35 shades of grey

*NIX periods of life

1969	no hair	- prenatal
1975	2 hairs	- birth of UNIX in Europe
1982	28 hairs	- birth of NLUUG
1998	too many hairs	- too much bread and butter
2010	well cut hairs	- survived
2017	35 grey hairs	- as milestone

in dedication to McLightje

teus hagen <teus@theunis.org>

NLUUG nj conference

Bunnik, 16th Nov 2017

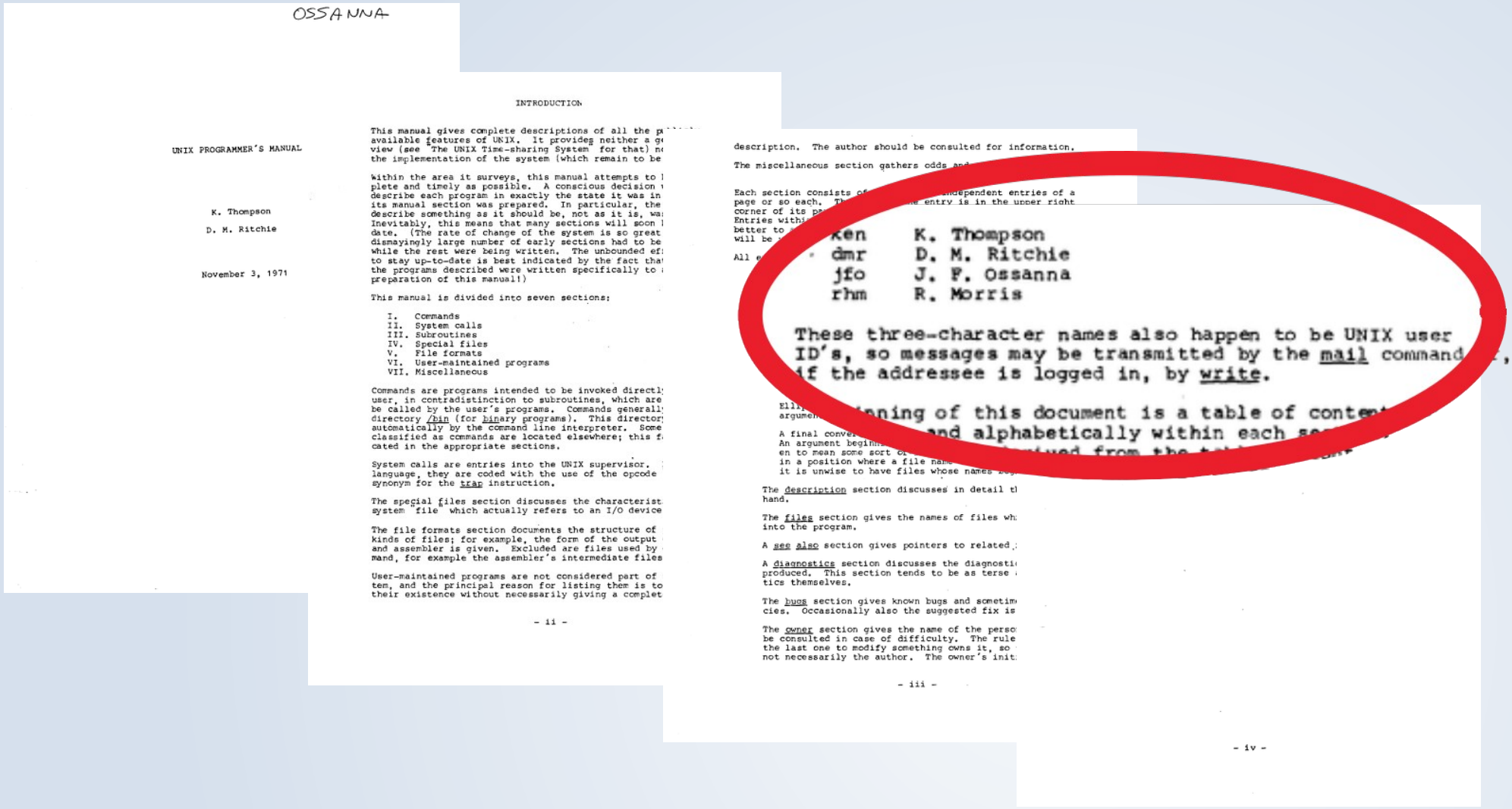
giving birth as UNICS

Bell Laboratories

- **1969** AT&T Bell Laboratories
  - frustration Multics development
    the participation stop
  - unused DEC PDP-7

- **1971** UNIX V1 Nov 3 PDP-11/20 as, fork(), roff
  - text processing, device driver for printing text
- **1973** rewrite in C: intro ***portability***
  - UNIX edition V4

UNIX V1 manual 3 nov 1971



OSSANNA

UNIX PROGRAMMER'S MANUAL

K. Thompson

D. M. Ritchie

November 3, 1971

INTRODUCTION

This manual gives complete descriptions of all the p
available features of UNIX. It provides neither a g
view (see The UNIX Time-sharing System for that) n
the implementation of the system (which remain to be

Within the area it surveys, this manual attempts to
plete and timely as possible. A conscious decision
describe each program in exactly the state it was in
its manual section was prepared. In particular, the
describe something as it should be, not as it is, wa
Inevitably, this means that many sections will soon
date. (The rate of change of the system is so great
dismayingly large number of early sections had to be
while the rest were being written. The unbounded ef
to stay up-to-date is best indicated by the fact tha
the programs described were written specifically to
preparation of this manual!)

This manual is divided into seven sections:

I. Commands
II. System calls
III. Subroutines
IV. Special files
V. File formats
VI. User-maintained programs
VII. Miscellaneous

Commands are programs intended to be invoked directl
user, in contradistinction to subroutines, which are
be called by the user's programs. Commands generall
directory /bin (for binary programs). This director
automatically by the command line interpreter. Some
classified as commands are located elsewhere; this f
cated in the appropriate sections.

System calls are entries into the UNIX supervisor.
language, they are coded with the use of the opcode
synonym for the trap instruction.

The special files section discusses the characterist
system file which actually refers to an I/O device

The file formats section documents the structure of
kinds of files; for example, the form of the output
and assembler is given. Excluded are files used by
mand, for example the assembler's intermediate files

User-maintained programs are not considered part of
tem, and the principal reason for listing them is to
their existence without necessarily giving a complet

- ii -

description. The author should be consulted for information.

The miscellaneous section gathers odds and

Each section consists of independent entries of a
page or so each. The entry is in the upper right
corner of its p
Entries with
better to
will be

All e

ken K. Thompson
dmr D. M. Ritchie
jfo J. F. Ossanna
rhm R. Morris

These three-character names also happen to be UNIX user ID's, so messages may be transmitted by the mail command , if the addressee is logged in, by write.

Ell
argumen
A final conve
An argument begin
en to mean some sort o
in a position where a file name
it is unwise to have files whose names

ning of this document is a table of conte
and alphabetically within each se

The description section discusses in detail t
hand.

The files section gives the names of files wh
into the program.

A see also section gives pointers to related

A diagnostics section discusses the diagnosti
produced. This section tends to be as terse
tics themselves.

The bugs section gives known bugs and sometim
cies. Occasionally also the suggested fix is

The owner section gives the name of the perso
be consulted in case of difficulty. The rule
the last one to modify something owns it, so
not necessarily the author. The owner's init

- iii -

- iv -

UNIX puberty time

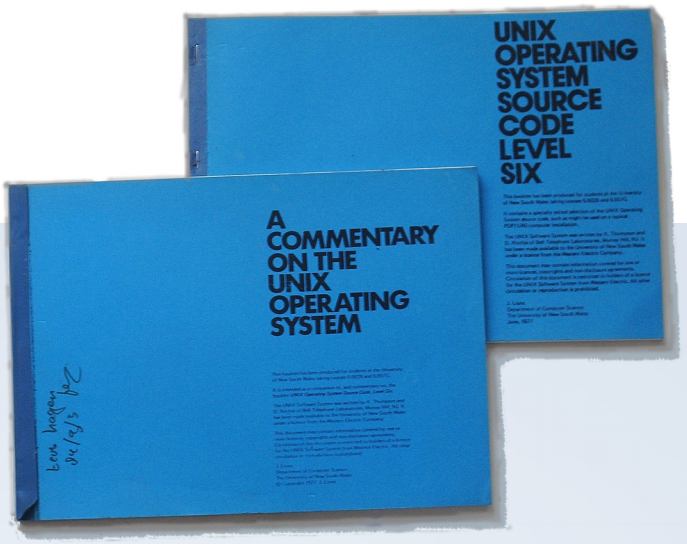
the AT&T business dream

AT&T Bell Laboratories

- **1973** symposium on Operating System Principles
- **1975** UNIX Version 6
- **1979** UNIX Version 7

  AT&T smells $$$$$
- **1980** Xenix the AT&T dream
- **1982** UNIX System III
- **1983** UNIX System V

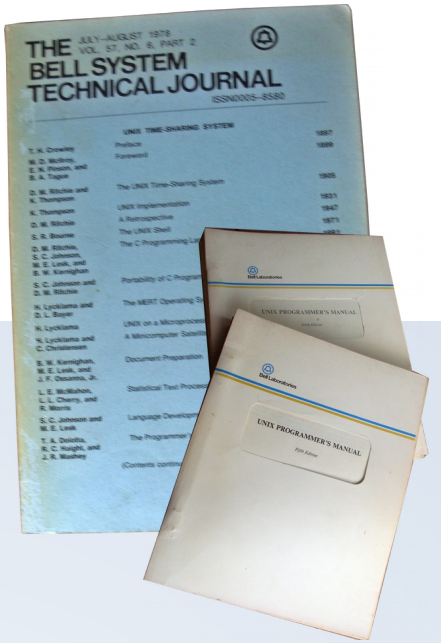
University New South Wales / Wollongong dept computer science




```
/*
        * If the new process paused because it was
        * swapped out, set the stack level to the last call
        * to savu(u_ssav).  This means that the return
        * which is executed immediately after the call to aretu
        * actually returns from the last routine which did
        * the savu.
        *
        * You are not expected to understand this.
        */
       if(rp->p_flag&SSWAP) {
               rp->p_flag =& ~SSWAP;
               aretu(u.u_ssav);
       }
```

- May 1976 John Lions started his UNIX V6 lectures
- Mar 1977 publication of comments & source
- 1977 Wollongong University first UNIX port to Interdata 7/32
- June 1979 AT&T withdraw permission
- 1996 book was freely released

giving the UNIX birth in Europe



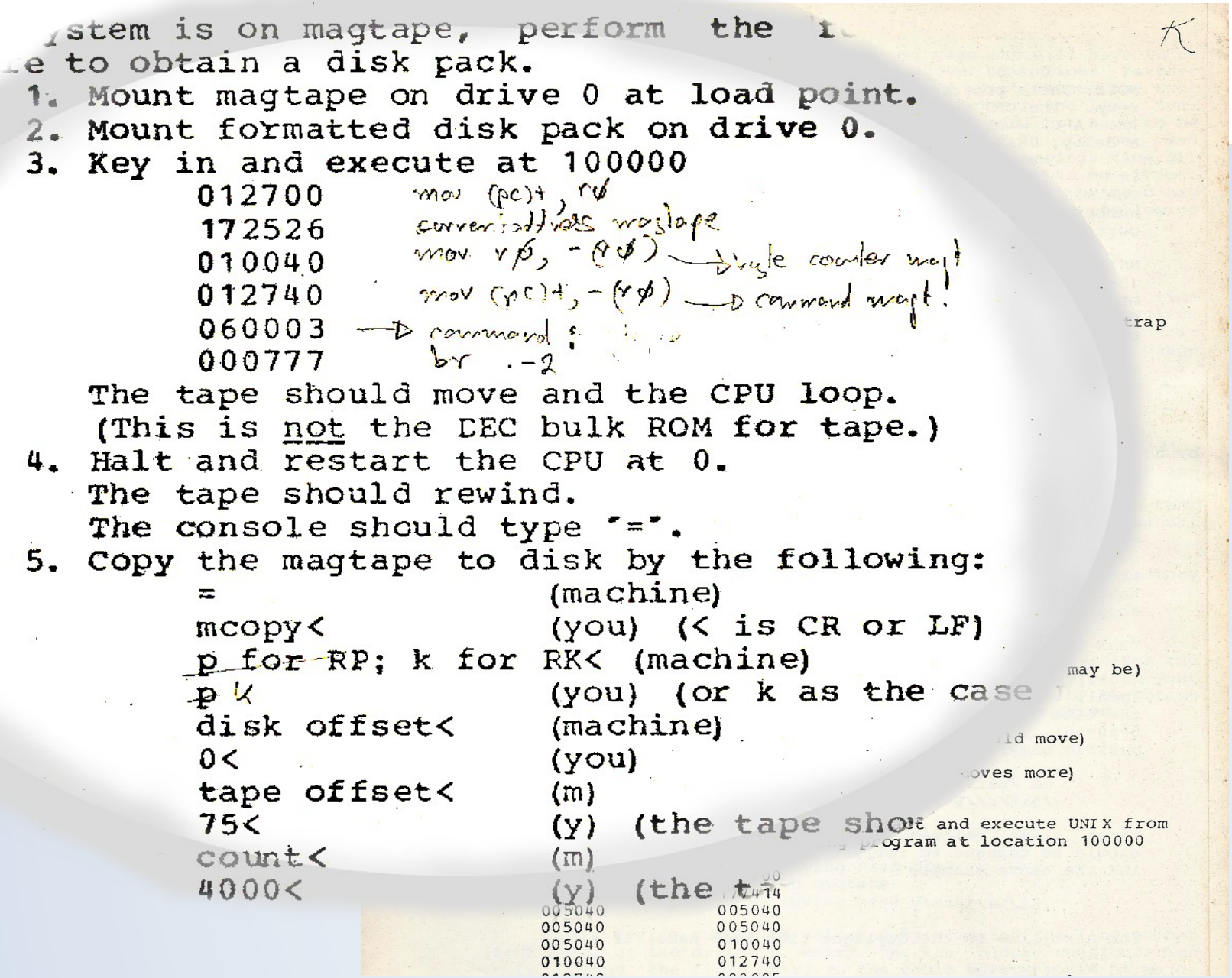
- **1975 Math. Center** (later CWI) in Amsterdam
  - DEC PDP-11/45: 2 RK05 (2.5 MB), DEC tape,
  - RSX 11-M frustration, ACM UNIX article: UNIX V5
  - 110 baud modems (later 300 baud and 1200 baud FD)
  - DECwriter 30 chars/second
  - Bourne sh(ell), real hackers do it with ed

- university/education license agreement (100 dollar)
- used the UNIX V7 bug tape from Lou Katz
- the lawyers struggled with setuid/setgid patent

Mathematical Center

CS student assistant

1975



ystem is on magtape, perform the f
e to obtain a disk pack.

