

Arrive with MS-Windows Leave with Linux

Noel J. Bergman
DevTech®





Session Overview

For more and more people, the question isn't WHY to ditch Microsoft Windows, it is HOW do it. How do you install and configure Linux to fully support your hardware, and run the applications you need? This is particularly true of the laptop computers that we all travel with these days.

This session addresses the issues faced when living with Linux on a laptop computer. Topics include managing Bluetooth, WIFI, dual-displays, fingerprint reader, WebCam, virtualization (including exposing devices to the guests), firewire, playing commercial DVDs, how to use an external USB drive for testing before you make the leap, *etc.* Included will be war stories, tips and tricks, recipes, and more.

Although we will not install Linux during the session, I'll try to organize a BOF and other unofficial, volunteer assistance for anyone who comes to Software Summit prepared to make the switch.



PLEASE ASK QUESTIONS! 😊



Why Switch?

- People have their own reasons. For me, MS-Windows Vista was the last straw:
 - About 50% of the time, suspend failed, leading to corrupt memory-mapped files and lost data.
 - Problems with VoIP audio in VMware that disappeared when running the same VM under a linux host.
 - Crippled (in Lenovo Support's words) and problematic WIFI management/roaming.
 - Problems hot-swapping both with the Ultrabay and with an eSATA ExpressCard.
 - Inserting xD cards caused BSOD.
 - Even Microsoft personnel were recommending WinXP or MS-Windows Server instead of MS-Windows Vista.
- System was a ThinkPad T61p 6457-7WU with 4GB RAM and 64-bit MS-Windows Vista Ultimate. All of the firmware, drivers and operating system were kept up-to-date.
- Because I extensively use VMware, migration was easier, but I wanted the host OS to support all of my hardware.



Hardware Support

- I wanted full support for all of the hardware in the ThinkPad.
- Some of what we will discuss is a bit ThinkPad-specific, but similar hardware in other laptops is also supported.
 - Good idea, if you are buying a new laptop, to buy what is supported.
- I have everything working except for xD, for which there is as yet no software support.



Which Distribution?

- I've worked with the following, both to learn which work best for my laptop, and to prepare for this presentation:
 - Ubuntu 7.10, 8.04.1, 8.10 (alpha & beta)
 - Fedora 9 and 10 (alpha & beta)
 - Note: unlike Ubuntu, each Fedora release can be considered largely unusable for most users until the rpm.livna.org repository supports that release, which does not generally happen during the test cycle.



Alphas and Betas?!

- The earlier you start to work with a distribution, the sooner you can find and report any regressions, as well as explore new features.
- Each new release on Ubuntu's enforced 6 month development cycle brings out a new kernel.
 - I found multiple regressions, *e.g.*, hot-swap, that needed to be fixed during the development of 8.04.1. In the end, the hot-swap solution requires configuration.
 - I found additional regressions, *e.g.*, with hot-keys, suspend/resume and fingerprint handling during the Ubuntu 8.10 cycle.
 - Things like suspend-to-RAM tend to waiver during the development cycle, and need to be tested.
- Ubuntu is considerably more user friendly during the development cycle than Fedora. Ubuntu provides a dedicated IRC channel (#ubuntu+1), all of the repositories are maintained, and fewer people slap you down for even thinking of testing their code.
 - RedHat has indicated during the conference that they will make changes to their IRC support system to better enable testing of beta releases.
- Until your hardware vendor decides to actively support Linux, you will have to do the testing and reporting yourself.



Other critical software

- You will have software that is important to you. You need to test it, keep an eye on it, report any defects. For example, I keep a couple of VNC clients around, since the preferred GNOME client, Vinagre, keeps breaking keyboard handling.
- The most critical software for me, other than the operating system, is VMware Workstation. I participate in early, closed, previews, as well as general beta programs. For example, I am currently running VMware Workstation 6.5, which was released on September 23, 2008. I had been testing it since December, 2007.



