



Destination Earth

DestinE Edge Services supporting application development



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Affiliations: ¹CloudFerro S.A., Warsaw, Poland; ²CS Group - Sopra Steria, Le Plessis Robinson, France; ³EODC, Vienna, Austria; ⁴EUMETSAT, Darmstadt, Germany

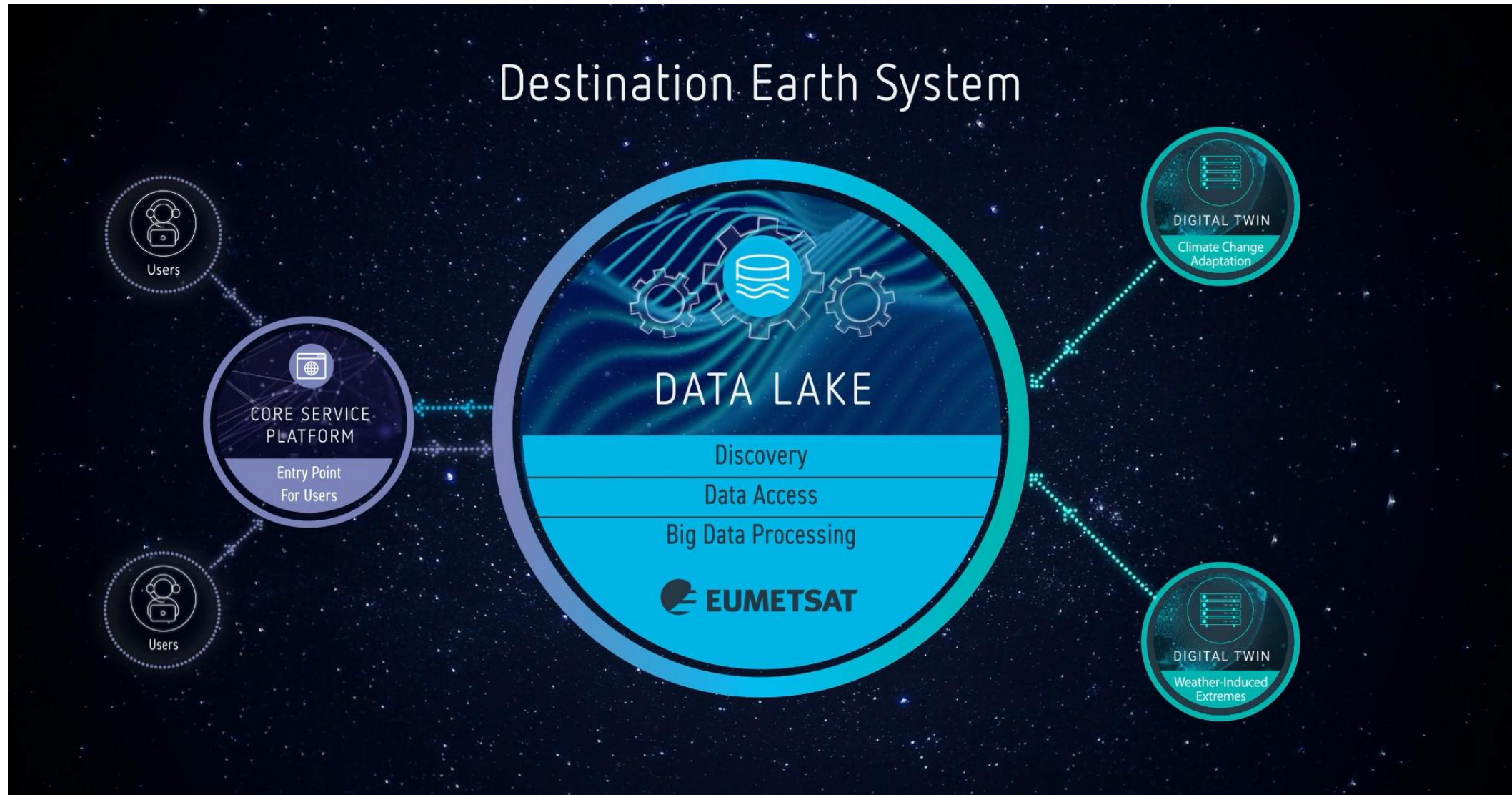
Destination Earth

Funded by
the European Union



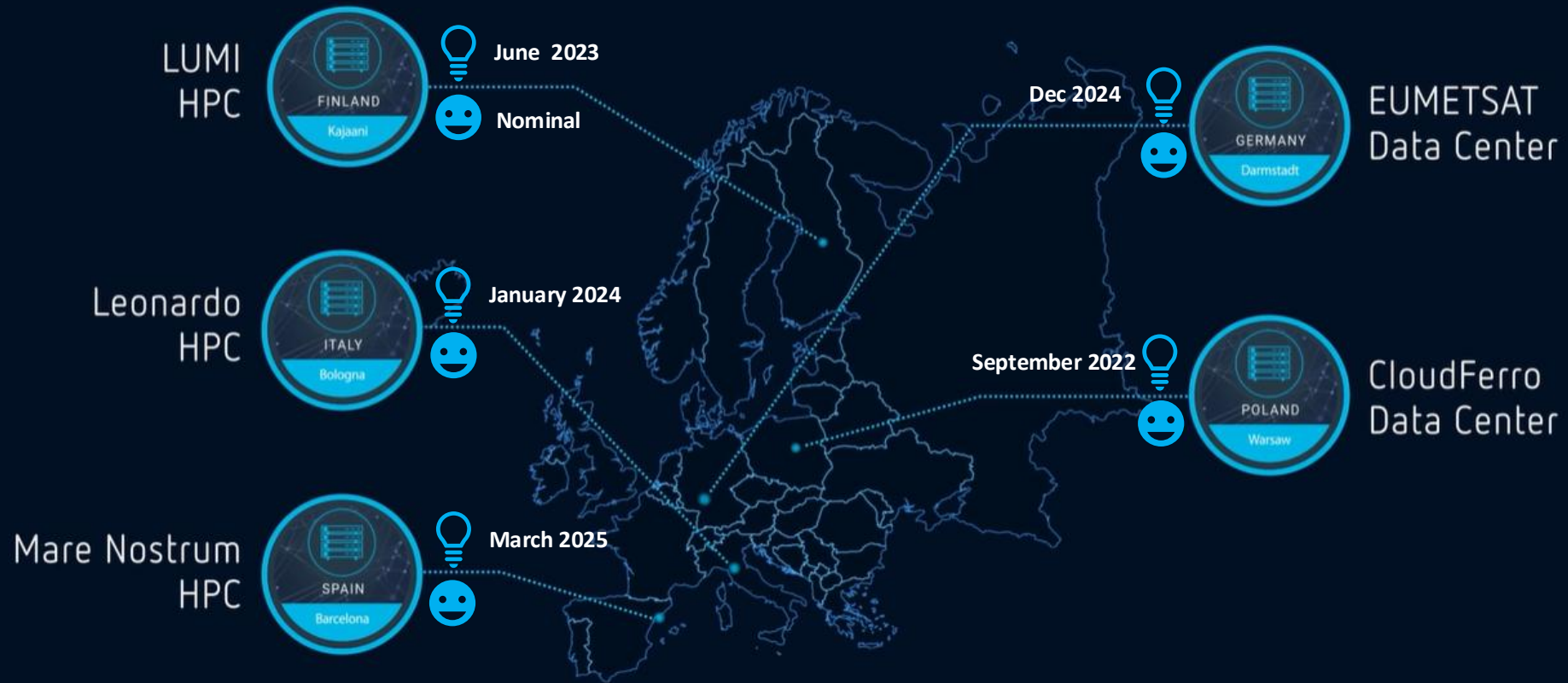
Implemented by

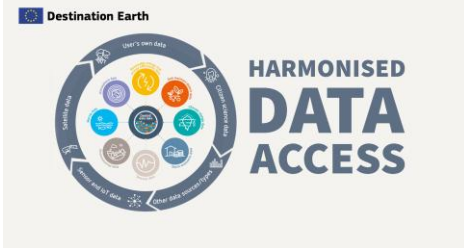






Data Lake distributed infrastructure





Harmonised Data Access: seamless access to

- DestinE Data – DT Outputs & User Generated Data for DestinE
- Federated Data