1. Mount magtape on drive 0 at load point.
2. Mount formatted disk pack on drive 0.
3. Key in and execute at 100000

012700	mov (pc)+, r0
172526	current address magtape
010040	mov r0, -(r0) → byte counter magt
012740	mov (pc)+, -(r0) → command magt!
060003	→ command :
000777	br .-2

The tape should move and the CPU loop.
(This is not the DEC bulk ROM for tape.)

4. Halt and restart the CPU at 0.
The tape should rewind.
The console should type "=".
5. Copy the magtape to disk by the following:

=	(machine)
mcopy<	(you) (< is CR or LF)
p for RP; k for RK<	(machine)
p k	(you) (or k as the case
disk offset<	(machine)
0<	(you)
tape offset<	(m)
75<	(y) (the tape sho
count<	(m)
4000<	(y) (the t

K

trap

may be)

ld move)

oves more)

t and execute UNIX from
program at location 100000

005040	005040
005040	005040
005040	010040
010040	012740

my UNIX puberty time

- **1981** CWI (MC)
  - add RM03 (67 MB drive), tape drive, serial switch
  - VAX 11/780 (32 bits)

    frustrated about the DEC OS: UNIX V32 → 4.1 BSD
  - started EUUG / EUnet / NLnet
- worked with University Berkeley, computer science group

  Bill Joy (later SUN) (vi,VM), Kirk McKusick (csh,filesystem), Eric Allman (email,DB), Sam Leffler (tcp/ip), Mike Karels (DB), Keith Bostic, etc.

  funded by DARPA: TCP/IP.

  thank you Armando Stettner (DEC)

Giving birth to European Unix Users Group and NLUUG

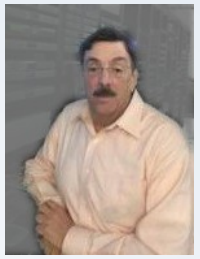
UNIX Conferences in Europe 1977-1990

- UK DECUS meetings, the UNIX groups pregnant time:
  - May 1977 Glasgow University
  - Sept 1977 University of Salford
  - Jan 1978 Heriot Watt University
  - Sept 1978 Essex University
- NL meetings, the UNIX user groups initiation:
  - Nov 1979 Free University Amsterdam
  - Apr 1981 CWI Amsterdam

MC machinery evolution

birth of MCvax.uucp

- PDP-11/45 → VAX 11/780
  - from segmentation to paging
  - unibus → massbus
  - RM03: 67 MB, 55K US$
  - Kennedy tape 125ips, 800/1600, 45K US$
  - autodialer + 1200 baud modem: 2.5K US$
  - cheapest VAX11/750 340K US$



CWI got snr 0032 with RSX11 (written in assembler)

first UNIX 32V AT&T, later BSD4.1 (thank you Armando, Bill)

- **1982** SUN 1 (Motorola 68020) BSD 4.2: MCsun

two programs, many (>50) *NIX systems

test Usenix/Uniforum conference Dec 1982

- Dec **1982**:

  CPU DEC, Motorola 680X0, Z8000, Intel 80X86 at **8-12 MHz**

  - VAX 780: 6-8 secs (€ 340 K + airco)
  - Apple Lisa: 22-25 secs (€ 10 K + fan)
  - Intel Altos: 13-27 secs (+ fan)
  - Amdahl: 0.5 secs (++ airco)

- 35 years later, Nov **2017**:
  - Intel Core i5, **3.30GHz**: 0.001-0.003 secs (€ 500)
  - Rasp Pi Zero W, **1 GHz**, ARM V6 BCM2835:

    0.01-0.02 secs (€ 10.- + SD card + USB adapter)

EUUG conferences

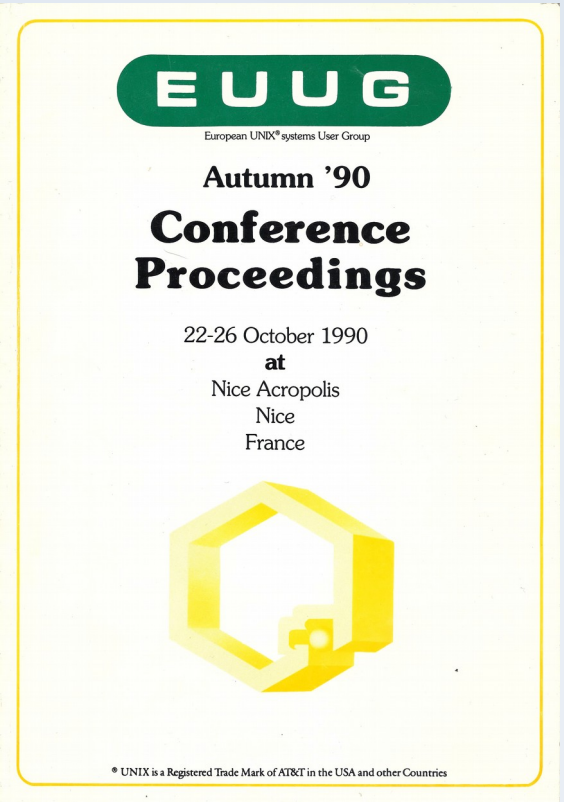
European UNIX® systems User Group

1981 April	**CWI, Amsterdam, The Netherlands**
1981 September	Nottingham University, UK
1982 September	University of Leeds, UK (Otis Wilson)
1982 April	CNAM, Paris, France (EUnet announcement)
1982 September	University of Leeds, UK
1983 April	Wissenschaft Zentrum, Bonn, Germany
1983 September	Trinity College, Dublin, Ireland
1984 April	**University of Nijmegen, Nld** (Brian Kernighan)
1984 September	Cambridge University, UK (Lions)
1985 April	Palais de Congres, Paris, France (Daniel Karrenberg)
1985 September	Bella Conference Center, Copenhagen, Denmark

EUUG conferenties + exhibits

1986 April	Centro Congressie, Florence, Italy
1986 September	UMIST, Manchester, UK
1987 May	**sailing Helsinki/Stockholm**
1987 September	**Trinity College, Dublin Ireland**
1988 April	Queen Elisabeth, London, UK
1988 October	Hotel Estoril-Sol, Cascais, Portugal
1989 April	Palais des Congres, Brussels, Belgium
1989 September	Wirtschaftuniversität, Vienna, Austria
1990 April	Sheraton Hotel, Munich, Germany
1990 October	Nice Acropolis, Nice, France
1991 May	1e EurOpen, Kulturhuset, Tromso, Norway
1991 September	EurOpen, Budapest, Hongary

...



first: Andy Tanenbaum with Minix,

only then: Linus Torvalds with Linux

- **1987 MINIX** as CS OS student training

  it nearly escaped a disaster: system call problem

- **1991 Linux** as terminal server

  it nearly escaped some disasters:

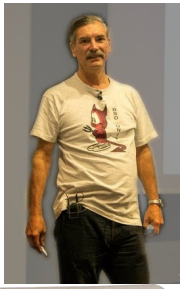
  all was good, but a bad first tcp/ip implementation

Open Source changed the OS computer world

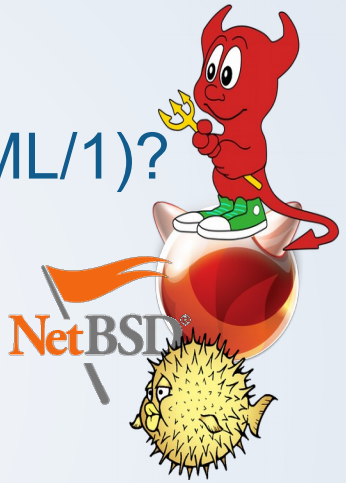
- *it is **free** but not a free beer*
- *everybody can contribute, so it **grows ...***

beginning of 1990th

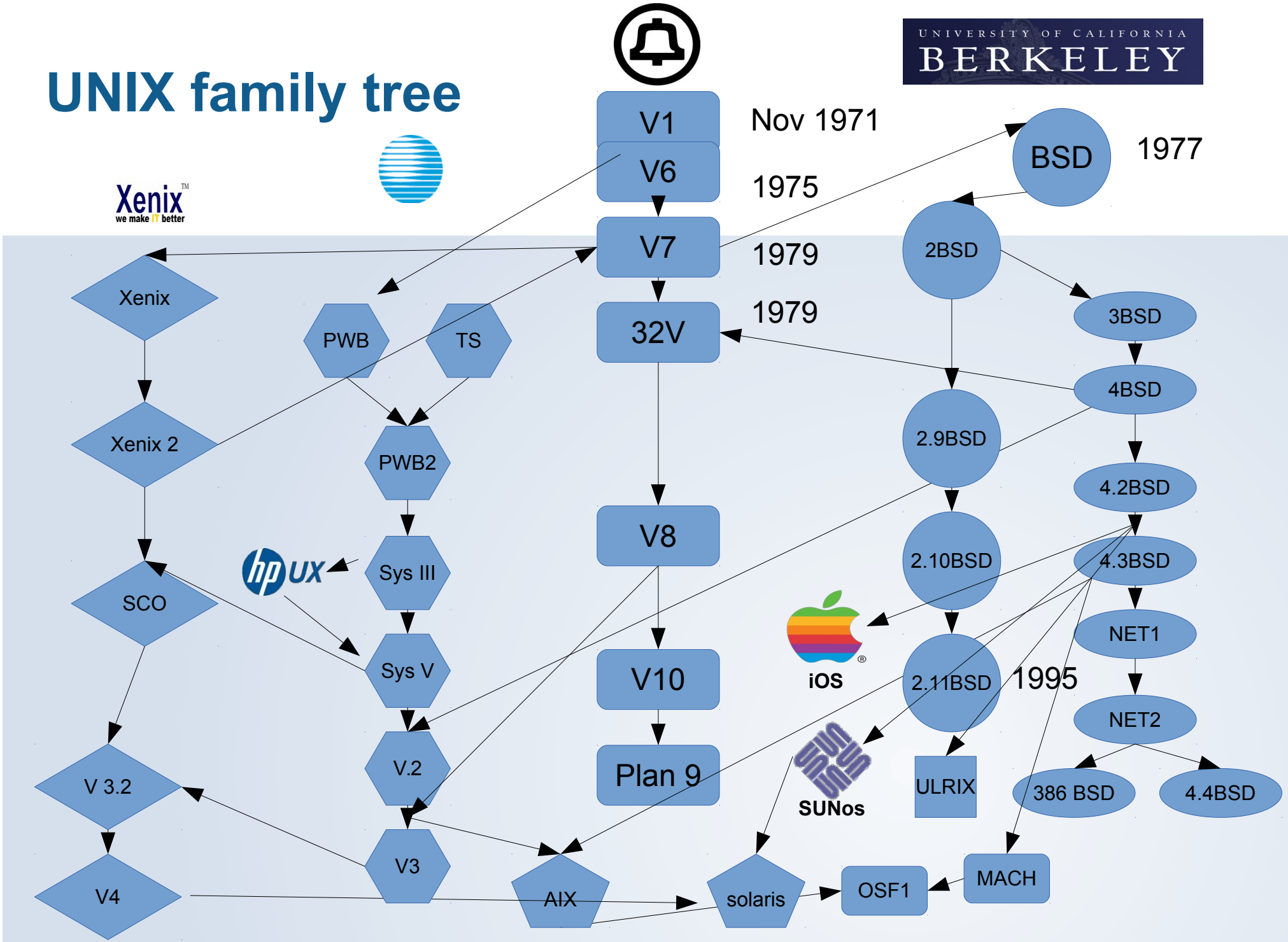
the focus was on



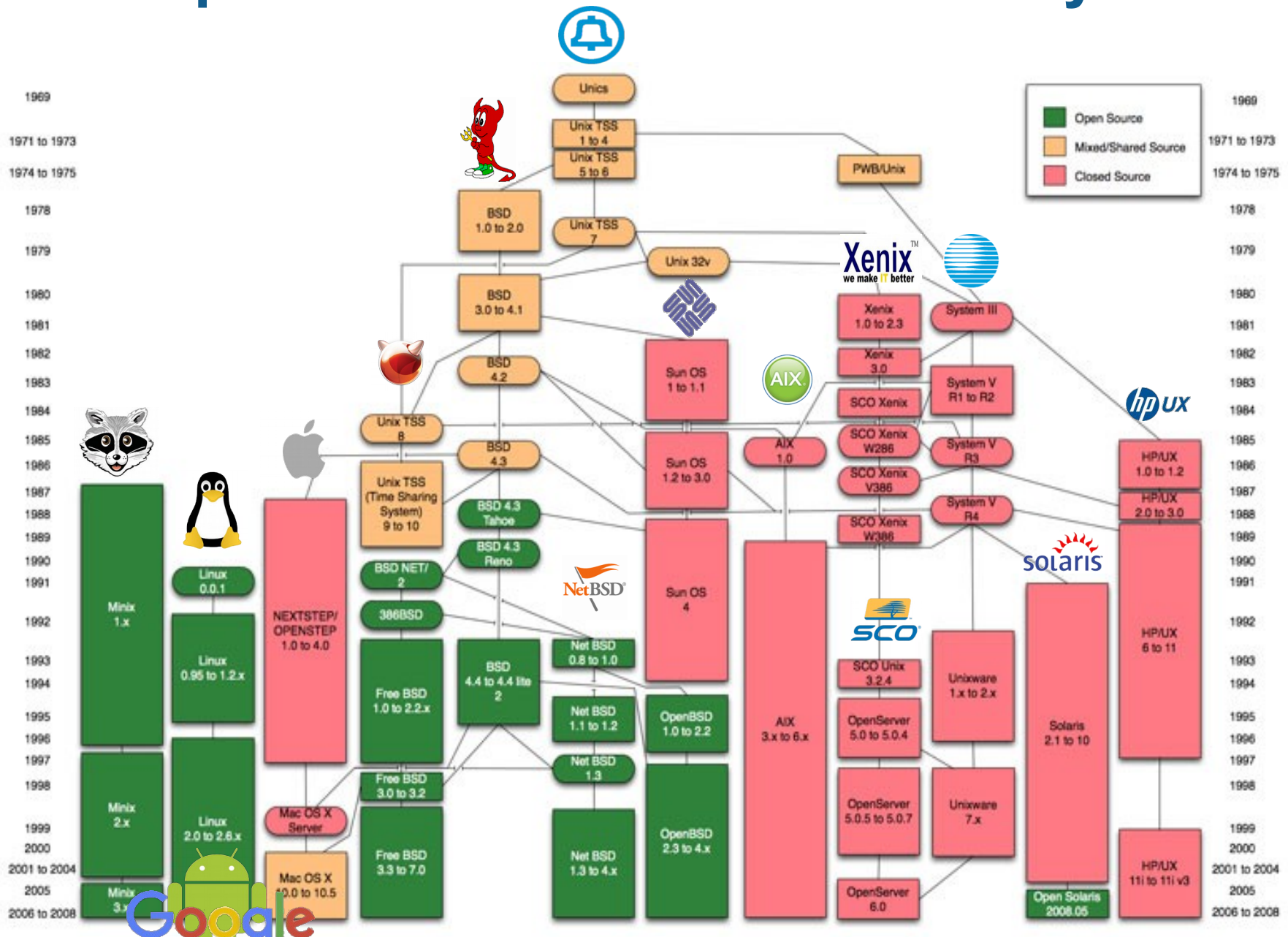
- the **OS**
  - boot, virtual mem management
  - TCP/IP and network services
    - sendmail, bind, Ingres, X11 and graphics cards
  - and basic OS services
    - shell (bash): first scripting language (troff, M4, ML/1)?
    - discovery that there was security problem
- text processing
- C and the programming environment



