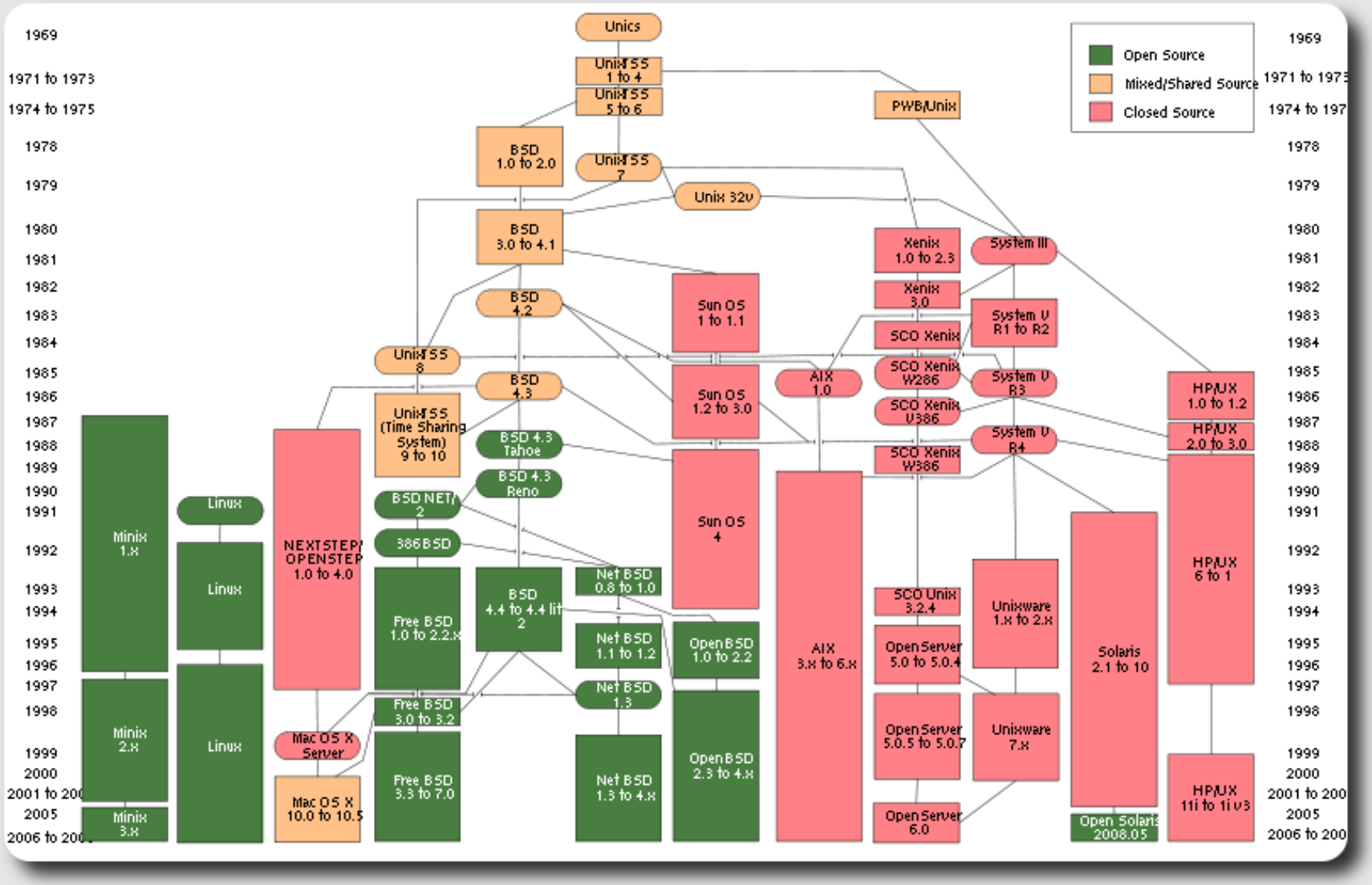
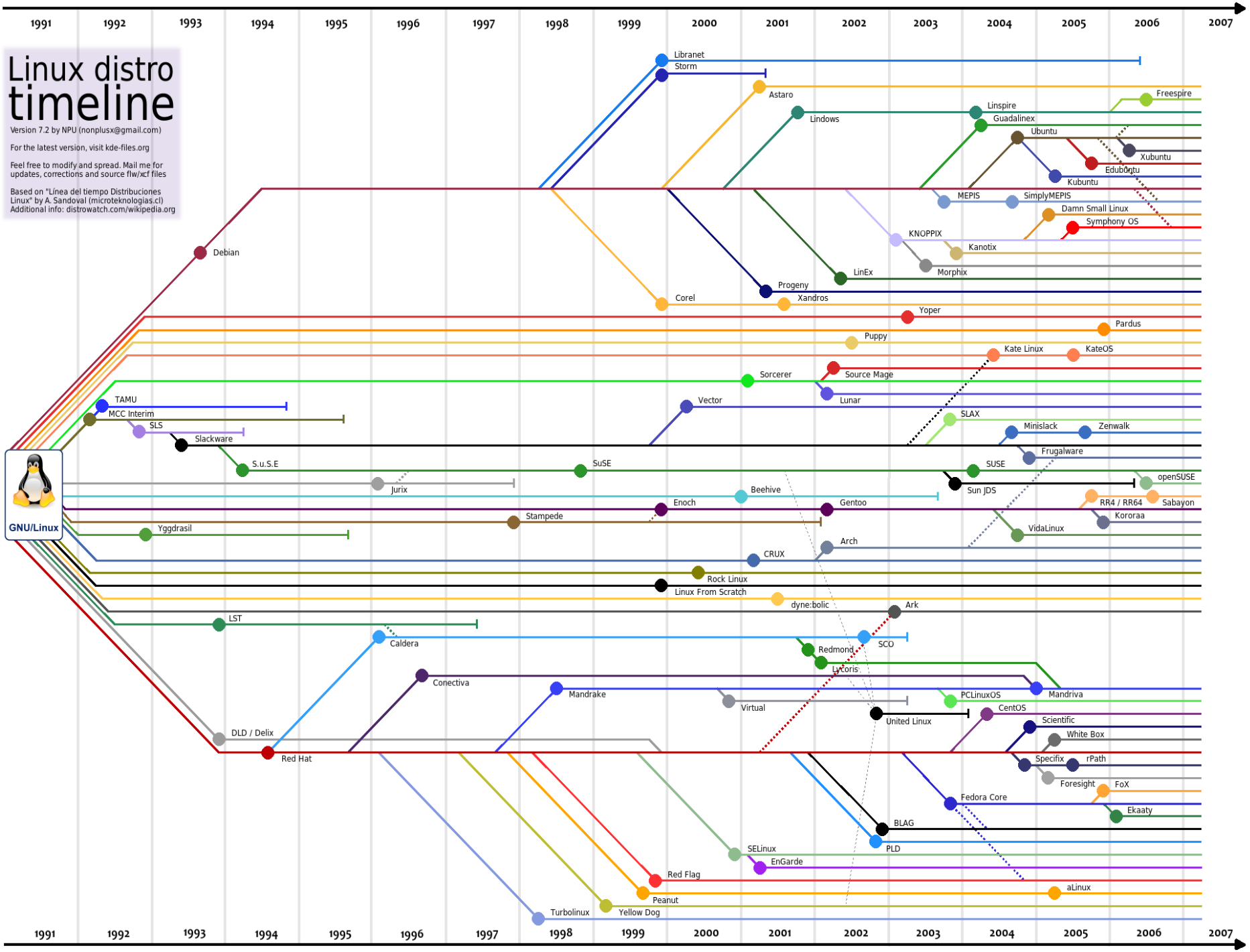
UNIX™/Linux Overview