as per defined & evolving “[DestinE Data Portfolio](#)”.

API => Spatio Temporal Asset Catalog (STAC)



STACK: SaaS suite which enables near data processing

- JupyterHub, Dask/ Dask Gateway and Data Cube (coming soon)



ISLET Compute: (IaaS/PaaS) enables near data processing by allowing users to manage and deploy virtualised workloads

ISLET Storage: S3 Object Storage to store user’s data and processing results

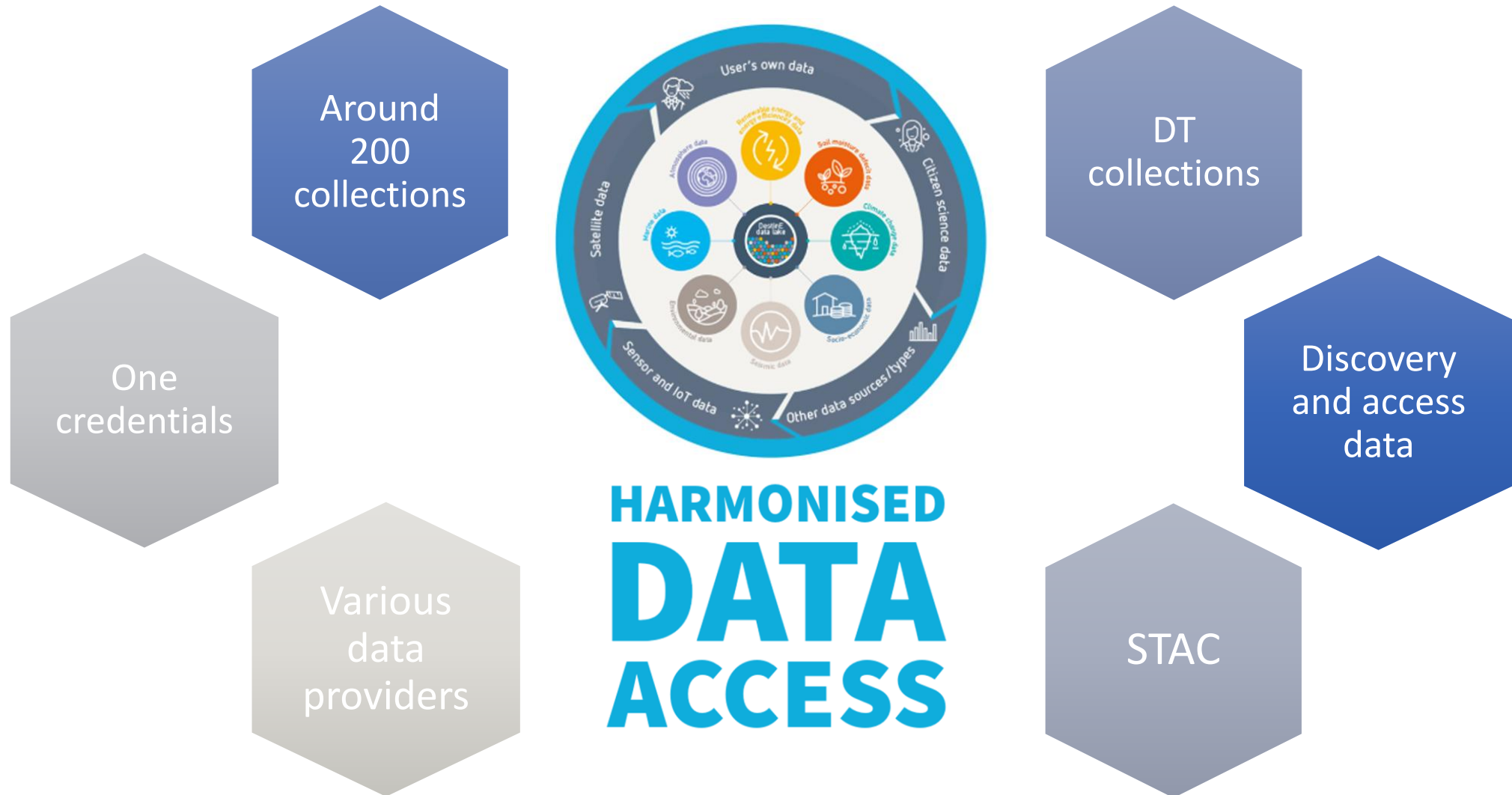


HOOK: allows to execute high level pre-defined or own workflows

- Data harvest: to harvest data from a federated data provider a priori of planned data processing or analysis task



