Panel 1

Unix History

incomplete

brief

DEC PDP-7 ≈ 1970

no historian

not Expert

Ken Thompson Dennis Ritchie

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Panel 2

Back to the 60's

- There were NO personal computers
- Different mainframe computers, each with its own operating system
- Computers were NOT networked; data transfer was via magnetic tape. Often computers from the *same manufacturer* could not talk to each other, not to mention computers from different makers.
- It was difficult to get one program created on one system to work on another system, and it was even difficult to transfer data output by one system into another system.
- No C programming language, or No standardized programming language at all
- Programming was frequently done by submitting a program via punch cards and the computer delivered a printed answer
- More and more "dumb terminals" were hooked up to a mainframe (text-based only) which required a multi-user, multi-tasking operating system – many were not.

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Panel 3

Punch Cards

Punch card reader ~ 1952

Card from a Fortran program: Z(1) = Y + W(1)

IBM 701 Development System
≈ 1953

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Panel 4

Along came Unix

The "Unix" operating system was introduced with the following features:

- Multi-tasking capability
- Multi-user capability
- Portability
- Integral set of tools (including tools for pattern recognition and text processing/formatting)
- Library of application software

All Unix configuration files are plain text files (in contrast to Windows Registry).

Unix systems are organized at three levels:

- The **kernel**, which schedules tasks and manages storage
- The **shell**, which executes user commands and programs and connects them via "pipes"
- The **tools** and applications that offer additional functionality

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Panel 5

Major players:

- **Bell Laboratories** (formerly Bell Telephone Labs, then AT&T Bell Labs, now part of Lucent Technologies) at Murray Hill, NJ, and Holmdel, NJ. This is where "Unix" was originally developed; AT&T guards Unix carefully and with law suits.
- **UC Berkeley** is where BSD (Berkeley Systems Distribution) Unix started. No longer a player in developing Unix further, but played integral role. BSDI is a company that markets products derived from BSD. It is not a registered Unix system (but dates back to the original Unix).
- **Ken Thompson** and **Dennis Ritchie** are considered the founders of the Unix operating system. Ritchie was also instrumental in developing and standardizing the C programming language.
- **Richard Stallman**, who was working for MIT, is the founder of the GNU Project to develop a complete Unix-like, free operating system (GNU is Not Unix). He started with GNU Emacs and, with many others, developed everything but a kernel.
- **Linus Torvalds** is a programmer who develops a product that mimics the form and function of a Unix system but is not derived from licensed source code. Note that "Linux" is not a registered Unix system. Linus actually develops and controls (as a benevolent dictator) the "Kernel", while much of the rest of the Linux system is contributed by many other programmers, often under the GNU license.
- **The Open Group** (includes X/Open) defines – on paper - a comprehensive open systems environment and chooses Unix as the basis of open systems. It sets and maintains the standards for a "registered Unix" system.

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Panel 6

Unix History (abbreviated)

1969 Ken Thompson, Dennis Ritchie, and others at AT&T Bell Labs used a PDP-7 (by DEC) to create what was to become Unix.

1970 First Unix edition created with an "assembler", a file system, fork(), roff, and ed. Used for text processing of patent documents.

1973 Fourth Edition, rewritten in C. This change made the OS portable

mid-70's: Ken Thompson sabbatical at UC Berkeley and introduces Unix to students

1975 "Version 6" is the first Unix version widely known outside Bell Labs

1978 "The C Programming Language" by Kernighan and Ritchie de-facto standard

1979 Seventh Edition had a C compiler and UUCP networking capabilities

1980 Xenix, 4BSD was introduced

1983 AT&T announces Unix System V, the first supported release

1984 UC Berkeley released 4.2BSD, which includes TCP/IP support. Berkeley held contract with DOD to produce a "standard operating system for the DOD". AT&T releases System V Release 2. About 100,000 Unix installations around the world

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Panel 7

Unix History (2)

1984 GNU Project was launched Stallman

1986 4.3BSD released and is "almost free" of AT&T code

1987 System V Release 3. About 750,000 Unix installations around the world

1988 POSIX.1 published, Open Software Foundation, and Unix International formed

1989 Unix System V Release 4. ANSI C Standard appeared (revised by ISO in 1990)

1990 Open Group launches XPG3 Brand (an early attempt to standardize Unix)

1991 Unix System Laboratories (USL) becomes a company (owned by AT&T); Linus Torvalds starts Linux kernel development

1992 Unix System V Release 4.2, XPG4 Brand by Open Group

1993 4.4BSD final release from Berkeley. Novell buys USL and transfers rights to "Unix" trademark and the "Single Unix Specification" to the Open Group.

