

Linux and Free Software



Overview and philosophy



Written on GNU/Linux using OpenOffice.org 1.1.1

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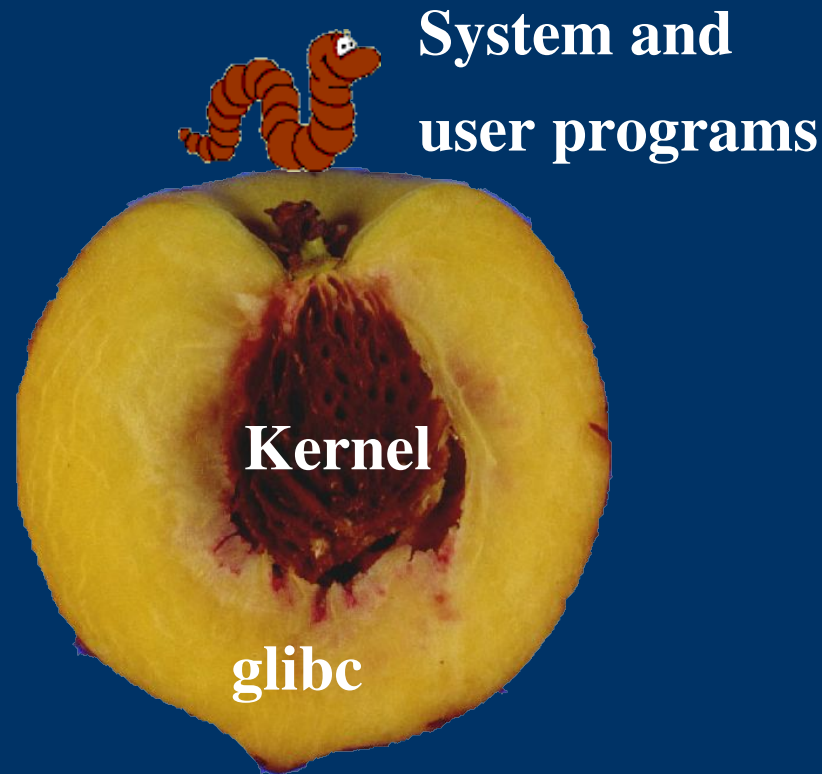
- ❖ What is Linux?
- ❖ History of GNU, Linux and Free Software
- ❖ What Free Software is about
- ❖ Differences between GNU/Linux and Solaris
- ❖ Use GNU/Linux and Free Software!

How to pronounce Linux?

« Leenux »!

What is Linux?

- ❖ Linux is just an operating system kernel



What is Linux?

- ❖ Linux is a Unix kernel clone
- ❖ Can be found in: computing clusters, personal computers, Sony Playstation 2, PDAs, cell phones...
- ❖ Supports most of today's processors
- ❖ Has been supporting 64 bit processors for years.
- ❖ Developed by a community of programmers
- ❖ Linux is free software

What is GNU / Linux?

- ❖ GNU adds the basic programs to Linux to create a totally free Operating System:
 - ❖ Basic Unix commands: ls, grep, copy, man
 - ❖ Standard C library: glibc
 - ❖ Compiler tools: gcc, make, gdb
 - ❖ Text editor: Emacs
 - ❖ High level programs: gimp (graphics), GNU chess, Gnome (desktop), LaTeX (editing), Emacs (text editor) and a lot more!



What Free Software is

- ❖ Free as free beer <> free as free speech
It's not at all a question of price!
- ❖ Free software grants you 4 essential freedoms:
 - ❖ The freedom to use the program
 - ❖ The freedom to distribute the program to others
 - ❖ The freedom to study the program
 - ❖ The freedom to modify the program
- ❖ No problem with selling Free Software!
- ❖ Freeware is not Free Software at all!



Free Software Licenses

- ❖ The GNU General Public License (GPL):
GNU, Linux, Mozilla, OpenOffice ...
Any modified version must be released under the GPL. Any program using or linked with GPL code must be released under the GPL too.
- ❖ The GNU Lesser General Public License
Used by libraries: GTK...
Same conditions but can be used as such in proprietary programs.
- ❖ Less strict licenses: the BSD license
Tcl/Tk, Apache...
Proprietary versions can be made.

History of Free Software and GNU

- ❖ Early years of computing: programmers shared their programs.
- ❖ Notion of public domain in the US: Programs developed in universities and research centers paid by public funds should be available to the public.
- ❖ In the 1980's, almost all software was proprietary, in particular Unix.
- ❖ In 1983, Richard Stallman created the GNU project.
GNU means: GNU is Not Unix.
- ❖ Richard Stallman is the author of famous programs: Emacs, gcc, make and several others...
- ❖ 1989: First release of the GPL license
- ❖ In 1990: the GNU project was almost complete, except its Kernel (the HURD that was not ready).



