



# Linux in Your Lap

## Session 9365

Rich Smrcina - Sytek Services, Inc.

August 20, 2002

SHARE 99 – San Francisco

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SERVICES, INC.

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# Of Course



- The Joys & Heartaches of Running Linux on a Laptop

Speaker: Rich Smrcina, Sytek Services, Inc.

Length: 1 hour

Classification: Technical

When: Tuesday 1:30pm

Where: San Francisco Hilton

# Of Course



- Objectives
- My first mistake
- Hello, my name is Rich & I'm a Linuxholic.
- The Best Teacher is Linuxperience...
- Installment Plan
- If the Shoe Fits...
- Boot Loaders
- 'X' Marks the Spot!
- init Picker
- Connect this...
- Let's Backup a Moment Here!
- You just can't win with a Winmodem

# Of Course



- Word for Word...
- Excell-ent!
- Presentations...
- Samba Enchanted Printing...
- Exploring with Netscape on Linux...
- You Want Some Cheese With That Wine?
- Win4Lin Free4All...
- VM Where??
- Going to the Movies
- Linux on a Laptop: a No Windows Situation?
- What's Next?
- What a Tangled Web We Weave...

# Objectives

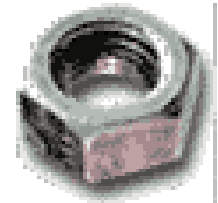


- The object of this session is to profess my process and progress in installing Linux on a laptop and running it as an alternative to a Windows desktop.
- Linux can provide a desktop environment now equivalent to that obtained from Windows (more or less). Of course getting there is half the fun...
- Even when running on a laptop that no one ever intended to be free of “the Nem-MS”.

# Objectives



- Speeds and feeds...
  - Toshiba Satellite 1805-S273
  - Intel Pentium III 1 Ghz processor
  - 256 MB RAM
  - Floppy disk drive and 20GB Hard Drive
  - 14.1" color display
  - Trident Cyberblade video subsystem
    - 16 million colors at 1024 x 768
  - CD-ROM w/DVD
  - V.90/56K internal modem
  - Integrated 10/100 Ethernet
    - PCMCIA Linksys Wireless LAN Adapter

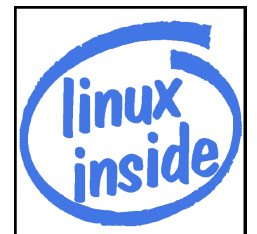




# My first mistake



- How I purchased the Toshiba laptop that was destined to be my 1<sup>st</sup> Linux system:
  - With no thought that some laptops might be more Linux-ready (or at least Linux-friendly, or just Linux-aware!) than others...
  - With no idea of how different each and every component of various laptop brands are
  - With no thought concerning if the dialup modem was ‘really’ a modem...
  - If I had it to do again, I will buy yet another laptop then I will find something that says “Linux” on the box...



# Hello my name is Rich...

(and I'm a Linuxholic)



- **Obsession:** *a persistent disturbing preoccupation with an often unreasonable idea<sup>1</sup>*
- **Compulsion:** *an irresistible impulse to perform an irrational act<sup>2</sup>*
- A religion consumes one's core reserves of dedication & faith
- *“Getting a laptop made in 1999 to do stupid Linux tricks became a Druidic sacrament of computer compulsion.”*
  - It seemed somewhat easier in 2001...

1,2: Webster's Ninth New Collegiate Dictionary

# The Best Teacher is Linuxperience



- No matter HOW many times you read the same HOW-TO's that never seem to address precisely your situation...
- You MUST continue reading them, aloud if allowed, until somehow, finally...
- One great & glorious day, some small piece of the puzzle clicks into place...success!

# Installation Plan



- Laptop came with Windows ME
- Used Partition Magic to shrink ME to 2.5GB
- Created swap and ext2 partitions
- Installed RedHat Linux 7.2
- Up and running in around an hour

# If the show FIPS...



- FIPS is the “First non-destructive Interactive Partition Splitting program”.
- FIPS is a program designed to split an existing DOS partition without deleting the data on it.
- FIPS is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License.

