

birdhouse

Backend Solutions

for climate related assesses and decisions

UN GIS Initiative - Workshop

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et Birdhouse Developer Group



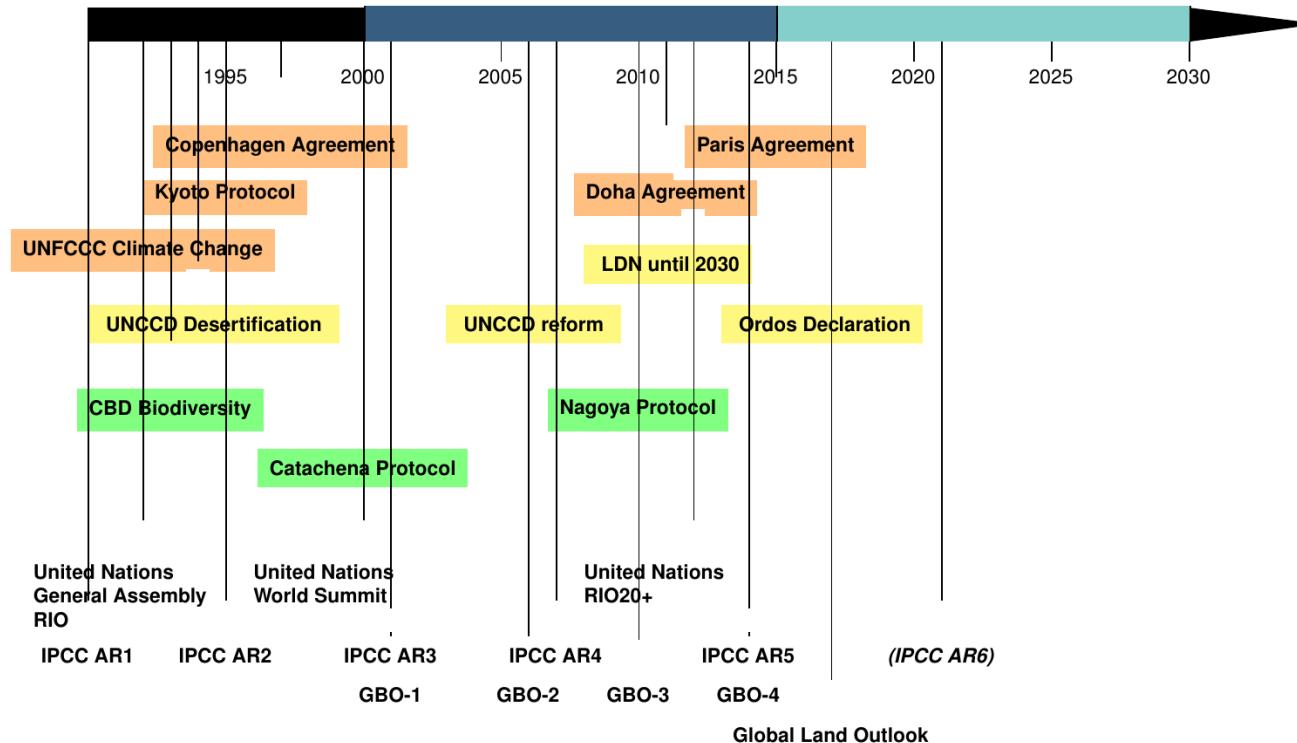
UN Conventions, COPs, Reports and Data

1990

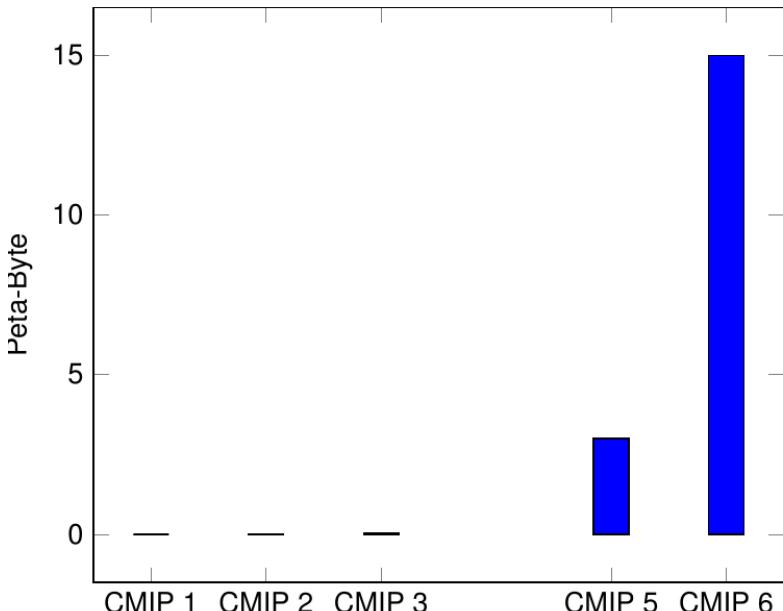
2030

Millenium Goals

SDGs



Growing Amount of Data (Example Climate Model data)