HARMONISED DATA ACCESS





**HARMONISED
DATA
ACCESS**

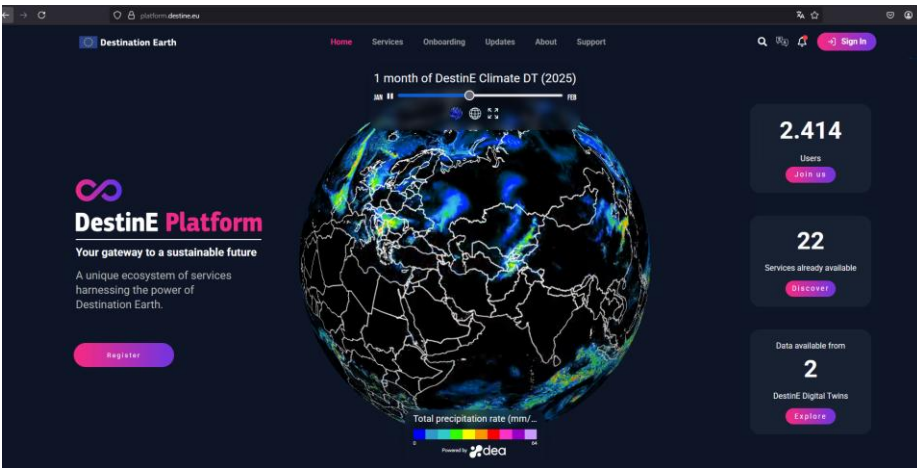


<https://github.com/destination-earth/DestinE-DataLake-Lab>

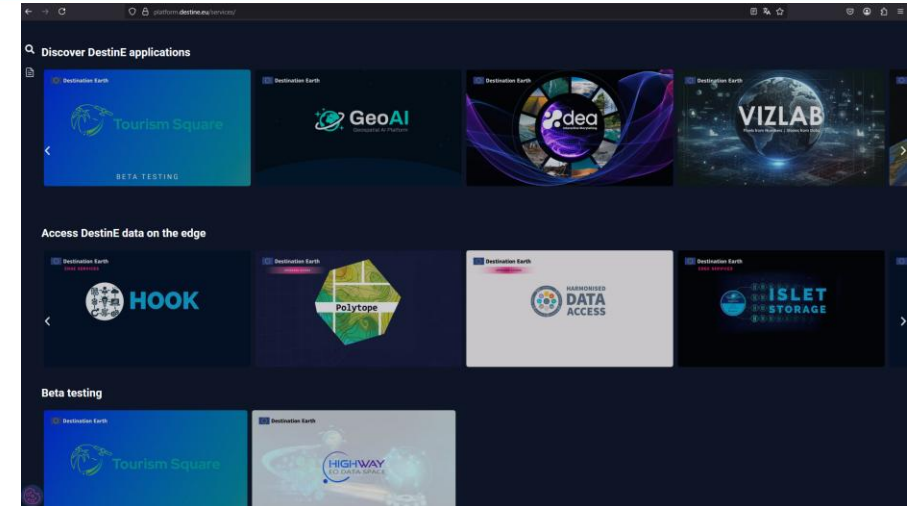
Jupyter Lab environment provided
by the DEDL STACK Service

Virtual machine offered by the
DEDL Islet Service

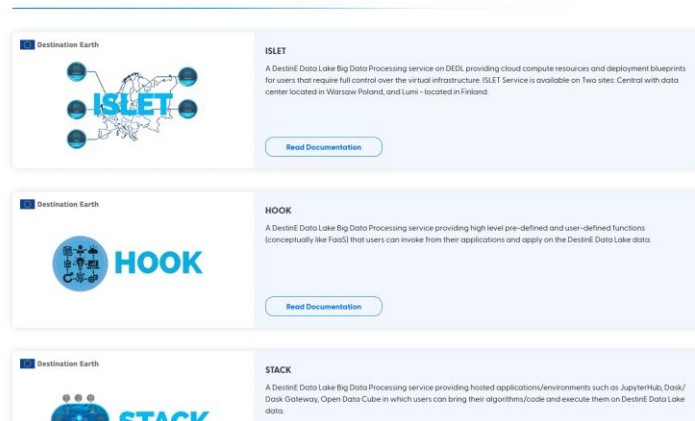
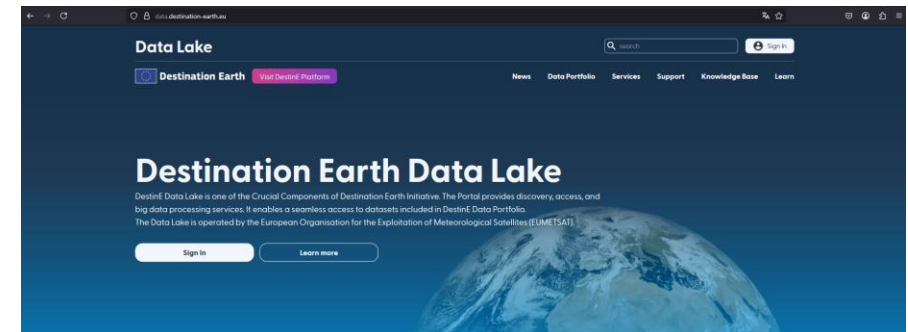
On your own local environment



<https://platform.destine.eu/>

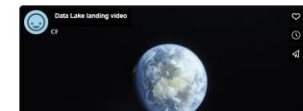


<https://data.destination-earth.eu/>



Destination Earth Data Lake

The Goal of DestinE Data Lake (DEDL) is to help us better understand our Ecosystem, enhance decision-making process, and enable us to build a better, safer and more sustainable future. DEDL grants its users access to huge amounts of EO Data. Open Data Policy is a key element for this.





Our EDGE Services

Data Lake provides five main services that enable users to find, save, and process data according to their needs. Learn more about Islet, Stack, Hook, Harmonized Data Access and Fresh Data Pool and join us in the quest of finding answers to the most important questions. All the services are managed in one place through My Data Lake Services Portal. Explore DestinE Data Lake and embark on a journey.

MY DATA LAKE SERVICES

The platform allows you to see and manage all the services that compose the DestinE Data Lake initiative. My Data Lake Services attends to the needs of organizations and institutions that utilize EO Data in their work. You can sign up your organization and become its administrator or simply join an existing group as a member via invitation code. The Portal allows you to manage access as well as set limits (quotas) to each service offered by DEDL. Keep in mind that those services will not be available for you to use until both access and quota roles are requested and granted by our Approval Board. To properly set up your organization, make sure that you request access to all the tools you would like to use immediately, as the approval process may take up to a few days.

[Go to My Data Lake Services](#)

Logout

My Services

Configuration

My profile

Entity

Entity requests

Users & privileges

Invitations

Access

Active roles

Role requests

Home > Profile

Profile

Email

pgrzybowski

First name

Patryk

Country

PL

Newsletter

-

Logout

My Services

Configuration

My profile

Entity

Entity requests

Users & privileges

Invitations

Access

Active roles

Role requests

Home > Role requests

Role requests

No role requests found.

Services

hda

Edit access

hook

Edit access

stack-dask

Edit access

stack-jupyter

Edit access



Quota roles

Select role*

	Role name	Role type	Description
☐	stack-dask-low	quota	Low quota for Stack Dask Service. Consists of 1 core and 2 GB RAM.
☐	stack-dask-medium	quota	Medium quota for Stack Dask Service. Consists of 4 cores and 8 GB RAM.