# If the show FIPS...



- FIPS 2.0 is at: <ftp://ftp.gnu.org/pub/gnu/parted/>
- FIPS is distributed in the hope that it will be useful, but **WITHOUT ANY WARRANTY**
- The author is Arno Schaefer, a Computer Sciences student, from Deutschland
- Arno's Email:  
[schaefer@rbg.informatik.th-darmstadt.de](mailto:schaefer@rbg.informatik.th-darmstadt.de)

# Boot loaders



- GRUB and LILO
- GRUB is the **GR**and **U**nified **B**oot loader
- LILO is **L**inux **L**Oader
- Similar to ‘boot-strap’ loaders on many other operating systems, such as NT Loader or SAPL on zVM
- Their mission in life is to start up when the computer is turned on
- Then they find the actual start program of the operating system, called the kernel

# Boot loaders



- If the kernel is where the boot loader thinks it is, the kernel is started and the boot loader gets out of the way
- It's really a way to organize the very low-level (preliminary) start parameters
- The boot loader allows the kernel to be stored outside the boot sector (the very edge of the 1<sup>st</sup> partition of the hard drive)
- It does this by pointing out the kernel at boot time



# Boot loaders



- `/etc/grub.conf`

```
# added by NeTraverse - DO NOT REMOVE THIS LINE, it's used for uninstall
default 2
# end added by NeTraverse - DO NOT REMOVE THIS LINE, it's used for uninstall
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You do not have a /boot partition. This means that
#           all kernel and initrd paths are relative to /, eg.
#           root (hd0,5)
#           kernel /boot/vmlinuz-version ro root=/dev/hda6
#           initrd /boot/initrd-version.img
#boot=/dev/hda
timeout=10
splashimage=(hd0,5)/boot/grub/splash.xpm.gz
title Red Hat Linux (2.4.7-10)
    root (hd0,5)
    kernel /boot/vmlinuz-2.4.7-10 ro root=/dev/hda6
title Windows
    rootnoverify (hd0,0)
    chainloader +1
# added by NeTraverse - DO NOT REMOVE THIS LINE, it's used for uninstall
title Win4Lin
    root (hd0,5)
    kernel /boot/win4lin ro root=/dev/hda6
# end added by NeTraverse - DO NOT REMOVE THIS LINE, it's used for uninstall
```

# Boot loaders



- `/etc/lilo.conf`

```
boot = /dev/hda
timeout = 50
compact
linear
message = /boot/message
default = linux
vga = 773
read-only
map=/boot/map
install=/boot/boot.b
image = /boot/vmlinuz-2.2.16-22smp
label = linux
root = /dev/hda5
image = /boot/vmlinuz-2.2.16-22
label = linux-up
root = /dev/hda5
```

# 'X' Marks the Spot



- X-Windows (Xfree86) provides a graphical environment for Linux/UNIX systems
- It is implemented as a client-server application
- The server is the machine with the graphics display
- The client is the machine where the application is executing
- On PC's they typically run together
- The cross machine functionality can be used between PC's or more typically with a system that does not have native graphics capability (like Linux for S/390)

# 'X' Marks the Spot



- KDE and GNOME desktop environment
- **K Desktop Environment**
- **GNU Object Model Environment**
- GNOME provides desktop environment only, a window manager will need to be selected (or installed)
- KDE does both...
- Other window managers: Enlightenment, Window Maker, Sawfish, Blackbox & Twm.
- Some of these come as part of most Linux's

# init Picker



- Linux initializes to various levels of operation
- This scheme controls the entire erector set of programs, applications, profiles, configs, etc. that start up or not
- All depending on the run level of the system.
- The config file */etc/inittab* (the ‘init table’) controls how each run-level runs

```
# Default runlevel. The runlevels used are:
# 0 - halt (Do NOT set initdefault to this)
# 1 - Single user mode
# 2 - Multiuser, no NFS, same as 3, with no network
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
```