CMIP 1	1 GB	IPCC AR 1 1990
CMIP 2	500 GB	IPCC AR 2 1995
CMIP 3	35 TB	IPCC AR 3 2001
	Not existing	IPCC AR 4 2007
CMIP 5	3,5 PB	IPCC AR 5 2014
CMIP 6	10-20 PB (in ESGF)	IPCC AR 6 12-16 April 2021

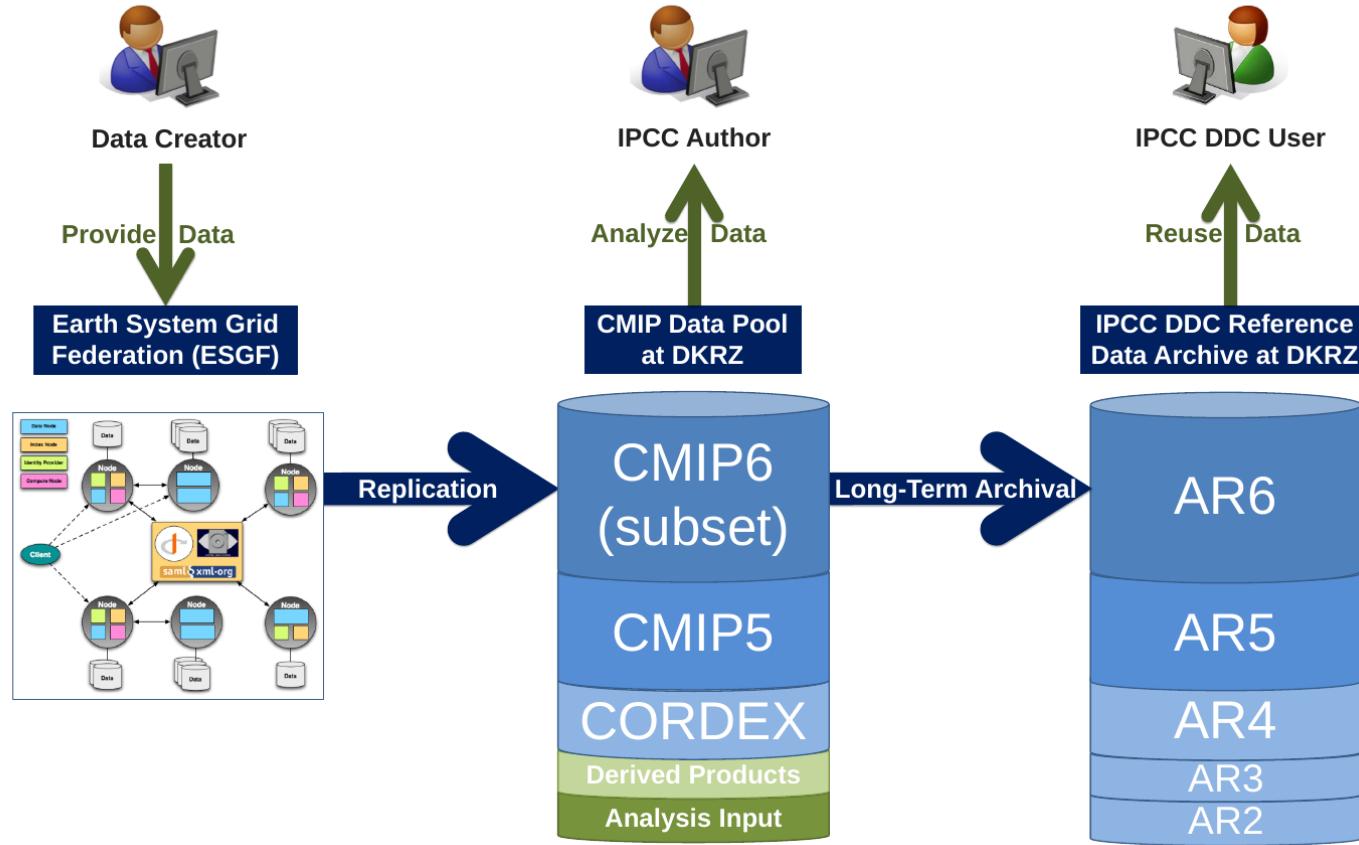
CMIP = Coupled Model Inter-comparison Project

