

Getting Started in Linux

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1. What is Linux?

■ Linux kernel

- ◆ Developed by Linus Torvalds
- ◆ Strictly speaking, 'Linux' is just the kernel

■ Associated utilities

- ◆ Standard tools found on (nearly) all Linux systems
- ◆ Many important parts come from the **GNU** project
 - Free Software Foundation's project to make a free Unix
 - Some claim the OS as a whole should be 'GNU/Linux'

■ Linux distributions

- ◆ Kernel plus utilities plus other tools, packaged up for end users
- ◆ Generally with installation program
- ◆ Distributors include: Red Hat, Debian, SuSE, Mandrake

2. What Can You Do with Linux/Unix?

- Virtually anything that you can do with a computer:
 - ◆ General purpose office PCs, thin-clients and servers
 - ◆ Home consumer PCs (games, multi-media, etc.) – a weak spot
 - ◆ Software development – free languages, compilers, tools
 - ◆ Single-use devices and systems
 - ◆ Vast multi-purpose data centres and server farms
 - ◆ Build the Internet
- Largely depends on motivation, effort, co-operation and experience
- Learning and mastering it is a bit like natural language acquisition:
 - ◆ You can get going with pre-verbal sounds and gestures
 - ◆ Takes years of learning and practice to acquire fluency
 - ◆ No one knows more than a fraction of the whole

3. Linux Isn't Windows

- More flexible, powerful, stable and secure
- Primarily, because it's made up of simple, tiny, components which can be assembled and configured in infinite ways
- The X windowing system is networked, OS-independent and older
- Command lines are used for power and productivity, not inertia
- Data files typically plain text (ASCII) rather than binary
 - ◆ Allowing re-use and re-assembly by *any* program or application
- Underlying architectures are designed but implementations evolve
 - ◆ Innovative divergence then convergence around best practice
 - ◆ Inconsistencies remain if they're not 'important' enough to fix
- Supported by fewer hardware vendors and ISVs

4. Getting Linux

- All applications and distributions released under open source licences can be freely copied from any source
 - ◆ Some commercial installers and config tools are proprietary
- Try before you install, using a run-from-CD distro
- Buy/copy binary CDs used by friends, colleagues, or WYLUGers, if:
 - ◆ They use a beginner-friendly distro
 - ◆ It's a popular distro which others can help you with
 - ◆ They install/configure an easy maintenance distro
- Buy an established commercial distribution with a good manual
- Burn binary CD images, or install directly, from the Internet
- Build, combine and configure every component from source code

5. Hardware Requirements

- Depend entirely on what you want to do with your system
- Linux runs on just about every CPU and platform you've heard of
- Trouble-free installation and functionality is most likely with established, generic, popular components
- Some common uses of Intel-compatible systems:
 - ◆ Single-use console min. – 386 CPU, 4 Mb RAM, 50 Mb HDD
 - ◆ Basic X window min. – 486 CPU, 16-32 Mb RAM, 100 Mb HDD
 - ◆ Acceptable office thin client – 586 CPU, Fast XVGA, Fast Ethernet, Twin P3 Server
 - ◆ Basic office PC – 500+ MHz 686, 128 Mb RAM, 10 GB HDD
 - ◆ Typical SoHo Multi-media PC – 1+ GHz P4/Athlon, 512 Mb RAM, 120 Gb HDD

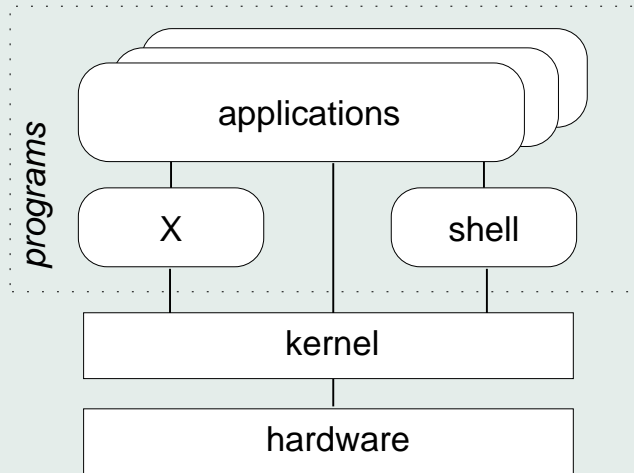
6. Installing Linux

- Installing a modern commercial distribution on dedicated, modern, vanilla hardware is easier and quicker than Windows:
 - 1 Insert a bootable installation CD
 - 2 Turn on your machine
 - 3 Accept all the default configuration choices
- Some can even install dual-boot systems in the same way
- Less polished or custom installs require knowledge of hardware specs, HDD partitions, and TCP/IP networking
- Installing on esoteric hardware, including laptops, is difficult
- In the last two cases, get help from friends, user groups, mailing lists, 'install fests', HOWTOs, Google, etc.

