave-signal
git clone https://bitbucket.org/agraef/faust-vst
  mkdir /usr/local/src ;;
  ln -s /l/fj/vstsdk3 /usr/local/src/vstsdk
  cd faust-vst; make; make install
  cp faust2faustvst /w/scripts/
  cp -p faustvst.cpp /usr/local/lib/faust
sudo port install py-scipy ;; to define pylab - stub - pulls in stuff
;; Follow (adapted) http://sublimated.wordpress.com/2009/01/20/how-to-install-matplotlib-and-s
sudo port install py27-scipy py27-ipython ;; trying to get pylab going
sudo port install py27-numpy py27-matplotlib ;; trying to get pylab going
sudo port install py27-wxpython-3.0
;; FAQ: http://matplotlib.sourceforge.net/faq/installing_faq.html#what-is-a-backend
;; Create and add the following to ~/.matplotlib/matplotlibrc
  backend : WXAgg # Use wxpython as the plotting backend.
;; Now this works:
python2.7
>>> import matplotlib.pyplot as plt
>>> plt.plot([1,2,3])
;; works, but no plot visible. The following fixes it somehow (and works):
python simple_plot.py --verbose-helpful
;; where simple_plot.py contains:
  from pylab import *
  plot([1,2,3])
  show()
port install py27-pip ;; seems like a nice tool, though I don't need it now
port select --set pip pip27 ;; continuing with that
pip-2.7 install matplotlib ;; does nothing (already done)
pip-2.7 upgrade matplotlib ;; upgraded python-dateutil from 2.2 to 2.3, so ok!
port install octave-symbolic ;; for newtonsMethod.m
port uninstall octave-symbolic ;; so octave would start
port install faustlive-devel ;; check it out!
port installed | grep octave
  octave @3.8.2_3+atlas+gcc48 (active)
  octave-control @2.6.5_0 (active)
  octave-general @1.3.4_0 (active)
  octave-signal @1.2.2_0 (active)

```

```

octave-specfun @1.1.0_0 (active)
port uninstall --follow-dependents octave
>alias octave /Applications/Octave-cli.app/Contents/MacOS/Octave
octave> pkg install -forge control ;; fails
octave> pkg load signal
octave> pkg load audio
octave> pkg install -forge statistics ;; fails: "statistics needs io >= 1.0.18"
octave> pkg -verbose install -forge io ;; fails
port install kaffe ;; java - needed to build octave from source - pulls in much stuff - ABORTE
port install automake ;; needed to build octave from source
port install autoconf ;; needed to build octave from source
;; Edit Makefile manually to set AUTOCONF, AUTOHEADER, AUTOMAKE to /opt/local/bin/*
cd /usr/local/Library
git clean -d -f
brew update
brew tap --repair && brew tap homebrew/science
brew install Caskroom/cask/java
brew link --overwrite gcc
brew install octave
brew install slicot ;; needed by Octave Forge control package
octave> pkg -verbose install -forge control ;; fails
unsetenv CDPATH
octave> pkg -verbose install -forge control ;; fails later in make (Homebrew configure failed)
;; Try to build octave from source (octave-hg)
;; Install Java download: https://www.java.com/en/download/mac\_download.jsp?locale=en
port install gcc49 ;; gotta bypass clang to build octave
port select --list gcc
port select --set gcc mp-gcc49
brew install gcc49 ;; gotta bypass clang to build octave from source (parallel front)
brew reinstall octave --with-docs ;; to fix 'pkg install -forge control'
;; FAILS due to ghostscript already being there
port install octave +fltk +atlas +gcc49 ;; getting desparate now
alias octave-cli /Applications/Octave-cli.app/Contents/MacOS/Octave
alias ohb /usr/local/bin/octave ;; homebrew will collide with source build
alias omp /opt/local/bin/octave
;; remember to try installing things as a new user
octave> pkg -verbose install -forge control ;; WINS!!!
octave> pkg -verbose install -forge general
octave> pkg -verbose install -forge signal
octave> pkg load all
;; octave still crashes and dumps core on exit
sudo port clean --all installed
;; sudo port -f uninstall inactive
;; Declare war on pstricks problem:
;; Indicating error during ps2pdf (I think): Error: /undefined in InitOL

```

```

cd /l/p/pstricks/
wget http://giraffe.cs.washington.edu/texlive/texlive-pstricks-15485.tar.bz2
;;not needed: wget http://giraffe.cs.washington.edu/texlive/texlive-pstricks-22586-src.tar.xz
port installed | grep texlive
port contents texlive-pstricks > port-installed.txt
diff -rcb /l/p/pstricks/texlive-pstricks-15485/runfiles/texmf-dist /opt/local/share/texmf-texlive
cat doit
sudo /bin/cp -rp /l/p/pstricks/texlive-pstricks-15485/runfiles/texmf-dist/* /opt/local/share/texmf-dist
port install octave-control ;; give MacPorts version a chance once again
port install octave-signal ;; give MacPorts version a chance once again
;; Others maybe needed:
%% general-1.3.2
%% data-smoothing-1.3.0 miscellaneous-1.2.0 specfun-1.1.0
%% dot-dot-octave_packages optim-1.2.2 struct-1.0.10
/bin/rm -rf /usr/local/octave ;; clean up old pkg installs etc.
port install octave-miscellaneous
port install octave-optim ;; pulls in octave-struct
/bin/rm -rf /opt/local/lib/octave/packages/<anything old>
port install gEDA-gaf ;; gEDA/gaf - gschem and friends (needed by guitarix)
port install octave-symbolic ;; for itself, and pulls in py-sympy needed by guitarix
port select --set py-sympy py27-sympy
Install PhoneView from http://www.ecamm.com/?gclid=CP2B-YzTgMUCFY-TfgodVloAOw
port install gsl ;; math numerical library
port install gtkmm ;; for guitarix
port install avahi ;; for guitarix
port install eigen3 ;; for guitarix
;; for guitarix, had to hack wscript to add '-mt' to 'boost_system' and ldflags=[ '-L/opt/local'
port install lv2 +universal ;; testing - seemed to help
port install py27-pygtk ;; resolving undefined symbols in write-jason
port install python-pygtk ;; resolving undefined symbols in write-jason
port install py27-pygtkhelpers ;; keeping on trying
port install glibmm +devel ;; etc
port install py-fabric ;; See http://www.fabfile.org/installing.html
port install py-pyaudio
sudo port uninstall --follow-dependents atk ;; because x86 arch failed to build => removed the
    ---> atkmm @2.22.7_1
    ---> py27-pygtk @2.24.0_3+x11
    ---> at-spi2-atk @2.16.0_0
    ---> gtk2 @2.24.28_0+x11
    ---> gtk3 @3.16.4_0+x11
;; still failing on other +universal packages that can't build for arch x86 (like Faust)
port -qv installed > ~/etc/port-qv-install.'shortdate'.txt ;; ~/etc/port-qv-install.2015-06-30
port -fp uninstall --follow-dependents installed
port clean all
curl -O http://svn.macports.org/repository/macports/contrib/restore_ports/restore_ports.tcl

```

```

chmod +x restore_ports.tcl
;; No: sudo ./restore_ports.tcl ~/etc/port-qv-install.'shortdate'.txt
;; Instead:
port install octave-signal
;; FAILED: Atlas failed due to no fortran compiler and suggested installing gcc4x
port install octave +fltk +atlas +gcc49 ;; used previously - pulls in gcc49 only
;; FAILED due to clang having been chosen for atlas before:
port clean atlas
port install octave +fltk +atlas +gcc49 ;; used previously - pulls in gcc49 only
Selected C compiler: /opt/local/bin/gcc-mp-4.9
Selected F77 compiler: gfortran49
Warning: GCC compilers on MacOS do not support AVX: downgrading. [Advanced Vector Extensi
;; and later at the end:
---> Activating octave @3.8.2_9+atlas+gcc49+glgui
WARNING: Dependency 'arpack' is installed with the +accelerate variant, using
Apple's Vector Libraries which have some known bugs that can cause Octave to
crash if using certain functions in arpack. The +atlas variant does not have
these issues with Octave, but does take many hours to compile even on modern
hardware.
;; perhaps we should have said "port install octave +fltk +gcc49 +atlas"
;; so far, no "universal" installed packages
;; In the mood to clean things up:
cd 'brew --prefix'
rm -rf Cellar
brew prune
rm 'git ls-files'
rm -r Library/Homebrew Library/Aliases Library/Formula Library/Contributions
rm -rf .git
rm -rf ~/Library/Caches/Homebrew
;; for more details, see ~/etc/octave-signal-install-log.txt
port install qt5-mac ;; for f2ca
launchctl load -w /Library/LaunchDaemons/org.freedesktop.dbus-system.plist
launchctl load -w /Library/LaunchAgents/org.freedesktop.dbus-session.plist
;; no qmake until:
setenv PATH "${PATH}:/opt/local/libexec/qt5-mac/bin"
port install git-extras ;; really like "git info" - say port contents git-extras | grep bin |
port install wget
port install w3m ;; needed to do the following instead:
port install emacs-w3m-devel ;; ~/.emacs presently requires this
cd <anyproject>; git config --global core.excludesfile ~/.gitignore_global; <edit the ignore f
cd /l/pc; git update-index --assume-unchanged GeoShred/GeoShred.xcodeproj/xcuserdata/jos.xcuser
port install py34-numpy
port install py34-scipy
port install py34-matplotlib
port select --set python python34

```

```

port select --set python3 python34
edit ~/matplotlib/matplotlibrc as follows:
    backend : QtAgg
    #original [jos 2015/7/28]: backend : WXAgg # Use wxpython as the plotting backend.
port install libsndfile
port install sox ;; for play (stest)
port install rb19-bundler ;; playing with staticgen (written in ruby)
    pulled in b19-ronn rb19-hpricot ruby19 libyaml ruby_select
    rb19-mustache rb19-rdiscount rb19-rspec
port install octave-optim ;; need lsqin for MoForte calibration work
port install mercurial ;; hg needed for octave
port install markdown-mode.el ;; installs in /opt/local/share/emacs/site-lisp/markdown-mode.el
port install ncurses +universal ;; for /w/juce_faustllvm
port install zlib +universal ;; "
port install openssl +universal ;; "
port install llvm-3.5 +universal;; "
sudo port install llvm-3.4 +universal ;; faust2 requires (argh!)
llvm-config --libs ;; add to Extra Linker Flags in JUCER settings
port install texlive +letter

    ;; pulls in texlive-basic texlive-bin harfbuzz-icu libzip
    poppler openjpeg15 poppler-data potrace texlive-common xorg-libXaw
    xorg-libXp xorg-printproto texlive-bin-extra detex dvipng tlib
    latexdiff p5.16-algorithm-diff latexmk texlive-latex pdfjam
    texlive-latex-recommended pgf texlive-context
    texlive-fonts-recommended texlive-math-extra texlive-metapost
    texlive-xetex texlive-generic-recommended texlive-fontutils
    lcdf-typetools ps2eps psutils t1utils texlive-lang-czechslovak
    texlive-lang-english texlive-lang-european texlive-lang-french
    texlive-lang-german texlive-lang-italian texlive-lang-polish
    texlive-lang-portuguese texlive-lang-spanish texlive-luatex
    texlive-plain-extra
port list texlive-\\* and not installed ;; yes, you can really say that
port install netpbm aspell-dict-en ImageMagick xfig ;; needed for l2h & devel (from "Summary"
port install py-mysql ;; aiming toward using SQLAlchemy
    ;; pulls in py27-mysql mariadb mysql_select tcp_wrappers
port install mysql5 ;; why not pulled in already?
    ;; Warning: All compilers are either blacklisted or unavailable
port install libsamplerate ;; need sndfile-resample
port install ngspice ;; Circuit simulator based on Spice 3f5, XSpice and others
port install ngspice-docs
;; download and install the spice3-compatible MacSpice: http://www.macspice.com/Download.html
;; download and install ltspice: http://www.linear.com/designtools/software/
port install aspell ;; aspell --mode=tex -c
;; not done yet: brew install emacs --cocoa

```

```
;;          ln -s /usr/local/Cellar/emacs/23.2/Emacs.app /Applications/Emacs.app
;;      then try: M-x ns-toggle-fullscreen
port install texlive-pstricks ;; for presentations using powerdot
sudo ln -s /opt/local/libexec/qt5/bin/qmake /usr/local/bin ;; name change (qt5-mac -> qt5)
port install mpage ;; for making multipage software listings for printing
...
```

5.4 Getting Up and Running in Mac OS X (Leopard and then Snow Leopard)

Below is my blog on how I configured my Mac Pro (in late 2008, after many years running Linux and Windows). Later sections describe (in reverse-chronological order) my software setups for Linux and Windows. (Section 15 below gives a corresponding reverse-chronological log of hardware purchased and built for my setup.)

1. Install VMware, which then installed Windows XP *unattended!*

- My first headbutt was that the virtual Windows machine could not see the other Windows machines in its “work group”. A second problem was that Bonjour could see the printers shared on my network, but any attempt to print to them from Safari caused Safari to hang forever. As usual, an Internet search came quickly to the rescue. Both these problems were fixed by the same change: It turns out the network mode of the virtual machine must be *bridged* (not “shared with the host”, which is the default) in order to see other members of the Windows workgroup. In other words, the vm must be “directly connected” to the network. (With the virtual machine running, go to “Virtual Machine / Settings / Network” in VMware, change the mode, reboot the vm, and try clicking on “View workgroup computers” in (virtual) Windows.)
- Copy setup program for Beyond Compare 2 and install it.
- Copy Windows personal data using Beyond Compare (a simple copy failed because there was a cyclic-redundancy check failure on one file).
- Note that Norton Ghost failed to either copy the drive or restore a check point, presumably due to that one bad file.⁴
- When I set up the Windows virtual machine, I thought it would be easy to enlarge it as needed. I was wrong:
 - Search the Web for someone’s story (nothing in the VMware menus or even doc that I could find).

⁴I had checked “ignore bad blocks”, but nothing worked after many hours of trying different modes of operation (booting from DVD, etc.). It just kept saying it couldn’t copy the drive, giving an obscure error message regarding some cluster not being allocated [the restore was said to fail due to a “bad sequence”]. According to a Web search, all one can do in this situation is keep rerunning scandisk and retrying. Beyond Compare did the obviously correct thing of simply logging the non-copied file and continuing. I simply renamed the non-copied file BAD-BLOCK at its source and restored the file from a back-up mirror. Norton Ghost “gave up the ghost” in total failure, and wasted a ton of my time in the process. This may be an example of a program making itself useless because it assumes the user can’t do anything but click a few buttons in the UI, and at the same time they can’t afford to provide technical support when things go wrong. In the Linux world, I always get useful answers from a Web search, and anything can be fixed, and usually already is, because the whole world has access to the source code.

- Delete the snapshot I had made after I first got Windows installed up to Service Pack 3 (you can't resize a virtual machine with any snapshots). (From now on, my "snapshots" will be copies of the directory package, compressed by bzip2.)
 - `locate ".vmdk"`
 - `alias vdm '/Library/Application\ Support/VMware\ Fusion/vmware-vdiskmanager'`
 - `vdm -x 100GB myWindowsXPDisk.vmdk`
 - Install and run Partition Magic (!) on the virtual machine to enlarge the disk partition within Windows XP
2. `/usr/bin/chsh -s /bin/tcsh me`
 3. `sudo scutil --set HostName newhostname.local`
 4. Copy Linux versions of `~/tcshrc` and `~/emacs` and customize as needed
 5. Make Caps Lock another Control key (System Preferences / Keyboard & Mouse / Keyboard / Modifier Keys / CapsLock Key: Control)
 6. `sudo /usr/libexec/locate.updatedb` [Make `locate` work - Note that this is arguably obsoleted now by Spotlight]
 7. Automate mounting of samba shares as follows (from the Web):
 - Make sure shares are connected in the Finder
 - Access the "Login Items" tab in "System Preferences / Accounts"
 - Click the plus sign [+] and choose the desired Volume
 8. Install X11 from Optional Installs on the Mac OS X installation disk
 9. Download Xcode 3.0 disk image [have to register as an Apple developer]
 10. Change the root password [seems to be required before you can su]
 11. Add known hosts to `/etc/hosts` as usual [no app seems to own this]
 12. Check out Subversion repo containing my project-independent personal data
 13. Install MacPorts package: <http://guide.macports.org>
 14. `sudo port selfupdate` [port installs binaries in `/opt/local/bin` so add to path]
 15. `sudo port install pure q latexdiff latex2html gnupg`
 16. `sudo port install octave octave-signal octave-audio sox`
 17. Octave note: To compile `.oct` files, add the following lines


```
CFLAGS="-m32 ${CFLAGS}"
FFLAGS="-m32 ${FFLAGS}"
CPPFLAGS="-m32 ${CPPFLAGS}"
CXXFLAGS="-m32 ${CXXFLAGS}"
LDFLAGS="-m32 ${LDFLAGS}"
```

in the file `/Applications/Octave.app/Contents/Resources/bin/mkoctfile-3.2.3` after the "set -e" line. The problem was that in Snow Leopard compilers try always to build in 64bit, while libraries shipped with Octave are 32 bit. The `-m32` flag forces the compiler to build 32bit programs. (From <http://www-old.cae.wisc.edu/pipermail/help-octave/2009-October/016456.html>)

18. `port search octave` [to list all Octave packages]

[Update 12/24/2008:]

- `sudo port uninstall octave`
- Download and install `octave.app.dmg` from the sourceforge Octave download page⁵
- Download and install packages Miscellaneous, Optim, Signal, Audio, etc., from <http://octave.sourceforge.net/>
- `ln -s /Applications/Octave.app/Contents/Resources/bin/octave /usr/bin/octave`
- `ln -s /Applications/GnuPlot.app/Contents/Resources/bin/gnuplot /usr/bin/gnuplot`
- `ln -s /Applications/Octave.app/Contents/Resources/bin/mkoctfile /usr/bin/mkoctfile`

[Update 6/15/2010:]

- `mv /usr/bin/octave /usr/bin/octaveapp`
- `sudo port install octave-audio octave-benchmark octave-control octave-data-smoothing octave-general octave-ident octave-integration octave-io octave-linear-algebra octave-miscellaneous octave-missing-functions octave-odepkg octave-optim octave-optiminterp octave-plot octave-signal octave-specfun octave-special-matrix octave-spline-gcvspl octave-splines octave-statistics octave-strings octave-struct octave-symband`
(It was necessary to hide my `/.octaverc` file for this to work. The build, which uses a shell that imported my environment, failed as a result of something in there. I was able restore it afterwards and things seem to be fine.)

19. `sudo port install openssl` [wget needed by older octave-forge build]
20. `mv /usr/bin/texi2html /usr/bin/texi2html-HIDE` [older octave-forge build needs the version in `/opt/local/bin` — haven't checked all the newly separated packages]
21. `sudo port install xpdf` [not really needed, but I have scripts that expect it]
If this fails for you, try the following:

```
port uninstall xpdf
port uninstall poppler
port install -f xpdf +with_poppler
```

(There is a bug in which both `xpdf` and `poppler` want to install the same file. Since `xpdf` depends on `poppler`, `poppler` wins and `xpdf` refuses to overwrite the file so its installation fails.) I found I had to do this again after the usual "port selfupdate; port upgrade outdated"

22. `port install qtplay` [command-line audio/mp3 player using Quicktime]
23. `port upgrade outdated` [from time to time]

⁵http://sourceforge.net/project/showfiles.php?group_id=2888&package_id=237839

24. Install Carbon Emacs,⁶ which was a lot nicer than the port version (which runs in a Terminal window). Best of all, it uses `[command]` for meta! — feels completely normal.
25. Firefox installed from Web download
26. `defaults write com.apple.finder AppleShowAllFiles TRUE` [To see `.emacs`, etc., in Finder]
27. Install latest Faust:
 - Read-only access to Faust compiler:
`git clone git://faudiostream.git.sourceforge.net/gitroot/faudiostream/faudiostream`
 - Developer (Read-Write access) to Faust compiler:
`git clone ssh://USERNAME@faudiostream.git.sourceforge.net/gitroot/faudiostream/faudio`
 I also replace many installed products by symbolic links back to the git clone, so source edits will immediately take effect without an explicit install.
28. As an experiment, I tried installing Fedora 9 in a VMware Fusion virtual machine (under the latest Mac OS X). To my surprise, it worked pretty well, except for a few glitches:
 - There were display problems that began after `xorg.conf` as written by the VMware tools (I simply backed out to the previous `xorg.conf`).
 - I was able to install `planetccrma-core` and `planetccrma-apps` without difficulty. The real-time kernel booted without any trouble. However, while JACK sort of worked (with underruns), it frequently hangs and has to be killed. Non-JACK sound works fine (using pulseaudio) from the virtual F9 machine on the Mac!

I also needed to do the following for VMware Tools:

- `yum install kernel-rt-devel` [needed to compile VMware Tools with Planet CCRMA real time kernel installed. The Tools compilation requires the path `/usr/src/kernels/<latest-kernel>/include` to be entered manually.]
29. Installed `tcsh` (my emacs shell) and `octave` and their dependencies from Cygwin into Windows virtual machine.
 30. Make it easy to reload PDF files in Preview:
<http://www.macosxhints.com/article.php?story=2006010200141989>
 31. To open `.dvi` files written by `TEX` or `LATEX`, I placed the following script in `~/bin/dvi2pso`:

```
#!/bin/tcsh -f
# convert .dvi to .ps and open in Preview
# mkdir -p /tmp/dvi2pso
dvips -f $1 -o /tmp/dvi2pso/$1.ps
open /tmp/dvi2pso/$1.ps
```

To my surprise, I could not set this (executable) file to be the opener for all `.dvi` files. However, I could do this after the following commands:

⁶<http://homepage.mac.com/zenitani/emacs-e.html>

```

cd ~/bin
mkdir -p dvi2pso.app/Contents/MacOS/
cd dvi2pso.app/Contents/MacOS/
ln -s ../../../../dvi2pso .

```

It appears the Finder will only allow full fledged *applications* to open documents. Maybe this is a security thing.

32. To automatically reload changed PDF documents in Preview (very helpful when writing LaTeX documents, set up the applescript called “Reload Preview Document 1.0” by Trevor Harmon. (For this, inspect (via %1) a PDF document and make sure its opening app is Preview.)
33. `port install xfig` [I use `xfig` all the time under Linux, and I export figures in `.fig` format from Octave using the `print -dfig` command. This allows further editing, line thickening, etc. The `fig2dev` program included with `xfig` is very useful for converting `.fig` files to either PDF or EPS under Makefile control.]
34. After some flailing around in `xfig`, I stumbled upon the following table of equivalences:

X11		Mac OS X
<i>left-click</i>	=	<i>click</i>
<i>middle-click</i>	=	<i>option-click</i>
<i>right-click</i>	=	<i>command-click</i> = <i>two-finger click</i>

Table 1: Left/middle/right mouse-click equivalences

-
35. Install Xquartz = updated X11 for Mac OS X [<http://xquartz.macosforge.org/trac/wiki>]
 36. `svn checkout svn+ssh://ccrma-gate.stanford.edu/~jos/svnrc/l2hsvn/trunk ./l2h;`
`cd l2h; ./configure; make; make install` [fix some latex2html bugs that often bite me]
 37. To be able to see the HP LaserJet 1220 printer on my Linux machine, I first tried CUPS printing:
<http://www.trollop.org/articles/2007/10/31/linux-printer-sharing-with-mac-os-x-105-leopard>
<http://www.wikihow.com/Share-a-Cups-Printer-With-Apple-Mac-0s-X>
but this never worked: “Network host `jcups` server `hostnamej` is busy; will retry ...”.
I also tried HP IP Printing under the “More Printers” button, entering the IP address of the Linux machine manually (since “Auto” failed to find it), and no printers were found. What worked was, when adding a printer, to choose the *Windows* (!) printing button (as opposed to the “IP” button), selecting the Linux host, and finally the printer, which was exported on the local net via Samba. (I chose the “HP laserjet 1220” driver instead of the “HP laserjet 1220 Gutenprint” driver, which I hope was the best choice.) I also selected “Print Using Generic PostScript Printer.”
 38. To be able to access my HP LaserJet 1220 printer under VMware Windows (on the Mac Pro), I had to *first* browse to the printer (or at least its host) under “My Network Places” / “View

workgroup computers” which triggered a login on that host. Only after doing that could I successfully browse to the printer under Control Panel / Printers and Faxes / “Add a printer” link. Also, this is needed after every time the connection is broken! I call this a Windows XP bug: “Add a printer” should trigger the login while browsing in exactly the same way, but it doesn’t. The driver choices for the laserjet 1220 were “PCL” and “PS (MS)”. My understanding from a cursory Web search is that the PCL driver is from HP while any “MS” driver is a Microsoft “native driver.” I chose PCL.

39. `port install gv` [I use it to generate 2up and 4up EPS files, among other things]
40. Add `local` to the “Search Domains” field of the Network preference pane in System Preferences so that “ssh hostname.local” works on my local subnet. This works in one direction only: I can access my (fixed-IP-address) Mac Pro from my (dynamic-IP-address) Macbook Pro, but not the other way around. This is quite inconvenient, and I think whoever designed DHCP without reliable automatically exported name support should be reassigned.
41. `port install mpage` [Used to print 2-up via the shell alias `'mpage -2 -H -bLetter -f \!* | lpr -l'`]
42. `cd <faustsource>/Faust/tools/faust2pd-1.0.2`; [change `q` prefix from `/usr/local` to `/opt/local`, leave `pd` prefix unchanged]; `make install`; `make install-pd`; `ln -s /opt/local/bin/q /usr/local/bin`
43. Download and install 64-bit version of Pd-extended⁷ [surprisingly hard to find in a search result!]
44. Install Tcl/Tk Aqua⁸ (standalone version) (Daniel A. Steffen maintains) [To install Wish.app for use with Mac OS X version of Pd-extended]
45. For testing MIDI patches in Pd-extended, one must add the exported MIDI device(s) under Pd-extended / Preferences / MIDI Settings. Also, IAC Driver must be activated (see below).
46. Install the Virtual MIDI Piano Keyboard (vmpk):
Mac universal binary vmpk.app obtained from <http://sourceforge.net/vmpk/>
(could not compile latest CVS because it requires Qt built with Carbon support)
47. Install (the smaller) MidiKeys 1.7b⁹
but unfortunately it is compiled for PowerPC only! (and no source)
48. Argh! MIDI connections via software *disabled* by default!
Enable software MIDI connections by activating the IAC driver:
 - Launch `/Applications/Utilities/Audio MIDI Setup.app`
 - Select Window / Show MIDI window
 - Double-click on “IAC Driver”
 - Select “Device is online”

⁷<http://sourceforge.net/projects/pure-data/files/pd-extended/0.42.5/Pd-0.42.5-extended-macosx106-x86\protect\unh>

⁸<http://www.categorifiedcoder.info/tcltk/>

⁹<http://midikeys.en.softonic.com/mac/download>

- If more than one MIDI port is needed, click on ‘+’
 - **Note:** The “Apply” button is disabled, and the port-number increment-switches don’t work, but MIDI seems to work anyway. In Pd, for example, one can choose the device MidiKeys and/or “VMPK Output” (when installed and running) and/or “IAC Driver IAC Bus 1”.
49. `port install qt4-mac` [needed by `faust2coreaudio`]
 50. `port install aspell-dict-en` [needed by `aspell` (don’t know how `aspell` got installed previously, or why it was installed without any dictionaries, thus rendering it useless and confusing)]
 51. `port install pure-devel` [needed by `pd-pure-0.4`]
 52. `port install mercurial` [needed by next command:]
 53. `hg clone http://freehg.org/u/cozyd/tabsynth/` [graphics-tablet synthesis control]
 54. `cd /usr/local/bin; ln -s qmake-mac qmake` [no idea why this was necessary, but it makes `faust2coreaudio` work ok.]
 55. `sudo perl -MCPAN -e shell; install HTML::WikiConverter` [for a project]
 56. `port deactivate libungif; port install qjackctl` [messing with `faust2jack` on the Mac]
 57. Originally I did `port install texlive +letter`, and this worked for a good while, but eventually (by Nov. 2010) it became broken (`texnansi.enc` could not be found by `dvips`). Thus, ...
 58. `port remove texlive`
 - `sudo port -u uninstall` [necessary because the following will fail if there is more than one version]
 - `sudo port uninstall -follow-dependents texlive-basic`
 - Download `MacTeX.mpkg.zip` `MacTeXtras.zip` from <http://www.tug.org/mactex/>
The download never “completed” but the 1.66 GB file seemed to be ok.
A second download attempt appeared to complete but was only 1.01 GB and would not unzip.
 - Install `MacTeX-2010`
 - `setenv PATH "/usr/texbin:$PATH"`
(The doc says this is done automatically, but it was not for me.)
 - `reinstall latex2html` (configure; make; `sudo make install`)

I reported the problem to trac.macports.org, and was informed that I needed to install `texlive-fonts-extra` which contains that file. Another option is to install the `texlive +full` variant, which `MacTeX-2010` is said to do internally. For now I am sticking with `MacTeX-2010` because it has an unexpected great feature that MacPorts `texlive` currently lacks: The `MacTeX` version of `latex+dvips` appears to automatically crop the generated file

to the declared papersize. I'm working on a 6x9 book, and was in the habit of cropping in Adobe Acrobat Pro, but now that time-consuming manual step is no longer necessary. Another cool feature worth mentioning is that it installs a System Preferences panel that allows toggling between the use of MacTeX and texlive; that is, they are compatible and do not overwrite each other. In particular, MacTeX installs all of its programs in its own directory `/usr/texbin/` (which you have to add to your shell search `$PATH`.) Next time I have a TeX-related headbutt, I'll be able to easily try the MacPorts version of texlive.

59. `defaults write com.apple.finder _FXShowPosixPathInTitle -bool YES` [make directory paths visible atop Finder windows]
60. Download and install Deltopia DeltaWalker. This is a passable replacement (on Mac OS X) for Beyond Compare on Windows. It also has some more advanced features than Beyond Compare since it is based on Eclipse. One can also use FileMerge (`/Developer/Applications/Utilities/FileMerge.app`) for this purpose, but I find it harder to use. One can also use Beyond Compare from a Windows virtual machine running on the Mac under VMware Fusion, operating on "shared folders"; however, copying links changes their apparent size so I don't yet trust it. For a quick file diff, I now prefer `opendiff` from the command line (which uses FileMerge).
61. `man opendiff`

5.4.1 Fix MacPorts for Snow Leopard

After upgrading to MaxOSX Snow Leopard (v10.6.1), a number of MacPorts no longer worked. Below is what I had to do.

```
mkdir macports; cd macports
svn co http://svn.macports.org/repository/macports/trunk/base/
cd base
./configure LDFLAGS=''
make
sudo make install
sudo port selfupdate
```

Considered other directions at <http://forums.macrumors.com/showthread.php?t=720035>

```
su
```

```
port -f -u uninstall installed [after much futzing]
```

Overwrite `/opt/local/share/texmf/dvips/config/config.ps` with working version (dated 1986) by Tomas Rokicki et al., as described above.