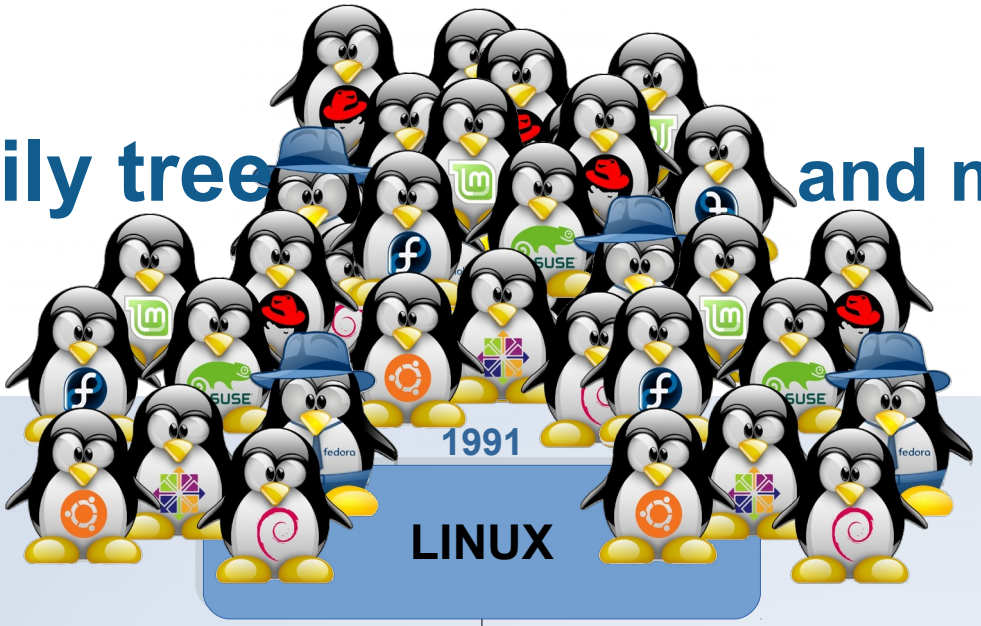
UNIX family tree



the complete UNIX/LINUX/MINIX family tree



LINUX family tree and many more



1993 Debian
2003 Puppy Linux
1995 Enoch
1992 SLS
2002 Crux
1993 Red Hat

2001 linspire
2002 knoppix
2004 ubuntu
2000 gentoo
2005 sabayon
1993 slackware
1997 caldera
2002 arch
2005 mandriva
2004 CentOS
2003 fedora

1992 SUSE

RaspBerry PI 2012
OpenGEU
Linux Mint
ZenWalk
OpenSuse
PCOSLinux

1984 birth time of the user:

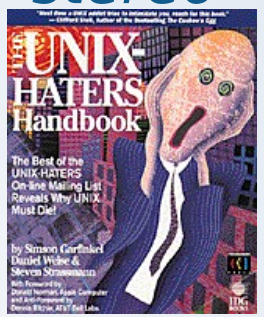
focus on user interface X-Window

Marcus J. Ranum, Digital Equipment Corporation:

"If the designers of X-Window built cars,
there would be no fewer than five steering wheels hidden about the cockpit,
none of which followed the same principles
-- but you'd be able to shift gears with your car stereo --
useful feature, *that."*

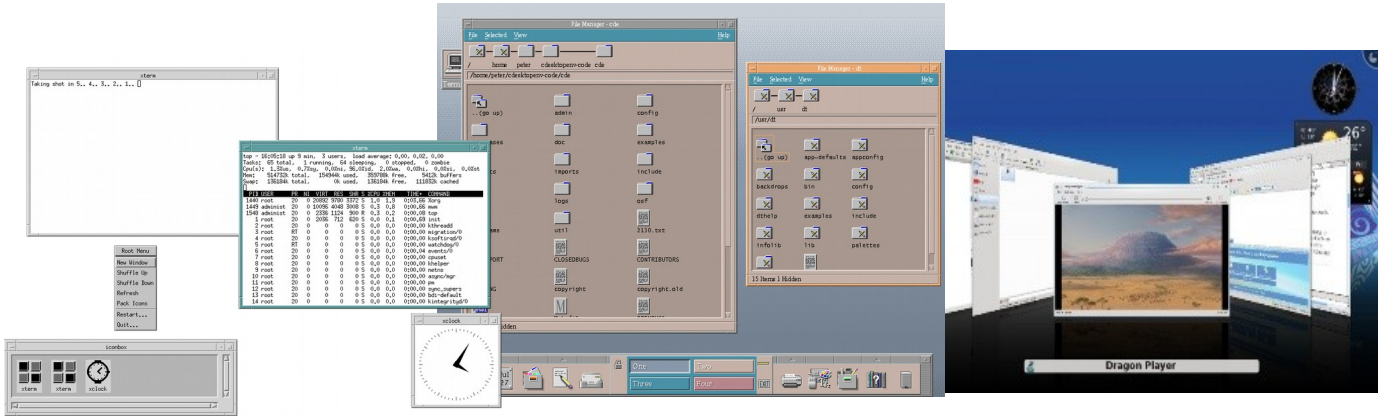
Don Hopkins in *UNIX haters handbook*:

the X-Window disaster:



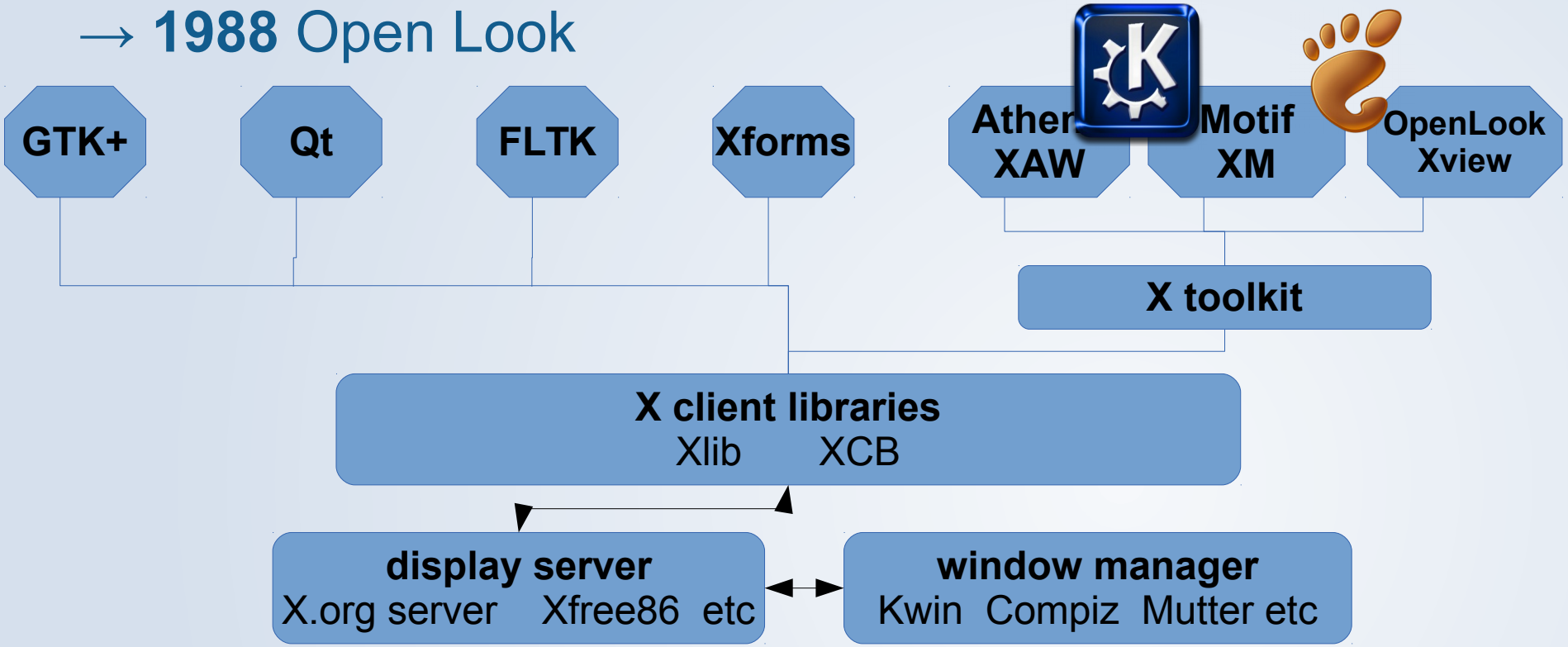
"How to make a 50-MIPS Workstation run like a 4.77 MHz IBM PC"

X-Window



- ***1984***: X1 ***1987***: X11 ***2013***: X11R7.8
- user interface first styling: SUN: NeWS (not open)

  → **1988** Open Look



UNIX services:

from easy (max 5 pages in C) in 1982

to full time job in 2016

- *network (IPv4 forever?)*:
  - e-mail (sendmail, postfix, anti-spam, etc.)
  - domain/hostname service (bind, etc.)
  - telnet/ftp → website (Apache, SSL security)
  - RFS/NFS → cloud eg OwnCloud

- *IPv6 implemented, hardly used*
- *DNSsec implemented, hardly used*
- *X.509 certificates implemented, an organisational disaster*
- *encryption: lucky we are with Bruce, EFF and others*
- *forget your privacy*

SANE

SANE 2002
SANE 2004

NLUUG
UNIX User Group - The Netherlands

NLnet Stichting

USENIX

1st International SANE Conference

SANE '98 - November 18-20, 1998

know your history

Peter Salus at SANE 1998 conference:

“Institutional Alzheimer's Disease

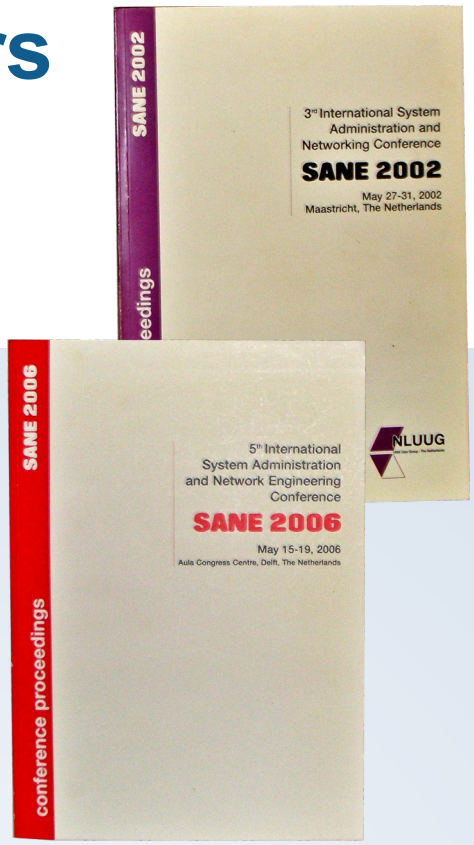
One of the biggest problems confronting us today is, in my opinion loss of memory.
Many contemporaries seem to have no recollection of even the recent past.

Thus, at the end of last July, The New York Times carried a story about a bug in MS's Outlook Email and Outlook 98 as well as Netscape Mail that were susceptible to breakins employing the ``*overflow buffer*."

It is 10 years since Bob Morris loosed the Internet worm.
One would have hoped that **folks in Redmond**, WA, might know about that vulnerability.
Guess not.”

De NLUUG/SANE conference feeders

1985 t/m 2008



- **Jos Alsters** **18 conferences 1990-2006**
- JC van Winkel 12 conferences 1994-2007
- Marten van Gelderen 9 conferences 1986-1994
- Willem de Vries 9 conferences 1989-1998
- Armijn Hemel 7 conferences 2001-2008
- Jack Jansen 7 conferences 1990-2001
- René Pluis 7 conferences 2001-2007
- Edwin Kremer 7 conferences 1996-2006
- more than 3 conferences:

  Emile van Dantzig, Bob Eskes, Fred Donck, **Rudi van Drunen**, Walter Belgers, Henk Hesseling, Melanie Rieback

NLUUG conference themes

- user interfaces
- networking, connectivity, security, IP6, DNS, VoIP
- UNIX, LINUX, MINIX and tooling and X-Window
- standardisation
- system administration, measurements, security
- UNIX in commercial environment
- World Wide Web
- languages and tooling: Java, python, perl
- virtualisation

after SANE Paris → Amsterdam

car accident Sept 30, 2004 06:48

Hans Bakker

McLightje

with:

Edwin Herman

Sebastian Snoeck

car from Rop Gongrijp

back from delivering **Richard Stallman** to Paris

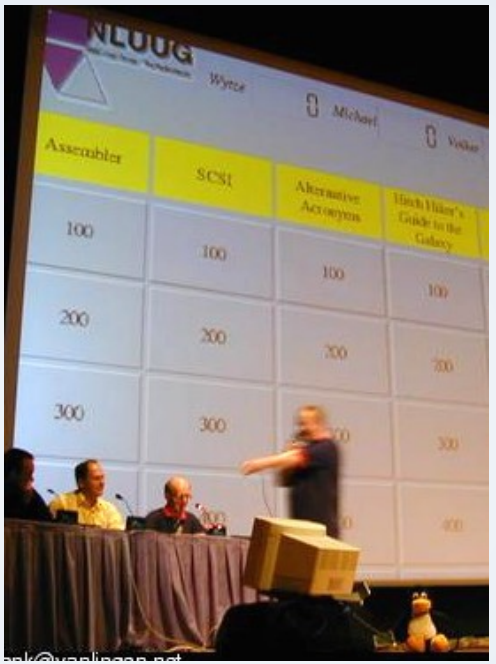
InSANE quiz

replica from LISA game show

- Rob Kolstad & Daniel Klein at LISA US
- Rob Kolstad & Jos Visser at SANE

the friday afternoon

kick out the fun

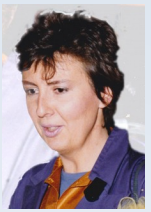


verliefd?