Getting Started

- Have a plan! Do **not** assume that you will simply switch in an hour, day, or weekend.
- Do your homework. There are web-sites that detail what it takes to make various distributions work on various hardware.
 - Please note that they are often incomplete and sometimes wrong. Use them as a resource, but keep your wits sharp and Google handy.
- Test first! I spent October 2007 through August 2008 testing, configuring, living with and, oh yeah, testing before I was prepared to switch **full-time**. You need not spend that much time.



Using VMware made it easy for me to switch.



When you first try ...

- I do not recommend that you remove MS-Windows when first starting out.
- Find a place to install Linux.
 - An external, bootable, hard drive, *e.g.*, an external USB drive.
 - I started off with a couple of external USB drives. Ubuntu 7.10 and 8.04 were my test candidates. Fedora 9 was not happy in this configuration.
 - A second hard drive (but see below)
 - A so-called “Live DVD” can be helpful, but ties up your drive (as would a 2nd drive bay adapter), and suffers from being a more limited environment.
 - I do not recommend a flash drive as your test media. The setup is more complicated, and is not representative of a production install.
- You may run into a conflict between how linux and MS-Windows want to manage the clock. I suggest that you configure MS-Windows to use UTC, which linux also does.
 - See <http://miknight.blogspot.com/2006/06/storing-system-time-in-utc-in-windows.html>



Installing to a USB Drive

- This is just a normal Linux install, *except* ...
 - Although you do want to install GRUB, you must be **careful**: install GRUB onto the external drive, not your main drive. You will use your BIOS to boot from the external drive.
 - Exactly how you do this varies from distribution to distribution, and is not always clearly marked. For example, it may be on one of the last install screens accessed *via* an otherwise unmarked “advanced” button.
 - During installation, your USB hard drive will be hd1, since hd0 is your internal drive. However, when you use the BIOS to boot from the USB hard drive, it will now become hd0. Unfortunately, GRUB will be configured for hd1. You can fix GRUB before or after rebooting, but if you attempt the latter, you’ll have to use the “edit” option to temporarily repair the entry when trying to do your initial boot.



A Multi-Boot Layout

- Regardless of whether you are still testing, or are ready to go full-time, when you are ready to install to your main hard drive, you will almost certainly want to configure for multi-boot.
- I currently have:
 - Partition 1: Dedicated GRUB partition (8MB)
 - Partitions 5, 6, 7, and 8: operating systems (10GB each)
 - Partition 5: **Ubuntu 7.10** -> Fedora 10 (installed during CSS)
 - Partition 6: Ubuntu 8.04.1
 - Partition 7: Ubuntu 8.10
 - Partition 8: Fedora 9
 - Partition 9: swap partition (4GB)
 - Partition 10: shared data partition (remainder of drive)



Dedicated GRUB Partition

- Install GRUB
 - make small GRUB partition
 - `mkfs ext3 /dev/sda1`
 - `e2label /dev/sda1 GRUB`
 - `mount /dev/sda1 /tmp/GRUB`
 - `mkdir /tmp/GRUB/boot`
 - `cp -r /boot/grub /tmp/GRUB/boot`
 - modify `menu.lst` to use `configfile` entries
 - run `grub`
 - `find /boot/grub/stage1`
 - `root (hdx,y)`
 - `setup (hdx)`
- When subsequently installing actual linux partitions, do install GRUB, but be careful to install the bootloader to the partition, not the MBR (*q.v.*, "Advanced..." on the "Ready to Install" dialog of Ubuntu). May also need to fix `hd_` to `hd0`.



