# BSD is Dying

A cautionary tale of Sex and Greed

# Prologue

# What is BSD?

# What is UNIX?

# What is an Operating System?

# What is a Computer?

# What is a user?

# Who am I?

# SysAdmin

networks

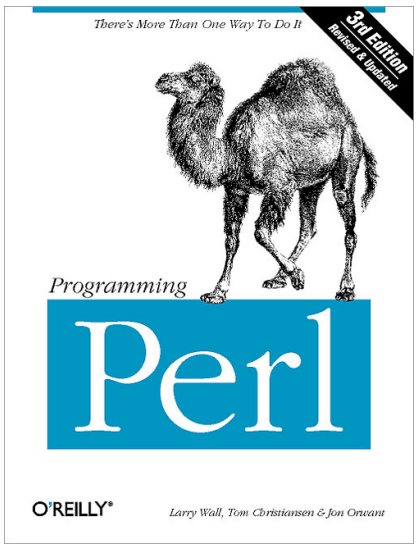
# firewalls

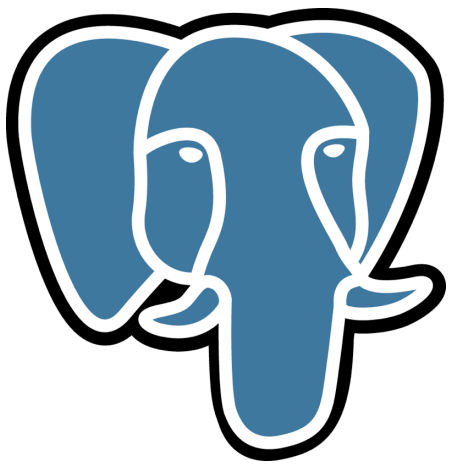
tweaking

vol. 05
Make:
technology on your time
Launch a High-Powered
WATER ROCKET
Street Legal Electric Cars
O'REILLY
makezine.com

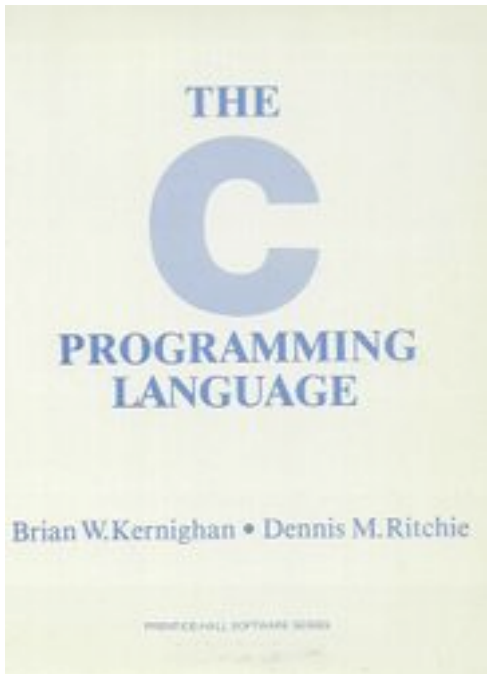
# Programmer

(sorta)


There's More Than One Way To Do It
3rd Edition
Revised & Updated
Programming
Perl
O'REILLY®
Larry Wall, Tom Christiansen & Jon Orwant