# Connect this...



- Integrated Ethernet adapters...
  - No problem
- Linksys Wireless Lan
  - ‘Connected’ to a Linksys wireless accesspoint (which is also a router)
  - Very pleasant surprise, worked with open source driver
  - RPMs for distributed kernels at <http://www.linux-wlan.org>
    - Currently running linux-wlan-ng 0.1.10

# Let's Backup a Moment!



- To archive key files on my laptop I run a REXX program on Sytek Service's VM system in Bellingham, WA.
- The program starts a *telnet* session to my laptop, logging in to the user account on my laptop I've set up for doing the archiving.
- The *.bashrc* script (i.e. the PROFILE EXEC) starts & changes the run level of the system from 5 (multi-user, gui interface) to 3, which is multi-user, but only shell (text) interface.

# Let's Backup a Moment!



- This allows files to be archived while “at rest” & not being changed by a running X11 (graphical) environment.
- My program called by `.bashrc` creates compressed archives of selected directories & files .
- The archive files are copied to several directories on the laptop (each on different partitions to allow recover of an isolated hard drive failure).



# Let's Backup a Moment!



- Finally, the backups are FTP'd to my userid on my VM system.
- To restore a file, I wrote a short bash script to uncompress the tar archive file containing the directory of the file to be restored, & then copy the file as specified in the call to the script.

# Let's Backup a Moment!



- Other backup software...
  - tar, cpio: built in Linux commands
  - Amanda (Advanced Maryland Network Disk Archiver)
  - Arkeia
  - TSS-BAR (Tape Services Suite – Backup and Restore - UTS Global)
  - Brightstor (CA)
  - Networker (Legato)
  - TSM (Tivoli Storage Manager - IBM)

# You just can win with a WinModem!



- The basic fact of the “winmodem” is that it is not an internal modem that operates via a hardware configuration
- Instead, laptop-makers have taken to using the processor & motherboard itself, combined with *software*, to duplicate the functions of a modem
- This is trivial on Windows systems, because the manufacturers make the specs of the pseudo-modem available to Microsoft programmers

# You just can win with a WinModem!



- Unfortunately, the situation is not so clear cut for Linux
- Drivers for some Winmodems exist
  - Lots of info and resources at:  
<http://www.linmodems.org>
- Lucent AMR modems are definitely not supported!
  - See how unhappy Rich is?
- As always check the HCL and Laptop HOWTO

# Word for Word...



- MS Word alternatives...
  - Abiword
  - Applix Words
  - OpenOffice.org
  - StarOffice Writer from Sun
  - Koffice
  - WordPerfect Office 2000 from Corel?

# Excel-ent!



- MS Excel alternatives...
  - Gnumeric
  - Applix Spreadsheets
  - OpenOffice.org
  - StarOffice Calc from Sun
  - Koffice
  - WordPerfect Office 2000 from Corel?

# Presentations...



- MS PowerPoint alternatives...
  - Applix Presents
  - OpenOffice.org
  - Koffice
  - StarOffice Impress
  - WordPerfect Office 2000 from Corel?

# Samba Enchanted Printing



- SWAT is a web-browser-based configuration tool to set up Samba printing.
- Samba enables printing from a Linux box even to printers owned & controlled by Windows systems (or systems that try to look like Windows).



