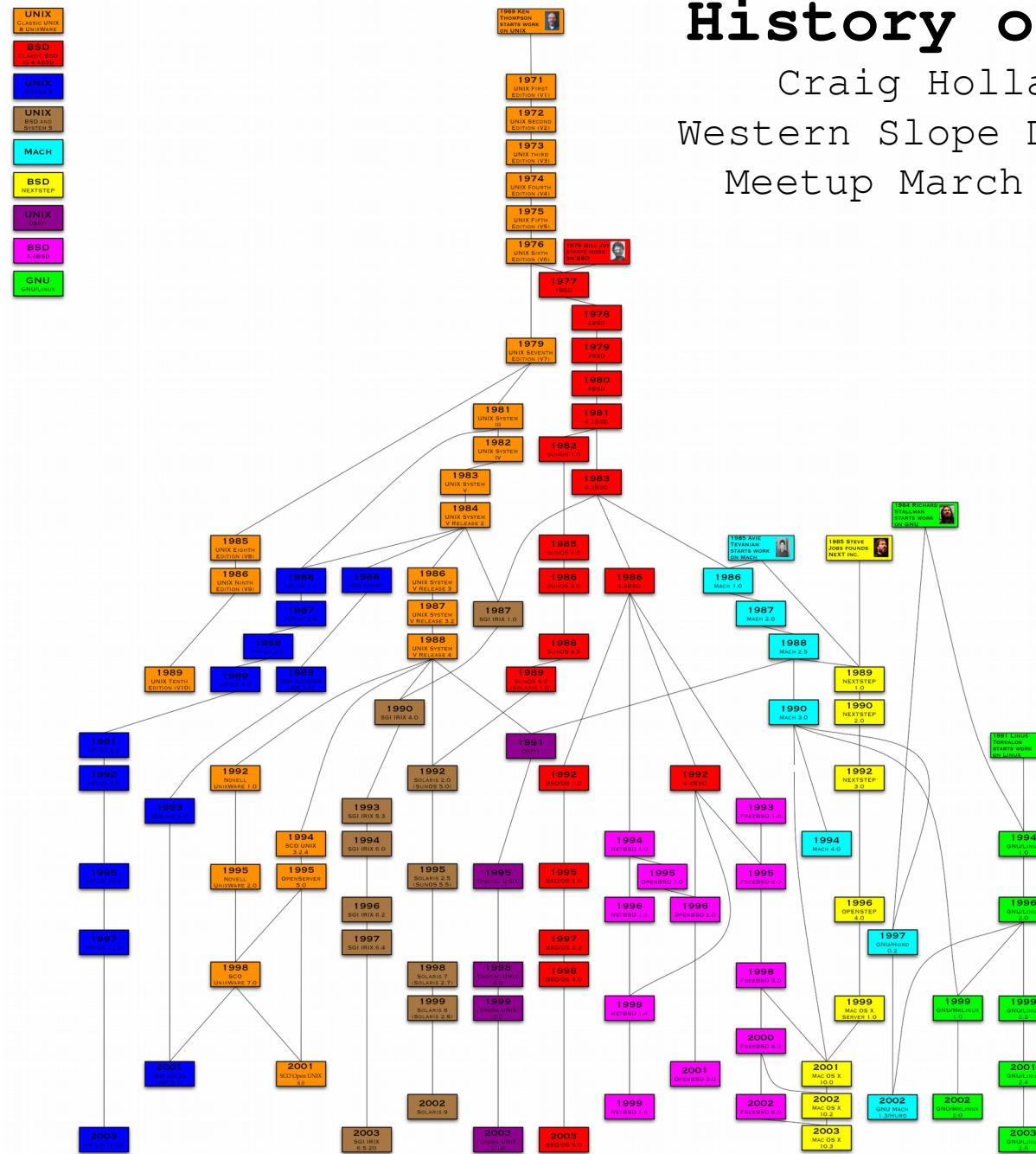




History of Unix

Craig Hollabaugh Western Slope Developers Meetup March 2nd 2017





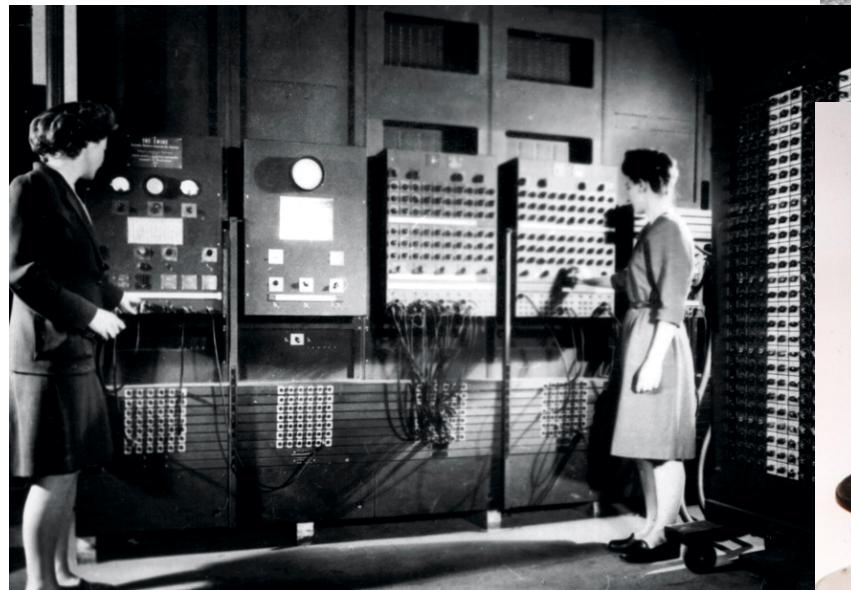
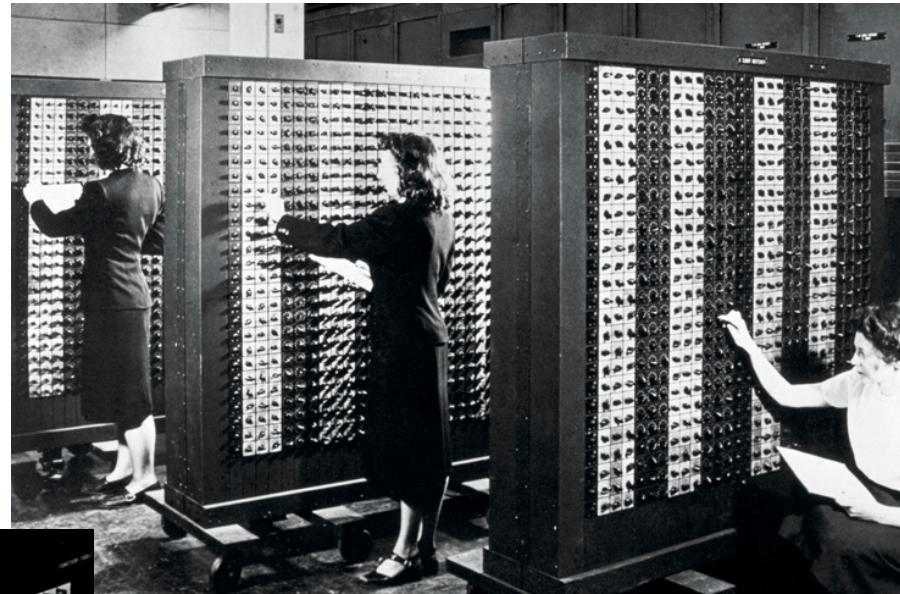
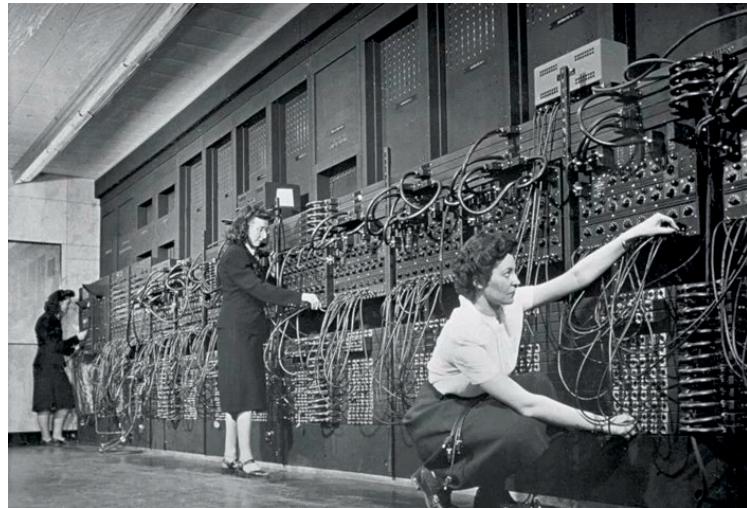
A Computer

In 1613, a person who computes

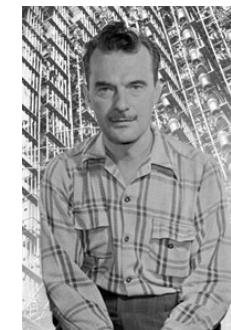


Blaise Pascal
1623–1662

Kay McNulty, Betty Snyder, Marlyn Wescoff,
Ruth Lichterman, Betty Jean Jennings, and Fran Bilas



ENIAC Girls
The first US programmers



18k tubes, 60klbs, 150kW
100kHz clock, failed every 2 days

Who Was Nick Metropolis?
His problem used 1 million cards



Bell Labs and the 1956 Consent Decree



Allowed AT&T to remain a vertically integrated monopoly but had to license all Bell Labs patents royalty free.



Multics

MIT, Bell Labs and GE – 1964

MULTICS

- ✓ Process abstraction
- ✓ Virtual memory
- ✓ Dynamic linking
- ✓ Hierarchical file system
- ✗ Entirely programmed in
high-level language
- ✗ Multi-level security
- ✗ On-line reconfiguration
Reboot