```
port install netpbm [for latex2html, which is separately installed outside of MacPorts, as noted in the previous subsection]
```

```
port install aspell-dict-en
port install ImageMagick [for convert command, used by htlatex]
port install xfig [for hand-drawn figures]
port install wget
port install maxima FAILED (dependency sbcl failed to build)
port install sox [command-line sound playback and miscellaneous processing]
```

5.4.2 Install More Stuff for Mac OS X

Whenever I install something new, I try to remember to log it here, noting any headbutts and associated fixes:

- `sudo ln -s /usr/bin/gzip /opt/local/bin` [needed by perl installs below]
- `sudo perl -MCPAN -e shell; install SHA; install YAML; install HTML::WikiConverter::MediaWiki` [for a project - also PhpWiki]

```
port install qt4-mac [needed by faust2coreaudio and faust2jaqt - along with dependents, occupies 25 GB!]
```

```
port install poppler [needed to diff PDF files using FileMerge - see http://www.macosxhints.com/article.php?story=20091116055842805]
```

```
Remember that uninstall needs xmlcatmgr remove nextCatalog /opt/local/share/xml/docbook/4.1.2/catalog.xml and similarly for all docbook*
```

```
port install xpdf [needed to diff PDF files using FileMerge]
```

```
port install bibtool [needed to straighten out a fouled up bibtex file]
```

```
port install transmission [lightweight bittorrent client installed in /Applications/MacPorts/Transmission.app — I needed torrent support to download the Fedora 12 DVD image — recommended by http://torrentfreak.com/mac-bt-clients/]
```

```
port install md5sha1sum [for /opt/local/bin/sha1sum, md5sum]
```

```
Installed MacGPG2-2.0.12 from SourceForge (no “port” as yet): http://sourceforge.net/projects/macgpg2/
```

```
port install librsvg [needed rsvg-convert for .svg to .eps conversion]
```

```
port install psbind [said t be a smarter psnup]
```

```
port install Eterm [interesting replacement for Terminal]
```

```
port install bibtool [trying to convert BibTeX format]
```

Download and run the installer for 64/32-bit `jackosx` from <http://www.jackosx.com/> (Grame)
[installs JackPilot and JACK]

```
port install libsndfile
```

which also installs the following command-line programs:

- `sndfile-cmp`
 - `sndfile-convert`
 - `sndfile-info` ;; prints header info
 - `sndfile-jackplay`
 - `sndfile-metadata-get`
 - `sndfile-metadata-set`
 - `sndfile-play`
 - `sndfile-regtest`
 - `sndfile-resample` ;; sampling-rate converter
- `port install i386-mingw32*` [to try compiling VST plugins] ⇒

```
i386-mingw32-binutils @2.19.1_0 (active)
i386-mingw32-gcc @3.4.5-20060117-2_1 (active)
i386-mingw32-libunicows @1.1.1_0 (active)
i386-mingw32-runtime @3.15.2_0 (active)
i386-mingw32-w32api @3.13_0 (active)
```

Unfortunately there is a bug that prevents Faust compilations using `sinf` and `powf`. This was fixed by installing later mingw32 binaries.

- `defaults write com.apple.desktopservices DSDontWriteNetworkStores true`
- `svn checkout http://pure-lang.googlecode.com/svn/trunk/ pure` [to try out new pure-octave]
- Various pure-octave add-ons such as `faust2pd`
- `port install git*`
- `git clone git://juce.git.sourceforge.net/gitroot/juce/juce`
- `sudo port install graphvis` [needed by new `faust2graph` utility]
- `sudo port uninstall bibtool` [install latest tarball instead]
- `sudo port install mp3blaster` [hoped to play Ogg Vorbis videos from LAC-2010, but no luck]
- Download and install QuickTime Ogg Vorbis plugin from <http://www.xiph.org/quicktime/>
[to play videos from LAC-2010]
- `sudo port install gtkmm` [so I could compile `foo-yc20-1.0.0.tar.bz2`]
- Download `jack-tools-0.0.3.orig` tarball

- `cd /usr/local/bin; sudo ln -s /opt/local/bin/glibtoolize libtoolize` [needed for `autogen.sh` in `jack-tools*/sw-27`]
- Download jamin dmg file [includes swh-plugins] [wanted a real-time spectral display for jack]
- `port install fftw` [*thought* it was needed by jamin]
- `port install fftw-3-single` [needed by jamin]
- `ln -s /Library/Audio/Plug-Ins/LADSPA ladspa` [help jamin find required plugins]
- Download Thunderbird dmg file
- `port install asciidoc` [translates text doc to numerous formats]
- `port install qtiplot` [looking for a Qt spectrum display widget]
- `port install latexmk` [promising 'make' facility for LaTeX docs]
- `port install hydrogen` NOT [drum machine - surprised to find it in Mac Ports - make fails]:


```

      svn co http://svn.assembla.com/svn/hydrogen/trunk hydrogen
      cd hydrogen
      setenv QTDIR /opt/local/libexec/qt4-mac
      scons
      ./hydrogen
      # I can symlink to the above "in-place" file
      # The following install works, but then hydrogen can't find its GUI widgets:
      # sudo -E scons install
      
```
- `port install maxima` [for my sporadic symbolic math needs]
- Turn off %[mouse-down] as a Front Row launch:


```

      http://forums.macrumors.com/showthread.php?t=437187
      
```
- `port install mpage` [for printing multiple pages per page]
- `port install liblrdf` [probably didn't need this - wanted LADSPA SDK]
- Download LADSPA SDK and install main header file:


```

      cp ladspa.h /usr/local/include
      
```
- Download `meterbridge-0.9.2.tar.gz` tarball
- `port install libsdl_image` [required by meterbridge tarball]
- `svn co https://guitarix.svn.sourceforge.net/svnroot/guitarix/trunk guitarix`
- Download `waf-1.5.18` tarball [to compile guitarix for Mac OS X]
- `port install boost` [ibid.]

- `ln -s /opt/local/include/boost .` [not familiar with waf]
- Download and install `libiconv-1.13.1` [for 64-bit version of `libiconv.dylib`]
- Download and install `gettext-tools` portion of `gettext-0.18.1.1` [for 64-bit version of `libintl.dylib`]
- `port install gtk2-clearlooks` [guitarix wants it around]
- `defaults write org.gnu.Emacs AppleAntiAliasingThreshold 100`
- `defaults write com.apple.iTunes full-window -1`
- `port install moc` [music on the console (and in the background)]
- Manually install `pal-0.4.2` from tarball [a command-line calendar utility]
- Manually install `Mencoder OSX for Mac`¹⁰ from `.sit` file [for animations in Octave]

Following tips at <http://www.krizka.net/2009/11/06/creating-animations-with-octave/>

- `port install GitX` [git GUI for Mac OS X]
- `port install pure-faust` [also installs `pure` (the language), `faust`, and several `p5-*` utilities]
- `port install pure-xml` [needed by `faust2pd`]
- Download and unpack `faust2pd` from <http://pure-lang.googlecode.com/files/faust2pd-2.3.tar.gz>

```
make
```

```
make install ;; oops: "dyld: Library not loaded: xml.dylib"
```

The problem is that `faust2pd` is looking for `pure` libraries under `/usr/local`, but they are installed instead under `/opt/local` (as are all MacPorts installs). Therefore, we need an environment variable providing the dynamic library search path:

* In my `.tcshrc` file:

```
setenv DYLD_LIBRARY_PATH /opt/local/lib/pure
```

* In your `.bashrc` file, if you use `bash` (as most people do):

```
DYLD_LIBRARY_PATH=/opt/local/lib/pure
export DYLD_LIBRARY_PATH
```

- Failure on `netpbm` of `port upgrade outdated`

```
port uninstall xfig [dependent]
```

```
port uninstall transfig [dependent]
```

```
port uninstall netpbm [losing package]
```

```
port upgrade outdated [ok, now it completes]
```

```
port install xfig [and deleted dependencies] – FAILS! Awaiting MacPorts bugfix...
```

¹⁰http://download.cnet.com/Mencoder-OSX/3000-2646_4-33844.html

```
port install xfig @3.2.4 [and deleted dependencies] – WINS! Beware 'upgrade out-
dated' now ...
```

- port install librsvg [for SVG to PS conversion (LaTeX figures from Faust block dia-grams)]
- port install svg2pdf
- Install SuperCollider.app et al.

Follow a subset of the directions for hooking up emacs to SC on OS-X at <http://sam.aaron.name/2010/02/09/hooking-supercollider-up-to-emacs-on-os-x.html>. Instead of copies I used symbolic links, and I didn't do the defaults write (yet). At the moment, GUIs depending on SwingOSC do not yet work. See also <http://permalink.gmane.org/gmane.comp.audio.supercollider.user/73920>

```
port install emacs-w3m [Needed for w3m GUIs in SC; Unfortunately installs emacs as well]
```

```
Edit /etc/man.conf to include MANPATH /opt/local/man and MANPATH /usr/local/man
```

```
Copy <linux_machine>:/usr/share/SuperCollider/Extensions to ~/Library/Application
Support/SuperCollider/Extensions/ — This brought over AmbIEM BBCut2 dewdrop_lib
Help MathLib SC3plugins scide_scel SwingOSC
```

```
mkdir /usr/share/SuperCollider/ and
copy <linux_machine>:/usr/share/SuperCollider/SwingOsc to /usr/share/SuperCollider/
Now in Emacs on the Mac I can say SwingOSC.default.boot; Help.gui; Object.browse;
and I don't seem to need SuperCollider.app any more. Ya gotta love platform-independent
code!
```

- port install cmake [Needed to build SC from source]
- sudo port upgrade --enforce-variants zlib +universal
sudo port upgrade --enforce-variants zlib +universal
sudo port install xdiskusage
- port install wmctrl [using in Emacs-controlled SC]
- port install octave-optim [unconstrained optimization tool box]
- port install mercurial [pure uses hg instead of svn, git, etc.]
- port install gimp [misc bitmap graphics]
Pulled in gimp-app gimp2 aalib gegl babl lensfun libopenraw libspiro openexr ilmbase
libexif libgnomeui audiofile libbonoboui libgnome esound libgnomecanvas libglade2
libgnome-keyring gnome-keyring libwmf py27-gtk py27-cairo py27-numpy py27-nose
py27-distribute py27-py py27-gobject webkit-gtk enchant hunspell gst-plugins-base
gstreamer bison flex libsoup glib-networking libproxy gimp2 gimp-jp2 gimp-lqr-plugin
liblqr gtk-nodoka-engine gutenprint icns-gimp ufraw cfitsio dcraw exiv2 gtkimageview
xsane sane-backends libusb-compat libusb net-snmp - all for only about a gig!

- Flux.app alters screen brightness and color based on time of day. However, it has problems with flickering.
- `port uninstall liblrdf` - failed to build and didn't need it
- ...

5.5 Notes (Mac OS X)

Having three different machines running Mac OS X, Fedora F8 Linux, and Windows XP, respectively, really gives one a “three-ring circus” experience. It’s sometimes confusing to operate one display, two keyboards, and three mice. Also, the Mac OS X environment includes a virtual Windows environment, as well as typically several X windows connected to my Linux machine (using `xhost` and `ssh -X`). I really like VMware’s “unity” mode in which Windows applications share the same desktop as Mac apps. (In that case, the Windows apps may be launched from a VMware menu.) I can *almost* drive everything from the Mac.

Related to the previous point, one thing that annoys me very much in emacs on Linux is that one must be very careful to press modifier keys such as meta and shift in the right order. This issue disappears when driving from the Mac. The issue appeared relatively recently in Linux, perhaps somewhere around Fedora 6.

Misc. Remarks:

- On the Macbook Pro, I miss the “page up” and “page down” keys for scrolling up or down by one screenful. Often `⌘↵` / `↵` works, or sometimes `⌘→` / `→`, but neither works reliably across all applications. Regression!
- Instead of upgrading my Belkin OmniView switcher, I’m connecting the Mac Pro directly to the digital input of my Dell monitor. The Belkin drives the monitor’s analog input from either the Linux or Windows machine. At some point I may get an all-digital (DVI-D) video switcher. It might only need to be two-way if I can ultimately retire my ailing Windows machine. If I can get comfortable driving everything from the Mac, I won’t need it at all.
- I originally planned to start running the Mac version of Quicken, but after reading comments on the Web, I decided I was better off running the Windows version of Quicken in my VMware virtual Windows machine. Since Quicken flows into TurboTax, I probably want to keep using the Windows version of that as well.
- I also planned to run Eudora natively, but this was not easy to set up.¹¹ I’m therefore running Eudora in virtual Windows on the Mac, and this is so far working out great.

¹¹I copied my Eudora email from my Windows computer to the Eudora mail folder on the Mac, and none of it was recognized at all! I could probably fight through this by changing directory and file names until it looked right, but it’s just a lot easier to continue using the Windows version in my VMware virtual machine. (Also, I’ve got 100GB to burn there, so I might as well use it for something.) Since Eudora is no longer supported by Qualcomm, I tried importing the Windows-format Eudora email folders into the Mac Mail app — it started off reading happily, and my hopes were raised, but then the Mail app crashed (I sent a crash report to Apple). Another nice thing about Windows virtual machines is that it is easy to keep old versions of Windows lying around if that’s what it takes to keep Eudora running (of course all the current mail protocols such as POP could go away, but I think that will take a while).

- Sound did not work in VMware Fusion at first. I *thought* sound was ok on the Mac because it played a boot-up sound on the internal speaker, and pd-extended’s audio checker (via portaudio) was working fine. After at least an hour of fooling around, I finally determined that the failure was due to the default output on the Mac Pro being the *digital* output. (See “Applications / System Preferences / Sound / Output”.) You have to select exactly one of “digital out”, “line out”, or “headphones out”. It seems completely unbelievable that one cannot have more than one sound output connector operating at a time, especially line out and headphones out for Pete’s sake! Is Apple trying to save a few cents on an audio output signal buffer in a \$3K system? This makes no sense to me at all. Well, I’ll be using the digital output soon enough, so I’m going to try to forget about analog audio (non)support on the Mac Pro. On second thought, perhaps it’s just software senility: portaudio evidently ignores this setting and drives all the audio outputs (though I’ve only checked the headphone out at this point from Pd). I am always amazed by how many switches there are in the sound path that can result in “no sound”.
- Attempting to burn a CD-R audio disk from Windows Media Player 11 within VMware just hanged forever waiting for a blank CD to be inserted. The disk was later declared “not blank” by iTunes — another disk for the coaster collection.
- Compiling a large LaTeX book in PDF took 25 seconds on the Mac Pro and half a second longer on my quad-core Linux system, according to the command “time make pdf > /dev/null”. The Mac quad-cores are running at 2.8 GHz with 2GB of memory while the Linux quad-cores are at 2.4 GHz with 4GB of memory. The disks should be about the same. The ps2pdf utility seems slower than it should be (single-threaded?).
- While it is slightly slower, I presently prefer my Linux box for book development because of its more ergonomic keyboard. I also find `xpdf` easier to use than Preview when checking PDFs. Preview has the significant advantage of being able to “crop all pages” within the inspector (according to a current text selection using the “select tool”), but I haven’t found a way to crop automatically in the Makefile (possibly Automator can do it, but I’ll have to spend some time learning about that — it did not work to guess my way through its UI). Also, embedded hyperlinks in the PDF work from `xpdf` but not Preview, as far as I can tell.
- I was impressed to see that `latex2html` worked as well as it did right out of the box (as installed by port).
- The first snag I hit compiling my books on the Mac Pro was the absence of the file `fancyheadings.sty`, which was not contained in `texlive`. For now, I’ve added `fancyheadings.sty` to my svn repo for the books, and I’ve found no further problems (to my amazement).
 - As of 12/31/08, on my machine, four ports (`latex2html`, `bibtex`, `doxygen`, `texmacs`) depend on `texlive` [Also LyX needs `texlive`], while only one (`xdvipdfmx`) depends on `tetex` (now discontinued, and supposedly absorbed 100% into TeX Live).

```
port uninstall xdvipdfmx tetex.]
```
- The second snag compiling my books was that `latex2html` creates a file `index.html` that is a hard link to `[book-name].html`, and it also creates `Index.html` for the Index section of the book (you know—a normal index). The problem is of course that the Mac OS X

filesystem is case-insensitive by default, so the book index is lost in the HTML version. One solution is to compile HTML versions of my books (and anything else having an index section) on Linux machines only. Another (which I use) is to override the appropriate line in `sub_english_titles` to become

```
$idx_title = "Index for this Document";
```

Since ‘for’ is included (in the same sub) within `$GENERIC_WORDS` (*i.e.*, words not to be included in generated filenames), the Index file becomes `Index_this_Document.html` instead of the usual `Index.html`.

- I moved my HP LaserJet 3380 to the Mac Pro (via USB), and I’ve been able to print to it from the Mac environment and from Windows in VMware, but not consistently. Printing often hangs the printing app, requiring rebooting (at least rebooting fixed things).
- At some point printing stopped working completely from Windows. It took me a while to figure out that I had to click on one of the USB icons in the lower-right corner of the screen and explicitly connect to the local HP Laserjet 3380 on the Mac. Perhaps the previous item involved some apps being disconnected and others not?
- I was able to print from AbiWord (part of GNOME Office) originally from the Mac, but after installing and updating the HP software for the 3380, AbiWord now hangs forever when trying to print. Also, when it did print, the output looked pretty bad (poor font spacing).
- It’s also very hard to edit in AbiWord due to layout errors on the screen, especially when editing. So, for Word-type documents, I’ll either need to run MS Word in VMware, or spring for the Mac version.
- Burning a DVD was surprisingly hard to figure out: It can be done in the Disk Utility application, but not in the “obvious way” of setting up the source and destination fields and clicking the “Burn” button. Instead, you set up the source only and click “Burn” and it automatically burns to the “SuperDrive”. Thus, in the Disk Utility, set up the source field by, *e.g.*, dragging the `.iso` file from the Finder, (or select “File / Open Disk Image” in its menu and browse to your `.iso` image), click the “Burn” button, and insert a blank DVD-R disk if you haven’t already.

5.6 Macbook Pro Internal Hard Drive Upgrade 2009-11-07

I followed the ExtremeTech guide¹² to upgrading a MacBook Pro internal hard drive, and it went smoothly. (The hard-drive retaining mechanism has changed since that article, however. There is now a hold-down lever on the right side of the drive, held in place by two screws.)

My Macbook Pro is over a year old, so voiding my warranty was not an issue. (☺)

The new drive I chose (at Best Buy, where I got some excellent product-choice input) was a 2.5” 500GB Seagate “Momentus” 7200 rpm, and the old 200GB drive was placed in a RocketFish external enclosure. The RocketFish enclosure is especially nice, in my opinion, and I will love the Seagate drive if it lasts a long time. Already I can see that it is quieter and a bit faster than the

¹²<http://www.extremetech.com/article2/0,2845,2119528,00.asp>

original drive. After booting the Mac OS X Snow Leopard disk and “erasing” the new drive (to format it), I was given the opportunity to load all my apps, user directories, and settings from the external drive containing my old system. This made the upgrade extremely painless, and I can’t thank the responsible Apple engineer enough for working that out so well.

One surprise, however, was that my Xcode installation did not get copied over. (In contrast, all the MacPort stuff in `/opt/local` was copied.) I discovered this when I noted `make` was missing (which should be in `/usr/bin`). Thus, Xcode had to be reinstalled from its `.dmg` file, unlike everything else.

5.7 Restoring a MacBook Pro from Backup 2010-09-06

Here is my blog on the details of getting a new MacBook Pro initialized from the backup directory for an up-to-date but dead MacBook Pro.

5.7.1 Genius Advice

A couple of Apple “geniuses” (who looked at my dead MacBook Pro) advised using Migration Assistant or copying from backup directories *only* for personal data. Their advice was to reinstall all applications from scratch. Instead, I decided to use `rsync`¹³ to copy everything from backup (as described below) because

1. my time is limited,
2. I did this successfully for everything but Xcode before (§5.6), and
3. my dead system was quite up to date, so anything I whack on the new machine should be an upgrade of it.

I did worry, however, that upgrading only *some* system files (*e.g.*, in `/Library`), before running Software Update to update the whole system, might confuse the Software Update enough to abort it (things like that happen all the time using the Windows installer/uninstaller—you generally cannot uninstall anything that is already partially uninstalled, for example), but it seemed to go fine. Chalk up another point for the Apple software engineers who wrote the Software Update code! Of course any software update or uninstall should be able to forge ahead no matter what, perhaps with options.

5.7.2 Restoring from Backup using `rsync`

I used the “`rsync -auv`” command so that in the unlikely event the new computer had a newer file, it would be left alone (the ‘-u’ option). Below, let `bh` denote the backup host (my server) and let `bd` denote the backup directory on that host (such as `/Backups/MacBookPro`).

```
sudo tcsh
rsync -av bh:bd/Users/me/ /Users/me
mkdir /opt
rsync -av bh:bd/opt/ /opt
mkdir /usr/local
```

¹³I could not use Migration Assistant from the old machine because that machine could not even boot up in Target mode, although you can hear its disk whirring. They say the “logic board” probably died.

```
rsync -av bh:bd/usr/local/ /usr/local
rsync -auv bh:bd/Library/ /Library
rsync -auv bh:bd/Applications/ /Applications
rsync -auv bh:bd/Developer/ /Developer
```

After the above copies, I updated the Mac itself in the usual way (Software Update in the Apple menu) and redid misc. configuration items described in §5.4, such as adjusting my shell, making caps-lock ctrl, and setting various defaults with `dwrite`.

The above is a bit conservative (avoiding most system-file copying), but since there was about a two-year difference in the hardware age, I did not want to simply do “`rsync -auv bh:bd/ /`,” even though I think it should probably work (☺).

5.7.3 Headbutts

No ‘make’. In my backup, I found that I had `/usr/bin/make` as a link to `gnumake`. I guessed that was installed by Xcode, so I reinstalled Xcode from its `.dmg`. I could have simply `rsync`’d `/usr/bin` from backup, but I do recall having to explicitly reinstall Xcode even after copying everything in ‘/’ (see §5.6). After that, I did an `rsync -aunv` (note the ‘n’ meaning “dry run” or “not really”) to see if anything else might be needed for `/bin`, and only `/bin/launchctl` was listed. (I left it alone.)

I also later learned I had to install iTunes from the `.dmg`. It must leave some cookies in the system somewhere that it insists on finding—rather odd for a free app.

I also later found out Logic was “zombified”. Maybe I’ll reinstall it some day.

My `EPSON Scan.app` utility just dies when you try to launch it. Reinstallation from `epson12645.dmg` fixed it. Must be installing stuff in system directories.

Ok, some MacPorts needed to be reinstalled (`port uninstall foo; port install foo`) as well (not sure this was related): `maxima`, `sox`.

I also needed to copy `/Library/Application Support/Adobe/` (half a gigabyte of stuff!). Otherwise, I ran into missing fonts, and Distiller would not even launch. I guess `/Library` is not a system folder since it includes files installed by apps installed by users.

6 Software for Linux

I use the Red Hat Fedora distribution, and I find it to be excellent, containing almost everything I want. A critical advantage it has over other distributions is that the Planet CCRMA distribution (of music/audio free software) is based on it. The things I add beyond the standard core distribution(s) are described below. In reverse-chronological order (roughly), I log an overview of each software release I have installed or upgraded to.

6.1 Desktop Publishing Software for Linux

For publications, I use the tools listed below:

- `LaTeX/TeX` (math-oriented source format)
- `latex2html` (converts LaTeX format to HTML format for the Web)
- `xfig` (for drawing figures)

- `dvips` (generates postscript format)

My system for compiling document sources and creating a finished website is described in the online document “Tools for Publishing LaTeX Documents on the Web.”

6.2 Linux Machine 3

6.2.1 F17 in VMWare Fusion: Fresh Install from Fedora 17 Live ISO to a VMWare Fusion Virtual Fedora-64-bit Machine on a MacBook Pro

This went surprisingly well, and I was up and running with most things (not sound-generating things) working in half an afternoon. Roughly:

- Download Fedora 17 Live ISO image
- Create, in VMWare Fusion, a Fedora-64-bit “custom” virtual machine, taking all defaults (1GB mem, 20GB-max disk)
- Set the virtual DVD/CD-ROM to the ISO image file just downloaded
- Boot the virtual machine and install Fedora as usual from its virtual DVD
- Disconnect the Fedora DVD and mount the vmware-tools ISO image in its place
- Copy the vmware-tools `.tgz` file from ISO image to disk, unpack, and follow instructions. In particular,
 - Install `gcc`, `make`, `kernel-devel`, and `perl`.
 - Run `vmware-install.pl` (taking the defaults for the most part).
 - File sharing and fast networking failed to compile for me, but I don’t notice any problems besides file sharing not working (nothing in `/mnt/hgfs`).
 - Basically same as <http://minhtech.com/linux/fedora-linux-13-install-vmware-tools/>

It took me a while to figure out that the VMWare default directory for is now `/Documents/Virtual Machines.localized`. In the Virtual Machines Library view, you can select “Show in Finder” in the right-click menu. I find it amazing that VMWare hackers would allow a space in a default filename.

6.2.2 Sound Out Useless in F17 under VMWare Fusion due to Underruns

Fedora 17 on a VMWare Fusion virtual machine is great for lightweight use (editing, silent apps), but audio apps unfortunately do not keep up with real time (getting continuous underruns, called “xruns” in the JACK messages window). This is likely just a bug of some kind, since the hardware should be able to do it. Plain ALSA sound-out comes closer to working than JACK sound-out. I tried making huge buffers in JACK (4096 frames/period, the largest setting in `qjackctl`) and dropping the sampling rate to 22 kHz, but this had no audible effect. There is much more silence than sound when there should be a steady sound. (In the ALSA case, the sound is nearly continuous, but noisy.) Tests run included the Pd tone generator (menu item Media / Test Audio and MIDI) and a `qtractor` lv2 synth plugin (simple sawtooth oscillator). I am allocating one CPU core and


```

yum install faust ;; faust-git does not build yet (isatty not found at load time)
yum install faust-tools ;; faust2* et al.
yum install ruby ;; for faust2sc (missing faust-tools package dependency)
yum install llvm-devel ;; faust2 (the new Faust itself) needs
yum install pd-extended
yum install patch ;; needed to apply a patch
yum install xmonad-gnome ;; tiling window manager (=> 65 pkgs! ghc*,dmenu,..)
yum install x-tile ;; much simpler, and pretty darn nice
yum install bluetile ;; simplified xmonad with more compatible defaults
system-config-firewall ;; enable/disable various ports such as ssh (port 22)
ln -s /usr/bin/qmake-qt4 /usr/bin/qmake ;; for faust2jaqt
;;
;; fix copy/paste in vmware (not sure what actually helped):
vmware-config-tools.pl ;; take all defaults
service vmware-tools start
;; not yet
;; reboot
;; ok!
;; work around a bug in the latest Faust git:
cd /usr/local/include/faust/gui/
sudo ln ../audio/meta.h .
git clone https://github.com/kmatheussen/radium ;; =>
  build_linux ;; =>
  yum install libXaw-devel
  yum install libsamplerate-devel
  yum install liblrdf-devel
  yum install liblrdf-devel
  yum install glib2-devel
  make packages
  ./build_linux.sh -j7
  yum install python-devel
  yum install ladspa-devel
  git clone git://git.code.sf.net/p/faudiostream/code faust
Dropbox / Preferences / Advanced / Selective Synch ;; save disk space
yum install ladspa-calf-plugins.x86_64 ladspa-swh-plugins.x86_64 ladspa-caps-plugins.x86_64
yum install meld ;; for git 'mergetool'
yum install lv2-devel ;; for faust2lv2 usage
yum install qtractor ;; lv2 host to try out
yum install vkeybd
yum install swig ;; for faust2android
yum install libyaml-devel ;; for supercollider build
;; Upgrade from Fedora 17 to 18:
  yum --enablerepo=updates-testing install fedup
  sudo fedup-cli --network 19
;; I suspended the virtual machine because the MacBook disk was filling up.

```

```
;; After freeing some disk space, I resumed the Fedora VM, and the upgrade
;; was in some insane loop apparently due to the broken network connection.
;; After that, DNS was wiped clean, and I could not restart the network.
;; The easiest solution was to delete the virtual machine and restore from backup.
;; Conclusion: Do not suspend a Fedora virtual machine while fedup-cli is running.
;; From the top (now going to 18 before 19, just to try being safer):
yum update
;; make a VM backup of updated F-17 system
yum --enablerepo=updates-testing install fedup
sudo fedup-cli --network 18
yum install gdb ;; installs gdb (had trouble with lldb)
codesign -s me /opt/local/bin/ggdb
...
```

Here are some vst plugins for linux: <http://distrho.sourceforge.net/ports.php>

6.3 Linux Machine 2

6.3.1 F20: Fresh install of Fedora 20 on home-built Linux Desktop 2

12/28/13: Installed a new 2-TB hybrid disk drive, installed Fedora 20 Live to it from DVD (CD-R not large enough even for the 1GB Live .iso, USB stick will not boot). Took the default disk layout (500MB /boot, etc.).

Followed

http://docs.fedoraproject.org/en-US/Fedora/20/html/Installation_Guide/Making_USB_Media-UNIX_Linux.html

```
yum upgrade
yum install emacs
yum install tcsh
yum install subversion
usermod -s /bin/tcsh me
mkdir /media/sda1
chmod 777 /media/sda1
mount /dev/sda1 /media/sda1
;; Note: this is already mounted under /run/media/me/ under a huge
;; random-looking name, and mounting it under a more useful name seems
;; to work fine. That said, I'd like to disable the automount but can't
;; find out how in a few minutes. It appears autofs is no longer used.
```

6.3.2 F20 Headbutts

It took me a while to find my old system disk and mount it. The boot partition was automounted, but not the LVM partition.

