What's missing so that Debian is *finally* Reproducible?

Mattia Rizzolo

DebConf 23

Kochi • India

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very incomplete list of people who have been working on *this*

akira • Alexis Bienvenüe • Alexander Couzens • Allen Gunn • Andrew Ayer • Asheesh Laroia • Bernhard M. Wiedemann • Boyuan Yang • Ceridwen • Chris Lamb • Chris West • Christoph Berg • Clint Adams • Dafydd Harries • Daniel Kahn Gillmor • Daniel Shahaf • Daniel Stender • David Suarez • Dhole • Drew Fisher • Emmanuel Bourg • Emanuel Bronshtein • Esa Peuha • Fabian Wolff • Frédéric Pierret • Guillem Jover • Hans-Christoph Steiner • Harlan Lieberman-Berg • Helmut Grohne • Holger Levsen • HW42 • Intrigeri • Jan Nieuwenhuizen • Jelle van der Waa • Jelmer Vernooij • josch • Juan Picca • Justin Cappos • kpcyrd • Levente 'anthraxx' Polyak • Lunar • Maria Glukhova • Mathieu Bridon • Mattia Rizzolo • Morten Linderud • Nicolas Boulenguez • Niels Thykier • Niko Tyni • Paul Wise • Peter De Wachter • Philip Rinn • Reiner Herrmann • Robbie Harwood • Roland Clobus • Santiago Vila • Sascha Steinbiss • Satyam Zode • Scarlett Clark • Stefano Rivera • Stefano Zacchiroli • Stéphane Glondu • Steven Chamberlain • Tom Fitzhenry • Vagrant Cascadian • Valerie Young • Valentin Lorentz • Wookey • Ximin Luo

(Huge sorry if YOU are missing!)

Who am I

Mattia Rizzolo / mattia@debian.org

Debian user since 2013, contributing since 2013, Debian member since 2015

Located in Milan, Italy

Working on Reproducible Builds since 2014


Reproducible
Builds

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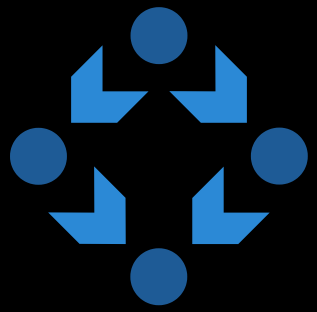
Introduction

Who doesn't know about Reproducible Builds, why and how?

I expect everybody in this room to know about the project, let's see if I was too optimistic!



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https://reproducible-builds.org

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What about other projects (AIUI)

Many projects support reproducible builds by now, but it's unclear what that means, how it's enforced and what that means for their users.

Their definitions also varies bit between each other.

As well as what they are focusing on

We still haven't found what we're looking for.

What about policies? What do projects really want?

100% can be politically challenging

Back to Debian

10 YEARS!

Reproducible Builds were first discussed at DebConf13...

..in a BoF hosted by Lunar sparking all of this. DebConf14 had another BoF.

Automated test builds at the end of 2014.

FOSDEM 2015: getting the wider FLOSS community involved.

diffoscope!

First summit at the end of 2015 in Athens.

DebConf15 had four people giving the talk...

“How can we get this done...???”

We wondered at the beginning of the *Stretch* development cycle.

Debian *9 / stretch*

The "reproducible in theory but not in practice" release

Debian *10 / buster*

The "we could be reproducible but we are not" release

Debian *11 / bullseye*

The "we are almost there but still haven't sorted out some requirements" release

Debian *12 / bookworm*

The "this should be mostly reproducible, but nobody verified it yet" release

Debian

9 / stretch	"reproducible in theory but not in practice"
10 / buster	"we could be reproducible but we are not"
11 / bullseye	"we are almost there but still haven't sorted out some requirements"
13 / bookworm	"this should be reproducible, but nobody verified it yet"

Debian *13 / trixie*

The first Debian release with some meaningful reproducibility?

