

What Is Unix?

- One of the first widely-used operating systems
- Basis for many modern OSes
- Helped set the standard for multi-tasking, multi-user systems

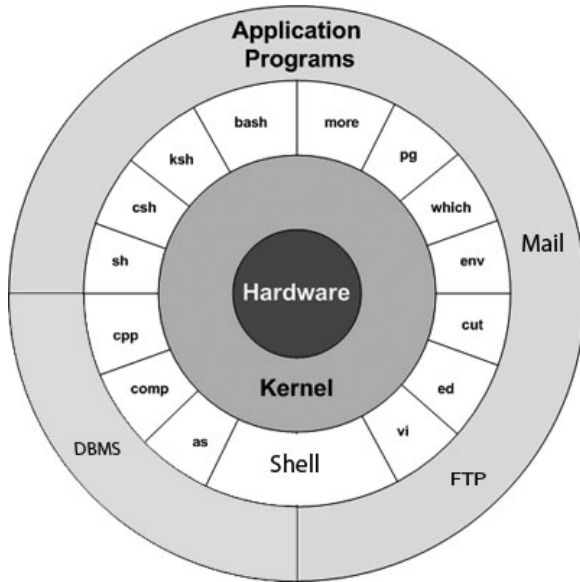
Short history of UNIX

- '60s The ambitious project **MULTICS** (Multiplexed Information and Computing System) fails, but a number of seminal ideas (like pipes and shells) are proposed
- '69 Ken Thompson, Dennis Ritchie (et al.) start working on a file system, and name their system UNICS, which is later changed to UNIX.
 - UNIX was “small, simple and clean”, and distributed freely to many universities, where it becomes popular

Short history of UNIX

- '73 Thompson and Ritchie rewrote UNIX in C (while most of the operating systems at that time were written in assembly)
- '81 Berkley UNIX 4.1 BSD: vi, C shell, virtual memory
- '91 Linux, GNU, and others: similar to UNIX, but their source code rewritten, very popular and widespread, free
 - Many Linux Distributions: Ubuntu, Fedora, Debian, ...
 - Currently, X/Open is responsible for developing UNIX

Unix Architecture



A shell is a program that allows the user to interact with the UNIX system:

- read user's input and parses it
- evaluates special characters
- setup pipes, redirections, and background processing
- find and setup programs for execution

There are primarily two “families” of unix shells:

- Bourne shell (AT&T) *sh* \Rightarrow *ksh* \Rightarrow *bash*
- C shell (Berkley) *cs**h* \Rightarrow *tc**sh*
- We focus on bash: easy syntax and default in many systems

- Berkeley Software Distribution (BSD)
- GNU/Linux
- Mac OS X
- Sun's Solaris
- IBM AIX
- HP-UX
- Silicon Graphics IRIX

Berkeley Software Distribution

- Developed by students and faculty at UC Berkeley
- Forked from the proprietary version back in the 80s
- Has since split into many additional flavors - namely,
- NetBSD, OpenBSD, and FreeBSD
- Spawned a popular open-source software license (the BSD License!)
- Primary competitor to Linux among free OSes

Advantages/Disadvantages: BSD

Pros

- Reliable and very secure
- Clean code
- Usable on almost anything that uses electricity
- Most flexible license
- Free!

Cons

- Conservative: slow progress
- Least community/professional support
- You thought Linux was for nerdy outsiders?!



- Commercial offshoot of BSD
- Designed to run on Sun's SPARC servers, since ported to x86
- Most of the source code was recently released for the OpenSolaris project



Advantages/Disadvantages: Solaris

Pros

- Built specifically for the hardware it runs on
- Scales really well as system size/load increases
- Lots of support from Sun as well as the community

Cons

- You are paying for Sun's support and probably the hardware
- Primarily for server use, not super desktop-friendly