IPCC = Intergovernmental Panel of Climate Change

ESGF = Earth System Grid Federation

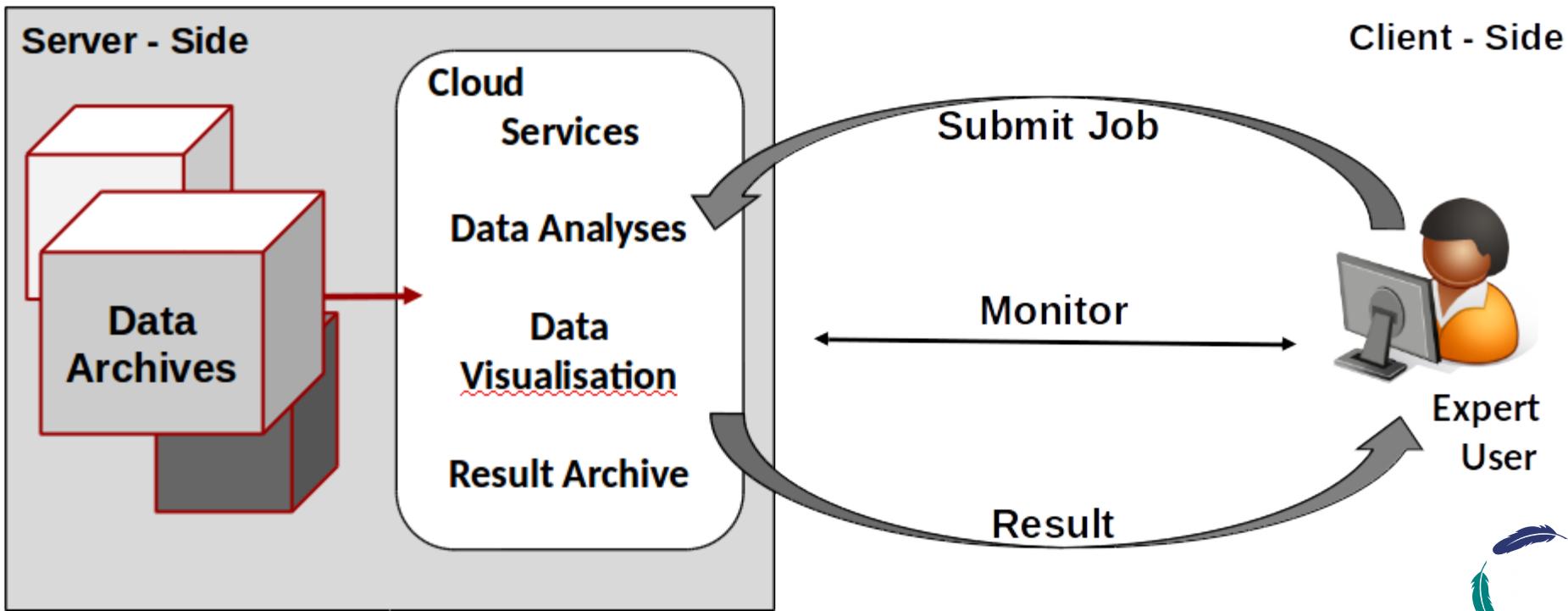


IPCC Data Distribution Center for AR6

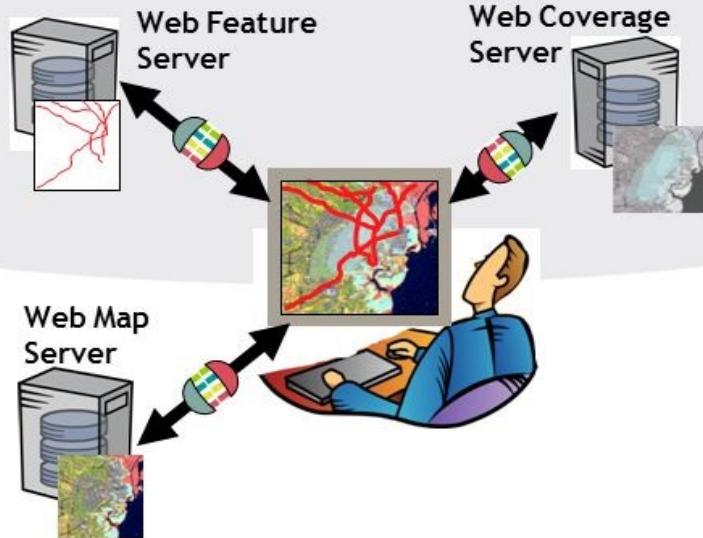


high performance environment

(*low internet bandwidth*)



The geospatial web is enabled by OGC standards:



- Web Map Service (WMS)
- Web Map Tile Service (WMTS)
- Web Feature Service (WFS)
- Web Coverage Service (WCS)
- Catalogue (CSW)
- Geography Markup Language (GML)
- KML
- Others...