Unix/Linux Preparation Course
June 27, 2010
Pago Pago, American Samoa

UNIX History




Linux distro timeline
Version 7.2 by NPU (nonplusx@gmail.com)
For the latest version, visit kde-files.org
Feel free to modify and spread. Mail me for updates, corrections and source flw/xcf files
Based on "Línea del tiempo Distribuciones Linux" by A. Sandoval (microteknologias.cl)
Additional info: distrowatch.com/wikipedia.org
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
GNU/Linux
Libranet
Storm
Astaro
Lindows
Linspire
Freespire
Guadalinex
Ubuntu
Xubuntu
Edubuntu
Kubuntu
MEPIS
SimplyMEPIS
Damn Small Linux
Symphony OS
KNOPPIX
Kanotix
Morphix
LinEx
Progeny
Xandros
Corel
Debian
Yoper
Pardus
Puppy
Kate Linux
KateOS
Sorcerer
Source Mage
Lunar
Vector
TAMU
MCC Interim
SLS
Slackware
SLAX
Minislack
Zenwalk
Frugalware
S.u.S.E
SuSE
SUSE
Sun JDS
openSUSE
Jurix
Beehive
Enoch
Gentoo
RR4 / RR64
Sabayon
Stampede
Kororaa
Yggdrasil
VidaLinux
Arch
CRUX
Rock Linux
Linux From Scratch
dyne:bolic
Ark
LST
Caldera
SCO
Redmond
Lycoris
Conectiva
Mandrake
Mandriva
Virtual
PCLinuxOS
CentOS
United Linux
Scientific
White Box
DLD / Delix
Red Hat
Specifix
rPath
Foresight
FoX
Fedora Core
Ekaaty
BLAG
PLD
SELinux
EnGarde
Red Flag
aLinux
Peanut
Turbolinux
Yellow Dog