Apache
HTTP SERVER PROJECT


THE
C
PROGRAMMING
LANGUAGE
Brian W. Kernighan • Dennis M. Ritchie

jdixon@

OpenBSD

# Consultant

**DixonGroup**
Consulting

# Employee

raba
technologies

Lover

DragonFlyBSD

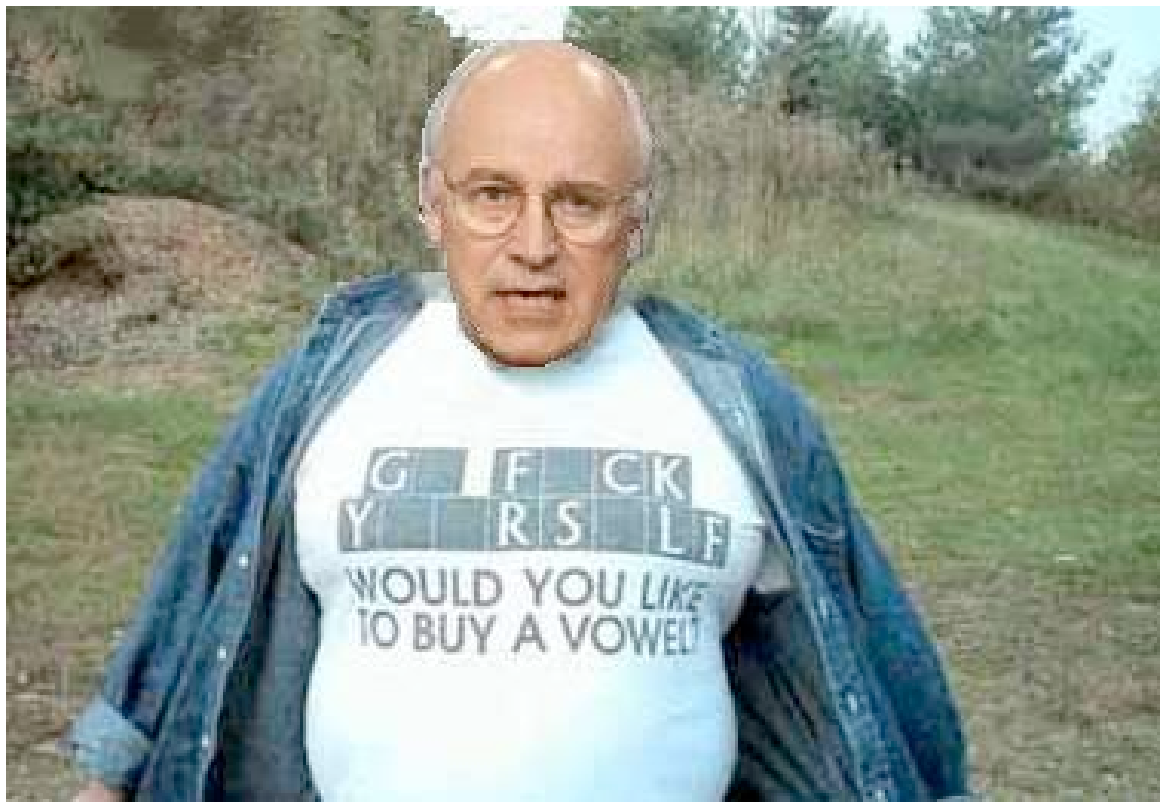
# Why am I here?

To talk about why...

NetBSD®

DragonFlyBSD

... is dying.


G F CK
Y RS LF
WOULD YOU LIKE
TO BUY A VOWEL?

# What is BSD?

# What is UNIX?

# What is an Operating System?

# What is a Computer?

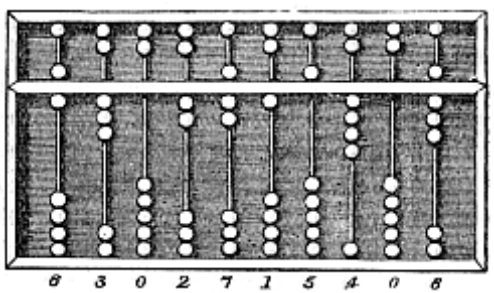
com-pu-ter [k*uh* m-pyoo-ter]

n.

1. A device that computes, especially a programmable electronic machine that performs high-speed mathematical or logical operations or that assembles, stores, correlates, or otherwise processes information.

2. One who computes.

sgi


6 3 0 2 7 1 5 4 0 6

WOPR

What does a Computer
**do** ?

