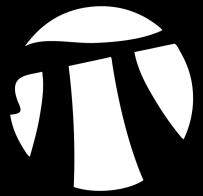
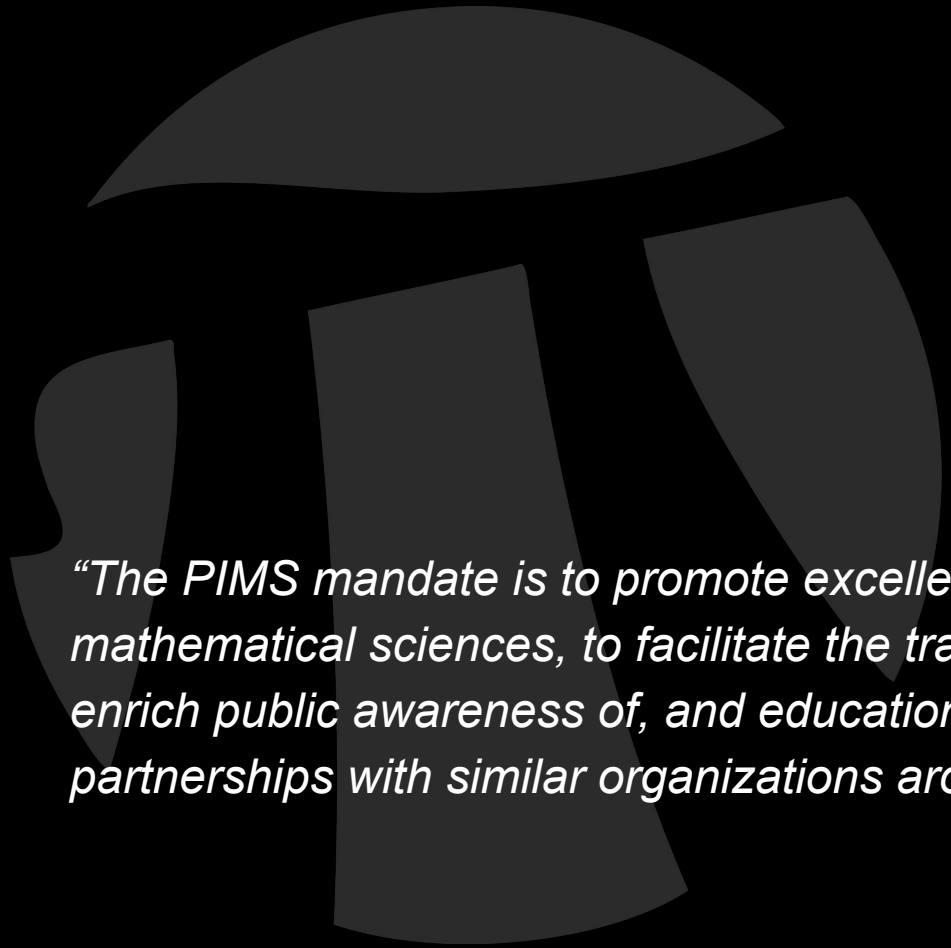
Canadians Land on Jupyter