# Browsin' the 'net



- By a not-coincidental irony, Netscape Navigator usually comes 'bundled' with Linux
  - Navigator 4.78, comes with RHL 7.2
- Mozilla looks a lot better than NS
- Konqueror is quite good, but also quite buggy
- Had problems with Opera (site rendering)
  - Fee based product
  - ...or you get swamped with advertisements

# You want some cheese with that WINE?



- Of the three “Windows-emulators” we are discussing, Wine seems the most “Linux-y”.
- This is seen on several levels. Wine is the only Open Source software of the three
- It is also different in that it is *not* an emulator.
- In true Linux fashion, Wine is a recursive acronym (for “Wine Is Not an Emulator”)

# You want some cheese with that WINE?



- Wine provides true virtual Windows processing. This environment is able to furnish Windows services absent the actual ‘physical’ presence of Windows.
- Yet, unmodified Windows software can run in this environment.
- What kind of smoke and mirrors are used to accomplish this?

# You want some cheese with that WINE?



- By using an implementation of the Windows 3.x & Win32 APIs on top of X11 & Linux, Wine provides a Windows compatibility layer, rather than an emulation
- Wine includes both a development toolkit (WineLib) for porting Windows sources to Linux & a program loader, allowing unmodified Windows 3.1/95/NT binaries to run under Intel Unix's
- In addition to Linux, Wine works on most popular Intel Unix's, including FreeBSD & Solaris
- Since Wine does not require a running copy of Microsoft Windows, it is a completely alternative implementation consisting of 100% MS-take-free code
- However, it can also use native Windows system DLLs if available

# You want some cheese with that WINE?



- Unlike Win4Lin and VMware, Wine comes with complete source code, documentation and examples
- It is freely redistributable
- The licensing terms are similar to X11
- As of 2001, Wine consists of over 650K lines of C code
- Wine is basically a Linux-based project attempting to provide the necessary *translation code* to enable MSDOS- structured executables to adapt to the Linux way of doing things
- This is a novel approach, to say the least.
- Most importantly, it is an effort that is only just under way

# You want some cheese with that WINE?



- It has been written by more than 300 developers from dozens of countries around the world
- Wine implements more than 90% of the calls in popular Windows specifications such as ECMA-234 & Open32
- New snapshot releases appear every two weeks or so
- Wine looks to be a vehicle that someday may well become the standard in porting applications & file structures between Win & Linux
- It is most definitely a work still in progress, an Open Source project not yet proven in the field
- Like Linux itself, Wine needs, & deserves to be given the time, & encouragement to grow into its own

# You want some cheese with that WINE?



- As the product is still under development, it is not yet as suitable for general use as Win4Lin or VMware.
- It may still be a little “before its time”.
- Wine is in active use by an estimated 90,000 people who find it useful in running a variety of Windows programs, while paying MSzero.
- The Wine Development Project website is:  
<http://www.winehq.com/>

# Win4Lin Free4All...



- Win4Lin, by NeTraverse, allows full-blown Windows (95, 98 and ME) to run on Linux
- A running copy of actual Windows and copies of any applications to be run are required
- Win4Lin establishes a platform on which to run software, but provides no applications itself
- Win4Lin is fairly straight-forward and the directions actually work as written
- Installs a special Win4Lin enabled kernel
  - *...we let most of the code in Windows execute on the host processor, rather than emulating a processor in software. This requires ring 0 privilege to accomplish, therefore “kernel”* Win4Lin-users 07/03/02



# Win4Lin Free4All...



- It is installed from a shell session (command line) while XWindows is up and running.
- Three stage install process
  - Download an installer program
    - Invoke installer – which installs Win4Lin enabled kernel
    - Reboot
  - Restart installer
    - With Windows CD in drive
      - Copies Windows files to hard drive
  - Install Windows

# Win4Lin Free4All...



- Either a bootable Windows CD (ME or 98 but not 95) or a Windows boot floppy are needed to install
- While configuring Linux Windows, the 25-character Windows product ID is required
- Installing Windows under Win4Lin takes less than  $\frac{3}{4}$  as long as a “normal” native Windows installation

# Win4Lin Free4All...



- Networking options
  - VNET or Winsock
  - VNET is the most robust, but requires a second IP address
  - Winsock is probably simpler, but has restrictions
- Filesystem access
  - Win4Lin programs and data live in the Linux filesystem
  - Windows, applications and data are under the users control (/home/stosh/win is the 'C' drive)
  - \$HOME/mydata is the 'D' drive
  - The CD is the 'N' drive
  - You can change these or create any additional mappings