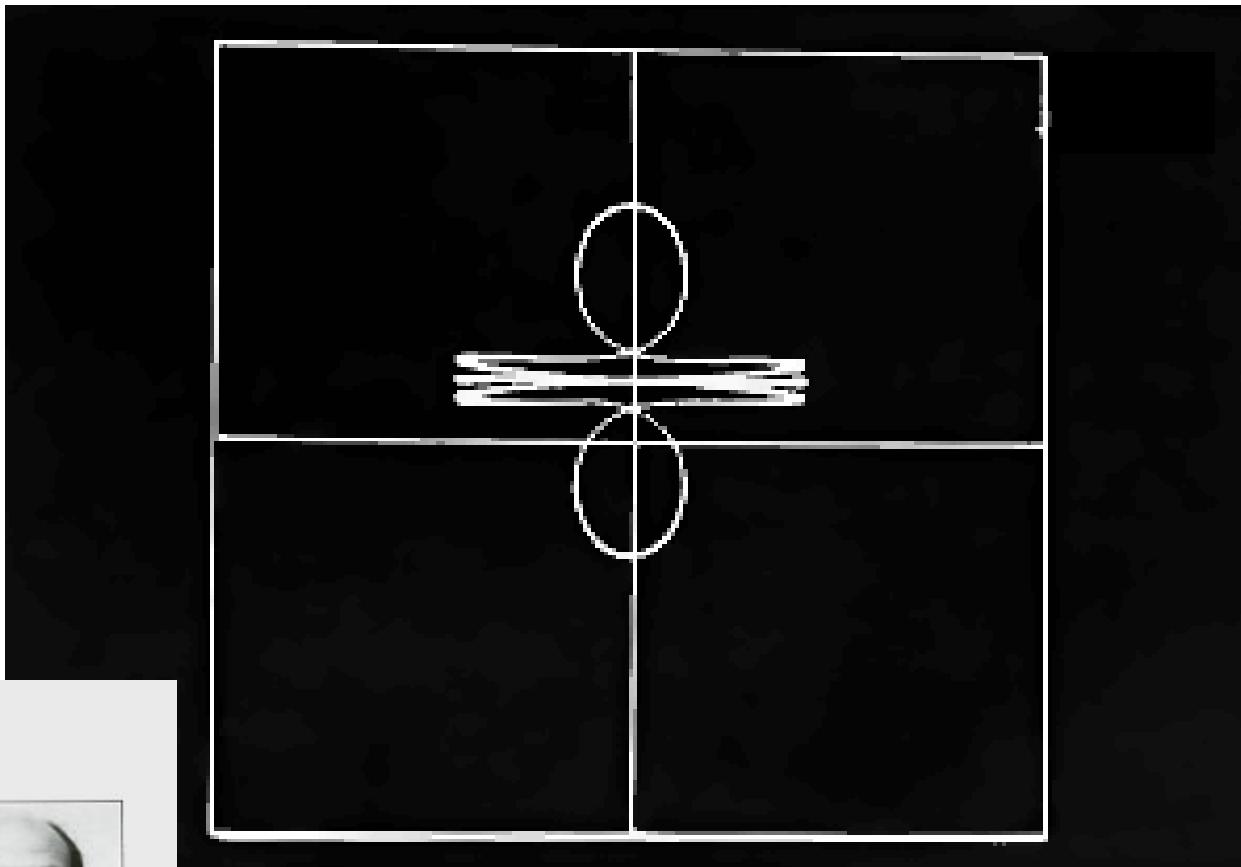


I'm a Multician
The First Cloud System

Which of these is true for the OS
running on your laptop today?



Space Travel - 1969



5
♥



Ken Thompson

5
♥



DEC PDP-7 Unix 1969



Smaller than multics,
in one month running
OS with assembler,
editor, shell

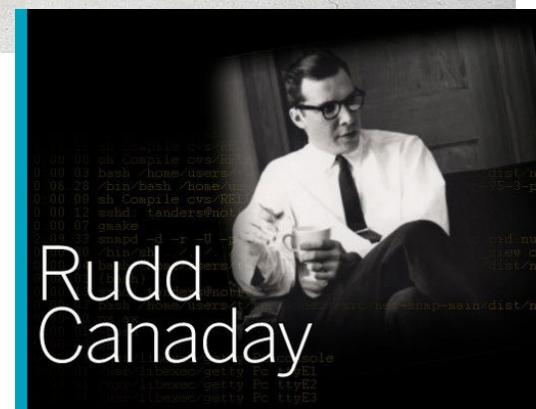
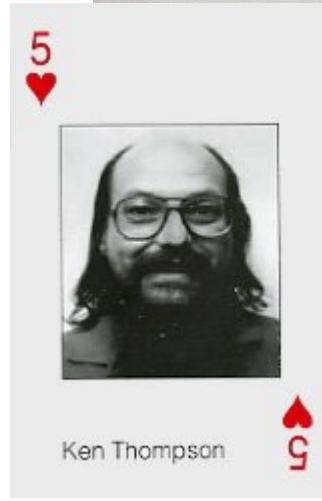
Unics (UNiplexed
Information and
Computing Service)

9kB of memory, paper
or DECtape, \$550K
2016 dollars

120 made and sold

1969 Bell Labs team
including Thompson,
Richie, Canaday dev
of HFS, processes,
device files, and
command-line

Kernigan terms Unix





VAX – PDP-11 – 1970



DEC sells a total of 600,000 PDP-11s from 1970 to 1990. \$66K in 2016 dollars.

C first developed on PDP-11. Unix rewritten in C.



Dennis Ritchie and Ken Thompson at the PDP-11.



Unix Philosophy

DOTADIW

KISS

Exercise for You!

Read Eric Raymond's 17 Unix Rules



Do One Thing and Do It Well

adb ar as atob awk bash bc bsh btoa c89 cal
cat cb cc chgrp chmod chown chsh ci cmp co
comm cp cpio cpp cron csh dbx dc dd df diff
diff3 dirname du ed egrep elm emacs eqn
eval ex expr fc fgrep fmt fsck ftio ftp
fuser getty grep id imake irc jsh ksh ld
lex lint lharc ln logname lorder lpc lpd
lpq lpr lprm ls m4 man mkfs mknod mv mvmdir
mwm nawk nl nm nn nohup nroff oclock od
passwd pax pcc pg pgp pico pine ping povray
pr prs prof ps pwd qdaemon ranlib rcp rcs
rlogin rm rmdel rmail rmdir rmt rsh roff rz
sar sdb sed sh shar stty su sync sz tar tbl
tclsh tcsh tee telnet tex tr troff tsh
tsort ttt ulimit uname uniq uucp vi vim
wall wc **who** wish wm xargs xdm xdpr xfd
xmkmf xrdb xwd xwud yacc zip



