Debian
Teaching Opportunities

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5 December 2012
fOSS$_a$ 2012
Lille, France

About the speaker

hacker . . .

- active in FOSS since 1998
- Debian Developer since 2001
- Debian Project Leader since 2010

. . . and teacher

- regularly teaching "FOSS" since 2000
- research fellow at IRILL since 2009
- Maître de Conférences since 2011, Univ. Paris Diderot

Outline

Outline

Free Software, à point: distributions
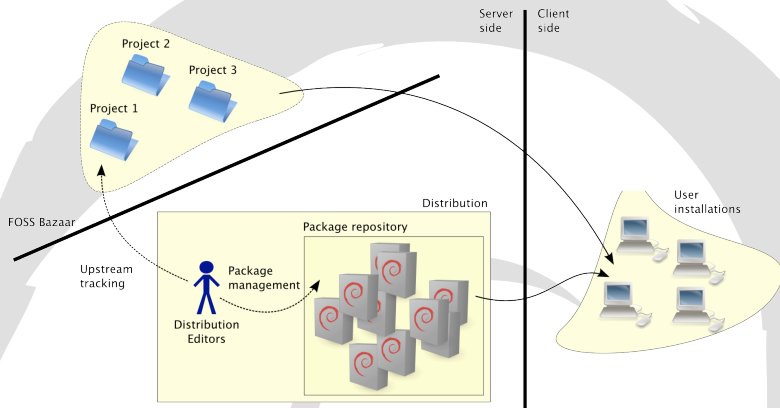
- ease software management
- key notion: the package abstraction
- offer coherent software collections
- killer application: package managers (& installers)

Debian: once upon a time

> *Fellow Linuxers,*
>
> *This is just to announce the imminent completion of a brand-new Linux release, which I'm calling the Debian Linux Release. [. . .]*
>
> Ian A Murdock, 16/08/1993
> `comp.os.linux.development`

- make GNU/Linux competitive with commercial OS
- easy to install
- built collaboratively by software experts
- 1st major distro developed "*openly in the spirit of GNU*" FSF-sponsored for a while

$\frac{1}{3}$ of Debian: the operating system

flagship product: Debian stable

- binary distribution
- completely Free (DFSG)
- released every 24 months ($\approx$)
- a dozen architectures
  - ▶ with several kernels(!)
- archive-wide security support (3-3.5 years)

renowned for

ports, stability, packaging system, old hw support, documentation, smooth upgrades, i18n/l10n, the testing suite, runs anywhere, technical policy, package choice, ...
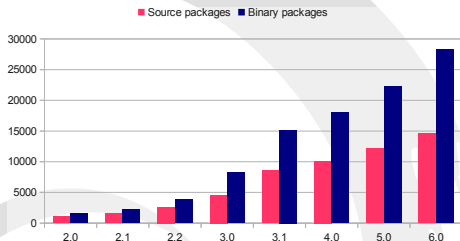
one of the largest Free Software porting platforms

Debian 6.0 "Squeeze" — looking back

- release: February 2011
- dependency-based boot system (faster, more robust)
  - completely Free Linux kernel, firmware included
- GNU/kFreeBSD
- improved debian-installer
  - ext4, btrfs
  - ZFS (on kFreeBSD)
  - ease complex setups
    e.g. LVM + RAID + encryption
- Debian Pure Blends
  - Debian Edu, Debian Med, Debian GIS, DebiChem, ...
  - blends.alioth.debian.org
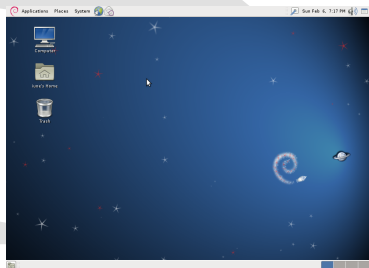
new services:

- snapshot.debian.org
- backports.debian.org
- stable-updates
- screenshots.d.net
- ask.debian.net

Debian 7.0 "Wheezy" — looking forward

- multiarch
  proper technical way of sharing
  packages across archs
  - 3rd party software, easily
  - cross-compilation
- private cloud deployment
  - OpenStack, Xen/XCP, . . .
- public cloud support
  - EC2, Azure, . . .
- new archs: armhf, s390x
- desktop: GNOME 3.4, KDE
  Plasma 4.8, XFCE, . . .
- upgrades throughout the archive

Timeline
- freeze: June 30th, 2012
- release: *when it's ready*[TM]
  ETA: Q4 2012 – Jan 2013

$\frac{1}{3}$ of Debian: the Project

Common goal:

Create the best, Free operating system.