# Win4Lin Free4All...



- Memory size of the environment is configurable up to 128MB
- Lots of config options with provided utility
- Runs windowed on the Linux desktop or in Full Screen mode
- NeTraverse: <http://www.netraverse.com>

# VM Where?



- VMware provides the strongest “padded cell” Windows environment emulation
- This makes it unlikely to have Windows bring down or adversely effect the Linux base system
- VMware is probably the ‘slickest’ of the Windows-providing products for Linux, but it should be; it’s the most costly of the three
- Again, Windows itself and any applications you wish to run are not included with VMware

# VM Where?



- The software is much much more than just an MS Windows enabler, of course
- True to its mainframe namesake (IBM's z/VM operating system), VMware is able provide a virtual hosting environment for many varied systems
- VMware is a professional strength, robust systems host manager
- It's really overkill for the important but simpler task of providing "Windows" applications to the Linux system user

# VM Where?



- The reason for still needing software that has not yet been ported to Linux is convenience while interacting with the still-overwhelming Windows world of computer users
- The full-blown VMware Workstation product may be more than is needed outside of a multi-user production shop.
- VMware's website: <http://www.vmware.com>

# Going to the movies



## Software (both open source)

- Xine
- Ogle
- RPMs available for both
- Xine
  - None of the available RPMs would work
  - Compiled from source (about 8 packages)
  - After a lot of tweaking and another source patch, no luck
  - DVD image is divided into three sections
  - Other video playback is fine (mpegs, avi, etc)
- Ogle
  - RPMs installed and worked OK (5 packages)
  - Same DVD playback problem as Xine



# Linux on a Laptop: A 'no-win' -dows situation?



- At least on laptops, for now, none of the Linux distributions will necessarily work “right out of the box”
- Until the hardware manufacturers start to play nice with the Open Source community, folks will be writing drivers to distraction
- The amount of manual configuring, tailoring and customizing that is not just possible, but *required*, is daunting

# Linux on a Laptop: A 'no-win' -dows situation?



- What Windows does better:
  - There's still nothing quite like PowerPoint.
  - Plug & Pray usually works out.
- For the non-programmer, most installation procedures are easier (since one has so little input into the install or configuring), when compared to the 'real-life' operating system feel on Linux of *make, depmod & build*
- Why I'm sticking with Linux (but always keeping one Windows machine too)
- The real reason: it's way more fun, more intellectually stimulating and...
- The Open Source culture just feels *right* to me

# What's Next?



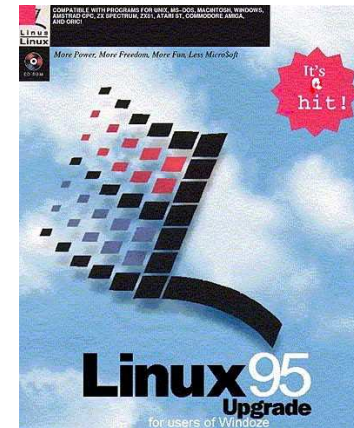
- Upgrade Linux
  - New KDE (3.0.2)
  - New XFree86 (4.2 to fix the DVD playback problem)
  - Install additional font packages and try OpenOffice again
- Buy CD-R/W to take backups
- Revisit printing through desktop system

# What a Tangled Web we Weave...



- Linux Documentation Project

- <http://www.linuxdoc.org>
- <http://www.tldp.org>



- Linux FAQ

- <http://linuxdoc.org/FAQ/Linux-FAQ/index.html>

- “The Cathedral & the Bazaar”