Licensing

1956 Bell anti-trust lawsuit
Could only be a phone company
Licensing and selling media was OK

1973 v5 licensed to education

1975 v6 commercial
License was \$90K in 2016 dollars

Sidenote
1975 Microsoft founded in Albuquerque

Xerox Alto - 1973



Touchpad and 3-button mouse based on Engelbart's 1968 demo
Xerox also invents Ethernet and the laser printer at the same time.
Doesn't run Unix



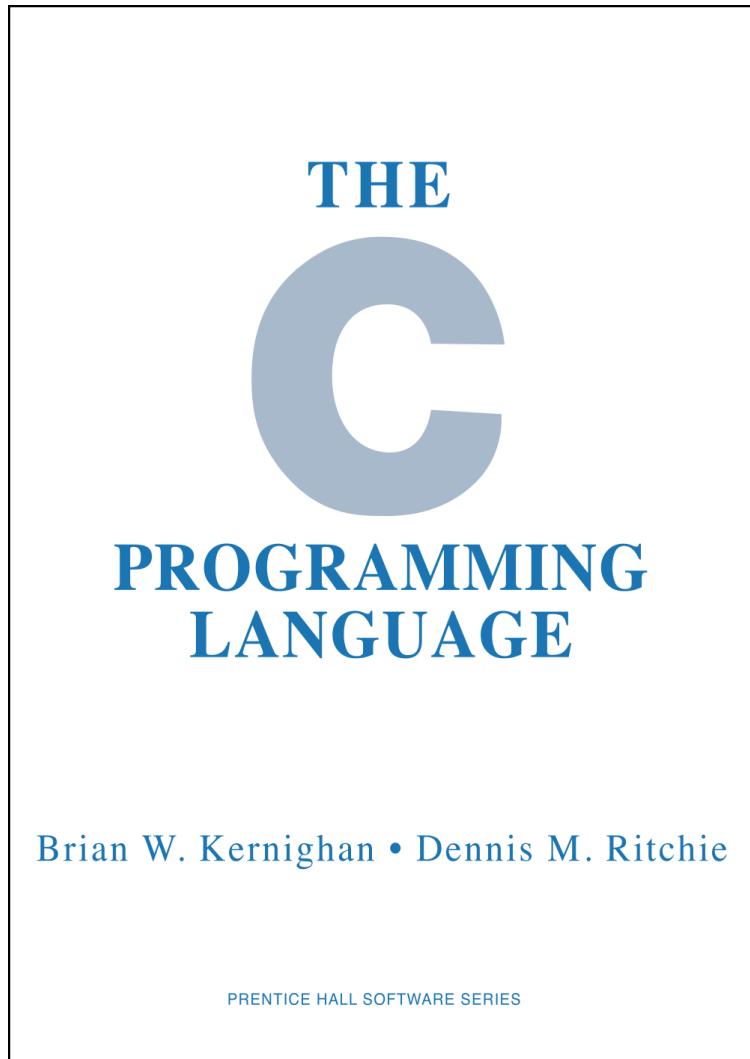
First Unix Meetup

1974 USENIX New York





K&R - 1978



hand, "\n" is a character string which happens to contain only one character. The topic of strings versus characters is discussed further in Chapter 2.

Exercise 1-6. Write a program to count blanks, tabs, and newlines. □

Exercise 1-7. Write a program to copy its input to its output, replacing each string of one or more blanks by a single blank. □

Exercise 1-8. Write a program to replace each tab by the three-character sequence >, backspace, -, which prints as >, and each backspace by the similar sequence <. This makes tabs and backspaces visible. □

Word Counting

The fourth in our series of useful programs counts lines, words, and characters, with the loose definition that a word is any sequence of characters that does not contain a blank, tab or newline. (This is a bare-bones version of the UNIX utility *wc*.)

```
#define YES 1
#define NO 0

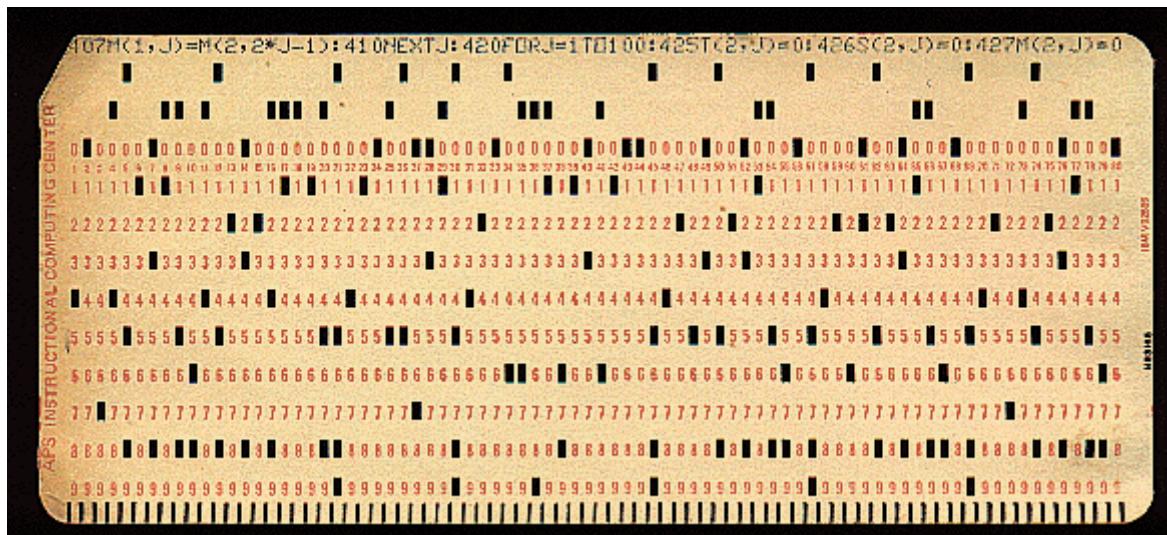
main() /* count lines, words, chars in input */
{
    int c, nl, nw, nc, inword;

    inword = NO;
    nl = nw = nc = 0;
    while ((c = getchar()) != EOF) {
        ++nc;
        if (c == '\n')
            ++nl;
        if (c == ' ' || c == '\n' || c == '\t')
            inword = NO;
        else if (inword == NO) {
            inword = YES;
            ++nw;
        }
    }
    printf("%d %d %d\n", nl, nw, nc);
}
```