WHOLE
FOODS
MARKET

Microsoft
Office
2000

Mozilla
Thunderbird®

Google™

pr0n

**09 F9 11 02 9D 74 E3 5B D8 41 56 C5 63 56 88 C0**

KEANU
REEVES
LAURENCE
FISHBURNE
MATRIX
DVD

[WITH_TEETH]
PARENTAL
ADVISORY
EXPLICIT CONTENT

REST
IN
PEACE
Conan
0 Au
poisoned by a
rotted kobold
corpse
2001
Sayonara Conan the Samurai...

How... ?

```
00100011011010010110111001
10001101101100011101010110
01000110010100100000001111
00011100110111100101110011
00101111011010110110010101
11001001101110011001010110
11000010111001101000001111
          10
```

foundation

kernel +

libraries +

# userland applications

= operating system

NetBSD®

DragonFlyBSD

# What is a kernel?

management

# processes

memory

# peripheral devices

And by extension...

networking

# security

# disks and file systems

# user interfaces

# userland applications

Mozilla
Thunderbird

Google™

pr0n

[WITH_TEETH]
PARENTAL
ADVISORY
EXPLICIT CONTENT

REST
IN
PEACE
Conan
0 Au
poisoned by a
rotted kobold
corpse
2001
Sayonara Conan the Samurai...

much, much more...

[ pause ]

# In summary...

[ catch breath ]

# Genesis

# In the beginning...

(1960s)

MASSACHUSETTS
INSTITUTE OF TECHNOLOGY
1861
MENS ET MANUS

Bell Laboratories

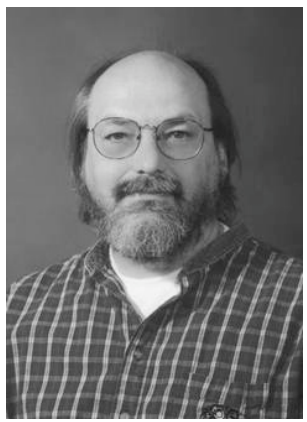
**Mult**iplexed **I**nformation and
**C**omputing **S**ervice

Life was Good (TM)

Life was Good (TM)

