



Deltares



C-SCALE

Copernicus - eoSC AnaLytics Engine

Federated Earth System Simulation and Data Processing Platform (FedEarthData)

Enabling Copernicus Big Data Analytics through EOSC

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Copernicus Programme



Has established itself globally as the **predominant global spatial data provider**.

A graphic for the Copernicus Programme. It features a large image of Earth from space on the left. To the right, the text "FULL, FREE AND OPEN ACCESS TO DATA" is displayed above a satellite icon. Below this is a list of six monitoring areas, each with a corresponding icon: Atmosphere Monitoring (network icon), Marine Environment Monitoring (fish icon), Land Monitoring (land icon), Climate Change (upward arrow icon), Emergency Management (flame icon), and Security (shield icon). At the bottom, the Copernicus logo is shown with the tagline "Europe's eyes on Earth".

FULL, FREE AND OPEN
ACCESS TO DATA

- ATMOSPHERE MONITORING
- MARINE ENVIRONMENT MONITORING
- LAND MONITORING
- CLIMATE CHANGE
- EMERGENCY MANAGEMENT
- SECURITY

opernicus
Europe's eyes on Earth

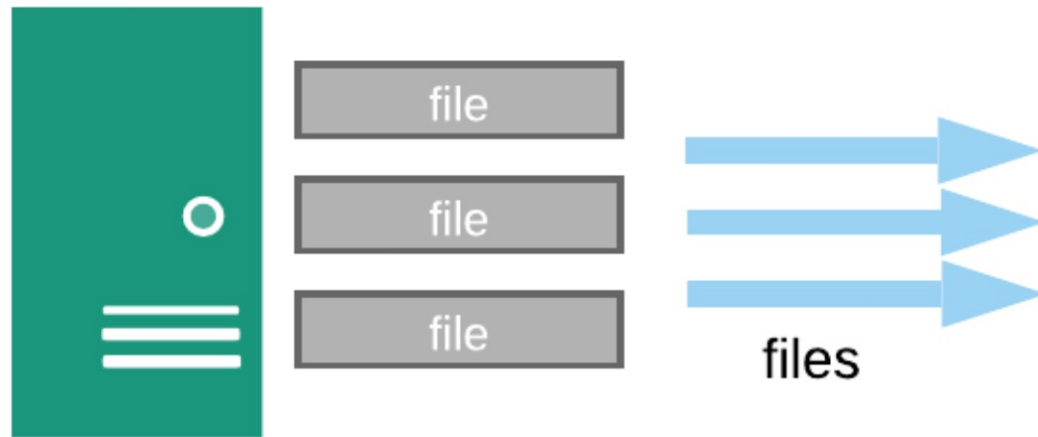
Aims to contribute significantly to the vision of a digital copy of our Earth, i.e. a **digital twin of the earth**, supporting current EC goals within the **Europe 2020 strategy**, the **Green Deal** and its related **Destination Earth** initiative.

Bring data to compute

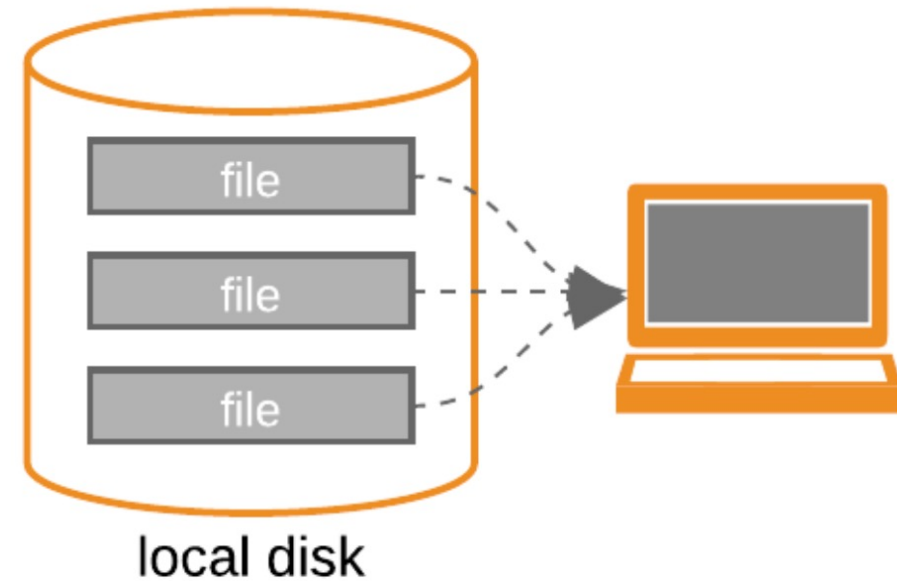
How we analysed data in the past



step 1: download



step 2: analyze



This is fine when you're working with $O(\text{MB})$ data.