Every time the program encounters the first character of a word, it counts it. The variable *inword* records whether the program is currently in a word or not; initially it is "not in a word," which is assigned the value *NO*. We prefer the symbolic constants *YES* and *NO* to the literal values 1 and 0 because they make the program more readable. Of course in a program as tiny as this, it makes little difference, but in larger programs, the increase in

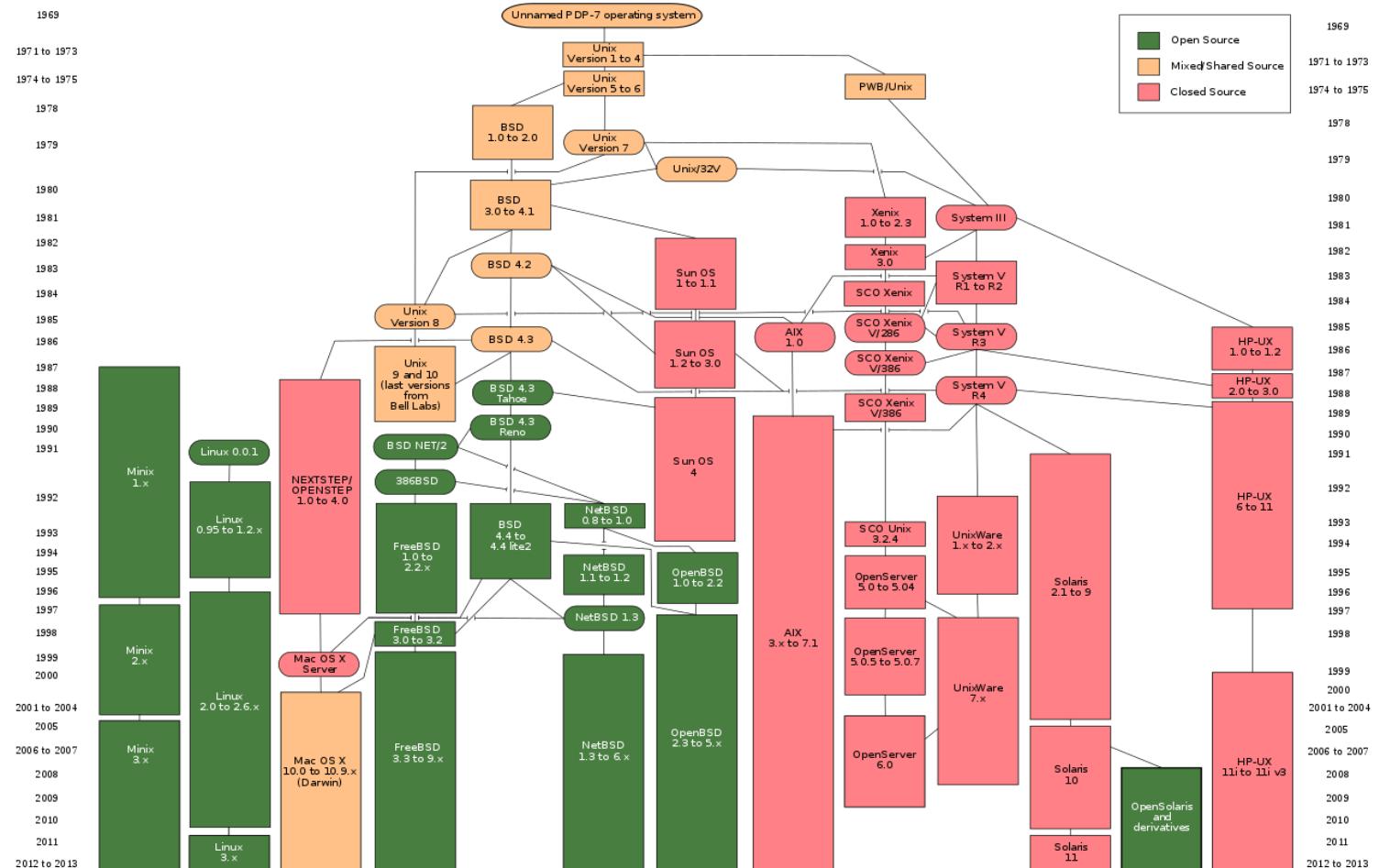


PunchCards, DecWriter and VT100





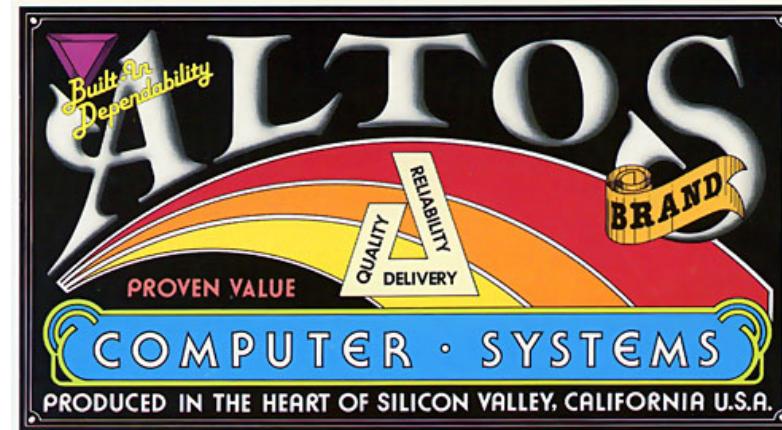
Unix Explosion





Microsoft Unix - XENIX

| Altos 586 | |
|------------------|---------------------------------|
| Released: | mid-1983 |