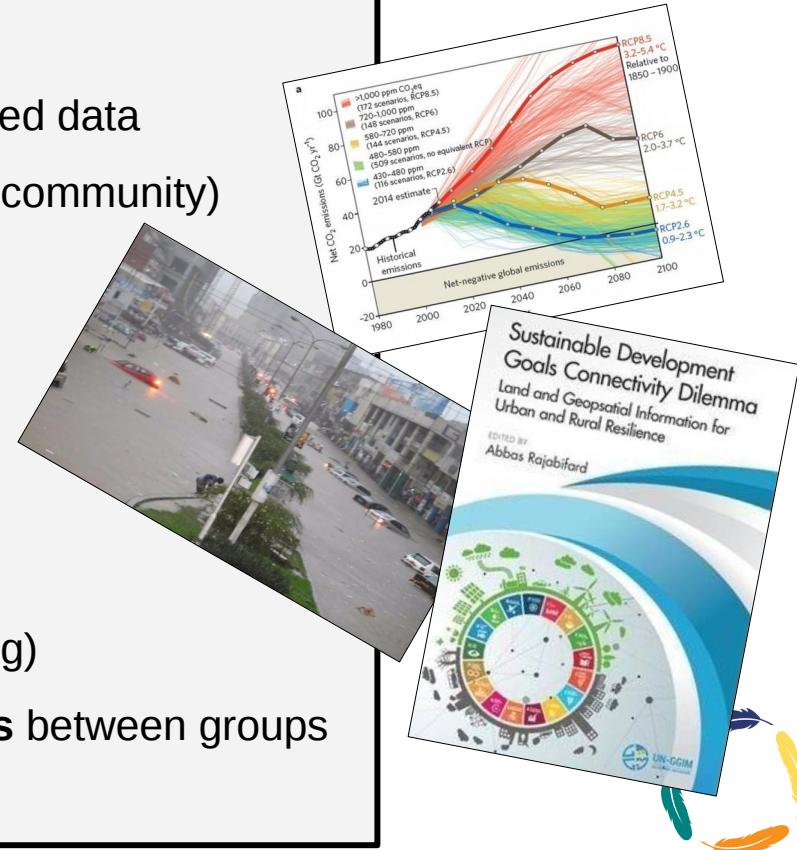
Relevant to geospatial applications: Critical Infrastructure, Emergency Management, Weather, Climate, Homeland Security, Defense & Intelligence, Oceans Science, etc