Dedicated GRUB Menu

- This is just the salient part of my menu for the GRUB partition:

```
title      Ubuntu 7.10 -> Fedora 10
savedefault
configfile (hd0,4)/boot/grub/menu.lst
```

```
title      Ubuntu 8.04.1
savedefault
configfile (hd0,5)/boot/grub/menu.lst
```

```
title      Ubuntu 8.10
savedefault
configfile (hd0,6)/boot/grub/menu.lst
```

```
title      Fedora 9
savedefault
configfile (hd0,7)/boot/grub/menu.lst
```



Multiple OS Considerations

- Having multiple OS partitions helps to balance stability, functionality and testing, but there are some considerations:
 - **uid and gid ranges.** Ubuntu starts at 1000, Fedora at 500. Since I have a shared partition, I need to make sure that my uid and gid are the same, regardless of which OS I boot. A solution is to adjust /etc/passwd and run chown recursively on the OS-specific home directory.
 - **i-node size.** Fedora 9 and later default to using 256 byte inodes. Other, generally older, distributions use 128 byte inodes. Until all of my distributions support 256 byte inodes, I need to ensure that ext3 file systems are formatted with 128 byte inodes. One way is to pre-format the partition, and tell the installer not to reformat. There are two contexts where i-node size can be an issue:
 - My GRUB partition must be capable of booting the partition, so at such point as I use 256 byte inodes, my standalone GRUB must be suitably updated.
 - If I want to be able to edit/repair one OS partition from another, I must ensure that if one uses 256 byte inodes, that another supports it.
 - **File systems.** I use ext3 for my OS partitions, but xfs for my big, shared, partition. I need to make sure that I have xfs and xfs utilities available.
 - **Shared content.** What do we keep OS specific, what do we share, and how?
 - I share Desktop/, vmware/ and other *document-related* directories by using symlinks.
 - **DO NOT SHARE YOUR HOME DIRECTORY!**



File System Choices

- Pretty much *the* standard is ext3. Use it unless you have a reason to do otherwise.
- I use xfs for my large, shared, volume. Why? Two reasons:
 - Performance is better for large files, and I keep my VMware virtual machines on that volume.
 - Volume checking is significantly faster. At one point, I had tried ext3 for that volume, but on the occasions when fsck ran, it took an unacceptable amount of time.
- At such time as ext4 is available and stable on all of my installed distributions, I will reevaluate my file system choice for that volume.



Example: Ubuntu 8.04.1

- Installing Ubuntu 8.04.1
 - install
 - update
 - nvidia detected, needs approval, installs nvidia-glx-new & nvidia-common
 - install nvidia-settings and change menu to use gksudo
 - Alternative: install nvidia-glx-new-envy
 - install emacs
 - install flashplugin-nonfree
 - install icedtea-gcjwebplugin
 - install vmware
 - install xfsprogs
 - install model specific packages as desired (*e.g.*, thinkfinger)
 - Install additional software ...
- Time: 25 minutes



Bluetooth

- The good news is that Bluetooth works out of the box for the various distributions. The bad news is that there is no GUI for much of it, and enabling/disabling the radio is platform specific.
 - ThinkPad:
 - `echo [enable|disable] > /proc/acpi/ibm/bluetooth`
- I've not tested many Bluetooth devices, but have tested bluetooth mouse, headset and GPS.
 - You may need to run `hidd` to connect to a mouse. You can also configure `/etc/default/bluetooth` to automatically do it.



Networking

- Wireless and wired networking generally works out of the box.
 - For a time, Intel e1000(e) wired networking was blacklisted on distributions using kernel 2.6.27 due to a problem.
 - <https://bugs.launchpad.net/ubuntu/+source/Linux/+bug/263555/>
 - Fedora 9, 10 and Ubuntu 8.10 support concurrently active NICs with their graphical network managers. With Fedora 9, I have a script to properly set routing priorities. Ubuntu 8.10 and Fedora 10 get it right out of the box.
- Fedora 9, 10 and Ubuntu 8.10 support the radio LED.
- I have successfully used both 802.11a and 802.11g, although people have reported problems using 802.11a with older Intel (downloadable) microcode.



