

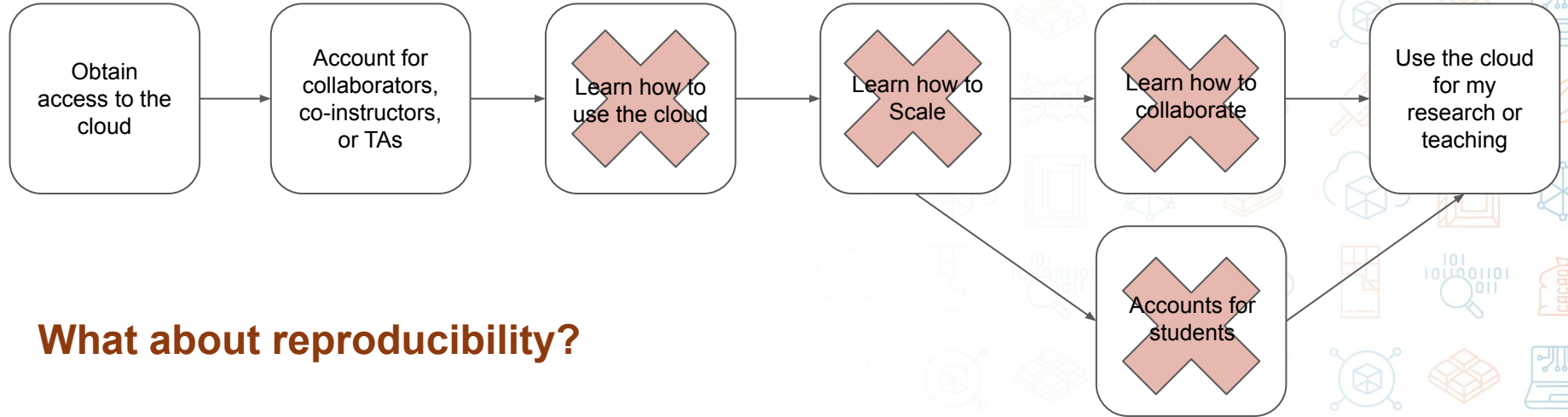


Cloud Automation & Continuous Analysis Orchestration

CACAO for Workshops

Michele Cosi
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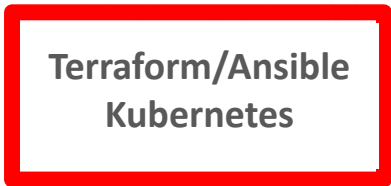
Process in using the cloud for research or teaching



What about reproducibility?



Researcher
Educator
RSP*



Jetstream2



Kubernetes



Edge Clouds

What are templates? Think "recipes".

Salted Brown Butter Crispy Treats

Name

What's different about these? Oh, just a bit more (cough*double*) butter which you toast until it's brown and nutty and help along with some coarse salt, just minor things. But it changes *everything*.

Purpose/ Yield

Makes 16 2-inch squares or 32 1- x 2-inch small bars

Ingredients

4 ounces (1/4 pound or 1 stick) unsalted butter, plus extra for the pan
1 10-ounce bag marshmallows
Heaping 1/4 teaspoon coarse sea salt
6 cups Rice Krispies cereal (about half a 12-ounce box)

Instructions

Butter (or coat with non-stick spray) an 8-inch square cake pan with 2-inch sides.

In a large pot, melt butter over medium-low heat. It will melt, then foam, then turn clear golden and finally start to turn brown and smell nutty. Stir frequently, scraping up any bits from the bottom as you do. Don't take your eyes off the pot as while you may be impatient for it to start browning, the period between the time the butter begins to take on color and the point where it burns is often less than a minute.

As soon as the butter takes on a nutty color, turn the heat off and stir in the marshmallows. The residual heat from the melted butter should be enough to melt them, but if it is not, turn it back on low until the marshmallows are smooth.

Remove the pot from the stove and stir in the salt and cereal together. Quickly spread into prepared pan. I liked to use a piece of waxed or parchment paper that I've sprayed with oil to press it firmly and evenly into the edges and corners, though a silicon spatula works *almost* as well.

Let cool, cut into squares and get ready to make new friends.

Lessons learned

Other metadata:

Author(s)

Dependencies

Equipment

Customization (configurable parameters)

Scaling up your recipe

What is not metadata?