commercial failure

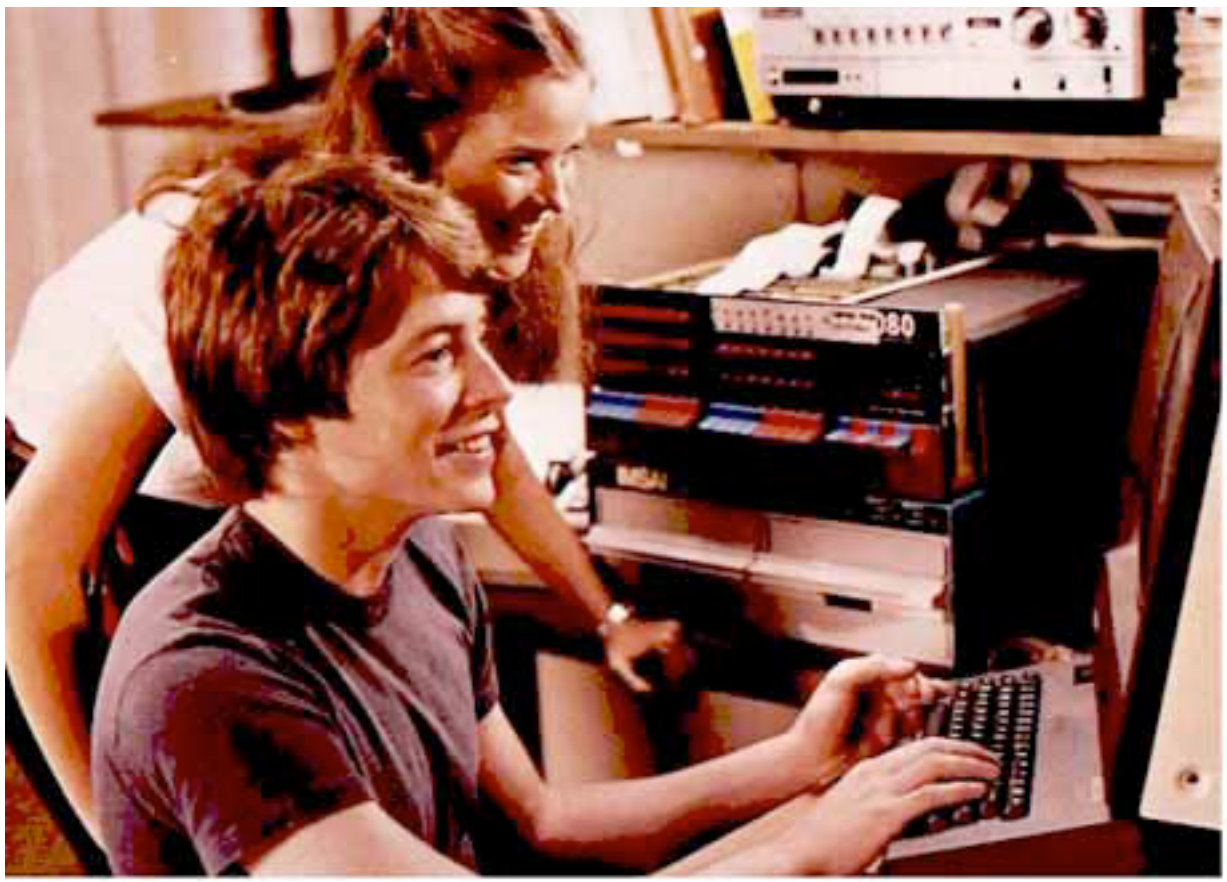
Bell Laboratories

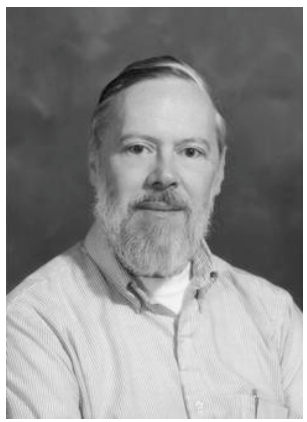


# Ken Thompson

# Space Travel

What is an assembly programmer to do?





# Dennis Ritchie

1970

**Un**iplexed **I**nformation and
**C**omputing **S**ystem

number of users

2

# UNIX

# text processing

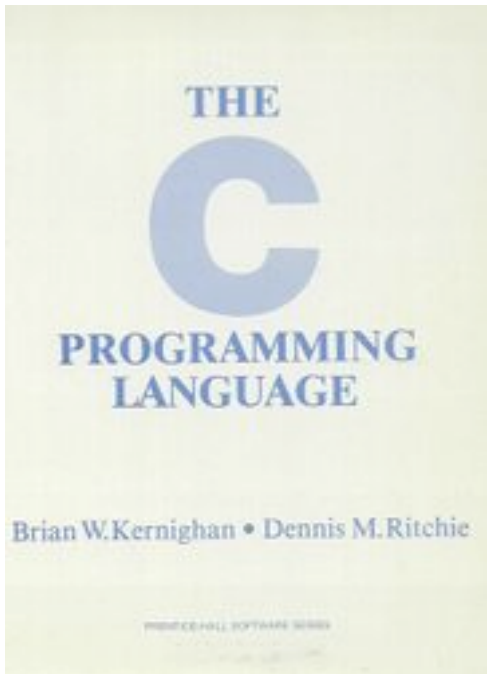
roff

text editor

# patents

1973

rewrote UNIX


THE
C
PROGRAMMING
LANGUAGE
Brian W. Kernighan • Dennis M. Ritchie

portable

source code available

1974

# Bob Fabry

THE·UNIVERSITY·OF·CALIFORNIA·BERKELEY·
LET THERE BE LIGHT
·1868·

$99

1977

# Bill Joy

# Berkeley Software Distribution

# 1BSD

# Pascal compiler

ex

1978

# 2BSD

vi

csh

1979

# 3BSD

# VMUNIX

(Virtual VAX/UNIX)