```
fdisk -l | grep /dev/sd ;; find disks
mount | grep /dev/sd ;; find what's mounted already
;; figure things out
```

```
;; mount stuff
;; edit /etc/fstab
```

Subversion repos could not be accessed remotely via “svn+ssh” protocol, but could be accessed locally via the “file:” protocol. This was solved by deleting my host key in `~/.ssh/known_hosts`. I discovered this need by trying to `scp` a file from the repo to `/tmp`. The `svn` command should be more informative when it fails.

Basically, when you install a new disk and do a fresh install, it appears you need to delete the entry in `~/.ssh/known_hosts` on every machine that uses `ssh`, `scp`, etc., to access that machine, including on that machine itself.

6.3.3 F20: Things installed after fresh F20 install

```
;; Planet CCRMA and rpmsfusion repos:
rpm -Uvh http://ccrma.stanford.edu/planetccrma/mirror/fedora/linux/planetccrma/20/i386/planetccrma
rpm -Uvh http://download1.rpmsfusion.org/free/fedora/rpmsfusion-free-release-20.noarch.rpm
groupmms -a me -g jackuser ;; check with 'groups me'
yum install supercollider-world ;; 32 packages
;; not ready yet: yum install pd-extended
yum install git
yum install fwbackups ;; run it to configure backups
Install DropBox from https://www.dropbox.com/install?os=lnx
dropbox start -i
gsettings set org.gnome.desktop.interface clock-show-date true
;; get ssh working now and in the future:
service sshd start ;; -> /bin/systemctl start sshd.service
chkconfig --list sshd ;; -> systemctl list-unit-files | grep sshd
chkconfig --level 2345 sshd on
systemctl list-unit-files | grep sshd
yum install octave-devel
yum install octave-signal ;; pulls in octave-control, specfun, general
;; MUST MANUALLY ADD SEARCH PATH:
;; In ~/.octaverc:
addpath(genpath('/usr/share/octave/packages/'),' -end'); % Not automatic!
;; Probably better to say this in Octave:
octave:1> pkg install -forge signal
;; I tried it got this:
octave:1> pkg install -forge signal
warning: creating installation directory /home/jos/octave
error: the following dependencies were unsatisfied:
  signal needs octave >= 3.8.0 ;;(!)
  signal needs control >= 2.4.5
octave:1> pkg install -forge control
;; .. much compilation and compiler warnings ..
;; seemed to install ok
pkg install -forge signal
```

```

error: the following dependencies where unsatisfied:
    signal needs octave >= 3.8.0
octave:7> version
ans = 3.6.4 ;; sigh
;; Finally found
;; http://sourceforge.net/p/octave/_list/hg
;; http://sourceforge.net/p/octave/signal/ci/default/tree/
hg clone http://www.octave.org/hg/octave octave-hg
hg clone http://hg.code.sf.net/p/octave/signal octave-signal-hg

pkg install -forge package_name
yum install octave-doc ;; could not find residuez
;; residuez has apparently been taken out of Octave
;; join https://mailman.cae.wisc.edu/listinfo/octave-maintainers
yum install octave-audio
yum install qt octave
yum install perl-Env ;; needed by /w/latex/ckc ("use Env qw(PATH HOME);") - probably covered by
yum install texlive-latex ;; tetex is superseded by texlive - pulls in 109 dep pkgs
yum install texlive-latex-bin ;; texlive-latex contains no binaries!!!
yum install texlive-bibtex-bin ;; this package granularity crap is annoying
;; error: no latex.fmt
yum install tex ;; you've GOT to be kidding me!
yum install texlive-epsf
yum install texlive-psfrag ;; will this ever end?
yum install texlive-pdfpages ;; for including PDF
yum install psutils ;; for psnup
cd /w/l2h
./configure
make
sudo make install
yum install netpbm ;; for image-generation in l2h
yum install latex2html ;; pulls in 79 more packages!
\rm /usr/local/bin/latex2html ;; from previous install
\rm /usr/local/bin/texexpand ;; from previous install
yum install cinnamon ;; using now at CCRMA - adds 37 dependencies
;; FAILED to map caps lock to ctrl via ~/.xmodmap: http://unix.stackexchange.com/questions/114
;; Failed: wget http://dl.google.com/earth/client/current/GoogleEarthLinux.bin && chmod +x Goog
yum install git-extras ;; "git info" et al.
;; Failed: wget http://dl.google.com/earth/client/current/GoogleEarthLinux.bin && chmod +x Goog
;; Visit http://www.google.com/earth/download/thanks.html#os=linux#linux_dl=rpm_64
yum install lsb ;; for google-earth - pulled in a lot of perl stuff
yum install lsb-core-ia32 ;; for google-earth - 64-bit google-earth failed to install, trying
yum install lsb-graphics-ia32 ;; for google-earth
yum install http://sourceforge.net/projects/postinstaller/files/fedora/releases/20/x86_64/updat
yum install aspell ;; nice for spell-checking LaTeX documents

```

```

;; follow directions at http://fedoraforum.org/forum/showthread.php?t=276955
sudo yum install pulseaudio-module-jack alsa-plugins-jack jack-audio-connection-kit
;; add yourself to jackuser group:
sudo usermod -a -G jackuser username
cp /etc/pulse/default.pa ~/.pulse/pulsejack.pa
emacs ~/.pulse/pulsejack.pa
;; find these lines:
;; #load-module module-null-sink
;; #load-module module-pipe-sink
;; and add these two right after:
load-module module-jack-source
load-module module-jack-sink
;; then to stop pulse from restarting when it's stopped:
echo "autospawn = no" > ~/.pulse/client.conf
;; in qjackctl settings>options scripting set:
Execute Script on Startup: pulseaudio -k
Execute Script after Startup: pulseaudio -DnF ~/.pulse/pulsejack.pa
Execute Script on Shutdown: pulseaudio -k
Execute Script after Shutdown: killall jackd; pulseaudio -D

;; now pulse should stop when you start jack and restart as jack
;; source and sink. when you stop jack pulse should restart in its
;; original state.
yum install audacity ;; pulls in vamp-plugin-sdk
yum install ffmpeg ;; audacity needs for mp3 support
yum install hevea ;; trying it out
yum install xcalib ;; invert video with 'xcalib -invert -alter'
yum install xfig ;; for fig2dev
yum install screen ;; very useful for remote job management
svn checkout http://jacktrip.googlecode.com/svn/trunk/jacktrip/ jacktrip-read-only
yum install qt4-devel jack-audio-connection-kit-devel ;; for jacktrip
;;
;; Guitarix build from source:
yum install intltool ;; for guitarix to build
yum install libsndfile-devel ;; for guitarix to build
yum install glib2-devel ;; for guitarix to build
yum install gtk2-devel ;; for guitarix to build
yum install glibmm24-devel ;; for guitarix to build
yum install gtkmm24-devel ;; for guitarix to build
yum install liblrdf-devel ;; for guitarix to build
yum install lv2-devel ;; for guitarix to build
yum install ladspa-devel ;; for guitarix to build
yum install lilv-devel ;; for guitarix to build
yum install boost-devel ;; for guitarix to build
yum install avahi-gobject-devel ;; for guitarix to build

```

```

yum install faust ;; for guitarix to build
yum install gperf bluez eigen3 ;; for guitarix to build
yum install texlive-pst-tools ;; Try to fix broken dvips: https://bugzilla.redhat.com/show_bug
;; From http://fedoramagazine.org/upgrading-to-fedora-21-workstation-from-fedora-20/
yum install fedup
fedup --network 21 --product=workstation
rpm --rebuilddb
yum distro-sync --setopt=deltarpm=0
yum install rpmconf
sudo rpmconf -a
If you are using google-chrome from the Google repository, you must re-install google-chrome d
;; failed:sudo yum remove google-chrome-\* && sudo yum install google-chrome-[beta,stable,unst
ldconfig /usr/local/lib ;; Does "setenv LD_LIBRARY_PATH /usr/local/lib"? (guitarix requires th
yum install yum-cron ;; automatically updates yum repos
2015-07-19:
fedup --network 22
WARNING: problems were encountered during transaction test: broken dependencies
firewalld-config-workstation-0.3.14.2-2.fc21.noarch requires firewalld-0.3.14.2-2.fc21.noar
These packages may have problems after the upgrade.
dnf install python-dnf-plugins-extras-migrate && dnf-2 migrate
dnf install pd-extended ;; pulls in tcl/tk

;; ...

```

6.3.4 F16: Upgrade from Fedora 15 to 16 on home-built Linux Desktop 2

This did not go smoothly, but I got through it. Here is what I did:

1. Erase old kernels to free up space in the /boot partition:

```

rpm -q kernel
rpm -e <older kernels>

```

2. preupgrade

Unfortunately, the preupgrade is so large that even *one* kernel in /boot is too many. (My /boot partition is only 200 MB, which, before `preupgrade`, was plenty.) I moved my last kernel files to / hoping to be able to delete them later. I figured that if the upgrade failed, I could boot up in single-user mode from any old Linux disk and move them back.

6.3.5 F16: grub2 fails to install

The upgrade failed, and getting to / proved to be difficult. I apparently ran into this bug: https://bugzilla.redhat.com/show_bug.cgi?id=771524

Amazing a bug that basic is still around. Basically, the new boot-loader, `grub2`, ran into trouble (could not install), and it couldn't manage to leave behind a working version of `grub.conf` for the old `grub`.

I would like to emphasize that I created *significantly more* than the amount of free space requested by `preupgrade`, so we have at least two Fedora 16 bugs here.

I tried (on my MacBook Pro) burning an F16-Live CD-ROM to use as a rescue disk, but it would not boot in my Linux-machine's CD-ROM drive. That's too bad because it is wonderfully small: only half an hour to download and one CD-ROM!

I found an old F12 disk lying around that *did* boot, so I booted into its shell. I had to press "SKIP" at the last step to get a shell because something failed hard when it did the mounting, requiring a hard reset of the machine.

I could mount `/dev/sda1` and look around the `/boot` directory just fine, but nothing I tried would mount `/dev/sda2` (because it had a new LVM name that I had no immediate way of knowing). So much for the saved kernel files. Fortunately, the new `/boot/grub2` directory appeared to be fully set up and reasonably easy to decipher: The `vmlinuz ... root=` option in `/boot/grub2/grub.cfg` told me the new name of my main file system, so I was able to cobble together a working `/boot/grub/grub.conf` that looked like this:

```
title Fedora F16
root (hd0,0)
kernel /vmlinuz-3.2.7-1.fc16.x86_64 ro root=/dev/mapper/vg_hostname-lv_root
initrd /initramfs-3.2.7-1.fc16.x86_64.img
```

where `hostname` is the host name (run `hostname` in a shell to find yours). Since the installation of the grub2 bootloader had failed, grub was still doing the booting, and the system came up.

I noticed, by the way, that `/dev/mapper/vg_hostname-lv_root` is a symlink to `../dm-2` — I hope it is now ok to mount `/dev/dm-2` directly. That would be a huge improvement in my opinion. I have long missed the old `/dev/sda2` type names for disk partitions ever since LVM came out.

Since I don't need anything fancy, I hope to simply keep grub and not fight through the grub2 installation headbutts. I'm worried that my 200 MB `/boot` partition is not up to the task, since there is discussion on the Web about some large files in grub2. That 200 MB boot partition causes me trouble every time I upgrade. I firmly resolve to do a fresh install for F17 on a new disk with at least a 500 MB boot partition (or whatever is recommended). It's hard to think about reserving on the order of a gigabyte for a freaking kernel, but now they're putting exotic and gigantic "upgrade kernels" in `/boot`, along with who-knows-what-else in `grub2`.

6.3.6 F16: GNOME Shell fails to start

Next, when I tried to log in under GNOME 3, I got the astonishingly useless error message "Oh no! Something has gone wrong" and was forced to log out. The login panel came back, but I could not log in as any user, not even root. I could type Ctrl-Alt-F2 to get a console login prompt (Alt-F7 to get back to the login panel), and logging in that way worked fine. The F16 release notes had the answer to this one under "Starting GNOME Shell fails after upgrade from Fedora 15 with color profile installed." The fix is as follows (while logged in via the console method, or ssh'd in from another computer):

```
chcon -R -t icc_data_home_t ~/.local/share/icc
```

Ok. Next?

6.3.7 F16: General Diatribe

I get that the GNOME developers are trying to dumb down the user interface so that it does not confuse end users, and evidently developers and sysadmins are expected to use the command line or KDE for everything. (I in fact never want to leave Emacs.) However, the lack of informative error messages, as reported above, seems like it's going too far. At least put in enough info that we can search the Web on it. I expect there was some log I could have looked at regarding the GNOME Shell failure mentioned above, but what a pain, and how many logs would I have to peruse given that there was *no hint* as to the nature of the failure?

I would suggest that we have a different version of GNOME desktop for developers and sysadmins, one that has useful error messages and GUIs for system administration like we had in GNOME 2 (things that are now only accessible as `system-config-*` from the command line).

6.3.8 F16: Things Installed Later

Amazingly, there are no alternative “themes” installed for GNOME 3. A helpful web page was <http://fedoraunity.org/Members/bookwar/gnome-3-tips>.

```
yum install gnome-shell-extensions-user-theme ;; amazing not installed by default!
yum install gnome-tweak-tool ;; set stuff
yum install projectM-jack ;; to try out some visualization plugins
# Set up sudoers, following
# http://www.mjmwired.net/resources/mjm-fedora-fc6.html#sudo
# cd /etc
# chmod +w sudoers
# echo 'jos ALL=(ALL) NOPASSWD:ALL' >> /etc/sudoers
# chmod -w sudoers
yum install csound ;; checking out some patches
yum install scon
# follow directions for Fedora installation of openframeworks:
  cd <openframeworks-sourcedir>/scripts/linux/fedora/
  sh install_codeblocks_svn.sh ;; (trouble)
  ./install_dependencies.sh ;; (trouble)
  yum install openal-soft-devel.x86_64
  sh install_codeblocks_svn.sh
  ./install_dependencies.sh
  yum install freeglut-devel.x86_64
  ./install_dependencies.sh
  /sbin/ldconfig
# That seemed to do it for building the library - then for the examples:
yum install glew-devel
yum install freeimage-devel
# Then add '-lz' to Projects / <app> / build config / config.make / USER_LIBS
# in codeblocks. Several examples won't build until you do this.
# install baudline tarball from www.baudline.com [spectrum analysis]
yum install dconf-editor ;; to restore desktop right-click and icons
  ;; alt+f2 dconf-editor
```

```

;; Navigate to org / gnome / desktop / Background
;; Enable "Show-Desktop-Icons"
echo '/usr/bin/jackd -P1 -dalsa -dhw:UA-25EX -r48000 -p1024 -n2 -P'>!~/jackdrc
# override pulseaudio with jack following procedure at
# http://fedoraforum.org/forum/showthread.php?t=276955
# Also set system sound output to Jack sink
yum install eclipse
# install android development tarballs
# ADT Plugin installation failed in eclipse
# Follow http://fedoraproject.org/wiki/HOWTO_Setup_Android_Development
# Still failed - after some thrashing, non-NDK installation worked.
# (It was tried and failed before, so this makes no sense - server dropout?)
# Since I have a 64-bit system: yum install glibc.i686 glibc-devel.i686 libstdc++.i686 zlib-devel.i686
git clone git://git.code.sf.net/p/libmodsynth/git libmodsynth ;; read about it
ln -s /usr/bin/moc-qt4 /usr/bin/moc ;; so libmodsynth would compile
git clone https://github.com/vibou/vibou.gTile.git gnome-gTile ;; prefer tiled windows
;; Switch to "On" at https://extensions.gnome.org/extension/28/gtile/
;; USAGE: Alt-F2 gTile
yum install gnome-shell-extension* ;; wish I had found this earlier
yum install gnome-shell-theme*
;; http://www.if-not-true-then-false.com/2012/gnome-shell-tweaking-extensions-themes-on-fedora/
ALT F2 r ;; restart GNOME Shell to get extensions
;; Get all current Gnome Shell extensions settings:
gsettings list-recursively |grep "org.gnome.shell.extensions"
;; syntax for settings:
gsettings set org.gnome.shell.extensions.[name] [key] [value]
;; example:
gsettings set org.gnome.shell.extensions.dock size 60
;; opening a .midi file with Movie Player resulted in the installation of
;; opencv, wildmidi-libs, fluid-soundfont-lite-patches, libtimidity, openni, gmyth, tinyxml
;; oddly, it tried to install them as me, not root (but then failed)
;; yum install on the whole list said all were installed
;; Next attempt to open a MIDI file in Movie Player worked!
git clone https://github.com/pantherb/setBfree.git ;; cool organ synth!
yum install tcl-devel tk-devel ;; for setBfree
yum install zita-convolver-devel ;; for setBfree
yum install a2jmidid ;; so setBfree JACK MIDI can be driven from ALSA midi
;; (run a2jmidi_bridge or a2jmidid)
gnome-session-properties ;; Options / Automatically restore session
yum install python-mozhttpd.noarch ;; simple python web server? (nope)
yum install python-requests.noarch ;; python http support? (nope)
yum install python3-requests.noarch ;; python http support? (finally!)
yum install liveusb-creator ;; making a Fedora 20 USB live-cd
echo 100000 | tee /proc/sys/fs/inotify/max_user_watches ;; for dropbox
...

```

```
;; for network printing, in system-config-firewall, enable Samba Client,  
;; Multicast DNS (mdns), Network Printing Client (IPP) and Network Printing Server (IPP)
```

6.3.9 F15: Upgrade from Fedora 14 to 15 on home-built Linux Desktop 2

I simply used `preupgrade`, as in §6.3.10. The only delay was when it asked me to delete unused kernels in `/boot` to make enough space for the new stuff—nice!

Most of my issues had to do with getting everything (particular music/audio stuff) going on a 64-bit Linux system for the first time. In particular, lots of paths needed to be changed from `/usr/lib` to `/usr/lib64/` here and there. In my opinion, wordlengths should not be encoded into directory names. Let each `.o` file identify its architecture (as I believe they already do), and let loaders print error messages if they can't find the architecture they need.

F15 Issues (mid-July 2011):

- The Emacs editor pane often freezes. It seems to reliably come back after accessing an Emacs menu item in the window frame. You can trigger it by clicking to the right of the 'Help' menu item. See https://bugzilla.redhat.com/show_bug.cgi?id=600325 for details. Interestingly, the bug also bites when using Emacs remotely from a MacBook (Emacs on Fedora 15, X windows display on the MacBook).
- Emacs still crashes immediately when run as root. This bug has been around for a long time. It may not be considered a bug, but rather a security limitation. GConf complains that it “failed to contact configuration server.” Also, `gedit` crashes similarly when run as root. Searching around, I found out that a workaround is to use `”su -”` in place of `”su”`. To avoid some warnings, `sudo mkdir -p /root/.local/share`.
- Emacs still cannot display `\texttt{text}` in latex-mode. Each “verbatim” character displays as a black rectangle. A work-around is to go to “M-x text-mode”. This bug has been around since at least F14 as well. I may need to install some missing font. A bizarre workaround is to install `emacs-auctex`. See https://bugzilla.redhat.com/show_bug.cgi?id=684797 for details.
- Apparently it is no longer possible to configure the command line used to start an app from its launcher icon. I used to set geometry in emacs, and I had a special one for starting up in `slang` mode. This is real regression in the GNOME 3, but there is a way out: See “alacarte” below. It appears GNOME 3 is somewhat simplified by default to avoid intimidating new users, so experienced users have to go figure out how to get back their lost functionality by installing finer-grained add-ons. While this is annoying, a lot of the new features in GNOME 3 are great, such as dragging windows to the left or right to make them fill half the screen for side-by-side viewing. I found a helpful intro at <http://blog.randell.ph/2011/05/29/gnome-3-on-fedora-15/>¹⁴, and a nice “GNOME 3 Cheat Sheet” at <http://live.gnome.org/GnomeShell/CheatSheet>¹⁵.
- It is also very sad that `nautilus` can no longer be invoked with a directory name on the command line. They didn't even provide an option for that. The mac has a great command

¹⁴<http://blog.randell.ph/2011/05/29/gnome-3-on-fedora-15/>

¹⁵<http://live.gnome.org/GnomeShell/CheatSheet>

'open' which will take any argument and try to open it with the right app (Finder for dirs). I have an alias 'o' for 'open' on the Mac and 'nautilus' on Linux. Now the Linux version can only open my home directory. Regression! It appears Fedora wants to be the desktop for tablets and smart-phones, etc. I think this is misguided for an OS that's supposed to be bleeding edge. The very least they could do is maintain the "desktop power-user" features and bring them back in some "theme" preset named something like "AllBellsAndWistles". Instead, they are driving us to search out other desktop environments. I tried XFCE and found it too unstable (perhaps due to my graphics card), but otherwise looking very promising. I also tried KDE but found it too heavy on resource usage (*i.e.*, slow on my older machines). So, for now I am stuck searching for work-arounds to the general trend to dumb-down the Fedora user interface. I suppose it makes sense that Red Hat would want to aim for unsophisticated users since ultimately their business model is to support such users for \$, but hey guys, you have to *develop* on that system as well! Can't you conveniently preserve the good old power-linux features for yourselves? Maybe the philosophy is "if the (l)user can find easily it, we will have to support it." I guess I should switch to debian or something. (Update 9/25/13: Since the MacBook Pro became available with a 768GB SSD, I've been able do everything I need to do there. I now use my Linux machines as backup servers and occasionally ssh in to do large compiles and such. I won't be upgrading them further until I have to.)

- In System Settings / Keyboard / Shortcuts:

```
Ctrl+Alt+E = emacs -geometry 80x50
Ctrl+Alt+Shift+E = emacs -sclang -geometry 80x50 /l/tests.sc
Ctrl+Alt+S = emacs -sclang -geometry 80x50 /l/tests.sc
Ctrl+Alt+C = google-chrome
Ctrl+Alt+T = gnome-terminal [in Launchers]
Ctrl+Alt+J = qjackctl
```

Note that new shortcuts (all but `gnome-terminal`) have to go under "Custom Shortcuts" — the "+" button is disabled in all the other categories, such as Launchers, where the above should arguably go (and where Terminal already is). The xml definitions for them can be found in `/.gconf/desktop/gnome/keybindings/custom0`, etc. Of course, we're supposed to edit them via the GUI.

- Bug: I map the caps-lock key to control, and if I try to type a shortcut while logging in, I can get stuck with caps-lock on and no way to turn it off. Caps-lock should be disabled when there is no way to set it using the keyboard.
- Integrating pulseaudio and JACK is not stable. After getting JACK working with my UA-25EX, I added the following two lines to `/etc/pulse/default.pa`, as described by the Fedora 14 Musician's Guide:

```
load-module module-jack-sink
load-module module-jack-source
```

followed by `killall pulseaudio` and lots of futzing. The bottom line is that the system frequently pauses for several seconds. In between pauses you get maybe 3 seconds to type something useful. To avoid this, I'm assigning general audio to the motherboard audio CODEC,

managed by pulseaudio, and my UA-25EX interface is owned by JACK. At the moment, I have to switch between two pairs of headphones, but I'll soon have a mixer for both.

- Pd-extended more or less works, but there is a large delay from MIDI, and I often hear digital noise that sounds like small underruns in the D/A converter (a UA-25EX audio interface) when playing a canned MIDI file in a Pd patch. In contrast, SuperCollider plays MIDI files with no such distortion. To be sure about this, I need to try using the same synthpatch in both Pd and SC (which can be done because I'm generally working with Faust-generated patches).
- Printing failed to work. Somehow it had the wrong IP address. This problem may have existed before upgrading to F15 since I don't remember printing on Linux since I reset the printer's firmware (in order to get wireless printing working on an old MacBook). I was able to fix the problem by navigating to `http://localhost:631/printers/HL2170W` and selecting `modify_printer/Other_Network_Printers/LPD_LPR_Host_or_Printer/Continue/jedit IP address/Continue`. I got the correct IP address by selecting "Attached Devices" in my router's admin Web interface. Why is printing always a can of worms?
- I hooked up the HDMI output of my Sapphire Radeon 4650 graphics card to our main TV (a two-year old Panasonic "VIERA" type), and only "THX mode" would show the whole screen. All other modes cut off the "Activities" menu on the left (called the "dash"). Worse, audio does not make it. The HDMI audio device appears to be supported, since you can select "HDA ATI HDMI" as the Sound Output device, but I could never get a sound on the TV from it, nor any kind of error message. I tried all the supposedly supported sampling rates. I get the same behavior going into the receiver. My guess is that there is something wrong with the HDMI audio format supplied by the graphics card, since all sorts of game machines work just fine into the same HDMI connector(s), and the video is doing ok. However, it could also be a Fedora 15 driver problem for the HDMI sound output.
- Google Voice voicemails cannot be played in the Chrome browser. I can play .wav and .mp3 files from the Internet in Chrome. The problem appears to be in the Javascript transport interface; when I press the play button, it completely disappears. I'm running google-chrome-beta. If I try google-chrome-stable, it can't use my "profile" because it belongs with the beta version, and it doesn't tell me where it is so I might try deleting it. It would be nice if it offered to start a new compatible profile and tell me where the incompatible one exists on the disk.

"Problems":

```
> package-cleanup --problems
Loaded plugins: presto, refresh-packagekit
Package libpanelappletmm-2.26.0-2.fc12.x86_64 requires libpanel-applet-2.so.0()(64bit)
# yum remove libpanelappletmm
```

"Orphans":

```
> package-cleanup --orphans
Loaded plugins: presto, refresh-packagekit
```

```

amsynth-1.2.2-1.fc12.ccrma.x86_64
brhl2170wlpr-2.0.2-1.i386
cupswrapperHL2170W-2.0.2-1.i386
eggdbus-0.6-2.fc13.i686
eggdbus-0.6-2.fc13.x86_64
fox-1.6.30-1.fc12.ccrma.x86_64
ifd-egate-0.05-22.x86_64
kernel-2.6.35.13-91.fc14.x86_64
kernel-2.6.35.13-92.fc14.x86_64
kernel-devel-2.6.35.13-91.fc14.x86_64
kernel-devel-2.6.35.13-92.fc14.x86_64
libnc-dap-3.7.4-3.fc14.x86_64
pam_smb-1.1.7-11.fc12.x86_64
phat-0.4.1-1.fc14.ccrma.x86_64
rezound-0.12.3beta-1.fc12.ccrma.x86_64
specimen-0.5.2-0.1.rc3.fc14.ccrma.x86_64
supercollider-beastmulchplugins-0.0-0.2.fc14.ccrma.x86_64
supercollider-beastmulchplugins-debuginfo-0.0-0.2.fc14.ccrma.x86_64

```

```

# yum remove kernel-2.6.35*
# yum remove kernel-devel-2.6.35*
[others kept to remind me about them]

```

Things done afterwards:

- `yum install gnome-shell-extensions-alternative-status-menu` followed by Alt + F2, r, jenterj [to get power-off in the upper-right user menu - I later learned that pressing ALT (“Command” on my Mac Pro keyboard) would have worked while displaying that menu]
- `yum install alacarte` [now click on Applications / Main Menu]
- `yum install alsamixer`
- Install downloaded `nautilus-dropbox-0.6.8-1.fedora.x86_64.rpm`
- `gsettings set org.gnome.shell.clock show-date true` [to get date display back on the Gnome top panel]
- Get `faust2pd` working [2011-08-02]:

```

yum remove pure ;; v0.47-1.fc15 removed
yum install hg ;; mercurial
\hg clone http://pure-lang.googlecode.com/hg pure ;; I have an hg alias
cd pure/pure
autoreconf
configure --enable-release
make
make check

```

```

#make install
/sbin/ldconfig
;; problem:
    > pure
        pure: error while loading shared libraries: libpure.so.7:
            cannot open shared object file: No such file or directory
;; fix:
/sbin/ldconfig /usr/local/lib
cd ../pure-xml
#make install
cd ../faust2pd
#make install
#make install-pd
;; problem: faust2pd simply exits, apparently doing nothing
;; fix:
;; See http://code.google.com/p/pure-lang/wiki/GettingStarted
yum remove llvm ;; also removed llvm-devel, pure, pure-devel
;; obtain tarball for latest llvm (2.9) from llvm.org
./configure --enable-optimized --enable-targets=host-only
make
make check
#make install
cd <pure>/pure
make clean
autoreconf
configure --enable-release
;; problem:
;; interpreter.cc:66:40: fatal error:
;; llvm/System/DynamicLibrary.h: No such file or directory
#updatedb
locate DynamicLibrary.h
;; study make files, configure.log, etc.
configure ;; no --enable-release!
make
make check
#make install
cd ../faust2pd
make clean
make
#make install
;; faust2pd now does something
cd ../pd-pure
;; Needed the following lines inserted in Makefile after "# Linux":
;; PDDIR=/usr/lib64/pd-extended
;; CPPFLAGS = -I$(PDDIR)/include

```

```

make
#make install
cd ../faust2pd
;; Edit Makefile as follows:
pdprefix = /usr/lib64/pd-extended
# where to install the Pd stuff
libdir = $(pdprefix)/lib64
datadir = $(libdir)/pd-extended/extra
make
make install
make install-pd

```

- Add `-path /usr/lib64/pd-extended/extra` to `.pdrc`
- `yum install libicu-devel` [for SuperCollider build from source]
- To get my usual autolaunched apps when firing up GNOME 3, create the following files in `~/.config/autostart/`:

```

terminal.desktop
chrome.desktop
emacs.desktop

```

by copying and editing the example `dropbox.desktop` that was installed automatically.

- `yum install emacs-auctex` - bizarre workaround for emacs latex-mode verbatim bug: See https://bugzilla.redhat.com/show_bug.cgi?id=684797
- `yum install alpine` [convenient for reading email to root as root over an ssh connection]
- `/sbin/ldconfig /usr/local/lib` [why do I have to keep doing this?]
- `echo /usr/local/lib >> /etc/ld.so.conf` [does this fix it?]
- `yum install gitk` [commit viewer for git]
- Switch from Planet-CCRMA SuperCollider stuff to latest git version:

```

> yum remove supercollider*
> git clone --recursive git://supercollider.git.sourceforge.net/gitroot/supercollider/supercollider
> cd sc; mkdir build; cd build; cmake ..; make; make install; cd ../..
> git clone --recursive git://sc3-plugins.git.sourceforge.net/gitroot/sc3-plugins/sc3-plugins
> cd sc3-plugins/build; cmake -DSC_PATH=/usr/local/include/SuperCollider/ ..; make; make install
> cp <old-extensions-dir>/MIDIFile.sc ~/share/SuperCollider/Extensions/

```

- `yum install lilypond` [surprised not already there - moved out of Planet CCRMA and into Fedora?]
- `yum install alsa-plugins-jack` [provides PCM plugin 'jack']

- `yum install nautilus-open-terminal` [settling in...]
- `yum install evince-nautilus`
- `yum install fluidsynth-dssi` [surprised not already there]
- `yum install pavucontrol` [said to “know about things none of the desktop-specific tools know about” regarding sound hw]
- `yum install dbench` [for comparing HDD and SDD performance]
- `yum install fwbackups` [trying out new backup utilities]
- `yum install bluecurve-gnome-theme` [windows not pretty right now F15 versions were installed, so maybe they are behind]
- `yum install qsampler` [pulls in libgig, liblscp, linuxsampler]