| Price: | US \$10,990 \$23K in 2016 |
| CPU: | Intel 8086 @ 10 MHz |
| RAM: | 512K - 1MB |
| Display: | Text on RS-232 terminal |
| Ports: | 6 serial, 1 parallel |
| Storage: | 5 1/4-inch floppy, 10MB-40MB HD |
| OS: | Microsoft XENIX |



IBM PC 5150 – 1981
4.77MHz, 16k-256k
MSDOS
\$6500 in 2016 dollars

5150 - Involuntary Psychiatric Hold



MaBell

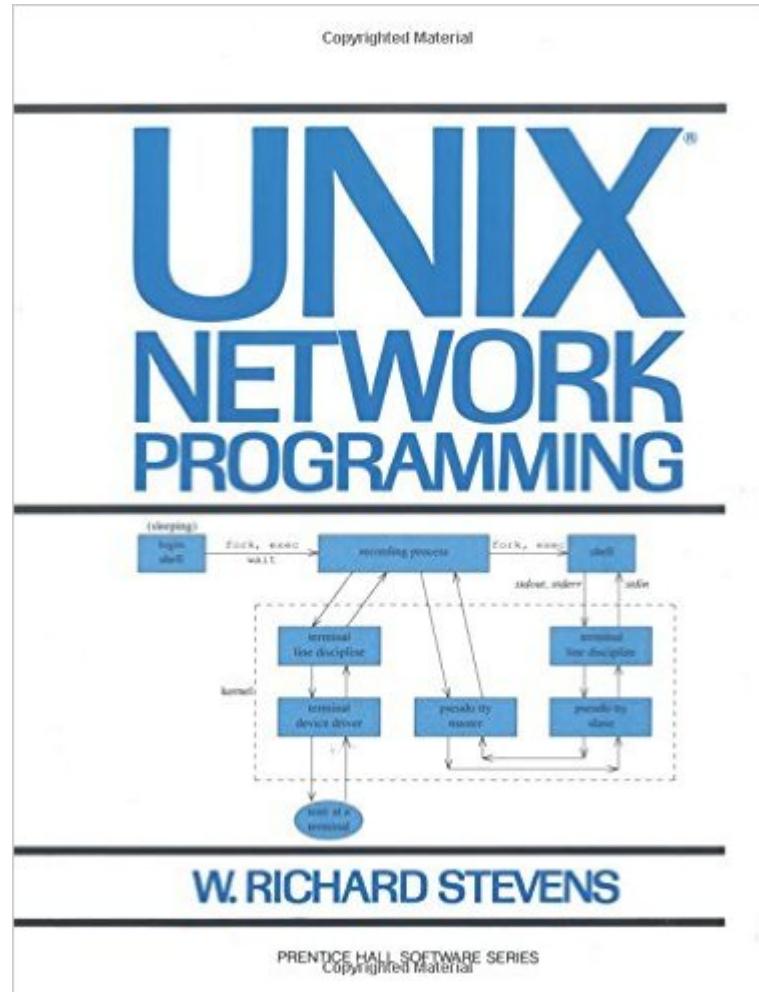


1983

Anti-trust settlement broke up AT&T
Rush to commercialize, nearly killed Unix



BSD gets TCP/IP - 1983



Editors

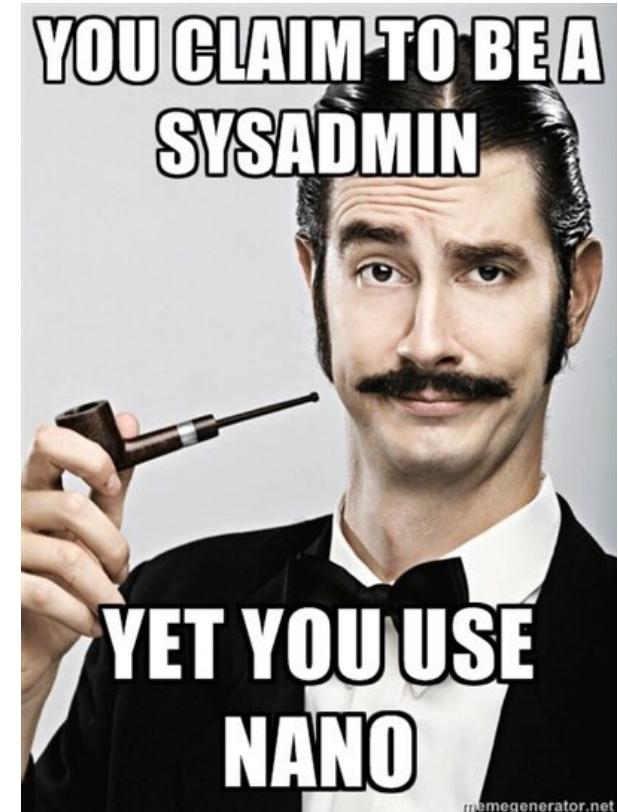


vi - Bill Joy develops visual interface as a UCB grad student



emacs - Richard Stallman sees WYSIWIG editor at Stanford AI Lab, returns to MIT, creates TECO with editing macros, emacs