Description of planned activities*

Description of planned activities*

Request role



Raise « project » request for EDGE services

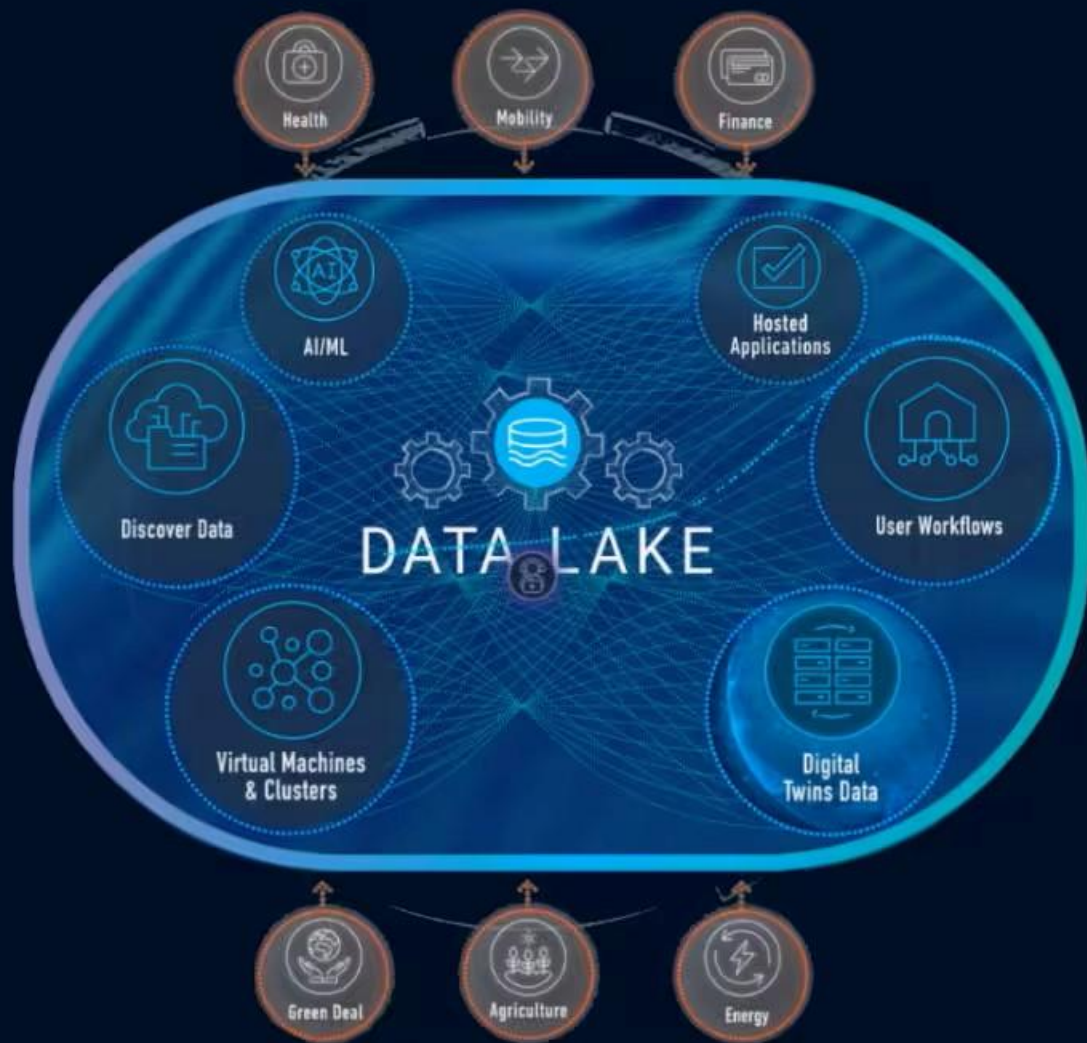


Edge services





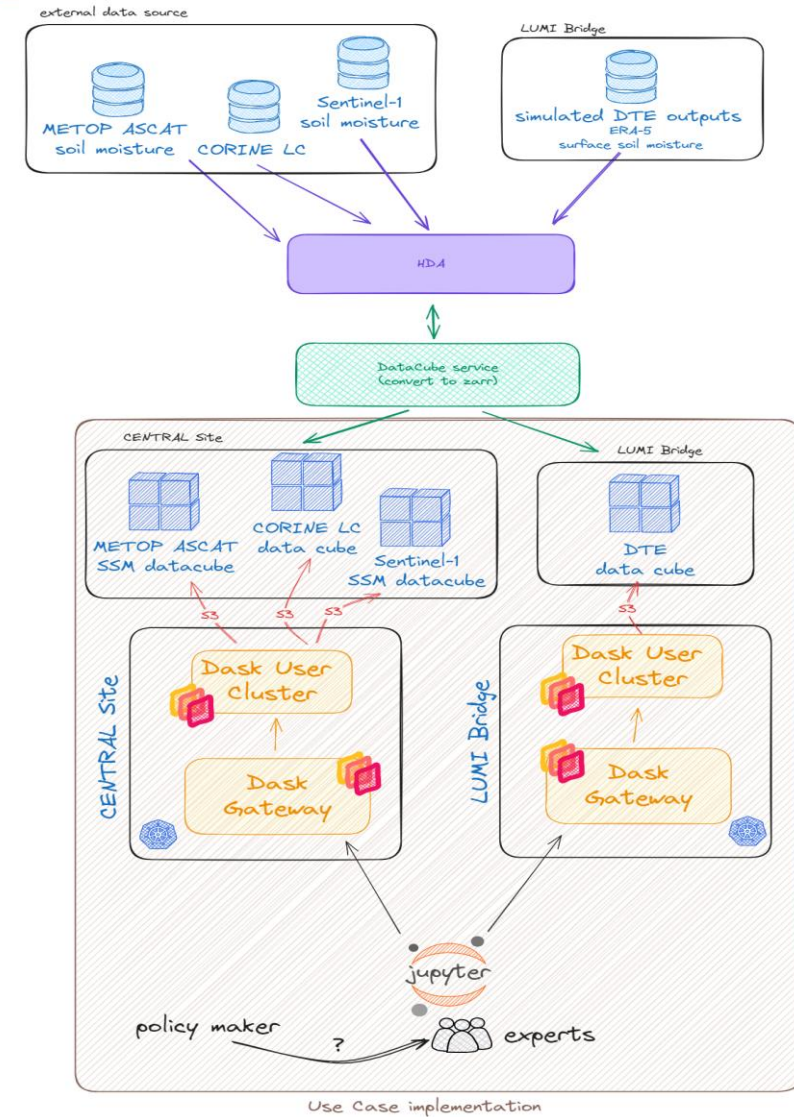
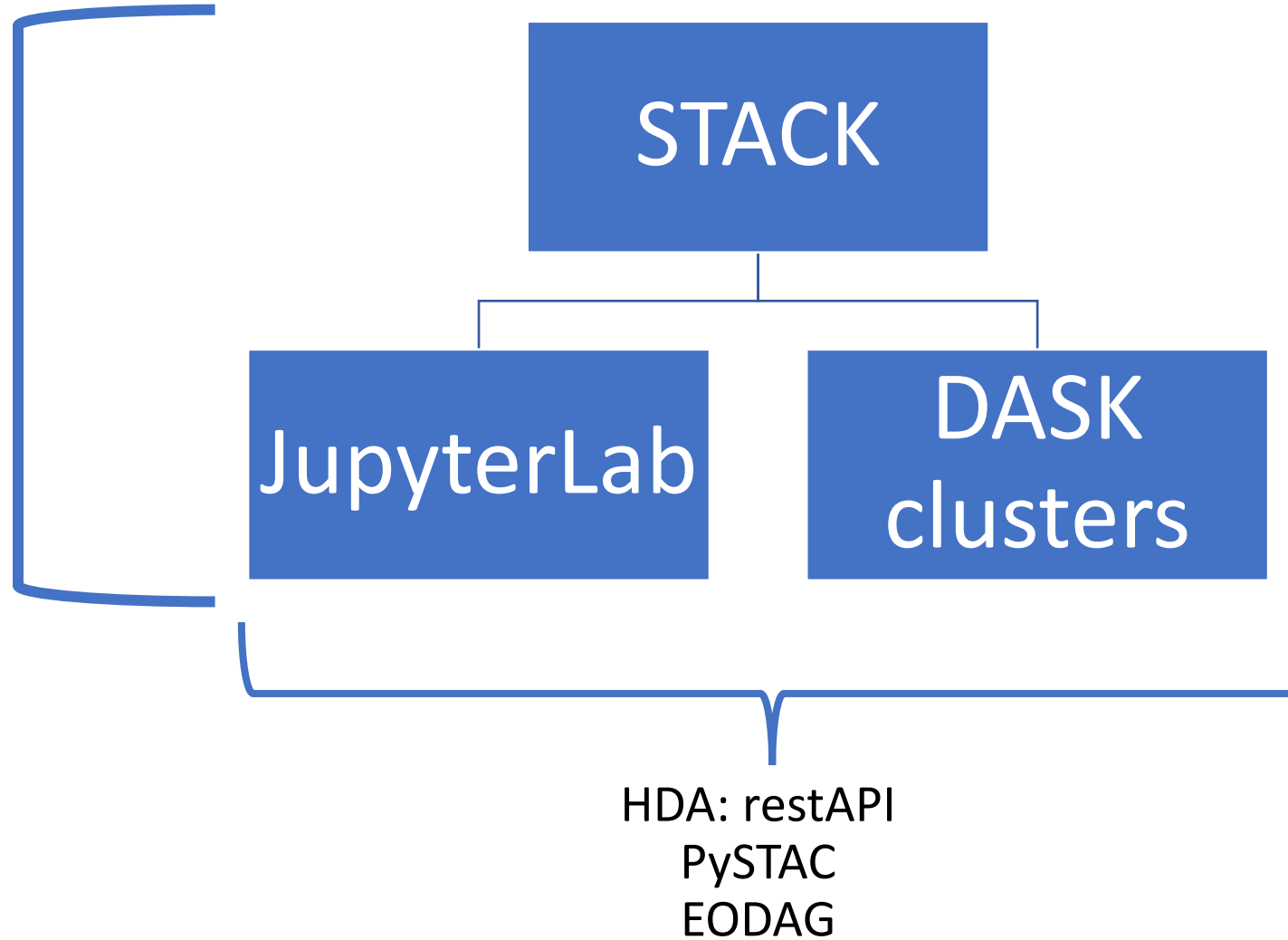
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STACK



Data Bridges





Server Options

☐ JupyterLab (Full working environment)

DestinE Data Lake JupyterLab

☐ Remote Compute Kernels - Central Site

Remote Kernels to compute at Central Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

☐ Remote Compute Kernels - LUMI Bridge

Remote Kernels to compute at LUMI Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

☐ Remote Compute Kernels - LEONARDO Bridge

Remote Kernels to compute at LEONARDO Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

☐ Remote Compute Kernels - EUMETSAT Bridge

Remote Kernels to compute at EUMETSAT Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

☐ Remote Compute Kernels - MareNostrum Bridge