Networking@Keystone

- You may occasionally encounter situations, as we do at Keystone Conference Center, where a network appears to be linux-unfriendly.
- The fix for Keystone Conference Center:
 - Our TCP defaults to `net.ipv4.tcp_window_scaling=1`. We want to turn that off. You can change it temporarily by running `sysctl -w net.ipv4.tcp_window_scaling=0`, or permanently by changing `/etc/sysctl.conf`.



Wireless WAN

- Check to see if the particular WWAN adapter you want is known to be supported.
 - Many WWAN adapters, even though they insert into a CardBus or ExpressCard slot, have a USB interface, which works with existing Linux code.
 - Thomas Cameron uses a PC5750 with Verizon.
- You may need to use MS-Windows to perform a one-time setup of the WWAN adapter.
- You will also likely need to perform configuration. Instructions can be found on the web.



Network Sharing

- Ubuntu works with CIFS (SMB) out of the box when I install it.
- Fedora works after requiring that I open the firewall.
 - System->Administration->Firewall, select Samba Client



Network Printing

- Exposing a printer to SMB and CUPS clients has worked out of the box for me.
- Accessing a printer on MS-Windows *via* SMB has also worked out of the box.
- Accessing a printer on Mac OS X has been an issue.
 - On the Mac OS X side, so far, we have had the best success exposing it *via* CUPS as an IPP device rather than SAMBA.
 - On the linux side, of the various distributions I have tested, so far only Ubuntu 8.10 successfully detects a CUPS printer published by Mac OS X.



Local Printing

- I have experienced no problems when using a local, USB, printer.
- HP appears to provide, by far, the best vendor support for Linux. We have HP multi-function printers, and have full support for their scan, FAX, print and media-reader capabilities.
 - See <http://hplipopensource.com/>



nVidia

- nVidia actively supports Linux with a closed source driver, but support from distributions varies due to licensing viewpoints.
- Ubuntu supports nVidia out of the box, but requires you to explicitly agree to use the closed source driver. Until then, it defaults to low resolution.
 - A feature request exists asking that Ubuntu adopt the approach used with Fedora, which uses the open source driver at native resolution when the closed source driver is not available.
- Fedora provides only an open source driver, which although preferable to low resolution, is inadequate in major ways, *e.g.*, using it disables suspend. To use nVidia's closed source driver, you would use the livna repository (or install manually).
 - There is both a "kmod" package for the driver and an "akmod" package. Installing the latter means that the kernel driver will be built and installed from source on your system. This is good when there is a kernel update and the necessary, matching, kmod has not yet been uploaded.



Dual-Monitors

- Handling of xorg.conf is still more of an art than it ought to be, and the distros are working hard to eliminate it as a problem.
 - Work is on-going to eliminate the need for xorg.conf.
- However, I currently find that none of them make it easy to configure a 2nd display as painlessly as they should, unless you have a new monitor that reports its resolutions back to the graphics adapter. If I just try to setup a second monitor, the setup tools think that I'm dealing with a low-res display, and don't provide a nice way to advise them otherwise.
 - Caveat: my experience is with nVidia. If you are using ATI or Intel graphics, YMMV.
 - The nVidia 177.80 driver improves the default support.
 - The latest nv driver also improves in this area.
- For me, I've taken the time to manually configure xorg.conf for when I use multiple monitors, and I keep a copy of that file around for the purpose.



ThinkPad Keys

- As a general rule, ThinkPad keys, *e.g.*, Fn-F2 (lock), Fn-F4 (suspend), Fn-F12 (hibernate), brightness, volume, Thinklight, page forward/reverse, *etc.*, work.
- From time to time, they get broken. This happened, for example, during the Ubuntu Intrepid Ibex 8.10 test cycle.
- Again, I find it helpful to maintain more than one OS partition, and to participate during OS test cycles.