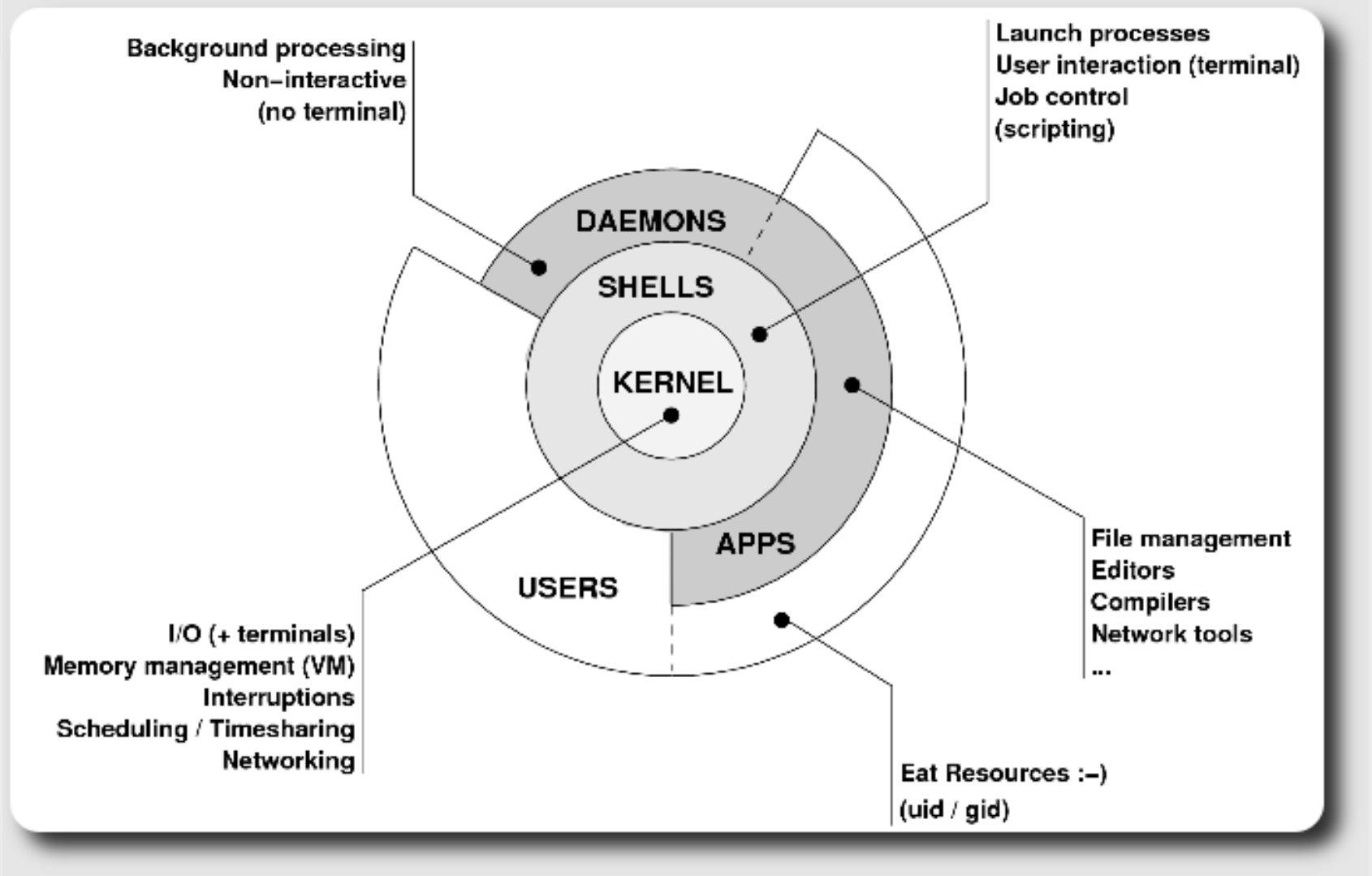
Ubuntu Timeline

Version	Code name	Release date
4.10	Warty Warthog	2004-10-20
5.04	Hoary Hedgehog	2005-04-08
5.10	Breezy Badger	2005-10-13
6.06 LTS	Dapper Drake	2006-06-01
6.10	Edgy Eft	2006-10-26
7.04	Feisty Fawn	2007-04-19
7.10	Gutsy Gibbon	2007-10-18
8.04 LTS	Hardy Heron	2008-04-24
8.10	Intrepid Ibex	2008-10-30
9.04	Jaunty Jackalope	2009-04-23
9.10	Karmic Koala	2009-10-29
10.04 LTS	Lucid Lynx	2010-04-29
10.10	Maverick Meerkat	2010-10-10

