

Behind the Scenes of tox

The Journey of Rewriting a Python Tool with more
than ~~40~~ 18 Million Monthly Downloads

2023-04-19, PyCon DE & PyData Berlin

Jürgen Gmach



Canonical



Things You Should Never Do, Part I



“the single worst strategic mistake”

“They decided to rewrite
the code from scratch.”

All about me

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Maintainer of tox

PSF Fellow

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All about me

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hiring

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tox

Testing a library or an app

manual way

- create a virtual environment
- build package
- install the package
- install test dependencies, e.g. pytest, coverage
- run tests

And probably more, e.g. run linters, build documentation...

Testing a library or an app

the tox way

```
● ● ●  
  
# tox.ini  
[tox]  
envlist = py37, py38, py39, py310, py311  
  
[testenv]  
deps = pytest > 7  
commands = pytest tests  
  
# pipx install tox and run it  
tox
```

Initial tox release by Holger Krekel



2010-07-02

Bernát Gábor joined the tox team



2017-06

Soon he noticed...

tox was written with the following assumptions

It is used ...

- to create a Python environment
- on your local system
- to be configured via a tox.ini file
- to build source distributions
- to evaluate configuration eagerly

Bernát Gábor starts the first rewrite attempt



2017-12-21



Holger Krekel's last contribution



2018-03-24

Bernát noticed a pattern in the bug reports for tox



Bernát Gábor became a maintainer of virtualenv



Bernát Gábor started rewriting virtualenv



I asked a fellow Zope maintainer how to test a package both with Python 2 and 3



2018-12-15

Release of virtualenv

Lessons from the Trenches: rewriting and re-releasing virtualenv

<https://www.youtube.com/watch?v=l9A0a8qZgOs>



2020-02-10

Bernát announced the tox 2nd ed. rewrite on Twitter



First commit for the tox rewrite



2020-03-29

Bernát started streaming the rewrite on Twitch



I started answering tox questions on StackOverflow



2020-10-05

“Tool confusion - pythonic code with flake8, tox and pre-commit”

Python Ireland

<https://www.youtube.com/watch?v=9ZkjNJpUSLY>



2020-10-14

I started contributing to discussions and github issues



2020-11-09

Bernát announced tox4 alpha 2



2021-01-08

Test tox4 alpha2 against 300 Zope repositories



2021-02-07

22%

success rate

22%

success rate

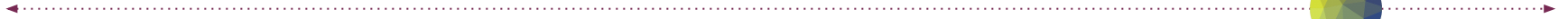
“a 22% success here, not that great news 😊 but on the plus side seems if we fix zope we should be in a decent place”

Bernát Gábor

Feedback on Twitter

Bernát: “From plugins point of view version 4 will be totally breaking.”

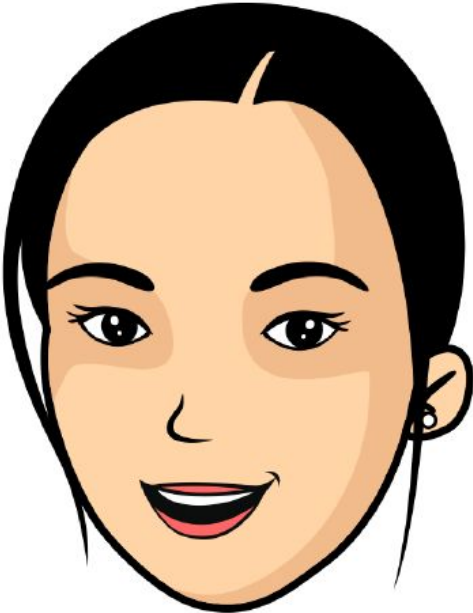
Oliver: “Are the people with the torches and pitchforks at the gates already?”



2021-03-01

Feedback on Github

Cheuk Ting Ho: "I love tox"



2021-03-15

First “serious” pull request



2021-03-20

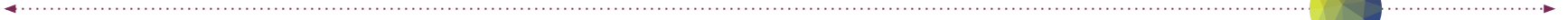
Bernát announced me as a tox maintainer



2021-04-05

“Testing the tox4 Pre-Release at Plone-/Zope-Scale”

World Plone Day



2021-04-17

Bernát announced tox4 at PyCon US via lightning talk



2021-05-15

Life happened



Life happened

- Bernát moved to the US



Life happened

- Bernát moved to the US
- I built a house



Life happened

- Bernát moved to the US
- I built a house
- I joined Canonical



Torches and pitchforks



<https://pixabay.com/de/photos/m%c3%a4nner-appenzeller-brauchtum-394235/>

Just release it

“That multi-year rewrite seems to never reach GA. If it was a business it would have being bankrupt one long time ago.”



2022-04-22

Just release it

“That multi-year rewrite seems to never reach GA. If it was a business it would have being bankrupt one long time ago.”