DARPA

**C**omputer **S**ystems
**R**esearch **G**roup

1980

# 4BSD

# job control

delivermail

# curses

1981

# 4.1BSD

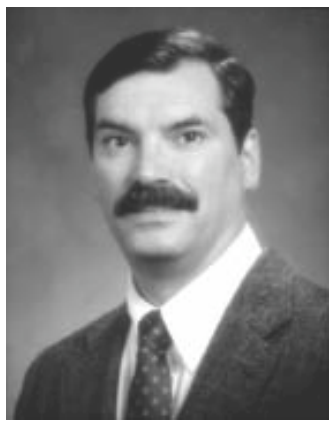
# performance on VAX

1983

# 4.2BSD

# TCP/IP

# Berkeley Fast File System



Marshall Kirk McKusick

UNIX

1986

# 4.3BSD

# performance improvements over 4.2BSD

1988

# 4.3BSD-Tahoe

initially designed for Power 6/32
"Tahoe" platform

some machine-independent code

1989

# Net/1

separated networking code
from AT&T UNIX code

permissive BSD license

1990

# 4.3BSD-Reno

# MACH virtual memory system

# Sun-compatible NFS

# moving towards POSIX

1991

# Net/2

all AT&T code and utilities
were replaced or removed

intel
i386
A80386DX-16 IV
SX236
L0500740
INTEL © '85

basis for 386BSD and BSD/386

# William Jolitz

# 386BSD

NetBSD®

BSD
BSDI
Internet Server
BSD/OS
Berkeley Software Design, Inc.
7759 Delmonico Drive
Colorado Springs, CO 80919 USA
Service: 800-ITS-BSD8
Sales: 800-800-48SD
General: +1 719 593 9445
BSD
BERKELEY SOFTWARE DESIGN, INC.

