



Linux in Your Lap

Session 9371

Rich Smrcina
- Sytek Services, A Division of DSG
February 25, 2003
SHARE 100 – Dallas

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A DIVISION OF

DSG

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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 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...
- You just can't win with a Winmodem
- Application Alternatives

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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...

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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”.

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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



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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...



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Hello my name is Rich...

(and I'm a Linuxholic)



- **Obsession:** *a persistent disturbing preoccupation with an often unreasonable idea¹*
- **Compulsion:** *an irresistible impulse to perform an irrational act²*
- 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

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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!

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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

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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.

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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

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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
- They initially 'boot' when the computer is turned on
- Then they find the actual start program of the operating system, called the kernel

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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 1st partition of the hard drive)
- It does this by pointing out the kernel at boot time

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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
```

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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
```

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'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)

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'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

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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)
```

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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

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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 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

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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

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Application alternatives



- Word processing
 - Abiword
- Spreadsheet
 - Gnumeric
- Suites
 - Anywhere Desktop (Vista Source)
 - OpenOffice.org
 - StarOffice (Sun)
 - Koffice
 - WordPerfect Office (Corel)

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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

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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

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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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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?

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You want some cheese with that WINE?



- 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

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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

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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/>

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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*

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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

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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 $\frac{3}{4}$ as long as a “normal” native Windows installation

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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

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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>

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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

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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

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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>

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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



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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

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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

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Gadgets and Gizmos



- 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!

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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

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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)

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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

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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

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What's Next?



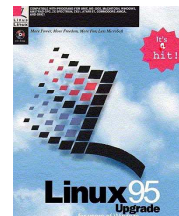
- Upgrade to Redhat 8.0 didn't work as expected
 - Some performance improvement related to new KDE
 - Fixed a lot of problems
 - Kmail, Konqueror, mouse, Open Office
 - Created others
- Either re-install Redhat 8.0 fresh
 - or -
- Pick a different distribution
(likely SuSE Linux Desktop Office)

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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/>



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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>

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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>

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What a Tangled Web we Weave...



LINUX

- 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>

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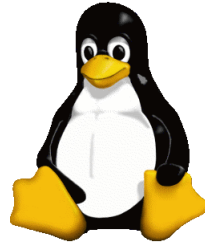
What a Tangled Web we Weave...



- 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>

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End of *Linux in Your Lap*



Rich Smrcina
Sytek Services, a division of DSG
rsmrcina@dsgroup.com
Office: 262-392-2026
Cell: 414-491-6001