- <http://www.tuxedo.org/~esr/writings/cathedral-bazaar/>

# What a Tangled Web we Weave...



- Filesystems HOWTO
  - <http://linuxdoc.org/HOWTO/Filesystems-HOWTO.html>
- Bash Prompt HOWTO
  - <http://linuxdoc.org/HOWTO/Bash-Prompt-HOWTO.html>
- Chroot-BIND HOWTO
  - <http://linuxdoc.org/HOWTO/Chroot-BIND-HOWTO.html>
- Linux IPCHAINS HOWTO
  - <http://linuxdoc.org/HOWTO/IPCHAINS-HOWTO.html>
- The Linux Kernel HOWTO
  - <http://linuxdoc.org/HOWTO/Kernel-HOWTO.html>
- The Linux Network Administrator's Guide, Second Edition
  - <http://linuxdoc.org/LDP/nag2/index.html>
- The Linux System Administrators' Guide
  - <http://linuxdoc.org/LDP/sag/index.html>
- Linux Administrator's Security Guide version: 1.0
  - <http://linuxdoc.org/LDP/lasg>
- The Linux Kernel Module Programming Guide
  - <http://linuxdoc.org/LDP/lkmpg/mpg.html>

# What a Tangled Web we Weave...



- Setting Up Your New Domain Mini HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Domain.html>
- Linux Bridge+Firewall Mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Bridge+Firewall.html>
- Bridge + Firewall + DSL Mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Bridge+Firewall+DSL.html>
- Firewall & Proxy Server HOWTO
  - <http://linuxdoc.org/HOWTO/Firewall-HOWTO.html>
- FTP mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/FTP.html>
- The Linux Electronic Mail Administrator HOWTO
  - <http://linuxdoc.org/HOWTO/Mail-Administrator-HOWTO.html>
- The Linux Intranet Server HOWTO
  - <http://linuxdoc.org/HOWTO/Intranet-Server-HOWTO.html>
- Linux Security HOWTO
  - <http://linuxdoc.org/HOWTO/Security-HOWTO.html>

# What a Tangled Web we Weave...



- Security-Related Internet Sites:
  - <http://www.securityfocus.com/>
  - <http://www.insecure.org/>
  - <http://rootshell.com/>
  - <http://www.cert.org/>
  - <http://lsap.org/>
- DHCP mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/DHCP/index.html>
- Secure POP via SSH mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Secure-POP+SSH.html>
- User Authentication HOWTO
  - <http://linuxdoc.org/HOWTO/User-Authentication-HOWTO/index.html>
- Qmail VMailMgr & Courier-Imap HOWTO
  - <http://linuxdoc.org/HOWTO/Qmail-VMailMgr-Courier-imap-HOWTO.html>
- VMailMgr HOWTO
  - <http://linuxdoc.org/HOWTO/VMailMgr-HOWTO.html>

# What a Tangled Web we Weave...



- BASH Programming - Introduction HOWTO
  - <http://linuxdoc.org/HOWTO/Bash-Prog-Intro-HOWTO.html>
- The Linux Reading List HOWTO
  - <http://linuxdoc.org/HOWTO/Reading-List-HOWTO/index.html>
- A mSQL & perl Web Server HOWTO
  - <http://linuxdoc.org/HOWTO/WWW-mSQL-HOWTO.html>
- Secure Programming for Linux & Unix HOWTO
  - <http://linuxdoc.org/HOWTO/Secure-Programs-HOWTO/index.html>
- Firewall Piercing mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Firewall-Piercing.html>
- Programming Languages mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/Programming-Languages.html>
- The Linux Printing HOWTO
  - <http://linuxdoc.org/HOWTO/Printing-HOWTO/index.html>
- SMB HOWTO
  - <http://linuxdoc.org/HOWTO/SMB-HOWTO.html>
- NFS HOWTO
  - <http://linuxdoc.org/HOWTO/NFS-HOWTO/index.html>
- NFS-Root-Client Mini-HOWTO
  - <http://linuxdoc.org/HOWTO/mini/NFS-Root-Client-mini-HOWTO/index.html>



## End of *Linux in Your Lap*

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