Provenance

Time and cost of experimentation
(aka blood, sweat, tears)

Lessons learned



jupyterhub

] Name

Created by: Edwin Skidmore

Launch a multi-vm zero-to-jupyterhub

] Purpose/
Yield

openstack_compute

openstack terraform

] Ingredients

Updated: 8/30/2023, 1:23:15 PM

Imported by: xuzzy73@access-ci.org

Scaling

Customization

New Deployment: jupyterhub JETSTREAM 2 / TRA220028

Region —
 2 Parameters —
 3 Authentication —
 4 Users —
 5 Storage —
 6 Image —
 7 Review & Deploy

Deployment Name *

Image
Featured-Ubuntu20

No. of Instances * Master Flavor
m3.medium

Selecting a GPU flavor will install GPU kubernetes drivers.

Advanced Settings

START OVER PREVIOUS NEXT

Example Templates

<u>Name</u>	<u>Purpose</u>	<u>Git repo</u>
single-image	Deploy one or more instances	https://gitlab.com/cyverse/cacao-tf-os-ops/-/tree/main/single-image
single-image-k3s	Deploy a k3s cluster with multiple nodes	https://gitlab.com/cyverse/cacao-tf-os-ops/-/tree/main/single-image-k3s
vms4workshop	Deploy a set of instances with instructor and separate student instances, with a desktop and ssh	https://gitlab.com/cyverse/cacao-tf-os-ops/-/tree/main/vms4workshop
single-image-docker	Deploy one or more instances configured as a docker stacks	https://gitlab.com/cyverse/cacao-tf-os-ops/-/tree/main/single-image-docker
cacao-tf-jupyterhub	Deploy a Zero to Jupyterhub with multiple nodes configurable GPUs, Shared Storage, and other configurable options; Dask Gateway as an option	https://gitlab.com/stack0/cacao-tf-jupyterhub
colab	Deploy a vm to use with Google Colab	https://gitlab.com/stack0/jippy
cacao-tf-danswer	Open source LLM chat interface	https://gitlab.com/stack0/cacao-tf-danswer.git
text-generation-webui	Open source LLM chat interface for research	https://github.com/edwins/text-generation-webui.git

CACAO, Researcher and Educator templates

- Community requested for JS2 and AWS curated templates
- Community contributed
- Best practices (security, appropriate resources, gpus drivers, etc)
- Sharing (or restricting)
- Reproducibility
- Customizable
- Scalable
- Reduce onboarding