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Debian issues in depth

1. ********
2. ********
3. ********
4. ********

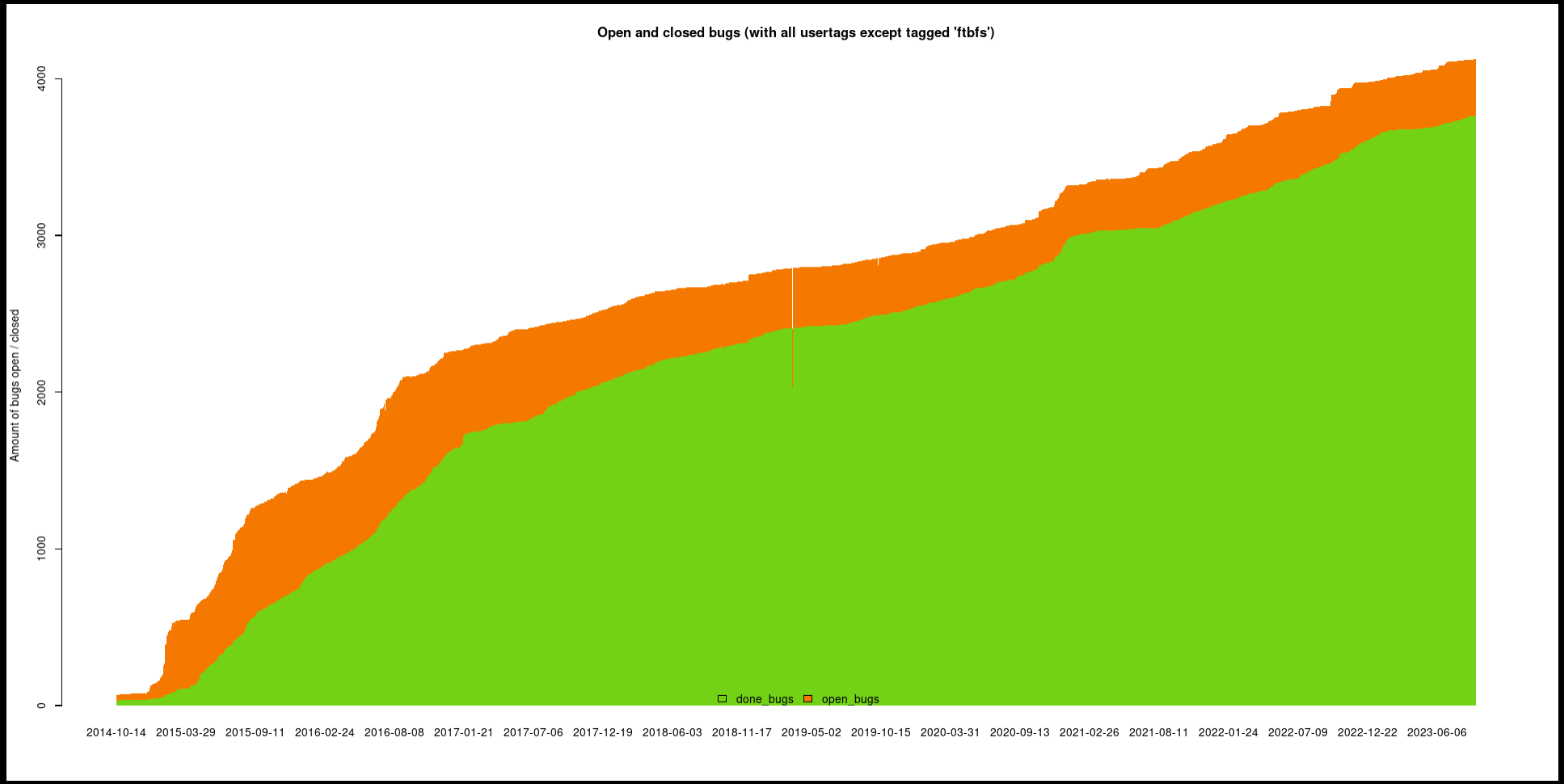
Debian 13 trixie on amd64 is currently 94% reproducible

That is a lie.

or rather: 94% are CI results.

I explain what's "wrong" with CI results in a moment...

94% reproducibility is neither a lie nor useless...



Those bugs are real.

That number (94%) hasn't meaningfully changed in a while

Depending on what you look and when you look, it goes from ~92% to ~96%, but that's hardly interesting.

CI versus rebuilds:

We have no **Debian** infrastructure rebuilding Debian packages. What runs on *tests.reproducible-builds.org* are builders, not rebuilders.

That's why we called 94% (or whatever) a "lie".

Up until recently we had two main blockers for rebuilders:

- >3000 packages without .buildinfo files, fixed mostly by Holger in February 2021 and in June 2022.
- snapshot.debian.org was (and is) unusable for rebuilds, partially sometimes fixed by Frédéric Pierret and josch since June 2021, by providing a partial mirror for amd64 only and only going back until January 2017.

