Community weather radar software and Open Science

Daniel Michelson

Environment and Climate Change Canada

Short Course on Community Radar Software

1 July 2018

Ede, Netherlands

open source buzz words
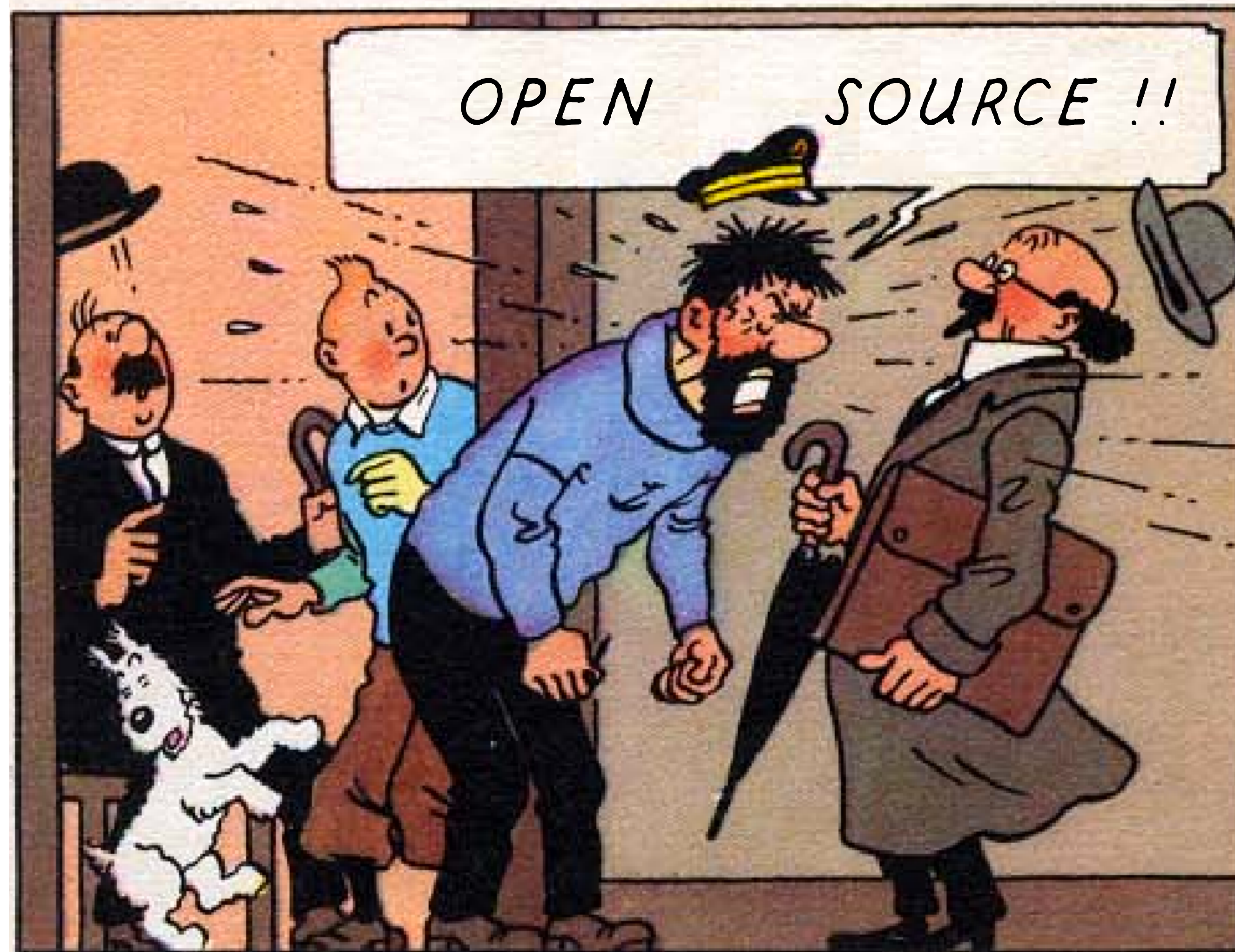
Open
Free/libre
Transparent
Collaborative
Social coding
Crowd sourcing
Yada yada yada ...

how it can sound ...

