

Linux Basics Tutorial version 1.0

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for

Western PA Linux Users Group

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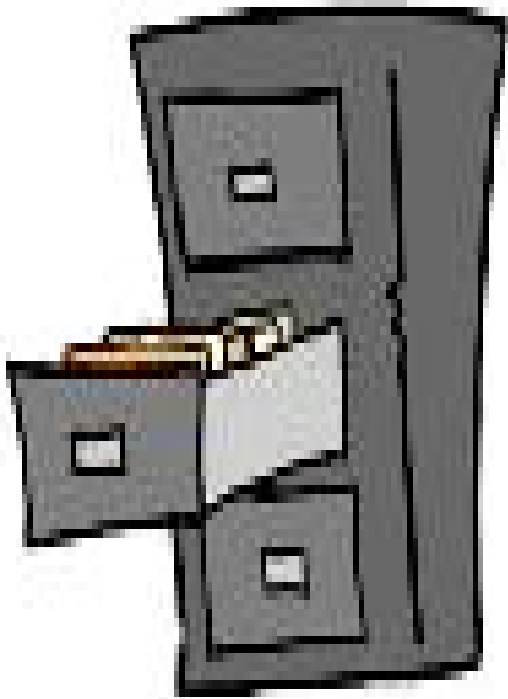
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Sorry folks...

This is going to be rough

It all starts with /



/bin

/boot

/dev

/etc

/home

/lib

/mnt

/opt

/proc

/root

/sbin

/tmp

/usr

/var

The Linux filesystem

Formats: ext2, ext3, reiserfs...

You can mount just about any kind of file system
in Linux

Disk Partitioning

- Allows you to divide up the disk for multiple Oses
- Makes disks less cluttered - better for storage & retrieval
- Allocate space for certain purposes
- Easier for backups

```
dd if=/dev/hda1 of=/dev/hdb2bs=1k conv=sync,noerror
```

Common Partitions

/boot

/usr

/opt

/home

/var

/tmp

<swap>

/

Key Drives in 4 steps

- 1) Look in dmesg to find the device name
- 2) Look with fdisk to find out how it is partitioned
- 3) Create directory if needed

```
mkdir /mnt/key
```

- 4) Mount it

```
mount /dev/sda1 /mnt/key
```

Burning ISOs – Linux in 2 steps

- 1) `cdrecord -scanbus`
- 2) `cdrecord -v speed=2 dev=0,0,0 -data
cdimage.iso`

Copying cdrom

- 1) Mount /mnt/cdrom
- 2) mkisofs -r -o cdimage.iso /mnt/cdrom
- 3) cdrecord -v speed=2 dev=0,0,0 -data cdimage.iso

More than you ever wanted to know about Linux cd writing can be found at the howto...

<http://www.ibiblio.org/pub/Linux/docs/HOWTO/CD-Writing-HOWTO>

Security starts with you and your users!

Don't login as root, su instead.

No account or password sharing
logout or use xlock

Select GOOD passwords

Npasswd will help you pick good ones, respect it!

Protect your /etc/shadow

John the Ripper or crack will tell you if your passwords are good enough!

You can implement Kerberos and secure cards.

File permissions

To check the permissions use “ls -l”
utilize groups

```
chown {username} {filename}  
chown :{groupname} {filename}
```

chmod to change permissions

```
chmod a+rwx {filename}
```

```
chmod u+r {filename}
```

```
chmod o-x {filename}
```

```
chmod 700 {filename}
```

Educate yourself about the services
you are running!

No one should use telnet or ftp, use ssh/scp instead

Use `chkconfig -list`

check <http://www.cert.org> for vulnerabilities

turn off any services that are vulnerabilities until
you can update or patch!

Init levels

Init allows you to control your system state

- 1 single user
- 2 multiuser
- 3 networking
- 4 reserved (not really used)
- 5 X (aka the GUI)
- 6 reboot

`/etc/inittab`

`id:3:initdefault:`

Shutting down and Rebooting

`/etc/shutdown -h now`

`/etc/poweroff`

`/etc/shutdown -t60 -r`

`/sbin/reboot`

`/sbin/init 3`

Boot Loaders

LILO – a simple boot loader with no frills

GRUB – yet another boot loader with a very simple command line

lilo.conf example

```
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
message=/boot/message
password=huggybot
lba32
default=linux
image=/boot/vmlinuz-2.0.36
    label=linux
    root=/dev/hda2
    read-only
other=/dev/hda1
    label=win
```

Set it into a action!