Debian Social Contract (1997)

- 100% Free Software
- give back
- don't hide problems
- priorities: users & Free Software

Debian Constitution (1998)

Structures and rules of a Free-Software-compatible democracy

Strong motive to join: $\approx$ 1'000 project members, world-wide
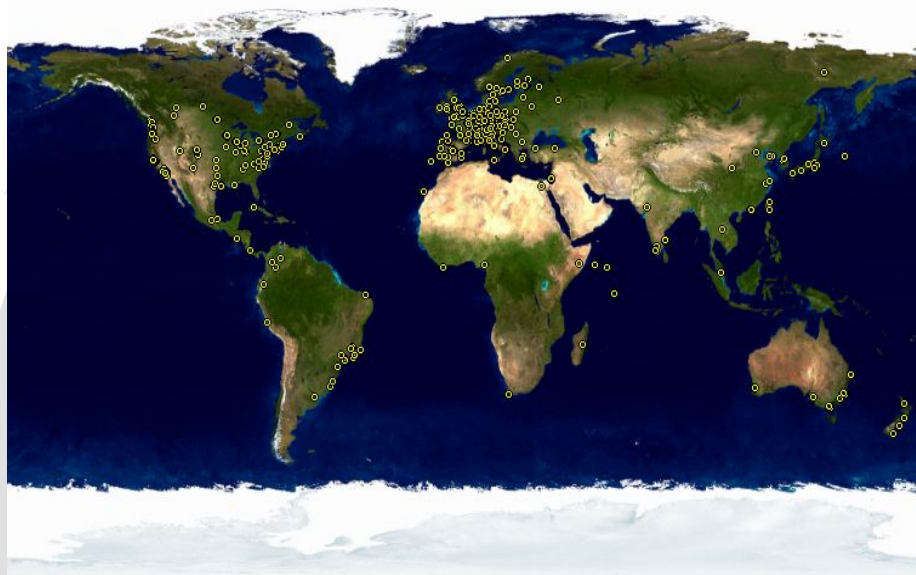
$\frac{1}{3}$ of Debian: the community

Open development

- we don't hide problem
- easy to have an impact (just "show me the code!")

Large amounts of communication

- mailing lists
- IRC
- (a few) Web services(, growing)
  - social: @debian, !debian on identi.ca

Large number of tech-savvy users

- users help each other, contribute patches, get involved

What's so special about Debian?

There are 300+ *active* distributions (`distrowatch.com`)
What's so special about Debian? Why should you care?

- package quality
- freedom
- independence
- decision making
- derivatives!

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There are 300+ *active* distributions (distrowatch.com)
What's so special about Debian? Why should you care?

1. package quality
   - policy (design + testing)
   - maintainers are experts of the sw they package
   - no 2nd class packages, all are equal

2. freedom

3. independence

4. decision making

5. derivatives!

What's so special about Debian?

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What's so special about Debian? Why should you care?

1. package quality
2. freedom
   - rooted in Free Software principles
   - an important "political" actor in Free Software
   - free the bottom up, dogfooding
3. independence
4. decision making
5. derivatives!

What's so special about Debian?

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What's so special about Debian? Why should you care?

1. package quality
2. freedom
3. independence
   - no (single) company babysitting us
   - donations
   - volunteers, gift-economy
4. decision making
5. derivatives!

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What's so special about Debian? Why should you care?

1. package quality
2. freedom
3. independence
4. decision making
   - do-ocracy & democracy
   - no imposed decision
   - "show me the code" discipline
5. derivatives!