what we really want is …

Open Data + Open Algorithms + Open Software + Open Peer Review + Open Access = OPEN SCIENCE
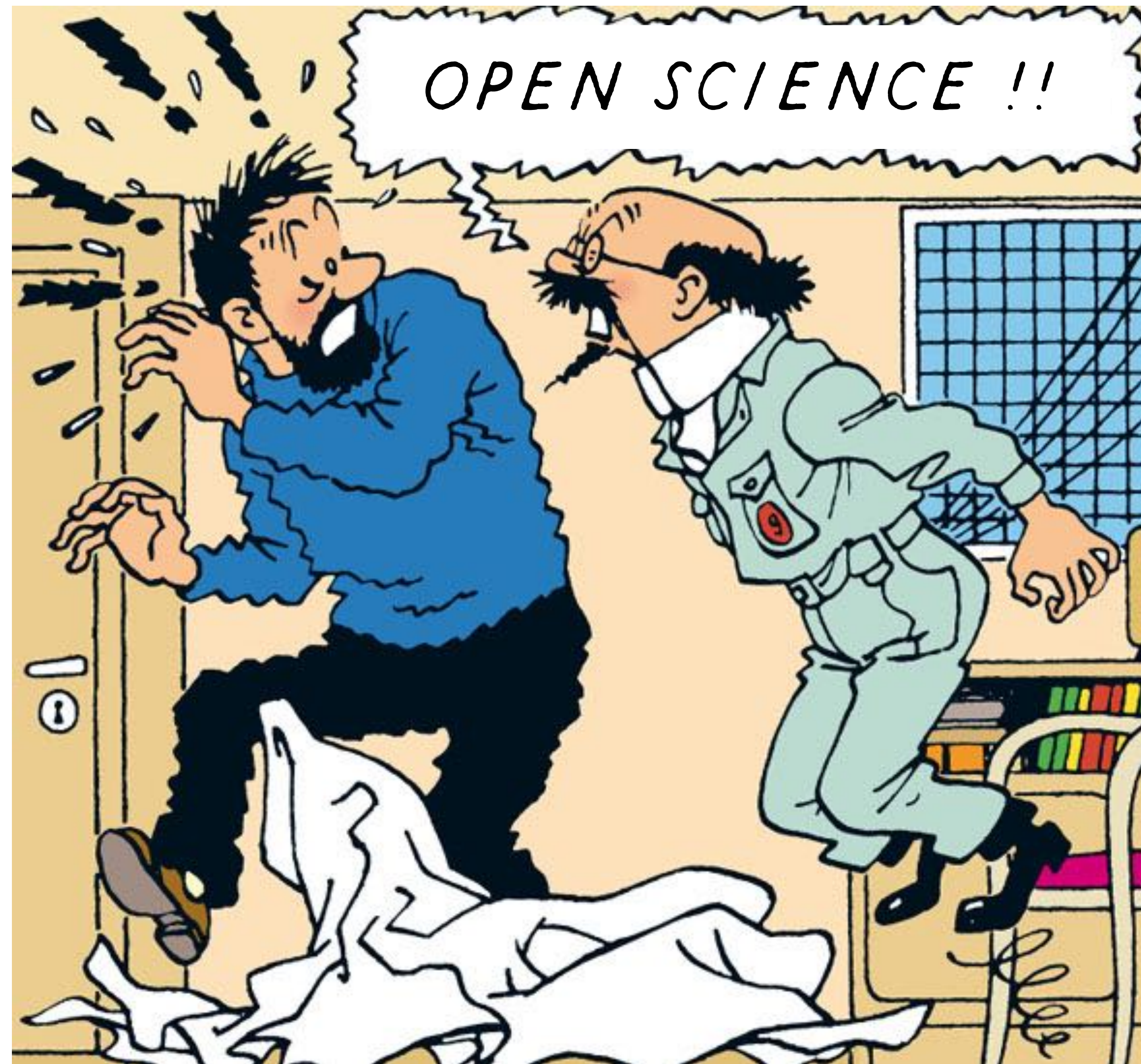
Thereby, science can be:

- ✓ Transparent
- ✓ Reproducible
- ✓ Transferrable
- ✓ Credible!
- ✓ Durable, sustainable
- ✓ Collaborative

IMPORTANT!

No conflict between IPR and licensing.

SO …

reproducibility crisis

In relevant academic publications:

- Algorithmic documentation is incomplete

- Unavailability of:

  - Data

  - Software code

  - Ancillary code (e.g. for creating figures)

- Results cannot be replicated and verified

Why?

- Rapid computational revolution, unmatched IT skills

- Main barrier: perceived lack of time for sharing code

incentives?

"What's in it for me?"

"What will I have to show for my efforts?"

Incentive structures must be aligned to encourage genuine collaboration.

✓Personal incentives (career advancement, job satisfaction)
✓Organizational incentives
✓National incentives

Measuring "impact".

open source community approach

To build a better computational foundation for science that would be, compared to the existing commercial alternatives and traditions:

✓ Technically superior.

