C-SCALE

Copernicus - eoSC AnaLytics Engine

Contribution of C-SCALE to the EOSC Exchange capabilities

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The C-SCALE Project

Europe lacks an integrated compute and storage infrastructure for the exploitation of **Copernicus** datasets in scientific and applied applications.

C-SCALE responds to that challenge by enhancing the **EOSC Portal** with pan-European federated data and computing infrastructure services for Copernicus.

C-SCALE: Copernicus - eoSC AnaLytics Engine

- Project duration: Jan 2021 – June 2023
- Budget: ~ 2 millon Euros
- Consortium of 11 partners with pan-European coverage

C-SCALE

enables

Seamless access
C-SCALE seamlessly integrates access to EO and Copernicus data into the EOSC portal service offerings, exposing Copernicus data to a much broader audience

Easy Processing & Analysis
C-SCALE federates European e-infrastructures and lay the foundation for a European open Big (Copernicus) Data Analytics platform
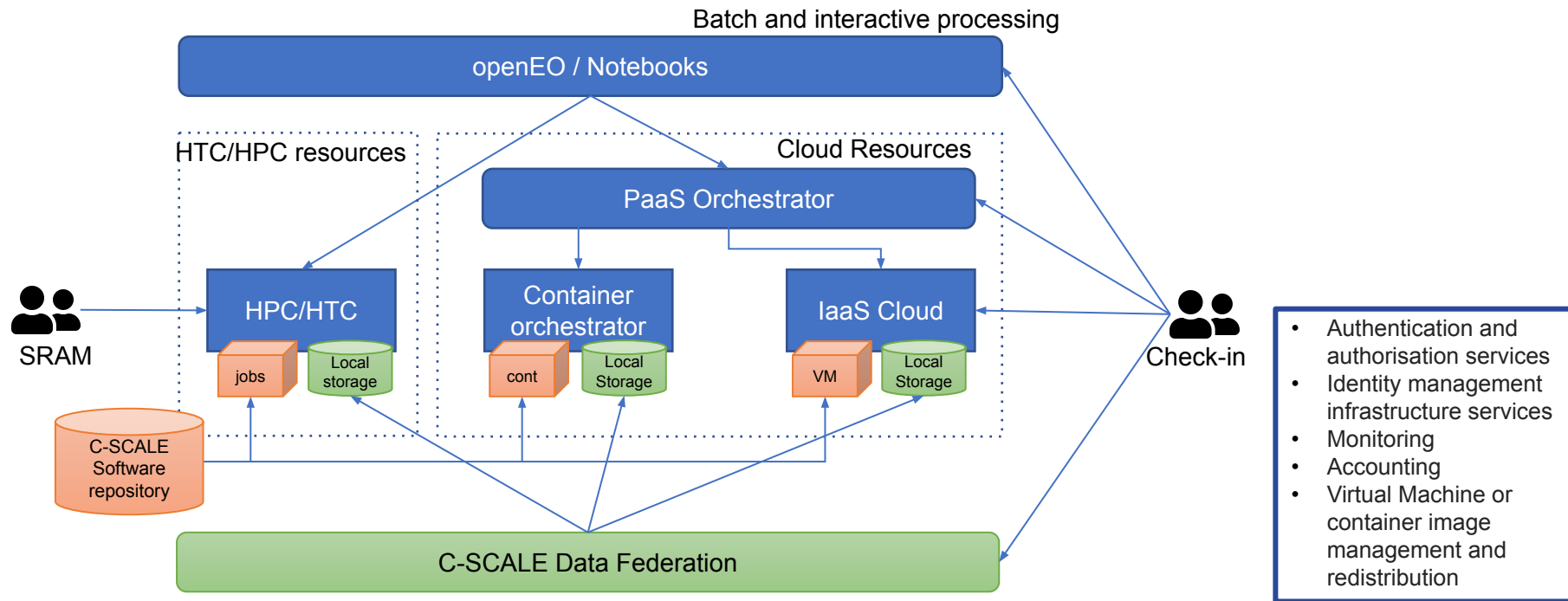
Cross-disciplinary research
The integration enabled by C-SCALE helps to make the Copernicus data FAIR and create optimal conditions for cross-disciplinary research

