Linux in Your Lap

Session 9365

Rich Smrcina - Sytek Services, Inc.
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• 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
• Objectives
• My first misteak
• Hello, my name is Rich & I'm a Linuxholic.
• The Best Teacher is Linuxperience...
• Installment Plan
• If the Shoe FIPS…
• Boot Loaders
• ‘X’ Marks the Spot!
• init Picker
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• Let’s Backup a Moment Here!
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Of Course

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• 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 misteak

• How I purchased the Toshiba laptop that was destined to be my 1\textsuperscript{st} 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
- **Compulsion**: an irresistible impulse to perform an irrational act

- 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!
Installment 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.
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
• GRUB and LILO

• GRUB is the GRAnd Unified Boot loader

• LILO is LIinux LOader

• 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
• 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 1st 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

```bash
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-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
• 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.
• 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.
• 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
• 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?
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?
• 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
• 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
• 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
• 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 ¾ as long as a “normal” native Windows installation
• 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
• 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
• 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.linuxdoc.org)
  - [http://www.tldp.org](http://www.tldp.org)

- **Linux FAQ**
  - [http://linuxdoc.org/FAQ/Linux-FAQ/index.html](http://linuxdoc.org/FAQ/Linux-FAQ/index.html)

- “The Cathedral & the Bazaar”
What a Tangled Web we Weave...

- Filesystems HOWTO
  - [http://linuxdoc.org/HOWTO/Filesystems-HOWTO.html](http://linuxdoc.org/HOWTO/Filesystems-HOWTO.html)
- Bash Prompt HOWTO
  - [http://linuxdoc.org/HOWTO/Bash-Prompt-HOWTO.html](http://linuxdoc.org/HOWTO/Bash-Prompt-HOWTO.html)
- Chroot-BIND HOWTO
  - [http://linuxdoc.org/HOWTO/Chroot-BIND-HOWTO.html](http://linuxdoc.org/HOWTO/Chroot-BIND-HOWTO.html)
- Linux IPCHAINS HOWTO
  - [http://linuxdoc.org/HOWTO/IPCHAINS-HOWTO.html](http://linuxdoc.org/HOWTO/IPCHAINS-HOWTO.html)
- The Linux Kernel HOWTO
  - [http://linuxdoc.org/HOWTO/Kernel-HOWTO.html](http://linuxdoc.org/HOWTO/Kernel-HOWTO.html)
- The Linux System Administrators' Guide
  - [http://linuxdoc.org/LDP/sag/index.html](http://linuxdoc.org/LDP/sag/index.html)
- Linux Administrator's Security Guide version: 1.0
  - [http://linuxdoc.org/LDP/1asg](http://linuxdoc.org/LDP/1asg)
- The Linux Kernel Module Programming Guide
  - [http://linuxdoc.org/LDP/lkmpg/mpg.html](http://linuxdoc.org/LDP/lkmpg/mpg.html)
What a Tangled Web we Weave…

- Setting Up Your New Domain Mini HOWTO
- 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
- Linux Security HOWTO
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

- Secure POP via SSH mini-HOWTO

- User Authentication HOWTO

- 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
- A mSQL & perl Web Server HOWTO
  - http://linuxdoc.org/HOWTO/WWW-mSQL-HOWTO.html
- Secure Programming for Linux & Unix HOWTO
- 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
- SMB HOWTO
  - http://linuxdoc.org/HOWTO/SMB-HOWTO.html
- NFS HOWTO
- NFS-Root-Client Mini-HOWTO
End of *Linux in Your Lap*

Rich Smrcina  
Sytek Services, Inc.  
rsmrcina@sytek-services.com  
Office: 262-392-2026  
Cell: 414-491-6001