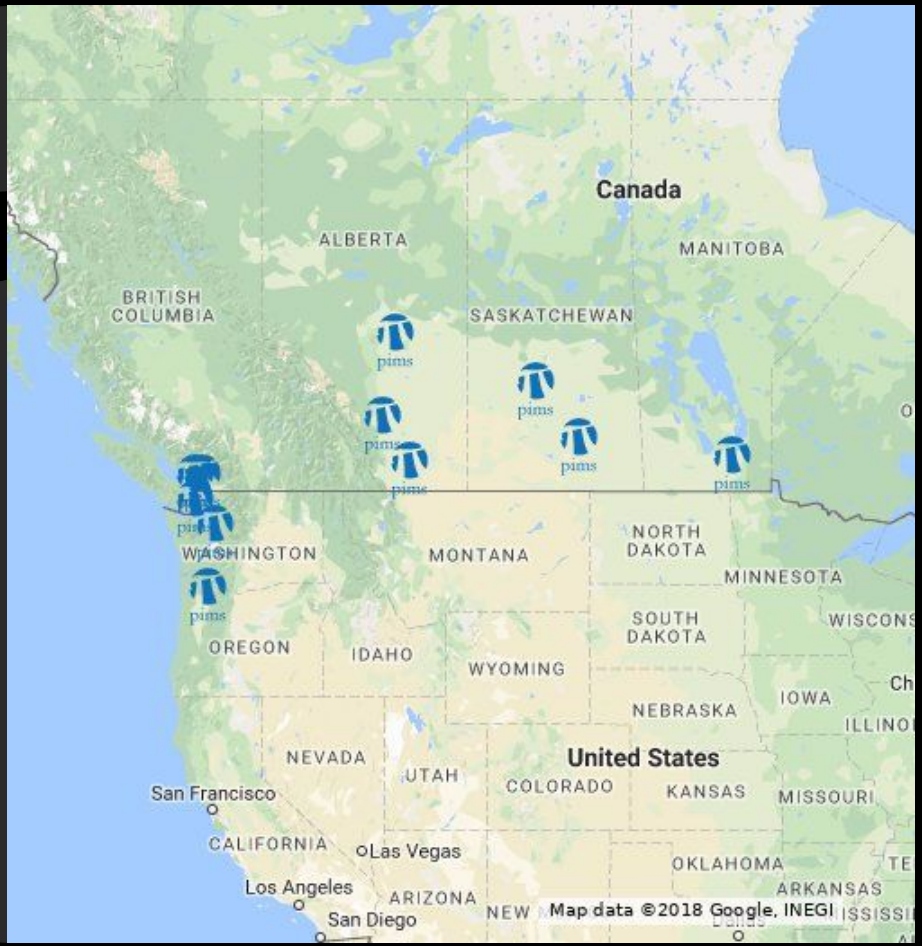
Dr. Ian Allison
Dr. James Colliander



Pacific Institute *for the* Mathematical Sciences



“The PIMS mandate is to promote excellent research and applications of the mathematical sciences, to facilitate the training of highly qualified personnel, to enrich public awareness of, and education in, mathematics, and to create partnerships with similar organizations around the world.”


Canada
ALBERTA
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OREGON
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How do we ensure that students and researchers have access to the tools they need?

syzygy

syzygy

ˈsizijē/ *noun* ASTRONOMY; ˈsizijē/ *noun* MATHEMATICS; ˈsizijē/ *noun* BIOLOGY;

ˈsizijē/ *noun*; A collaboration between PIMS, Cybera and Compute Canada to make **institutional** JupyterHub's available across Canada

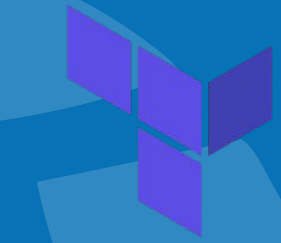
computecanada

cybera

syzygy: Design Goals

- *Super simple access*
- *Automate and minimize admin*
- *Be hardware agnostic*
- *Partition resources*
- *Share everything!*

Tools and Resources

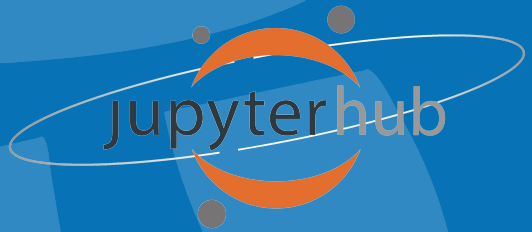


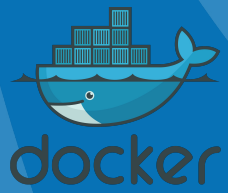
HashiCorp
Terraform

ANSIBLE

Terraform - *Infrastructure as code*

Ansible - *Simple IT Automation*



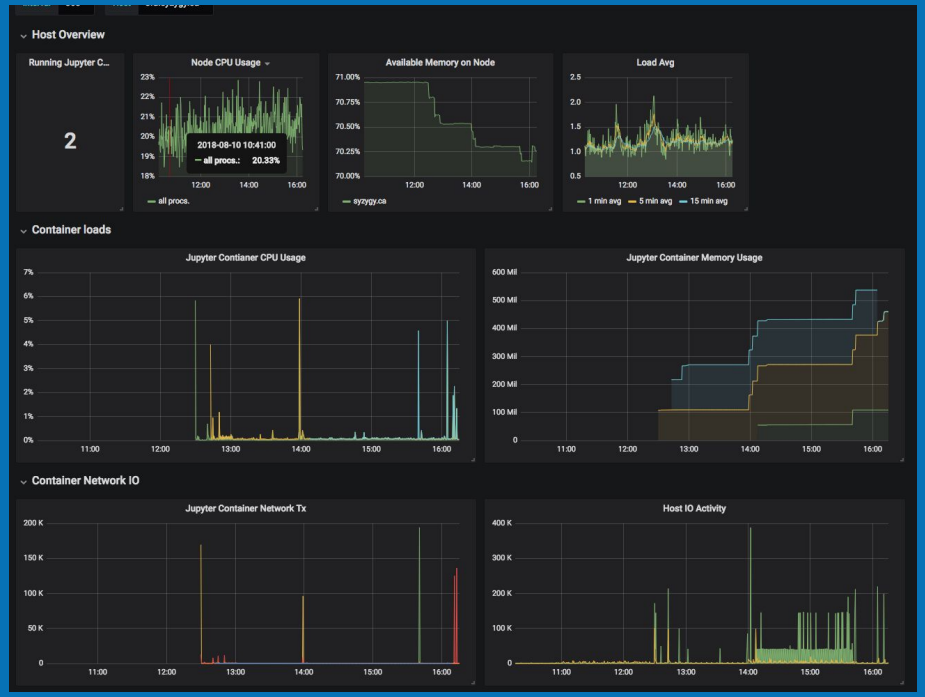


ZFS

syzygy - The Moving parts

- *JupyterHub*
- *Shibboleth*
- *DockerSpawner*
- *ZFS, dehydrated, ...*

Monitoring: Prometheus & Grafana



syzygy Today

By the Numbers

- *19 Hubs; 14 universities + “others”*
- *3 clouds + some metal*
- *~8000 users (400,000 have access)*
- *5 TB of Disk used (/home + docker)*
- *567 GB of memory*
- *124 CPU cores*

Testimonials

“Syzygy gives my students access to modern, cloud-based computing in a format that feels natural to them, even those unfamiliar with computing.”

