Introduction to Linux

Why Linux?

- Nothing is hidden (opensource is good for education)
- It runs anywhere, on almost anything

  Android, OS X, Raspberry Pi, Old PCs
- Low resource requirements
- You are likely to use it in your job, i.e, good on resume
- Free: as in beer and in freedom (apps, toolchains)
- Software development toolchain is free and high quality
- Lots of software available (communities of users)
- It conforms to you

Why not Linux?

- Occasional hardware support issues
- Won't run most Microsoft programs, many games
- If you're not paying attention, you can really screw up

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Linux is in more places than you think

- U.S. Army is the largest install base for Red Hat Linux.
- The US Navy nuclear submarine fleet runs Linux.
- In 2006, the FAA migrated to Red Hat Linux to manage air traffic.
- Over 90% of all supercomputers and IBM's *Watson* run Linux.
- Google's search clusters and other apps run on Linux.
- Almost everything that happens in Amazon's nine worldwide distribution centers is driven by Linux.
- Wikipedia uses Linux to serve up its web pages.
- The New York Stock Exchange uses Linux for its trading platform.
- Linux powers the $10 billion Large Hadron Collider. CERN also runs Linux on its 20,000 internal servers.
- Apache HTTP Server is the dominant web server today.

Source: http://www.comparebusinessproducts.com

Introduction to Linux

UNIX, Linux, What's the difference?

- UNIX
  - Ken Thompson and Dennis Ritchie, AT&T Bell Labs 1971
  - Dennis Ritchie developed "C", to build Unix
  - Designed to be shared and portable
  - Became quickly popular in the academic community
  - Unix philosophy: *"The power of a system comes more from the relationships among programs than from the programs themselves." - Brian Kernighan and Rob Pike*

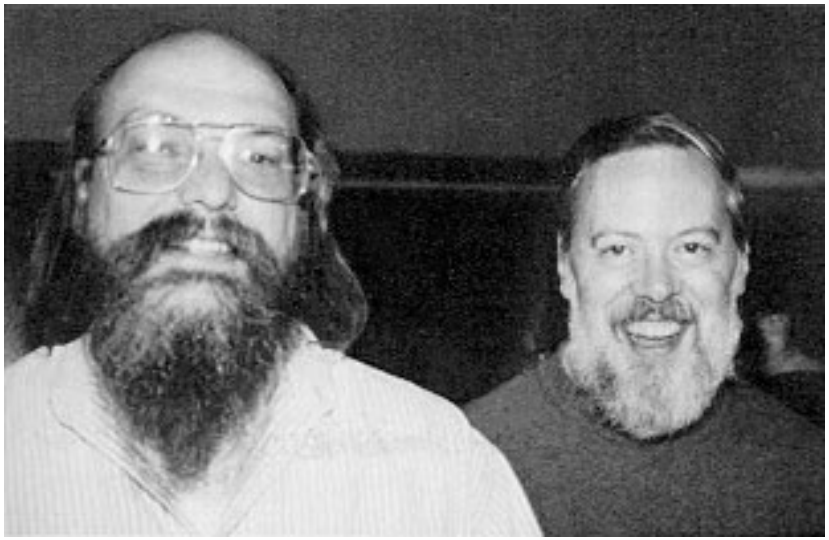

Figure: Ken Thompson and Dennis Ritchie - The original neckbeards!

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UNIX, Linux, What's the difference?

- Linux
  - Richard Stallman's goal was a free UNIX-like OS ~1983
  - Written in "C" as a free alternative to UNIX
  - Kernel written originally/maintained by Linux Torvalds ~1991
  - Linux is more accurately called GNU/Linux

Figure: Linus Torvalds and Richard Stallman

Bottom Line: Users can hardly tell the difference

Introduction to Linux

What can I do with it?

- Do program development or uC's, Android, cross platform apps
- Start a business with nearly no software tool cost
- Bring old computers back to a useful life
- Customize your desktop the way you want it
- Customize the OS the way you want it

What can I avoid doing with it?

- Buying software
- Updating software packages separately
- Hunting for drivers
- Waiting for a big company to fix bugs
- Being on hold for an hour to get help

The Linux Shell

- The shell is your direct portal into the operating system (OS)
- Applications stand between you and the OS
- Linux + Shell programming = Software Lego Blocks
- Traditional user interface is the command line
- Shell has built-in command language
- Typically we use the Bash shell or C shell

Upside/Downside

- High level of control
- Considerable complexity
- High level of productivity possible
- Not as easy as GUI, but way more efficient (with time)

GUI or CLI?

- GUI: What you see is what you get
- GUI: But, what you see is **all** you get
- CLI: Not always the best way: CAD Tools, etc.
- GUI: Easy, but not necessarily efficient
- CLI: For power users, not novices

A CLI allows you to do things for which a program does not exist.

Accessing a Linux Machine

- Windows
  - The program PuTTY provides a window with a shell interface
  - Fill in the boxes, point and click
- Mac
  - Using built-in Unix shell, execute "ssh" command
  - `$ ssh -l username access.engr.orst.edu`
- Virtualize
  - VMWare - virtualization software hosts a guest operating system
  - Free from COE computing website
- Which distribution?
  - Ubuntu - popular, but has Windows 8-like interface
  - Mint - built on Ubuntu but with better windowing interface
  - Fedora - beta version of Red Hat
  - Red Hat Enterprise Version - This is what COE hosts