Jan Christian van Winkel “JC”

32 jaar ondersteuning NLUUG

1985 Patricia Otter, Xirion



1991 Mariëlle Klatten

Transmediair, NLUUG, ICONIQ

Monique Rours

2005 interactie

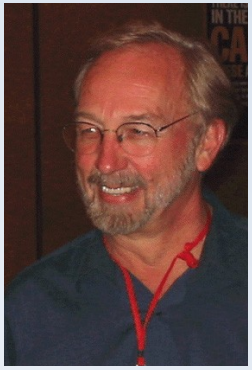
2013 Debbie Reinders

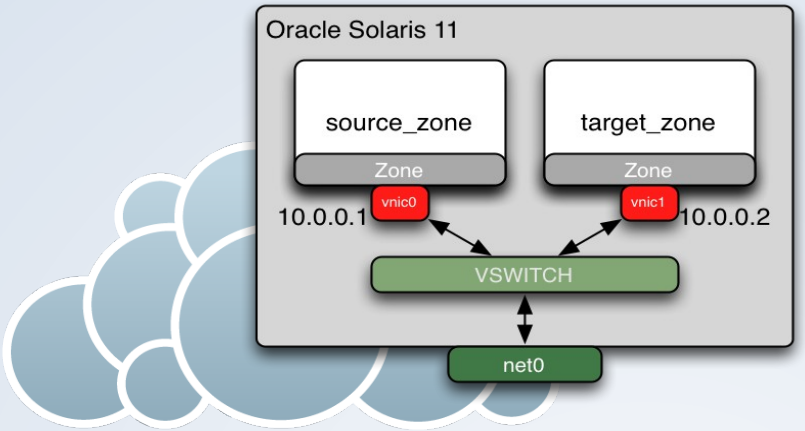
en Mark Overmeer

UNIX services: the How-To forget

security, privacy

John Gage (SUN): "the network is your computer"



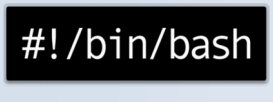


Ken Thompson: "everything is a file"

Dave Presotto/Robert Pike: Plan 9

UNIX services: from easy (5 pages in C) in 1982 to full time job in 2016

- *networking*
- *programming (today everything is scripted?)*:
  - assembler → fortran → B → C/pascal → C++/modula
  - perl exception handling: java and python
  - bash, HTML, java-script, php



- *debugging a script: it's a disaster*
- *objective programming: too complicated*
- *perl: ever debugged a regular expression?*

  Douglas Adams: ^(?=(?!(.)\1)([^\DO:105-93+30])(?-1)(?<!\d(?<=(?![5-90-3])\d))).[^\WHY?]$

UNIX services: from easy (5 pages in C) in 1982 to full time job in 2016

- *networking*
- *programming*
- *databases*: ingres → MySQL SQLite

- *the idea of "everything is a file" is lost?*
- *everything is in the MySQL database nowadays?*

UNIX a major role in encryption

- *governments "do not like"*

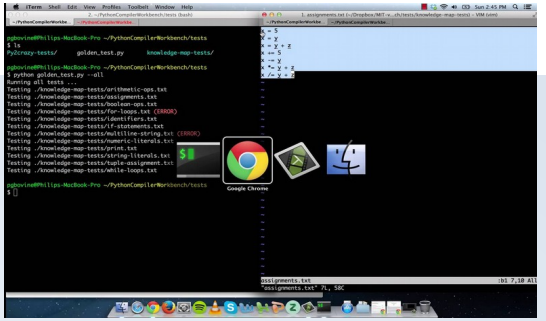
  the UNIX public key mechanisms

- **1991** PGP → 2001 GNU GPG
- **1995** NLUUG ondersteunt "het geval"
- **1998** OpenSSL

CAcert
Free Digital Certificates for Everyone!

UNIX services: from easy (5 pages in C) in 1982

today 2016 it is a full time job



- *networking*
- *programming*
- *databases*
- *workbenches:*
  - document workbench:

    roff → new roff → typeset roff (CAT) → GNU roff → PS

  - programming workbench:

    1972 SCCS (make) → RCS → CSV → GIT

THIS ALL is in the PAST now

the focus nowadays is on *applications*

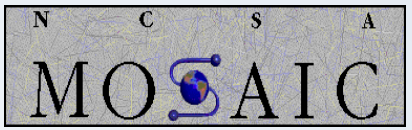
- *Open Source community thank you!*
- *the problem: tower of Babylon*
  - *complexity*
  - *footprint N times OS footprint*
  - *interoperation is almost gone*
- *the issue is not anymore:*
  - *CPU/GPU speed 3GHz*
  - *memory 8GB*
  - *disc space 4TB*
  - *network bandwidth: fiber to the home, still IPv4*
  - *but wifi is still too slow, too local, insecure*

touching World Wide Web

- **1990** World Wide Web

  CERN internet document access service

- browser applications
  - **1992** birth on NeXtStep
  - **1992** voila WWW
  - **1993** Mosaic (NCSA)
  - **1998** Netscape
  - **1999/2002** Mozilla Firefox



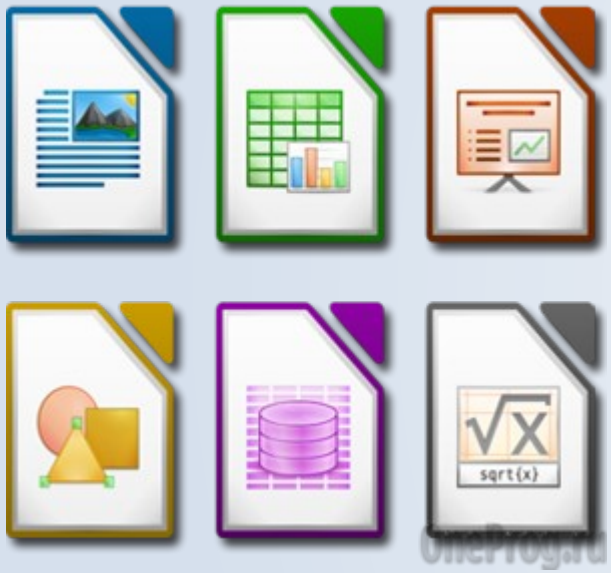
browsers war

- the war is as it was with UNIX
  - *commerce against freedom of use and contribution*
  - *against monopolies*
  - *against control*
  - *standards: theory ↔ pragmatism*
  - *money gives you a saying*

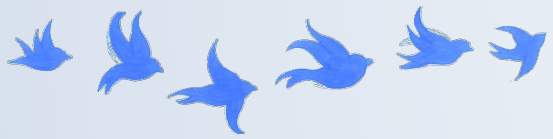
applications I use (only Open Source)

on: iOS, Ubuntu, Debian

- text processing
- interaction
- domotica
- environmental measurements



the UNIX time line

- **1969** Bell giving birth to UNIX
- **1975** UNIX Version 5/6 public
- **1980** Xenix commercial
- **1981** BSD UNIX Open Source / SUN commerce
- **1982** UNIX System commercial
- **1987** Minix and X11
- **1991** Linux
- **1990** WWW
- **2010**  **2015 Internet of Things**
- **2019** after 50 year: only the history is left and privacy gone?

the NLUUG time line

40 board members from 1982 - 2017

		begin	eind			begin	eind			begin	eind
Marten van Gelderen	v	1982	1995	**Jos Alsters**		1993	2005	**Klaas van Gend**	p	2006	2011
Teus Hagen	v	1982	~1985	Leo Willems		1993	1996	Adriaan de Groot		2007	2011
Theo de Ridder	p	1982	~1985	Ted Lindgreen		1993	1995	Armijn Hemel		2007	2010
Andrew Tanenbaum		1982	1984	**Willem de Vries**	s	1993	2000	Melanie Rieback		2006	2010
H. Jan Thomassen	s	1982	~1986	**J.C. van Winkel**	v	1995	2006	**Mark Overmeer**	s	2008	2012
Gerrit Smit		1984	1989	Nico Caarts		1995	1997	**Luc Nieland**	v,p	2009	2017
Francis Brazier	s	1985	1995	Neltsje v. Nieuwpoort		1996	1997	Jos Jansen		2010	2010
Wytze van der Raay	p	~1985	1991	**Edwin Kremer**		1996	2004	Patrick Reijnen	v	2010	-
Hans Linschoten		1986	1989	**Bob Eskes**		1997	2005	**Rudi van Drunen**		2010	2016
Emile van Dantzig	p	1989	1995	Bart Muyzer		1998	2002	**Marcel Nijenhof**		2011	2016
Peter Geers		1989	~1990	Jos Visser		1998	2000	**Pieter-Paul Spiertz**		2011	2017
Guido v. Rossum		~1990	~1990	Fred Donck		2000	2006	Victor Langeveld		2014	2014
Henk Hesselink		~1991	1993	**René Pluis**	v	2001	2009	Mark Janssen	p	2016	-
Jack Jansen	p	1992	2005	Bram Moolenaar	p	2002	2006	Michael Boelen	s	2016	-
Chel van Gennip	p	1993	1999	**Walter Belgers**	v	2003	2010	**YOU ?**		2018	?

NLUUG AWARDS

Piet Beertema (Internet pioneer)

Wietse Venema (Satan/Postfix, 2000)

Guido van Rossum (Python, 2003)

Bram Moolenaar (VIM, 2008)

Andrew Tanenbaum (Minix, 2009)

Wytze van der Raay,

Teus Hagen (2010)

Olaf Kolkman (Internet, 2015)

NLUUG surviving her children

the love affairs:

- 1982 European Unix Users Group

pan European Unix Network 1998

EUUG/EurOpen nov 1992 OpenForum Jaarbeurs Utrecht

- 1985 Mathematical Center

(CWI)

Unix network (provider) the Netherlands 1997

- 1998 NLnet & Unix USERS USA

System Administration and Network Engineering 2006

NLUUG sponsors in the past up to (s)now

- conference booth or table
- service/support, contribution, booth+
  1) Xirion
  2) Transmediair
  3) AT Computing
  4) TUNiX
  5) Schuberg Philis
  6) Snow

NLUUG sponsors past up to (s)now

AT Computing	InproveIT	Red Dolphin	Stone-IT
Competa	LISIT	Redhat	Sun
ContextShift	LWN	Reduxio	SURF SARA
CVIS	Madison Gurkha	RHODIX	SUSE
DATAMAN	Netco	Rhodix Redhat	UniXerius
Google	Netgear	Roodveldt	Transmediair
hp VX	ORACLE	Schuberg Philis	TUNIX
Infoblox	PEARSON	Secure Link	Zarafa
Innosys Infra	proxy::	snow	Xirion

what is keeping me busy?

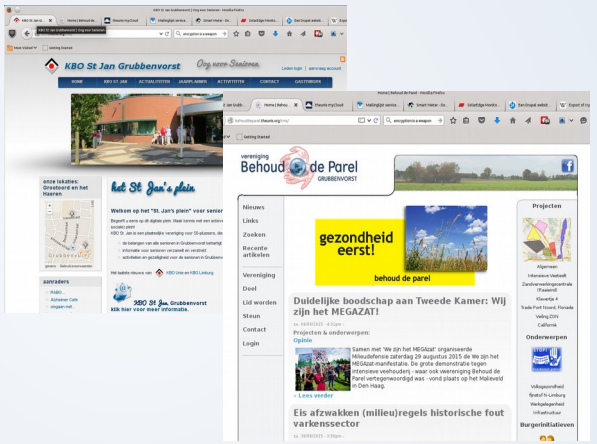
- internet security and privacy
- local environment:

  gasses, noise and particulate matters

  environmental measurements (MySense)
- digitizing local society:

  local websites,

  email lists, OwnCloud



my thanks goes to,

just to name a very few

Rick Adams
* Eric Allman
* Piet Beertema
* Jaap Akkerhuis
* Keith Bostic
Stephen Bourne
Vinton Cerf
* Peter Collinson
* Sunil Das
* Tom Duff
Robert Elz
Mel Ferenz
Dan Forsyth
John Gilmore
* Jim van Keulen
* Bill ...
* Bram Moolenaar

James Gosling
* Ed Gould
* Peter Honeyman
Joseph Ossanna
* Rob Pike
Phil Plauger
David Pressotto
Rick Rashid
* Brian Redman
* Dennis Ritchie
* Greg Rose
Debbie Scherrer
Chantal Spafford
Henry Spencer
* Guido van Rossum
* David Rosenthal
Daniel Klein

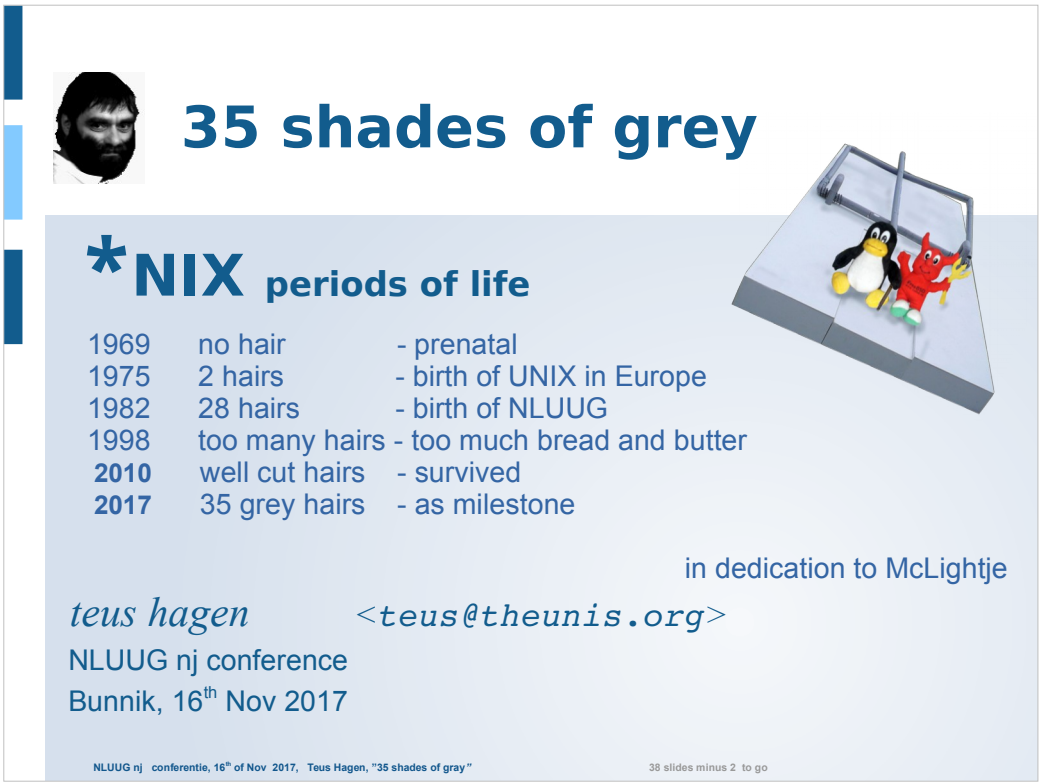
* Richard Stallman
Armando Stettner
* Andy Tanenbaum
* H. J. Thomassen
Ken Thompson
* David Tilbrook
Mike Tilson
* Linus Torvalds
Larry Wall
Peter Weinberger
* Phil Zimmermann
Bruce Schneier
Bill Joy
* Johan Stephenson
* Ellie Young
* Evi Nemeth

* Simon Kenyon
* Jim McKie
* Rob Kolstad
* Nigel Martin
* Sam Leffler
John Lions
Lou Katz
* Rob Kolstad
Mike Lesk
Rob Kridle
* Kirk McKusick
Alan Nemeth
* Mike O'Dell
* David Rosenthal
* Strack Zimmerman
* Wietze Venema
* Jon Hall - maddog