CI versus rebuilds:

We have no **Debian** infrastructure rebuilding Debian packages. What runs on *tests.reproducible-builds.org* are builders, not rebuilders.

https://beta.tests.reproducible-builds.org/debian *is showing* rebuilds of ftp.debian.org - huge thanks to Frédéric Pierret for this PoC.

We are also aware of other similar setups, for example one in NYU; I'm not sure of their current status.

https://beta.tests.reproducible-builds.org/debian

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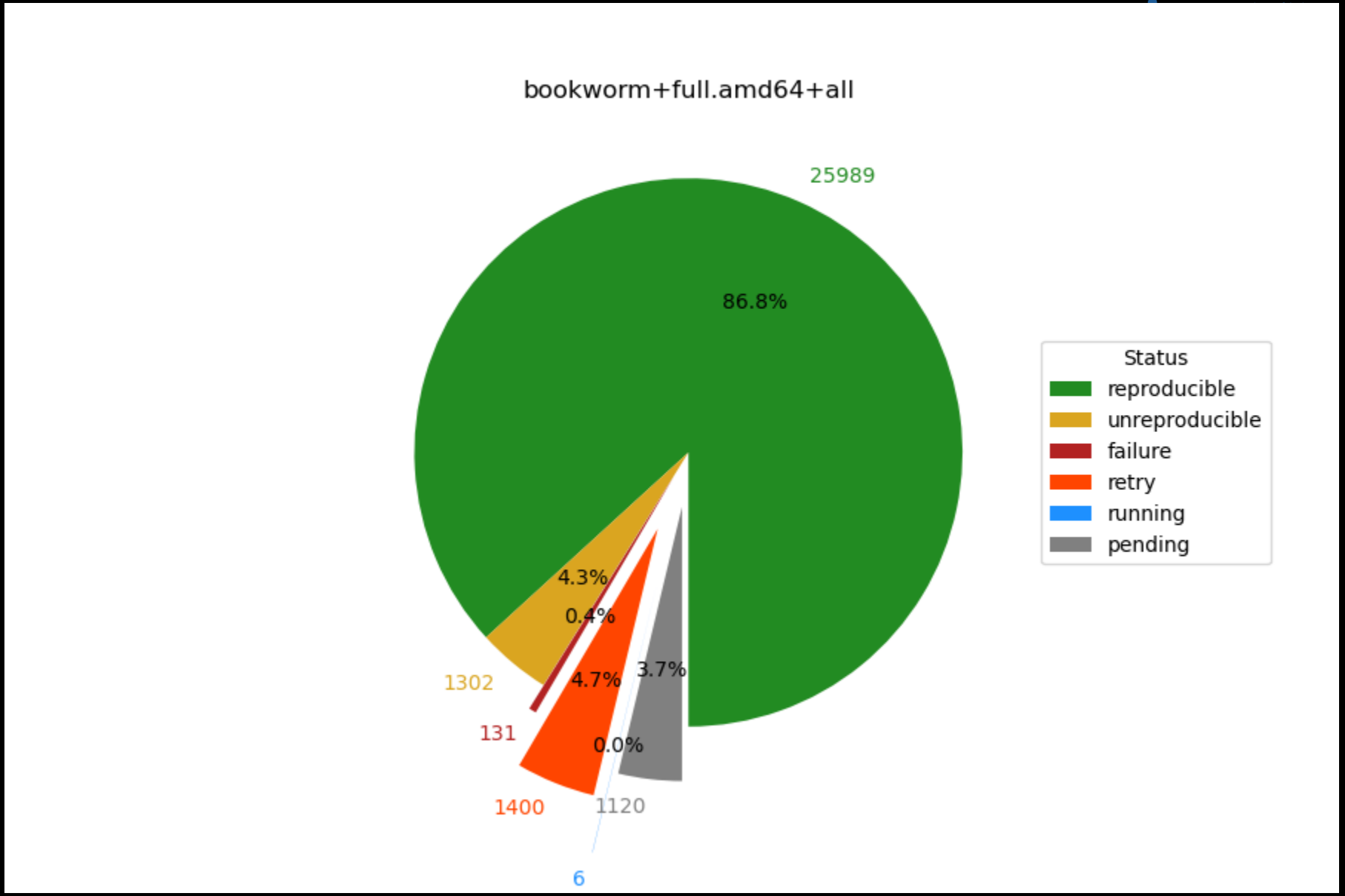

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Debian issues in depth

1. barely working *snapshot* service.
2. ********
3. ********
4. ********

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working around snapshot.debian.org

snapshot.debian.org was (and is) unusable for rebuilds, fixed by Frédéric Pierret and josch since June 2021, by providing a partial mirror for amd64 only and only going back until January 2017.

without a "working" snapshot.debian.org (it works, "just" not for our usecases) we cannot have reproducible Debian...

