Analyse de données scientifiques à l'échelle sur HPC ou dans le Cloud avec Pangeo

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Overview

Introduction & Motivation to Pangeo (Tina Odaka)

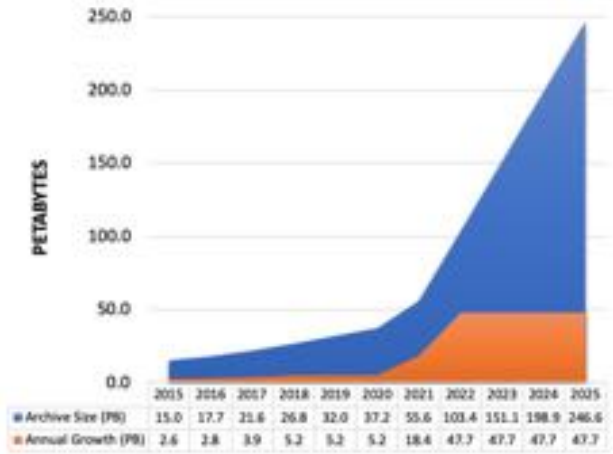
Demonstration on CNES computing platform (Guillaume Eynard-Bontemps)

Introduction and Motivation for PANGEO

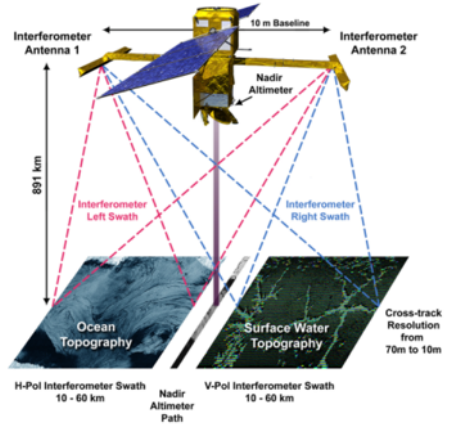
Analysis of Big Geosicence Data (observations and simulations)

- CMIP5 (Coupled Model Intercomparison Project Phase 5) 2PB, CMIP6=18PB

- NASA earthdata cloud evolution :



https://earthdata.nasa.gov/eosdis/cloud-evolution NASA EOSDIS graphic.



SWOT Satellite instruments : https://swot.cnes.fr/fr

Crisis for traditional data analytics workflows

PANGEO to free scientists to explore their data

Dugornay Olivier (2014). **Déploiement d'un profileur Arvor face au rocher du Lion**. Ifremer. https://image.ifremer.fr/data/00378/48926/

Pangeo is a funded *collaboration* dedicated to the advancement of scalable, interactive, easy-to-use data analysis for the climate and weather community.

Alfred P. Sloan FOUNDATION

EARTHCUBE
TRANSFORMING GEOSCIENCES RESEARCH

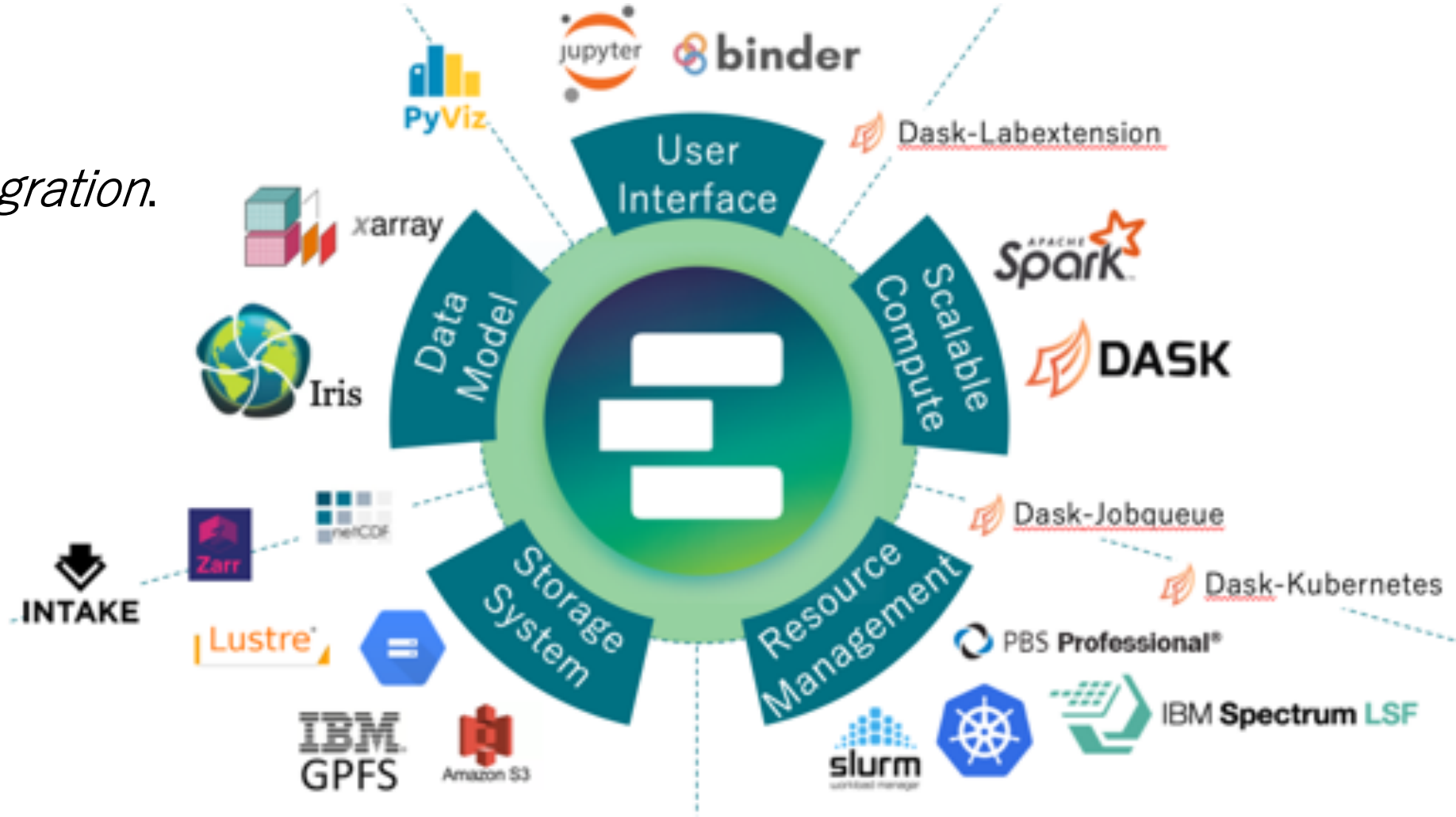
« Pangeo: An Open Source Big Data Climate Science Platform » Ryan Abernathey et al.
https://figshare.com/articles/Pangeo_NSF_Earthcube_Proposal/5361094