Later creates GNU - “GNU's not Unix”





RTFM and apropos

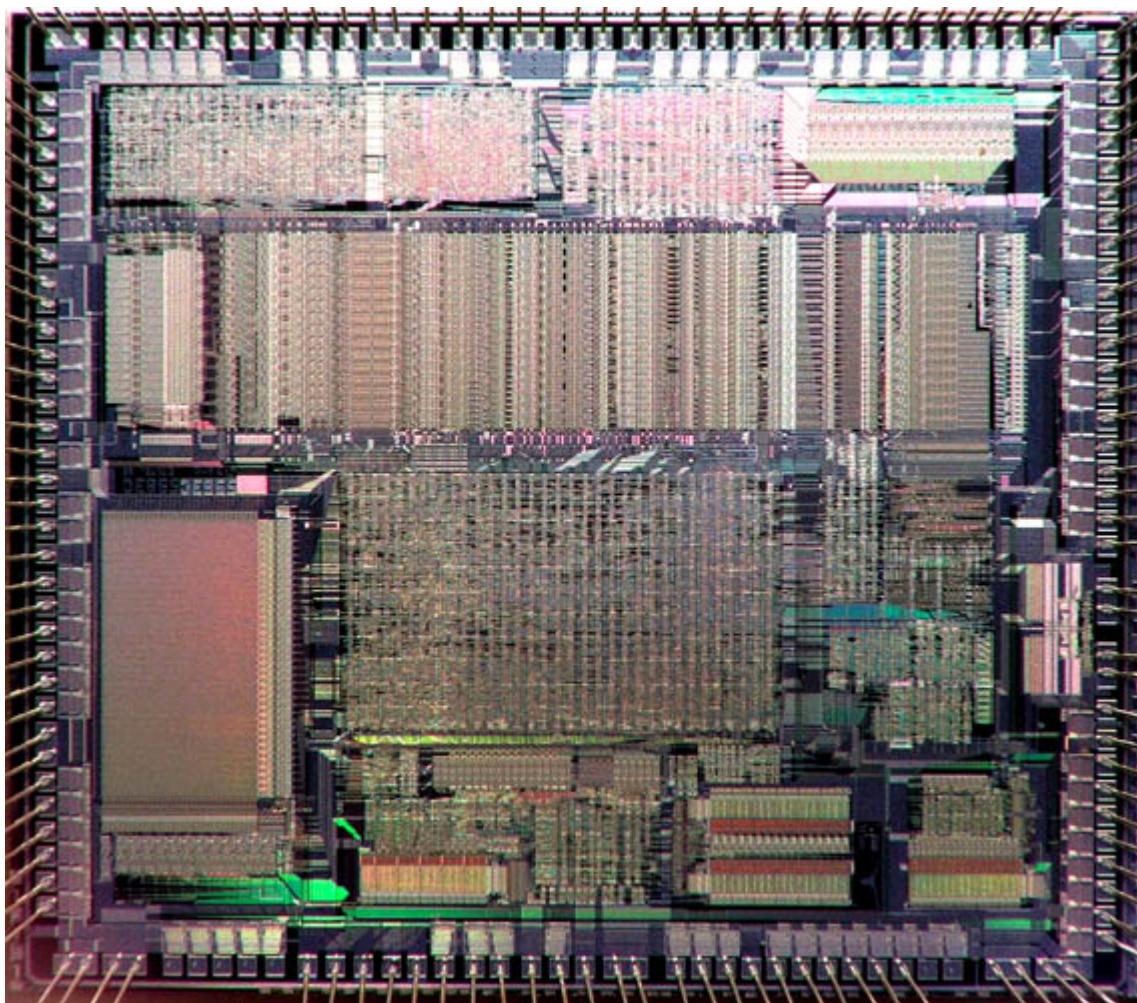


BEING A
SYSADMIN
IS EASY. IT'S LIKE
RIDING A BIKE
EXCEPT THE BIKE IS ON FIRE
YOU'RE ON FIRE
EVERYTHING IS ON FIRE
AND YOU'RE IN HELL





386&VM and What's Next? - 1985



275,000 transistors
\$976 in 2016 dollars
RAM Price 512K \$440



BSD, Mach, Darwin, later OSX



OS/2 Released - 1987



IBM and Microsoft join venture - has Unix and Xenix ties, later basis for NT

Morris Worm – 1988



One of the first worms distributed via the Internet. Cornell student launched from MIT, infected 6000+ university, lab and government Unix computers in hours.

Damage estimate between \$10M and \$100M

Robert Morris first felony conviction under 1986 Computer Fraud and Abuse Act.

Currently an MIT professor.





