PAVICS
A Platform for the Analysis and Visualization of Climate Science

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2016-12-07
- Computer Research Institute of Montreal
  - Applied research center in IT
  - Positioned between academia and businesses

- Canada’s National Research and Education Network
  - Funds digital infrastructure for research
  - Funds reusable research software tools

- Consortium on Regional Climatology and Adaptation to Climate Change
  - Provides climate scenarios and services
  - Runs a regional climate model
  - Consulting services on adaptation to climate change

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Ouranos needs a platform for climate services

Creating and delivering climate products

For each client, create and run a suite of operations converting raw climate data into useful “products”;

Enforce best practices on staff;

Archive operations and parameters as “workflows” (provenance & reuse);

Share workflows with colleagues;

Improve code quality, reduce errors;

Make climate research less painful

Replace nitty-gritty details by abstractions;

Replace list of files by criteria-defined “ensembles”;

Replace grid masks by “regions”;

Replace algorithms by “processes”;

Replace cpus by “computing ressources”;
Data search & acquisition

Selection of an ensemble of simulations

Subsetting

User specific visualization

Climate indicator computation

Downscaling
Climate Data Processing with Birdhouse

PyWPS
Data Cataloging and Process Management

Pyramid

Pavics platform

Backend

Pyramid Json Backend

Solr Index

Celery (Scheduler)

Solr

pycsw
Internal assessment of UV-CDAT and COG

UV-CDAT

- Hard time understanding how to extend with new functionality
- Crashes with regional model simulations (early 2016)
- Uncertainty regarding provenance mechanism, web UI

Cog

- YUI not maintained since 2014
- No REST API
- No client side business logic
Exploration of emerging technologies

- Secondary objective of the project: identification and exploration for more advanced topics.
- Deliverable as sandboxes or local test instances.

Big data stack

Advanced workflows

N-Dimensional visualization

Source: UV-CDAT
Outlook

- As a climate service organization, we must **move away from repeating primitive tasks** of scripting data search, subsetting and basic climate indicator computations for each project.
- We must also acknowledge that our members have varying degrees of familiarity with climate science and big data manipulation and therefore **require different climate products**.
- **Modularity** is key to plug and play the components that allow the creation of a user experience tailored to the many categories of climate science users.
- **Dialogue** between the many development teams that are working on the challenges of climate data distribution and analysis stimulates reusability, proper documentation, and more thorough testing.