Linux in Your Lap

Session 9371

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- Sytek Services, A Division of DSG
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Giving Credit

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Of Course

• The Joys & Heartaches of Running Linux on a Laptop

  Speaker: Rich Smrcina
  Length: 1 hour
  Classification: Technical
  When: Tuesday 1:30pm
  Where: Adams Mark, Dallas
Of Course

• 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!
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• Connect this...
• You just can’t win with a Winmodem
• Application Alternatives

Of Course

• Samba Enchanted Printing...
• Browsin’ the ‘net
• You Want Some Cheese With That Wine?
• Win4Lin Free4All...
• VM Where??
• Codeweaving
• Going to the Movies
• Gadgets and Gizmos
• Let’s Backup a moment here
• 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 show that Linux can work well as a laptop operating system and to progressively demonstrate the configuration and usage of Linux on a laptop with the purpose of 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
    • 20GB USB 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 system that was destined to be my first laptop system:
  - With no thought that some laptops might be more Linux-ready than others…
  - With no idea of how different each and every component of various laptop brands (and sometimes the same brand) 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\(^1\)
- **Compulsion**: an irresistible impulse to perform an irrational act\(^2\)

- A religion consumes one’s core reserves of dedication and faith

- “Getting a laptop made in 1999 to do stupid Linux tricks became a Druidic sacrament of computer compulsion.”
- It seemed somewhat easier in 2002, 03 …

\(^1,2\): 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
  - upgraded to 8.0 at the end of last year
- Up and running in around an hour
If the shoe 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 shoe 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
Boot loaders

• 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

• They initially ‘boot’ 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**

  ```ini
  # 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
  root=LABEL=Windows
  root=LABEL=Windows
  initrd /boot/initrd-2.4.7-10.img
  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
  ```

- **/etc/lilo.conf**

  ```ini
  boot = /dev/hda
  timeout = 50
  compact
  linear
  message = /boot/message
  default = linux
  vga = 773
  read-only
  map=/boot/map
  inst=/boot/inst
  image = /boot/vmlinuz-2.2.16-22smp
  label = linux
  root = /dev/hda3
  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 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 access point (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 0.1.16-pre2
• 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 and 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
Application alternatives

- Word processing
  - Abiword

- Spreadsheet
  - Gnumeric

- Suites
  - Anywhere Desktop (Vista Source)
  - OpenOffice.org
  - StarOffice (Sun)
  - Koffice
  - WordPerfect Office (Corel)

Samba Enchanted Printing

- SWAT is a web-browser-based configuration tool to set up Samba shares and printing

- Samba enables printing from a Linux box even to printers owned & controlled by Windows systems (or systems that try to look like Windows)
  - Controlled by smbclient program and it’s front end shell-script smbprint
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
  • 2.2.1 was quite buggy
  • 3.0.3 is much better, also faster

• 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”)

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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?

WINE is an implementation of the Win16 and Win32 APIs on top of X11 and Linux.
WINE provides a Windows compatibility layer, rather than an emulation.
WINE includes both a development toolkit (Winelib) for porting Windows sources to Linux and a program loader, allowing unmodified Windows 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 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?

- Wine comes with complete source code, documentation and examples
- It is freely redistributable
- The licensing terms are GNU LGPL
- As of 2002, Wine consists of over 1 million lines of source 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
- 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 applications
- New snapshot releases appear about monthly
- Wine is in active use by an estimated 100,000 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 installing Windows under Win4Lin, the 25-character Windows product ID is required

• Installing Windows under Win4Lin takes less than ¾ 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

• File system access
  • Win4Lin programs and data live in the Linux filesystem
  • Windows, applications and data are under the users control ($HOME/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 Windows session configuration 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 is perfect for a server consolidation initiative or for developers

VM Where?

- It’s really overkill for the important but simpler task of providing “Windows” applications to the Linux system user

- The full-blown VMware Workstation product may be more than is needed outside of a multi-user production shop
  - The driving force behind xSeries consolidation with the IBM x440

- VMware’s website: http://www.vmware.com
Codeweaving

• A relatively new player is Codeweavers
• Provides a package called Crossover Office
• Takes Wine to a commercial level
• Can run Microsoft Windows applications right on the Linux desktop
  • MS Word 97 and 2000
  • MS Excel 97 and 2000
  • MS Powerpoint 2000
  • Lotus Notes R5
  • Internet Explorer 5.0 and 5.5
  • and more…
• Available with SuSE Linux Office Desktop
  • Codeweavers code included
  • Also StarOffice
  • Linux kernel 2.4.19
  • KDE 3.0.4

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
Gadgets and Gizmos

• Sharp SL-5500
  – Hardware
    • 64MB Storage
    • StrongARM processor running at 206Mhz
    • Compact Flash and SDRAM card slots
  – Software
    • Typical PDA functionality
    • Address Book, Calendar, Calculator, To Do list
    • Also Email, Opera Web Browser, Word Processing, Spreadsheet, Presentations
    • Picture viewer, Media Player, Voice Recorder
    • Games

• Sharp Zaurus
  – Lots of expandability
    • Compact flash cards for networking, etc.
  – Docking cradle for USB Connectivity
  – Additional Software available for download
    • http://www.myzaurus.com
    • Terminal program
    • Qtopia Desktop
      – To sync with desktop running either Linux or Windows
      – Backup address book, files and to-do list to laptop
  – Best of all, it runs Linux!
**Gadgets and Gizmos**

- Buslink USB 2.0 Disk-on-the-Go/Lite
  - USB attached disk system
  - 20GB capacity
  - USB drivers work on Redhat 7.2 (2.4.9) and 8.0 (2.4.17)
  - Looks like a SCSI disk drive
    - Mount /dev/sda1

**Let’s Backup a Moment!**

- Backup is as easy as tarring my files to the portable disk drive

- 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)
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 configure, make and make install

• Why I’m sticking with Linux (but for now keeping one Windows machine too)

• The real reason: it’s way more fun, more intellectually stimulating
What’s Next?

- Upgrade to Redhat 8.0 didn’t work as expected
  - Some performance improvement related to new KDE
  - Fixed a lot of problems
    - Kmail, Konqueror, mouse, Open Office
  - Created others

- Either re-install Redhat 8.0 fresh
  - or -

- Pick a different distribution
  (likely SuSE Linux Desktop Office)

What a Tangled Web we Weave...

- Linux Documentation Project
  - http://www.linuxdoc.org
  - http://www.tldp.org

- Linux FAQ

- “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 System Administrators' Guide
- 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
- 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://rootsell.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

• 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/HOWTOmini/Firewall-Piercing.html
• Programming Languages mini-HOWTO
  • http://linuxdoc.org/HOWTOmini/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/HOWTOmini/NFS-Root-Client-mini-HOWTO/index.html
End of *Linux in Your Lap*

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