✓ Openly developed from the start: no more black boxes.

✓ Based on validated, tested, documented, reusable code whose problems are publicly discussed and tracked.

✓ Built collaboratively, with everyone participating as equal partners and worrying first about solving the problems, not about who is first author or grant PI.

✓ Licensed as open source but in a way that encourages industry participation and collaboration.

what is "community"?

"a specific group of people, from a particular patch of earth, who knew and judged and kept an eye on one another, who shared habits and history and memories, and could at times be persuaded to act as a whole on behalf of a part."

Anand Giridharadas

Examples:

"... is a pillar of the community."

"A bad man is a plague spot in a community."

"communities"

Intelligence community

Business community

Faith community

European Community

International community

Software developer community

Scientific community

Medical community

Venture capital community

One people one community

roll of community

Less about looking out for each other (although we s

More about lobbying for the same things.

"People will only trust your product ... if you show th
about the product but about the community you wis

f Like

Träffas och ha äkta skoj?

Gå med i vår community för
människor som söker ÄKTA skoj i
ditt område!

●●●○○ ROGERS 3G 07:06 ⏱ 45 % ▭

Daniel, it's the little things we do together
and for each other that make community
matter. From all of us at Facebook, here's a
video celebrating how you and your
community are better together.

thanks for being part
of the community

🔒 Only you can see this unless you share it

✏ Edit   ➤ Share

mitigating the reproducibility crisis

A minimum standard for publication.

Authors: in a Section called e.g. "Computational procedures":

✓Statement describing code availability and accessibility

✓High-level description of computational environment, with DOI or URL references

✓Use a code repository (version control!) containing exact OS and software versions

✓Provide log files reflecting processing steps

Reviewers: is there enough information to allow testing/repeating by others?

open science solutions

Marketable skill

✓ Easier to recruit/replace, succession plan

✓ Increases work gratification (potentially)

licensing - floss
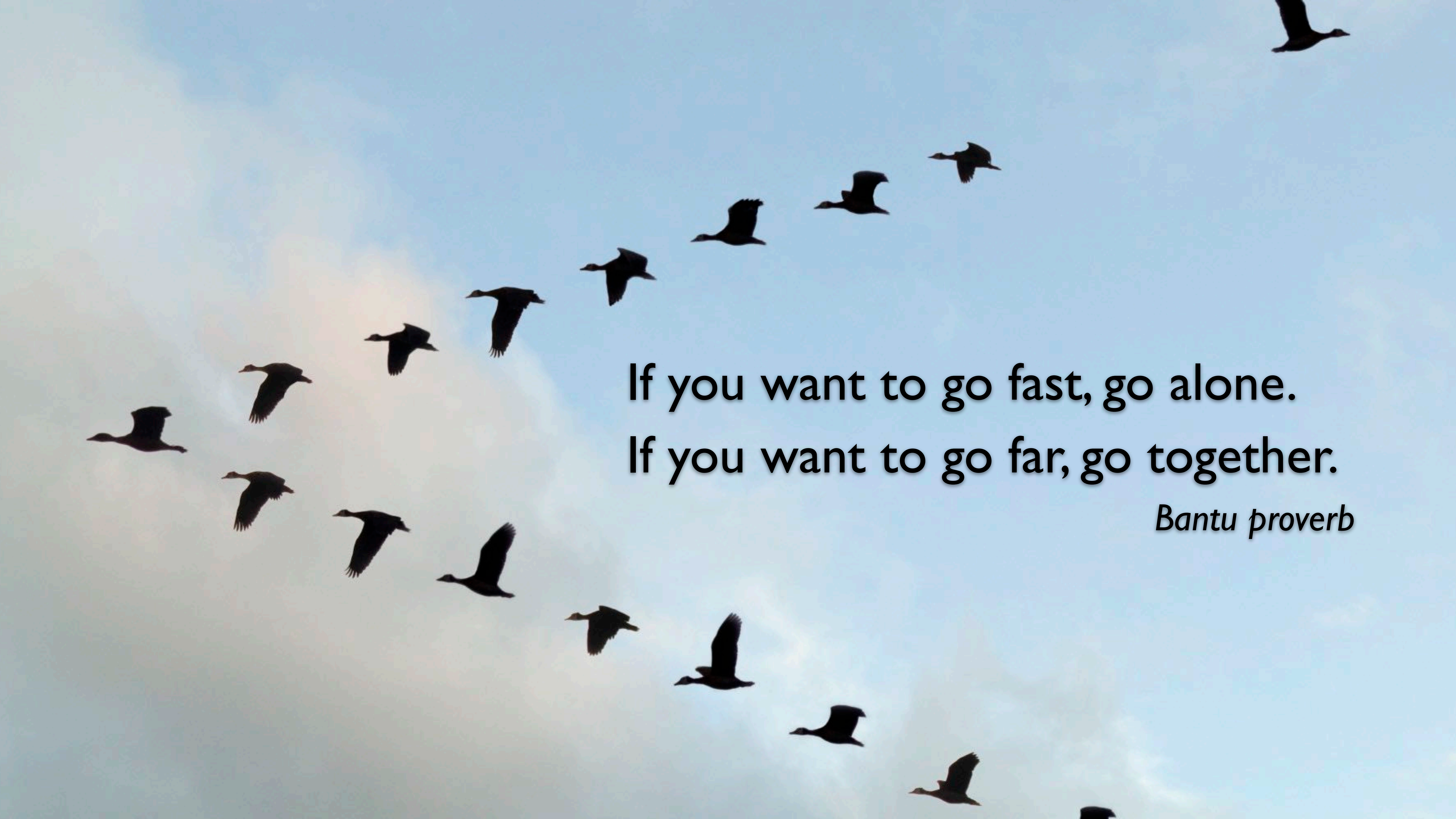
Free/libre and Open Source Software