CACAO Use Cases

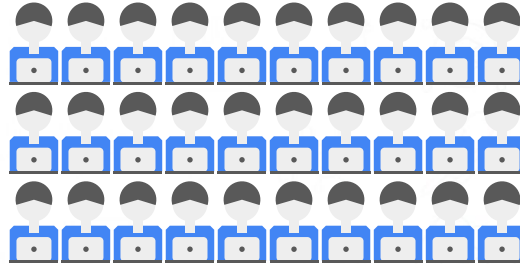


Professor

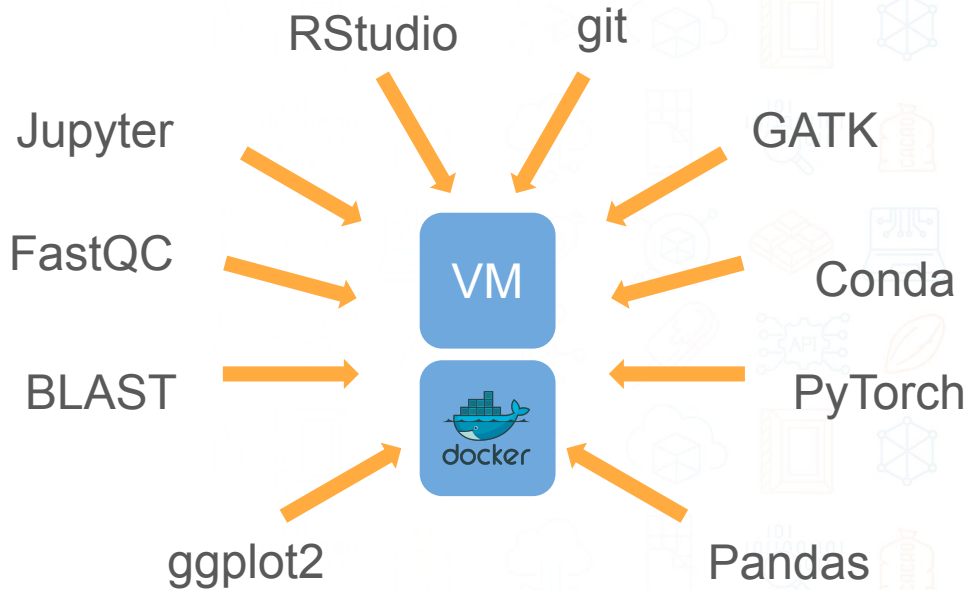
CACAO Use Cases



CACAO Use Cases



CACAO Use Cases



CACAO Use Cases




CACAO Educational Use Cases



AIIRA
AI Institute for Resilient Agriculture

IOWA STATE UNIVERSITY
Translational AI Center



12 DAYS OF CROSS-DISCIPLINARY TRAINING IN COMPUTATIONAL BIOLOGY FOR GRADUATE STUDENTS JULY 9-22 2023

COMBIO '23

UNIVERSITY OF MONTANA

COMBIO '22

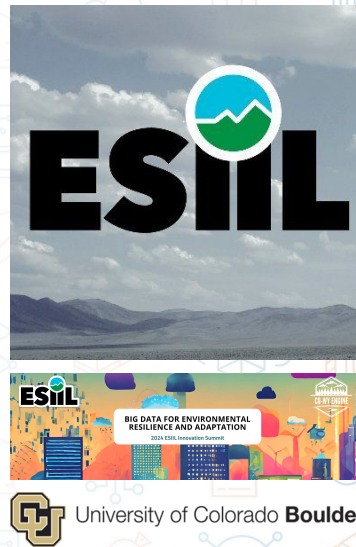
NUS National University of Singapore



6th Uppsala Transposon Symposium

Oct 26-28, 2022

UPPSALA UNIVERSITET



ESiL

ESiL

BIG DATA FOR ENVIRONMENTAL RESILIENCE AND ADAPTATION

UNIVERSITY OF COLORADO BOULDER

CACAO Educational Use Cases



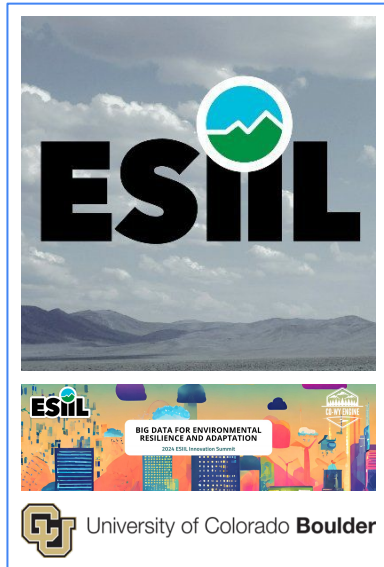
- **Workshop Aim:**
 - develop skills in the field of Molecular Dynamics (MD) and genomics; gather data from MD simulations.
- **Duration:** ~2 weeks each.
- **Attendees:** ~60 unique attendees.
- **Platforms & Software:**
 - CACAO, JetStream;
 - ~30 unique software covered.
- **Outcome:**
 - >1TB of MD simulations.

CACAO Educational Use Cases



- **Workshop Aim:**
 - develop skills around tools used in genomics with a focus on Transposable Elements (TE)
- **Duration:** 3 days (1 tutorial day)
- **Attendees:** ~40 unique attendees.
- **Platforms & Software:**
 - CACAO, JetStream;
 - ~6 unique software covered.
- **Outcome:**
 - Training through simplified access to tools and libraries.

CACAO Educational Use Cases



- **Workshop Aim:**
 - develop a network of Environmental scientists, giving access to popular env science tools
- **Duration:** 3 days
- **Attendees:** ~200 attendees (resource usage continued after summit).
- **Platforms:**
 - CACAO, JetStream, CyVerse
- **Use case:**
 - Access to GPU-supported JupyterLabs for trainings;
 - Data gathered during the summit expanded to >10TB by users and >250TB from the community

Thank you!

Feel free to email info@cyverse.org for any questions

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