```
wget http://sonimusicae.free.fr/Host/Maestro-Concert-Grandv2.rar
wget http://download.gna.org/unrar/unrar-0.0.1.tar.gz ;; failed!
;; unpack .rar file by transferring it to Mac and double-clicking (stuffit wins)
yum install gitedit
yum install linuxsampler-dssi
yum install PersonalCopy-Lite-soundfont.noarch ;; General MIDI SoundFont
    ;; Installs SFs in /usr/share/soundfonts
    ;; I have not figured out how to use GM kits with LinuxSampler
wget http://learjeff.net/sf/jRhodes3.sfArk.zip
wget http://learjeff.net/sf/jRhodes3a-looped.sfArk.zip
wget http://learjeff.net/sf/jRhodes3c-stereo.sfArk.zip
wget http://www.melodymachine.com/files/sfarkxrc_lx86.tar.gz
yum install wine ;; sigh
Download sfark_setup.exe from http://melodymachine.com/sfark.htm
wine sfark_setup.exe
;; copy *.sfArk files to ~/.wine/drive_c/users/me/Desktop = /home/me/Desktop
;; open them in sfArk
;; "process selected files"
;; *.sf2 created
;; copy them where desired
;; qsampler / linuxsampler doc: http://linuxsampler.org/documentation.html
;; qsampler / linuxsampler quick guide: http://bb.linuxsampler.org/viewtopic.php?f=6&t=81
;; Device: create a MIDI device (ALSA)
;; Device: create a JACK output audio device (2 chans)
;; - optionally hook up the inputs/outputs (autoconnect later if saved)
;; - otherwise use QJackCtl to hook up the connections
;; Instrument: Read GIG and/or SF2 files
;; Edit: Add a sample channel, select instrument, etc.
;; Save As to LSCP file
```

- `yum install csound`

- ...

6.3.10 F14: Upgrade from Fedora 12 to 14 on home-built Linux Desktop 2

See §6.4.10 on page 73 for the instructions I followed. Below is a terse synopsis:

- Prepare for upgrade:

```
yum update
yum install preupgrade
yum clean all
```

- Remove all `.rpmnew` and `.rpmsave` files to a save directory:

```
mkdir -p ~/F12-to-13/rpmnew-f12
find / -xdev -name '*.rpmnew' -print -exec \mv {} ~/F12-to-13/rpmnew-f12 \;
mkdir -p ~/F12-to-13/rpmsave-f12
find / -xdev -name '*.rpmsave' -print -exec \mv {} ~/F12-to-13/rpmsave-f12 \;
<save shell typeout so complete pathnames are stored>
<note that only the last of any rpmnew or rpmsave files with the same name will survive>
```

- Run `preupgrade` to perform the upgrade to F14 (takes a long time to download all the packages)

```
preupgrade
```

- (Follow instructions, reboot)

- Look at the output of

```
package-cleanup --problems
```

```
Package qtractor-0.4.3-0.1.fc12.ccrma.x86_64 requires liblo.so.0()(64bit)
Package chromium-libs-6.0.467.0-2.fc12.x86_64 requires libicudata.so.42()(64bit)
Package chromium-libs-6.0.467.0-2.fc12.x86_64 requires libicui18n.so.42()(64bit)
Package chromium-libs-6.0.467.0-2.fc12.x86_64 requires libicuuc.so.42()(64bit)
```

```
package-cleanup --orphans
```

```
ModemManager-0.4-5.git20100720.fc12.x86_64
aeolus-0.8.2-1.fc12.ccrma.x86_64
ams-2.0.0-1.fc12.ccrma.x86_64
amsynth-1.2.2-1.fc12.ccrma.x86_64
brhl2170wlpr-2.0.2-1.i386
chromium-6.0.467.0-2.fc12.x86_64
chromium-libs-6.0.467.0-2.fc12.x86_64
```

```
clalsadrv-1.2.2-1.fc12.ccrma.x86_64
clxclient-3.6.1-1.fc12.ccrma.x86_64
cupswrapperHL2170W-2.0.2-1.i386
fox-1.6.30-1.fc12.ccrma.x86_64
ifd-egate-0.05-22.x86_64
jmess-1-1.fc12.ccrma.x86_64
kernel-2.6.32.21-166.fc12.x86_64
kernel-2.6.32.21-168.fc12.x86_64
kernel-2.6.32.23-170.fc12.x86_64
kernel-devel-2.6.32.21-166.fc12.x86_64
kernel-devel-2.6.32.21-168.fc12.x86_64
kernel-devel-2.6.32.23-170.fc12.x86_64
kernel-rt-2.6.31.12-1.rt20.1.fc12.ccrma.x86_64
kernel-rt-2.6.31.12-1.rt21.1.fc12.ccrma.x86_64
paktype-fonts-common-2.0-5.fc12.noarch
phat-0.4.1-1.fc12.ccrma.x86_64
planetccrma-core-2010.02.22-1.fc12.ccrma.x86_64
planetccrma-repo-1.1-2.fc12.ccrma.noarch
qtractor-0.4.3-0.1.fc12.ccrma.x86_64
rezound-0.12.3beta-1.fc12.ccrma.x86_64
rtirq-20090920-1.fc12.ccrma.x86_64
specimen-0.5.2-0.1.rc3.fc12.ccrma.x86_64
v8-2.3.0-1.20100716svn5088.fc12.x86_64
```

- merge .rpmnew files with prior files as needed (I had only a few)

```
updatedb
locate .rpmnew

/etc/inittab.rpmnew
/etc/krb5.conf.rpmnew
/etc/libuser.conf.rpmnew
/etc/nsswitch.conf.rpmnew
/etc/avahi/avahi-daemon.conf.rpmnew
/etc/avahi/hosts.rpmnew
/etc/avahi/services/ssh.service.rpmnew
/etc/dbus-1/system.d/avahi-dbus.conf.rpmnew

locate .rpmsave

/etc/ldap.conf.rpmsave
```

I intend to take a look at the above save/new files if/when I encounter a seemingly related problem. (☺)

More things to do (discovered later):

- Enable ntpd service in order to get time synch over the net
- `yum remove chromium-libs-6.0.467.0-2.fc12.x86_64` [old]
- `yum remove planetccrma-repo-1.1-2.fc12.ccrma.noarch` [F12 orphan]
- `yum remove planetccrma-core-2010.02.22-1.fc12.ccrma.x86_64` [F12 orphan]
- `yum remove aeolus` [not ready for F14 yet]
- `/bin/rm -rf /.cache/*` [discovered when Google Chrome was having some problems]
- Right-click on a .svg file, select “Properties”, and set the “Open With” property to Firefox (so faust2firefox will work as intended).
- `yum install xorg-x11-fonts-misc` [so echomixer will work again]

New things circa May 2011:

- `yum install supercollider*`
- `yum install libsamplerate-devel` [so qtractor can use it]
- `yum install rubberband-devel` [so qtractor can use it]
- `yum install liblo-devel` [so qtractor can use it]
- `svn co https://qtractor.svn.sourceforge.net/svnroot/qtractor/trunk qtractor-svn`
`cd qtractor-svn; make -f Makefile.svn; configure; make; make install`
 [missing libmad-devel, lv2-devel]
- `yum install pure-devel` [so latest pd-pure can build]
- `yum install liblrdf-devel` [so ardour3 can build]
- `yum install flac-devel` [so ardour3 can build]
- `yum install libgnomecanvasmm26-devel` [so ardour3 can build]
- `svn co http://subversion.ardour.org/svn/ardour2/branches/3.0 ardour3` [gotta check out the new MIDI support in Ardour3]
- 2011-06-14: Network interface down for no apparent reason other than being noticed soon after a thunderstorm passed by. (No power outage or other sign of distress.) Moved ethernet cable from eth0 to eth1 and configured it the same but enabled IPv6 for the heck of it. Now it’s working. Possibly eth0 got fried by overvoltage due to lightning strike. However, the Netgear hub (on the other end of the same cable) was unharmed. Changed eth0 IPA to something unused.
- 2011-10-02: Now eth1 is down as well. Actually, it yoyos up and down, spending progressively more time down. The Realtek 8112L/8110SC dual ethernet controller chip is apparently almost completely dead on my \$300 ASUS P7P55D-E Premium motherboard bought less than two years ago. Crap. Ordered an Intel PCIe-x1 network interface card for about \$30 at Amazon (prime).

- `yum install gconf-editor` [want to mess with desktop-;gnome-;shell-;windows]
- `yum install cwiid-devel` [SC latest git needs this now (11/2011), presumably for Wii remote support]
- `yum install gnome-tweak-tool` [Linus likes it]
- `yum install aspell-en` [Don't know why this was needed again]
- `yum install mpfr-devel` [for pure 0.50]
- `yum install libtool-ltdl-devel` [for pure-faust 0.6]
- `yum install gmorgan` [new in Planet CCRMA]
- ...

6.3.11 F12: Fresh Install of Fedora 12 on Home-Built Linux Desktop 2

I am not using this machine much yet, other than as a server. The hardware is described in §15.2.

Things done after a standard F12 install with “desk-top publishing” checked (which seems mainly to load OpenOffice):

```

yum install emacs
yum install tcsh
usermod -s /etc/tcsh me
<run script for checking out personal repos>
make-links <personal data linked from separate volume into /home/me>
yum install texlive-latex ;; tetex is superseded by texlive
;; copy/pasted from
;; http://ccrma.stanford.edu/planetccrma/software/installplaneteleven.html
rpm -Uvh http://ccrma.stanford.edu/planetccrma/mirror/fedora/linux/-
planetccrma/12/i386/planetccrma-repo-1.1-2.fc12.ccrma.noarch.rpm
yum install jack-audio-connection-kit
yum install qjackctl
yum install jmess
yum install amsynth ;; run as amSynth (!)
yum install timidty++
yum install vkeybd
yum install multimedia-menus
yum install zynaddsubfx zynjacku phasex hydrogen hexter-dssi calf aeolus
yum install octave-forge
;; pause
yum install yum-fastestmirror
yum install rpmreaper
yum install zynaddsubfx
yum install phasex
yum install hydrogen
yum install ams

```

```

yum install whysynth-dssi
yum install ardour
yum install dssi-calf-plugins
yum install bristol
yum install aeolus
yum install specimen
yum install guitarix
yum install rakarrack
yum install rezound
yum install qtractor
yum install jamin - [v0.95]
yum install lv2-swh-plugins
yum install ladspa-swh-plugins
ln -s /usr/lib64/ladspa /usr/lib/ladspa ;; jamin, sw-h-plugins pre-64bit?
yum install qt-devel ;; for qmake and SuperCollider
ln -s /usr/bin/qmake-qt4 /usr/bin/qmake ;; for faust2jaqt
yum install jack-audio-connection-kit-devel ;; for faust2jaqt
yum install chromium ;; repo info at
;; http://rajaseelan.com/2009/07/04/how-to-install-google-chrome-in-fedora-10-or-fedora-11/
;; This later failed to update, so I did a new search and found this:
;; http://www.rootninja.com/install-google-chrome-browser-on-fedora-12/
;; I had to remove /etc/yum.repos/chromium.repo (even to do yum update)
;; There is now a google.repo and the package is now google-chrome-beta
yum install maxima ;; for my sporadic symbolic math needs
yum install octave-devel ;; for .oct file compilation
yum install qtoctave ;; eval
yum install plplot-octave ;; eval
svn co https://guitarix.svn.sourceforge.net/svnroot/guitarix/trunk guitarix
yum install libsndfile-devel ;; for guitarix cvs compile
yum install gtkmm24-devel ;; for guitarix cvs compile
yum install ladspa-devel ;; for guitarix cvs compile
;; NOTE: The following configuration had to be abandoned when I upgraded
;; F12 to F14 - apparently pulseaudio autostarts JACK, when needed, using
;; an obsolete protocol (8) resulting in a infinite loop of jackd starts and
;; crashes:
    ;; configure pulseaudio to go through JACK as describe at
    ;; http://docs.fedoraproject.org/en-US/Fedora_Draft_Documentation/0.1/html/Musicians_Guide,
    ;; :
    emacs /etc/pulse/default.pa
        load-module module-jack-sink
        load-module module-jack-source
    killall pulseaudio
    ;; configure qjackctl not to 'killall jackd' on exit
yum install gspicegui ;; messing around with SPICE: gschem, geda
yum install stk-devel ;; making sure latest version does not conflict

```

```

yum install pdftk ;; needed by pdfcrop (Python version)
yum install poster ;; needed by pdfcrop (Python version)
yum install jack-keyboard ;; like vkeybd but outputs to a JACK MIDI port (no controllers)
;; install tarball for a2jmidid ;; need vkeybd controllers routed to JACK MIDI port
;; from http://download.gna.org/a2jmidid/?C=M;O=A
yum install w3m emacs-w3m ;; Emacs text-mode HTML viewer [SC help needs]
;; manually install pal-0.4.2 from tarball [a command-line calendar utility]
yum install rosegarden4 ;; music sequencer app
yum install dssi-examples ;; curious
yum install dssi-devel ;; hoping pkg-config will help rosegarden find
yum install qsynth ;; checking it out
yum install clthreads-devel ;; for compiling zita-rev1
;; install tarball for libclxclient-3.6.1 and do a 'make install', for zita-rev1

```

6.4 Linux Machine 1

6.4.1 F17: Upgrade to Fedora 17 from Fedora 16 on home-built Linux Desktop 1

I tried `preupgrade` and it went surprisingly smoothly: No initially noticeable issues! However, I learned later that I lost the ability to print.

6.4.2 F17 Printing Headbutts

However, I later learned that printing stopped working. I ended up unplugging the USB cable to my HP LaserJet 1220, deleting the printer from the system, rebooting, replugging, and reinstalling. This triggered a lot of printing-related packages to be installed that were evidently missed by the upgrade. On installation, I chose the most generic discovered local printer name (it appeared in three different forms), and the driver named “HP LaserJet 1220 Postscript (recommended)”. (It’s hard to avoid the word “recommended” in the title). Unfortunately, none of this worked, and so I’m now plugging the printer directly into my MacBook Pro when I need to print (where it works fine).

6.4.3 F16: Fresh install of Fedora 16, 64 bit, on home-built Linux Desktop 1, new SSD drive

In late December 2011 I bought a Crucial m4 256 GB SSD drive for about \$400 from Amazon. I burned a Fedora 16 x86_64 DVD and installed a standard “software developer” package set onto the new SSD drive, manually configured for 2 MB BIOS boot partition, 254 MB ext4 /boot partition, and ext4 / for the rest of the disk. The installation went smoothly. The main snag was finding out how to mount my old partitions:

```

# modprobe dm-mod
# vgchange -ay
# lvscan
# mount /dev/VolGroup00/LogVol100 /mnt/sda
# mount /dev/VolGroup01/LogVol100 /mnt/sdb
# mount /dev/VolGroup02/LogVol100 /mnt/sdc

```

(The new SSD drive is `/dev/sdd`.)

Having previously separated my system drive from everything else, to get back almost to normal, I only needed the following steps:

1. Copy my symlinks from my old F15 home directory:

```
# find /mnt/sdc2/home/me -maxdepth 0 -type l -exec /bin/cp -pud {} /home/me \;
```

2. Re-add any changes I had made under `/etc/` (hosts, fstab, cron.daily).
3. Retweak the UI for my tastes, as described for F15 in §6.4.8 below.

However, a difficulty occurred because user IDs now start at 1000 instead of 500. I first tried changing my uid and gid to 500, but that was a mistake because such numbers are presumed to be “system” accounts and not users. As a result, my account no longer appeared in the login window. So, I changed back to 500

```
# /usr/sbin/usermod -u 500 me
# /usr/sbin/groupmod -g 500 me
```

and did

```
# chown -R me.me <dir>
```

for my old personal directories on all disks, or

```
# find <dir> -uid 500 -exec chown 1000.1000 {} \;
```

for directories having mixed ownership, such as backups including root-owned stuff. Now, of course, I will need to change my uid and gid to 1000 if/when I ever boot up one of those old Fedora partitions.

Next, I copied any nonstandard repos in `/etc/yum.repos.d/` from the F15 to the F16 disk. To make a script for installing all my packages, I ran `yum list installed` on F15 (on Linux machine 2, because it is generally cleaner), piped it through `sort` and `uniq`, deleted garbage lines, and changed each desired line (using an `emacs` macro) to the form `yum install pkg` (deleting each line from the first `'` to remove version and architecture specification). The final result was then executed as a shell script, and the installs went smoothly.

For general sanity, I also made the following UI changes (when using the Mac Pro keyboard on Linux):

```
System Settings / Keyboard / Layouts / Options /
  Caps Lock / CL=ctl
  Alt/Win / Left Alt [Command] is swapped with Left Win [Option]
```

In “Advanced Settings” (from, I think, `yum install gnome-tweak-tool`), I enabled “Theme / Keybinding theme/ Emacs” as an experiment. (Where is this documented?) From a quick Web search, it appears one then needs to use `’/’` in place of `’F’` for searching within a page.

6.4.4 F16 Minor Annoyances

- Astonishingly, one cannot reach system configuration utilities from Activities / Applications / System Tools / System Settings. Instead, in a shell, type `system-config-itabi` to find the handles. Strange!
- ssh logins take too long. A web search indicates that this is a DNS problem, and that to work around it, set “UseDNS no” in `/etc/ssh/sshd_config`, followed by `/bin/systemctl restart service.sshd`.
- After every reboot, I was having to say `/sbin/ldconfig /usr/local/lib` in order to pure to work. Finally I figured out that I needed to create a file `/etc/ld.so.conf.d/pure.conf` containing the line `/usr/local/lib`.
- Deleted `/mnt` from `PRUNEPATHS` in `/etc/updatedb.conf` (All my personal stuff is under `/mnt`!)
- Xorg was soaking up way too much CPU using the FOSS radeon driver. This was resolved by following *two* items of advice found on the Web. First, I added `radeon.modeset=1` to the kernel options, so that the relevant line in `/etc/default/grub` now reads (only end of line changed):

```
GRUB_CMDLINE_LINUX="rd.md=0 rd.dm=0 KEYTABLE=us quiet SYSFONT=latarcyrheb-sun16 rhgb rd.l
```

Also, before rebooting, I installed `catalyst` to try out the proprietary ATI driver `fglrx`:

```
yum install xorg-x11-driv-catalyst
```

(obtained from `rpmfusion-nonfree-updates—testing` repo). After rebooting, `/sbin/lsmmod` shows that *both* `fglrx` and `radeon` are running! Both seem to initialize happily according to `/var/log/messages`. However, `/proc/ati/0/name` only lists `fglrx`, so I guess it won. I’ve now removed the `radeon` kernel option. In any case, graphics performance is *way* better now (a clean order of magnitude less CPU usage in `pdextended`).

Later, I experienced some glitches which settled down after a while. Then, after a reboot, GNOME 3 started up in “fall back mode,” which is very slow (no acceleration?). In this case, only the `radeon` driver was loaded.

Following the advice at <http://forums.fedoraforum.org/showthread.php?t=155503>, I did this:

```
rpm -Uvh http://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-stable.noarch
yum install akmod-catalyst xorg-x11-driv-catalyst xorg-x11-driv-catalyst-libs
```

followed by a reboot. It’s glitchy but at least it works again. However, all my key-equivalents are gone.

More advice from <http://forums.fedoraforum.org/showthread.php?t=271971>:

```
# Add the following line in /etc/environment
export CLUTTER_VBLANK=none
```

(said to minimize the probability of gnome-shell crashes while displaying tooltip overlays). I have not yet done this, waiting for a problem to appear first.

According to <http://www.howtoforge.com/enabling-compiz-on-a-fedora-16-gnome-classic-desktop> it is not possible to use *compiz* with GNOME 3, but it can be used in *classic* GNOME mode (aka the “fallback” mode). I decided to do without compiz (but I do miss it).

- Redo other stuff done in §6.3.9 that inexplicably was apparently not done by the script created from “yum list installed” (above):

```
yum install gnome-shell-extensions-alternative-status-menu
```

- `ssh` logins and `scp` transfers were slow. In my `/etc/resolv.conf` I was using my router as DNS server, which relays the requests. Replacing that IP address with a real DNS server got it back to normal. *Keeping it* there turned out to be harder: NetworkManager kept overwriting `/etc/resolv.conf`. Finally I found this on the Web: bring up Settings / Network / IPv4 settings, and select Automatic (DHCP) addresses only (*i.e.*, no automatic name servers). This allows manual configuration of DNS servers (right there).
- Re-enter stuff in `/etc/hosts`

6.4.5 F16 Printing Headbutts

Printing from the Mac no longer worked. I deleted the printer on the Mac, hoping to refresh it, but then it was no longer discoverable at all. Printing worked fine locally in F16. After some futzing around, I found that the printer was “shared” but not “published.” Ok, back to random searches on the Web. Bonjour could see the printer after I revved up Samba. I installed it, but then the Mac could not access the CUPS printer queue (“host is busy - trying again in xxx minutes”). This turned out to be an SELinux firewall configuration issue (the CUPS port 631 is disabled by default). In the end, I believe the two things I needed to do were

- Open up the CUPS port (631) in `system-config-firewall`. (An alternative is said to be `system-config-selinux`, but I did not try it.)
- Navigate to `localhost:631/admin/` and select “Share printers connected to this system” and “Allow printing from the Internet”.

One would expect the CUPS administration interface to be able to detect and report that port 631 is disabled. Similarly, when enabling port 631, a pointer to the CUPS administration page would be nice. In my opinion, error messages regarding remote CUPS printing on Mac OS X are extremely poor, and the man page for `cupsd.conf` is nearly useless, as is the syntax chosen for the file itself; it could be far more self-explanatory than it presently is.

I tried Samba because I was previously exporting printers as “Samba shares” (and might still need this to print from Windows in VMware Fusion on the Mac), but in the end I got printing working without Samba running.

6.4.6 F16 on an SSD — Overall Take

Running F16 on an SSD is *nice and fast!* The boot-up time is unbelievably fast. However, I don't yet trust SSDs as reliable storage, even though Crucial is said to be up there with Intel on reliability, so I only plan to have the system on it for now. (My /etc modified files are backed up in a personal subdirectory.) If the SSD dies, I can just start over with a fresh install as described in this section. My other disks back up to each other under nightly cron control, so I'm ok if any one disk fails.

On the whole, fresh installation on a new disk should have been nearly the same amount of work as doing an upgrade. Had there been no issues (yeah, right!), it's not all that much more work to do a fresh install. In my case, getting remote CUPS printing working again turned out to be the major time-sink.

6.4.7 F16: Further Installs

```
;; FAIL (at first) to install LinuxSampler (first thing should work now):
;; === Not useful: sfz support not included so salamander drum kit fails:
;; yum install qsampler ;; checking out linuxsampler
;; yum install linuxsampler-dssi ;; to try it out in Rosegarden
;; yum install lv2-linuxsampler-plugins ;; to try it out in Ardour
;; yum install gignedit ;; linuxsampler prefers .gig format
;; yum remove libgig ;; removes all of the above
;;
;; === Not compilable: All are missing install-sh, config.sub,
;;     config.guess, Makefile.in, etc.:
;; svn co https://svn.linuxsampler.org/svn/libgig/trunk libgig
;; svn co https://svn.linuxsampler.org/svn/liblscp/trunk liblscp
;; svn co https://svn.linuxsampler.org/svn/linuxsampler/trunk linuxsampler
;; svn co https://svn.linuxsampler.org/svn/qsampler/trunk qsampler
;; svn co https://svn.linuxsampler.org/svn/jlscp/trunk jlscp
;; svn co https://svn.linuxsampler.org/svn/jsampler/trunk jsampler
;; svn co https://svn.linuxsampler.org/svn/gignedit/trunk gignedit
;;
;; === Must use svn for .sfz === Download latest tarballs:
;; firefox http://www.linuxsampler.org/downloads.html#svn
cd libgig-3.3.0; configure && make && make install
cd linuxsampler-1.0.0; configure && make && make install
/sbin/ldconfig ;; argh
cd liblscp-0.5.6; configure && make && make install
cd qsampler-0.2.2; configure && make && make install
;; === qsampler compile failed:
;; /usr/bin/ld: .obj/main.o: undefined reference to symbol 'XDeleteProperty'
;; /usr/bin/ld: note: 'XDeleteProperty' is defined in DSO
;;     /usr/lib64/libX11.so.6 so try adding it to the linker command line
;; LinuxSampler experiments suspended until the PlanetCCRMA version
;; supports .sfz format - WHICH HAPPENED THE VERY NEXT DAY (see below)
;;
```

```

;; Not yet tried: cd gitedit-0.2.0; configure && make && make install
;; == The following looked interesting:
;; firefox http://sourceforge.net/projects/openorchestra/files/latest/download
cd linuxsampler-1.0.0; make uninstall
cd libgig-3.3.0; make uninstall
cd liblscp-0.5.6; make uninstall
;; Fernando comes to the rescue by making a fresh Planet CCRMA package from
;; the latest svn of libgig and linuxsampler, so we're back:
yum install qsampler ;; pulls in libgig and linuxsampler as dependencies
yum install gitedit ;; might try it out
yum install linuxsampler-dssi ;; to try it out in Rosegarden
yum install projectM-jack ;; visualization app w plugins
yum install projectM-pulseaudio ;; for non-JACK sound visualization
yum install yumex ;; GUI front end for yum
yum install lv2-ui-devel ;; for faust-lv2 to build
yum install fedora-release-rawhide ;; for the following:
yum update --enablerepo=rawhide mesa-* cogl gnome-session ;; fix gnome 3
;; DID NOT COMPLETE (too many fc17 dependencies for my comfort) - ABORTED
;; My problem is that GNOME 3 is starting in "fall-back" mode again.
;; NEXT: Removed 'radeon.modeset=1' from /etc/default/grub
;; => NO CHANGE; put it back;
;; NEXT:
yum update --enablerepo=rpmsfusion-nonfree-updates-testing xorg-x11-drv-catalyst
;; NOTHING
rpm -Va --nofiles --nodigest ;; no output
yum install kmod-catalyst ;; watches for latest version - DEPENDENCIES FAILED
yum install pinot ;; desktop search - beagle seems to have died on Fedora
                ;; pulled in antiword, catdoc, unrtf, xapian-core-libs
yum install tracker ;; desktop search used by XFCE, for example
                ;; There is no "tracker" program, but type tracker<tab> in a shell
                ;; There is also no man page, etc. You need tracker to find itself!
yum install strigi ;; desktop search - tracker can only index / (!?! )
                ;; again say "rehash; strigi<tab>" - what is the world coming to?
                ;; strigiclient looks promising, but it has GUI problems (can't display dir
yum install codeblocks ;; for openframeworks
[install openframeworks, fedora case, install_dependencies.sh only]
./install_dependencies.sh ;; (trouble)
yum install openal-soft-devel.x86_64
# That seemed to do it for building the library - then for the examples:
yum install glew-devel
yum install freeimage-devel
# Then add '-lz' to Projects / <app> / build config / config.make / USER_LIBS
# in codeblocks. Several examples won't build until you do this.
yum install compiz-fusion-extras
yum install compiz-manager

```

```

;; having fun trying out tiling window managers:
yum install x-tile ;; simple and effective (no special session required)
yum install dwm ;; does not seem to work on Fedora 16 - or I could not guess the Mod4 key
yum install xmonad-gnome ;; great, but left-right-flip required a learning curve
    ;; Advanced Settings now under Accessories while Settings under System Tools
    ;; GNOME 3 shell extensions do not seem to work (can't even configure them)
    ;; Presumably xmonad-gnome replaces the GNOME shell
yum install bluetile ;; simplified xmonad with more compatible defaults
;; So far I like bluetile best = xmonad blended with gnome
;; xmonad would be great to know well (and such hacks can be added to bt)
gnome-session-properties ;; Options / Automatically restore session
yum install gnome-shell-extension* ;; wish I had found this earlier
yum install gnome-shell-theme*
yum install ffmpeg2theora ;; convert many video formats to theora format
yum install kdiff3 ;; experimenting with git mergetool alternatives
yum install meld ;; Nice! Works a lot like opendiff on the Mac
;; Work around a bug in the Faust distribution (10/5/12):
cd /usr/local/include/faust/gui/
sudo ln ../audio/meta.h .
;; Upgrade fails, so we'll get by without it and its dependencies:
yum depends compiz
yum remove compiz
;; Upgrade things until the latest guitarix will build:
yum install lilv
yum deps compiz
yum install avahi-gobject-devel
yum install eigen3-devel
yum install gperfertools-devel
;; ...

```

6.4.8 F15: Upgrade from Fedora 14 to 15 on a home-built Linux Desktop 1

I simply used `preupgrade`, as in §6.3.10. Here I log only differences relative to the same upgrade on machine 2, logged in §6.3.9.

I had one big issue which was not enough space in `/boot/` (only 190 MB). It was so bad that I had to delete *all* prior kernels for the upgrade to proceed, leaving only the upgrade-to-F15 boot files. This looked safe to me because the `upgrade-boot` tells you exactly how much more space it needs in `/boot/`. However, to my great surprise, the upgrade made *no entry in `/boot/grub/grub.conf`* for the new F15 kernel. The `grub` shell could not list `/boot`, so I could not tell if the F15 kernel was even there, or what its name was. The upgrade did not complete in other respects as well (see below).

I booted up an old Helix rescue disk (where are all my old Fedora rescue disks???), but unfortunately it could only mount boot partitions and not logical drives, so I could only see my three boot partitions. My latest old one was for F8! I saved the F14 `grub.conf`, copied over the F8 `grub.conf`, copied its first choice of kernel boot files, and rebooted into F8. It spontaneously came up in single-user mode with all filesystems mounted — Hooray! From there I could copy my saved

last F14 kernel files (from `/etc/LastFedora14-kernel/` — glad I made that copy!) to `/boot/`, and restored my F14 `grub.conf`. I could have added the choice of F15 kernel at that point, since I could now see its boot files, but I worried that, if the upgrade did not give me that choice yet, it probably had more to using another F14 boot. However, when I rebooted into F14, nothing further seemed to happen. It just looked like F15 with an F14 kernel running. I made the final changes to `grub.conf`, rebooted, and here I am, seemingly whole (but only partially upgraded — see below).

In summary, there appears to be an F15 upgrade bug such that `grub.conf` is not updated to offer a default F15 kernel selection.

A moral of the story is, for now,

Do not delete all prior kernels to make room for an upgrade!

Next time I will do a fresh install and give *at least a GIGABYTE* to the `/boot/` partition, or maybe ten gigabytes! It would be nice to move this system from 32 to 64 bits anyway, but I also like having both a 32- and 64-bit system for testing whether various issues are related to system wordlength (all my CPUs are 64 at this point).

Amazingly, after the F14 upgrade, I had no `.rpmsave` files and only one `.rpmnew` file (to `/etc/inittab` with a file of only comments directing attention to `systemd`).

“Problems” (evidently the upgrade to F15 did not complete):

There were quite a few items listed by `package-cleanup --problems` and `package-cleanup -orphans`. Below is my log:

```
# yum remove beagle ;; no f15 version yet
# yum list installed | grep kernel
# yum remove kernel-rt ;; several old ones lying around
# ;; temporarily removed planetccrma-core
# ;; This is taking too long - let's try a shortcut:
# yum distro-sync ;; WHOAH! WANTS TO GO TO F14!
# yum repolist ;; WHOAH! All repos are F14!
# yum --releasever=15 distro-sync ;; gpg failure!
# yum --nogpgcheck --releasever=15 distro-sync ;; to hell with it
# ;; See http://fedoraproject.org/wiki/Upgrading\_Fedora\_using\_yum#Upgrading\_Fedora\_using\_yum\_d
# ;; The Fedora upgrade stuff is definitely not ready for prime time
```

Many `fc15` packages depend on some `fc14` packages, so it's very hard to know what is old and should be deleted.

Shortcuts

In System Settings / Keyboard / Shortcuts:

```
Ctrl+Alt+E = emacs -geometry 80x50
Ctrl+Alt+Shift+E = emacs -sclang -geometry 80x50 /sc/tests.sc
[Bug: this shortcut overflows the textfield and the window
cannot be resized to make it visible]
Ctrl+Alt+C = google-chrome
Ctrl+Alt+T = gnome-terminal [in Launchers]
Ctrl+Alt+J = qjackctl
```

Things done after F15 upgrade:

```
#yum install libicu-devel ;; for SuperCollider build from source
#<make install latest SuperCollider git on 9/12/11>
#/sbin/ldconfig /usr/lib/libscsynth.so
>mv ~/share/SuperCollider/Extensions ~/.local/share/SuperCollider/
><install quarks autogui, crucial, dewdrop_lib,
#yum remove supercollider
;; => Removing: supercollider, supercollider-devel,
;;   supercollider-dewdrop, supercollider-emacs, supercollider-extras,
;;   supercollider-mathlib, supercollider-midifile
;; [going with latest git versions now]
#updatedb ;; where is Emacs slang-mode.el* now?
;; Hacked .emacs load-library to find slang stuff
;; While editing a shortcut for Emacs, system went nuts
#yum install lynx ;; systemd died - back to the console
#yum install alpine ;; see if anything got mailed to root - *sigh*
#yum reinstall systemd-units ;; get once to GUI each time this is done
;; selinux is relabeling the file system on each boot - very slow
;; From /var/log/messages, looks like my graphics card freaked out,
;; causing the system to become unstable and evidently clobber itself
#yum install cwiid-devel ;; SC latest git needs this now (11/2011)
#yum install gnome-tweak-tool ;; Linus likes
#yum groupinstall Xfce -y ;; to try out XFCE window manager
  Add to XFCE Settings / Session and Startup / Application Autostart
  /usr/bin/setxkbmap -option "ctrl:nocaps"
;; For libmad install to work:
#rpm -Uvh http://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-stable.noarch.rpm
Retrieving http://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-stable.noarch.rpm
#yum install libmad-devel ;; MPEG audio decoder for latest qtractor svn to configure and build
#svn co https://qtractor.svn.sourceforge.net/svnroot/qtractor/trunk qtractor-svn; cd qtractor-
#yum install yum-updatesd ;; I thought I already had this previously!
  ;; then edit three 'no's to 'yes' in /etc/yum/yum-updatesd.conf
#yum install aeolus
#yum install libusb1-devel ;; for ardour 3.0 to build
#yum install aubio-devel ;; for ardour 3.0 to build
#yum install cppunit-devel ;; for ardour 3.0 to build
#yum install libgnomecanvasmm26-devel ;; for ardour 3.0 to build
#;; not found: lilv-0
#yum install scones ;; for sc-3.4 branch to build
#yum install octave-signal ;; don't know how this got lost - pulls in octave-optim
#yum install octave-doc ;; don't know how this got lost
;; ...
```

6.4.9 F14: Upgrade from Fedora 13 to 14 on a home-built Linux Desktop 1

I simply typed `yum distro-sync` (on November 7, 2010, right after f14 was officially released), and erased packages until it worked. It was rather ugly, but I was able to slog through it in an hour or so. This approach fared better than `yum upgrade` which also had a problem with JACK.

Even before the upgrade I needed to remove `sooperlooper` because it had an `sbcl` dependency problem.

I needed to remove `sbcl` (thus removing `maxima`, `cmn`, and `clm`), `fomus`, `system-config-display`, `pyecasound`, `rhpl`, `texinfo-tex` (thus removing `a2ps`), and `kudzu`. Thus, the main dependency problems seemed to be `lisp` and `python` related. I also temporarily disabled the `livna` and `planetccrma` repos.

I plan to try reinstalling the removed items from time to time.

Things done after the (rather choppy) upgrade to F14:

```
;; install zita-rev1 tarball ;; (for benchmarks relative to Faust version)
yum install clthreads-devel ;; for compiling zita-rev1
;; install tarball for libclxclient-3.6.1 and do a 'make install', for zita-rev1
yum install plplot-octave ;; scientific plotting in octave (to try)
yum install creox ;; guitar FX app found on the Web - does its own JACK connect
;; install /demolition-0.9.tar.gz from http://devel.tlrmx.org/audio/
;;      for testing LADSPA plugins
;;      needed to change 'glib' to 'glib-2.0' in Makefile (twice)
yum install dssi-devel
yum install liblo-devel
```

Things done after the above to get `faust2pd` working:

```
yum remove llvm ;; also removed llvm-devel, pure, pure-devel
;; make and install tarball for latest llvm (2.9) from llvm.org:
;; following advice on pure wiki re. configuring llvm:
./configure --enable-optimized --enable-targets=host-only
;; See http://code.google.com/p/pure-lang/wiki/GettingStarted
;; make and install tarball for latest pure:
yum install hg ;; mercurial
\hg clone http://pure-lang.googlecode.com/hg pure ;; I have an hg alias
cd pure
autoreconf
make
make check
make install
/sbin/ldconfig
;; problem:
> pure
pure: error while loading shared libraries: libpure.so.6:
      cannot open shared object file: No such file or directory
;; fix:
/sbin/ldconfig /usr/local/lib
```



```

;; install pure-xml tarball for faust2pd
;; install pd-pure tarball (for some faust2pd examples)
  ;; Needed the following lines inserted in Makefile after "# Linux":
  PDDIR=/usr/lib/pd-extended
  CPPFLAGS = -I$(PDDIR)/include
;; install faust2pd tarball - needed the following Makefile edit:
  pdprefix = /usr/lib/pd-extended
  ;; (now m_pd.h is found) and we see the following:
> make
  sed -e 's?@version@?2.3?' < faust2pd.pure > xxfaust2pd.pure
  pure -c xxfaust2pd.pure -o faust2pd
  rm -f xxfaust2pd.pure
# make install
  test -d /usr/local/bin || mkdir -p /usr/local/bin
  cp faust2pd /usr/local/bin
  strip /usr/local/bin/faust2pd
  chmod a+x /usr/local/bin/faust2pd
  ++++++
  Optionally, you can also run make install-pd to install the auxiliary Faust
  abstractions in /usr/lib/pd-extended/lib/pd/extra.
  ++++++
# make install-pd
  test -d /usr/lib/pd-extended/lib/pd/extra || mkdir -p /usr/lib/pd-extended/lib/pd/extra
  cp faust-*.pd /usr/lib/pd-extended/lib/pd/extra

```

6.4.10 F13: Upgrade from Fedora 11 to 13 on a home-built Linux Desktop 1

In general, the following info was helpful regarding the use of Fedora preupgrade to go from F11 to F13:

- <http://fedoraproject.org/wiki/PreUpgrade>
- <http://fedoraproject.org/wiki/YumUpgradeFaq>
- <http://www.pythian.com/news/5539/upgrading-to-fedora-12-you-might-need-more-boot-space/>
- <http://forums.fedoraforum.org/showthread.php?t=230491>

Here's what I did (thanks to Fernando (nando@ccrma) for some extra tips):

- Prepare for upgrade:

```

yum update
yum install preupgrade
yum clean all

```

- Remove all .rpmnew and .rpmsave files to a save directory:

```
locate '.rpmnew' > rpmnew-2010-06-19.txt
locate '.rpmsave' > rpmsave-2010-06-19.txt
;; NOTE - ONLY '/' PROCESSED BELOW (mounted drives left alone):
find / -xdev -name '*.rpmnew' -exec /bin/mv {} /mnt/sda/rpmsave-rpmnew \;
find / -xdev -name '*.rpmsave' -exec /bin/mv {} /mnt/sda/rpmsave-rpmnew \;
```

- Perform the upgrade (takes a long time to download all the packages):

```
preupgrade
```

- (Follow instructions, reboot)
- Look at the output of

```
package-cleanup --problems
package-cleanup --orphans
```

- merge .rpmnew files with prior files as needed (I had only a few)

I have heard that I might need to try `yum downgrade` if the new system turns out to have an older version of some package than the previous system. (Apparently this can happen.)

6.4.11 F11-to-F13 Upgrade Headbutts

Of course there were headbutts! Basically, X failed to launch: The Fedora progress screen just hanged after it appeared everything was done. According to the detailed boot log (type escape during the Fedora boot), the last daemon to launch was Avahi, but it launched [ok]. There was no message that X was trying to start, which I think is a bug. Since I suspected a graphics-card driver/settings problem, I changed the runlevel from 5 to 3 in `/etc/inittab` and then I could boot up to a login prompt with no problems. Oddly, my USB disk drive did not mount correctly into `/media/name` at runlevel 3, and I thought for a good while that it had been wiped out during the upgrade by some bug. (After all, the `preupgrade` instructions only say disks will “not necessarily” be wiped out during the install. (☺)) Fortunately, however, the automount works great at runlevel 5 (GUI mode), and the files are all there after all.

I had at least two problems that I know about so far:

1. `/etc/X11/xorg.conf` needed to be hidden away (there was something fatal in mine, and it’s not required any more - yay!)
2. something was wrong in my home directory (which I found out by creating a new user and `su'ing` to him/her and doing a `startx` ok).

I figured out problem (1) by searching for “Fedora 13 radeon hang” or the like, because I suspected my oft-recalcitrant graphics card, and hit upon the “basic test” for the radeon driver for Fedora 13 testing. One of the instructions was to make sure `xorg.conf` did not exist!

Regarding my home-directory problem (2), when I tried `startx` as me, `xauth` tried to create an infinite number of authority files until there were no more processes and the world locked up. I tried deleting all `.X*` and `.x*` files in my home directory, but that didn’t help. It finally worked

to move my home directory to a new name, copy in a newly created home directory (see `man useradd`), and edit all occurrences of the username to my name (and ownerships, etc.), and delete all cookie-looking files—this was not too tedious, because the initial user files are admirably small, but it would have been easier to change my main username (but of course I refuse to do that—it is not good to let the computer win, ever). I would submit, by the way, that files created for a new user should all contain `$HOME` instead of the actual username (most do already).

After finally getting logged in as myself under X, I got an SELinux alert that my home directory was not the right type. This is surprising because I copied it using `cp -rp`, where ‘p’ means “preserve,” but evidently not all properties were preserved. I was able to fix that in nautilus (an editable property). I suppose this could explain the `xauth` problem, but the error alert said access was NOT denied due to being in “permissive” mode. So, that lossage is still a mystery, as are the fatal aspects of my old `xorg.conf` file.

My HP LaserJet did not work right away, and the error message was that “There is a missing print filter”.

F13 is looking really good now, but I have some work to do to carefully move in my prior state. Fortunately, most of my prior state is a set of links to personal data on a different disk, precisely to make fresh installs go faster.

6.4.12 F11-to-F13 Things To Do After Upgrade

After eliminating `xorg.conf` and merging my home directory with a newly created user directory, as discussed above, I needed to reset some basic preferences. Since I’m an Emacs user, I always make caps lock and additional control key, and *for the first time* (as far as I know), I can now swap the “Alt” and “Windows” key on the left side of my (Apple¹⁶) keyboard! This is a huge win, since before, I had to use Option (on the Apple keyboard) as Alt, while Command is in the more natural position for this.

Summary:

- System / Preferences / Keyboard / Layouts / Options / Alt/Win key behavior: “Left Alt is swapped with Left Win”
- System / Preferences / Keyboard / Layouts / Options / Ctrl key position: “Make CapsLock and additional Ctrl”

I am now much happier on the Apple keyboard than before. The only remaining problem is that sometimes Caps Lock does not work as Control. In emacs, when typing Control-a to get to the beginning of the current line, I’m often leaving little ‘a’s around in the text. This doesn’t happen on any other keyboard, and it happens on both my Apple and older keyboard under Fedora Linux. I believe the problem was worse in earlier Fedora releases, but it’s still there. The problem goes away if I carefully press Control well before the key it is to modify, so it’s some kind of race condition in the keyboard driver. There needs to be a way to set the capture window for Control so that “virtually simultaneous” is allowed.

Blog of new installs in F13 so far (see F11 section for prior installs):

```
yum install jack-audio-connection-kit-devel.i686 # for faust2jack
yum install guitarix # pulled in jack-capture, xdialog, zite-resampler
```

¹⁶I use a shared Apple keyboard between my main Linux box and a Mac Pro

```

yum install libsndfile-devel fftw-devel # needed by guitarix source 'waf configure'
yum install qt-devel # for qmake-qt4
cd /usr/bin; ln -s qmake-qt4 qmake # for 'make jackqt' in Faust examples
yum install liblrdf-devel # RDF descriptions of LADSPA plugins (pulls in raptor-devel)
yum install libsamplerate-devel # audio sample-rate conversion
yum install imake # for makedepend
yum remove faust # change over to git repo [also removes faust-tools]:
git clone git://faudiostream.git.sourceforge.net/gitroot/faudiostream/faudiostream faust
yum install grip # need to grab stuff off of an audio CD
yum install fvwm # playing around with window managers in GNOME
yum install switchdesk # playing around with window managers in GNOME
yum install ccsm # compiz plugin config tool (more wm fun!)
yum install emerald-themes # I really should get back to work!
yum install <more compiz stuff listed at http://ranjith.zfs.in/enable-compiz-fusion-on-fedora-
# Summary for both GNOME and KDE:
yum install ccsm emerald-themes compizconfig-backend-kconfig \
    compizconfig-backend-gconf fusion-icon* emerald compiz-fusion \
    compiz-fusion-gnome libcompizconfig compiz-gnome compiz-bcop compiz \
    compizconfig-python compiz-fusion-extras compiz-fusion-extras-gnome
yum install xcalib # can invert video with 'xcalib -invert -alter'
yum install supercollider-devel # headers needed by faust2supercollider script
yum install supercollider-emacs # not pulled in by -devel
yum install supercollider-extras # needed for default(!) 'swing' gui
yum install supercollider-midifile # MIDI file reading support
yum install supercollider-dewdrop # Contains Voicer.sc
yum install beagle-gnome # tired of not having "spotlight" type desktop search capability
yum install gitk # nice GUI for git
yum install mingw32-iconv # so pure-lang/pure would compile
# In pd-pure/Makefile, changed pdincludedir to $(includedir)/pdextended
yum install libtool-ltdl-devel # so pure-lang/pure-faust would compile
yum install portmidi-devel # so pure-midi would compile
yum install clang # to compile C++ to LLVM (installs llvm)
yum install llvm-devel # needed by faust2 (51MB)
yum install clang-devel # maybe only this one was needed
yum install dot2tex # pulled in graphviz, pydot, pyparsing (for Faust dot graphs)
yum remove compiz-fusion-extras-gnome # resolve dependency snafu
yum remove compiz-fusion-extras
yum install compiz-fusion-extras
...

```

6.4.13 F11: Upgrade to Fedora 11 from Fedora 10 on a home-built Linux Desktop

Prior Fedora installations are described in later sections.

This was my easiest upgrade ever. Around mid-June 2009, an alert popped up inviting me to upgrade, and I bit. After the upgrade, everything appears to work! Amazing!

I did have one headbutt, however: my /boot partition filled up during the upgrade, causing

it to fail. To fix that, I rebooted in single-user mode, deleted all old kernels lying around, and reran `/usr/sbin/preupgrade-gtk.py`. (After the upgrade, this file was gone, so I would now try `/usr/sbin/preupgrade`.) The upgrade process installed itself as a bootable kernel, and I had to manually choose it at start-up before the time-out since the default kernel choice was a Fedora 10 kernel.

6.4.14 Fresh Install of Red Hat Fedora 10 (F10) on Generic Linux Desktop Machine 1

My Fedora 10 installation went pretty smoothly except for my Radeon HD 4850 (as usual). However, all issues seem to have been resolved by now. The biggest disappointment in Fedora 10 for me was that I could not set a static IP address using the System / Administration / Network GUI. It's not that it was such a hard bug to track down and work around; it's that I was really surprised to have to chase down a bug on this level—one that should never have slipped through testing by the individual who introduced the bug, or all the people using the test release, etc. I understand that this is all free software, but normally the software engineering standards are professional grade in the Linux world, so I really was surprised and disappointed. In fact, that was when I finally went out and bought a Mac. I needed a break from “senseless breakage”.

This time (for Fedora 10) I decided not to copy in my personal files. Instead I set up a set of links to those files on another disk (which can still be booted into Fedora 8 at any time). By saving all link-making commands (and other customization commands) in a script, I can quickly execute them again after a fresh install of Fedora 11, etc., and I can install over F10 instead of on a new disk.

So, here is the (pretty terse) blow-by-blow. (More chatty discussion appears regarding earlier Fedora installations in later sections.)

1. Do a default install (not selecting packages to install in any detail)
2. Append the following to `/etc/fstab` to mount my other disks at boot time:

```
/dev/mapper/VolGroup00-LogVol100 /mnt/sda ext3 defaults 1 2
/dev/mapper/VolGroup01-LogVol100 /mnt/sdb ext3 defaults 1 2
```

3. Set up links:

```
ln -s /mnt/sda/home/me/projects ~
...
```

4. Copy *selected* configuration files. (I minimize this because I have had many compatibility problems using old config files with new program versions.)

```
# my directory:
cp -pd /mnt/sda/home/me/.emacs ~
cp -pd /mnt/sda/home/me/.tcshrc ~
cp -pd /mnt/sda/home/me/.jackdrc ~
cp -pd /mnt/sda/home/me/.latex2html-init ~
cp -pd /mnt/sda/home/me/.octaverc ~
```

```
cp -pd /mnt/sda/home/me/.pdrc ~
```

```
# root's directory:
```

```
mv /root/.bashrc /root/dot-bashrc-F10  
cp -pd /mnt/sda/root/.bashrc /root/.bashrc  
cp -pd /mnt/sda/root/.emacs /root/.emacs  
cp -pd /mnt/sda/root/.jackdrc /root/.jackdrc  
cp -rpd /mnt/sda/root/.ssh /root/.ssh
```

5. Copy desired lines from /mnt/sda/etc/hosts to /etc/hosts
6. Add my printer using the GUI
7. Get Samba working (this was a pain — I've heard this is easier to do at initial installation time).
 - In System / Administration / Firewall, enable SSH, Samba, Samba Client, Network Printing Client, Network Printing Server
 - make sure services iptables and ip6tables are enabled in System / Administration / Services
 - `yum install samba-swat`
 - enable and start service xinetd
 - enable and start service smb
 - enable and start service nmb
 - enable swat and navigate browser to `http://localhost:901/`
 - Ack! `system-config-samba` no longer exists!:
 - `yum install system-config-samba`
 - Add desired samba user via Preferences / Users / Add User
 - `/sbin/service smb restart`
 - `/sbin/service nmb restart`
8. `yum --enablerepo=updates-testing update system-config-network` (which fixes bug in which gateway IPA overwrites net mask)
9. *Now* manually enter static IP address and DNS in System / Administration / Network. (Previous step REQUIRED. Otherwise, the gateway IPA overwrites net mask.)
10. DNS still vanishing — disable Network Manager in Services and said `/sbin/service network restart`. Firefox must *explicitly* be taken out of offline mode. Hmmm.
11. Install Foxmarks in Firefox
12. `yum install emacs`
13. `yum install xfig`

14. `yum install gv` [I still prefer it for PS viewing]
15. Check out, build, and install from various SVN repos using a script I've built up for that.
16. `cd /usr/local/bin; ln -s /usr/bin/perl` [I have perl scripts needing this]
17. Disable isdn service [why is this enabled by default? who uses ISDN any more?]
18. `yum install adobe-release` [from <http://get.adobe.com/flashplayer/>]
19. Set time manually, add local location
20. Display
 - `yum install system-config-display` [To get xorg.conf back]
 - `system-config-display --reconfig`
 - Do not forget about [ctrl][alt][f2] et al. when display is hosed
 - Finally discovered included radeon driver can be configured to work (after much futzing with fglrX, unsuccessfully)
21. `yum install octave-forge`
22. Install Planet CCRMA: Instructions at <http://ccrma.stanford.edu/planetccrma/software/installplanetnine.html>
 - `rpm -Uvh http://ccrma.stanford.edu/planetccrma/mirror/fedora/linux/planetccrma/10/i386`
 - `yum install planetccrma-core` [still necessary for Gina 3G support in JACK]
 - `yum install planetccrma-apps`
 - `yum install pd-extended`
23. `yum install gsl-devel` [GNU Scientific Library for pure]
24. Install tarballs for llvm, pure-0.2, pure-xml, and faust2pd-2.0 (written in pure)
25. `yum install mercurial` [needed by next command:]
26. `hg clone http://freehg.org/u/cozzyd/tabsynth/` [graphics-tablet synthesis control]
27. `yum install gtkmm24-devel` [needed by tabsynth]
28. `ln -s /l/stkrs/include /usr/local/include/stk` [needed by tabsynth]
29. `yum install xcdroast` [for DVDs etc.]
30. `yum install flash-plugin` [so last-fm Firefox plugin would work]
31. `gststreamer-properties` [set Default Output to ALSA, and Device to Gina3G (my system only, of course) =i alsasink device="hw:2,0"]
32. `yum install PackageKit-cron` [for automatic updates] - edit `/etc/sysconfig/packagekit-background`

6.4.15 Upgrading Red Hat Fedora Core 7 (F7) to Fedora 8 (F8) on Generic Linux Desktop Machine 1

On May 3, 2008, following the instructions found at

<http://howtoforge.com/upgrading-fedora7-desktop-to-fedora8/>,

I upgraded my Linux desktop machine (described in §15.9 below) as follows:

```
> su
# yum clean all
# rpm -Uvh ftp://download.fedora.redhat.com/pub/fedora/linux/releases/8/Fedora/ \
    i386/os/Packages/fedora-release-8-3.noarch.rpm \
    ftp://download.fedora.redhat.com/pub/fedora/linux/releases/8/Fedora/ \
    i386/os/Packages/fedora-release-notes-8.0.0-3.noarch.rpm
# yum upgrade
... [ran into dependency trouble with pd-py and libxcb-devel] ...
# yum remove pd-py libxcb-devel
... [libxcb-devel did not exist] ...
# yum remove libxcb
...
Removing for dependencies:
kdemultimedia          i386    6:3.5.9-1.fc7    installed    20 M
kdemultimedia-extras  i386    6:3.5.9-1.fc7    installed    6.9 M
xine-lib                i386    1.1.11.1-1.fc7.1 installed    5.3 M
...
# yum upgrade
...
Install    115 Package(s)
Update    1447 Package(s)
Remove      0 Package(s)
Total download size: 1.8 G
...
Error Downloading Packages:
  sbcl - 1.0.13-1.fc8.i386: failure: sbcl-1.0.13-1.fc8.i386.rpm from updates:
  [Errno 256] No more mirrors to try.
# yum remove sbcl
...
Removing for dependencies:
clm-sbcl          i386    2008.01.09-1.fc7.ccrma installed 5.1 M
cm-clm-sbcl      i386    2.11.0-0.20070607.cvs.7.fc7.ccrma installed 0.0
cm-fomus-sbcl    i386    2.11.0-0.20070607.cvs.7.fc7.ccrma installed 3.4 M
cm-sbcl          i386    2.11.0-0.20070607.cvs.7.fc7.ccrma installed 16 M
cmn-sbcl         i386    2007.11.03-2.fc7.ccrma installed 5.7 M
...
# yum upgrade
...
```



```

Transaction Check Error:
  file /usr/lib/SuperCollider/plugins/JoshPVUGens.so conflicts between
  attempted installs of
  supercollider-joshpv-ugens-0.20070712-1.119svn.fc8.ccrma and
  supercollider-josh-ugens-0.20080331-0.svn216.1.fc8.ccrma
...
# yum remove supercollider
...
Removing for dependencies:
faust-supercollider      i386      0.9.9.2-1.fc7.ccrma installed      8.1 k
supercollider-ambiem     i386      0.4-2.fc7.ccrma installed      133 k
supercollider-bbcut2     i386      2.1-1.fc7.ccrma installed      528 k
supercollider-devel      i386      0.0.20070720-0.2.6186svn.fc7.ccrma installed 6.7 M
supercollider-dewdrop    i386      07.0424-1.fc7.ccrma installed    799 k
supercollider-mathlib    i386      0.20070727-3.118svn.fc7.ccrma installed 97 k
supercollider-midifile   i386      0.0-1.fc7.ccrma installed        22 k
supercollider-redclasses i386      0.0-2.fc7.ccrma installed      148 k
supercollider-swingosc   i386      0.530-1.fc7.ccrma installed      1.3 M
supercollider-world      i386      2007.03.08-1.fc7.ccrma installed  0.0
...
# yum remove supercollider-josh-ugens
...
# yum -y upgrade
...
[root@jos2p8 fg]# yum install planetccrma-apps
...
Error Downloading Packages:
  sbcl - 1.0.13-1.fc8.i386: failure: sbcl-1.0.13-1.fc8.i386.rpm from updates:
  [Errno 256] No more mirrors to try.
... [oh well, I'll burn the common-lisp bridge when I get to it -
  supercollider seems to be fine] ...

```

Later on (Oct. 2008), I had to manually remove the F7 version of avahi in order for yum update to run successfully:

```
rpm -e --noscripts avahi-0.6.17-1.fc7
```

(from https://fedoraproject.org/wiki/YumUpgradeFaq#Fedora_7_-_3E.Fedora_8)

6.5 Installing Red Hat Fedora Core 8 (F8) on an HP Pavilion dv2125nr (dv2000) Notebook Computer

For reasons described in §6.7, I did a fresh install of F8 on the two Linux partitions of my HP Pavilion dv2000 notebook.

One anomaly is that sometimes my X mouse-cursor disappears (though it still works invisibly). A reboot usually fixes it. Sometimes a couple of reboots are necessary. This is actually the most annoying problem I have with Fedora F8 on this notebook. It's like having a 5-minute boot time,

with attendance required. [Update July 31, 2008: This problem continues unabated with the nv driver. It does not seem to happen with the proprietary nvidia driver.]

A more common but lesser annoyance in GNOME/X11 behavior is that the track pad puts out spurious events if you place one finger near the lower edge of the track pad and then drag in the interior with a different finger. This can result in many “back” commands in the Firefox browser. You can’t simply drag the opposite direction to get back to where you were, so it’s quite annoying. Emacs sees commands like “double-mouse-7”, “triple-mouse-6”, and “triple-mouse-7” while doing this (which are fortunately undefined). If this is some power-user feature of the track pad, I haven’t figured out how to tame it yet. I simply have to be super-careful to touch the track pad at only one point at all times. It’s actually difficult because the left-click button is immediately below the track pad, so that when pointing and clicking, it is really easy to make things leap around accidentally.

My Broadcom 4311 wireless chip did not work for months. However, starting with kernel 2.6.23.9-85.fc8 (Dec. 7, 2007), and after upgrading my firmware to version 5 (to be compatible with the new b43 driver), it started working again.

I could not connect to an external projector using the default driver ‘nv’ (for the NVIDIA GeForce Go 6150 graphics hardware). As far as I can tell, there is no way to obtain output of any kind to the VGA connector. This was resolved by installing the NVIDIA proprietary driver called ‘nvidia’. However, after around June 2008, the nvidia driver would no longer compile. As a result, I rolled back to the last working kernel and added the line `installonlypkgs=1` in `/etc/yum.conf` so that the F8 kernel would no longer be updated. That worked for a while, and then some update somewhere wiped out all of my sufficiently old kernels (even though I have `installonly_limit=0` in `/etc/yum.conf`). For a while I couldn’t use the nvidia driver at all, and that may have been causing other problems (such as overheating and no mouse after boot). Finally I got `yum install kmod-nvidia` to work (it kept failing saying that the downloaded package didn’t match what it was looking for, but retrying eventually worked!).

Note also that, for successful external video projection, the laptop must be booted while connected to a running external projector. Otherwise, the `nvidia-settings` utility may not offer any working resolutions and refresh rates. See §6.5.1 below for further details.

A problem that seems to get worse over time is overheating of the laptop. It does not seem to overheat under Windows. I’ve heard that the NVIDIA graphics chip has overheating problems, so perhaps that’s the problem. I wish I could try the nvidia driver again to see if it manages temperature better than the nv driver.

6.5.1 Miscellaneous F8 Installs

- Planet CCRMA [see home page — `yum install planetccrma-apps` is working as of 2/6/08]
- `yum install perl-XML-Twig` [needed by Rosegarden]
- Tarball install of `pd-qext-0.1.tar.gz`
- `yum install q-devel` [needed by Rosegarden]
- `yum install gtk-recordmydesktop` [to make a video of a demo - this never worked]
- `sh NVIDIA-Linux-x86-169.12-pkg1.run` to install free proprietary NVIDIA driver for the NVIDIA GeForce Go 6150 hardware on the HP Pavilion. This had to be done with the X server not running, which I did by changing the line “id:5:initdefault:” in `/etc/inittab` to

“id:3:initdefault:” and rebooting. (Just exiting X with ctrl-alt-backspace did not pick up the new desired runlevel — I expect there is an easier way to exit X and login to a console, but that’s the best I’ve got for now). Note that the installation had to be repeated after a kernel upgrade from version 2.6.23 to 2.6.24 (the kernel interface needed to be rebuilt). The symptom was that the nvidia driver specified in `/etc/X11/xorg.conf` could not be loaded, and I had to revert back temporarily to the default driver `nv` (which happens if you let the system autoconfigure for you). It is easier to refuse autoconfiguration after a kernel upgrade, in which case you get a text login prompt, and you can login in text mode, type `sh NVIDIA-Linux-x86-169.12-pkg1.run`, and recompile the driver interface immediately. (But again this does not work with latest F8 kernels, as of July 2008.)

- USB MIDI support for Oxygen 8 keyboard [not yet done]:
 - `yum install fxload`
 - `wget http://homepage3.nifty.com/StudioBreeze/software/bin/usbmidi-20040829.tar.gz`
 - See <http://www.kvraudio.com/forum/viewtopic.php?t=190021&view=previous>
- `yum install usbutils` [for `lsusb` command]
- Tarball install of `raul`, `flowcanvas`, `patchage`, which in turn required the following:
 - `yum install glibmm24-devel`
 - `yum install gtkmm24-devel`
 - `yum install libgnomecanvasmm26-devel`
 - `yum install graphviz-devel`
 - `yum install lash-devel`
 - `yum install libglademmm24-devel`
- Install `acroread` rpm from Adobe
- `yum install tk-devel` [for `scilab` source compilation]
- `yum install pd-extended` [for `pmpd`]
- Install `pd-gem`:
 - `sudo rpm -ivh http://rpm.livna.org/livna-release-8.rpm`
 - `sudo rpm --import /etc/pki/rpm-gpg/RPM-GPG-KEY-livna`
 - `yum install pd-extended-extra` [or `yum install pd-gem`]
- `yum install kdwebdev` [to try out the `quanta` HTML/CSS editor]
- `yum install mplayer mplayer-gui xvidcore xine mjpegtools-libs libmms xine-lib-extras-nonfree gnome-mplayer gxine-mozplugin gxine vlc` [Following advice on the net regarding playing standard media files — requires `/etc/yum.repos.d/livna.repo` — it is said that `mplayer` and `vlc` can play most formats.]
- To build `CLAM` from source:

- yum install xerces-c-devel [pulls in xerces-c]
- yum install libsndfile-devel
- yum install libmad-devel
- yum install id3lib-devel [pulls in id3lib]
- yum install portaudio-devel
- yum install qt4-devel [NetworkEditor]
- yum install amarok [music librarian/player]
- (HP Notebook) yum install kmod-nvidia [need livna repo — had to be repeated several times due to intermittent package mismatch error]
- yum install gnome-keyring-manager [I believe it is a Fedora F8 bug that this was not already installed, or perhaps a bug in the dependencies of other packages that expect to use the GNOME keyring.]
- yum install nvclock [to address my overheating NVIDIA GeForce chip on my HP notebook — it turned out acroread was the culprit, starting up a thread in the background that heated up a CPU until the system shut down (somewhere around 100 degrees Celsius)]
- yum install gtkpod [to use an iPod]
- Unpack <http://ccrma.stanford.edu/~jos/webpub/latex2html-2006-1.tar.gz> configure; make; make install;
- Messing around with XML:
 - yum install perl-XML-LibXML [supports DOM and XPath API]
 - yum install perl-XML-Handler-YAWriter [xmlpretty]
 - yum install PyXML [XML libraries for python]
 - yum install perl-SOAP-Lite [for XML over Web services]
 - yum install CPAN [for perl packages not listed by yum]
 - perl -MCPAN -e shell [login to CPAN]
 - i /SemanticDiff/ [find this package]
 - install XML::SemanticDiff [install this package]
 - install Test::More [required by above package]
 - install Test::Pod [desired by XML::SemanticDiff]
 - install Test::Pod::Coverage [desired by XML::SemanticDiff]
 - test XML::SemanticDiff [all tests this time]
 - install XML::Parser [update]
 - install CPAN [update]
- yum install unrar [for opening .rar archives]
- yum erase AdobeReader_enu [use evince instead of acroread to prevent CPU thermal runaway when viewing PDFs in Firefox]

6.6 F7: Things to do after Upgrading Red Hat Fedora 6 to Fedora 7

See §6.8 below for the list of things I had to do after upgrading to Fedora 6 on my Linux desktop (with the desktop itself described in §15.9 below).

- First of all, the update would not fly until I converted the `/etc/fstab` entries for my external disks to label format. For example, typing, as root,