2022-04-22

“Such a major release will ultimately break a lot of people, and we need maintainer availability to help those users and address their concerns.” Bernát Gábor

Dependency with "vulnerable" version of pylib

a drama in two acts



Dependency with "vulnerable" version of pylib

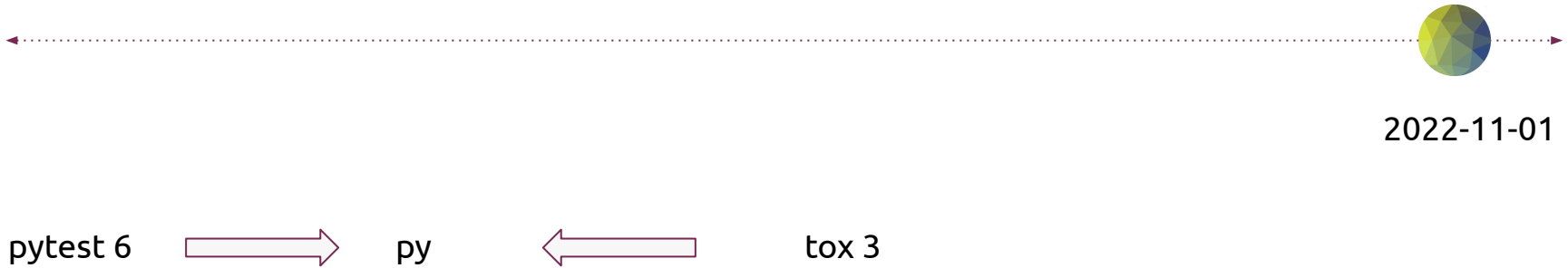
1. tox breaks CI




2022-11-01

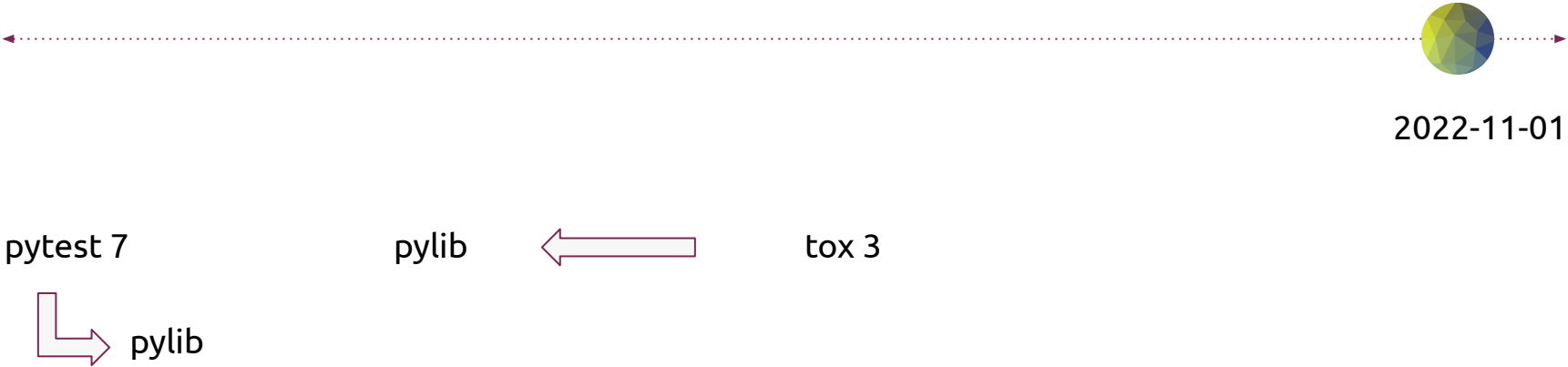
Dependency with "vulnerable" version of pylib

2. tox gets broken



Dependency with "vulnerable" version of pylib

2. tox gets broken

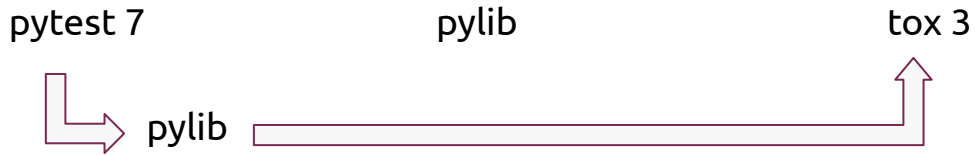


Dependency with "vulnerable" version of pylib

2. tox gets broken



2022-11-01



Sorin to the rescue

Sorin Sbârnea announced to be able to work a full week on tox4.



2022-11-22

Release

Only three years later!



2022-12-07

Post-release different things happened

- lots of regressions
- lots of complaints
- lots of contributions from ~50 contributors
- lots of praise

Hyrum's law

With a sufficient number of users of an API,
it does not matter what you promise in the contract:
all observable behaviors of your system
will be depended on by somebody.

I am not your supplier

<https://www.softwaremaxims.com/blog/not-a-supplier>

<https://testandcode.com/196>

Highlights

- configurable via tox.ini, cli and environment variables
- faster
- easily extensible
- built-in wheel support
- support for grouping aka labels
- evaluate configuration lazily

<https://tox.wiki/en/latest/faq.html#new-features-in-tox-4>

Abstractions

- config -> configuration management
- execute -> command execution inside environments
- journal -> result recording of a tox session
- plugin -> plugin management
- session -> command management
- tox_env -> tox environment management

=> evolved, not right from the beginning

What we did well

- automated test suite
- announcements on various channels and calls to action to test pre-releases
- stick around after release
- keep a legacy branch
- keep old documentation
- keep releasing critical updates to the tox 3 branch, though it is officially unmaintained

What we could have done better

What we could have done better

nothing

What we could have done better

nothing - given the resources

Lessons learned

- have a plan
- test a lot
- be available post-release
- prepare for bugfixes in the coming months after the release
- be ready to re-evaluate everything from the ground up
- be nice, but set boundaries

And ... legends are not always right!

Thank you!

