A System for Automating Reproducibility in Science

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https://github.com/tomcrick/DSCatalyst

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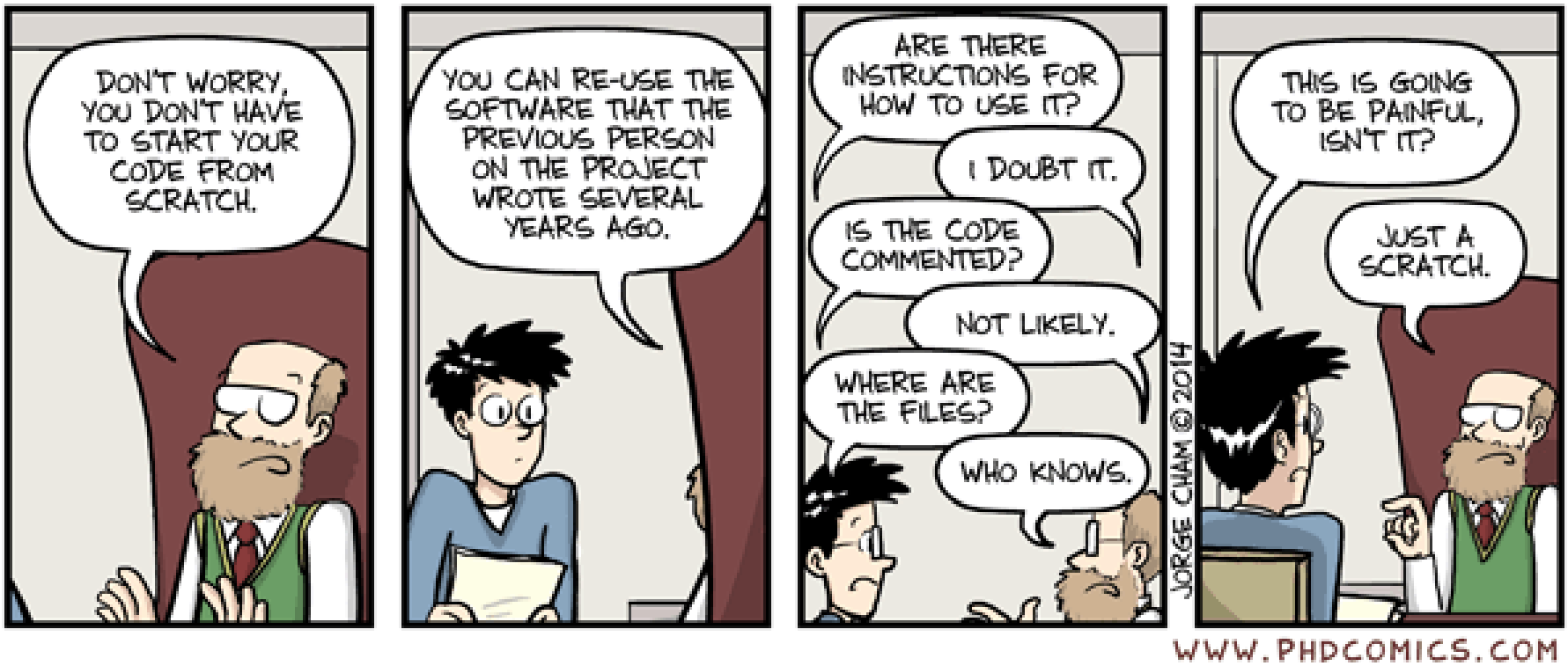
Our Computational World

"[Computational techniques] have moved on from assisting scientists in doing science, to transforming both how science is done and what science is done."

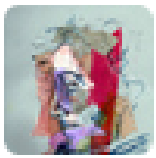
Science as an open enterprise, Royal Society (June 2012)

`https://royalsociety.org/policy/projects/science-public-enterprise/`

Motivation


DON'T WORRY, YOU DON'T HAVE TO START YOUR CODE FROM SCRATCH.
YOU CAN RE-USE THE SOFTWARE THAT THE PREVIOUS PERSON ON THE PROJECT WROTE SEVERAL YEARS AGO.
ARE THERE INSTRUCTIONS FOR HOW TO USE IT?
I DOUBT IT.
IS THE CODE COMMENTED?
NOT LIKELY.
WHERE ARE THE FILES?
WHO KNOWS.
JORGE CHAM © 2014
THIS IS GOING TO BE PAINFUL, ISN'T IT?
JUST A SCRATCH.
WWW.PHDCOMICS.COM