* Paul Klint
George Farber
Carl Malamud
* Sape Mullender
Donnelyn Kaey
* Neil Todd
* Marc Nyssen
* Peter Salus
* Michel Gien
* Glenn Kowack
* Keld Simonson
Werner Koch
MC / CWI
NLUUG / USENIX
EUnet / NLnet
EUUG / EurOpen

Gerrit°, Wytze°, Marten°, Ted°, Frances°, Willem°, Emile, Henk, Jos, Jos, Jos, Jack°, Gert, Rolf, Jim, Leo, JC°, Chel°, Mark°, Edwin°, Elizabeth, Marelle°, Chantal, Fred°, Jeroen, Armijn, Rene°, Steven, Rudi°, Brad, Hans, Ivana, Melanie, Paul, Frans, Jan, Diana, Bob°, Nellie, Eric, Nico, Gratien, Eugene, Theo°, Peter, Victor, Erik, Brad, Johan, Pieter-Paul, Luc°, Kendrick, Marc, Walter°, Michael, Raymond, Marcel, Mike, Jeroen, Bart, Patricia°, Piet°, Marcel, Monique°, Pieter°, HendrikJan°, Jaap, ... Rommy

Marielle, Chantal, Ellie, Monique, Bob, Mark, …, Debbie



Hoge ups en lage downs
Grove indeling van karakteristieke perioden

Van research, naar development
naar engineering
naar technologie verkenning naar applicatie
-
Met dank aan input van:
JC van Winkel, Wytze van der Raay
Mark Overmeer, Jos Vos
Marielle Klatten en Patricia Otter
-
Foto materiaal en logo's zoveel mogelijk uit die tijd
-
Excuses als ik iemand vergeten ben te noemen

Verbeteringen en correcties graag
-
Geen geschiedschrijving, niet de periode na 2013 (iedereen kent die)
Met Mark Overmeer als drijvende kracht naar ind. lidmaatschap
-
Presentatie opgedragen aan MacLichtje

giving birth as UNICS

Bell Laboratories

- **1969** AT&T Bell Laboratories
  - frustration Multics development
    the participation stop
  - unused DEC PDP-7

- **1971** UNIX V1 Nov 3 PDP-11/20 as, fork(), roff
  - text processing, device driver for printing text
- **1973** rewrite in C: intro ***portability***
  - UNIX edition V4

NLUUG nj conferentie, 16th of Nov 2017, Teus Hagen, "35 shades of gray" 38 slides minus 3 to go

AT&T was een telefoon provider met comp aspiraties

-

Flatgebouw in New Yersey

Krapoos op de gang

-

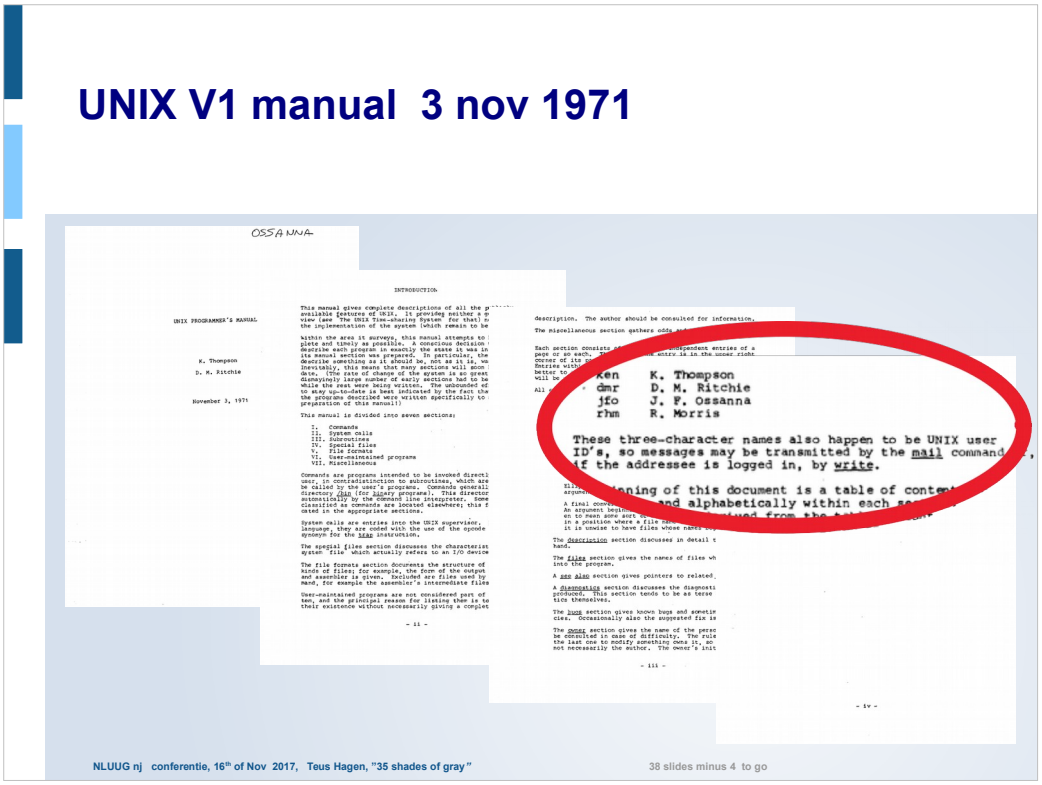
Begon met jonge duo uit gefrustreerdheid Multics

Ken Thomson & Dennis Ritchie

=

UNIX V1 manual (Ossanna) staat online

uit de home dir van Dennis



Joe Ossanna – overleden in 1977

Opvallend:
3 letter initialen als gebruiker
=
Write → chat
Mail → e-mail
-
Pas met U V5 inter machine communicatie
File transport via UUCP

=

Met V7 ontdekte AT&T een mogelijke US$ melkkoe

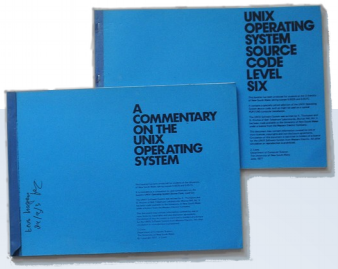
kregen groene oogjes (dollar tekens)

-

Vergelijking met Philips lampen → telefoon boer met computer fabrikant

University New South Wales / Wollongong

dept computer science




```
/*
        * If the new process paused because it was
        * swapped out, set the stack level to the last call
        * to savu(u_ssav).  This means that the return
        * which is executed immediately after the call to aretu
        * actually returns from the last routine which did
        * the savu.
        *
        * You are not expected to understand this.
        */
       if(rp->p_flag&SSWAP) {
               rp->p_flag =& ~SSWAP;
               aretu(u.u_ssav);
       }
```

- May 1976 John Lions started his UNIX V6 lectures
- Mar 1977 publication of comments & source
- 1977 Wollongong University first UNIX port to Interdata 7/32
- June 1979 AT&T withdraw permission
- 1996 book was freely released

Uitvinder van open source Lions
(naast tapes met fortran programma's)
-
John Lions eerste Open Source confrontatie met AT&T lawyers
Lou Katz met V7 bugs tape
-
De strijd om Open Source en UNIX was begonnen
Studenten die copieerden en verspreiding deden: geest was uit de fles
-
Eerste OS port naar Interdata 7/32
-
Beslecht in ca 1996 (patent worsteling) vooral door efforts
vanuit Berkeley University California
met BSD

giving the UNIX birth in Europe

- **1975 Math. Center** (later CWI) in Amsterdam
  - DEC PDP-11/45: 2 RK05 (2.5 MB), DEC tape,
  - RSX 11-M frustration, ACM UNIX article: UNIX V5
  - 110 baud modems (later 300 baud and 1200 baud FD)
  - DECwriter 30 chars/second
  - Bourne sh(ell), real hackers do it with ed
- university/education license agreement (100 dollar)
- used the UNIX V7 bug tape from Lou Katz
- the lawyers struggled with setuid/setgid patent

Frustratie tav assembler van DEC

-

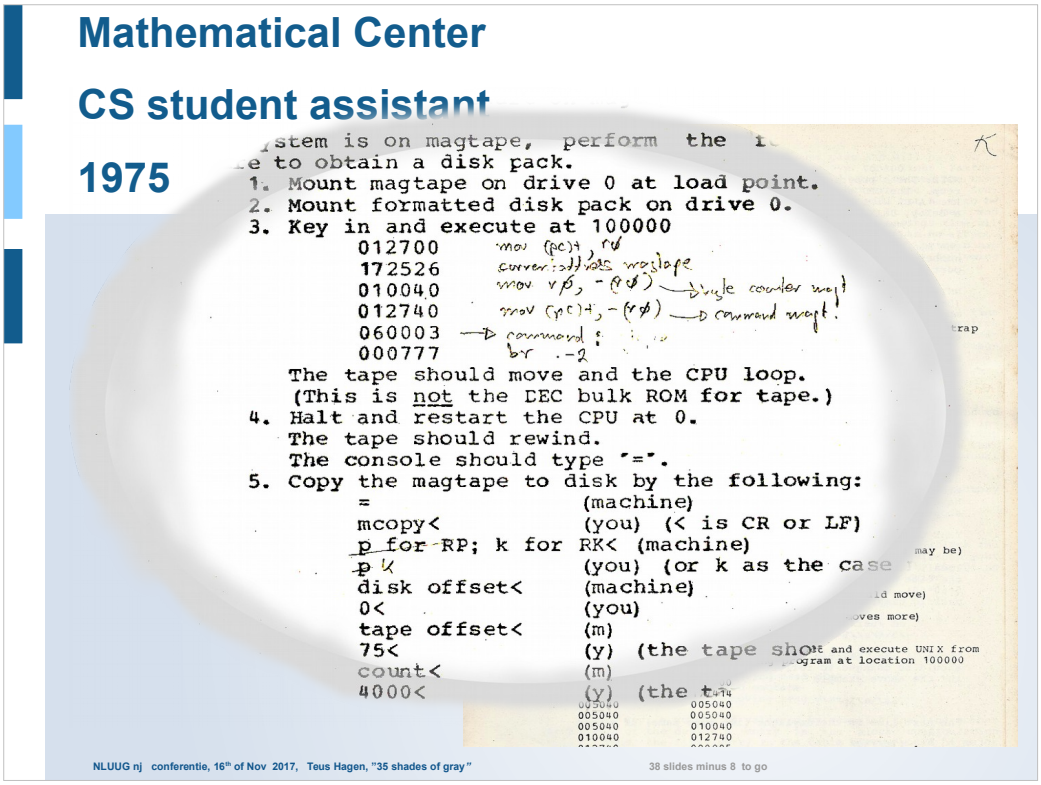
10 characters per seconde

UNIX V5 on RK05 disk, no license needed!

-

Test tav kennis vroeger:

Wie weet wat STICKY BIT is?



Installatie manual van UNIX van tape naar disk

=

Let op de K Ken Thompson

-

Initialen gedoe doorgedrongen in email adressen ...

Wie weet deze?

DMR - Dennis Ritchie

AST - Andy Tanenbaum

PC - Peter Collinson

HJT - Hendrik Jan Thomassen

JC - Jan Christiaan van Winkel

my UNIX puberty time

- **1981** CWI (MC)
  - add RM03 (67 MB drive), tape drive, serial switch
  - VAX 11/780 (32 bits)

    frustrated about the DEC OS: UNIX V32 → 4.1 BSD
  - started EUUG / EUnet / NLnet
- worked with University Berkeley, computer science group

  Bill Joy (later SUN) (vi,VM), Kirk McKusick (csh,filesystem), Eric Allman (email,DB), Sam Leffler (tcp/ip), Mike Karels (DB), Keith Bostic, etc.

  funded by DARPA: TCP/IP.

  thank you Armando Stettner (DEC)

Interdata werd het bijna
VAX 11/780 serie nr 32

LAN: een dikke coax kabel TCP/IP gebaseerde LAN

Collision detect basis: vergelijkbaar met slotted ring (UK driven)

Nu weer Aloha?
Internet of Things met op Aloha gebaseerde technologie uit het Hawaii internet tijdperk?

Digital Equipment interest PDP11 groups serie DECUS

-

Initiatieven van een afscheidingsbeweging in de UK

Vanwege UNIX controverse met RSX11 en RT11

=

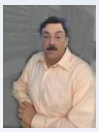
Meeting CWI was in weze het UNIX startschot

omdat Ken en Dennis er spraken.

MC machinery evolution

birth of MCvax.uucp

- PDP-11/45 → VAX 11/780
  - from segmentation to paging
  - unibus → massbus
  - RM03: 67 MB, 55K US$
  - Kennedy tape 125ips, 800/1600, 45K US$
  - autodialer + 1200 baud modem: 2.5K US$
  - cheapest VAX11/750 340K US$



CWI got snr 0032 with RSX11 (written in assembler)

first UNIX 32V AT&T, later BSD4.1 (thank you Armando, Bill)

- **1982** SUN 1 (Motorola 68020) BSD 4.2: MCsun

Armando Stettner (DEC westkust DEC UNIX fanaat)
En Bill Joy (paging programmatuur ipv UNIXV32 soort segmentatie)
SUN ook weer Bill Joy
-
Port naar Motorola 68020 en later RISK architectuur
en UNIX strijd met Intel CPU architectuur
=
SUN met argument graphics research
OK van koninklijke KMC
Kantoor en Machine Centrale in den Haag

two programs, many (>50) *NIX systems

test Usenix/Uniforum conference Dec 1982

- Dec **1982**:
  - CPU DEC, Motorola 680X0, Z8000, Intel 80X86 at **8-12 MHz**
    - VAX 780: 6-8 secs (€ 340 K + airco)
    - Apple Lisa: 22-25 secs (€ 10 K + fan)
    - Intel Altos: 13-27 secs (+ fan)
    - Amdahl: 0.5 secs (++ airco)

- 35 years later, Nov **2017**:
  - Intel Core i5, **3.30GHz**: 0.001-0.003 secs (€ 500)
  - Rasp Pi Zero W, **1 GHz**, ARM V6 BCM2835:

    0.01-0.02 secs (€ 10.- + SD card + USB adapter)

“Figures do'nt lie, but liars figure”

-

Test in reactie op computer beursen in 1983

1.000.000 optellingen (register) short, int en long

door Andy Tanenbaum, Teus Hagen en later Rob Pike.