“[Jupyter] matches the expectations and needs of students in many disciplines working with data to build arguments.”

- Meghan Allen & Steve Wolfman, CS103

Testimonials

“In 2017 and 2018, I co-hosted the BC Data Science Workshop, featuring an array of student teams collaborating with their respective industry mentors … Using syzygy and JupyterHub as the interface for the participants streamlined both their experience and ours. The configuration was painless and allowed us to minimize the number of moving parts with which students needed to be familiarized”

- Aaron Berk, PhD student, Organizer: BCdata workshop

Testimonials

“I estimate the number of hours students are engaged with software and data has increased 10-fold. Syzygy has removed significant barriers to entry for math students pursuing careers in data and computation.”

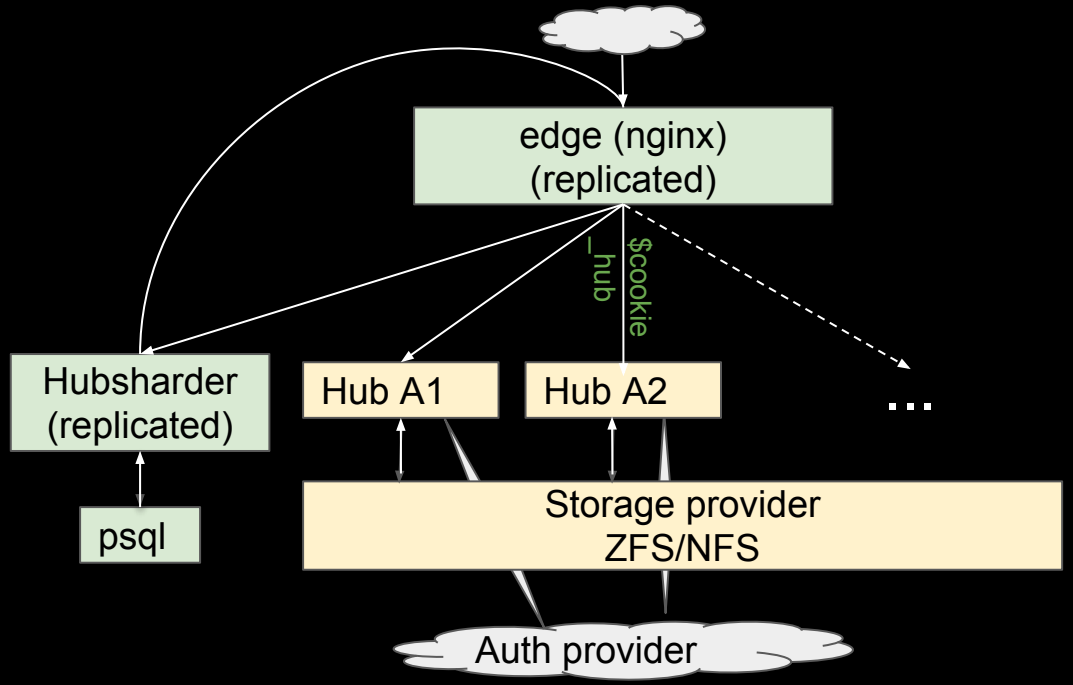
- Patrick Walls, S^3 + Math 210 Introduction to Mathematical Computing

syzygy Tomorrow

Plans - Technical

How many users can a Hub handle?

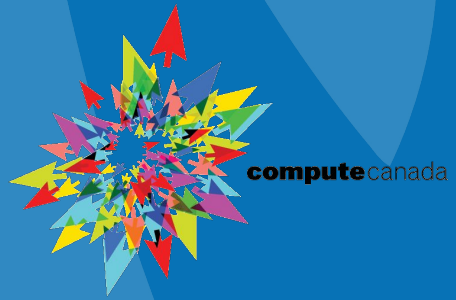
*What about 10 * N, 100 * N, … ?*



Plans - Community

- *More syzygy hubs!*
- *Teaching and Research*
- *Social Collaboration Structures*
  - *Workshops*
  - *University-Industry*
  - *University-Government*

Félix-Antoine Fortin



- *Compute Canada Clusters*
- *github.com/cmd-ntrf/jupyter-lmod* + *CVMFS*
- *Clusters cloud-init*
- *Cloud-init deployments; Workshops*

Effort > Expertise

- Most of this is implementation not development
- There's a huge appetite for that implementation!

Canadians Have Landed on Jupyter.

Callysto

Thank You