Knowledge for sound decision making
Data and service-based knowledge facilitated by C-SCALE will help to monitor and mitigate climate change and improve the quality of life for citizens of Europe and around the world

FedEarthData

FedEarthData: federation of Earth observation data archives and computing resource providers, enabling execution of Earth observation processing workflows with seamless access to data
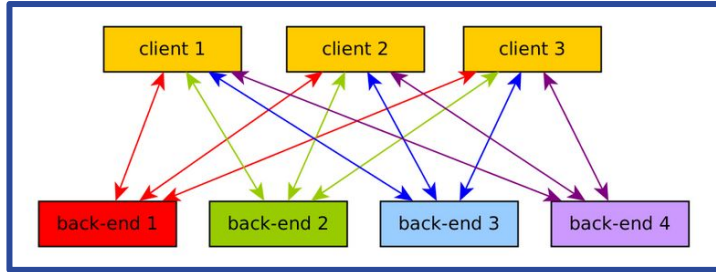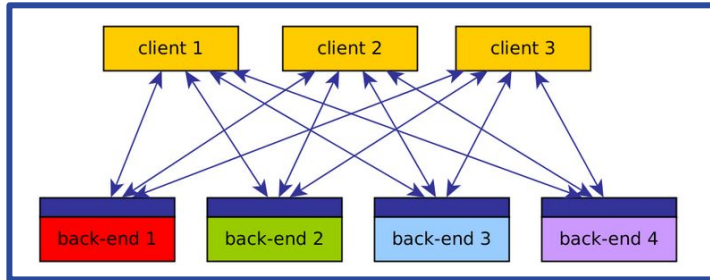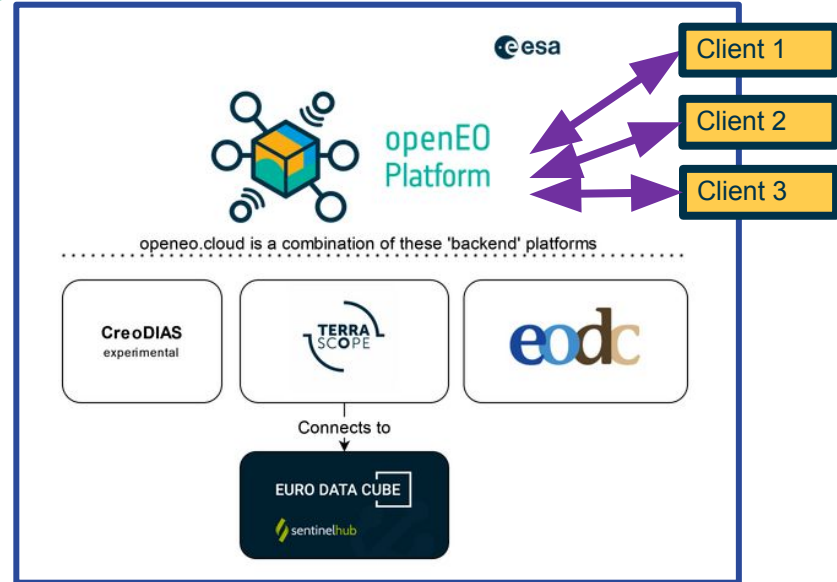
Batch and interactive processing

openEO / Notebooks

HTC/HPC resources

Cloud Resources

PaaS Orchestrator

SRAM

HPC/HTC

jobs | Local storage

Container orchestrator

cont | Local Storage

IaaS Cloud

VM | Local Storage

Check-in

C-SCALE Software repository

C-SCALE Data Federation

- Authentication and authorisation services
- Identity management infrastructure services
- Monitoring
- Accounting
- Virtual Machine or container image management and redistribution

openEO Platform

Situation before openEO:

openEO API:

openEO Platform:

openeo.cloud is a combination of these 'backend' platforms

- Clients: Python, R, Javascript
- Web Editor
- JupyterLab

Metadata Query Service (MQS)

- Earth Observation data discovery service arching over FedEarthData member providers

- Data providers already know where their data are
  - Bring their discovery interfaces under a common one
    - single point
    - shared protocol

- Spatio-Temporal Asset Catalogue (STAC) interface to enable queries across the federation

- MQS is a query broker and aggregator, it is **not yet another metadata database**.