-

Met Rob: bc command: geen bc dan geen UNIX

De BC controverse: wetenschap en sales/gebruikers

=

We are no liars, so we just use shell scripts, perl and python

-

Zelfde programmaatje Python: 100 keer trager, echt waar

EUUG conferences

EUUG
European UNIX® systems User Group

1981 April	**CWI, Amsterdam, The Netherlands**
1981 September	Nottingham University, UK
1982 September	University of Leeds, UK (Otis Wilson)
1982 April	CNAM, Paris, France (EUnet announcement)
1982 September	University of Leeds, UK
1983 April	Wissenschaft Zentrum, Bonn, Germany
1983 September	Trinity College, Dublin, Ireland
1984 April	**University of Nijmegen, Nld** (Brian Kernighan)
1984 September	Cambridge University, UK (Lions)
1985 April	Palais de Congres, Paris, France (Daniel Karrenberg)
1985 September	Bella Conference Center, Copenhagen, Denmark

Trinity College Ierland anecdote:
Helen Gibbons (liason kon. Familie UK):
zorgde voor minister van onderwijs, stijf in het pak voor opening conf
Dronken de **voorraad port** weg uit de professorale eetzaal

-

p&P6 boot prompt van Unix op PDP11

-

Otis Wilson AT&T conf 1982 Leeds:
UNIX V32 com.license 40K US$ + 10% royalty
(fl 3.65 → **65K euro**)
University license 400 US$
1202 installations: UNIX V7, **total 3797**

-

April 1985: Jean Wood dec;
Full afternoon discussion about "**nice legs**" of Jim McKie
No, my legs are written in a functional programming language

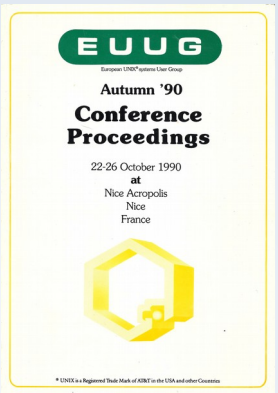
-

Thema's: netwerk LAN en WAN, OS, tekstverwerking, talen en implementaties, licensing issues

EUUG conferenties + exhibits

1986 April	Centro Congressie, Florence, Italy
1986 September	UMIST, Manchester, UK
1987 May	**sailing Helsinki/Stockholm**
1987 September	**Trinity College, Dublin Ireland**
1988 April	Queen Elisabeth, London, UK
1988 October	Hotel Estoril-Sol, Cascais, Portugal
1989 April	Palais des Congres, Brussels, Belgium
1989 September	Wirtschaftuniversität, Vienna, Austria
1990 April	Sheraton Hotel, Munich, Germany
1990 October	Nice Acropolis, Nice, France
1991 May	1e EurOpen, Kulturhuset, Tromso, Norway
1991 September	EurOpen, Budapest, Hongary

...



Het vaarwel VAX/Interdata/Amdahl naar 80n86 Intel, Zilog en Motorola CPU's

-

Thema's: OS, linux, minix, scripting talen, netwerken, source control, workbench, programming, system admin, desktops, X-windows, graphics

-

ISPs problematiek: teveel **login accounts**

-

16 → 32 bit → 64 bits problematiek

Single processing CPU's

VAX had parallelismeen micro programmering

maar nooit gebruikt

-

Swiss army knive (hint naar UNIX tooling): steeds maar dikker mes

voor key note: David Tilbrook en anderen

first: Andy Tanenbaum with Minix,
only then: Linus Torvalds with Linux

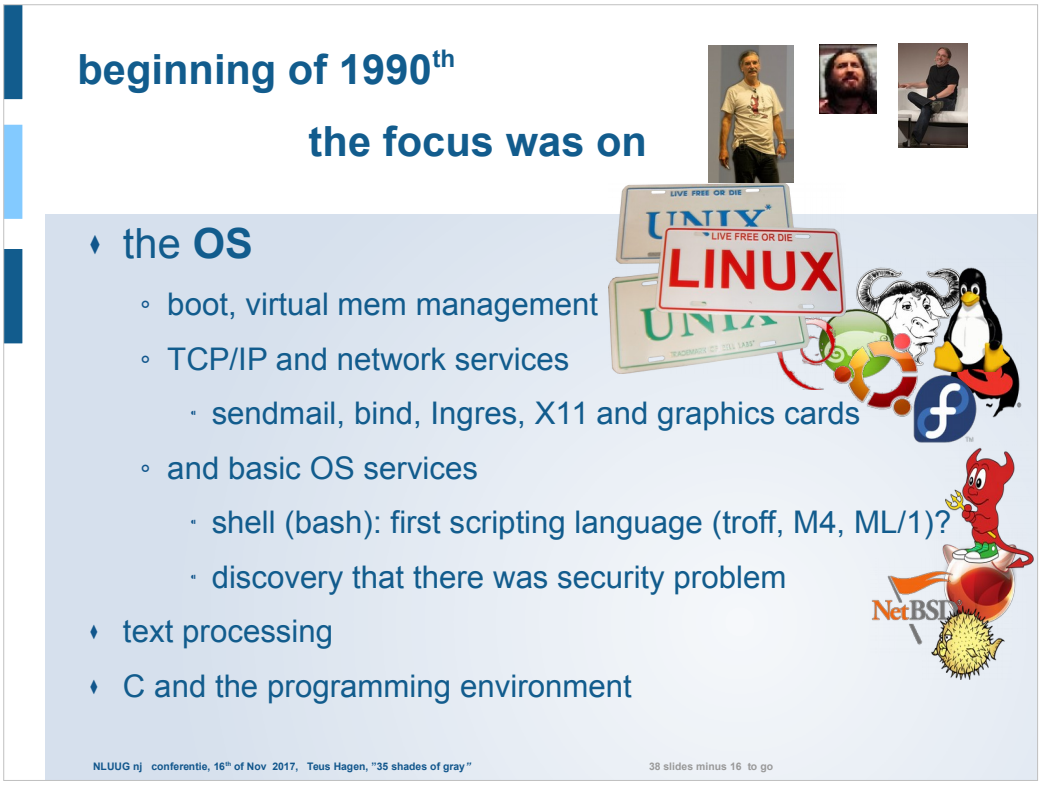
- **1987 MINIX** as CS OS student training
  - it nearly escaped a disaster: system call problem
- **1991 Linux** as terminal server

  - it nearly escaped some disasters:
  - *all was good, but a bad first tcp/ip implementation*

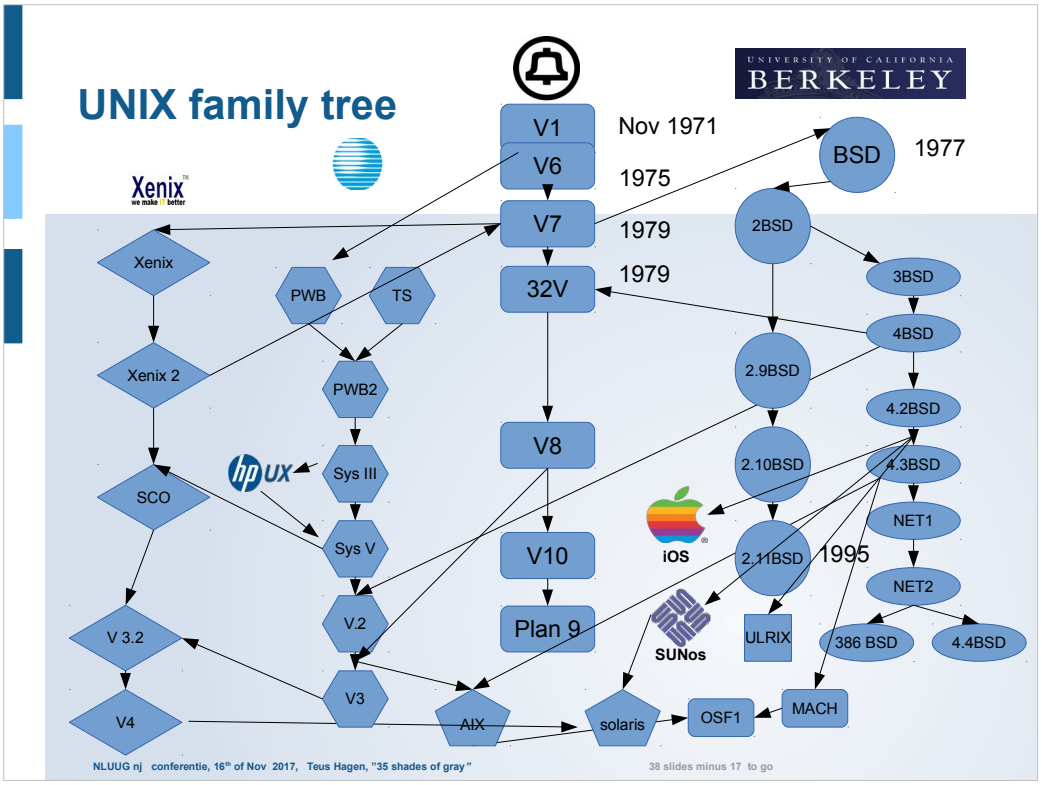
Open Source changed the OS computer world

- *it is **free** but not a free beer*
- *everybody can contribute, so it **grows ...***

Andy: aanvankelijk geen UNIX, Amoeba
Echte CS prof: os voor studenten: pas na “stage” bij Labs Minix
=
Linus Trevolts: frustratie tav terminal acces problematiek
-
onduidelijk waarom hij geen Minix had genomen?
=
Doel de grootste, en het dijt maar uit



Probleem was:
OS en drivers
Talen: van Fortran naar C, tov Algol 60/68, Pascal, Modula
-
Tekst processing:
Artikelen zijn wetenschappelijker als ze
gepubliceerd zijn niet met een kettingprinter
maar getypeset
-
Andy boek OS principles geschreven dus via Bell Labs
Math. Centrum: wiskundige formules via typesetting
ipv IBM bolletjes typemachine
=
Kirk McKusick/Bill Joy, Eric, Keith, John, Michel ao
Richard Stallman
Linus Torvalts



1979 toen was alles nog heel gewoon: te bevatten en simpel

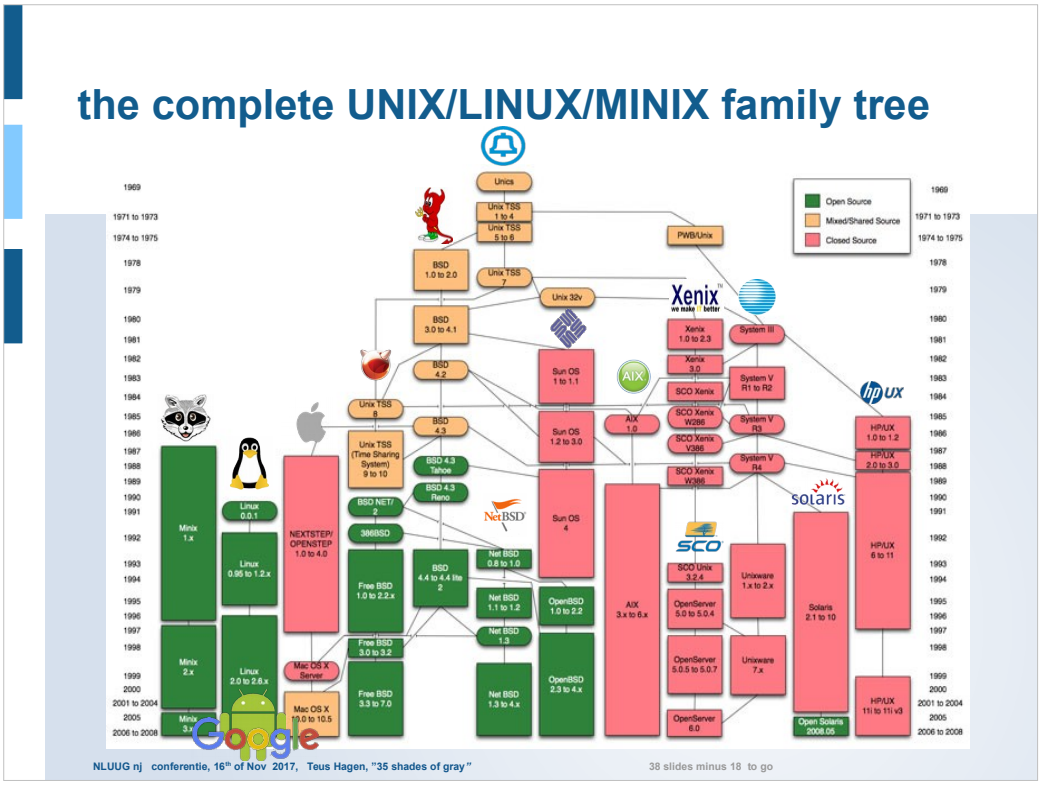
Alles is een file plan 9

=

BSD boom alles open source

=

Links de commercie het Trump gedeelte



De toren van Babel

-

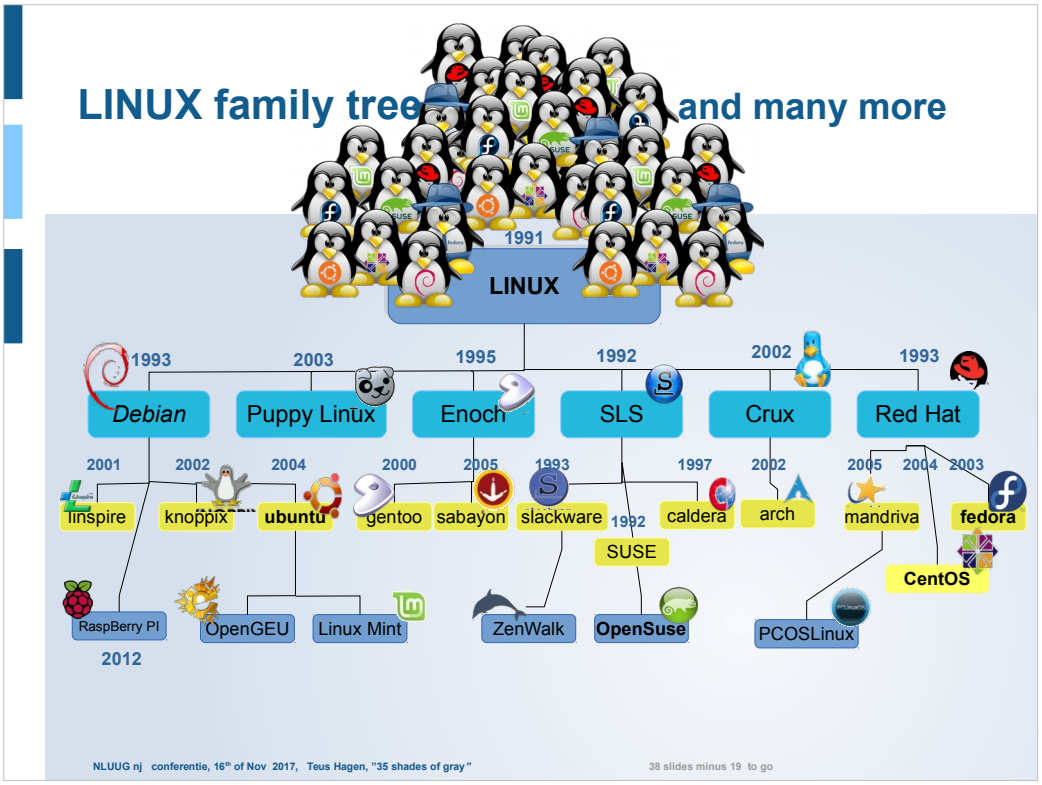
De commercie slaat toe

-

De fun is over

-

Google en Cisco rule the world of today?