Data becoming increasingly high resolution



Sentinel-2A: 10m resolution



Planet Labs SkySat (0.8m resolution)

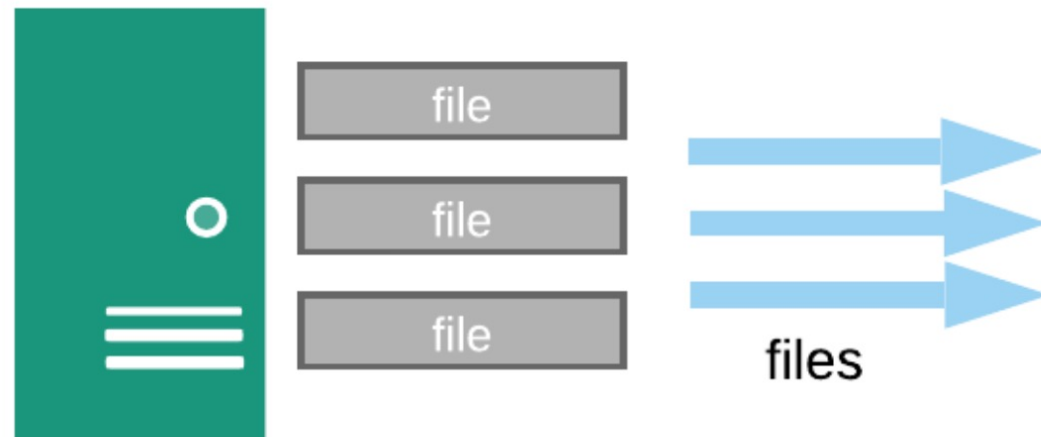


Bring data to compute

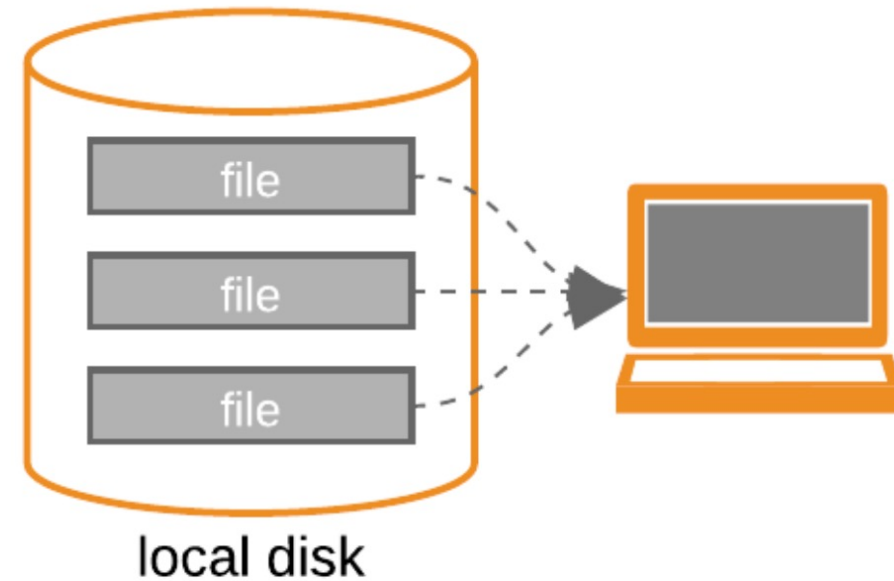
How we analysed data in the past



step 1: download



step 2: analyze



This is fine when you're working with $O(\text{MB})$ data.

But becomes increasingly difficult / impossible as we move to $O(\text{GB})$, $O(\text{TB})$ and $O(\text{PB})$

A paradigm shift: Bring compute to data



Bring your analysis / model / processing to the compute.
Use a platform!