We are setting up snapshot.reproducible-builds.org ist, but... this really is wrong

snapshot.reproducible-builds.org

I consider working on this really out of scope for our group

We failed many times to establish any useful communication channels with the current snapshot.d.o people

one person maintaining this so far. Thank you very much, Frédéric Pierret, and sorry too.

improvements to our snapshot.debian.org mirror

https://salsa.debian.org/freexian-team/project-funding/-/merge_requests/14

Freexian is clearly not amused either, as they don't want to fund something that is unclear how it's going to be hooked up back into the current snapshot.debian.org

, we are trying to figure out where to go from there..

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Debian issues in depth

1. barely working *snapshot* service.

2. distribution of the buildinfo files.

3. ********

4. ********

"Solved" problems with `.buildinfo` files

Holger NMUed everything that was built before buildinfo files existed, however there are cases where packages without buildinfo files pop up (like packages going through NEW).

buildinfos.debian.net is just a PoC, but it works around #862073, #763822, #862538, #929397 (all against *ftp.debian.org* well enough.

We are doing a poor job at verifying the provenance of those buildinfo files (OpenPGP keys signing .buildinfo are usually not in the network, etc), so we just ignore signatures...

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Debian issues in depth

1. barely working *snapshot* service.
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3. big projects are not geared up to maintain their reproducibility
4. ********

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Big projects continue to be a pain to deal with

Projects like linux, gcc (for the build-essential set) and other similary big projects can be hard to work with.

Over the years many patches have been made to those projects, but they regularly regress due to upstream changes that don't take reproducibility in consideration

example: the Rust addition to Linux

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Debian issues in depth

1. barely working *snapshot* service

2. distribution of the buildinfo files

3. big projects are not quite keyed in keeping up their reproducibility

4. installation images

meaningful reproducibilty of Debian d-i images (amd64 only)

Roland Clobus has been working on reproducible live images for years now

This might just be me, but…

At least nowadays we have a working continuous testing system, with the builds done by jenkins and then the results tested on openqa.debian.net => great progress from last year!!

Still there are no buildinfo-like documents being

Still there are no buildinfo-like documents being produced

Debian issues in depth

Other issues…

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other issues, release team area

We are very happy that testing migration is blocked for binary uploads.

We very much like the idea of accellerating migration for reproducibility.

Debian policy: too early for "must", but maybe for *trixie* we can have "must not regress"?

(also) for this reason, we have recently stopped variating build-paths on *unstable*

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other issues, salsa CI related

"btw", *reprotest* is still basically unmaintained upstream.

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trixie goals

~1.5 years until the freeze.

0 packages without .buildinfo files (and stop regressing!)

build-essential reproducible.

d-i/live images reproducible and verified

a working snapshot service

a stably running rebuilder

more trixie goals (?)

snapshot.debian.org usable for mass rebuilds by many users for all architectures.

more rebuilders! (instead of more CI builders)

0 bugs with patches unuploaded. Currently there are 249 of these.

#863622: apt: warn when installing packages that are not reproducible

.buildinfo files known, used and properly distributed by dak.

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forky goals

Who knows where we are going...!

100% reproducible packages and distributed images for `forky`?

What else?

A liveable planet would also be really really nice. 🥵😱

Thank you

… and all the contributors out there!

Do you think reproducible builds should happen?
If so, please pick *one* of these bugs and help fixing.
We need your help.

https://wiki.debian.org/ReproducibleBuilds

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66AE 2B4A FCCF 3F52 DA18 4D18 4B04 3FCD B944 4540

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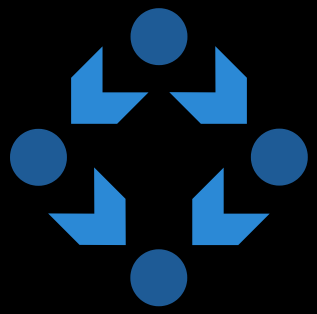
Thank you for coming!



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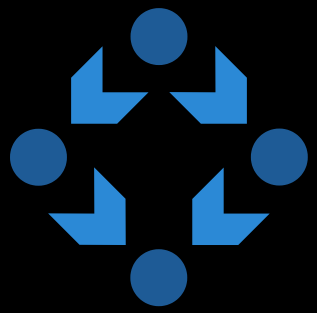

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Q & A ?

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Please enjoy DebConf23!