Unix vs. Linux

- Are they the same?
  - Yes, at least in terms of operating system interfaces
  - Linux was developed independently from Unix
  - Unix is much older (1969 vs. 1991)
- Scalability and reliability
  - Both scale very well and work well under heavy load
  - (this is an understatement)
- Flexibility
  - Both emphasize small, interchangeable components
- Manageability
  - Remote logins rather than GUI
  - Scripting is integral
- Security
  - Due to modular design has a reasonable security model
  - Linux and its applications are not without blame

The Unix System



Kernel

The "core" of the operating system

Device drivers

communicate with your hardware

block devices, character devices, network devices, pseudo devices

Filesystems

organise block devices into files and directories

Memory management

Timeslicing (multitasking)

Networking stacks - esp. TCP/IP

Enforces security model

Shells

Command line interface for executing programs

DOS/Windows equivalent: command.com or command.exe

Also programming languages for scripting

DOS/Windows equivalent: batch files

Choice of similar but slightly different shells

sh: the "Bourne Shell". Standardised in POSIX

csh: the "C Shell". Not standard, but includes command history

bash: the "Bourne-Again Shell". Combines POSIX standard with command history.

Others: ksh, tcsh, zsh

User processes

The programs that you choose to run

Frequently-used programs tend to have short cryptic names

"**`ls`**" = list files

"**`cp`**" = copy file

"**`rm`**" = remove (delete) file

Lots of stuff included in most base systems

editors, compilers, system admin tools

Lots more stuff available to install too

Using the Debian/Ubuntu repositories

System processes/services

Programs that run in the background; also known as "daemons" ==>

Examples:

cron: executes programs at certain times of day

syslogd: takes log messages and writes them to files

inetd: accepts incoming TCP/IP connections and starts programs for each one

sshd: accepts incoming logins

sendmail (other MTA daemon like Exim): accepts incoming mail

Security model

Numeric IDs

user id (uid 0 = "*root*", the superuser)

group id

supplementary groups

Mapped to names

/etc/passwd, /etc/group (plain text files)

Suitable security rules enforced

e.g. you cannot kill a process running as a different user, unless you are "*root*"

Any questions?

?

Core directory refresher

/ *(/boot, /bin, /sbin, /etc, maybe /tmp)*
/var *(Log files, spool, maybe user mail)*
/usr *(Installed software packages)*
/tmp *(May reside under “/”)*

Don't confuse the the “root account” (/root) with the “root” (“/”) partition.

‘Default’ Partition

During an Ubuntu installation you can choose this option. It creates the following:

Root partition

this will contain everything not in another partition

/bin, /sbin, /usr etc.

user home directories under /home

A *swap partition* for virtual memory

/boot for kernel boot files

Partitioning Issues

/var may not be big enough

/usr contains OS utilites, third-party software

/home contains your own important data

If you reinstall from scratch and erase /home, you will lose your own data

- Everything in “/” is now more common due to RAID. Why? Valid?
- /tmp?
- Others?
- How much *swap* should you define?

Note...

Partitioning is just a logical division

If your hard drive dies, most likely *everything* will be lost.

If you want data security, then you need to set up mirroring with a separate drive.

Another reason to keep your data on a separate partition, e.g. /u

Remember, "`rm -rf`" on a mirror works *very* well.

Or, as always "Data Security" <==> Backup

Any questions?

?

What's Unique to Ubuntu

Software management

Command Line

- `dpkg`
- `apt`
  - `apt-cache`
  - meta-packages
- repositories
- `aptitude`

Graphical

- synaptic
- Ubuntu App Centre

What's Different cont.

Startup scripts

In /etc/init.d/ (System V)

Upon install services run!

Controlling services

update-rc.d

sysvconfig

rcconf

rc-config

What's Different cont.

Make and GCC

- Not installed by default. Why?
- 30,000'ish packages
- To install:

```
apt-get install build-essential
```

What's Different cont.

The use of the *root* account is discouraged and the *sudo* program should be used to access root privileges from your own account instead.

You can do *apt-get dist-upgrade* to move between major and minor releases.

Package sources in /etc/apt/sources.list (how you install from cd/dvd or the network).

Important Reads

man apt-get
man sources.list

Some people like aptitude, partly for the full-screen interface

Meta Packages

Annoying to new users

Provide all packages for subsystems

Initial documentation

https://help.ubuntu.com/community/MetaPackages

Examples include:

build-essential	(libc, g++, gcc, make)
ubuntu-desktop	(xorg, gnome)
xserver-xorg-video-intel	

There's More

But, hopefully enough to get us started...

Some Resources

www.ubuntu.com
ubuntuforums.org
www.debian.org
ubuntuguide.org
http://en.wikipedia.org/wiki/Debian
http://en.wikipedia.org/wiki/Ubuntu_(Linux_distribution)

GIYF (Google Is Your Friend)

Packages & Exercises

We'll reinforce some of these concepts using exercises...