Remote Kernels to compute at MareNostrum Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

Start

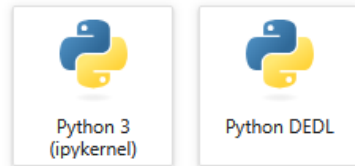




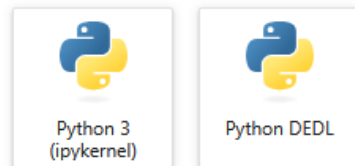
☐ JupyterLab (Full working environment)

DestinE Data Lake JupyterLab

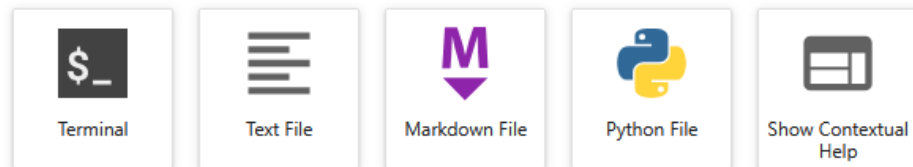
Notebook



Console



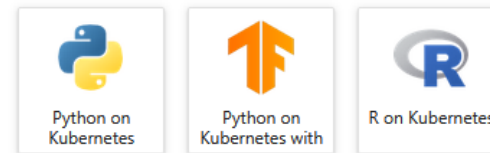
Other



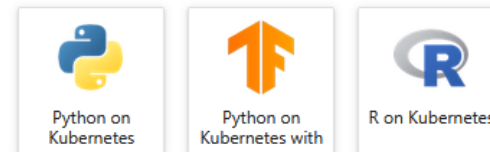
☐ Remote Compute Kernels - LEONARDO Bridge

Remote Kernels to compute at LEONARDO Bridge (Jupyter Home not available & use of Object Storage S3 for Data Exchange mandatory)

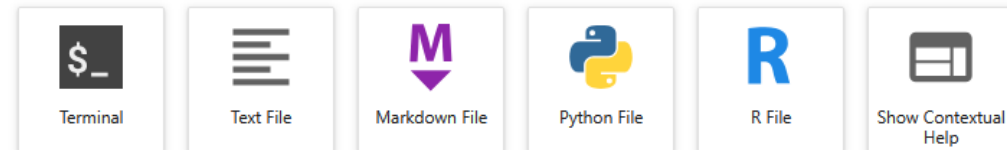
Notebook

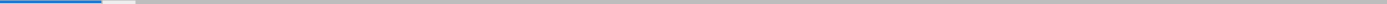


Console



Other





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Destination Earth - Climate Change Adaptation Digital Twin - Data Access using DEDL HDA

Documentation Digital Twin - Parameter Usage

Author: EUMETSAT

Credit: Earthkit and HDA Polytope used in this context are both packages provided by the European Centre for Medium-Range Weather Forecasts (**ECMWF**).

