



Using UNIX-based Operating Systems

A Beginner's Guide

Nathan Dimmock (ned21@srcf.ucam.org)

Why Use UNIX?

Historical:

- Prevalent in academic circles
- Prevalent in the server room – particularly the web

Practical:

- Good programming tools and simple I/O model.
- Lots of **Free** s/w available
- Powerful – designed by power users for power users.
- Reliable – athena.jesus managed 250 days before power cut.

Getting Started

- Most important interface to UNIX is the *shell*.
- Most commonly used shell is BASH.
- Can seem intimidating at first, but in UNIX every operation can be achieved from the shell and so:
 - Fast for good typers. UNIX commands are concise and can keep hands on keyboard.
 - Easy and efficient for remote usage.
 - Anything that can be expressed on a command line can be trivially scripted.
- But don't worry, also some very good GUIs available! (e.g. GNOME and KDE)

Basic Commands

Cmd	Win equiv.	Function
ls	dir	Display list of files in current directory
cd	cd	Change current directory
rm	del	Delete file(s)
cat	?	Display contents of a file
less	more	Display contents of a text file page by page
wc	?	Count number of chars/words/lines in a file
grep	?	Search files for a string or regular expression
locate	Find	Find files in your file system
vi(m)	notepad	A lightweight but powerful text editor
emacs	textpad?	An extensible editor
tar	winzip	File archiving utility
gzip, bzip2	winzip	Compress a file
man	F1	Find out more about a command
mkdir	?	Make a directory
rmdir	?	Remove a directory

Shortcuts: Wildcards, tilde, tab completion, environment variables.

Directory Structure

- Single tree hierarchy with “/” as the root.
- No concept of “drives” – hard disks may be *mounted* under any directory in the tree - e.g. /win.
- May also mount remote file systems in same way.
- An example root file system:

```
ned21@astro:~$ ls -F /
bin/          dev/          INFO          lost+found/ /sbin/        vmlinuz@
boot/         etc/          INFO~         mnt/         tmp/         vmlinuz.old@
bootsect.lnx floppy/       initrd/       proc/        usr/         win/
cdrom/        home/         lib/          root/        var/
```

- Links (symbolic and hard), \$HOME

File Permissions

- Every file (and directory) in UNIX has an *owner* and a *group*.
 - Owner is always a single user. Many users may be members of a single group.
- File permissions are expressed as 3 bits – read, write, execute.
- One set of three of bits for each of owner, group and *other*.

```
# ls -l intro_unix_slides.tex
-rw-r--r-- 1 ned21  ned21  3013 2003-02-13 14:48 intro_unix_slides
```

Editors

- Three most popular editors are vi(m), pico and emacs.
- vi: *modal* editor; lightweight. Epitomy of UNIX philosophy.
- pico: Probably used it on hermes. Easy to use interface, but lacks advanced features.
- emacs: Very powerful – can do just about everything including read mail, news and file management.
 - Like pico, it's *modeless*.
 - Rather bloated.
 - Documentation is not great, but lots of tutorials on the web.

UNIX Programs for Common Tasks

Graphical desktop: KDE, GNOME

Browsing: mozilla (+konqueror)

Mail: mutt, evolution, mozilla-mail

Word processing: LaTeX

Spreadsheet: gnumeric

Graph plotting: gnuplot

Slides: LaTeX / OOO

Media - xmms; DiVX, realplayer, QT

Explorer: nautilus, konqueror

Image viewing: xv, eog, xzgv

ICQ, AIM, Gnutella, Flash: yes

Compilers: gcc

Diagrams: dia, xfi g

Cool Stuff

- APT for *package* management.
- MAKE for handling complex projects (demo)
- SED for text manipulation (scripting demo)

Finding Out More

- Most commands have a `--help` switch
- `man commandname`
- Applications will usually have documentation in `/usr/share/doc/appname`.
- Ask! `jcn-help@jesus.cam.ac.uk`, `#jcn`

Installing a *NIX

- Linux is probably the best/easiest one for beginners.
- Debian Linux is big in Jesus: <http://www.debian.org>
- Dual booting is no problem if you have disk space, although you might need to repartition.
- JCN *installfest* on 24th February.