# Exodus

1992

# Unix System Laboratories

AT&T

# USL v. BSDI

Quick STOP
GROCERIES
LOTTERY TICKETS
LOTTERY TICKETS
LOTTERY TICKETS
CAMEL

injunction

SALE

# 1-800-ITS UNIX

# Net/2 + 6 files

Dickinson R. Debevoise

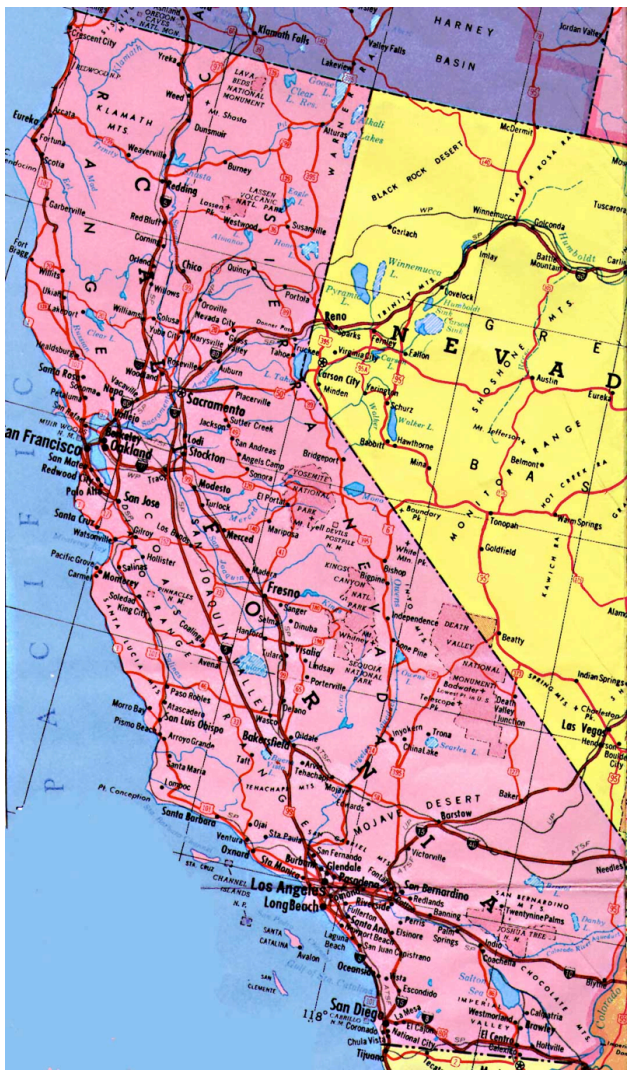
complaint narrowed

# recent copyrights

possiblilty of the loss
of trade secrets

state court

countersuit


HARNEY BASIN
BLACK ROCK DESERT
NEVADA
SIERRA NEVADA
CASCADE RANGE
KLAMATH MTS.
SHOSHONE MTS.
MONITOR RANGE
SAN JOAQUIN VALLEY
MOJAVE DESERT
DEATH VALLEY
Klamath Falls
Crescent City
Eureka
Redding
Chico
Sacramento
San Francisco
Oakland
Stockton
Modesto
Fresno
San Jose
Monterey
Bakersfield
Reno
Carson City
Las Vegas
Los Angeles
Long Beach
San Diego
Santa Barbara
Pt. Conception
Barstow
San Bernardino
Palm Springs
El Centro
Tonopah
Goldfield
Beatty
Winnemucca
Lovelock
Susanville
Mt. Shasta
Lassen Volcanic Nat'l Park
Yosemite Nat'l Park
Sequoia Nat'l Park
Death Valley Nat'l Monument
Joshua Tree Nat'l Monument
Lava Beds Nat'l Monument
Pt. Reyes Nat'l Seashore
Channel Islands Nat'l Park
Salton Sea
Colorado R.
118°

not coincidentally...

# USL

Novell

Ray Noorda, CEO

1994

settlement

2004

Groklaw

- 4.4BSD-lite to be released containing no disputed files. University to encourage licensees to switch from Net-2.
- University to cease distribution of certain files.
- USL to grant three months grace period to users of disputed files.
- Certain files distributed by University to carry USL copyright notice.
- Certain files distributed by USL to carry University copyright notices.
- USL to permit free distribution of certain files.
- University not to actively assist in legal attempts to challenge USL's rights to certain files.

AT&T

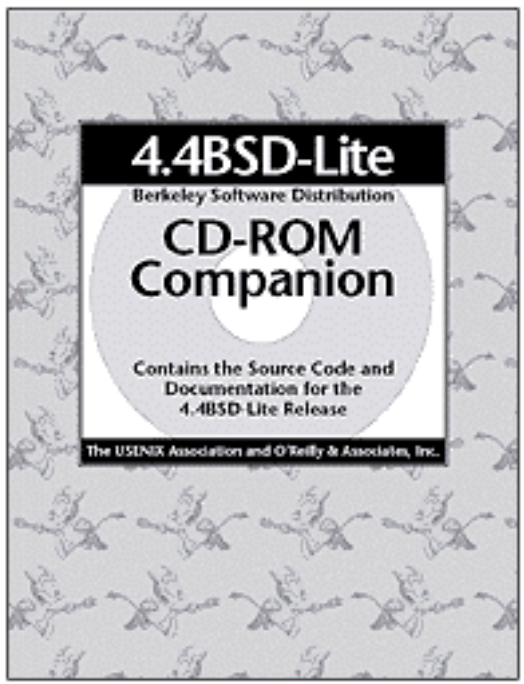
# 4.4BSD-Encumbered

(USL license)

# 4.4BSD-Lite

(BSD license)

# Resurrection


4.4BSD-Lite
Berkeley Software Distribution
CD-ROM
Companion
Contains the Source Code and
Documentation for the
4.4BSD-Lite Release
The USENIX Association and O'Reilly & Associates, Inc.

