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 million Euros
- Consortium of 11 partners with pan-European coverage
FedEarthData: federation of Earth observation data archives and computing resource providers, enabling execution of Earth observation processing workflows with seamless access to data.

C-SCALE Data Federation

- Batch and interactive processing
  - openEO / Notebooks
  - PaaS Orchestrator
  - IaaS Cloud

HTC/HPC resources
- HPC/HTC
  - C-SCALE Software repository
  - jobs
  - Local storage

Cloud Resources
- Container orchestrator
  - Local Storage
  - cont

Cloud Resources
- IaaS Cloud
  - VM
  - Local Storage

Check-in
- SRAM

C-SCALE: Software repository

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

- client 1
- client 2
- client 3
- back-end 1
- back-end 2
- back-end 3
- back-end 4

openEO API:

- client 1
- client 2
- client 3
- back-end 1
- back-end 2
- back-end 3
- back-end 4

openEO Platform:

- Client 1
- Client 2
- Client 3

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

- CreoDIAS experimental
- TERRASCOPE
- eodc

Connects to

- EURO DATA CUBE

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

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

Our Call for Use Cases is open!

Submit your application
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

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**General Data Processing**

- **Cloud Ferro Sentinel-1 Gamma**
- **EODC Sentinel-1 Gig0**
- **RAMSAR Data**
- **Gather file list from S2 Bucket**
- **Gather file list from yoda**
- **Transform file list to xarray**
- **Async Stream**
- **Process**
- **Analyse**

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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.
Thank you for your attention.

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