```
/sbin/e2label /dev/hda2 /mnt/hda2
```

labels `/dev/hda2` as `"/mnt/hda2"`. Then the `fstab` entry is changed from

```
/dev/hda2          /mnt/hda2          ext3    defaults          1 2
```

to

```
LABEL=/mnt/hda2   /mnt/hda2          ext3    defaults          1 2
```

- Next, after the upgrade completed, *of course* I typed (as root)

```
yum -y update
```

which took *hours* to complete (over 700 packages updated).

- I found it quite necessary to say

```
updatedb  
locate '.rpmnew'
```

to find all the config files that were not installed because I had modified them. In particular, after installing the two rpmnew files I found in `/etc/yum.repos.d/`, another `yum -y update` yielded over 300 more updates! (Before this, CUPS printing didn't work.)

- My printer was “disabled” for some reason. After I got CUPS working again, I simply had to enable it in the `/usr/sbin/system-config-printer` panel (which can also be launched under the main System menu).
- Samba didn't work right away. To get it going, I did a

```
yum install samba-swat
```

which pulled in `xinetd`, after which I could configure Samba again (`system-config-samba`) [Update F16: no longer exists - now supposed to go to `localhost:901` to run `'swat'`, but this does not yet work for me]. The Windows work group name had somehow gotten lost in the upgrade. Resetting that got it working for a while, but then it stopped working. I finally got it working again after merging `/etc/samba/smb.conf` with `smb.conf.rpmnew` and deleting `/etc/samba/smbusers` and rebuilding it from the config gui. Another barrier was that somehow the `nmb` service was no longer configured to start as well as the `smb` service. I had to add it explicitly to run-level 5 myself.

- Installed the Fedora 7 repo files for Planet CCRMA, following the instructions for Fedora 6 with 6 changed to 7 in the repo URL.
- Reverted changes to `/usr/share/texmf/dvips/misc/alt-rule.pro` so that `latex2html` would work (see §6.9 below). To make this easy, I keep an RCS directory there, so I simply visit the file in `emacs` and type `^X v c` to “cancel” all changes since the last commit. (The RCS file was initialized by typing `^X v i` after the desired changes were first made.) I then type `^X^Q` to “check out” the file so that future `tetex` updates can clobber it as usual, after which I check to see if any good changes occurred.

In summary, Fedora 7 mostly works, and the upgrade was straightforward, but Samba is broken, which prevents networking with my Windows machine.

6.6.1 Miscellaneous Installs

- `yum install yum-updatesd` [I was surprised to have to install this, until I discovered that it doesn't work in Fedora 7, as of 8/31/2007. I have it disabled in System / Administration / Services until it works so I can run `yum` at the command line. I believe the auto-updater was installed by default in earlier Fedora releases — I enabled update downloads in `/etc/yum/yum-updatesd.conf`]
- `yum install HelixPlayer`
- `yum install HelixPlayer-plugin`
- `yum install RealPlayer`
- `yum remove kernel-alsa-module` [obsolete - started requiring an unavailable FC5 kernel, preventing `yum update` from working]
- `yum remove planetccrma-core` [started requiring an unavailable FC6 kernel, preventing `yum update` from working]
- `yum install proftpd` [needed an ftp server]
- Installed VTK tarball [Visualization Tool Kit - for `octaviz`]
- Installed `octaviz` tarball [octave interface to VTK]
- `yum install cmake` [needed for VTK and `octaviz` installation]
- `yum install referencer` [digests PDF files and such; generates BibTeX files]
- `yum install octave-devel` [octave headers needed for `octaviz` install]
- Installed `octplot` tarball [handle graphics for Octave - activated by `octplot_enable` - works very well but freezes the machine repeatably when closing plot windows - saying `octplot_disable` and exiting Octave to close plots appears to be safe]
- `yum install fltk-devel` [needed by `octplot`]

- (Note that `octave-graceplot`¹⁷ is already part of `octave-forge` [yet another gnuplot alternative for Octave - activated by `toggle_graceplot_use`])
- `yum install supercollider-devel` [so ‘`pkg-config -cflags libscsynth`’ can be used in makefiles]

6.7 Dual-Booting Windows XP and Red Hat Fedora Core 6 (FC6) on an HP Pavilion dv2125nr Notebook Computer

My low-cost HP Pavilion dv2125nr notebook (bought September 2006) came with Windows XP installed. While it was initially purchased only for presentations, I decided to try shrinking the Windows partition to 50 GB and install Red Hat Fedora Core 6 (FC6) in the freed-up 50 GB.

To repartition the 120 GB hard drive, I did the following:

1. Downloaded and ran the HP Drive Key Boot Utility¹⁸ to make a bootable USB key drive. One can also make a bootable CD-ROM instead (see the GParted LiveCD¹⁹ website).
2. Loaded the key drive with GParted LiveUSB²⁰ files, booted the key drive, and resized the Windows partition to 50 GB. It seemed to work perfectly, although I wound up with an extra small 1 GB ntfs partition that I didn’t expect.
3. Rebooted Windows and let it do a filesystem check.
4. In the Windows disk storage manager (“Control Panel / Administrative Tools / Computer Management / Storage”) I deleted the small 1 GB ntfs partition. (Windows would not let me assign a drive letter to it using the right-click menu, so I couldn’t verify that it was unused, but it seems not to be missed.) Deleting this spurious partition seemed to be important to do because there are only 4 primary partitions, Windows uses two, and Linux wants at least two (one for `/boot`, and another which can be “extended” for everything else). Windows uses one for the `C:` drive and one for the HP backup partition.
5. Booted the FC6 install disk (which the DVD-burner created from a DVD iso image), and selected to remove all *Linux* partitions and take the default layout. (Careful! The default selection is to erase *all partitions* and take the default layout. To be extra safe, select the checkbox saying you want to review the layout before committing to it.)
6. Elected to install the `grub` loader at the beginning of the `/boot` partition. I think this is required to keep Windows and its virus-checkers happy. The bootable windows partition is listed as “other” below “Linux” when choosing which OS to boot by default.
7. Rebooted (Linux) and followed installation directions as usual.

The main thing that didn’t work right away was wireless networking. [Update: Sometime around mid-March 2007, the standard wireless support in the FC6 kernel “just worked”, rendering the remainder of this paragraph obsolete, unless you find that wireless isn’t working for you.]

¹⁷<http://rpmfind.net/linux/rpm2html/search.php?query=octave-graceplot>

¹⁸http://h18007.www1.hp.com/support/files/server/us/revision/8641.html?jumpid=reg_R1002_USEN

¹⁹<http://gparted.sourceforge.net/livecd.php>

²⁰<http://gparted.sourceforge.net/liveusb.php>

[Update 2: On August 23, support for version 4 firmware (for the Broadcom wireless chipset) appeared in FC6. It was necessary to run `bcm43xx-fwcuttter` again to install the version 4 firmware in `/lib/firmware`.] I had to connect a physical ethernet cable and reboot in order to update all of the installed FC6 packages, etc. Progress on the wireless front can be tracked at the Mozilla bug page²¹ for this issue. (I found this by searching for “hp pavilion wireless” in the fedora mailing-list.) On Jan. 15, 2007, I finally got wireless working thanks to Comment #51 (a new test kernel) in conjunction with Comment #41 (re. overall setup) on the Mozilla bug page. In my posts to that page, I describe exactly what I did. Basically, you download a “test kernel” with the fixes installed, and you use `fwcuttter` on the Windows driver to cut out the needed wireless firmware and place it where it can be found under Linux (see comment numbers above).

After basic Fedora installation, I pretty much followed the “post-FC5” procedure described in the next section. Everything went smoothly until I agreed to apply all pending security updates (over 100). This was after installing `gv`, `octave-forge`, and saying `yum update` to update all the FC6 packages to latest versions. After that, the system would boot up only to a login prompt instead of the X login panel (*i.e.*, no X windows). I logged in the “old fashioned way”, su’d to root, and typed `yum update` once again, and the problem went away. I next had a dependency failure during `yum update` related to Python package confusion. I did a `yum remove` on the packages wanting the unavailable dependency, made a list of packages erased via `cat /var/log/yum.log | grep Erased > erasedpkgs`, and edited that file to become a shell script to `yum install` them all again. This was a bit of a pain, but it didn’t sink too much time.

Another minor problem I encountered was the lack of any way to “wake up” after a hibernate or a suspend. There seems to be no way to get it going again. I therefore specify “do nothing” when the laptop cover is closed. Needless to say, this consumes the battery much faster, and the laptop remains pretty warm when closed (warm enough that I don’t want to slide it into my shoulder bag). Therefore, if I need to take a break while running on battery power, I just shutdown the whole thing. I rarely run on batteries anyway.

The laptop wakes up fine after merely “putting the display to sleep.”

The track-pad disable button works, which is valuable for disabling the track pad while editing text for a while in a single window. Stray touches of the track pad often generate mouse-down events wherever the mouse happens to be.

6.7.1 FC6 Sound Support on the HP Pavilion Notebook

[Updated 6/29/07 for latest FC6 with `planetccrma-*` installed.]

Sound support is usable, but not smooth. The mute button and volume level slider are not supported at all, so a tool like `alsamixer` is necessary to set volumes and toggle mutes.

Plugging something into the headphone jack once (but not always) resulted in the master gain being muted, and nothing seems to unmute it automatically, so I had to unmute the master gain in `alsamixer`. [This seems to be working better as of 9/4/07.] (To do this, type ‘m’ with the far-left slider selected to change “MM” to ‘00’ in the mute indicator). Also, the default system speaker volume was initially zero (use the up-arrow key to raise it).

The “play” command-line function (by `sox`) works fine, as long as the `jack` audio server is not running. The same goes for the ALSA `aplay` command.

²¹https://bugzilla.redhat.com/bugzilla/show_bug.cgi?id=213556

Audacity for FC6 works as long as I manually set the sampling rate (to 48000 Hz) and word format (to 16-bit) before playing—otherwise it hangs.

Because I had done a `yum install jack-audio-server` prior to installing Planet CCRMA, I had the problem that the jack audio server would not start unless root launched it (“cannot use real-time scheduling (FIFO at priority 10) [for thread nnn, from thread nnn] (1: Operation not permitted); cannot create engine”). Subsequently, audacity could not connect to jack (“Error while opening sound device. ...”) unless it too was run by root. As a normal user, I could only run audacity in stand-alone mode. Similarly, the `sndplay` command (which is jack-aware) only worked for root if the jack server was running, and it worked for normal users otherwise.

According to Fernando (on the Planet CCRMA mailing list): “You need to edit a configuration to allow non-root users to have access to realtime scheduling and memory locking (that was ”automatically” done in Planet CCRMA with a patched version of the `pam` package). In `/etc/security/limits.conf` add:

```
--- cut here ---
# or (default) allow everyone access
*          -          rtprio          99
*          -          nice            -10
*          -          memlock         4000000
--- cut here ---
```

You’ll need to logout and login again for that to take effect.” If you obtain the jack audio server via the Planet CCRMA procedure, this should be taken care of automatically for you.

On my HP notebook, using default settings, the jack audio server obtained chronic sound-out underruns (“xruns”). These are clearly audible as periodic gaps in the sound. Eventually I hit upon changing “Periods/Buffer” from the default 2 to 3. (Setting it to 4 resulted in failure of `jackd` to start.) Prior to that, I had set Frames/Period to 4096 (the maximum sound-buffer size). Fiddling with Priority did not seem to affect anything. I had also checked “Force 16bit” which seems to now be required (unchecking it also results in a failure of jack to start).

I assume my sound device is a standard AC-97 CODEC, which means the hardware sampling rate is undoubtedly 48000 Hz. I find I can set the jack server sampling rate to 44100 as well, indicating that there is plenty of bandwidth for on-the-fly sampling-rate conversion.

6.7.2 FC6 and Planet CCRMA on the HP Pavilion Notebook

Aside from the sound problems mentioned above, many things are working. I am mostly using Pure Data (PD) and Rosegarden with DSSI plugins, and there was one critical change: I had to change the first line in `/etc/hosts` from

```
:::1      localhost.localdomain  localhost
to
127.0.0.1      localhost.localdomain  localhost
```

Without this change, the WhySynth editor GUI would not come up on the screen, even though it was running. It is said that `liblo` needs to be able to resolve the hostname for Open Sound Control (OSC) linkage between the host and GUI, and it apparently can’t deal with the newer

'::1' notation, which is said to be for IPv6 (Internet Protocol, version 6). I only had this problem on my notebook because there I did a fresh install of FC6. On my desktop machine, in contrast, I *upgraded* from FC5 to FC6, and `/etc/hosts` was evidently left alone (it still has the old style localhost entry).

Initially, `pd` produced no sound. It evidently did not detect the jack audio server and defaulted to 0 audio output channels. This was fixable under the “Media / Audio settings ...” menu item. For the future, I added various flags to my `/.pdrc` init file:

```
-jack -r 48000 -audiooutdev 1 -outchannels 2 \  
-path /l/pd/externs \  
-path /usr/lib/pd/extra \  
-path /usr/lib/pd/extra/cyclone \  
-path /usr/lib/pd/extra/oscx \  
-path /usr/lib/pd/extra/iemlib \  
-path /usr/lib/pd/doc/5.reference/iemhelp \  
-path /usr/lib/pd/doc/5.reference
```

The various added `-path` directories have evolved over the years — I don’t know if they’re all still needed. The directory `/l/p/pd/externs/` contains my own `pd` externs. I believe all the others come standard with “`pd` extended” as installed when the Planet CCRMA distribution is installed.

6.7.3 Additional Installs

- Download and install the `fluendo-mp3` decoder (you “purchase” it for \$0)
- `yum install gtk+-devel` [for `gtk-config`, which was needed to make a Faust-generated `jack-gtk` example.]
- `yum install supercollider-devel` [so ‘`pkg-config --cflags libscsynth`’ will work in a Makefile]
- `aseqview` [a MIDI monitor for ALSA, installed from SUSE tarball `aseqview-0.2.8.tar.gz`]
- Installed to get `gnustep` (and thence MusicKit) up and running:
 - `yum install gcc-objc`
 - `yum install portaudio` [see below]
 - `yum install libjpeg-devel`
 - `yum install libtiff-devel`

The `portaudio` version was too old (for FC6!), so I had to install v19 from the SourceForge CVS as explained in `MusicKit_README.pdf`. There was a fair amount of “lint” to clear up in order to get the MusicKit to build. In particular, the platform-dependent framework (`portaudio` version) had to be installed before `SndKit` and `MusicKit` could build.

The `gnustep` build was easier, just using the `compile-all` script. I did have to install the `ffcall` library (v1.10) from the tarball obtained from www.gnustep.org. I believe everything else (besides `ffcall` and `portaudio`) was installed from RPMs.

6.7.4 Summary of FC6 on my HP Pavilion Notebook

In summary, aside from almost nonexistent power-management support and relatively weak wireless support, my HP Pavilion dv2125nr notebook is working great running Red Hat Fedora Linux. On the music/audio front, I've successfully used rosegarden, hydrogen, audacity, pd, snd, sndplay, sox, and other audio-related programs so far. In particular, all of the software examples described at <http://ccrma.stanford.edu/realsimple/faust/> were developed, tested, documented, and published entirely on the HP notebook.

The main negative for me with this notebook is the fact that, after less than one year, the battery life fell to less than one hour. It appears to be a Lithium-ion batteries. The warranty on the \$120 replacement battery I bought (\$140 with CA tax) makes it clear that battery-life is not guaranteed, as if such degradation should be expected.

6.7.5 Stop the Presses!

Update 2007/10/26: My Windows XP partition suddenly died (became unbootable) while I wasn't even using the computer! No boot option would work (safe mode, etc.). The boot would progress to a blue screen showing some unreadable error message for what looked like a millisecond, and then automatically reboot. I couldn't find any way to stop the reboot and see the error message.

I tried out my HP Pavilion "system restore" disk, and it was unable to repair the system and instead insisted that I wipe out my entire Windows XP partition and start over from scratch.²² I probably could have used the GNU partition-guessing tool `gpart` to detect my Windows partitions and refresh the Master Boot Record (MBR), etc., but instead I went ahead and rebuilt the MBR and partitions from scratch using the HP system-restore disk.

Since the system restore did work ok, this is more evidence that the spurious 1GB partition I deleted (logged above) was not missed (unless that's where it kept a backup of the MBR (☺)).

Also happily, the system restore did not change any disk partitions, so that my Linux partition was not altered. However, the Linux boot loader is no longer accessible, so I will have to either rewrite the MBR, or edit `boot.ini` (used by Windows for booting). Since I've heard²³ that it's dangerous to alter the MBR (could this have been my problem after so many months of trouble-free dual booting?), I plan to use the `boot.ini` method next time around. However, for now, I am so annoyed with Windows in general (especially for crashing so hard that I have to build a new system from scratch after *less than a year*), I plan instead to move to MacOS-X and obtain Windows compatibility using something like Parallels or VMware Fusion to run Windows in the MacOS environment. The HP Pavilion will make a nice Christmas present for my mother.

[Update 11/18/2007] Ok, I needed to fire up my Linux partition, so my trick was to upgrade it to Fedora 7, figuring I could rewrite the boot loader in the process. Unfortunately, the upgrade crashed before it finished. I think the problem has to do with an unreliable DVD drive. (The laptop often will not boot from DVD, and it seems to be very sensitive to power-supply voltage.

²²This would normally be fine with me because my back-up policy is to back up only personal data, because I like rebuilding a new system from scratch every three years or so (when I normally get new hardware or a major OS upgrade). This is the first time in my life (since the dawn of personal computers in the early 1980s) that I have had to rebuild my world on a machine before I really wanted to. For the first time I wish I had backed up the drive image using a product such as Norton Ghost. I really don't feel like setting up a new Windows system from scratch right now (loading GNU Emacs, Cygwin tools [which are tedious to specify], making caps-lock a control key, checking out my various svn repos, and so on).

²³<http://www.geocities.com/epark/linux/grub-w2k-HOWTO.html>

For example, one of my tricks to get it to boot from DVD is to remove the power connection, which presumably removes all ripple from the supply voltage, and perhaps lowers the voltage a little.) I restarted the upgrade, and it appeared to finish ok. However, after rebooting, yum would not run because its “rpm” module was missing. I tried `synaptic`, which found 49 “broken” packages, but it could not fix any of them. Then I thought, “hey! Fedora 8 is out!” So I downloaded a Fedora 8 DVD image via the torrent and burned a DVD-R for that. I plugged my laptop into its own dedicated power circuit (maybe the other circuit was “dirtier”?) and booted off the F8 DVD. The anaconda installer crashed in some python script very early on.

After a little searching in the Fedora mailing list archives, I retried the F8 upgrade in “text mode,” and that went better. The next snag was that the `anaconda` installer said it could not update the boot loader (due to “system changes”), but it would let me skip the bootloader update, or write a new bootloader. I selected “write a new bootloader”, and that crashed. Ok, let’s try “skipping” the bootloader update—the upgrade to F8 proceeded smoothly after that. Upon reboot, lo and behold, the linux kernel was the F8 kernel! The existing bootloader (in the MBR) just worked? I guess that means there is no kernel-specific info in the MBR boot-loader; hooray for orthogonal engineering. After the upgrade and reboot, `yum -y update` worked just fine, and I’m back in business.

I should mention that before the F8 upgrade, I moved `planetccrma.repo` from `/etc/yum.repo.d/` to `/etc/yum.repo.d-hold/`. I did this because I noticed that most of the “broken” packages in the F7 upgrade were PlanetCCRMA packages. Later I also had to `yum remove planetccrma-core` because it was specifically tied to F7; it’s just a meta-package so removing it does not cause any actual packages to be removed.

The only “problem” I noted with the upgrade to F8 was that my display resolution was capped at 800x600. Feeling relatively foolhardy (but backed up), I set `enabled=1` in `/etc/yum.repos.d/fedora-updates-test` in order to try the very latest updates (of which there were 247). This took me to release “F8.9” which evidently includes the various versions of F9 packages under development. The good news is that my screen-resolution problem went away. The bad news is that I lost my mouse! The mouse just sat in the middle of the screen whether I tried the touchpad or the external USB mouse. If I exited X windows (via control-alt-backspace), I got a standard command-line login prompt and a *working text-mode mouse!* This is not good. I next tried to “upgrade” to F8 again (actually a downgrade). This went suspiciously quickly, leading me to think nothing happened, but *something* happened because then the Linux partition wouldn’t boot (grub printed “file not found”). I rebooted the F8 DVD again, selecting “rescue an existing installation” and looked at `boot/grub/grub.conf`, and sure enough, it only listed kernels that were no longer there. The F7 and F9 kernels had apparently been deleted by the F8 “upgrade”, but `grub.conf` had not been rewritten to point to the F8 kernel that was installed. (In fairness, I did ask to skip updating the bootloader, because no other option would work.) So, I edited `grub.conf` to point to the one and only kernel in `/boot`, and the reboot went fine. Now the problem was no `mirrorlist.txt` in `/var/cache/yum/(fedora|updates)`, so `yum update` would not run. Evidently, enabling the F9 test updates *deleted* `mirrorlist.txt` from `fedora` and `updates`! I ran `synaptic` which reported 6 broken packages (sounds pretty simple), and noted that I had two copies of `avahi`. I then `yum remove` the F7 version of `avahi`, leaving only the F8 version. Finally, I copied `/var/cache/yum/development/mirrorlist.txt` to the `fedora` and `updates` directories, and that seemed to get `yum update` working again. Unfortunately, that left me with a lot of F9 packages, even though I disabled the `fedora-development` repo. Miraculously, the system still works fine without a mouse. You learn a lot about a system by mangling it and

having to claw your way back to the surface. (☺)

I suppose the next step is to re-install the fedora-release package and do a standard yum-based “upgrade”— something like `yum group base reinstall` or the like (I don’t want to look it up). Rather than futzing with this any further, I tarred up my home directory, scp’d it to my main Linux machine, freshly installed F8, grabbed my home directory and unpacked it into *another* directory, from which I mv’d in only what I really want to keep (*i.e.*, standard procedure for a fresh build). I think I could have fought through the upgrade, but I was ready to get it over with. F8 looks pretty nice. However, as of Nov. 21, 2007, Planet CCRMA has a ways to go.

6.8 FC6: Things to Do after an FC6 Upgrade from FC5

On June 16, 2007, I upgraded my FC5 desktop system (described in §15.9 below) to FC6. This was my first Fedora upgrade (preferring normally to do fresh installations). The upgrade went fine, but the subsequent update had a few glitches:

- `yum -y update` (525 packages updated, 21 installed, 1081 updates!)
... Error: Missing Dependency: `samba-common = 0:3.0.24-7.fc5` is needed by package `samba-client`
- `yum install samba-common`
- `yum -y update`
... Transaction Check Error: file `/usr/include/sound/asequencer.h` from install of `kernel-headers-2.6.20-1.2952.fc6` conflicts with file from package `alsa-driver-1.0.11-1`. file `/usr/include/sound/asound.h` from install of `kernel-headers-2.6.20-1.2952.fc6` conflicts with file from package `alsa-driver-1.0.11-1.rhfc5.ccrma`
...
- `yum remove alsa-driver` (now in OS — also removes `planetccrma-core`)
- Reinstall bug workaround in `/usr/share/texmf/dvips/misc/alt-rule.pro` — (see Getting LaTeX2HTML Working below).
- `yum install planetccrma-apps` — (Requires prior installation of Planet CCRMA under FC5) — 222 packages installed
- `yum install planetccrma-menus`

In retrospect, I wish I had burned a new FC6 DVD instead of using the old one I already had lying around (which I had used for upgrading my HP laptop). The upgrade from DVD took less time than the “media check” step, but the subsequent update took three attempts comprising many hours spread out over two days. Of course, actual interaction time was negligible, since all glitches had immediate solutions.

I also wish I had turned off my nightly mirroring of `/etc` and `/usr/local` for a few days so I could refer back to the FC5 version if need be. So far I haven’t needed to do this, and I hope the `.rpmnew` versions of updated system configuration files will be sufficient.

6.9 FC5: Things to Do after Installing Red Hat Fedora Core 5 (FC5)

For FC5, I installed a lot of extras from the installation-DVD, so much of the work in customizing FC4 (described in §6.10 below) was not needed after the install. However, below are the things I did need to install afterwards.

- `yum install gv` [see remarks under FC4]
- `yum install lyx` [I use it to quickly look up symbol names for \LaTeX]
- `yum install octave-forge` [ditto]
- *Change default paper size in GNOME from A4 to Letter* (sigh)
In a shell, type `printconf-gui`, select printer, click Edit, select "Driver Options", change "Page Size" to Letter, click OK, click Apply. Repeat for each printer. Chasing this down cost me a couple of hours and a lot of wasted paper.
- `ln -s /usr/bin/perl /usr/local/bin/perl` [my scripts want it here]
- `yum install perl-libwww-perl`
- `perl -MCPAN -e shell`
`get Bundle::CPAN`
`get` [lots of things related to Web programming]
- Getting LaTeX2HTML Working
 - `yum install latex2html`
 - Install various bugfixes for latex2html (see §9 on page 102 for details)
- Download and install the `fluendo-mp3` decoder (you "purchase" it for \$0)
- `yum install gtk+-devel` [for `gtk-config`, which was needed by the software-MIDI-keyboard `clavinet` (a source tarball) and also by Faust-generated gtk UIs.]
- `yum install qt-devel` [for `qdu`, as I recall]
- Install tarball for `qdu`²⁴ [disk-space usage analyzer/manager]
(requires `qmake` from `qt-devel`)
To get `qdu` to compile, I had to comment out `"#include "directoryview.h"` in `qduInterface.cpp`.
- Install LaTeX utility `powerdot` for overhead presentations
 - Installed `fourier` (fonts used by `powerdot` – search for `fourier-GUT.tar.gz`)
 - Upgraded `xkeyval` before `powerdot` would compile – FC5 version not *quite* new enough
 - get `xkeyval.zip`: `wget ftp://tug.ctan.org/pub/tex-archive/macros/latex/contrib/xkeyval`

²⁴<http://linux.softpedia.com/get/Utilities/qdu-2228.shtml>

- A viable alternative to `powerdot` is `beamer.cls`, which is already distributed with `tetex` in FC5. If I'd known about `beamer`, I would have tried it first, since getting `powerdot` going requires a number of non-rpm installs. However, `beamer` does not use `pstricks` (in fact I read it is incompatible with it), and I'm already addicted to using `pstricks` to easily customize the slide background. I'm therefore hooked on `powerdot` already. The new FC5 user should probably try `beamer` first.
- Created (from the README file) a Makefile²⁵ for installing `xkeyval` on FC5. (`cd` to the top-level `xkeyval` directory and type `make`.) These changes will be whacked on the next FC5 update of `tetex`. You can try changing `TEXROOT` to `/usr/local/share/texmf`, but I like to give the official distribution a chance each update. After all, it *should* give us the latex `xkeyval`!
- Install tarball for Adobe Acrobat Reader (RPM not in Fedora extras).
- Install tarball for `pine`²⁶ [for email processing in a shell window]
The build command that worked was `build SSLDIR=/usr/bin lrh`
- Install Planet CCRMA [follow directions to set up repositories]
 - `yum install planetccrma-core` [kernel, sound drivers, and such]
 - `yum install audacity` [sound editor]
 - `yum install qjackctl` [jack control interface]
 - `yum install jackmix` [jack-based mixer]
 - `yum install jack-rack` [LADSPAA effects rack]
 - `yum install snd-gtk` [Bill Schottstaedt's sound editor]
- `yum install tcl-devel` [for pd]
- Install tarball for `pd extended`²⁷
- Install RPM for `RealPlayer`²⁸

The most annoying glitch in my FC5 installation was that I could not figure out how to mount my old FC4 system disk, because it was in “LVM” format and not already known to the FC5 system. I later learned that I should have “exported” it so it then could be “imported” on the new system. However, since I wanted to be able to boot my old FC4 system in the event something was amiss in FC5, I would not have wanted to try exporting the main FC4 system disk anyway. I ended up copying in my personal data from another (older) backup disk. Since I'm not using RAID, I plan to use `ext3` file systems for future Fedora systems.²⁹

²⁵<http://ccrma.stanford.edu/~jos/mypc/Makefile.xkeyval>

²⁶<http://www.washington.edu/pine/getpine/unix.html>

²⁷<http://prdownloads.sourceforge.net/pure-data/Pd-0.38.4-extended-linux-i386.tar.bz2?download>

²⁸<http://www.real.com/linux>

²⁹Actually, I plan to use the `ext2` file system, which is said to be compatible with `ext3` (just change the filesystem type in the mount command from `ext3` to `ext2`). I prefer `ext2` because files can be undeleted more easily. Apparently, `ext3` file deletions clear out more inode info making undelete infeasible (according to what I've read on the Web). I understand the main feature of `ext3` over `ext2` to be journaling, which avoids long `fscks` after a sudden power-down, etc. However, I think undelete is more valuable than journaling, unless someone can convince me otherwise.

6.10 FC4: Things to Do after Installing Red Hat Fedora Core 4 (FC4)

Below is a list of the things I needed to do after a fresh install of Fedora Core 4 (FC4). Nearly all actions required root privileges.

- Installation of Selected Fedora Extras:

- `yum install emacs` (!)
- `yum install gftp` [nice FTP client]
- `yum install yum-utils` [e.g., `yumdownloader`]
- `yum install tk` [needed by the Synthesis Tool Kit (STK)]
- `yum install samba` [for file-sharing over ethernet between Windows and Linux]
- `yum install samba-swat` [pulls in `xinetd` (!) and `system-config-samba` (!)]
- `yum install compat-gcc-32` [Usually “`./configure cc=gcc32`” is faster than debugging older code not compatible with the more strict `gcc-4.0`]
- `yum install octave` [runs most of my Matlab scripts]
- `yum install octave-forge` [for signal-processing tool-box items]³⁰
- `yum install gv`³¹ [has nicer page-positioning, document reload, etc.]
- `yum install xpdf` [has nicer link-following features than `evince`]

Be sure to look at the `xpdf` man page for complete set-up info. I *had* to manually create a `~/.xpdfrc` file containing