1992 SLS - Peter MacDonald

1993 Red Hat - Marc Ewing (zoekt rode pet)

1993 **Debian** - Ian Murdock

-

2000 Enoch (Noach) - Daniel Robbins

2002 Crux – Per Lidén

2003 Puppy – Barry Kauler

-

en het splitst maar af, ieder zijn eigen linux

=

De boom met eigen families

1984 birth time of the user:

focus on user interface X-Window

Marcus J. Ranum, Digital Equipment Corporation:

"If the designers of X-Window built cars,
there would be no fewer than five steering wheels hidden about the cockpit,
none of which followed the same principles
-- but you'd be able to shift gears with your car stereo --
useful feature, *that."*

Don Hopkins in *UNIX haters handbook*:

the X-Window disaster:

"How to make a 50-MIPS Workstation run like a 4.77 MHz IBM PC"

Anecdotes:

Dennis Ritchie: 10 jaar Usenix, Portland, fireworks Oregon: student legt stickybuit uit aan Dennis

-

Ken Thompson bracht zo min mogelijk "lawaai" in UNIX

Ken vond zijn auto teveel signalen geven, het links/rechts signaal was al teveel..

Bij de auto van Dennis geroepen omdat er iets vreemds was: rode lampje brandde

-

Alles gromde en bromde naar behoren

-

Ken draaide het lampje er uit:

probleem opgelost

=

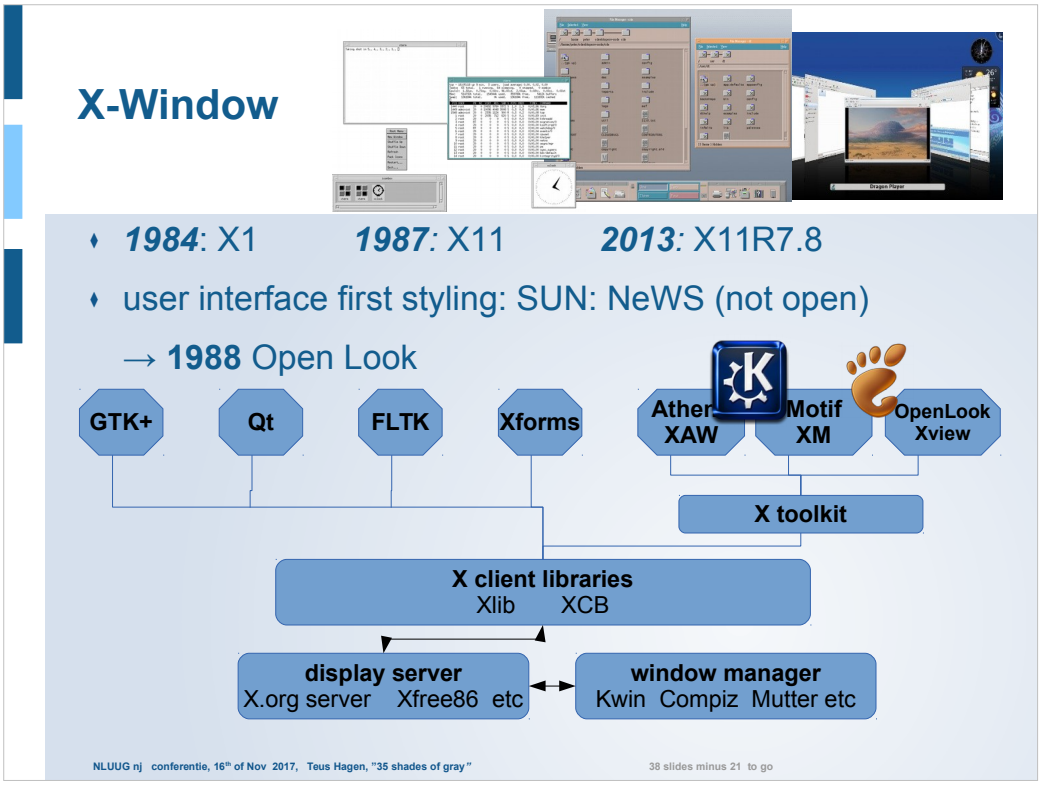
Minimaal 5 stuurwielen ergens verstopt

Geen stuurwiel is hetzelfde

Maar wel: radio knop om versnelling te sturen, aardige feature zo iets

=

Hopkins: hoe breng ik een 50 MIPS werkstation op zijn knieen.



X als tegenhanger van W (Windows)

Komt van MIT af

UNIX services:

from easy (max 5 pages in C) in 1982

to full time job in 2016

- *network (IPv4 forever?)*:
  - e-mail (sendmail, postfix, anti-spam, etc.)
  - domain/hostname service (bind, etc.)
  - telnet/ftp → website (Apache, SSL security)
  - RFS/NFS → cloud eg OwnCloud

- *IPv6 implemented, hardly used*
- *DNSsec implemented, hardly used*
- *X.509 certificates implemented, an organisational disaster*
- *encryption: lucky we are with Bruce, EFF and others*
- *forget your privacy*

Ontwikkeling van services ipv algorithmen

Geef het je te doen elke twee jaar weer een programma in elkaar zetten

Aspiraties naar wetenschappelijke erkenning van de proceedings

=

Peter Honeyman (honey van honydanbar uucp) van Usenix.

Altijd **vooraan bij USENIX om naar wietland Amsterdam te vertrekken**

=

Vier pluimen:

Jos Alsters: admin programmatuur en proceedings (LaTex) progs: LaSys CaSys

Edwin (aanwezig) Kremer: teveel tijd in programma cmtee gestoken.

Bob Eskes

Wytze financien

-

Driemaal in MECC Maastricht, daarna in RAI Amsterdam en bij TU Delft

-

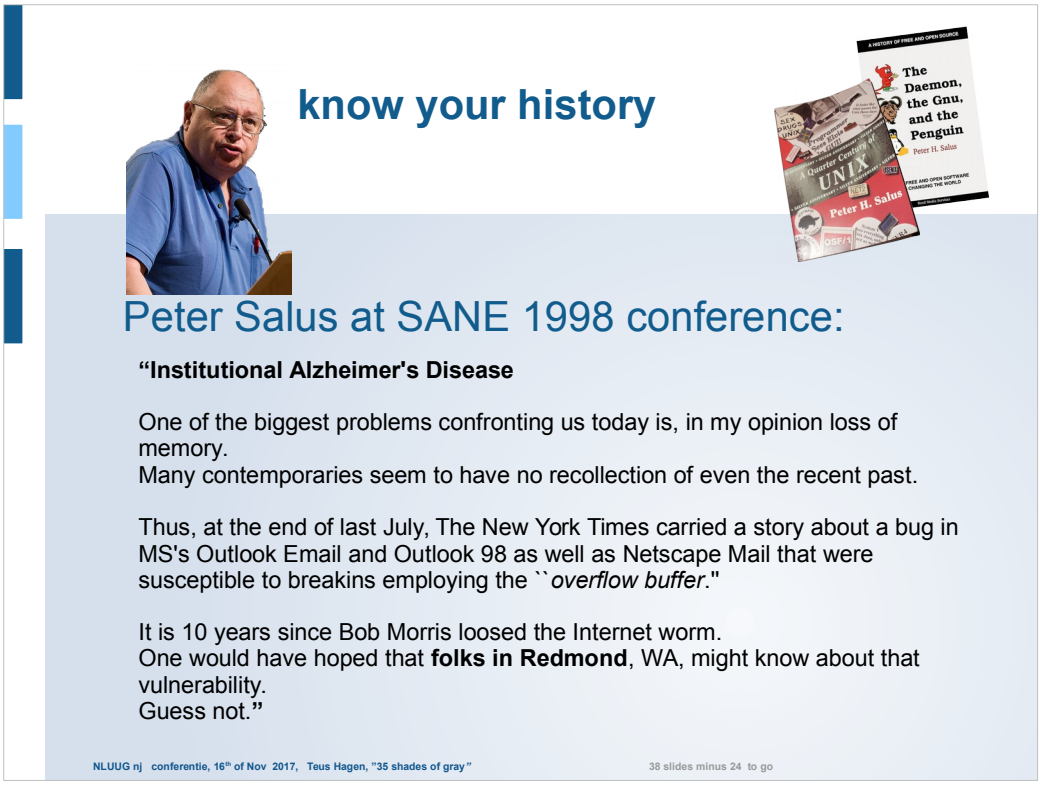
Volgens Wytze is dit een foto van de complete programmacommissie voor SANE 2004 + ICONIQ (Mariëlle Klatten & Sabina Beek)

PC:Walter Belgers (chair), Jos Alsters (tutotial coordinator),

Bastiaan Bakker, Fred Donck, Rudi van Drunen,

Peter Honeyman, Xander Jansen, Edwin Kremer,

Brenda Lagendijk, Tobias Oetiker, Alexios Zavras



De geschiedschrijver en roddelpers van alles wat met UNIX te maken heeft

De reviewer van alle gebeurtenissen

Scherp in zijn analyses

Was overal bij

-

Buffer overflow

Afzetten tegen Windows

-

Ted Lindgreen: windhoos

Conferenties hadden dagen met tutorials

-

Om de twee jaar SANE met eigen aspiraties

Omzet te groot voor NLUUG en risico indekking organisatie

2002 **475** bezoekers, 2004 **650**, 2006 **252** bezoekers

NLUUG ca **250** bezoekers per conf.

Dreigende splitsing (deja vu tav Stichting NLnet)

Op tijd gestopt

-

Let op logo NLUUG

-

Uniforum/Usenix probleem naar Europa, EurOpen teloorgang aan commerciele aspiraties

Mid 90'er jaren IT dip

2008: de dip niet alleen in IT

SANE bezoekers uit 25 landen:

Australia, Oostenrijk, Denemarken, Finland, Duitsland, Spanje, Griekenland, India, Ierland, TjechoSolwakije, Canada, Italie, Japan, Malysie, Mongolia, Noorwegen, Korea, Schotland, Slovenia, Zweden, Switzerland, Oeganda, Ukraine, UK, USA,

SANE 1998, 2000, 2002 MECC,
2004 RAI Amsterdam
2006 aula congress hall Delft
2010 opgeheven restand naar BSDcon en NLUUG
-
1998 230K turnover guldens, 14K resultaat
2002 260K turnover, 25K resultaat
2006 200K turnover, 15K resultaat
-
Hulp via achterstallige lening van NLUUG en NLnet

after SANE Paris → Amsterdam

car accident Sept 30, 2004 06:48

with:

Edwin Herman

Sebastian Snoeck

car from Rop Gongrijp

back from delivering **Richard Stallman** to Paris

Hans Bakker

McLightje

Auto geleend van Rop Gongrijp, mistig, vrachtwagen
Overnachting bij Rop: Richard Stallman
RMS moest zonodig toch nog naar Parijs

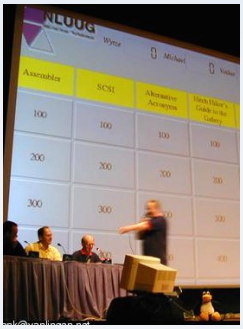
InSANE quiz

replica from LISA game show

- Rob Kolstad & Daniel Klein at LISA US
- Rob Kolstad & Jos Visser at SANE

the friday afternoon

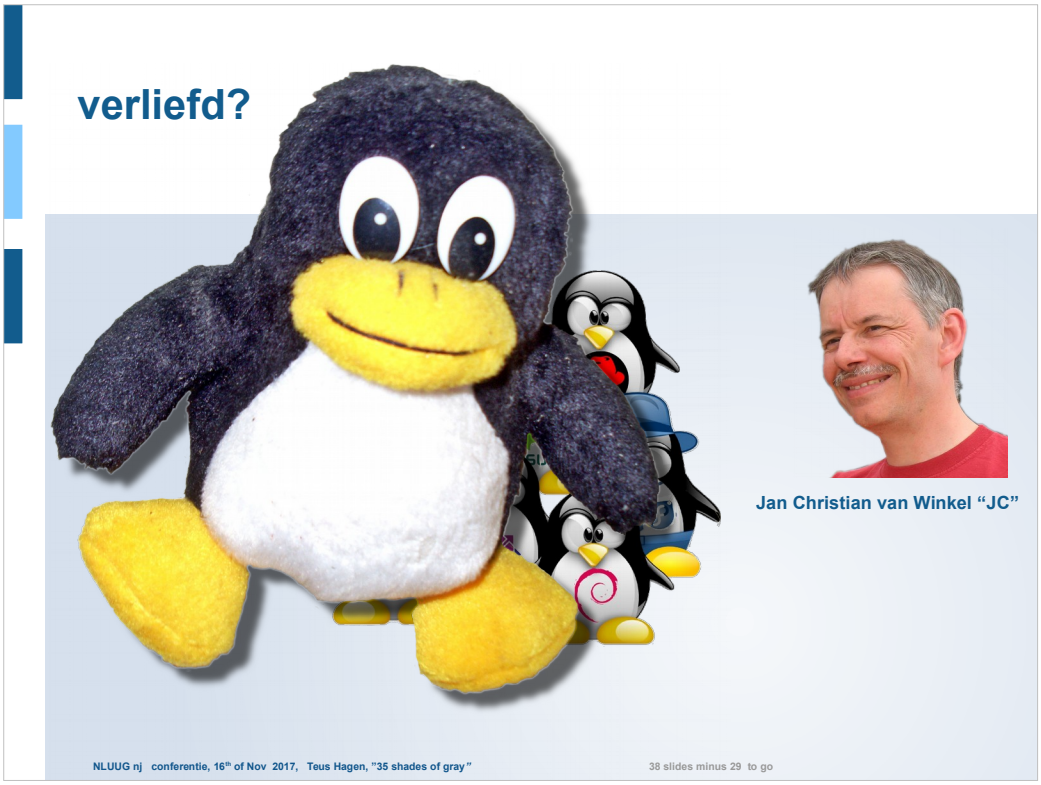
kick out the fun



om de twee jaar, systeem administrateurs gericht

Grootste succes eerste jaar **625** smaakte naar meer maar werd minder

Probleem van commercialisatie en naderende conjunctuur neergang



=

Dit is hem

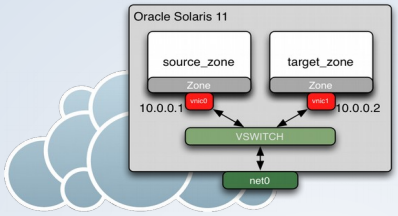
=

Niet duidelijk of JC het geweest is,
mogelijk was het hele bestuur verliefd.

