Ozone assessment as an EOSC-Synergy thematic service

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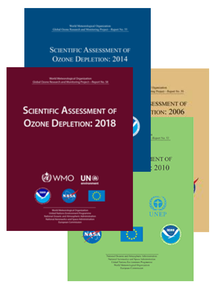
https://o3as.data.kit.edu

Ozone assessment is an important task for Climate and Environment studies. The ozone assessment service (O3as) project is going to support scientists and everyone interested in determining ozone trends for different parts of the world. It is one of the thematic services of the EOSC-Synergy project. The service applies a unified approach to analyse results from a large number of different chemistry-climate models, helps to harmonise the calculation of ozone trends efficiently and consistently, and produces publication-quality figures in a coherent and user-friendly way. Among other tasks it will aid scientists to prepare the quadrennial Global Assessment of Ozone depletion. It will also allow access to the high-level data by citizens. The service relies on several containerized components distributed across the cloud (Kubernetes) and HPC resources and leverages Large scale data facility (LSDF).

O3as: Ozone assessment



Motivation: Monitoring and projecting stratospheric ozone is mandated by UN Environment to **safeguard a healthy planet**. Regularly many climate models project future climate and ozone change, producing **huge amounts of data** that have to be analysed for **key metrics**. Those key metrics help policy makers to judge if measures implemented to protect the stratospheric ozone layer are working.

O3as project goals:

To provide a framework to efficiently explore ozone projections, including the calculation of key metrics:

- Improve the existing workflow and provide a **reliable tool** for scientists to perform analysis in a **more efficient** manner
- Ensure **reproducibility** of results
- **Simplify data access** and the use
- Publish high-level data to **citizens**

Timeline and milestones:

- ✓ Inventory of the current workflow and collection of requirements (7.2020)
- ✓ Prototype solution (12.2020)
- ✓ Access to **>100 climate models** via API (4.2021)
- First release leveraging EOSC-Synergy solutions (7.2021)
- Publishing at **EOSC marketplace** (8.2021)
- Feedback evaluated, service is in full production (1.2022)

O3as: ozone assessment for everyone

Problem:

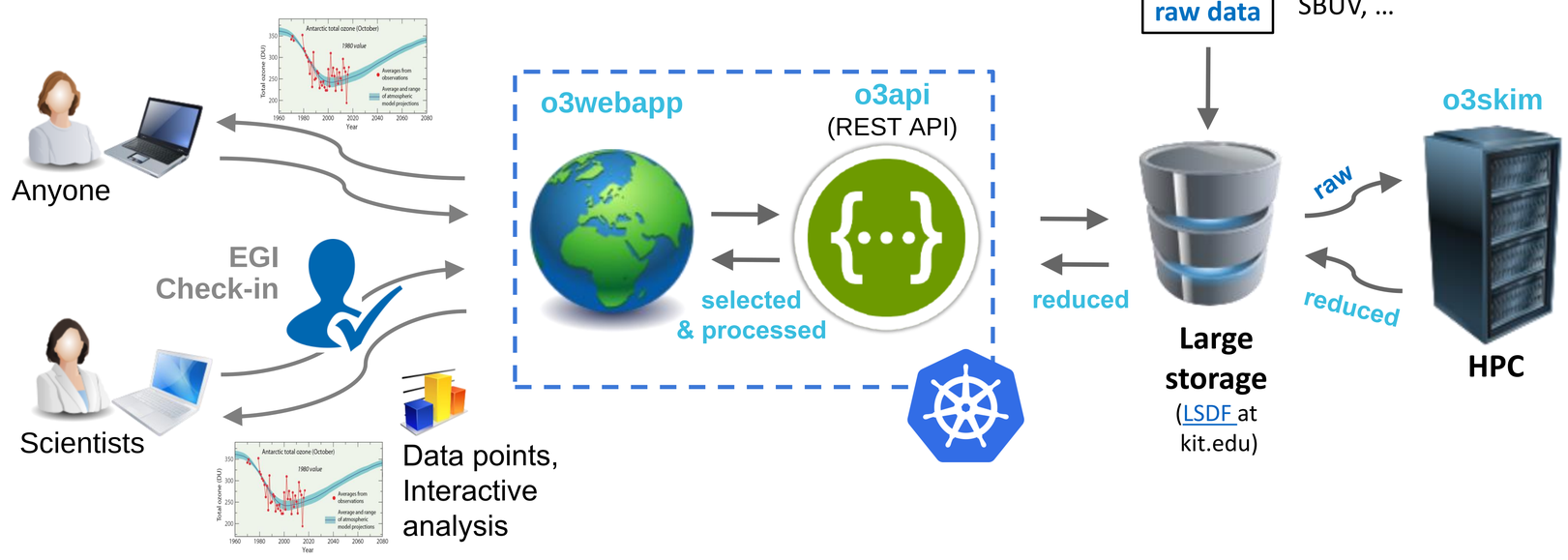
- A typical workflow of today has many **manual** steps
- Full processing from raw data takes **hours**
- The code is **not always accessible** or well **maintained**

⇒ Plots are **not easy to rebuild** for various inputs
⇒ Possible **inconsistency** in results
⇒ **No-way to assess** the results by **non-specialists**

O3as solution:

- Climate Models data (10's TB) are **collected** in one place
- The data are **reduced** to the parameters of interest and **homogenized** at **HPC** [o3skim]
- The reduced data (100's MB) can be accessed with **REST API in seconds** [o3api]
- A user may do final processing and plotting by leveraging the **WebApp** [o3webapp]

⇒ Basically **everyone** can **assess** Ozone models data

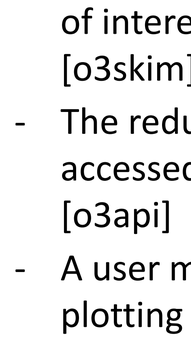


O3as consists of 3 main components:

- **o3webapp**: leverages React and bokeh
- **o3api**: is based on **OpenAPI/Swagger** and **Flask**
- **o3skim**: uses parallel computing (**xarray**, **MPI**) at HPC

All components are **open source** (GPLv3), **documented**, implemented with continuous integration and delivery (CI/CD) based on **Jenkins (JePL)**, and **dockerised**: o3skim is run via **udocker** in HPC, o3api and o3webapp are in the cloud (**Kubernetes** cluster).

EOSC SYNERGY



The **EOSC-Synergy** project aims to expand **European Open Science Cloud (EOSC) capacity** and **capabilities** by leveraging **Investments** and existing **know-how** & **resources** of national digital infrastructures.

8 EU countries: Spain, Portugal, UK, Czech Republic, Germany, Slovakia, Poland, Netherland

Project time: 9.2019 – 10.2022

AAI

Modern AAI solutions based on **OIDC**, e.g. EGI Check-in, oidc-agent, and the research on OIDC-based authentication for SSH

SQAaaS

- Automated validation process to assess the **quality** of the services and data repositories.
- Verifiable **digital certifications** to both software and services.
- Assessing data **FAIRness** and '**FAIR enabling**' data repository features.

Training

moodle

Learn platform for training courses on **open science** and using services from **EOSC**

Resources

Dashboards of either **Infrastructure manager** or **Openstack** can be used to deploy resources

bifi · CESGA · cesnet · Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas · IFCA Instituto de Física de Cantabria · INCD · Ústav Informatiky Slovenská akadémia vied

Thematic services

in Astrophysics, Biomedicine, Earth Observation, Environment:

WORSICA · SDS-WAS · OpenEBench · O3AS · UMSA · SAPS-SEB · SCIPION · G-CORE · MSWSS · LAGO

European Commission

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