Birdhouse
Supporting Web Processing Services for Climate Data

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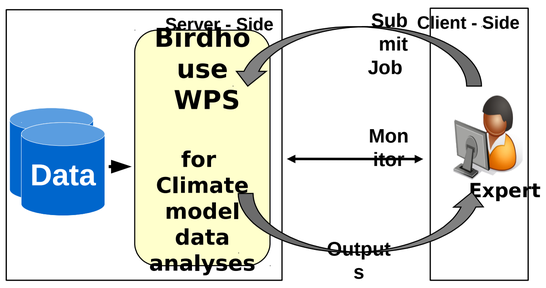
INTRODUCTON

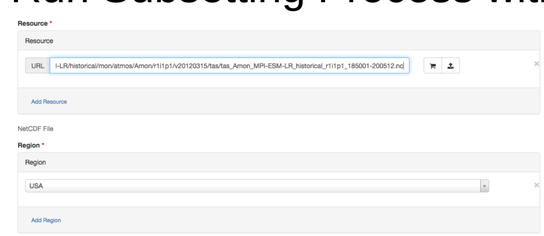
- The volume of climate data grows with the upcoming climate model projects (e.a. CMIP6).
- Even larger climate institutes and computing centers will not be able to keep all relevant data on one storage system.
- Climate processing services located at the data archives can be a valuable contribution to cope with the growing data challenge.
- A set of climate analyses processing tools are provided as services which can be accessed over the web.

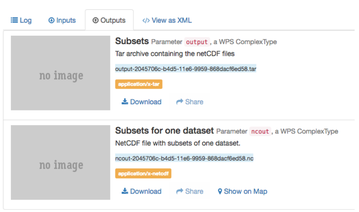


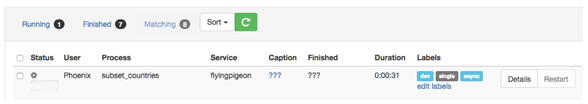
- Birdhouse uses the Web Processing Service (WPS) standard to realize services for climate processing tools.
- WPS is an open standard defined by the Open Geospatial Consortium (OGC) with several open source implementations.
- Birdhouse supports PyWPS but is not restricted to it (Zoo, GeoServer, COWS, 52North).

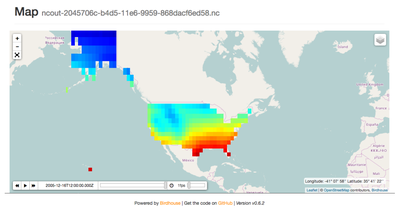
RUN PROCESSES

Run Subsetting Process with Region USA

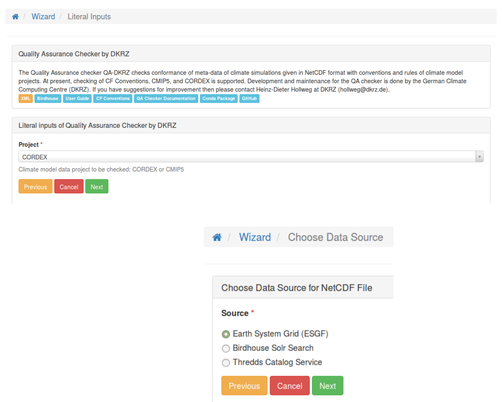


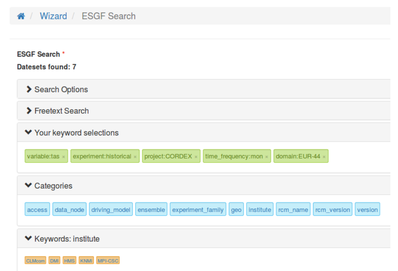






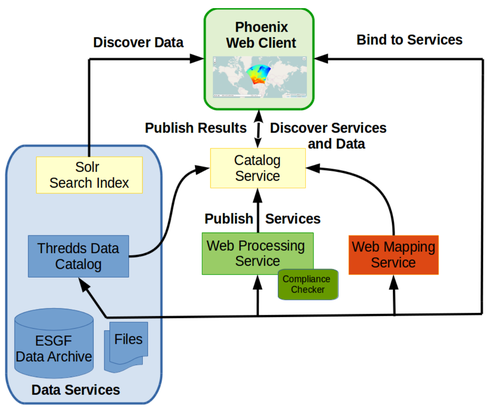
Wizard: run QA Checker on Data from ESGF





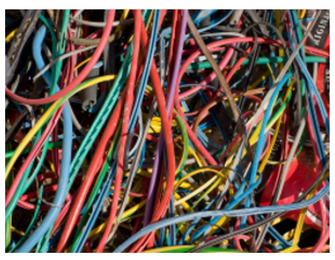
ARCHITECTURE

Overview of Birdhouse Components



- Birdhouse can interact with several OGC Web Processing Services.
- WPS services are registered in an OGC Catalog Service.
- The Phoenix web-client can display the processes of the registered WPS services. A process can be executed, monitored and the outputs are visualized.
- Phoenix uses a Web Map Service to show input and output NetCDF files on a Map.
- Data sources can be the ESGF Data Archive and external Thredds Data Servers.

Deployment with Conda and Buildout

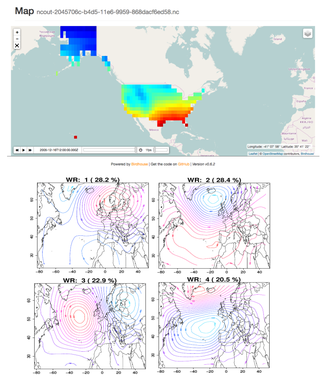


- Birdhouse uses the conda package manager to setup an environment with all used software components.
- It uses Buildout to setup a WPS (PyWPS) with all services (supervisor, gunicorn, nginx) and configuration files.
- *"Managing the Chaos"*

http://birdhouse.readthedocs.io/en/latest/installation.html

AVAILABLE PROCESSES

Flyingpigeon: Processes for Climate Impact



- Subsetting of pre-defined regions.
- Statistical analyses.
- http://flyingpigeon.readthedocs.io/en/latest/

Hummingbird: Processes for Compliance Checks and CDO

- Compliance Checks of Climate and Forecast conventions and project specific settings (CORDEX, CMIP5)
- Processes for CDO operators like sinfo, monmax, sellatlon.
- http://birdhouse-hummingbird.readthedocs.io/en/latest/

Processes for ESMValTool Diagnostics

- Currently only processes of tutorial diagnostics of the ESMValTool like a contour-plot are implemented.
- ESMValTool *namelists* are generated and the ESGF data coupling module is used.
- http://www.esmvaltool.org/

OUTLOOK & REFERENCES

Using Birdhouse in Copernicus

- Using PyWPS 4.x: ready for WPS 2.0 (pause, resume, delete).
- Run processes by batch processing schedulers like SLURM and in Docker Containers.
- Delegation to SLURM and Docker is handled internally of PyWPS (new Feature in PyWPS-4).
- WPS Process definition and code is not changed when run as batch job or in a Docker container.

References

- http://bird-house.github.io/
- Demo Installation: https://mouflon.dkrz.de/