Xirion bv Marten v Gelderen & Leon Oostenrijk (WTC → de Meern)
Theo de Ridder had alleen wat betaal-admin
Labels printen tot diep in de nacht
IBM man met blauw gestreept overhemd Efficency beurs (VIVKA)
100 → **400** bezoekers
-
Marielle: **het was een feestje** om met jullie samen te werken!
Transmediair Marielle en Chantal Driessen (→ NLnet)
Transmediair via Emile van Dantzig
In dienst NLUUG
Met Sane zelfstandig ICONIQ en Monique: SANE 1998 **625** bezoekers
Monique Sours bloemetjes buiten zetten
=
Bob Eskens en Edwin Kremer hulpjes van M&M
Aspiraties faalde met NLUUG bestuur mei 2005
-
Interactie in Ede: conf. Medische wereld
Te kostbaar
-
Verlossing met Debbie Reinders (conf), terug naar het feestje en Mark (admin)

UNIX services: the How-To forget security, privacy

John Gage (SUN): "the network is your computer"

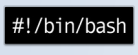


Ken Thompson: "everything is a file"

Dave Presotto/Robert Pike: Plan 9

UNIX services: from easy (5 pages in C) in 1982 to full time job in 2016

- *networking*
- *programming (today everything is scripted?)*:
  - assembler → fortran → B → C/pascal → C++/modula
  - perl exception handling: java and python
  - bash, HTML, java-script, php

- *debugging a script: it's a disaster*
- *objective programming: too complicated*
- *perl: ever debugged a regular expression?*

  Douglas Adams: ^(?=(?!(.)\1)([^\DO:105-93+30])(?-1)(?<!\d(?<=(?![5-90-3])\d))). [^\WHY?]$

UNIX services: from easy (5 pages in C) in 1982 to full time job in 2016

- *networking*
- *programming*
- *databases*: ingres → MySQL SQLite

- *the idea of "everything is a file" is lost?*
- *everything is in the MySQL database nowadays?*

UNIX a major role in encryption

- *governments "do not like"*
  the UNIX public key mechanisms

- **1991** PRIVACY Now! STOP PGP → 2001 GNU GPG
- **1995** NLUUG ondersteunt "het geval"
- **1998** OpenSSL

CAcert
Free Digital Certificates for Everyone!

NLUUG nj conferentie, 16th of Nov 2017, Teus Hagen, "35 shades of gray" 38 slides minus 34 to go

NLUUG doneerde een flinke som geld aan Phil Zimmerman
Verwikkeld in rechtszaken in 1995

-

Encryptie algorithme was een wapen, dus geen export vergunning US

-

Smokkel via boek en OCR boek

-

T-shirt gedragen bij passeren douane

UNIX services: from easy (5 pages in C) in 1982

today 2016 it is a full time job

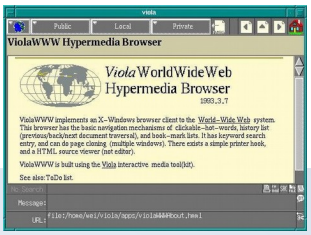
- *networking*
- *programming*
- *databases*
- *workbenches:*
  - document workbench:
    roff → new roff → typeset roff (CAT) → GNU roff → PS
  - programming workbench:
    1972 SCCS (make) → RCS → CSV → GIT

THIS ALL is in the PAST now

the focus nowadays is on *applications*

- *Open Source community thank you!*
- *the problem: tower of Babylon*
  - *complexity*
  - *footprint N times OS footprint*
  - *interoperation is almost gone*
- *the issue is not anymore:*
  - *CPU/GPU speed 3GHz*
  - *memory 8GB*
  - *disc space 4TB*
  - *network bandwidth: fiber to the home, still IPv4*
  - *but wifi is still too slow, too local, insecure*

touching World Wide Web



- **1990** World Wide Web
  - CERN internet document access service
- browser applications
  - **1992** birth on NeXtStep
  - **1992** voila WWW
  - **1993** Mosaic (NCSA)
  - **1998** Netscape
  - **1999/2002** Mozilla Firefox

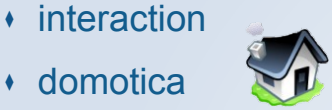
browsers war

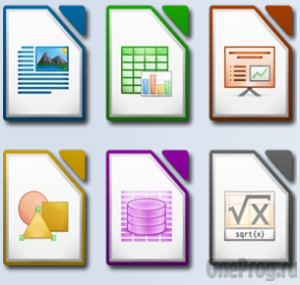
- the war is as it was with UNIX
  - *commerce against freedom of use and contribution*
  - *against monopolies*
  - *against control*
  - *standards: theory ↔ pragmatism*
  - *money gives you a saying*

applications I use (only Open Source)

on: iOS, Ubuntu, Debian

- text processing
- interaction
- domotica
- environmental measurements





the UNIX time line

- **1969** Bell giving birth to UNIX
- **1975** UNIX Version 5/6 public
- **1980** Xenix commercial
- **1981** BSD UNIX Open Source / SUN commerce
- **1982** UNIX System commercial
- **1987** Minix and X11
- **1991** Linux
- **1990** WWW
- **2010** **2015 Internet of Things**
- **2019** after 50 year: only the history is left and privacy gone?

the NLUUG time line

40 board members from 1982 - 2017

		begin	eind			begin	eind			begin	eind
Marten van Gelderen	v	1982	1995	**Jos Alsters**		1993	2005	**Klaas van Gend**	p	2006	2011
Teus Hagen	v	1982	~1985	Leo Willems		1993	1996	Adriaan de Groot		2007	2011
Theo de Ridder	p	1982	~1985	Ted Lindgreen		1993	1995	Armijn Hemel		2007	2010
Andrew Tanenbaum		1982	1984	**Willem de Vries**	s	1993	2000	Melanie Rieback		2006	2010
H. Jan Thomassen	s	1982	~1986	**J.C. van Winkel**	v	1995	2006	**Mark Overmeer**	s	2008	2012
Gerrit Smit		1984	1989	Nico Caarts		1995	1997	**Luc Nieland**	v,p	2009	2017
Francis Brazier	s	1985	1995	Neltsje v. Nieuwpoort		1996	1997	Jos Jansen		2010	2010
Wytze van der Raay	p	~1985	1991	**Edwin Kremer**		1996	2004	Patrick Reijnen	v	2010	-
Hans Linschoten		1986	1989	**Bob Eskes**		1997	2005	**Rudi van Drunen**		2010	2016
Emile van Dantzig	p	1989	1995	Bart Muyzer		1998	2002	**Marcel Nijenhof**		2011	2016
Peter Geers		1989	~1990	Jos Visser		1998	2000	**Pieter-Paul Spiertz**		2011	2017
Guido v. Rossum		~1990	~1990	Fred Donck		2000	2006	Victor Langeveld		2014	2014
Henk Hesselink		~1991	1993	**René Pluis**	v	2001	2009	Mark Janssen	p	2016	-
Jack Jansen	p	1992	2005	Bram Moolenaar	p	2002	2006	Michael Boelen	s	2016	-
Chel van Gennip	p	1993	1999	**Walter Belgers**	v	2003	2010	**YOU ?**		2018	?

Bold: ereleden

-

V – voorzitter

S – secretaris

P – pernningmeester

-

Blauwe achtergrond: huidig bestuur

NLUUG AWARDS

Piet Beertema (Internet pioneer)

Wietse Venema (Satan/Postfix, 2000)

Guido van Rossum (Python, 2003)

Bram Moolenaar (VIM, 2008)

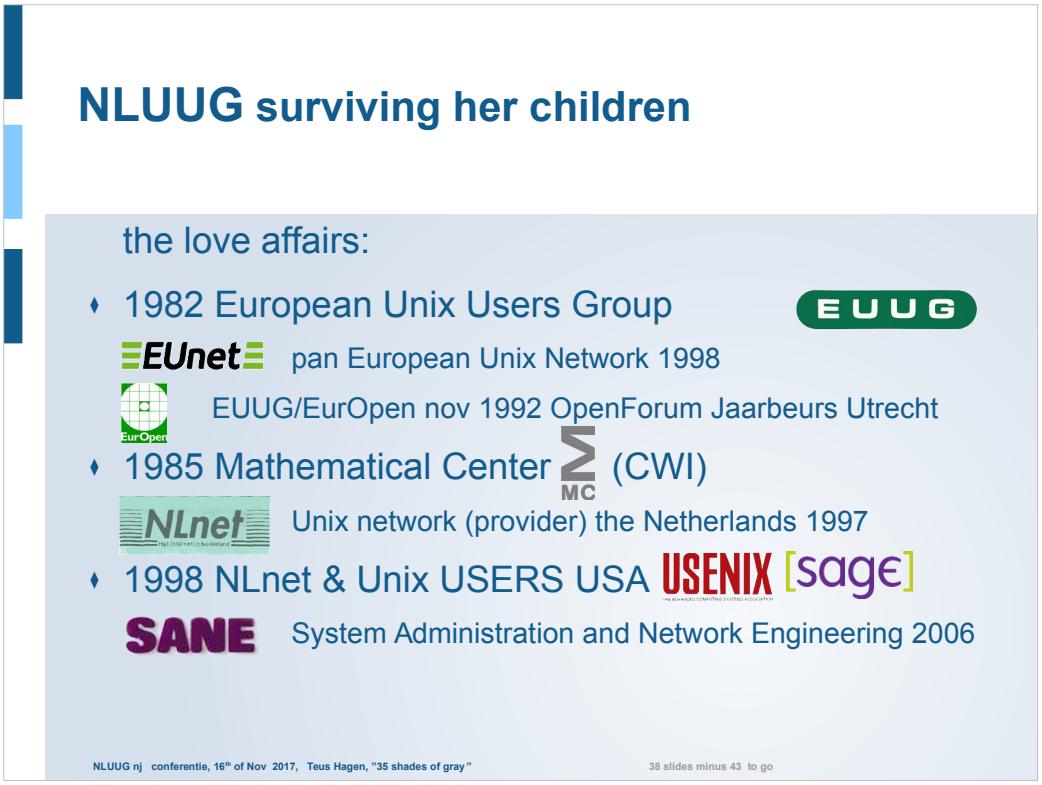
Andrew Tanenbaum (Minix, 2009)

Wytze van der Raay, Teus Hagen (2010)

Olaf Kolkman (Internet, 2015)

NLUUG nj conferentie, 16th of Nov 2017, Teus Hagen, "35 shades of gray" 38 slides minus 42 to go

Aan dit lijstje is te zien dat enkele personen die van alle NLUUG wallen mee-eten



Overlevers van UNIX/LINUX users groepen: handvol van de tientallen

=

GUUG (system admin), UKUUG, NUUG (sterven na dood),

Usenix/Lisa

-

Teloor gegaan:

DKUUG, FUUG, BUUG, i2U, HUUG, YUUG, PUUG,

AUUG, CHUUG, ICEUUG, EUUG-S

-

Wetenschappelijk element is verdwenen na 2002 in Europa

-

De job marktplaats lijkt weer wat terug te komen

=

1994 stichting Nlnet vanuit CWI: Ted Lindgreen, Frances Brazier, Jos Alsters, Maarten van Gelderen

=

Zelfde geschiedenismet bestuurspetten nu met SANE

Xirion - administratie, conf. voorbereiding, proceedings

-

Transmediair – adminstratieve hulp, ondersteuning

-

At Computing: conf. tasjes, terminal ruimte (wat was dat?)

-

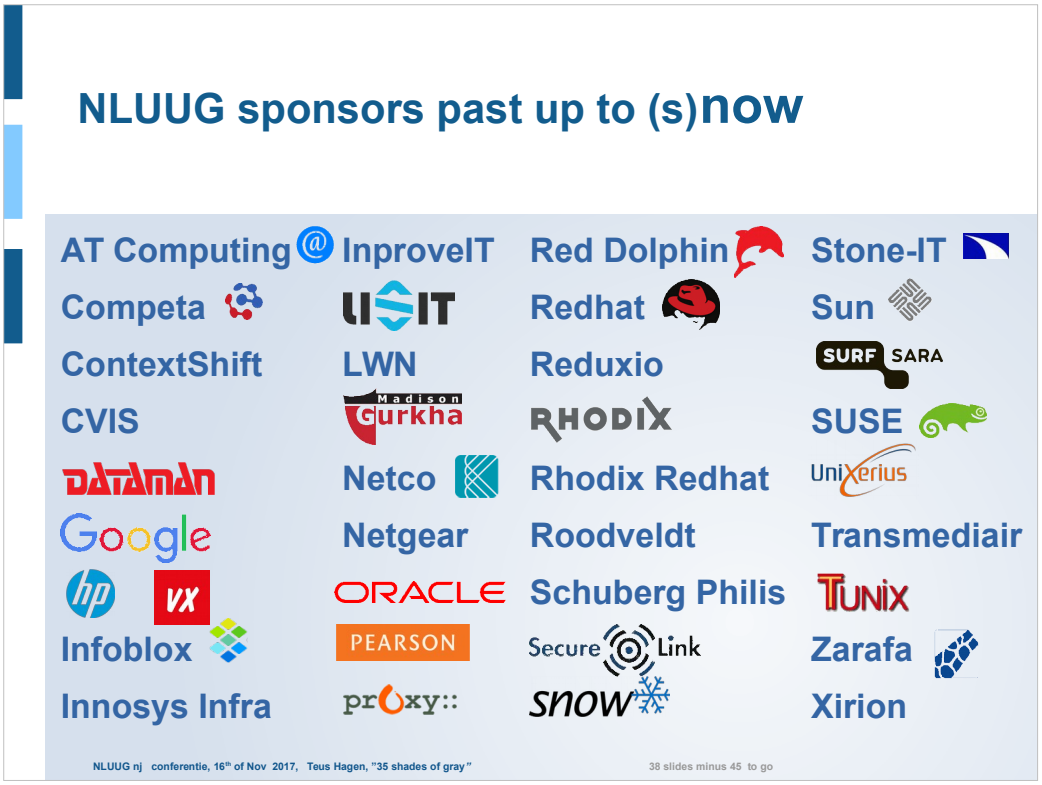
Medison Guhrka: black hat sessies, vele sprekers gesponsord

-

Schuberg Philis: 25 jaar NLUUG ondersteuning

-

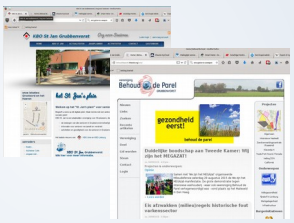
Snow: nu nog steeds ondersteuning, borrel, broodjes



Sommige bedrijven bestaan niet meer
Sommige zijn intussen overgenomen
Sommige hebben hun naam veranderd:
Bijv Gurkha naar Secure
Sommige logo's zijn niet duidelijk of niet te vinden
-
Wel bedrijven die de borrel en/of lunch mogelijk maakten
Of de conf. gadgets van een handvat voorzagen
-
Schuberg betaalde in weze 25-jaar NLUUG viering

what is keeping me busy?

- internet security and privacy
- local environment:
  - gasses, noise and particulate matters
  - environmental measurements (MySense)
- digitizing local society:
  - local websites,
  - email lists, OwnCloud



=

Internet privacy en security

=

Digitale ondersteuning plaatselijk

=

Luchtkwaliteit ivm bio-industrie Limburg

* bekenden uit de Open Source UNIX/Linux wereld bij de NLUUG op visite geweest

-

In rood de voornamen van personen

die volgens mij verdienstelijk zijn geweest

-

Met een o diegenen die erelid zijn.

Omcirkeld diegenen die hier in de zaal zitten

-

Vergeet Hans Bakker Mac Lichtje niet