Repositories

- You configure repositories from which yum (Fedora) and apt (Ubuntu) can download packages for your system.
- Ubuntu comes configured with a good set of repositories, organized by support and license.
 - See also <https://help.ubuntu.com/community/Medibuntu>
- Fedora needs for you to add the livna repository, since they take a very hard line on license issues for both legal and ethical reasons.
 - livna – all sorts of useful packages that are not allowed by the Fedora team. This includes the nVidia drivers, media codecs, *etc.*
 - Adobe and Skype – very optional, vendor-specific, repositories for their offerings.



Adobe Flash

- Ubuntu
 - Install flashplugin-nonfree
 - Dependent on nspluginwrapper on x86_64
- Fedora
 1. Add the Adobe repository
 2. Install Flash from Adobe.



Instant Messaging

- Pidgin – multi-protocol IM software with support for AIM, Yahoo!, MSN, IRC, GMail/GTalk, Sametime, ICQ, and others (16+ protocols in total).
 - Text only – lacks full fidelity with native IM programs.
- AIM – ancient. Use Pidgin.
- IRC – Pidgin works, but if you want a more sophisticated client, look at x-chat and others.



Skype

- The current version is 2.0.0.72, which is fairly old, although it does support text, audio and video.
 - Skype recently announced that there is a lot of work going on behind the scenes to better support Linux (<http://share.skype.com/sites/Linux/>).
- Ubuntu
 - See <https://wiki.ubuntu.com/SkypeHowto>
 - Easiest if you use the medibuntu repository.
 - I have found the static or static-oss package to be the most reliable.
 - I've also done it manually by installing the static binary for generic Linux and the dependent libraries.
- Fedora
 - Add Skype's repository to /etc/yum.repos.d/:
 - ```
[skype]
name=Skype Repository
baseurl=http://download.skype.com/Linux/repos/fedora/updates/i586/
gpgkey=http://www.skype.com/products/skype/Linux/rpm-public-key.asc
enabled=0
gpgcheck=0
```

➤ Install Skype



# Adobe Acrobat

---

- There are multiple alternatives to the Adobe product, so you may not need to install it.
- Personally, I do install Adobe Acrobat Reader.
  - Fedora: install directly from Adobe's repository or download the .rpm file.
  - Ubuntu: use the medibuntu repository, or download and install the .deb or .tar file.
- It is easiest to get PDF files to appear in the browser if you install the package for your distribution, *e.g.*, from the medibuntu repository, rather than install manually and go through the extra steps.



# Playing DVDs

---

- You have multiple choices to play DVDs, but if you want DVD menus, they are more limited:
  - Totem: plays DVDs; XINE backend is necessary to support DVD menus.
  - VLC: menu support is (sort of) present but very flaky.
  - Ogle: works
  - XINE: works well, but tricky to play from hard-drive (as opposed to your DVD device).
- To install support for DVD encryption (DeCSS):
  - Ubuntu: see <http://www.ubuntugeek.com/install-mplayer-and-multimedia-codecs-libdvdcss2w32codecs-w64codecs-in-ubuntu-804-hardy-heron.html>
  - Fedora: see <http://www.my-guides.net/en/content/view/103/26/>
- You might presume that MS-Windows would be better at playing commercial DVDs, but (for example) I can play a *Fiddler on the Roof* DVD with VLC, Ogle and Totem-Xine, that neither WinXP nor Vista will play.





# Converting Video for iPod

---

- It is fairly easy to convert video to a format suitable for an iPod with linux.
- We have multiple approaches, using free tools such as Handbrake.
- Further reference:
  - <http://tombuntu.com/index.php/2008/05/14/convert-dvds-for-iphone-or-ipod-touch-with-handbrakecli/>
  - <http://tombuntu.com/index.php/2008/05/22/easily-convert-videos-with-winff-and-ffmpeg/>



# Suspend & Hibernation

---

- Although they are occasionally broken by an update, these pretty much just work for me with Ubuntu 8.04.1 and Fedora 9†, as well as generally during the 8.10 test cycle.
  - †Recent updates with Fedora broke resume from suspend-to-RAM. Hibernation works. [Fedora bug #461095]
- Ubuntu 8.10 appears to suspend and resume much faster than Fedora 9, which could take upwards of one (1) minute to resume, when it worked.