DEDL Harmonised Data Access is used in this example.

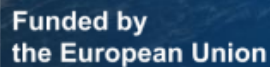
Obtain Authentication Token

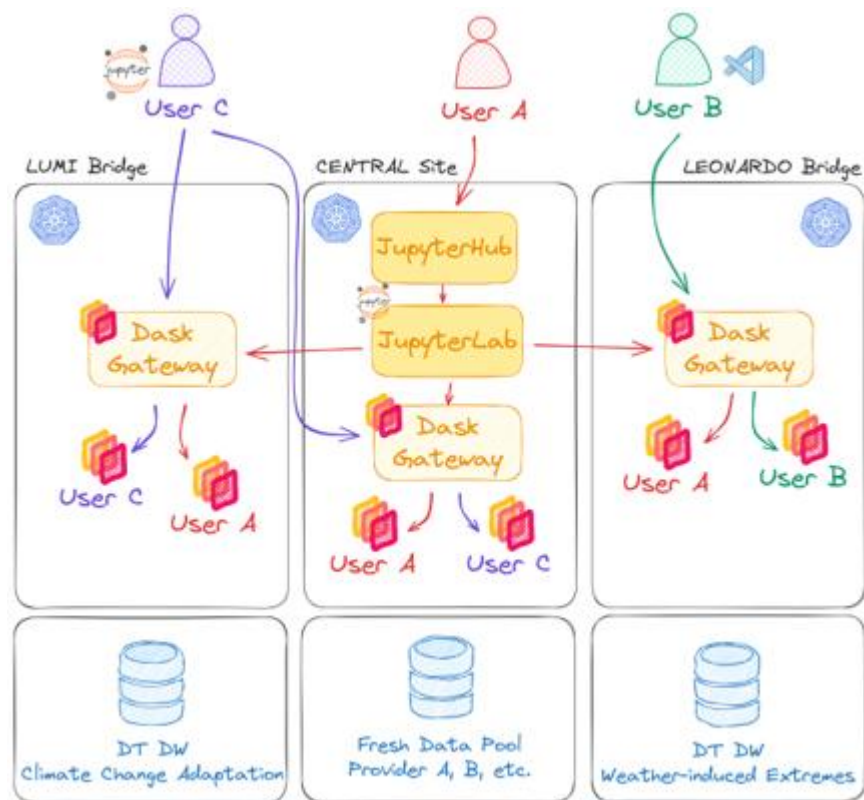
```
[ ]: pip install --quiet --upgrade destinelab
```

```
[6]: import requests
from requests.adapters import HTTPAdapter
from urllib3.util.retry import Retry
import json
import os
from getpass import getpass
import destinelab as deauth

import importlib.metadata
```

First, we get an access token for the API





Remote Cluster Access: Manage and execute tasks on **remote clusters** (e.g., cloud or HPC) directly from JupyterLab

Real-Time Dashboards: Monitor performance, task progress, and resource usage via **interactive dashboards**

Effortless Scaling: Dynamically balances workloads across workers for scalable **distributed computing**



File Edit View Run Kernel Git Tabs Settings Help

PRODUCTS SEARCH



Provider: Any

Product Type: METOP_ASCSZF1B

Date range: Start End

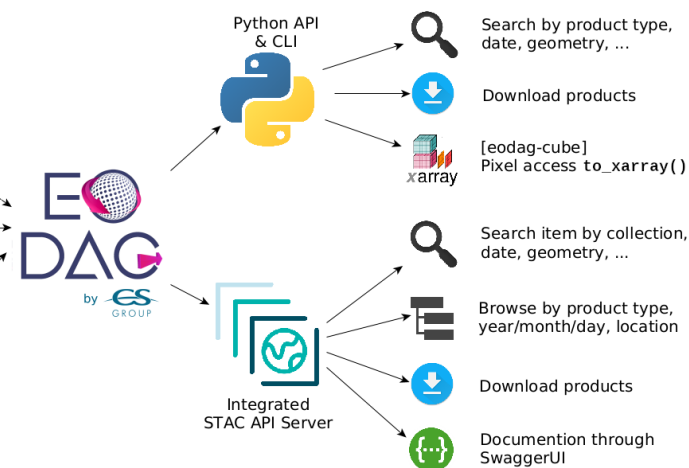
PARAMETERS [More parameters +](#)

No required parameter for this product type.

CUSTOM PARAMETERS

Name	Value
------	-------

[Preview Results](#) [Generate Code](#)



```
[ ]: from eodag import EODataAccessGateway, setup_logging

setup_logging(1) # 0: nothing, 1: only progress bars, 2: INFO, 3: DEBUG

dag = EODataAccessGateway()
geometry = "POLYGON ((0.703125 40.576134, 0.703125 42.548764, 3.427734 42.548764, 3.427734 40.576134, 0.703125 40.576134))"
search_results = dag.search(
    productType="METOP_ASCSZF1B",
    geom=geometry,
)
```



Object Storage Access

File Edit View Run Kernel Git Tabs Settings Help

S3 Object Storage Browser

This extension allows you to browse S3-compatible object storage instances, such as AWS S3 and IBM Cloud Object Storage.

Endpoint URL

Access Key ID

Secret Access Key

(Optional) Session Token

Connect

GitHub

File Edit View Run Kernel Git Tabs Settings Help

You are not currently in a Git repository. To use Git, navigate to a local repository initialize a repository here, or clone an existing repository.

Open the FileBrowser

Initialize a Repository

Clone a Repository

DASK

DASK DASHBOARD URL

Dashboard not connected

To connect, paste a dashboard URL in the box above, or create a new Dask cluster with the cluster manager below. If you are still unable to connect, check your network setup.