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Interlude — derivatives how to

Free Software 101

Freedom #0, to **run** the program, for any purpose

Freedom #1, to **study** how the program works, and change it

Freedom #2, to **redistribute** copies

Freedom #3, to **improve** the program, and **release** improvements

When applied to distros: derived distributions, AKA derivatives

How?
1. take existing packages and add your extras
2. patch & rebuild packages as needed
3. sync periodically

Debian derivatives

Debian: a base for ≈140 <u>active</u> derivatives — distrowatch.com

- Tucunare, LinEx, Inquisitor, Grml, UniventionCorporateServer, Vanillux, Emdebian, Crunchbang, PureOS, StormOS, Ubuntu, GNUSTEP, gNewSense, Debathena, Maemo, LMDE, SPACEflight, BCCD, Bayanihan, semplice, ArchivistaBox, Knoppix, Tails, BlankOn, AlienVault-OSSIM, DoudouLinux, Vyatta, Symbiosis, VoyageLinux, Lihuen, LinuxAdvanced, Aptosid, Canaima, siduction, ZevenOS-Neptune, BOSSlinux, Parsix, AstraLinux, ProgressLinux, Finnix, SprezzOS, CoreBiz, Epidemic-Linux, MetamorphoseLinux , . . .

Why?
- quality & licensing assurances
- solid base system
- huge package base
- the "*universal* OS", perfect for customizations

A Debian derivative example: Ubuntu

- started in 2004 by Canonical
  target: desktop
- Debian derivative
- very popular (15–20x Debian?)
- historical/past correlations

main	$\leftrightarrow$	corporate
universe	$\leftrightarrow$	community

  - ▶ heavily customized/forked in main
  - ▶ very close to Debian elsewhere
- sprouting its own derivatives ($\approx$80)
  - ▶ ... as Debian *transitive* derivatives

Data for Oneiric Ocelot, main + universe

Do you Debian?

- Ubuntu appears to be the most customized Debian derivative
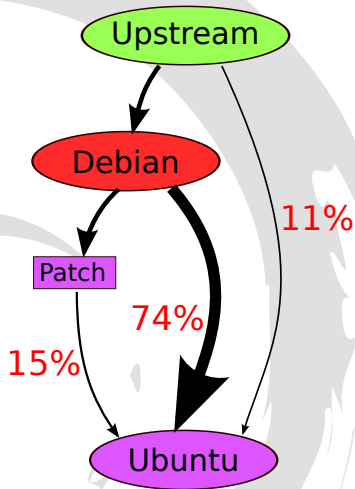- other derivs. ⇒ much larger amount of *pristine* Debian packages

Tucunare, LinEx, Inquisitor, Grml, UniventionCorporateServer,
Vanillux, Emdebian, Crunchbang, PureOS, StormOS, Ubuntu,
GNUSTEP, gNewSense, Debathena, Maemo, LMDE, SPACEflight,
BCCD, Bayanihan, semplice, ArchivistaBox, Knoppix, Tails, BlankOn,
AlienVault-OSSIM, DoudouLinux, Vyatta, Symbiosis, VoyageLinux,
Lihuen, LinuxAdvanced, Aptosid, Canaima, siduction,
ZevenOS-Neptune, BOSSlinux, Parsix, AstraLinux, ProgressLinux,
Finnix, SprezzOS, CoreBiz, Epidemic-Linux, MetamorphoseLinux ,
Debian, Xubuntu, Linux Mint, Ubuntu Studio, Mythbuntu, ArtistX,
Asturix, Peppermint OS, TurnKey Linux, Kubuntu, Caixa Mágica,
Lubuntu , . . .

if you are running a Debian (transitive) derivative, chances are you heavily
depend on Debian and on its well-being

even if your distro hasn't told you

Formal organization
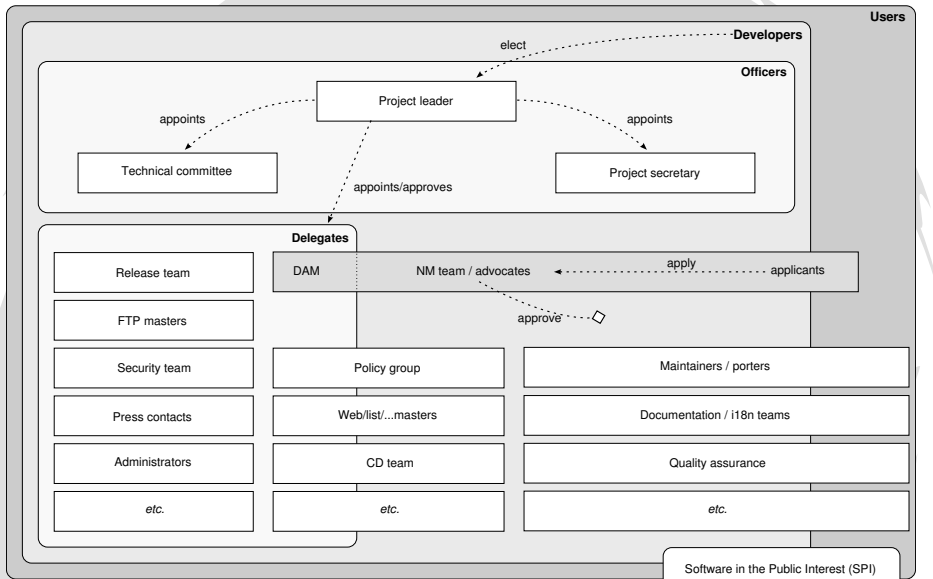
Day to day organization: teams!