€
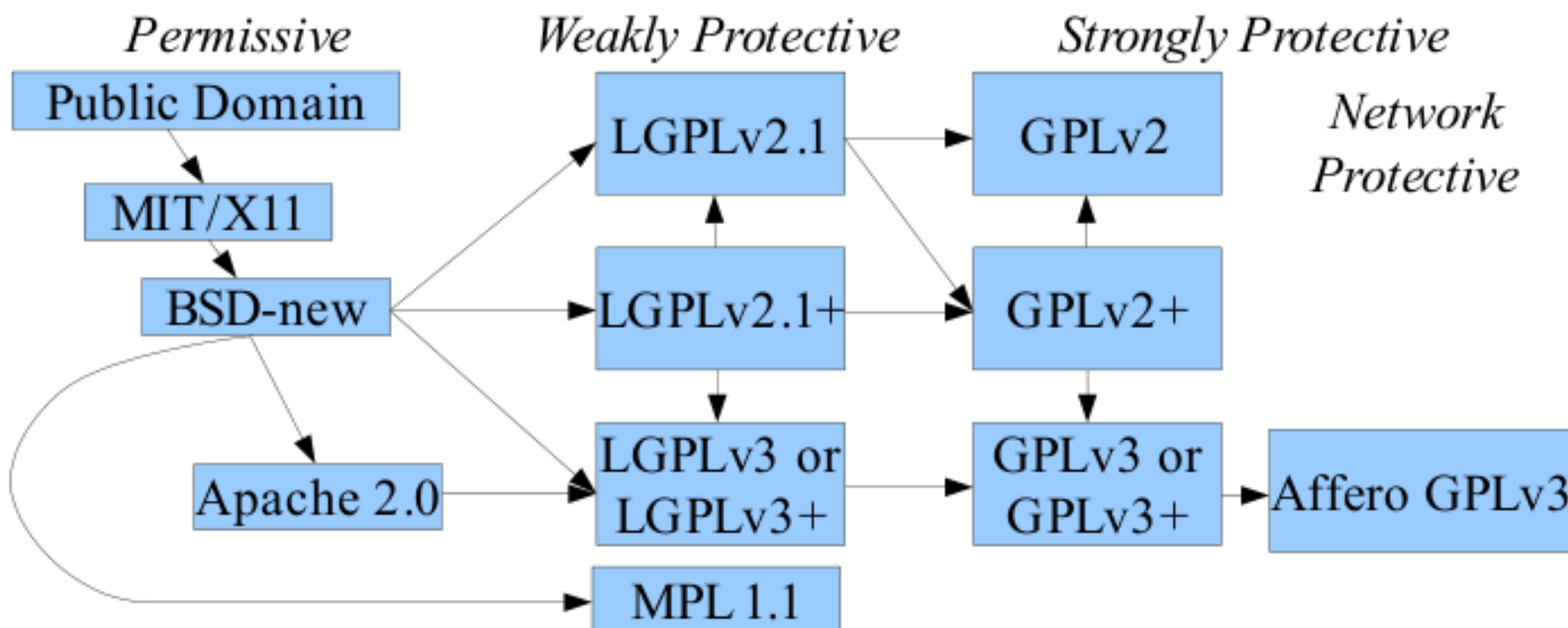
unit testing

A software development process in which the smallest testable parts of an application are individually and independently scrutinized for proper operation.