CLUSTERS + NEW



Destination Earth



HOOK



Available pre-defined hooks

- Data harvest
- LAI
- CARD BS
- CARD COHINF
- SNAP C2RCC
- SEN2COR
- MAJA

Users' custom hooks



Private s3 storage
OR
Temporary s3 storage



Interact with workflows using

- REST API
- openEO API

User Interface:

- JupyterLab (STACK)
- openEO (UI)

The screenshot displays a JupyterLab environment. On the left, a file browser shows the directory structure: / DestinE-DataLake-Lab / HOOK /, containing files DEDL-Hook_access.ipynb, README.md, and the selected Tutorial.ipynb. The main area shows the 'Tutorial.ipynb' notebook with a header banner for 'Destination Earth' funded by the European Union, implemented by EUMETSAT, ESA, and ECMWF. The notebook content includes a title 'DEDL - Hook Tutorial', an introduction paragraph, author information (EUMETSAT), links to API documentation, and two code sections: 'Install package and import environment variables' and 'Authentication - Get token'.

```
[ ]: #install DEDL authentication package to simplify your code
!pip install destine-auth

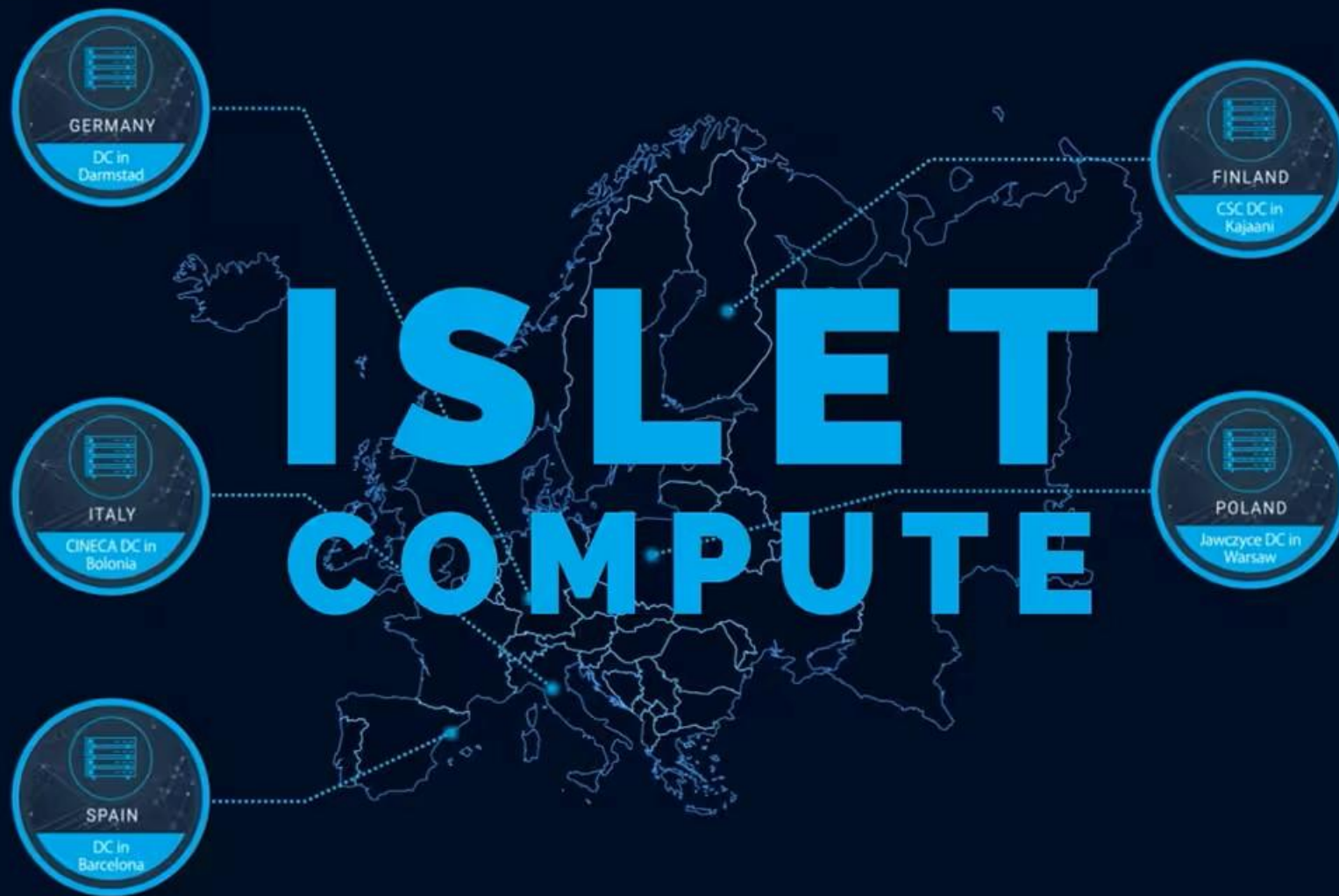
[ ]: import json
    #from io import BytesIO
    #from urllib.parse import urlencode
    #import pycurl
    import requests
    from getpass import getpass
    import destine_auth as destine_auth

Authentication - Get token

[ ]: #Request DESP credentials
DESP_USERNAME = input("Please input your DESP username or email: ")
DESP_PASSWORD = getpass("Please input your DESP password: ")
```




Destination Earth





Virtual environment based on the
OpenStack

Preconfigured images

VPU and GPU

K8s clusters

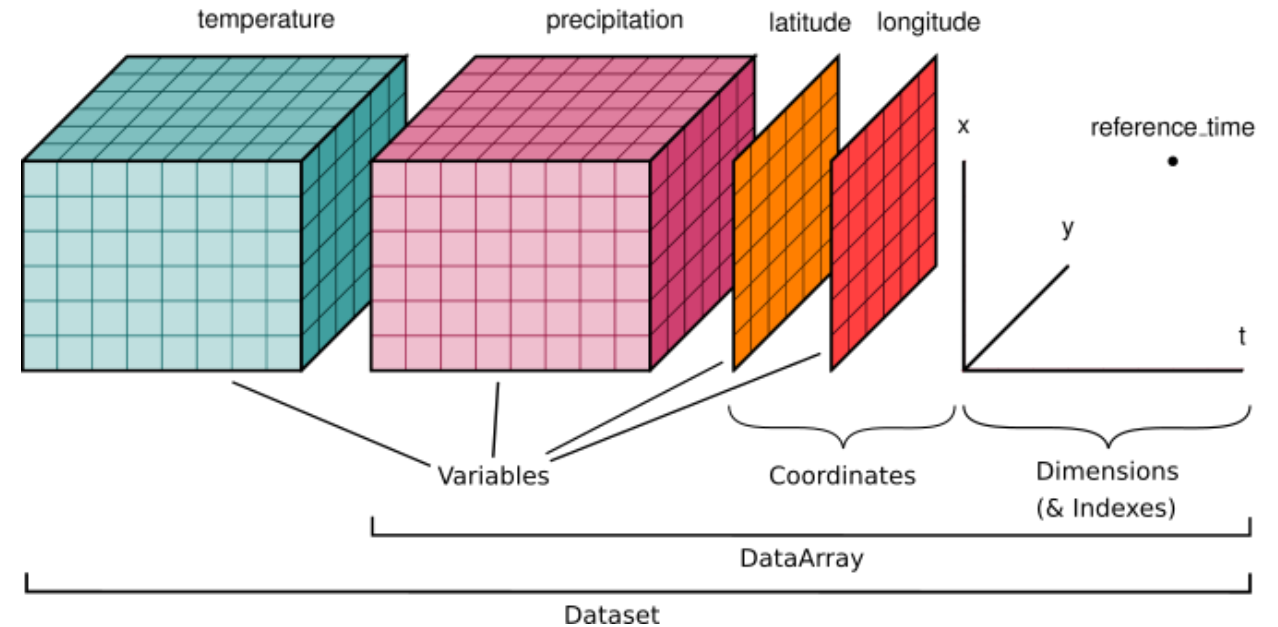


Access to s3 storage

Manage s3 storage



Efficient work – data cubes!