Motivation



Ian Holmes
@ianholmes

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You can download our code from the URL supplied. Good luck downloading the only postdoc who can get it to run, though #overlyhonestmethods

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4:52 PM - 8 Jan 2013

Sharing

Two key types of results arise from work done in the computational sciences:

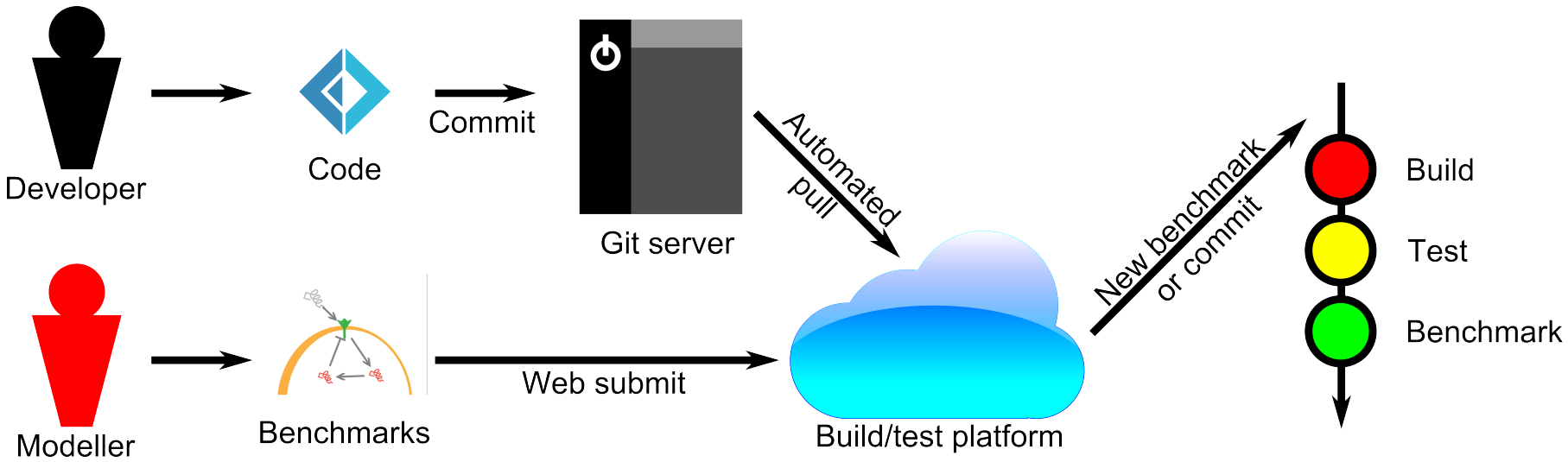
- Models
- Algorithms

Fundamental advantage of computer science and more broadly, computational science: **the unique ability to share the raw outputs of their research as software and datafiles.**

A System for Automating Reproducibility in Science

- Open software, algorithms and models
- Open and community curated benchmarks
- Integrated continuous integration system: authoritative source of results for these algorithms running on these benchmarks.

Proposed Workflow



Plan

- Build a cloud service which automatically pulls and compiles code from source repos;
- Run automated tests defined by the developers on the code;
- Perform analysis of benchmark sets supplied by both the developer and external users;
- Provide persistent audit trails for software and benchmarks results;
- Collaborate with key stakeholders in the open software/open data/open access/open science space, as well as key e-infrastructure organisations e.g. GitHub, figshare, SSI, Mozilla Science Lab, Digital Science, etc.
- Follow-on funding...
- **Key:** engage with communities to embed system/workflow and effect cultural change.

References

- Tom Crick, Benjamin A. Hall, Samin Ishtiaq and Kenji Takeda. *"Share and Enjoy": Publishing Useful and Usable Scientific Models*. In 1st International Workshop on Recomputability, 2014: `http://arxiv.org/abs/1409.0367`
- Tom Crick, Benjamin A. Hall and Samin Ishtiaq. *"Can I Implement Your Algorithm?": A Model for Reproducible Research Software*. In Proceedings of 2nd International Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE2), 2014: `http://arxiv.org/abs/1407.5981`
- Digital Science Catalyst Grant: `https://github.com/tomcrick/DSCatalyst` (Nov 2014)
- Microsoft Azure for Research Grant: `https://github.com/tomcrick/Azure4Research` (Dec 2014)