```
urlCommand "firefox %s"
psFile "|lpr"
```

- `yum install xfig` [for drawings — pulls in `transfig`]
- `yum install tetex-prosper` [for making slides/overheads in LaTeX]
- `yum install maxima` [Maxima³² is the original symbolic mathematics program. To get started, say `help`;`[return]`... pulls in Common Lisp, `libsigsegv` (user-mode page-fault handling), and `postgresql-libs` (database utilities)]
- Things needed for developing DSSI plugins for the `rosegarden` music sequencer. (If you are not going to develop applications or loadable plugins with GUIs, you can skip this whole group.)
 - `yum install gtk+` [gimp (and GNOME) toolkit — I need this to compile various dssi plugin GUIs]
 - `yum install gtk+-devel` [gimp toolkit header files etc.]
 - `yum install jack-audio-connection-kit-devel` [needed for DSSI plugin development]
 - `yum install anjuta` [“integrated development environment” for UNIX/GNOME]
 - `yum install glade2` [GUI builder used by `anjuta` - pulls in several `devel` packages]
 - `yum install devhelp` [for context-sensitive API documentation]

³⁰When I did this in 6/2005, it was necessary to edit and enable `/etc/yum.repos.d/fedora-extras-devel.repo`. However, this caused later updates (via “`yum update`”) to fail due to missing dependency `libc.so.6(GLIBC.2.4)` which was called for by `ginac`, which in turn is used by Octave. Disabling `fedoras-extra-devel` allowed `yum update` to continue. Now (9/2005), it appears `octave-forge` can be updated without enabling `fedoras-extra-devel`. It’s odd that *all* updates are aborted in `yum` when even one package hits a dependency problem.

³¹Fedora Extras include `gv` as of Oct. 27, 2005. Before that, it was necessary to deal with the source tarball: `gv-3.5.8.tar.gz` from <http://wwwthep.physik.uni-mainz.de/~plass/gv/>.

³²<http://maxima.sourceforge.net/>

- `yum install libgnomeui-devel` [GNOME libraries used by `glade2` - pulls in several more devel packages]
- `yum install libglademm24-devel` [needed to make the `ll-scope-0.2.1` DSSI plugin - pulls in five other “*24” packages]
- `yum install fftw3-devel` [need `fftw3.h` to make `libconvolve` which is needed to make the `dssi_convolve` plugin]
- RPM Installs from the Web (not in Fedora Extras)
 - `unrar`³³ [needed to unpack Sound Font files from the Web]
 - `scons`³⁴ [Build system used by `rosegarden` as a replacement for `autoconf`, etc.]
- Tarball Installs from the Web (not in Fedora Extras)
 - `qdu`³⁵ [disk-space usage analyzer/manager]
 - `valgrind`³⁶ [for catching out-of-bounds memory access and memory leaks in C programs]
 - `ps2eps`³⁷ [`ps2eps -B -C < infile.ps > outfile.eps` trims away excess whitespace in a postscript figure]
- Getting Samba working
 - Open Desktop / System Settings / Security Level / Modify Policy / Samba / Disable SELinux protection for the `smbd/nmbd` daemon [so WinXP can see things]
 - Desktop / System Settings / Server Settings / Services / Samba
 - * `smbpasswd -a me`
 - * add ‘`me = <Windows XP username>`’ to end of `smbusers`
 - Desktop / System Settings / Security Level / Firewall / [eth0 trusted]
- Edit `/etc/updatedb.conf` [to enable daily `updatedb`]
- `/etc/X11/xorg.conf: ctrl:nocaps`, or (better):
Desk Top / Preferences / KeyBoard / Ctrl Key Position / Alternate Ctl
- Evolution: answer questions to set up email
- `cp -rp /mnt/olddisk/usr/local /usr` [or just copy what you still want]
- `cp -rp /mnt/olddisk/home/me /home/me-new`
 - I prefer to move in old stuff as needed to eliminate old junk.
 - Be very careful when copying configuration files `~/.*`, since they may change format across major releases. I copy very few of these “dot files”, and I look them over first when they are important (such as Evolution email directories, etc.). Before copying, be sure to move the newly installed version to a new name as a backup.

³³<http://rpmfind.net/linux/rpm2html/search.php?query=unrar>

³⁴<http://dag.wieers.com/packages/scons/scons-0.96.1-2.2.el4.rf.noarch.rpm>

³⁵<http://linux.softpedia.com/get/Utilities/qdu-2228.shtml>

³⁶<http://valgrind.org/>

³⁷<http://www.tm.uka.de/~bless/ps2eps>

- Desk Top / System Settings / Printing / Set HP Laser Jet as PostScript printer
- Getting LaTeX2HTML Working
 - `yum install latex2html`
 - Carry forward bugfixes for pstoining and latex2html (all have been reported, but few have been incorporated—it is not clear that LaTeX2HTML is actually being maintained). See §9 on page 102 for some of the bugfixes.
 - Disable QV override in `/usr/share/texmf/dvips/misc/alt-rule.pro` This fixes the gray underbar problem in math images.
 - comment-out hyperref usage in my standard L^AT_EX header file (seems to be built in now)
 - *Immediately* start using the new latex option “`-file-line-error`”!
 - Start using the new latex option “`-output-format pdf`”.
- `ln -s /usr/bin/perl /usr/local/bin/perl` [my scripts want it here]
- In Desktop / System Settings / Network

Change 'localhost.localdomain' to '<preferred hostname>.localdomain'

In root shell: `/sbin/service network restart`

(This causes GNOME to complain on login - can't find address of hostname.
FIX: add hostname.localdomain as EXPLICIT synonym in `/etc/hosts`)
- Desktop / System Settings / Server Settings / Services

Turn off bluetooth, PCMCIA, Red Hat update checks

Turn on yum updates
- `cp -p daily-mirror.cron /etc/cron.daily/`
(daily backup = “slow RAID-1” — see §7 for `daily-mirror.cron`)
- Miscellaneous Optional Installs to Consider
 - `yum install thunderbird` [Most popular email client among Linux Journal readers— Evolution #2]
 - Find and install acroread, gpdf [for orthogonal pdf viewing/printing support]
 - `yum install gsview` [alternate postscript viewer]
 - `yum install gnumeric` [alternate numeric spreadsheet like MS Excel]
 - `yum install python-matplotlib` [makes nice figures from numeric]
 - `yum install bonnie++` [disk benchmarks]
 - `yum install gnotime` [time tracker]
 - `yum install pdftohtml` [I prefer LaTeX2HTML in general, but this is worth a look]
 - `yum install subversion` [nice version control app, extends CVS]
 - Install Dropbox from the Web [more convenient computer-file-synching than `svn` when no version-control needed]
 - `yum install nautilus-dropbox` [Dropbox integration for Nautilus]
 - `yum install eclipse-platform` [integrated development environment for Java, C++, etc.]
 - `yum install yumex` [GUI for yum]

- `yum install BibTool` [`bibtool` manipulates `bibtex` citation databases (used with `LATEX`)]
- `yum install HelixPlayer` [media player that works with Web browsers such as `firefox` et al.]
- `yum install alsa-tools` [ALSA command-line tools for specific hardware such as an FM OPL2/3 loader for ALSA (`sbiload`) - pulls in `ftk`]
- Install Planet CCRMA
To make `yum` aware of the Planet CCRMA package repositories, I use a modification of the files by Benjamin Hardy:

```
cp -p planetccrma.repo38 /etc/yum.repos.d/  
cp -p RPM-GPG-KEY-planetccrma39
```

Alternatively, one can use `apt` as described⁴⁰ in the online doc. After the `gpg` key and `yum` repository pointers are installed, one can look search for all packages starting with “planet” in `yumex`. Here is what I installed (listed as if done from the command line):

- `yum install planetccrma-core-edge` [installs the basics]
- `yum install planetccrma-audiovideoapps` [installs all apps]
- `yum install planetccrma` [installs a copy of the online doc, package lists, configuration files, etc., in `/usr/share/planetccrma/`]

Note that `yum install planetccrma-core-edge` is not needed if you do not need the low-latency kernel and replacement ALSA sound driver kernel modules. (I needed this for sure to obtain the `snd-echo3g` driver, which supports my Gina 3G audio hardware interface.) Another option is `planetccrma-core`—see the Planet CCRMA instructions for details.

Note that whenever the ALSA drivers are installed, such as after installing Planet CCRMA, it is necessary to unmute and set the gains on your audio output channels using `gamix` or `alsamixer`. The updated settings can then be stored by typing (as root)

```
/usr/sbin/alsactl store
```

This saves current sound settings for the ALSA driver in a system configuration file. Without this, you have to unmute and set gains on all channels after every reboot.⁴¹

- Incompatibilities
 - `nedit` replaced by `gedit`
 - `gv` and `xpdf` are replaced by `evince`, but I’m addicted to many features of the former tools that were not carried forward. Since `TEX` can now output PDF directly, I am trying not to use postscript any more. However, I do not yet have a replacement for `gv`

³⁸<http://ccrma.stanford.edu/~jos/planetccrma.repo>

³⁹<http://ccrma.stanford.edu/planetccrma/RPM-GPG-KEY.planetccrma.txt/etc/pki/rpm-gpg/>

⁴⁰<http://ccrma.stanford.edu/planetccrma/software/installtwosix.html#installsignature>

⁴¹ On my system, it was also necessary to type

```
/usr/sbin/alsactl restore
```

after each reboot. I do this in my own sound initialization script, where I also say `qjackctl -s`. This is supposed to happen in the ALSA sound startup script.

on the output of `psnup`. I think `xpdf` may be adequate for my needs, so we'll see how it goes. As of 11/2011, I still like it better than Evince or Acrobat Reader 8 (great key equivalents, keeps its slide-bars positioned,...).

- Broken things I'm avoiding at present

- `yum install mathml-fonts` [Math Markup Language fonts]

This enables MathML display in `firefox` when, additionally, `pango` (<http://www.pango.org/>) is disabled in `/usr/bin/firefox` (see <http://lists.linuxcoding.com/rh1/2005/msg31103.html>) and math fonts from Wolfram Research are installed (see <https://www.redhat.com/archives/fedora-list/2005-September/msg02194.html>). It is known that Pango is incompatible with MathML (see https://bugzilla.redhat.com/bugzilla/show_bug.cgi?id=150393), and disabling Pango in `firefox` allows it to display MathML. However, `firefox` aside, installing `mathml-fonts` also broke many fonts used by Terminal (characters were replaced by graphical elements and smiley faces, etc.). I worked around this by selecting a working font (Courier 10 Pitch) under Edit / Preferences / General in Terminal. More seriously, however, all GUI fonts in `kile` (a KDE WYSIWYG LaTeX editor that I don't use but wanted to try out) were similarly clobbered. `yum remove mathml-fonts` fixed the problem. I plan to try again after some number of `yum` updates have gone by.

7 Backups

For backups, I now use three methods:

- Dropbox for text and PDF files I want on multiple computers.
- Incremental mirroring (using `rsync`) from disk to disk on a daily basis. I think of this as a manual replacement for RAID (which maintains the ability to recover from unintended deletions—I have used this feature!).
- Subversion for things I want on multiple computers with version control.

Under Linux, I use `fwbackups` and am quite happy with it. It just backs up the internal hard drive to an external drive once per day early in the morning.

Other command-line tools that people use for backup on Linux systems include `rsnapshot` (written in perl, based on `rsync` itself) and `rdiff-backup` (written in python). A nice feature of `rdiff-backup` is that it stores compressed deltas of changed files. However, I am only interested in keeping the latest version of everything, preferring to rename files with a date embedded in the filename if there is any need for that. I hear `rsnapshot` is a lot like *Time Machine* on the Mac, but without the GUI. That is, it performs backups at different levels (hourly, daily, weekly, etc.). According to info on the Web,⁴² "... `rdiff-backup` is closer to a version control tool and `rsnapshot` closer to a traditional backup solution."

For Windows, the whole virtual machine file is backed up along with my regular Mac OS X backups. Since it is over 100 GB, I "exclude" it most of the time, and in the meantime back up

⁴²<http://www.saltycrane.com/blog/2008/02/backup-on-linux-rsnapshot-vs-rdiff/>

my user data files (Eudora, Quicken, TurboTax) into files shared on the Mac and therefore backed up separately by Mac Time-Machine backups.

Before moving Windows into VMware Fusion, I used to run Beyond Compare nightly on Windows to mirror one disk to another. I sometimes also ran rsync under Cygwin, e.g., using the alias

```
alias
mebkp 'rsync -avu /cygdrive/c/me/ /cygdrive/d/me'
```

(in my `/.tcshrc` file). Note how windows disk drives must be addressed under `'/cygdrive'` (something that took me a while to figure out). Beyond Compare is great when you want to really study the differences before copying across. I also use it over Samba to compare two different directories on my Linux machine.

7.1 Automating Passwords in rsync over ssh

Each time you run `rsync` over `ssh`, you are prompted for your password. You can make that go away as described at <http://mah.everybody.org/docs/ssh>⁴³. When I first tried this, it didn't work because of wrong permissions in `/.ssh` on the server, `chmod -R go-rw /.ssh` on the server fixed it. For each new machine, I only need to do the following two steps:

```
ssh-keygen -t dsa -f ~/.ssh/id_dsa -C "me@newmachine"
cat ~/.ssh/id_dsa.pub | ssh me@server 'cat - >> ~/.ssh/authorized_keys'
```

8 Fighting SPAM

For fighting email SPAM, I use

- Active Spam Killer (ASK)
- `procmail` filters
- A “catch-all” email account on a private ISP

My email first passes through `procmail` filters which are set up in the file `~/.procmailrc`. First, email from known mailing lists is routed to `evolution` email folders for later search and perusal. Then, remaining email is filtered through `spamassassin`, which is configured rather conservatively to avoid false classification as spam. Anything declared as spam is simply deleted because I found it completely impractical to check my spam folder for misclassifications (too much spam). Finally, email that survives `spamassassin` is piped through Active Spam Killer (ASK)⁴⁴ for final delivery.

ASK is a set of light-weight `python` scripts providing a simple challenge-response barrier for first-time email senders. After responding once, senders are automatically whitelisted by ASK. (They are then easily moved to an ignorelist or blacklist if needed.) The default “challenge” is simply to simply reply to the challenge-email. It would be easy to add a question or two if that ever becomes necessary. In my experience so far, spammers do not provide a working return email path, so they have no opportunity to enable their email for delivery. Their undelivered email eventually expires in the ASK queue and is quietly deleted.

⁴³<http://mah.everybody.org/docs/ssh>

⁴⁴<http://www.paganini.net/ask>

Many vendor websites require email addresses. I give them an email address of the form `companyname@mydomain` so that I can create an automatic filter-folder for them in `.procmailrc` (when their email might be important), or I can more easily ignore it when it's just self-promoting advertisement (which is the norm). It is also interesting to see which companies evidently sold my email address to spammers. My ISP automatically forwards all unrecognized email to my domain to a “catch-all” email account. In principle, this same “tagging” approach can be used at gmail by using addresses of the form `you+companyName@gmail.com`. However, in practice, most company websites do not accept ‘+’ in an email address, in my experience. I retrieve this “tagged email” from my catch-all email account on a particular home machine, sorting directly to `evolution` folders via `procmail` filters. This keeps it separate from my work email and minimizes the time spent looking at it. Once in a while I might search the folder for a particular company to see if there are any upgrade notices, etc.

9 Getting LaTeX2HTML *Really* Working

There are five bugs in the latest release of LaTeX2HTML that I am aware of. I used to keep having to patch every time I upgraded my OS or built a new machine, etc. To eliminate this hassle, I finally bit the bullet and created a new fork of LaTeX2HTML that either fixes or gets around all known bugs that were biting me. See http://ccrma.stanford.edu/~jos/webpub/Installing_LaTeX2HTML for further details and a download pointer.

10 Playing Sounds from PDF Presentations

As mentioned above, I use `powerdot` for generating overhead presentations in PDF format from LaTeX source. In this section, I describe how I make clickable sound links in PDF presentations.

The \LaTeX macro invocation

```
\soundexamplewav{Bb Clarinet}{bcq705}
```

creates a link “Bb Clarinet” in the PDF which plays the soundfile `bcq705.wav`. The macro `\soundexamplewav` is defined as

```
\newcommand{\soundexamplewav}[2]{\href{\playcmd \wavpath{#2}}{#1}}
```

and

```
\newcommand{\wavpath}[1]{\soundpathroot/wav/#1.wav}
```

where, for Web documents, I use

```
\newcommand{\playcmd}{} % just use a bare URL, no ‘‘command’’
\newcommand{\soundpathroot}[1]{http://ccrma.stanford.edu/~jos/}
```

while for on-the-road, self-contained laptop presentations, I use instead

```
\newcommand{\soundpathroot}[1]{..}
\newcommand{\playcmd}{run:} % Windows PDF
%\newcommand{\playcmd}{run:play } % Linux PDF
```

These PDF soundfile links are just like media links in HTML Web pages: The application registered for “.wav” files is launched to play the sound in the usual way when you click on the link. Therefore, it is good to find a sound-player that does not insist on bringing a window to the foreground, since that distracts from the full-screen presentation mode. For windows, I find WinAmp (any version) to be perfect for this purpose. For Linux, in Firefox, go to Edit / Preferences, select the Content tab, select “File Types .. Manage...”, and set your soundfile handler there (*e.g.*, a shell script that invokes the `play` command installed by `sox`).

11 Networking

My machines connect to DSL via a typical Linksys “gateway” device. I use as many static IP addresses as possible (everything but my notebooks). This is because dynamic address assignment by the Linksys (via DHCP) *does not support host names*. I find this to be completely absurd. The DHCP base level protocol should require a table of host names to be maintained, along with DNS lookup interception for those names. Somebody really dropped the ball on this one, in my opinion.

In the setup pages of the Linksys gateway (accessed from a Web browser), one is referred to two services for setting up host-name support (called DDNS). One of them is free, so I guess that’s not so bad, but the set-up effort looked like a lot more work than simply hard-wiring all but one of my IP addresses. Just reading the FAQ would have been more work!

You really want your notebook in DHCP mode when you take it out in the world. It is not obvious to me how to select different wireless “profiles” under Linux, but you can do that under Windows.

One helpful trick is to limit the DHCP assigned address-range in the gateway to the number of notebook computers you have. In my case, I can get it down to two, so I have a 50/50 chance of guessing it on the first try when I need to ssh to it from some other machine on the local network. I also set the assigned-address timeout as high as it will go (9999 minutes \approx one week — setting it to 0 means one day — another bug in my opinion).

12 Printing

I find I need two printers, one laser and one inkjet. I need the inkjet for color occasionally, but laser output is far superior for everything else I do.

12.1 HP LaserJet 1220 Laser Printer/Copier/Scanner

For laser printing, I have an HP LaserJet 1220 attached to the parallel port of my Linux machine. It was very simple to set this up under Linux using the `printtool`. The printer is supported, and I chose a “postscript driver” for it (the recommended driver, according to the LinuxPrinting.org database).

The printer seems to work on all black-and-white level-2 postscript documents. Unfortunately, sometimes color plots cause it to cough up an error code and abort the document. To solve this, I created a printer share in `/etc/samba/smb.conf` which exports the printer to Windows, then installed the HP software that came with the printer on Windows. For some reason, the installation software could not find the printer, even though it was visible when browsing my Linux machine under “Network Places.” I had to explicitly type in the path name to the printer share

(\\<hostname>\hp-laserjet-1220) during the driver installation. This did solve the color printing problem: now colors are converted to gray levels as one would expect.

Here is my printer share in `/etc/samba/smb.conf`:

```
[hp-laserjet-1220]
  comment = Linux laser printer/scanner/copier
  path = /var/spool/samba
  valid users = me
  browseable = yes
  read only = no
  guest ok = yes
  writable = no
  printable = yes
  user = me
```

12.2 Brother MFC7150C Inkjet Printer/FAX/Copier/Scanner

On my Windows machine, I have a Brother MFC7150C Multifunction “6 in 1” inkjet printer. It never worked properly under Windows 2000 Professional, but finally it does seem to work properly under Windows XP.

A warning regarding OS upgrades with Brother printers: The Windows 2K driver was months late, and it had severe bugs. Even worse, the updated driver a year or so after that also had bugs! The worst problem was that plain text turned to gibberish after the first page or two, as if the fonts bitmaps are getting clobbered in the printer’s memory. However, it must be a software problem since it did not happen under NT. Web pages and graphics-intensive output always seemed to print ok, although the inkjets are almost always a little too dry to give high quality. I have no intention of buying another inkjet printer in the foreseeable future. I greatly prefer laser technology, even if it means giving up color.

Another losing behavior is that received FAXes are usually *completely blank* because the inkjets are dried up and need to be “cleaned”. Fortunately, it is possible to configure the machine to retain FAXes in memory so they can be printed out again after cleaning the jets, but this is of course a pain.

13 Scanning Figures

My scanner (an HP LaserJet 3380 all-in-one) is attached to my Windows XP machine. Here is how I obtain half-way decent scanned figures into PostScript format (which I need for a variety of reasons):

- Scan into a Word document (Insert / Picture / from scanner)
 - Select a *customized scan*
 - Set the resolution to maximum (600 dpi in my case)
 - Set for black and white, when possible
 - Darken brightness to -20 or so
 - Do not trust scan rectangle to be accurate in the scan preview

- Save the Word document (.doc) as a Web document (.html)
This creates both .png and .jpg of the scanned images.
- Edit the .png files in gimp to crop, etc., then save in place.
- Convert to eps using the pnm tools, *e.g.*,

```
pnmtops image005.png > image005.eps
```

Note: Saving as eps in gimp gives bad results. There are also many, many other ways to get bad results (blurry, noisy PS images). There are probably ways to get better results as well. Please send me email if you know!

14 Windows

I run Windows in a VMware Fusion virtual machine. As mentioned above, I need it mainly for Eudora and Quicken. When gmail catches up to Eudora in features, and when Intuit gets its act together on Mac OS (or a competitor beats them to it), I plan to stop using Windows other than for checking in on it once in a while to see what they're up to. Only a few miscellaneous notes are logged here.

14.1 Windows 10

- Install Cygwin
- Make shortcut on the Desktop to a cygwin shell window, and run it as administrator (from right-click menu):

```
ln -s /cygdrive/c /c
```

15 Hardware

This section describes my PC hardware, in reverse chronological order.

The network environment consists of a DSL modem connected to a wireless-G broadband router (presently a LinkSys WRT54G). The router has four ethernet connectors, and two are occupied by my Mac Pro and Linux machines. The wireless capability is nice because it supports internet in our guest room over 100 feet away, as well as incidental notebook usage around the house, and even outside.

The router provides firewall services and network address translation, etc. I turn off all outside access via the firewall so that I can be relatively lax about security on the private internal network. I might enable the `ssh` port for outside logins occasionally, such as when I'm traveling. Since the wireless connection bypasses the firewall, it is set to use maximum encryption.

15.1 Why Build Your Own Machine from Pieces?

If you have supported a PC for a number of years, you have probably seen enough to be able to build your own PC from components. The main reasons I chose to do this were

- It is the only way I know to obtain adequate documentation on all system components.
- It's highly cost effective, especially for high-end configurations.
- You can build exactly to your needs.
- You can add extra power where it really counts.
- Hardware upgrades are more straightforward and inexpensive.

The main drawback to this approach is that you have to be prepared to spend an indefinite amount of time resolving problems. There probably won't be many, and if you're experienced, there may be none, but it doesn't take many issues to soak up days of your time. Be sure to search the Internet and websites of your vendors for compatibility issues if you hit any snags.

In my experience, considering the value of my time (at least when measured in lost outside consulting time), the total cost of ownership is far less when buying a checked-out system such as from Apple or Dell. On the other hand, I value the education I have obtained from building and trouble-shooting my own machines, and I will continue to make Linux PCs from scratch in the future. Besides, I'm naturally optimistic, and surely the problems won't be as difficult as they have been in the past (☺).

15.2 Motherboard Upgrade, December 2009

My home-office Windows machine, last upgraded in 2005 (see §15.8 below), suffered a power-supply failure that also took out either the graphics card or motherboard or both. I suspect the graphics card since the LEDs show me that the BIOS is checking the two CD-ROM drives for a bootable disk. Since Windows is working fine inside a VMware Fusion virtual machine (see §5.4 below), I decided to convert this machine to a Linux box.⁴⁵

For this upgrade, I found an ASUS-Gigabyte top-of-the-line board comparison⁴⁶ that was informative. I decided to get the “premium” ASUS board, since it has 2 PCI slots while the more-reviewed “deluxe” (\$30 less) board does not (all PCIe).

For the CPU, I chose the i7-860 — only 95 Watts! I considered the i7-870, which is also 95W, but it costs almost twice as much and is only slightly faster (2.93 GHz vs. 2.80 GHz). In a few months the 's' versions should be out at only 82W. On the Web, I found a nice comparison of the main i7 alternatives.⁴⁷ I also considered the i7-920 (130W), because I like the idea of triple-channel DDR memory, but the benchmarks did not seem sufficiently better to me. It also has the older, hotter, north-bridge/south-bridge design, while the i7-8xx have the more unified P55 glue chip. The P55 chip (called a “chipset” for some reason) and the i7-800 Lynnfield CPU appear to have been introduced only a few months ago (September 2009).

It looks like DDR3-1333 is the top of the line memory-wise (said to easily crank up to 1600 or even 1866 MHz). I chose initially 4GB and perhaps later 8GB of 1600MHz memory.

For the graphics card, I decided on a relatively low-end Sapphire Radeon 4650 card (said to be cool and quiet). I don't want to tax my 500W power supply, and I don't plan to do much in the way of 3D graphics.

In summary, the upgrade components are as follows (adapted from my Newegg shopping cart on December 9, 2009—the Antec green 500W power supply was around \$60 from Best Buy, as I

⁴⁵When the new graphics card arrives, also PCIe-16x, I will see if the old 2005 motherboard still works, and if so, try to fix it up in another old case I have and give it away, or use it as a networked PATA disk server, etc.

⁴⁶<http://www.hardwarezone.com/articles/print.php?cid=6&id=3068>

⁴⁷<http://www.guru3d.com/article/core-i5-750-core-i7-860-870-processor-review-test/2>

recall):

- \$54.99 - SAPPHIRE 100253HDMI Radeon HD 4650 512MB 128-bit GDDR2 PCI Express 2.0 x16 HDCP Ready CrossFireX Support Low Profile Video ... - Retail Item #: N82E16814102829
- \$149.99 - CORSAIR DOMINATOR 4GB (2 x 2GB) 240-Pin DDR3 SDRAM DDR3 1600 (PC3 12800) Desktop Memory Model CMD4GX3M2B1600C8 - Retail Item #: N82E16820145264
- \$279.99 - ASUS P7P55D-E Premium LGA 1156 Intel P55 SATA 6Gb/s USB 3.0 Intel Motherboard - Retail Item #: N82E16813131606
 - http://www.asus.com/Motherboards/Intel_Socket_1156/P7P55DE_Premium/
 - (2) PCIe x1 slots (small and medium blue, serial)
 - (2) PCI slots (light blue, legacy PCI)
 - (2) PCIe 2.0 x16 slots (dark blue, x16 or dual x8 link)
 - (1) PCIe 2.0 x8 slot (white, at x8 link)
 - (2) Gigabit LAN controllers: Realtek 8112L / 8110SC

A PCIe 2.0 x16 slot is good with a PCI Express x16 graphics card, and the two can be SLI-connected.

- \$289.99 - Intel Core i7-860 Lynnfield 2.8GHz LGA 1156 95W Quad-Core Processor Model BX80605I7860 - Retail Item #: N82E16819115214
- FREE - Transcend JetFlash V30 4GB Flash Drive (USB2.0 Portable) Model TS4GJFV30 - Retail Item #: N82E16820208060 -\$12.99 Saving on \$12.99 (tossed in with the CPU)

The free 4GB flash drive is a nice touch. Since the Linux DVD image is 3.3GB, I tried to install Fedora 12 x86_64 from it. Unfortunately, I could not find a way to make the ASUS motherboard boot from a USB drive. So, I had to burn a DVD-R and boot from it as usual.

So far I am quite happy with this system. It is very fast, yet relatively low-power and cool-running.

I hit two small snags building this machine:

- The CPU fan was hitting its power cable, making a lot of noise. I had to pull the cable out of its plastic guide channel in order to keep it away from the blades.
- I completely forgot about the second smaller power connection to the motherboard (a small 4-pin connector arranged in a square, said to carry 12 volts). When this power is not present, the board powers up and everything looks fine, but there is no POST sequence.

Fedora 12 installed perfectly with no issues. I will say, however, that the distribution was confusing. It appeared to include a sha1sum for the .iso image, but it was instead for the gpg signature. I downloaded the .iso image twice thinking I had a bad one the first time. The checksum for the distribution is in the .iso image itself, and it gets checked when you click the “Test” button at the media-check stage after booting from the .iso image.

Another odd thing was that I can't plug my USB keyboard into just any USB port. I have to remember to use the top right connector when viewing the back of the computer. Similarly, I have to remember to use the bottom-right ethernet connector (which is reasonable since the two connectors should be separate devices `eth0` and `eth1`).

I haven't figured out how to print to a networked Brother 2170 laser printer yet...

Things done after a standard F12 install with "desk-top publishing" checked (which seems mainly to load OpenOffice) are listed in §6.3.11.

15.3 New Crucial m4 256 GB SSD Drive, December 2011

Installation was uneventful—like any hard drive. It runs very cool compared to the other hard drives in the bay. See §6.4.3 regarding installation of Fedora 16 on it.

15.4 New KVM Switch, May 2009

My Mac Pro and Linux machine now share a single monitor (Dell 2407 24" flatscreen LCD monitor) and the Mac-Pro keyboard and mouse (both USB). This two-port sharing is implemented by a Belkin F1DG102D "Flip" DVI-D KVM Switch. I love this switch because all you need on your desk is the remote button, which has a small LED dot that is yellow for one computer and green for the other. The switch itself has no UI and can lie on the floor near the computer towers. (It's actually hard to do otherwise because one of the two monitor cables built into the switch is only about two and a half feet long.) In other words, the switch looks more like a cable Y-adaptor than a piece of gear—nicely done.

Previously I had a Belkin OmniView two-port KVM switch (for analog VGA and PS2 mice/keyboards), and it was a solid performer. I love it when a piece of hardware functions for years with no trouble whatsoever until it becomes obsolete (at least in my current setup—I hope to find a good home for it somewhere else).

The Mac Pro displayed immediately, which makes sense because it was previously going into the digital input (DVI-D) of the monitor, so its display settings were already compatible. The Linux box, however, had previously been going into the analog monitor input (VGA), and its display settings turned out not to be compatible with the digital monitor input—the screen was simply black, as if there were no signal at all. I luckily solved this problem on the first try by reverting to the standard VESA driver:

In `/etc/X11/xorg.conf`:

```
...