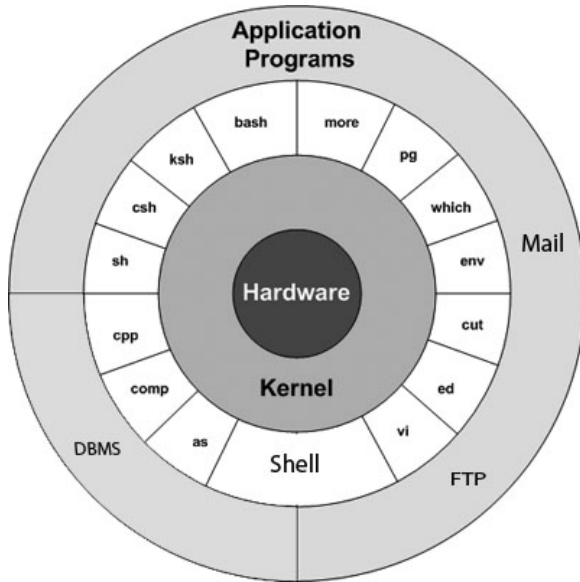


- Pieced together by a Finnish guy named Linus Torvalds
- starting in 1991
- Built over the internet using message boards (Usenet)
- Designed to a UNIX-like standard, but not a direct descendant

Note:

Linux technically only refers to the OSs core, or kernel - without other programs it cant really do anything.

Unix Architecture



Free Software Movement

GNU = Gnu is Not Unix

- Movement in the 80s to build a free OS
- Created many very popular tools
- Unix like but uses no Unix code

Stallman says:

There really is a Linux, and these people are using it, but it is just a part of the system they use. Linux is the kernel: the program in the system that allocates the machines resources to the other programs that you run. Linux is normally used in combination with the GNU operating system: the whole system is basically GNU with Linux added, or GNU/Linux.



Torvalds says:

Think of Richard Stallman as the great philosopher and think of me as the engineer.



Like BSD, GNU/Linux has a variety of flavors called “distributions”. These versions generally have different design goals (security, speed, desktop use) and package a unique set of tools with the kernel to achieve them.

- Hundreds of distributions, such as RedHat, Ubuntu, SuSE, Slackware, Gentoo, etc.

Saying “GNU/Linux” every time is tedious, so we will just refer to the entire system as “Linux”.

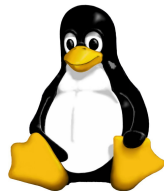
Advantages/Disadvantages: Linux

Pros

- Huge community support base
- Free (unless you want professional support)
- Free software to do almost anything
- “wine” allows you to run almost any windows program
- Some distributions are privacy preserving

Cons

- Lacks some widely-used software (Office, Photoshop etc)



Built on a BSD-based kernel, which was renamed “Darwin”

- Arguably the most popular desktop version of UNIX
- A pretty, easy to use experience built on a powerful frame



Steve Jobs Says:

What can the fully compliant UNIX technology in Leopard do? It can run any POSIX-compliant source code. Help you make the most of multicore systems. Put a new tabbed-interface Terminal at your fingertips. Introduce a whole host of new features that make life easier for every developer. Really, what cant it do?

Advantages/Disadvantages: OSX

Pros

- User friendly and just works
- Fully-featured GUI with a powerful terminal
- Supports most of the software the others lack

Cons

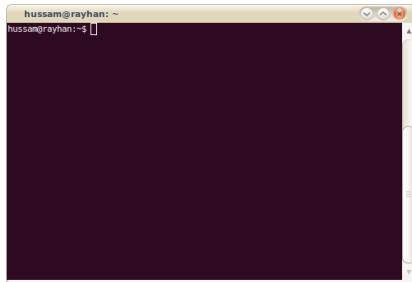
- Definitely paying for this one!
- Closed-source, not as flexible as Linux
- Only runs on hardware purchased from Apple (without breaching the EULA)



Why Linux?

- IT'S FREE
- More widely used than BSD or Solaris
- Easy to find beginner's guides online if you need them
- Basic tools are pretty much standardized

We're gonna live on a Unix terminal



- We'll interact with the Unix Shell: a text based program launcher.
- Mouse, windows, and clicks are from another (distant) world!



UNIX

Where there is a shell, there is a way.