FreeBSD®

# Intel x86

Intel x86

Intel Itanium

Intel x86

Intel Itanium

AMD64

Intel x86

Intel Itanium

AMD64

Alpha

Intel x86

Intel Itanium

AMD64

Alpha

Sun UltraSPARC

jail

access control lists

mandatory access controls

historically, strong TCP/IP and SMP performance

dtrace

ZFS

NetBSD

NetBSD®

over **50** hardware platforms
from a **single** source tree

forked from NetBSD 1.0

# Alpha

Alpha

i386

Alpha

AMD64

i386

Alpha

AMD64

i386

MacPPC

Alpha

AMD64

i386

MacPPC

SGI

Alpha

AMD64

i386

MacPPC

SGI

Sparc

Alpha

AMD64

i386

MacPPC

SGI

Sparc

Sparc64

Alpha

AMD64

i386

MacPPC

SGI

Sparc

Sparc64

VAX

Alpha

AMD64

i386

MacPPC

SGI

Sparc

Sparc64

VAX

Zaurus

new release every 6 months

“secure by default”

# full disclosure

full disclosure

audits

full disclosure

audits

privsep & revocation

full disclosure

audits

privsep & revocation

chroot jails

full disclosure

audits

privsep & revocation

chroot jails

random pids

full disclosure

audits

privsep & revocation

chroot jails

random pids

ProPolice

PF

# PF

# authpf

PF

authpf

CARP

PF

authpf

CARP

pfsyncd

PF

authpf

CARP

pfsyncd

sasyncd

PF

authpf

CARP

pfsyncd

sasyncd

bioctl

PF

authpf

CARP

pfsyncd

sasyncd

bioctl

hoststated

DragonFlyBSD

logical continuation
of FreeBSD 4.8

# SMP revamp

Mac OS X "Tiger"

others

# Revelations

# Why is BSD dying?

Because IDC says so.