# Fingerprint Reader

---

- The fingerprint reader on the ThinkPad is supported. The same code also supports many Dell and Toshiba laptops.
- Once installed, you should be able to sign in using your fingerprint, but depending on which distribution, you may have additional configuration to do in order to unlock the screen and/or use gksudo.
  - See also: [http://www.thinkwiki.org/wiki/How\\_to\\_enable\\_the\\_fingerprint\\_reader\\_with\\_ThinkFinger](http://www.thinkwiki.org/wiki/How_to_enable_the_fingerprint_reader_with_ThinkFinger)
- For the moment, Fedora has the most seamless and complete support of the distributions, in that you have less configuration to do for full support.
  - Add one line to `/etc/pam.d/system-auth-ac`
  - To allow the screensaver to unlock with thinkfinger (one possible way)
    - `chgrp ${user} /etc/pam_thinkfinger/${user}.bir`
    - `chmod g+r /etc/pam_thinkfinger/${user}.bir`
- At the moment, only a single fingerprint is permitted per user, and the user is not selected based upon the fingerprint.

# Hot-swap Bays

---

- Swapping a hard-drive and DVD burner in the ThinkPad Ultrabay works for me, but ...
  - Ubuntu 7.10 – First release to work semi-out-of-the-box.
  - Ubuntu 8.04.1 – Broken throughout the test cycle, only fixed at release. Kernel dies if I don't use scripts attached to events to manage the ultrabay.
  - Ubuntu 8.10 – Doesn't crash, but we still want those scripts to ensure that a writable file system is sync'd before ejecting the device.
- The scripts published on ThinkWiki should not be used as written – the devices are hard-coded rather than taking the values from the event in progress. I have replacements.
  - [http://www.thinkwiki.org/wiki/How\\_to\\_hotswap\\_UltraBay\\_devices](http://www.thinkwiki.org/wiki/How_to_hotswap_UltraBay_devices)
- `udevadm --monitor --env` can be your friend! ☺



# Media Reader

---

- The ThinkPad's built-in Ricoh media reader works fine for SD, SDHC and MMC media.
- There is no support for xD and Memory Stick media using the Ricoh media-reader.
  - On the other hand, when running 64-bit MS-Windows Vista inserting an xD card caused a BSOD, so choose your poison.
- When running Ubuntu 7.10, you have to manually mount the media; later versions and Fedora automatically mount the media.



# HD APS

---

- You can install support for the hard disk protection, but no one's kernel includes the patch for protection as yet, so you're limited to using the sensor for other purposes.
- I replaced the original 160GB drive with a 320GB drive that has it's own shock sensor.



## Misc. other hardware

---

- Fedora 9 does not recognize my SanDisk PCMCIA Compact Flash adapter. Fedora 10 and Ubuntu recognize and mount it properly.
- My SiiG eSATA ExpressCard works once I load the pciehp module. Hot-swap works with it, which did not work with MS-Windows Vista.

The logo graphic consists of a vertical black line intersected by a horizontal black line. To the left of the vertical line, there are three overlapping squares: a yellow one at the top, a red one in the middle, and a blue one at the bottom. The word "VMware" is written in a blue, sans-serif font to the right of the vertical line.

# VMware

---

- I several e-mails specifically asking for me to cover VMware in this session.
- VMware, amongst other things, means that you can run MS-Windows in a VM for those applications that need it.
- Some specific items of note:
  - Bluetooth
  - Audio
  - Unity
  - Networking





# VMware Bluetooth

---

- VMware allows you to attach a USB Bluetooth adapter. Conveniently, the internal Bluetooth adapters in our laptops are USB devices.
- You will need to install a Bluetooth stack into your guest OS. I just install the ThinkPad Bluetooth software as if I were installing on native MS-Windows.
- **NOTA BENE:** Bluetooth pairing is based upon key pairs not MAC addresses. So if you have a limited number of devices that can be paired, remember that each Bluetooth install will have a separate key pair.
  - As an aside for Fusion users, you also need to install the bootcamp drivers for your iSight and Bluetooth.