Section "Device"
    Identifier "VideocardVesa"
    Driver      "vesa"
EndSection

...

Section "Screen"
    Identifier "Screen0"
```

```

# (previous setting using Driver "radeon"):
#   Device      "Videocard0"
# (new setting selecting the VESA Driver):
#   Device      "VideocardVesa"
#   Monitor     "Monitor0"
#   DefaultDepth 24
#   SubSection "Display"
#       Viewport 0 0
#       Depth    24
# (previous setting using Driver "radeon"):
#   Modes      "1920x1200" "1600x1200" "1280x1024" "1024x768"
# (I left out the Modes line in order to let it autoselect.)
#       EndSubSection
EndSection

```

The autoselected resolution was 1600 × 1200 at “0 Hz” (which I presume lets the monitor choose the refresh rate).

The Mac Pro USB mouse immediately worked fine for the Linux box as well as the Mac Pro. Switching back and forth seems to cause no problems.

The only loser is Linux trying to use the Mac Pro keyboard via the KVM switch. The two problems so far are

1. Caps-lock behaves like caps lock instead of Ctrl, as I specify in my layout options [Fedora 10 only — problem gone in Fedora 11]
2. The emacs meta key is mapped to the Option key instead of the Command key

If I change my keyboard type in (Fedora 10) System / Preferences / Hardware / Keyboard / Layouts, the caps lock key gets fixed temporarily. Unfortunately, I have to do this every time I switch from Mac to Linux. A cheesy workaround is to leave the Keyboard Layout Options window open, and after switching to linux, change something and change it back. I originally changed it from “Microsoft / Microsoft Natural Keyboard” (my previous Linux keyboard) to “Apple / Macintosh” (or “Apple / Apple”). Upon further experience, it doesn’t appear that changing the keyboard type helped at all, only the fact that I changed the type from anything to anything else.

Red Hat declares KVM switches to be officially *unsupported* (see https://bugzilla.redhat.com/show_bug.cgi?id=kvm), so there is no point trying to report the bug against Fedora 10. In any case, it looks like an X11-Gnome interaction bug to me.

For lots of useful related info, see https://bugzilla.redhat.com/show_bug.cgi?id=446684

My workaround is to toggle my Keyboard Layout Options between

```
options = [ctrl ctrl:nocaps]
```

and

```
options = [ctrl ctrl:ctrl_ac]
```

(I go back and forth between these in the Keyboard Layout Options panel to fix the caps-lock problem after switching the KVM to Linux.)

Note that

```
gconftool-2 --type string -s /desktop/gnome/peripherals/keyboard/kbd/options
"[ctrl ctrl:nocaps]"
```

does not work. While it does set the options, caps lock is still caps lock. Only making a change in the GUI has any effect.

Ironically, using `ssh -X` to the Linux machine from the Mac works great. Caps lock does the right thing, and even emacs works properly using the Command key for meta. I suppose I don't normally need the KVM switch after all.

I'm going to limp along with these keyboard problems for a while before giving up and going back to using a separate, directly connected keyboard for the Linux machine. It fortunately seems to be ok to use my PS2 keyboard (a Microsoft Natural Keyboard) and Mac Pro USB keyboard hooked up at the same time. However, I find it difficult to switch between the Natural keyboard and the Mac Pro keyboard due to the very different physical layouts.

15.5 Motherboard Upgrade, July 2008

My home-office Linux machine, built in 2003 (see §15.9 below), was a pretty lucky “sweet spot” in the evolution of PC hardware, and it served very well and snappily over the past five years. While it continues to work fine when left on all the time, it typically freezes during bootstrap, and I fear a hard failure is imminent. Also, I give myself permission to upgrade any machine after three years, and it's been five years.

For this upgrade, I mostly followed the *Maximum PC* online article “Budget Badass Buyer's Guide — Updated Prices and Parts For July 2008.”⁴⁸ I have subscribed to *Maximum PC Magazine* for years, and always enjoy it. While I don't really do enough graphics-intensive work to warrant the latest PCI-E Radeon 4850 GPU, I couldn't resist. (I also want to pursue programming the 800 GPU stream processors for non-graphics applications — the SDK is available.) [I ended up regretting this four years later when the card died due to its fan wearing out. I never got around to much GPU programming, nor much graphics work at all. Instead, I had a relatively expensive, noisy, hot, weakest link in my system.]

15.5.1 Upgrade-2008 Parts List

The following cost about \$600 at newegg.com:

- MSI P35 Neo2-FR LGA 775 Intel P35 ATX Intel Motherboard, Retail, \$120
- Intel Core 2 Quad Q6600 Kentsfield 2.4GHz LGA 775 Quad-Core Processor Model BX80562Q6600, Retail, \$210
- Patriot Extreme Performance 4GB (2 x 2GB) 240-Pin DDR2 SDRAM DDR2 800 (PC2 6400) Dual Channel Kit Desktop Memory Model PDC24G6400LLK, Retail, \$88
- VisionTek 900241 Radeon HD 4850 512MB 256-bit GDDR3 PCI Express 2.0 x16 HDCP Ready CrossFire Supported Video Card, Retail, \$190
(The Maximum PC choice is the VisionTek Radeon HD 4870 card, which is a little faster but costs \$300.)

⁴⁸<http://www.maximumpc.com/>

In addition, I had to upgrade my 380W power supply (in an Antec Sonata case) to something over 600W. Diverging from the Maximum PC choice (which wasn't available at Newegg), I picked up a 650W Antec Earthwatts power supply at Fry's. Note that this power supply only has one 6-pin PCI-E connector, while the Radeon HD 4870 (which I chose to downgrade to a 4850) requires two such connectors. However, VisionTek includes an adaptor cable that connects a 6-pin PCI-E connector to two PATA-style power connectors (*i.e.*, the older, pre-SATA, four-pin hard-drive power connectors).

[Update 2009-08-18: The CPU fan and case fan failed over the summer, presumably due to the ambient temperature going too high. Both fans were hard to turn by hand. The CPU seemed to sense the overtemp and power down in time to save everything from heat damage. It seems likely the case fan failed first, being many years older. I suppose this is an example of how one cannot use a nice case "forever".]

[Update 2013-01-13: The GPU fan failed after being off for a month (winter break). Replaced with a \$40 Sapphire Radeon HD 6450 1 GB DDR3 HDMI/DVI-D/VGA PCI-Express Graphics Card 100322L.]

15.5.2 Upgrade-2008 Headbutts

Here are the problems I encountered with this upgrade:

- Initially, the system would not boot due to `/etc/fstab` having some explicit mounts listed which were no longer possible (it should have just booted up without those mounts, in my opinion, but instead it died when it couldn't `e2fsck` the failed mounts). I booted the F8 DVD in rescue mode, made a minimal `fstab` (involving `VolGroup 00` only), and then it was ok. I don't think it mattered what SATA port I plugged the boot-drive into (due to the drive being "labeled"), but I plugged it into SATA1. (It was SATA2 on the previous motherboard.)
- Next, X could not launch (understandably). I let the error-handler reconfigure for generic 800x600 VGA mode (the VESA driver), then downloaded the proprietary ATI Radeon driver (`ati-driver-installer-8-6-x86.x86_64.run`, obtained from <http://ati.amd.com/support/driver.html>), ran it, chose the precompiled Red Hat driver `fglrx v8.501` ("for X.Org 7.1 or later"), logged out and back in, and everything seemed fine until the next reboot (see below).
- My HP laserjet 1220 did not work at first because the new motherboard has no parallel port — Doh! Fortunately, when you take it apart (wincing as bits of plastic sound like they are breaking off and flying in all directions — perhaps I should oil the case a bit), you find that it also has a USB port, so I just had to dig up a cable. Phew!
- On my first reboot, it hanged after starting `udev` (presumably reading the `xorg.conf` file, in hindsight). Rebooting in single-user mode, I determined it was the ATI Radeon driver (`fglrx`) that was hanging. I reverted to the backed up `xorg.conf` in `/etc/X11`, which called for a standard VESA driver, and then I could reboot. Originally I had installed the recommended ATI driver for generic X11 systems. Since I was losing, I tried building one specifically for Fedora/F8. (The `--listpkg` option lists all supported cases.) Alas, the build failed with the following message:

```
error: %changelog entries must start with *
```

Talk about a bozo bug! I got the same failure trying to build for Fedora/F7 and Fedora/FC6. Finally, simply reinstalling the generic `fglrx` driver as I did originally worked. (Exiting single-user login proceeded to run-level 5 which worked normally.)

- After the next reboot, same problem! Apparently, I have to boot up in single-user mode, then exit to go to run-level 5! Otherwise the machine just reboots over and over again. I verified that the `radeon` driver did not work at all (“no devices”); it might actually function if the source were hacked to list the 4850 as a known variant, but I’m going to limp along with the `fglrx` driver for now.
- Update 12/25/2008: The bozo bug is fixed in `ati-driver-installer-8-12-x86.x86_64.run`. Now the driver is automatically rebuilt for whatever kernel is running. I’ve tested F8, F9, and F10 at this point with no problems taking all default selections. I have not yet tried to change the screen resolution.
- Something changed my network settings from a fixed IP address to DHCP! Windows XP / Samba took it in stride, but other machines could no longer find my Linux box. I re-entered the fixed IP address et al. in “System / Administration / Network”, typed `service network restart` in a shell, and things were back to normal.

I am pleasantly surprised by how cool and quiet the new system is. Since it draws much more power, I was worried that my old Antec Sonata case would not pull out enough air with its one quiet fan in the rear. So far, however, the core temperatures reported by `lm_sensors`⁴⁹ are always less than 40°C under “normal” maximum load for me (compiling a large book in LaTeX). The “red line” is said to be at 100°C. In contrast to this, my two-year-old HP Pavilion notebook (§6.7) idles at core temperatures in the 60s (AMD Turion64 dual-core), and a long project compile drives them up into the 80s and 90s. (The laptop has also shut itself down several times due to overheating.)

15.6 Mac Pro, May 2008

Nothing to say about this — it just worked right out of the box! Actually, I could note that it took me a while to figure out how to get the CD-ROM drive to open (“where’s the button next to the drive?”), and the headphone jack was initially dead for reasons I’ll probably never understand (see §5.4 for more on this). The tiny physical manual (almost small enough to include with a music CD), gave very clear instructions on how to open the case, add hard drives, add memory, etc. All in all, I feel well taken care of by Apple with respect to its products.

15.7 Monitor Upgrade, August 2007

I chose the Dell 2407 24” flatscreen LCD monitor (\$640.18 including shipping). At the moment, I’m using its VGA input driven by my Linux machine, and the digital input is driven by the Mac Pro. Since before 2000 I was using a 21” Cornerstone VGA monitor, which was great, but relatively large and heavy (and perhaps losing a bit of brightness).

A great feature of the Dell 2407 is that it will *rotate 90 degrees* on its stand (unlike the newer cheaper Dell monitors I’ve seen at Best Buy [December 2011]). This is called the “pivot” feature,

⁴⁹To set up `lm_sensors`, run `sensors-detect`. Then run `/usr/bin/sensors` to print out the current readings. You can also select “System / Administration / Services / `lm_sensors`,” and click “Restart” to update the numbers.

and it is a much better configuration for desktop publishing (6×9 book preparation in my case). Also, since it has 100 mm VESA mounting holes, I could wall-mount it on one of the many VESA wall-mounting systems out there. It would be very cool to have two of these monitors wall-mounted side-by-side on the typical adjustable arms for such things (normally used to mount LCD flatscreen TVs, I suppose).

15.8 Motherboard Upgrade, March 2005

For my Windows-XP machine (built in July of 2000—see §15.10 on page 114 below), I replaced the motherboard with a Gigabyte GA-K8NXP-SLI motherboard, choosing an Athlon 3200+ processor and 1GB of DDR-400 main memory. The exact board choice was driven mainly by a sale at NewEgg.com, but it is close to what I would have chosen. The SLI feature, however, forced me get a new SLI-compatible graphics card, so I picked up one with the NVIDIA GeForce 6600 GT chip on it. I rarely utilize this much graphics compute-power, but it's nice to have the capability. This can be considered an “intermediate” single-chip graphics-processor choice, since the 6800 XT was the top-of-the-line at the time. I do not plan to use the SLI feature (two graphics cards linked together for parallel computation), but I suppose it's nice to have the upgrade option.

The main snag I hit with this upgrade was that the “NVIDIA CK804 ADMA Controller (v2.7)” (a motherboard driver for the Silicon Image 3114 SATA disk controller chip) was *incompatible* with my Plextor PX-716SA/SW RT DVD drive. Enabling the 3114 SATA chip in the BIOS caused Windows XP to hang just after loading “Mup.sys” (which is the last thing you see before having to hard-reboot the machine). After much fooling around, the solution was to “Roll back to previous driver” (or just delete it) and let Windows XP use its default driver for that device. I tried to email a bug report to support@nvidia.com, but it bounced because I was not signed up in some way for tech support. Plextor tech support was great, and they had me fixed up in a couple of quick emails. I could not find a way to report the problem to NVIDIA.

15.9 Hardware Chosen in July 2003

[For motherboard upgrade in 2008, see §15.5.]

This was my third home-built system, and my second Linux machine:

- Gigabyte GA-8KNXP motherboard
- Pentium 4, 2.8 GHz, 800 MHz FSB
- Matched-pair dual DRAM, 1GB, TWINX-1024-3200C2PT
- Radeon 9000 graphics card, 128 MB DDR RAM
- Panasonic 1.44MB floppy drive
- Sony DVD-ROM/CD-RW combo drive, CRX300E/A

The above six items cost close to \$900 from newegg.com.

- Antec Sonata case, black: \$125 (pagecomputers.com)
- 120 GB SATA hard drives (2), Western Digital 1200JD: \$250 each (mwave.com)
- Internal SATA hard drive cables: \$7 each
- Envision 19” flat-panel display: \$600 (Costco)

In summary, this was a new machine with a second-to-fastest CPU (one could get 3GHz), lots of fast dual-DDR memory, two large and pretty fast disks, and relatively weak graphics. I love the flat-panel display, and don't feel it needs to be larger (even though I'm used to a 21" Cornerstone analog monitor).

I had planned to make a Raid 0 array out of the two SATA hard drives, as tests have shown that you really do get a 2X speed-up, and disk access is by far the limiting factor in speed. However, the Red Hat 9 kernel at the time did not support the SATA control chip on my Gigabyte motherboard, so I had to give up on that. Now I just use the second disk for mirror-based backups with `rsync` (see §7).

The Gigabyte motherboard is aimed at the server market, but I like it because it is so crammed with hardware peripherals on the board. Forget about technical support, however.

It's pretty neat having so much hardware on the motherboard, once support appears for it in the Linux kernel. (For example, the Intel networking chip was not initially supported, but is now.) I've also been able to get pretty far without a sound card (using the onboard Intel CODEC AC-97 chip). However, the `jack` server frequently hangs, possibly due to a lack of buffering, so I'm going to get a real sound card and see if that helps. I plan to get a Creative Labs Audigy 2.

I may also break down and get a more powerful video card, as the Radeon 9000 is quite noticeably behind the times for games.

15.10 Hardware Chosen in July 2000

[For motherboard upgrade in 2005, see §15.8.]

This system was needed to give me an updated Windows machine with an extra large disk and good sound support for some consulting work.

Here is what I chose:

- ASUS K7V motherboard (\$445 for board, processor, and CPU fan from Viking Computers)
- AMD Athlon 800 MHz processor
- 256MB PC133 SDRAM (around \$120 as of 10/31/00 — I think I paid over \$200 for it six months ago)
- Antec SOHO tower case with 300 Watt power supply (\$100)
- Western Digital 60GB, 6400 RPM, hard drive (around \$250, if memory serves)
- Matrox Millennium G400 32MB video card (swapped in from Linux machine which received an S3 Trio 8MB card instead (\$30))
- Teac 1.44MB floppy drive (\$20)
- 56X obscure-brand CD-ROM drive (\$35 at Fry's) - *This CD-ROM drive is unreliable. I will henceforth stick to the major brands and pay their premium.*
- Creative Labs SoundBlaster Live Platinum sound card and audio front panel with digital I/O (\$160).
- Netgear 10/100MHz ethernet card (\$30).

- Netgear DS106 10/100MHz 6-port ethernet hub (\$78 from PCSTOP.com).

I found most of the mail-order companies via <http://www.pricewatch.com>.

This machine gave me no trouble at all on the hardware front. Windows 2000, however, was another story, mostly due to manufacturers being behind in developing drivers. Apparently, Microsoft has been placing a huge upgrade burden on PC hardware companies, forcing them to totally rewrite their drivers to the new software models imposed by Microsoft. For Windows 2000, you *definitely* should download the latest drivers from the company websites. In my experience, the versions shipped on CD-ROM with the hardware are simply broken.

The worst thing about building a new Windows PC is the difficulty of getting all the software installed again. The Windows Registry makes this a real pain, as does the practice of adding new system files to the Windows system directories. You actually have to reinstall every application you want, unless you are willing to play games and take real chances with stability. Microsoft should have *long ago* required software installations to place *everything* in a single installation folder (such as a directory under **Program Files**, and then used a simple path mechanism like UNIX uses. At the very least, the Registry info should be in easier to maintain ASCII files. UNIX is *much* better in this respect. The NeXT OS was even better with their “app wrappers”. (Other NeXT features that the others need to adopt include “Services”, the “open” shell command, nameable “Terminal” windows, drag-and-drop into Open panels, Open panels that remember where you last were for each application, etc., etc.)

16 Historical Appendices

Below are various sections which are presently obsolete for me but could perhaps be relevant to someone else.

16.1 Hardware Chosen in March 2000

This was my first home-built system, and my first Linux machine.

My systems can be classified as a blend of “high end” and “midrange” components, as defined by the helpful example systems described at Hardware Central⁵⁰. I wanted systems with at least 256MB of fast memory and the fastest cost-effective processors. Everything else could be “last year’s news” in order to keep the price down. Here is what I chose:

- ASUS P3V4X motherboard (\$120)
- Intel Pentium III-EB CPU (Coppermine, 133MHz Front Side Bus) (\$330)
- Pentium III Cooling Fan⁵¹ (\$5)
- 256MB PC100 SDRAM (\$256)
- Iwing ATC Med-tower case with 230 Watt power supply (\$55)
- Matrox Millennium G400 32MB video card (\$175)
- Teac 1.44MB floppy drive (\$20)
- 56X obscure-brand CD-ROM drive (\$35 at Fry’s)

⁵⁰<http://www.hardwarecentral.com>

⁵¹When I first built the system, I did not use a thermal conducting cream (not included or even mentioned in the directions) between the Pentium and its fan. As a result (I think), the computer experienced frequent lock-ups for months until I noticed this and added some cream. I would say I lost several days to trouble-shooting lock-ups, trying various work-arounds.

- Western Digital 27GB ATA/66 hard drive (\$295).
- (later in August) IBM Desk Star 75GXP 30GB ATA-100 7200 RPM 9.5 ms hard drive (\$146 from Neutronet.com).
- Netgear 10/100MHz ethernet card (\$30).

I didn't really need such a large hard drive, but the cost per gigabyte made it a compelling choice. Besides, I've never met a disk I couldn't fill up eventually without even trying. I have since moved to a mirroring-based backup system.

The greatest thing to me was having an actual manual for the motherboard for the first time in my life.⁵²

16.2 Choice of Video Card

Reading `/usr/lib/X11/doc/README.*` in the Red Hat Linux distribution (which are actually README files from the XFree86 distribution) was the best way I found to determine which video card to buy for a Linux machine. First of all, you should decide which graphics chip set you want, then find a supported card that uses it. Graphics chips support “acceleration” to offload the CPU as much as possible. The file `/usr/doc/HOWTO/XFree86-HOWTO` in the Red Hat Linux 6.1 distribution states:

For optimal performance, we suggest using an accelerated card, such as an S3-chipset card. You should check the documentation for XFree86 and verify that your particular card is supported before taking the plunge and purchasing expensive hardware.

Take a look at `README.S3V` and `README.S3` for the details of S3 support. Another well supported graphics accelerator is the ATI chip set. The file `/usr/lib/X11/doc/AccelCards` talks about supported accelerated cards, but it was last modified in 1994! I ultimately chose the Matrox Millennium G400 card because (1) CCRMA machines have always used Matrox Gxxx cards for Linux, (2) the G400 was introduced fairly recently and got very good reviews, (3) G400 support is said to be available, and (4) I liked the following line in `/usr/lib/X11/doc/README.MGA`:

o Makes extensive use of the graphics accelerator. This server is very well accelerated, and is one of the fastest XFree86 X servers.

That's just what I wanted to hear! I also considered the Asus GeForce, since it seemed to have the edge in game-oriented performance reviews, but acceleration support in the GeForce was unclear (being listed only as “supported” in general). Also, it would have required downloading and installing the latest XFree86 release without the benefit of a Red Hat .rpm package, and this looked a bit messy and time consuming. Besides, I don't even plan to use this computer for games. All I want is a maximally fast display of text, Web pages, and illustrations.

⁵²This could be said to be my fifth PC, and *never* did I receive a motherboard manual with any of those machines. Nowadays you can probably always get the motherboard manual on the Web, but that's only if you can figure out the manufacturer. My oldest PC, from “PCW Computers”, according to a sticker on its case, seems to have no identifying marks whatsoever on its motherboard, and the PCW Computers websites I found seem to contain no documentation for what I have. My very first PC, an ancient AT&T 6300 “DOS-Unix merge” PC, had incredible amounts of documentation, reminiscent of the old mainframes. Maybe the motherboard was documented in there somewhere, but the computer was so old (pre 'AT' class — perhaps an 'XT' style) that it could not be upgraded at all when I looked into that. The AT&T PC DOS-UNIX merge idea was a great concept, but the software execution was poor, in my opinion, and the performance was abysmal. With my OmniView switcher, and Samba, I have implemented a “Windows-UNIX” merge using two machines, and I think it's a great solution.

16.3 Red Hat 6.1 Misc

TrueType fonts are basically Windows fonts, and they greatly improve Web browser text display, in my opinion. Red Hat's font server already supports them (unlike native X Windows), but in release 6.1, you have to edit `/etc/X11/fs/config` to install them. I think everything is automatic as of release 6.2, but I haven't checked closely. Search the Red Hat website for 'truetype' for details.

I use the GNOME desktop environment and the sawfish window manager under GNOME simply because they are the defaults in the RedHat Linux distribution. I have no major complaints about either, relative to other window managers/environments under X windows.

16.4 My Previous 300MHz Dell Machine

I previously used a Dell Dimension XPS D300 running Windows 2000 Professional (and Windows NT before that). I bought the Dell in 1998, and it is still a fine machine, although a 300 MHz Pentium II is well slower than what's available today. The Dimension series gives great value, and if you choose the right video card (the Matrox Millennium at that time), the base machine can run Linux as well as Windows. Dell will also configure a Linux PC for you, but I thought this service was unreasonably expensive last time I checked.

16.5 Why I had to upgrade from Windows NT to Windows 2000

I was doing fine in Windows NT until a strange malady set in with respect to accessing Web pages. I could reliably access new URLs that I had never visited before, but old ones would tend to hang forever, as if the host is down (when it wasn't).⁵³ Upgrading to Windows 2000 fixed the Web access problems in NT.

However, W2K is no bed of roses just yet. Brother didn't get around to porting a printer driver for the MFC-7150C until July 2000, so I *could not print* under W2K for months. Worse, Microsoft has "improved" the NT Backup program so that it now no longer supports my SCSI DAT drive. I therefore cannot do backups under W2K.

16.6 Backups Using Arkeia

My salvation for backups appeared to be the Arkeia free software for Linux (one of the editors' picks at LinuxWorld). Using the "synchronizer utility" in `ws_ftp`, I can in principle automatically mirror my Windows disks to my Linux machine (using `samba` and `smbfs` to network the Windows and Linux file systems), and then I only have to back up the Linux machine using Arkeia. However, this plan hit a snag: The `ws_ftp` synchronizer does not reliably finish its operations. The problem seems to be a breakdown in the ftp protocol, possibly due to a network problem. From the other direction, it does not work to back up Windows "shares" mounted by `smbmount` on the Linux machine — I checked. It pretends to work, but no files are actually written to tape. Backup software which supports both Linux and Windows on the same networked machine is rather expensive, since few

⁵³This may have started when I installed `FastNet99`, a tool which updates `LMHOSTS` to avoid DNS lookups. I uninstalled it, and I turned off using `LMHOSTS` in the Network Control Panel, but the problem persisted (for all browsers). There was probably something mucked up in the Windows Registry. The strangest behavior of all was that if I accessed `www.redhat.com`, I got a website talking about Red Hat Release 5.2, when the current release was 6.2! I deleted all my browser caching, etc., so I have no idea where the old site could possibly have been coming from, unless it was actually an old host still running at Red Hat Software serving up an obsolete website. Suffice it to say that I upgraded to W2K as soon as I possibly could (on Feb. 14, 2000).

home users have both. At the moment, I am relying on haphazard mirroring across machines for my backup, plus an occasional ftp to CCRMA of anything related to my courses.

16.7 Problems Burning CD-ROMs in Windows 2000 Pro with Norton Antivirus Guard Installed

Windows 2000 Professional is literally unusable while burning a CD ROM, and during lots of other operations for reasons I cannot imagine. It takes actual minutes for my desktop to initialize after a reboot, and I usually have to reboot *twice* because MS Explorer crashes the first time, leaving me with no task bar. Part of the delay could be attributed to Norton Virus Guard. Whatever the problem, the performance is so horrible (on my 900 MHz Athlon system) that I cannot stand to sit around and wait for it. While I suppose I could get some reading done, I generally pop over to my Linux machine and get something done over there while Windows does whatever it has to do. Since upgrading to Windows XP and switching to a different security scanner, this problem has gone away completely.

16.8 Printing over the Net to a NeXT Laser Printer

My former printing set up was pretty unusual. I used a NeXT laser printer attached to a Nextstation Turbo whose sole purpose in life was to be a printer server. It is a testament to the quality of NeXT hardware that this machine is still running flawlessly after 12 years of service—with no hardware problems whatsoever in all that time.

16.8.1 Printing from Linux

On my Linux machine, I print by copying postscript or plain text files to the directory `/p`. This directory is watched by the Nextstation Turbo, as described below. To print from `ghostview`, for example, I “Save As” `/p/p`, or use the “print command” `cat>/p/p`. (If I want to retain the print image on the NeXT machine, I give it a more reasonable name such as `/p/myfile.eps`. The file `'/p/p'` is simply a temporary file that is very fast to type.)

16.8.2 Printing from Windows

Thanks to `samba`, I can access the directory `/p` on my Linux box as `s:\p`, having mapped “Drive S:” in Windows to `\\<hostname>\p\`. I have a shortcut to this directory in the upper righthand corner of my desktop so that I can simply drag text or postscript files into the spool directory.

From inside programs, it is necessary to “print to file” using a postscript printer driver. I always specify the file `s:/p/p` to minimize typing. The next section describes how to set up printing-to-postscript-file under Windows.

16.8.3 Printing to PostScript File under Windows

In Windows 2000, all you have to do is attach a postscript printer driver to the “file” port:

- Start Button / Settings / Control Panel / Printers

- Add Printer (double click)
The next screen should be a small box called “Add Printer Wizard” and should show 2 radio buttons: Local Printer and Network Printer. Select “Local Printer” and the Next button.
- From the Available Ports list, scroll to the bottom to select “FILE:Print to file” port and click Next. After some delay, a list of known manufacturers and printers appears.
- From the Manufacturers list, select Apple; from the printer list select “Apple LaserWriter v23.0” and click Next.
- You can set it as the default printer if you want, but you probably don’t since this “printer” is only for creating PostScript files.
- Choose “Not Shared” from the next window and click next.
- Try the test page. You can check it in `ghostview`. It contains a wealth of information such as the systems files involved.

16.8.4 Printing on a NeXT Laser Printer from Windows or Linux

The great thing about NeXT laser printers is that they are practically free, and in my experience, the quality is perfect for what I need.

I could not come up with a working `printcap` entry for Linux, so instead, I designate an easy-to-type directory (`/p`) as the “spool directory”, and the NeXT machine polls it every minute or so to see if there is anything to print. Yes, it’s a kludge, but what else does the machine have to do, and who else is going to be printing at the same time? (There should at least be file locking in a multi-user or naïve-user environment.)

The following shell script runs on the NeXT machine once after it boots up:

```
#!/bin/sh -u
echo 'starting up lame spooler . . . '
echo   mount josp3:/p /p
      mount josp3:/p /p
echo   '/jos/bin/watchToPrint >& /tmp/watchToPrint.log &'
      /jos/bin/watchToPrint >& /tmp/watchToPrint.log &
```

(`josp3` is my Linux box.) Below is `watchToPrint`:

```
#!/bin/csh -f

if ($#argv == 0) then
    set del = 120
else
    set del = $1
endif

while (1)
    /jos/bin/printToPrint
    sleep $del
end
```

and finally printToPrint:

```
#!/bin/csh -f

cd /p

foreach file (*)
    lpr $file
    /bin/mv $file /Printed
end
```

A neat benefit of this simple printing scheme is that a copy of everything I've printed accumulates in the `/Printed` directory on the NeXT machine. Of course, the 330MB hard drive regularly fills up at which time I delete everything in `/Printed`. However, it can be very convenient for a quick reprint, such as after a paper jam, or when I forgot to insert letterhead in the bypass tray, etc.

Isn't wonderful how easy it is to cobble together something useful in UNIX?