Pangeo is a *community* that promotes open, reproducible, and scalable science.

. . . just to name a few.

Pangeo is a '*platform*' that is deployable on HPC or cloud.

Pangeo is about *integration*.

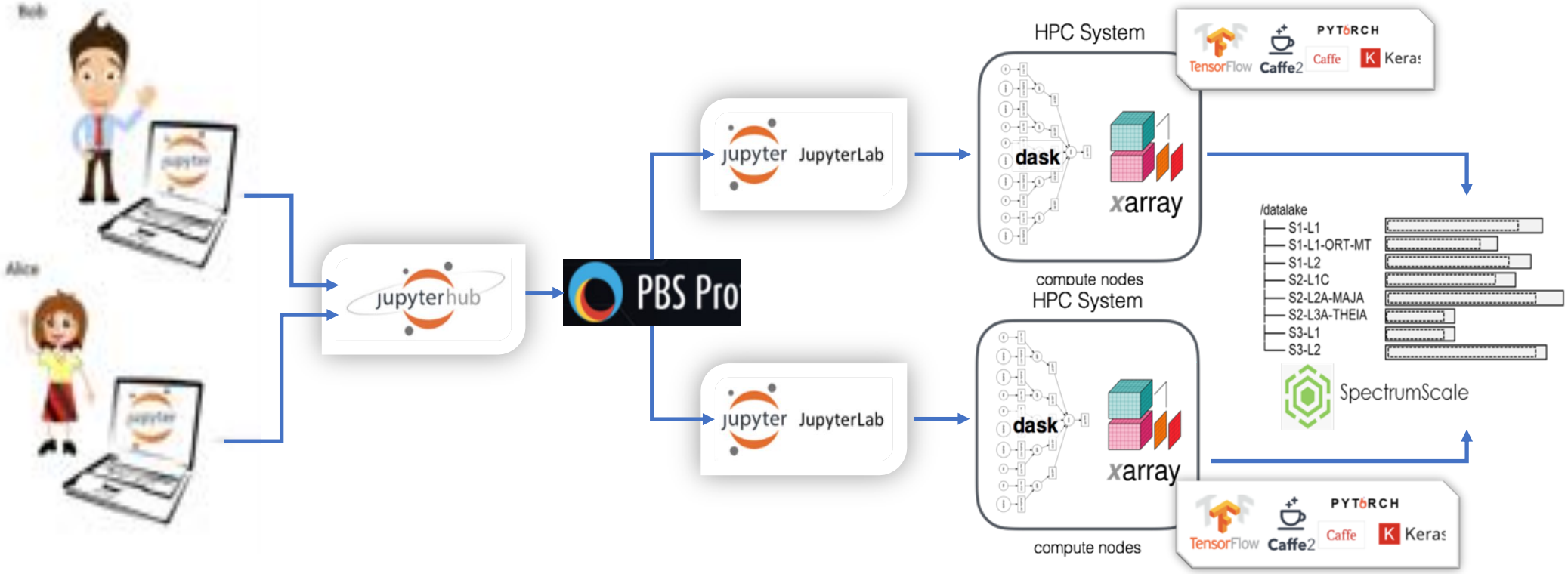


What is behind parallel computing in Pangeo

- Distributed computing = Dask
  - Dask worker clusters:
    - HPC: Dask jobqueue: on HPC, spawns Dask workers via job schedulers (e.g. PBS Pro, Slurm)
    - Cloud: Kubernetes and Helm integrations
    - Hadoop: Dask-Yarn
  - Workers process computations on each ‘chunked’ data.
  - Dask Scheduler orchestrates tasks among workers.

- Distributed IO , Zarr and other cloud ready formats
  - Directory tree format, each zarr directory is made of many files, each contains one chunk of data.
  - Each Dask workers can read /write only the necessary chunk of data.

Demonstration on CNES HPC



Try it with Pangeo Binder: http://gallery.pangeo.io/

Conclusion

Pangeo makes it possible to explore big-data geoscience using HPC or cloud in an interactive manner.

Easy to try

https://github.com/pangeo-data

Active community

https://discourse.pangeo.io

Start from here

http://pangeo.io/about.html