# VMware Audio

---

- VMware is lagging in its support for modern Linux audio architecture.
- At present, I have not been successful at getting VMware to use the internal microphone. Others also report this problem.
- On the other hand, I have no problems using either a USB headset or a USB webcam with built-in microphone, so both of those are successful workarounds, albeit not ideal.



# VMware Unity

---

- Unity is a new feature that allows your guest windows to appear seamlessly on your host desktop.
- Unity generally works well, but has some issues with multiple monitors.



# VMware Networking

---

- One of the improvements in VMware Workstation 6.5 on Linux is the addition of automatic bridging, bringing the same ease-of-use already enjoyed on the MS-Windows platform. Previously, you had to choose a wired or wireless connection, which you would have configured as a custom network.
- Keep in mind that VMware Workstation uses virtual HUBS, not virtual SWITCHES.
  - `vmnet-sniffer /dev/vmnet?` can be used to examine network traffic.



# VMware & iPod

---

- None of the linux native replacements for iTunes provide full fidelity to iTunes, nor is there a linux native iTunes.
- Your solution is to run iTunes in a virtual machine.
- Caveat: there is a known firmware defect with various iPods that is manifested when running a kernel  $\geq 2.6.13$ .
  - There is an un-maintained kernel patch floating around to address it.
- The summary, from VMware of what works:
  - Works: 3G, 2G Nano, 2G Shuffle, iPod Touch
  - Fails: 4G, Mini, 1G Shuffle
  - Might: 5G (1.2+), 1G Nano (1.3+)
- I gave my iPod Photo (4G) to my Mac-loving sister, and now have an iPod Touch.



# Manipulating Images

---

- GIMP comes with most distributions.
- ImageMagick/GraphicsMagick provide command line tools for doing batch manipulation.
- VIPS is a very sophisticated tool doing very fast manipulations in a pipeline.
- nautilus-image-converter adds simple image manipulation actions to the file browser's context menu.



# Get Involved

---

- If you don't, who will?
- Report Bugs.
  - <http://bugs.launchpad.net>
  - <http://bugzilla.redhat.com>
- Contribute (informal) documentation.
  - Mailing lists, Wiki sites, *etc.*
- Consider contributing code/patches.



# Recommendations

---

- I have multiple versions installed with good reason.
  - I rarely used Ubuntu 7.10 anymore, and replaced it (after backing it up) with Fedora 10 beta during the conference.
  - Ubuntu 8.04.1 is my backup plan.
  - Ubuntu 8.10 is where I spend most of my time, but it has numerous defects (still only a beta).
  - Fedora 9 is stable and has some things that work better than 8.04.1, but does not have as broad support in terms of packages that I use, so I often head back to Ubuntu.
  - I do like both Fedora and Ubuntu for their strengths, and will continue to evaluate them.
- So I have tended to use Ubuntu 8.10, followed by Fedora 9, followed by Ubuntu 8.04.1. This will change as releases evolve.
- Start as I did: have MS-Windows and linux side by side, learn to live with linux, and then switch when you are comfortable. Test, test and test. And consider using VMware or similar to let you keep running key MS-Windows applications after you've switched over.





# Resources

---

- [ThinkWiki.org](http://ThinkWiki.org)
- [Ubuntu](http://Ubuntu)
- [LaunchPad.net](http://LaunchPad.net)
- [FedoraProject](http://FedoraProject)
- [FedoraFAQ](http://FedoraFAQ)



# Related Sessions

---

- [“Automating Your Linux Infrastructure”](#)
- [“SELinux for Mere Mortals”](#)
- Both by Thomas Cameron



# Q&A

---

- Any questions? 😊
- Please remember to fill out your session evaluations.