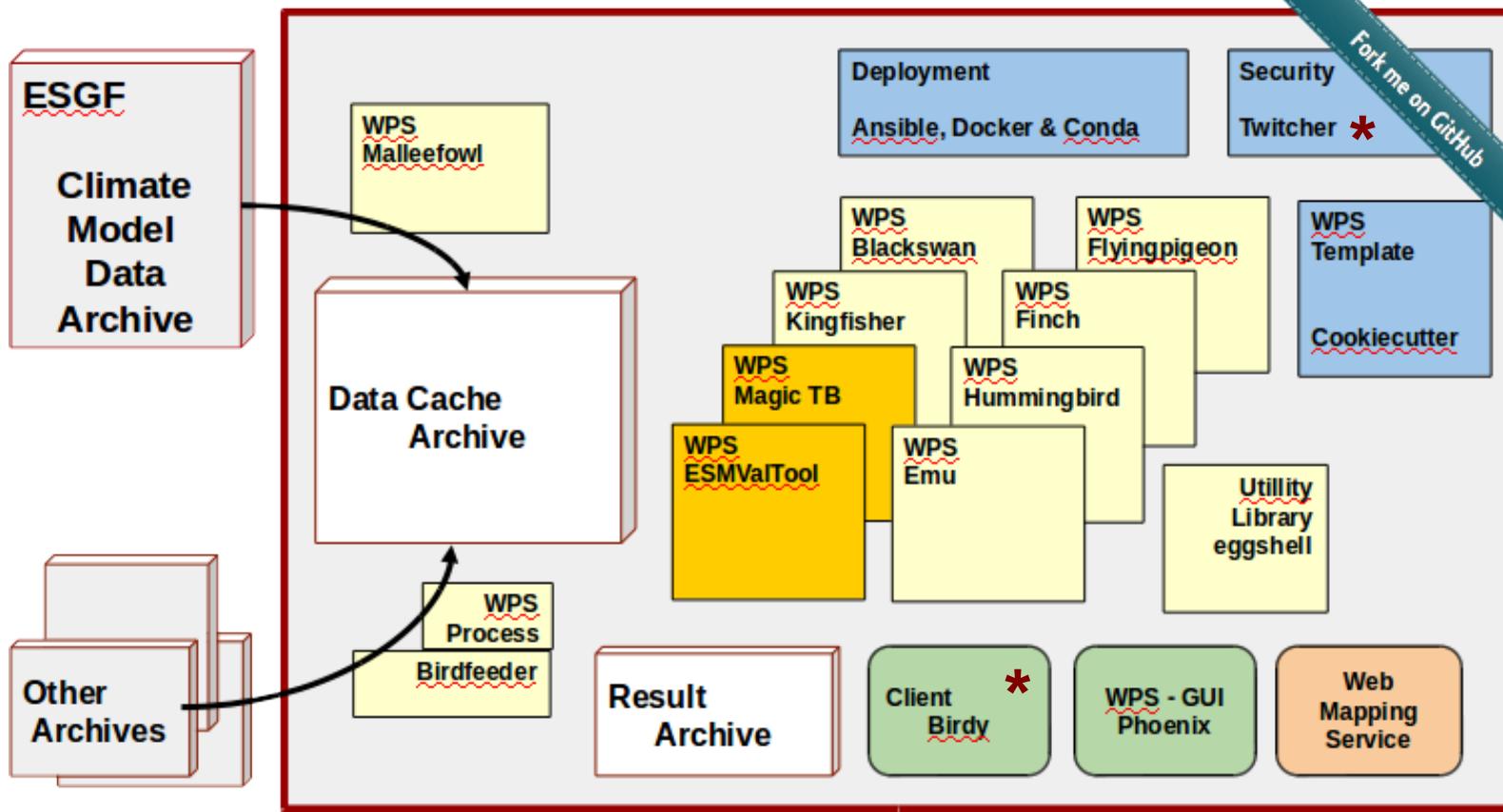
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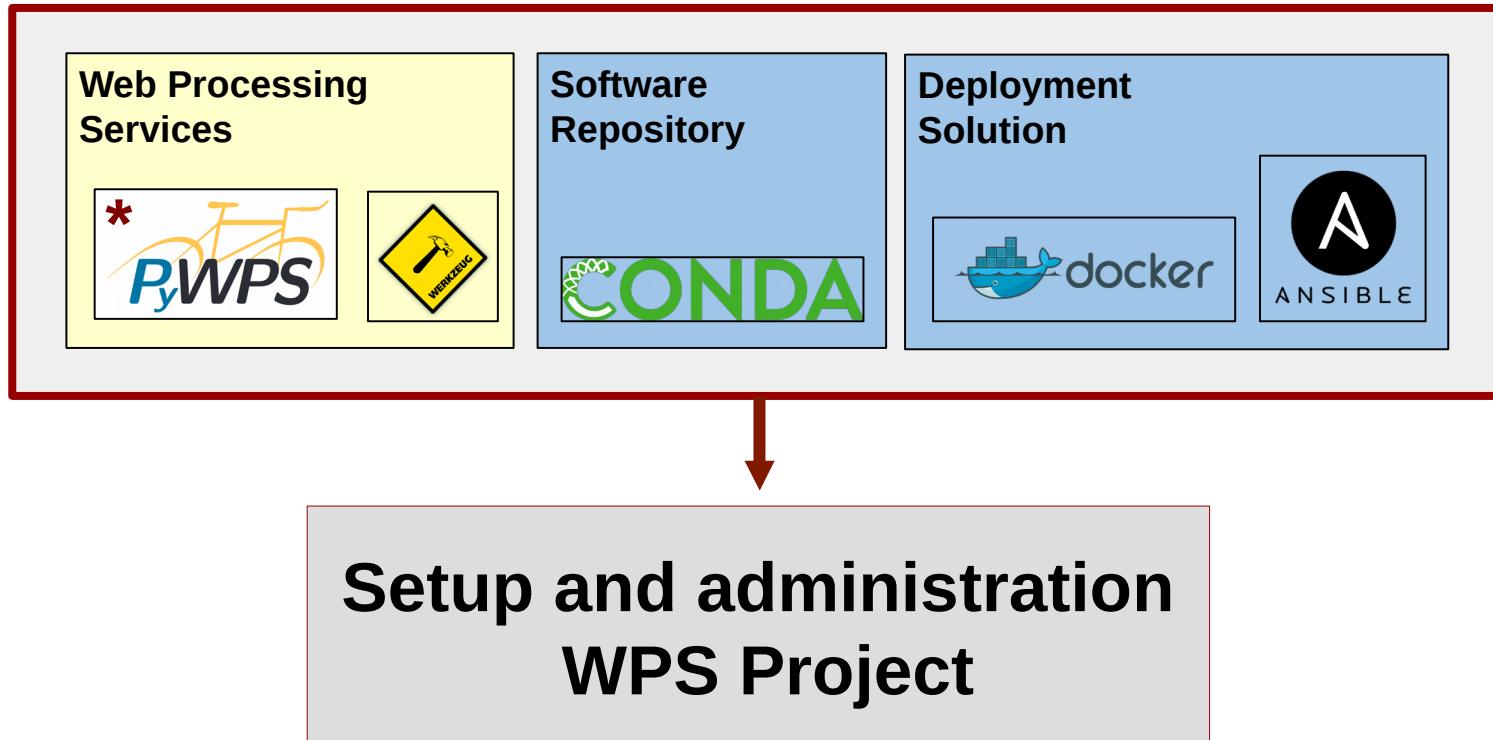