Webserver 0 - 1990



This original NeXT Computer was used by Tim Berners-Lee at CERN, and became the world's first Web server and ran the world's first Web browser in 1990



Linux Posted - 1991



Linus Torvalds

From: torvalds@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Message-ID: <1991Aug25.205708.9541@klaava.Helsinki.FI>
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki

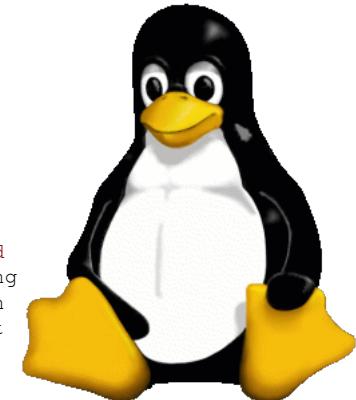
Hello everybody out there using minix -

I'm doing a (free) operating system (**just a hobby, won't be big and professional like gnu**) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them ☺

Linus (torvalds@kruuna.helsinki.fi)

PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT protable (uses 386 task switching etc), and **it probably never will support anything other than AT-harddisks**, as that's all I have :-(.



1998, a confidential memo at Microsoft stated, "Linux is on track to eventually own the x86 UNIX market," and further predicted, "I believe that Linux - more so than NT will be the biggest threat to SCO in the near future."



Its “GNU/Linux”!, Stallman



1995

NCSA httpd and a series of email patches

Netscape IPO, dot-com begins

SGI begins winning academy awards for visual effects



Abyss, Antz, Casper, Final Fantasy, Forrest Gump, Gladiator, Ice Age, Lord of the Rings, Jumanji, Jurassic Park 1,2,3, Shrek, Star Wars Ep1, Starship Troopers, Terminator 2, Hunt for Red October, The Matrix, Titanic, Toy Story, Twister and more



Unix Copyright Lawsuits

AT&T

Novell

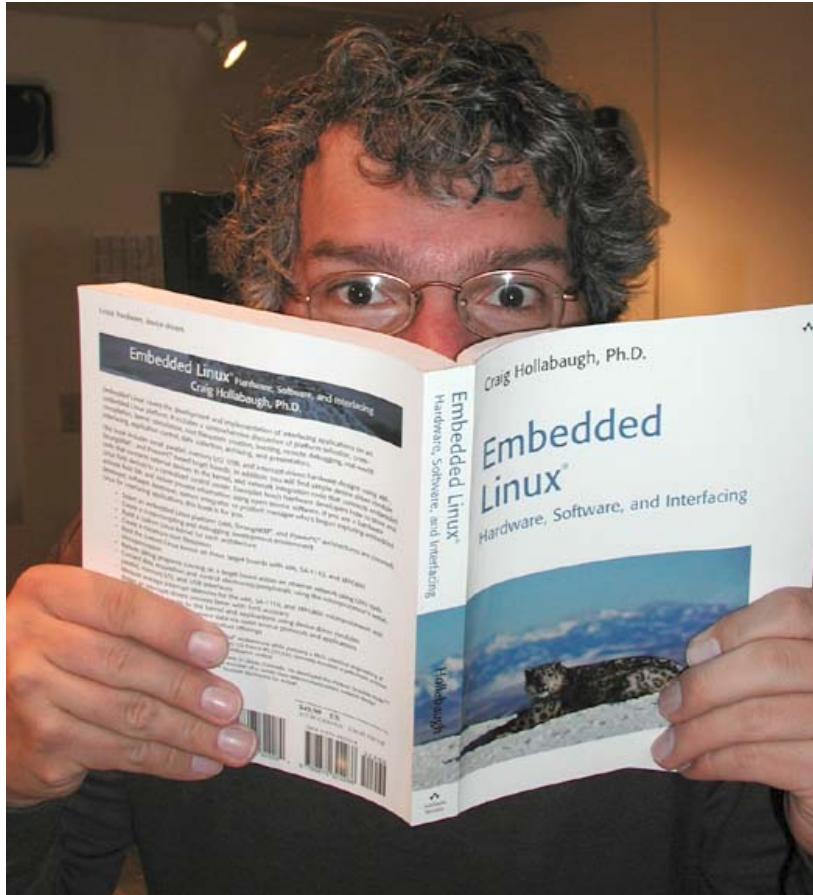
SCO

Linux and IBM

- 1991 Linux announced
- 1993 AT&T sells Unix to Novell
- 1995 Novell sells Unix to SCO
- 1995 dot-com begins
- 2003 Was Unix source code in Linux?
- 2003 Microsoft funds SCO for \$50M
- 2003 SCO sues IBM for \$1 billion
- 2010 Novell owns Unix copyrights
- 2016 SCO vs IBM lawsuit dismissed



Embedded Linux – 2002



BrightStar
MediaEngine
StrongARM 133MHz
8MB RAM 4MB Flash
\$2200

Addison/Wesley publishes Embedded Linux, hits Slashdot, goes to #5 on Amazon's computer book sales. Over 6 years, 10,000+ copies, translated into 5 languages.



The author and Jesse writing the raw text near Ouray campground.



2000s Fast Track

2003 googleplex takes over SGI's Mountain View location

2005 Torvalds gets pissed, creates GIT to distribute Linux src

2006 Google calls Craig ... “but we're google”, “so what?”

2007 iPhone released, loosely based on OSX

2008 Android released, uses Linux kernel

2009 Oracle buys Sun

2017 Oracle cans Solaris12



- em

Multics 1960s features exist today in all operating systems

Space Travel leads to UNICS

DOTADIW and KISS

RTFM

AT&T breakup nearly kills Unix

Many flavors of Unix

Student creates Linux

dotcom boom creates massive wealth

SCO sues, IBM wins, Unix wins, we all win

Unix lead to BSD, OS/2, NT, Darwin, OSX, Linux, WWW, iOS and Android



<https://www.youtube.com/watch?v=hjjydz40rNI>