History of Linux

- ❖ 1991: Linux kernel written from scratch in 6 months by Linus Torvalds in his Helsinki University room. Did that because he couldn't do what he wanted with his 80386 PC.
- ❖ 1991: Linus publishes his kernel on the net. He says he just does that as a hobby.
- ❖ Lots of programmers from the whole world join in and contribute to coding and testing
- ❖ 1994: Linux 1.0 released
- ❖ 1994: Red Hat founded by Bob Young and Marc Ewing, creating a new business model.
- ❖ 1995-: GNU/Linux and free software developing in Internet servers.
- ❖ 2001: IBM invests \$1 billion in Linux
- ❖ 2002-: GNU/Linux wide adoption starts in many industry sectors.



Linux and distribution versions

❖ Linux versions

- ❖ The current stable version is 2.4.x

Stable versions are x.y.z, y being an **even** number.

- ❖ The current development version is 2.5.x

Development versions are x.y.z, y being an **odd** number.

❖ Distribution versions

- ❖ Have nothing to do with Linux versions

- ❖ The current version of Red Hat is 9.0

- ❖ Don't say « Linux 9.0 » when you mean « Red Hat 9.0 »

GNU / Linux distributions

❖ Definition

Packs Linux kernel, glibc and free software tool versions and makes sure everything works well together.

❖ Most popular distributions



- ❖ Red Hat (Red Hat Inc.)
The most popular in the industry.



- ❖ Mandrake (MandrakeSoft)
User friendly and easy to configure distribution.



- ❖ Debian
Done only by a community of volunteers with no commercial interests (very good for quality). Very popular for robust Internet servers.

Famous Free Software

- ❖ Operating systems: freeBSD, openBSD
- ❖ Office: OpenOffice
- ❖ Mail / web browsing: Mozilla, Evolution
- ❖ Internet servers: Apache, bind (DNS), sendmail, etc.
- ❖ Graphics: GIMP
- ❖ Programming: gcc, make, Perl, Python, Tcl/Tk
- ❖ Compressors: gzip, bzip2

The choice of Free Software

- ❖ Reliability
- ❖ Portability
- ❖ Universality
- ❖ Performance
- ❖ Interoperability
- ❖ Reactivity
- ❖ Security

Wrong ideas about Free Software

- ❖ *"There is no support, no training"*
- ❖ *"There is no documentation"*
- ❖ *"A free or nearly free product is a toy"*
- ❖ *"Linux is difficult to install"*
- ❖ *"Free Software are not adequate for heavy tasks"*
- ❖ *"What appeal do I have in case of problem with the editors ?"*

Threats to Free Software and to the Software Industry

❖ Software patents: patenting ideas and algorithms

Legal in the US, not in the European Union (but plans exist)

The holder a patent can prevent anyone from making a free software implementation, even if it's a simple idea and there is no financial profit behind.

Example: Amazon patented the idea of buying in a single mouse click!

This is a very serious threat to small innovative software companies because they wouldn't be able to build on the ideas of others.

Threats to Free Software and to the Software Industry

- ❖ Laws against reverse engineering: a threat to free competition

Digital Millennium Copyright Act in the US

Lexmark could sue another company for making compatible ink cartridges.

EUCD plans in Europe: see <http://eucd.info/> and <http://eurolinux.org/>

A young European was sued because he reverse-engineered the DVD format to be able to play the DVDs he owned on his GNU/Linux computer!