Advantage of Server-Side Services

- Avoiding of double work
- Decrease difficulties for accessing raw / processed data
- Improved quality (continuous testing by the user community)
- Increased visibility of Developers/Researchers
- Sharing:
 - methods
 - compute resources
 - storage space
 - result data
- Standardized way of producing results (Monitoring)
- Enable multidisciplinary projects with synergies between groups
- low cost





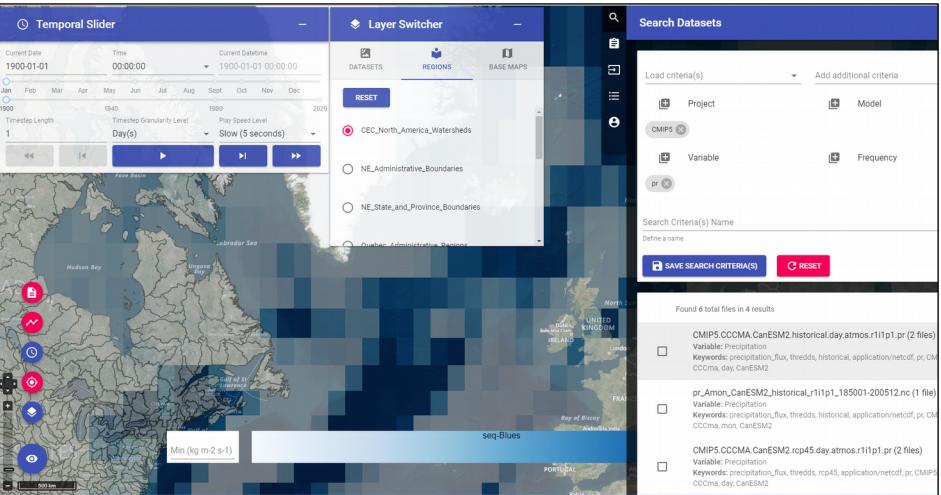


Client Side: User friendly :-)

Authentication with OAuth or OpenID

Token authentication

```
[n hempel@lsce3199 ~]$ export WPS_SERVICE=http://birdhouse-lsce3199:8080/wps
[n hempel@lsce3199 ~]$ birdy -h
usage: birdy [-options] <command> [<args>]
Flyingpigeon: Processes for climate data, indices and extrem events
optional arguments:
-h, --help show this help message and exit
--debug enable debug mode
command:
List of available commands (wps processes)
(visualisation, sdm, segetalflora, indices_single, subset_countries, eobs_to_cordex, ensembleRobustness)
Run "birdy <command> -h" to get additional help.
visualisation Visualisation of netcdf files:
sdm Species distribution model:
segetalflora Segetal Flora:
indices_single Calculation of climate indice (single variable):
subset_countries Subset netCDF files:
eobs_to_cordex EOBS to CORDEX:
ensembleRobustness Calculation of the robustness of an ensemble:
analogos Days with analog pressure pattern:
fetch Download Resources:
Just testing a nice script to visualise some variables
Species distribution model
Species biodiversity of segetal flora. Input files: variable:tas , domain: EUR-11 or EUR-44
This process calculates climate indices based on one single variable.
This process also checks only the given variables from input netCDF files.
downloads EOBS data in adapted CORDEX format
Calculates the robustness as the ratio of noise to signal in an ensemble of timeseries
Search for day with analog pressure pattern
This process downloads resources (limited to 50GB) to the local file system
and returns a textile with appropriate pathes
```



Tutorials

Land degradation neutrality (UNCCD SDG 15.3.1)

