Version 2.0

Intro to Unix/Linux!

Part 1: History

- Unix released in 1969
- Picture: Ken Thompson (sitting) and Dennis Ritchie working together at a PDP-11

- https://en.wikipedia.org/wiki/History_of_Unix

In the beginning, there was (no) Unix

- [On a PDP7], in 1969, a team of Bell Labs researchers led by Thompson and Ritchie, including Rudd Canaday, implemented a hierarchical file system, the concepts of computer processes and device files, a command-line interpreter, and some small utility programs, modeled on the corresponding features in Multics, but simplified.[3] The resulting system, much smaller and simpler than Multics, was to become Unix.

https://en.wikipedia.org/wiki/History_of_Unix


JANUS 71

PDP11

at The National Museum Of Computing, Bletchley, UK.


digital
pdp11
digital equipment corporation · maynard, massachusetts
pdp11/40


digital equipment corporation · maynard, massachusetts
ADDRESS
DATA
pdp11/40
POWER
LOCK
OFF
RUN
BUS
USER
PROC
CONSOLE
VIRTUAL
17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
LOAD ADRS
EXAM
CONT
ENABLE HALT
START
DEP

Some of Unix Features

Multi-user environment

Multi-tasking

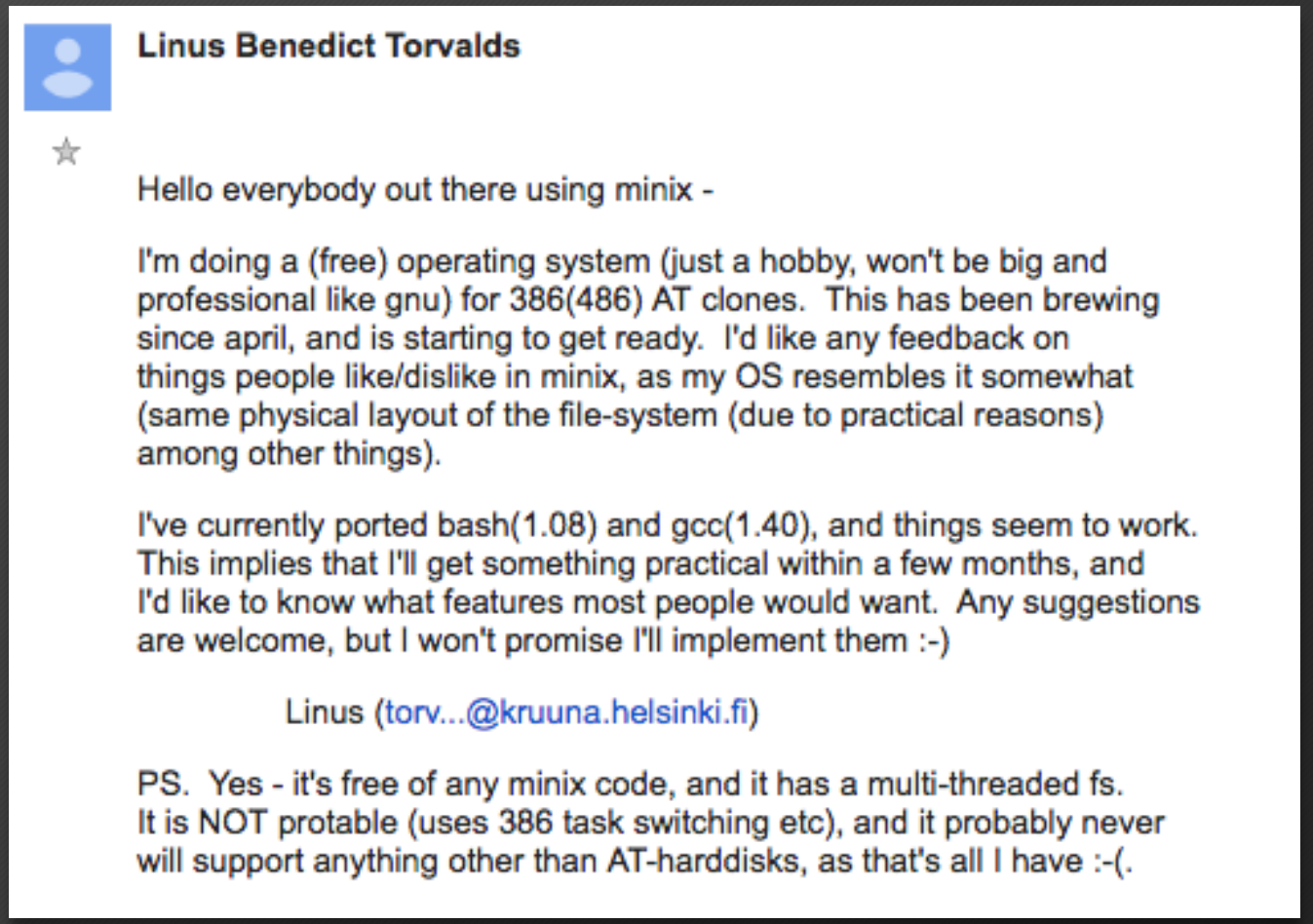
Security and authentication

Networking

Drawback: complex/expensive licensing

Origin of Linux Kernel

- IBM introduced PC (personal computers) based on Intel 8080 (later on became x86 architecture)
- Linus Torvalds was a student who used Unix at school, and wanted a similar OS for himself at home, started writing a clone of Unix, initially as a hobby
- Linus Torvalds made “Linux” source code available for free in 1991
- Free software Foundation, GNU started using Linux as their kernel



Linus Benedict Torvalds

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 (torv...@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 :-(.

Part 2: What you need to know as a new user

Unix/Linux is files!

- FHS (Filesystem Hierarchy Standard)
  - / ← root
  - Everything is located under the root
- Everything is file!
- Linux/Unix File types:
  - Regular files, and directories
    - Configurations, settings, data
  - Device files
    - Storage, Webcams, Network Cards, Serial Ports, …
  - Links
  - Etc.

Source: https://commons.wikimedia.org/wiki/File:Standard-unix-filesystem-hierarchy.svg

NO DRIVE LETTERS!

- A storage volume is mounted in a directory under / (`mount` and `umount` commands)
- Example of Advantages over having drive letters:
  - /home can be on a separate physical storage volume from / or /boot
  - /boot, where the kernel/OS images are loaded from, can be stored anywhere, even at a network location
  - All of these can be transparent to users!

NO Add/Remove programs!

- GNU/Linux is a “File-based” OS
  - all the configurations, devices, and applications are files!
- To run a program:
  - Copy binaries anywhere on the disk (that you have permission to write)
  - change the permission to allow execution and run!
- No installers, No Registry, No add/remove programs.
- Linux Distros use package management software to aid in managing software

Linux is Multi-user!

- Every file has “permissions mode”, owner, and group
- Permissions are assigned for:
  - Owner
  - Group owner
  - Others
- Notations:
  - Octal (777, 644, 650)
  - Alphabetic (rwx)

Command: ls -l

```
Permission |owner|Group | size| Date          |name

drwxr-xr-x 3 root root    4096 Apr 26  2012 acpi
-rw-r--r-- 1 root root    2981 Apr 26  2012 adduser.conf
drwxr-xr-x 2 root root    4096 Jul  5 20:53 alternatives
-rw-r--r-- 1 root root     395 Jun 20  2010 readme
```

su/sudo command

- Switch/substitute User!
- su: “makes it possible to change a login session's owner (i.e., the user who originally created that session by logging in to the system) without the owner having to first log out of that session.” (http://www.linfo.org/su.html)
- Some Linux Distros use “sudo” instead

```
#----Example 1----
user@host$ su alice
alice@host$ su
root@host#

#-----Example 2----
# The “passwd” command is used to
change password
user@host$ passwd
user@host$ sudo passwd
```