- Focus and data retention policies at member sites - avoiding polling resources irrelevant to the given query
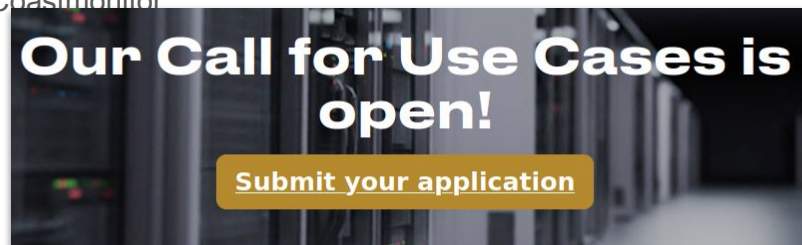
C-SCALE Use Cases

Use cases identified in the proposal stage

- **Aquamonitor**: track land-to-water and water-to-land changes worldwide

- **WaterWatch**: quantify water availability in reservoirs worldwide

- **HiSea**: weather and water quality information for ports and aquaculture industry.

- **LSDA**: seasonal river discharge forecast for any river basin in the world

- **RETURN**: quantify tropical forest recovery capacity

- **Wetland Water Stress Analysis**: identify and protect healthy wetlands as methane sin
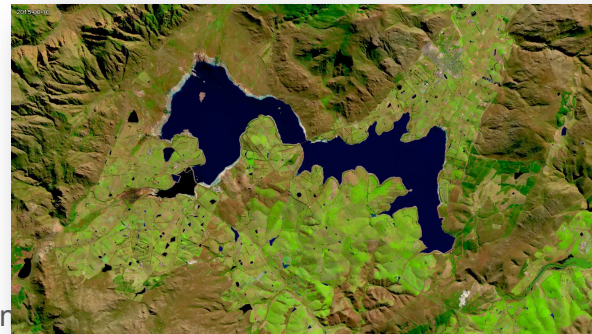
Use cases from the Open Call and EOSC DIH

- **4 already onboarded**: SAR on the fly, SPOTLIGHT, In SAR Cubes, Coastmonitor

- **6 currently being onboarded**:
    - energie.family
    - ubicube
    - TAMA
    - ITAINNOVA
    - KappaZeta
    - BioCarbon

C-SCALE workflow solutions

Workflows for Copernicus data processing

- Set of steps from raw data to figures
- Reusable: changing spatial and temporal scales
- Provided by C-SCALE Use Cases
- Goal: providing solutions for monitoring, modelling and forecasting of the Earth system
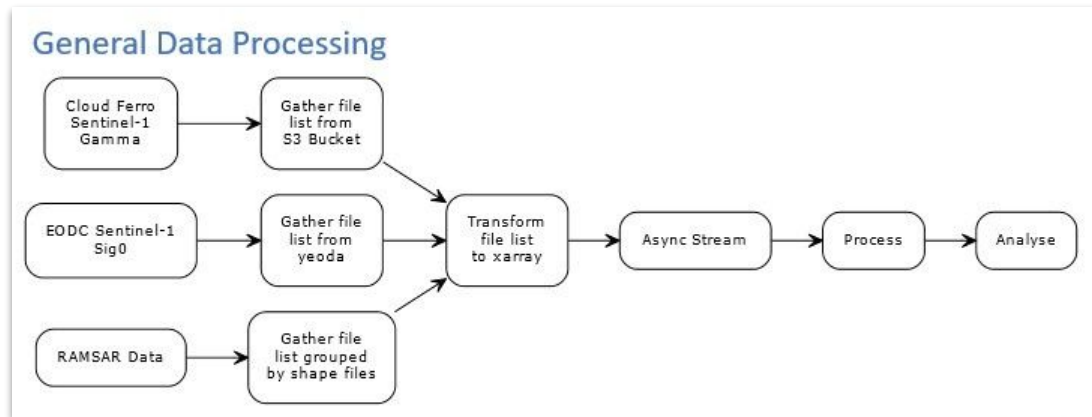
Contribution to the EOSC Exchange

- The C-SCALE services will be onboarded in the EOSC Marketplace by the end of the project lifetime.

- Their sustainability plans will be the focus of the last period of the project.

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Thank you for your attention.

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