Productivity

Land Cover

Soil Carbon

SDG Indicator 15.3.1:
Proportion of land degraded over total land area

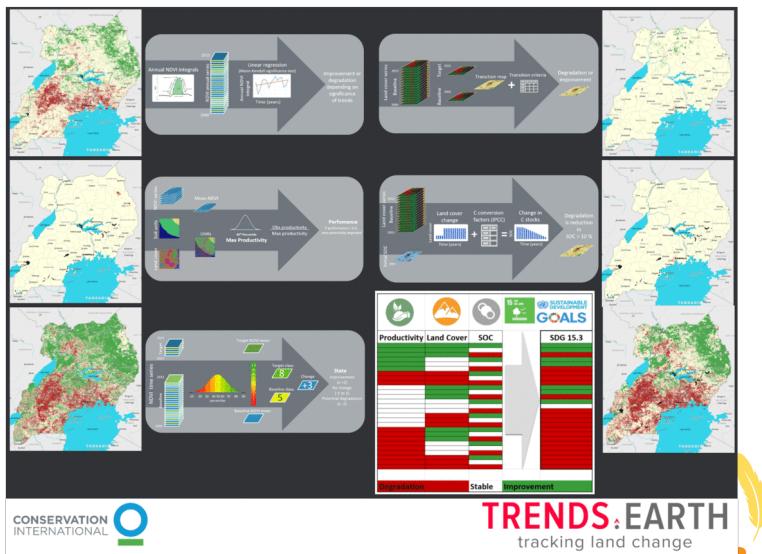
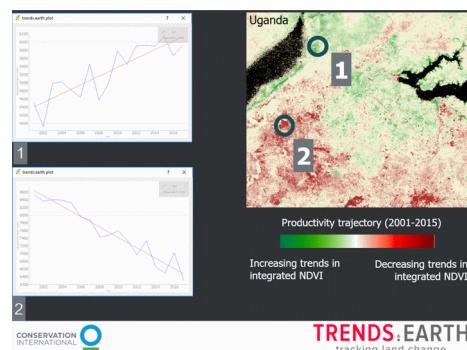
Trends.Earth

TRENDS.EARTH
tracking land change
from Conservation International

QGIS

+
Google Earth Engine

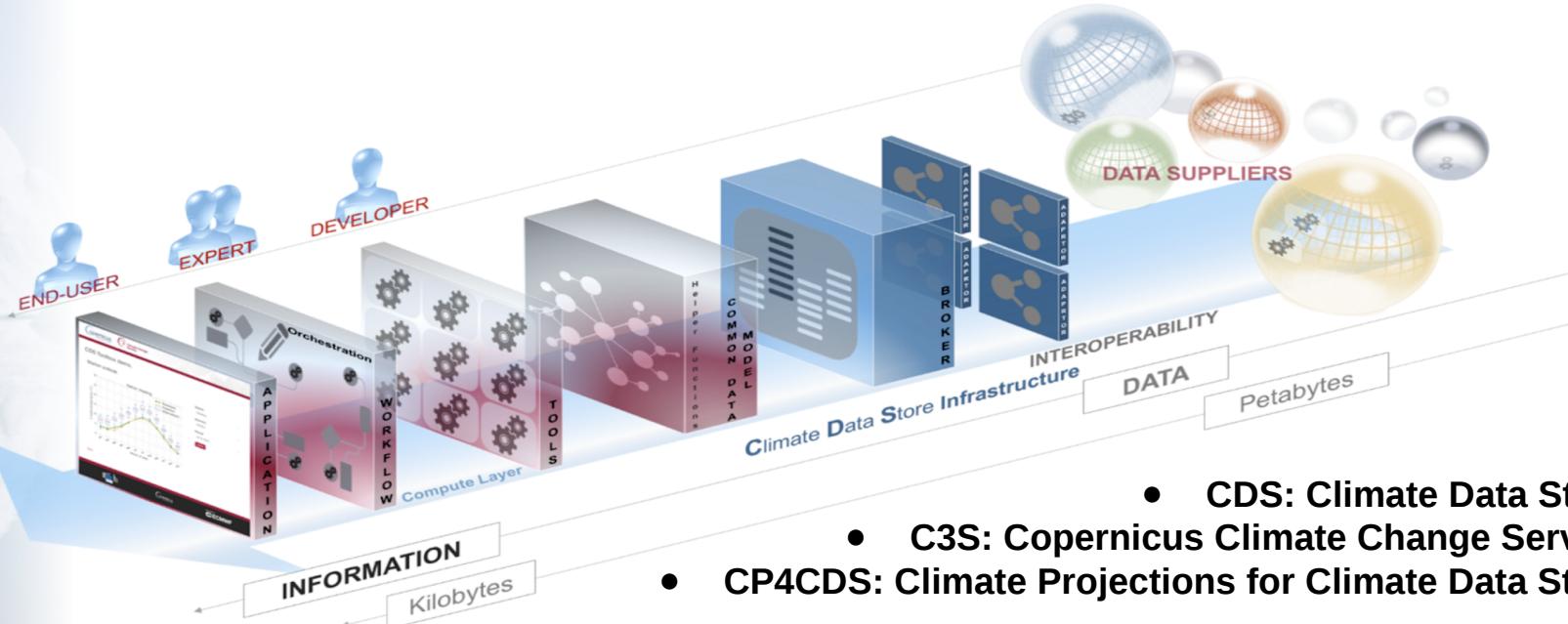
▲TRENDS.EARTH allows the user to compute each of these subindicators in a spatially explicit way generating raster maps which are then integrated into a final SDG 15.3.1 indicator map and produces a table result reporting areas potentially improved and degraded for the area of analysis.