market share <1%

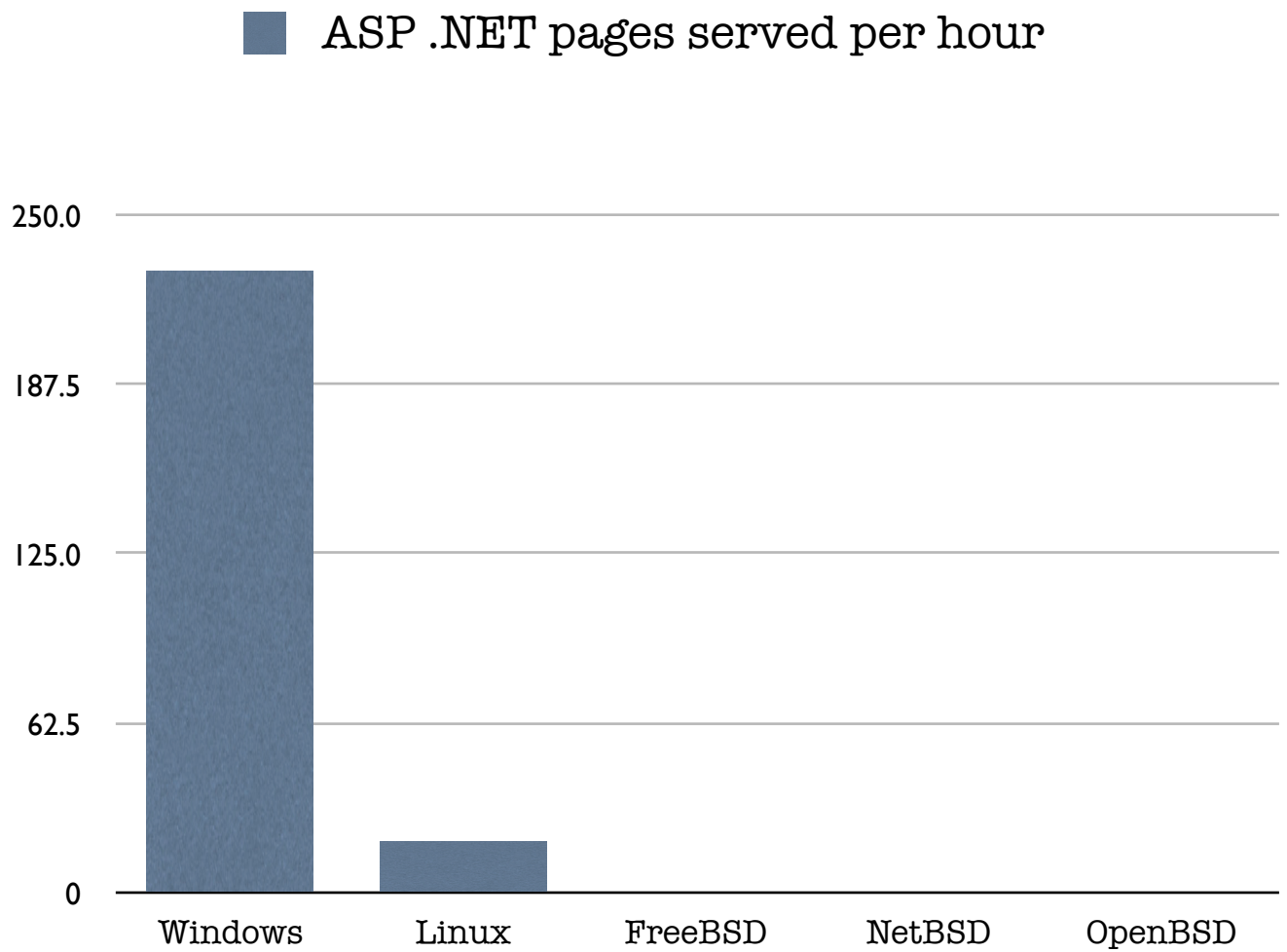
Netcraft confirms these findings.

**Last** place,
SysAdmin networking test

Open-source projects
are giving away **free** software.

# Free Software == Terrism

Inability to adapt.




Source: MCSE Weekly, Feb. 2003

Loss of talent.

FreeBSD has lost 93%
of their core developers.

Not all is lost.

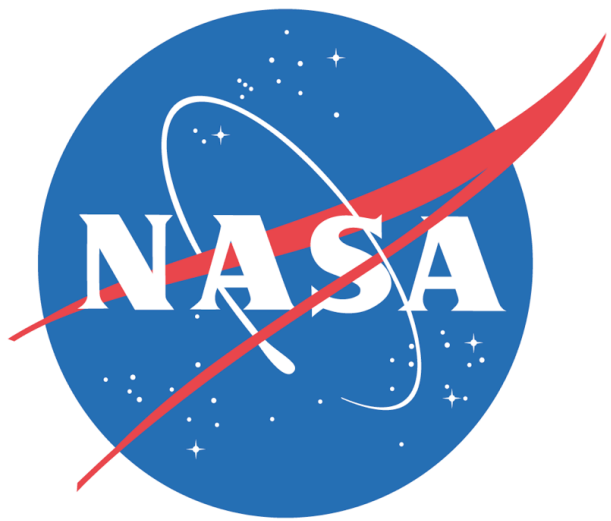
Fortunately, a few small companies still use BSD.

Adobe

Juniper
NETWORKS

NETWORKS

NOKIA
CONNECTING PEOPLE


NASA

NORTEL

NYI
est. 1996 in n.y.c.

Google™

YAHOO!

# Epilogue

# technological challenges

# virtualization

# DRM

# political challenges

# blobs

# NDAs

closed documentation

diversity

unity

the end