> http://wiki.debian.org/Teams/
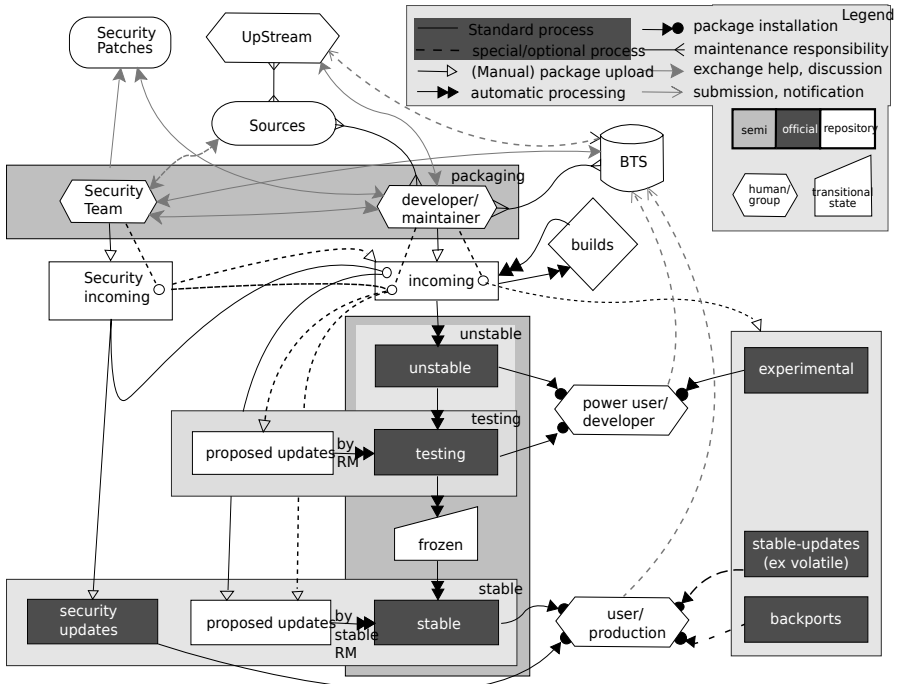
- teams grow as jobs get bigger
- some "core teams" are DPL delegates, most are not
- examples:
  - ▶ packaging teams for related packages
  - ▶ ftp-master
  - ▶ release team
  - ▶ security team
  - ▶ kernel team
  - ▶ debian-installer
  - ▶ debian-cd
  - ▶ . . .

Legend

Standard process	package installation
special/optional process	maintenance responsibility
(Manual) package upload	exchange help, discussion
automatic processing	submission, notification

semi | official | repository

human/group | transitional state

Security Patches

UpStream

Sources

BTS

Security Team

developer/maintainer

packaging

Security incoming

incoming

builds

unstable

unstable

experimental

proposed updates — by RM

testing

testing

power user/developer

frozen

security updates

proposed updates — by stable RM

stable

stable

stable-updates (ex volatile)

backports

user/production

Outline

How people get involved

Typical ways to start contributing:

1. join existing packaging teams   packaging / development
   - learn from experienced contributors
   - learn team work
   - high quality standards / rigorous procedures / perfectionism (VCS, patch minimality, software qualification, . . .)

2. adopt orphaned packages   packaging
   - take responsibility, long-term commitment

3. fix bugs   development / packaging
   - in packages you care about
   - activities: report bugs, submit patches, test others' patches, . . .

How people get involved (cont.)