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Panel 8

Unix History (3)

Early 90's 386BSD (a port of BSD to 386 processors); generates variants FreeBSD (free, very stable, very reliable), NetBSD (highly portable and multi-platform, research oriented), and OpenBSD (focus on security and portability)

1994 4.4BSD Lite eliminates all code claimed to infringe on USL/Novell

1995 Open Group introduces "Unix 95" branding program.

1997 The "Open Group" introduces Single Unix Specification, version 2, made available on the web

1998 The Open Group introduces Unix 98 brands, including Base, Workstation, and Server. Unix 98 registered products shipped by SUN, IBM, and NCR.

1999 Linux kernel 2.2 released, the "Open Group" and IEEE work on revision of POSIX. First LinuxWorld conference

end 90's: Apple OS X is based on BSD Unix and is released as "Open Source". Runs – so they say – also on Intel processors

2001 Version 3 of the Single Unix Specifications includes IEEE POSIX. Linux kernel 2.4 released.

2.6

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Panel 9

Unix/Linux Today

Today, GNU/Linux systems are widely used as servers and workstations.

A GNU/Linux distribution must be made available for free download, including source code. Distributors can package the system differently and charge for "release medium" (the CD containing the distribution). Distributors make money by "supporting" GNU/Linux distributions. Different GNU/Linux distributions vary in the specific tools and applications they include, the installation procedures, the drivers included to support new hardware, and the level of support they offer.

In addition there are many commercial (some registered) variations of Unix available, usually in binary form for a particular set of hardware (Solaris, AIX, Irix, OS/390). Other strains of Unix are used and modified for research purposes.

And of course there is Windows NT, a widely available, proprietary, non-Unix, multiuser, multitasking operating system.

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Major Linux Distributions

- ***Fedora*** *which is a community distribution sponsored by Red Hat*
- ***Red Hat Enterprise Linux****, a derivative of Fedora commercially supported by Red Hat*
- ***CentOS****, derived from the same sources used by Red Hat*
- ***Debian****, a non-commercial distribution maintained by a volunteer developer community with a strong commitment to free software principles*
- ***Ubuntu****, a popular desktop distribution maintained by Canonical derived from Debian.*
- ***Mandriva****, a Red Hat derivative popular in France and Brazil, today maintained by the French company of the same name*
- ***openSUSE****, originally derived from Slackware, sponsored by the company Novell*
- ***Gentoo****, a distribution targeted at power users, known for its FreeBSD Ports-like automated system for compiling applications from source code*
- ***Knoppix****, a LiveCD distribution that runs completely from removable media and without installation to a hard disk*
- ***Slackware****, one of the first Linux distributions, founded in 1993, and since then actively maintained by Patrick J. Volkerding*
- ***Linspire****, a commercial desktop distribution based on Ubuntu (and thus Debian), and once the defendant in the Microsoft vs. Lindows lawsuit over its former name.*

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Panel 11

http://distrowatch.com/

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Panel 12

http://www.livecdlist.com/

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Panel 13

The Unix Shell

For info, click:

http://www.math.shu.edu/Manuals/Unix/unixhelp/Pages

Basic shell commands:

ssh -l username scinis.shu.edu

testuser svde007

prod.

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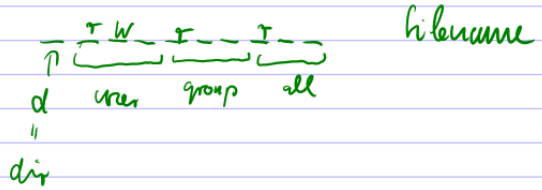
Panel 14

Create a file with some text in it "nano file"

Save it

List its name: "ls -l"

file permissions



① mkdir public_html

ls -l

drwx------

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Panel 15

Homework:

1. Change your password
2. Copy file "readme.txt" from a directory "000_outbox" into your directory
3. Edit that file and copy it to my "00_inbox" directory, using your username as filename.
4. Create a directory "public_html". Create a file "index.html" in that directory, readable for everyone. Verify by visiting http://sciris.shu.edu/~username
5. Try to determine what the following programs do:

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Panel 16

to change permissions, use

chmod u,a,g +/- rwx filename
dirname

Ex: chmod a-rw yourtextfile

drwx--------

drwxr-xr-x public_html

chmod a+rx .

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Panel 17

Create index.html in public_html

To rename mv old new

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Panel 18

What do these programs do (in English)

Program 1:

```
if who | grep -s keith > /dev/null
then
   echo keith is logged in
else
   echo keith not available
fi
```

Program 2:

```
while who |grep -s wachsmut
do
   sleep 10
done
echo "Program done, which means ..."
```

Program 3:

```
until who | grep wachsmut
do
  sleep 10
done
echo "Program done, which means …"
```

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