Confusion between hackers and crackers

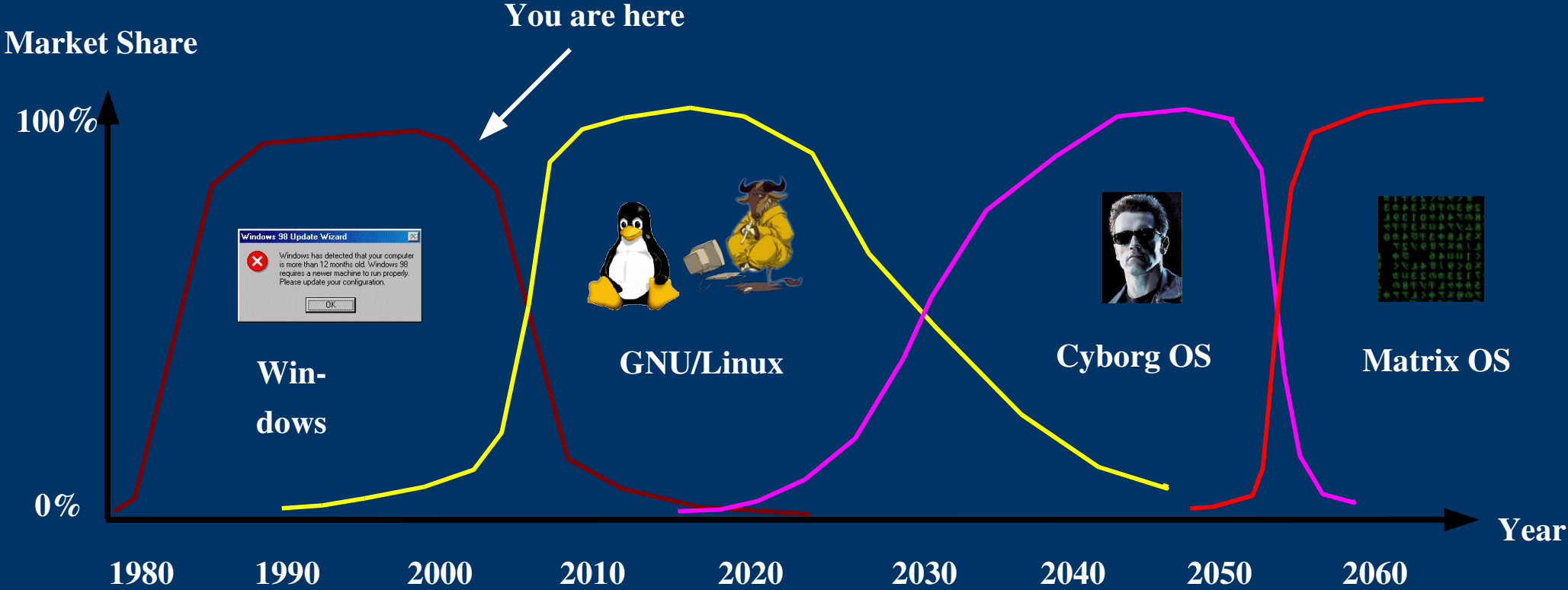
❖ Hackers

- ❖ Try to understand how the tools they use work
Can you imagine a car maker suing you because you try to understand how your car works?
- ❖ Like to create new solutions or improve existing ones to satisfy their needs and those of others

❖ Crackers

- ❖ Try to intrude or damage private computer systems
- ❖ Develop or propagate virus
- ❖ Try to crack passwords and steal proprietary information

OS Roadmap: GNU/Linux comes next



Differences between GNU/Linux and Solaris

- ❖ GNU/Linux:
 - ❖ Basic system commands in /bin: ls, grep, ps
 - ❖ More elaborate ones in /usr: mozilla, gimp, bzip2, top, perl
- ❖ Solaris:
 - ❖ /bin and /usr/bin are the same directory

Command line differences between GNU/Linux and Solaris

Very few differences! Almost all your usual Solaris commands will work fine!

ps is one of the few exceptions:

- ❖ GNU/Linux:

- ❖ ps -aux

- ❖ Solaris:

- ❖ ps -edf

GNU improved Unix commands

- ❖ `grep -r`
recursive search through a directory
- ❖ `ls --color`
Colorizes files according to their types
- ❖ `tar zcvf / tar jcvf`
Regular tar with on the fly compression / decompression
- ❖ `df -h / df -h`
Print file and directory sizes in a human readable way

Screenshots

- ❖ Red Hat screenshots

<http://frlinux.net/?section=distributions&article=100>

- ❖ Mandrake screenshots

<http://www.linux-mandrake.com/en/fscreenshots.php3>

Free books and articles

- ❖ Free Software development:
The Cathedral and the Bazaar, Eric Raymond
http://www.firstmonday.dk/issues/issue3_3/raymond/
- ❖ Open Sources, Voices from the Open Source Revolution
O' Reilly (free download or available at your bookstore)
<http://www.oreilly.com/catalog/opensources/book/toc.html>
- ❖ The GNU Manifesto
<Ctrl x><Ctrl p> in Emacs
<http://www.gnu.org/gnu/manifesto.html>
- ❖ Just for Fun: The Story of an Accidental Revolutionary
Linus Torvalds and David Diamond, HarperBusiness

Use Free Software!

- ❖ Free Software and open formats are good for you, in particular for the freedom to use your own files.
- ❖ Always something to learn and share with others
- ❖ Free Software is good for emerging countries