C-SCALE objectives



FedEarthData

- C-SCALE plans to deliver
 - A **federated compute and data infrastructure** offering Copernicus/EO data
 - A **seamless user experience** where the complexity of Copernicus data, compute and storage resource provisioning and orchestration is hidden from the end-user
 - Access to **optimized** low level **data** and higher-level **analysis ready data**
 - **On-demand solutions** to generate analysis ready data where these are not readily available
- The **research communities**, through use cases, will **co-design** and help create a federated infrastructure that delivers data and **platform services that are useful for the community**



The FedEarthData Platform

- A distributed infrastructure of data and compute providers to support the execution of Earth System Simulation and Data Processing workflows at scale
- Flexible computing capacity
 - Cloud IaaS
 - HTC & HPC
 - PaaS Orchestration
 - Notebooks
 - openEO
- With access to a large collection of EO (Copernicus) datasets
- FedEarthData is operational – supporting 11 use cases see e.g. <https://c-scale.eu/case-studies/>

Access via
EOSC Portal



Federated Earth System Simulation and Data Processing Platform
Easy processing of Copernicus data
Provided by: EGI Foundation

→ Webpage → Helpdesk e-mail

Ask a question about this Resource

ABOUT DETAILS

The Federated Earth System Simulation and Data Processing Platform provides a distributed infrastructure of data and compute providers to support the execution of Earth System Simulation and Data Processing workflows at scale. It offers a flexible cloud-based data processing capacity to create and scale data processing pipelines that run on optimised execution environments near the data. Jupyter Notebooks and openEO API offer user friendly and intuitive processing of a wide variety of Earth Observation datasets on these computing providers, including the ability to integrate these data with modelling and forecasting workflows leveraging specialised compute resources. Providers of the Copernicus Data Processing Platform already count with an extensive collection of Copernicus datasets, managed according to the FAIR principles, and may be further extended with new datasets requested by users of the platform.

SCIENTIFIC CATEGORISATION

- Natural Sciences
- Natural Sciences
- Engineering & Technology
- Engineering & Technology
- Agricultural Sciences

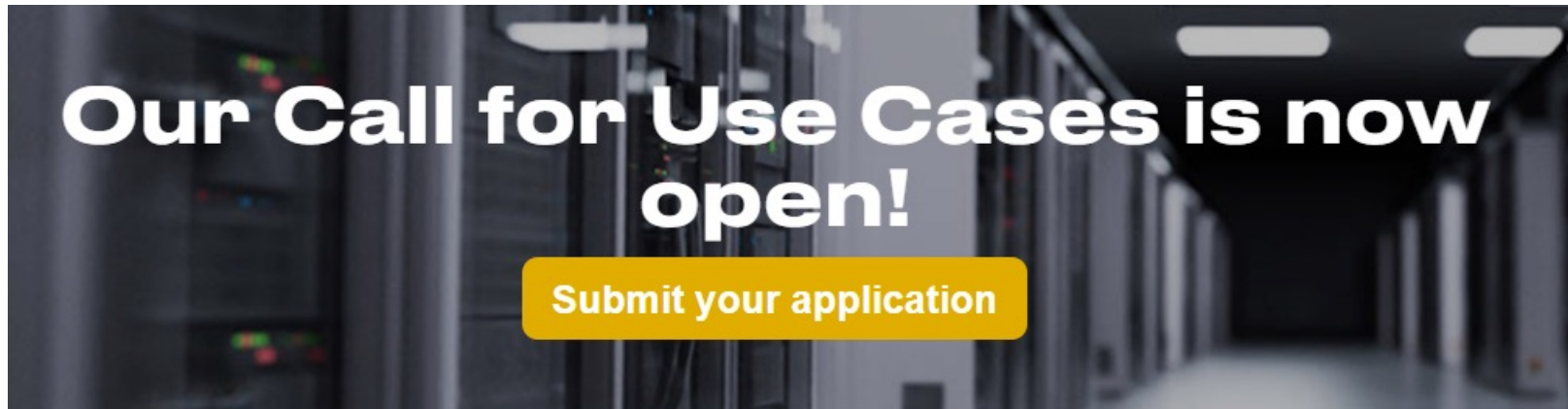
CATEGORISATION

- Compute
- Compute

Get involved in the co-design!



Submit a use case



<https://c-scale.eu/call-for-use-cases/>

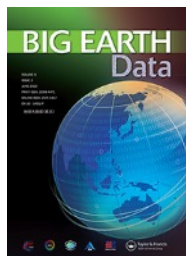


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Thank you for your attention.

Read our technical note! <https://doi.org/10.1080/20964471.2022.2094953>



An open compute and data federation as an alternative to monolithic infrastructures for big Earth data analytics

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