+ Good housekeeping
+ Helps achieve consistency/stability
+ Facilitates technology and knowledge transfer
+ Reduces vulnerability
+ Collaborative infrastructure – don't break others' code
- Requires time and effort
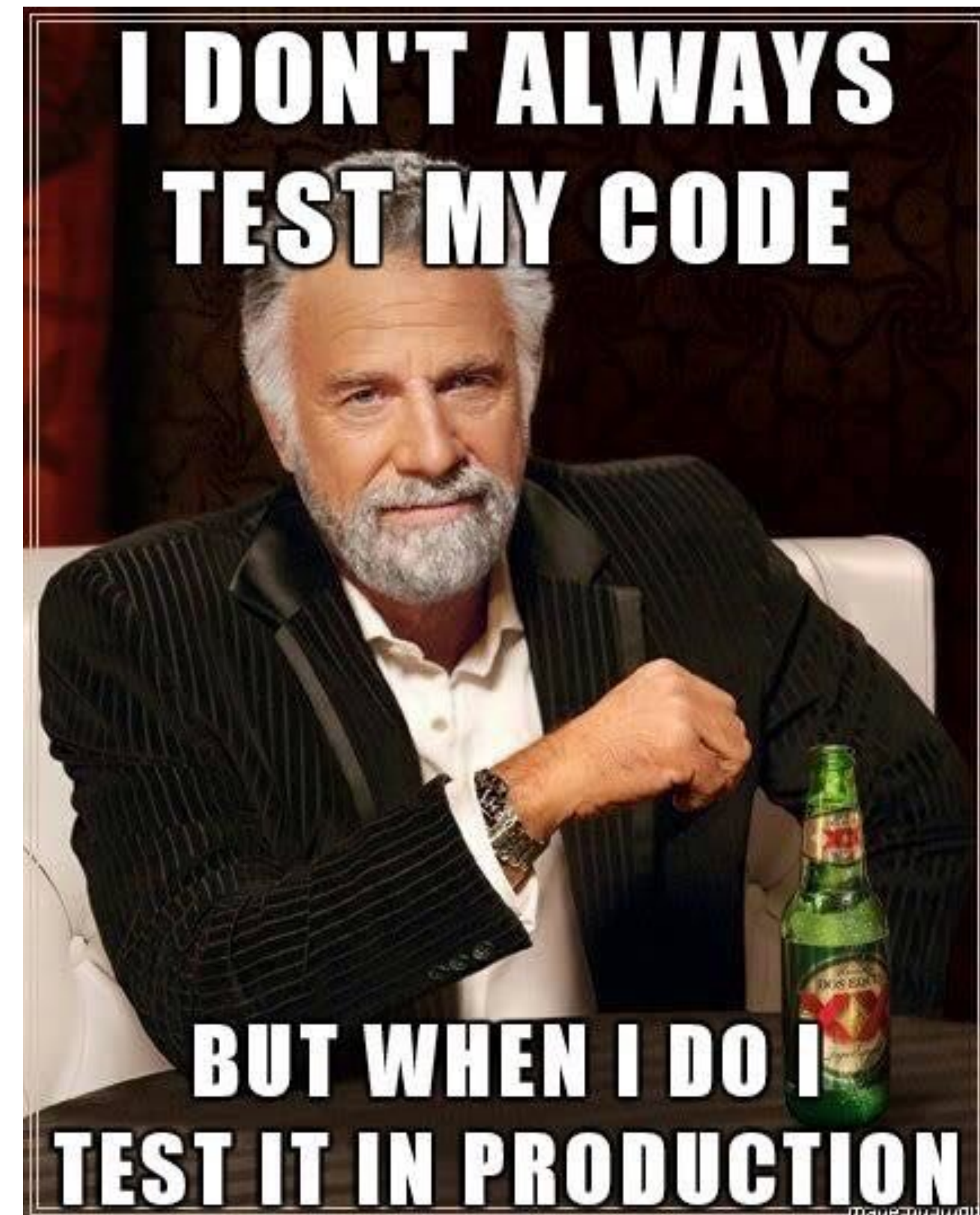
If you want to go fast, go alone.
If you want to go far, go together.

Bantu proverb

references

An ambitious experiment in Data Science takes off: a biased,
Open Source view from Berkeley
Fernando Perez, 12 November 2013. blog.fperez.org

Draining the life from 'community'
Anand Giridharadas, IHT, 21-22 September 2013

A minimum standard for publishing computational results in the
weather and climate sciences
Damian Irving, 2016: *BAMS*. https://doi.org/10.1175/BAMS-D-15-00010.1