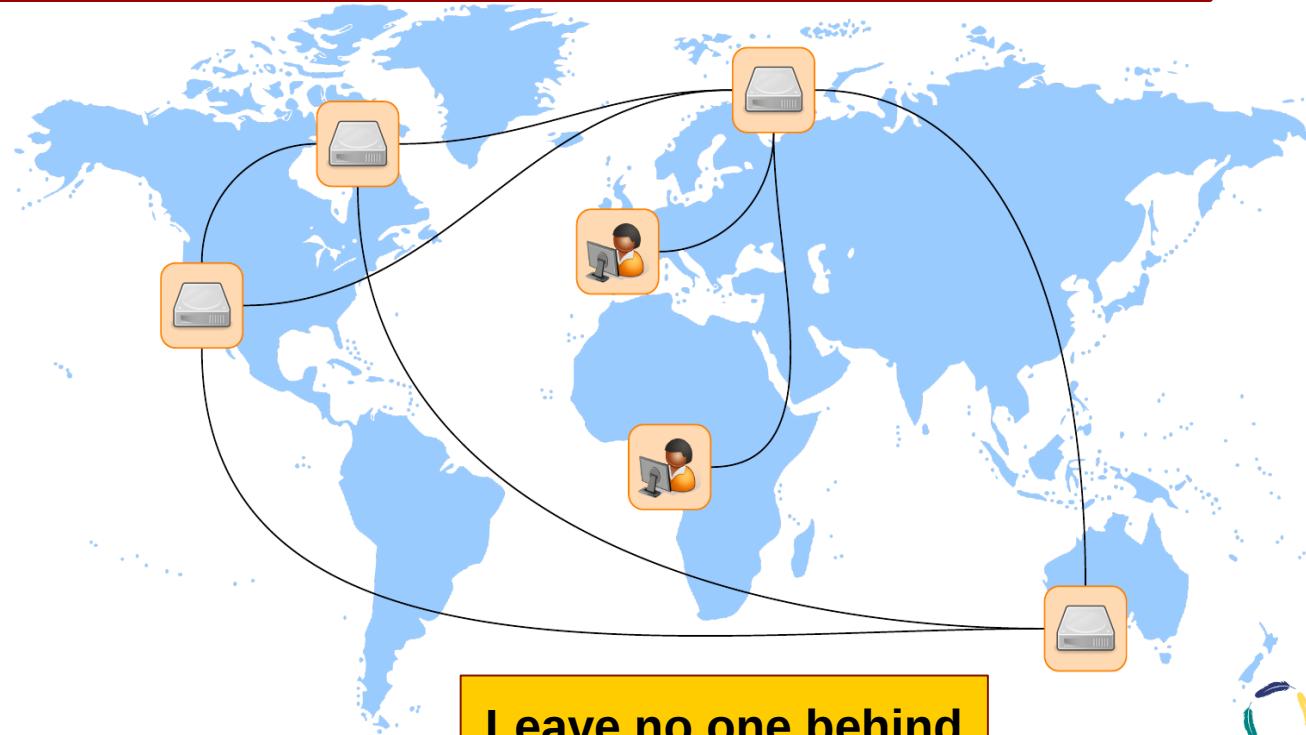


CDS Toolbox

Technology useful for
UNFCCC



Harnessing backend GIS for Sustainable Development → UN GIS Initiative



Leave no one behind



Outlook (birdhouse)

- **Canada**
 - Govt of Canada: Canadian Center for Climate Services (CCCS)
 - Pan-Canadian federated cyber-infrastructure
 - Earth Observation support
- **EU COPERNICUS**
 - C3S with CP4CDS ready for production .
 - extended for CORDEX (regional model data) in 2019/2020
 - extended for CMIP6 ... ?
 - Extended functionality (polygon subset etc.)
- **International:**
 - Web Processing Services on **ESGF Nodes**