Run /sbin/lilo

writes to the MBR

/etc/grub.conf

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#     all kernel and initrd paths are relative to /boot/, eg.
#     root (hd0,0)
#     kernel /vmlinuz-version ro root=/dev/hda5
#     initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
password=huggybot
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Linux (2.4.20-31.9)
    root (hd0,0)
    kernel /vmlinuz-2.4.20-31.9 ro root=LABEL=/
    initrd /initrd-2.4.20-31.9.img
title Red Hat Linux (2.4.20-30.9)
    root (hd0,0)
    kernel /vmlinuz-2.4.20-30.9 ro root=LABEL=/
    initrd /initrd-2.4.20-30.9.img
```

Set it into action

If grub is already on your MBR, you need not re-install grub when you make changes to
`/etc/grub.conf`

If you need to install grub on your MBR
`/sbin/grub-install /dev/hda`

Configuring X

/etc/X11/XF86Config or /etc/X11/X.org

XFree86 -configure or X.org -configure

http://www.wplug.org/meetings/one-meeting?wp_meeting_id=2987

What is XFree86/X.org?

- Both are free open source X11 servers, X.org forked from XFree86
- For linux, XFree86 provides the graphical user environment
- All X programs are clients that connect to the X server
- Window decorations provided by window manager
 - Gnome, KDE, fvwm, twm, etc. etc. etc.
 - Outside the topic of this presentation
- Still one of the most difficult service to configure on a linux system because you need to know a lot about your hardware.

XF86Config, Files section

_FontPath “path”

- Sets the search path for fonts
- “path”:
 - */usr/X11R6/lib/X11/fonts/100dpi/*
 - *unix/:7100*

_RGBPath “path”

- sets the path name for the RGB color database

_ModulePath “path”

- Sets the search path for loadable X server modules

XF86Config, InputDevice section

_Describes the various input devices, usually the keyboard and mouse

_Example:

```
Section "InputDevice"  
    Identifier "Mouse0"  
    Driver      "mouse"  
    Option      "Protocol" "IMPS/2"  
    Option      "Device"  
    "/dev/psaux"  
    Option      "ZAxisMapping" "4  
5"  
    Option      "Emulate3Buttons"  
    "no"  
EndSection
```


XF86Config, InputDevice section

_Describes the various input devices, usually the keyboard and mouse

_Another Example:

```
Section "InputDevice"
```

```
    Identifier "DevInputMice"
```

```
    Driver      "mouse"
```

```
    Option      "Protocol" "IMPS/2"
```

```
    Option      "Device"  "/dev/input/mice"
```

```
    Option      "ZAxisMapping" "4 5"
```

```
    Option      "Emulate3Buttons" "no"
```

```
EndSection
```

XF86Config, Device Section

_Devices section describes the video devices to be used

_There can be more than one of these sections

- Describe multiple devices

- Hardware driver and framebuffer driver

_Example:

```
Section "Device"
```

```
    Identifier "Videocard0"
```

```
    Driver     "nv"
```

```
    VendorName "Videocard vendor"
```

```
    BoardName  "NVIDIA GeForce 2 MX
```

```
(generic)"
```

```
EndSection
```

XF86Config, Monitor Section

_Describes the monitor(s) connected to the system

_Example:

```
Section "Monitor"  
  Identifier "Hitachi CM771"  
  VendorName "Hitachi"  
  ModelName "CM771"  
  HorizSync 31-96  
  VertRefresh 50-160  
  DisplaySize 365 275  
  Option      "dpms"  
EndSection
```

XF86Config, Screen Section

- _ Screen section defines one “screen”
- _ A “screen” is a binding of:
 - A graphics device from the Device section
 - A monitor from the Monitor section

_ Example:

```
Section "Screen"  
  Identifier "Screen0"  
  Device "Videocard0"  
  Monitor "Hitachi CM771"  
  DefaultDepth 24  
  Subsection "Display"  
    Depth 24  
    Modes "1600x1200" "1280x1024"  
  EndSubSection  
EndSection
```

XF86Config, Serverlayout section

_Represents binding of

- One or more “screens” from the Screen section
- One or more “input devices” from the InputDevice sections
- If multiple displays, also specifies the relative layout of the screens

_Example:

```
Section "ServerLayout"  
  Identifier    "Default Layout"  
  Screen      0 "Screen0" 0 0  
  InputDevice  "Mouse0" "CorePointer"  
  InputDevice  "Keyboard0" "CoreKeyboard"  
  InputDevice  "DevInputMice"  
  "SendCoreEvents"  
EndSection
```

What is NFS?

- Network File System
- One of many protocols for file sharing
- created by Sun Microsystems in 1985, originally for diskless systems it was found to be a great way to share files
- A free way to share files from one Unix system to another
- An RPC (Remote Procedure Protocol) dependent service with your choice of transport, TCP (Transmission Control Protocol) or UCP (User Control Protocol)

When to Use NFS

- Unix system to Unix system file sharing
- You want to use files that are on another system as if they were local
- Fast protocol
- Multiple files need to be shared
- Large files (NFS version 3 recommended)
- Simple to setup
- Not very concerned with security

Quick setup guide for Linux NFS server

- make sure nfs-utils is installed
- start portmap and nfs services
- edit /etc/exports, a typical config would look like this...

`/home/bethlynn/share foo.lookandsee.net(rw) bar.lookandsee.net(ro)`

- run “/usr/sbin/exportfs -av” to activate the export

Share options...

- ro rw
- no_root_squash
- no_subtree_check
- speeds things up when exporting the entire volume sync prevents data corruption
- can export by hostname wildcards, ip address, subnet, NIS netgroup

/data *.lookandsee.net(rw,no_root_squash)

/data 192.168.10.0/255.255.255.0

/data @mangers(ro)

Quick Setup Guide for Linux Client

- check to see if nfs-utils are installed
- start portmap and nfs
- Run

```
mount -soft host:/home/bethlynn/share /net/home/bethlynn
```

Special Thanks

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OK this is really the end

yup, that's all folks