(to understand how participation in Debian
can contribute to student formation)

Typical ways to start contributing:

4. improve Debian infrastructure   development
   - very complex, heterogeneous, real-world infrastructure
   - no need to be a Debian Developer
   - most services provide link to corresponding source code and setup
     instructions

5. work on ~~non~~ *differently* technical tasks   management, . . .
   - documentation, translation
   - design (themes, websites)
   - communication (newsletter, press releases, press inquiries)
   - accounting
   - events (mini-DebConf, DebConf)
   - video team
   - . . .

Stefano Zacchiroli (Debian)   Debian   fOSSa 2012 — Lille   21 / 28

Outreach — to students and teachers

- nope :-(
    - i.e. no specific outreach program for teaching
    - "only" general outreach to all potential contributors

- Debian contributor demography, relevant groups:
    - professional sysadms
    - students (master & PhD)
    - researchers
    - teachers (at all levels)

Participation in FOSS outreach programs

Also, we do participate in general FOSS outreach programs, with some success.

Google Summer of Code (GSoC)

> [GSoC] is an annual program [. . .] in which Google awards stipends (of 5,000 USD, as of 2012) to hundreds of students who successfully complete a requested FOSS coding project during the summer. — Wikipedia

- participants since 2006 (2nd edition)
- non packaging tasks, but software development
  - e.g. infrastructure, toolchain, . . .
- prefer newbie contributors, but accept (student) DDs
- 2011: 30 applications / 9 accepted / 9 successful
- 2012: 68 applications / 15 accepted / 12 successful

Participation in FOSS outreach programs (cont.)

Also, we do participate in general FOSS outreach programs, with some success.[1]
Google Code In (GCI)

> *[GCI] is an annual programming competition sponsored by Google that allows pre-university students to complete tasks specified by partnering FOSS organizations.*

- participated in 2011 (2nd edition)
  - example tasks:
    - ⋆ write 4 manpages
    - ⋆ prepare a QA upload
    - ⋆ fix a dpkg bug
    - ⋆ triage 3-4 bugs
    - ⋆ translate a wiki page
- had hard time collecting enough tasks in 2012 → drop off

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[1]thanks Ana Guerrero for her help with GSoC/GCI Debian figures

Teaching Debian — as sysadm technology

Teaching Debian administration (to train sysadms):

- $+$ highly relevant on the market

  > *Debian is now the most popular Linux distribution on web*
  > *servers* [*29.4% of FOSS, 9.6% of total*]
  >
  > — `w3techs.com`, *January 2012*

  - $+$ lack of enough trained engineers
  - $=$ student motivation (in theory)
- few, but important Debian-specific skills
  - ▶ reuse other common FOSS skill-sets

(Free) Resources

📄 Raphaël Hertzog, Roland Mas
   The Debian Administrator's Handbook
   `http://debian-handbook.info/`, 2012

also: `apt-get install debian-handbook`

Teaching Debian — as packaging technology

Teaching Debian packaging:

- not (yet) as relevant as Debian administration, but growing...
- ...and key in specific contexts
  - ► e.g. (derivative) distribution editors
  - ► e.g. companies with `.deb`-based deployment work-flows

(Free) Resources

📄 Lucas Nussbaum
Debian Packaging Tutorial
http://www.debian.org/doc/devel-manuals#packaging-tutorial, 2012
also: `apt-get install packaging-tutorial`
Already in lecture format with practical exercises — duration 4h–8h,
depending on the class level.

Using Debian as a teaching platform

Depends on your software needs and its availability in Debian.
Really.

- at high school level and below[2]
  - ▸ Debian Edu (AKA "Skolelinux") — a school lab, out of the box
  - ▸ http://www.slx.no/en/product
  - ▸ http://wiki.debian.org/DebianEdu
- at university level, computer science/engineering
  - ▸ very flexible for labs
  - ▸ good platform for development (using testing)
    - ★ fresh software, but more tested than development snapshots
    - ★ plenty of active per-language sub-communities
  - ▸ very good platform for OS-related classes
    - ★ consistent way to find system-level documentation
    - ★ easy and consistent way to retrieve sources and investigate more

---

[2]not my area of expertise

Wrap up

By using and contributing to Debian students can learn:

- team work: processes, discipline, peer review, management, . . .
- software life-cycle management
- development: patching complex code bases
- development: complex, world-wide infrastructure
- Free Software ethos

Thanks!

Questions?

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