7. Unix and Linux

- Linux is based on Unix
 - ◆ Unix philosophy
 - ◆ Unix commands
 - ◆ Unix standards and conventions
- There is some variation between Unix operating systems
 - ◆ Especially regarding system administration
 - ◆ Often Linux-specific things in these areas

8. Unix System Architecture



- The shell and the window environment are programs
- Programs' only access to hardware is via the kernel

9. Unix Philosophy

■ Multi-user

- ◆ A **user** needs an **account** to use a computer
- ◆ Each user must **log in**
- ◆ Complete separation of different users' files and configuration settings

■ Small components

- ◆ Each component should perform a single task
- ◆ Multiple components can be combined and chained together for more complex tasks
- ◆ An individual component can be substituted for another, without affecting other components

10. Graphical Interfaces

- May look/behave like Microsoft, but fundamentally different
 - ◆ Networked, platform-independent, multi-head, heterogeneous
 - ◆ Typical users work with 3–4+ ‘virtual desktops’
- Made up of independent components:
 - ◆ Display Managers (xdm, etc.) – login session management
 - ◆ X – primitive mechanisms for drawing objects on screens
 - ◆ Window Managers – provide decorations, controls, menus
 - ◆ Desktop Environments (Gnome/KDE) – drag & drop, integration between applications, common key bindings, etc.
- Application crashes may ‘freeze’ the screen, or even bring down X, but rarely affect the rest of the system
 - ◆ Control from consoles (Ctrl+Alt+F1–F6) or remote shell

11. Command Line Productivity

- Command line interfaces (CLIs) give simultaneous access to otherwise impossible combinations of tools, options and data
- Experienced users find them quicker and simpler than mousing
- Many old Unix hands are unaware of the productivity and usability features in Linux shells like `bash`, e.g.
 - ◆ Command and filename completion
 - ◆ Command history
 - ◆ Command substitution
- Increasingly long and sophisticated command lines, eventually get saved as shell scripts (programs)
 - ◆ Cutting out much of the human effort entirely

12. Text Editors

- Text editors are for editing plain text files
 - ◆ Don't provide advanced formatting like word processors
 - ◆ Extremely important – manipulating text is Unix's *raison d'être*
- Particularly useful for markup, programming, config files
- Emacs and Vim are most popular, powerful and sophisticated, but take time to learn
 - ◆ Simpler editors include Nano, Pico, Kedit and Gnotepad
- Some programs run a text editor for you
 - ◆ They use the `$EDITOR` variable to decide which editor to use
 - ◆ Usually it is set to `vi`, but it can be changed
 - ◆ Another example of the component philosophy

13. A Minimal Set of Command Line Tools

- Shells – `bash`, `ssh`
- File manipulation – `cp`, `mv`, `rm`, `scp`, `cat`, `lpr`, `dd`, `chmod`, `chown`
- Directories – `pwd`, `ls`, `mkdir`, `rmdir`, `du`
- Searching – `find`, `locate`, `grep`
- Viewing files – `less`, `head/tail`, `cat`
- Documentation – `man`, `info`, `help`
- Resources & job control – `ps`, `df`, `jobs`, `bg/fg`
- Backup/archiving – `tar`, `gzip`, `bzip2`, `zip`
- A web browser – `lynx`, **or** `links`, **or** `elinks`
- A mailer – `mutt`, **or** `pine`

14. Common Sets of Desktop Tools

- Web browsers – Galeon, Konqueror, Opera, Mozilla
- Office suites – Star/Open Office, K Office, Gnome Office, MS-Office (via Wine, VMware, Crossover Office)
- Single wordprocessors, spreadsheets, etc. – mixed and matched
- Graphics – Gimp (bitmap), Sodipodi (vector), Kontour (vector)
- Viewers – Ghostview (PostScript/PDF), Acroread (PDF), xpdf (PDF)
- Multimedia – Xmms, gmpayer, gPhoto, Linux VideoStudio, TV/radio
- Email clients – Kmail, Evolution, Balsa, Mozilla Mail
- News Readers – Knews, Pan, Mozilla News
- Misc – scanning, OCR, voice, speech, file sharing, IDEs, etc

15. Information Sources

- Your own system documentation
 - ◆ `/usr/share/doc/appname`
 - ◆ `man appname` or `man -k keyword`
 - ◆ `info appname`
 - ◆ `appname --help` or `appname -h`
- Linux Documentation Project <http://www.tldp.org/>
- User group web sites and mailing lists – for almost all apps
- Distribution sites – SuSE, Red Hat, Mandrake, Debian, SuSE
- Really good books – Unix rewards reading and learning
 - ◆ Look for many editions and user recommendations
- Google

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