Data in native
format



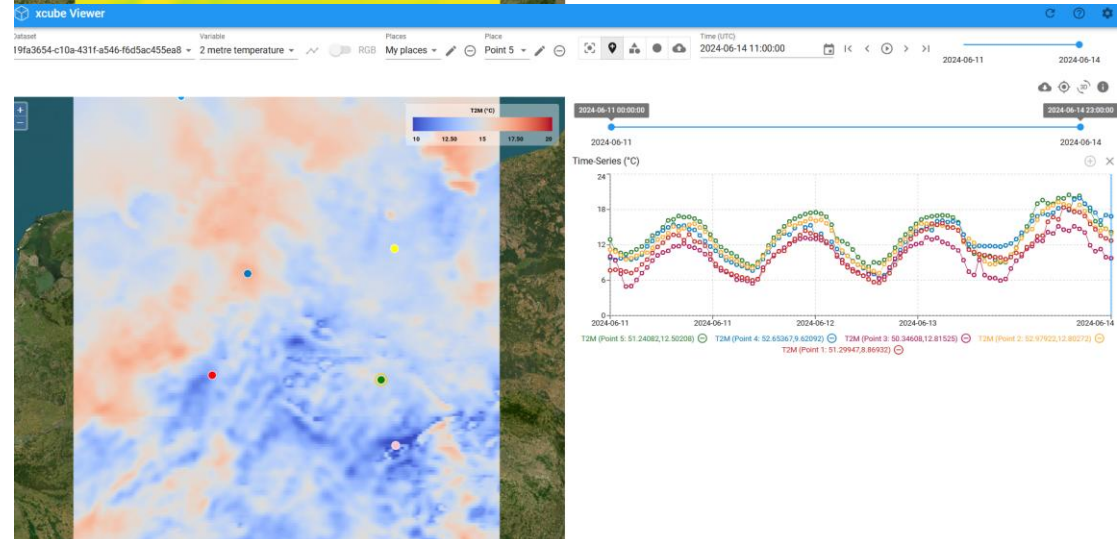
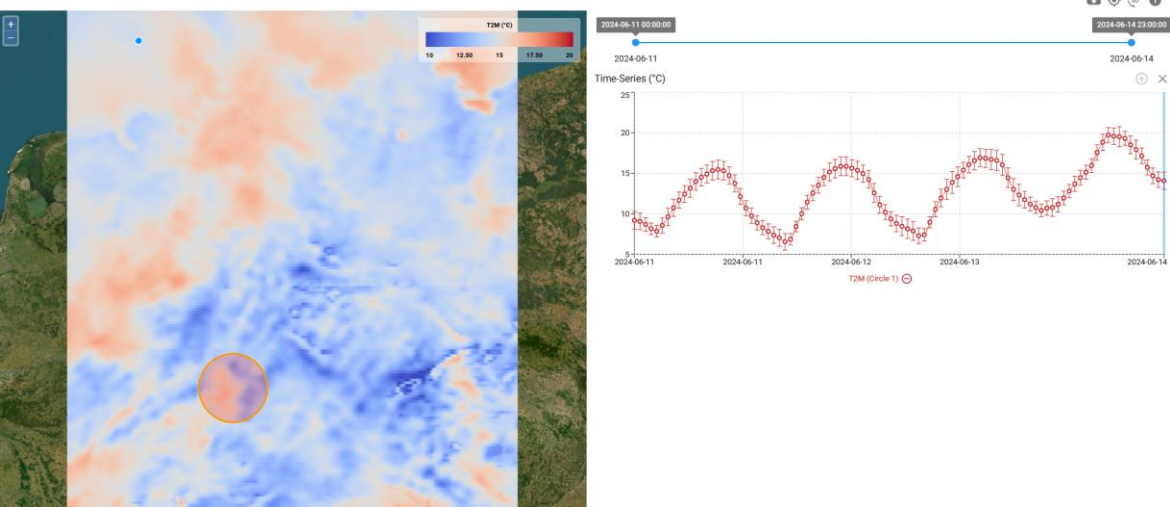
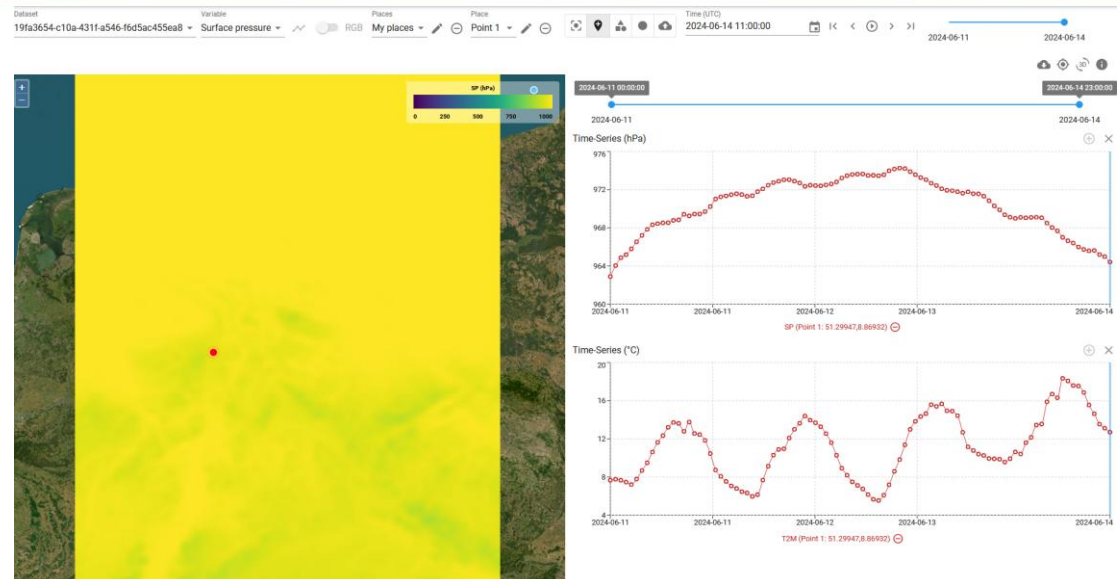
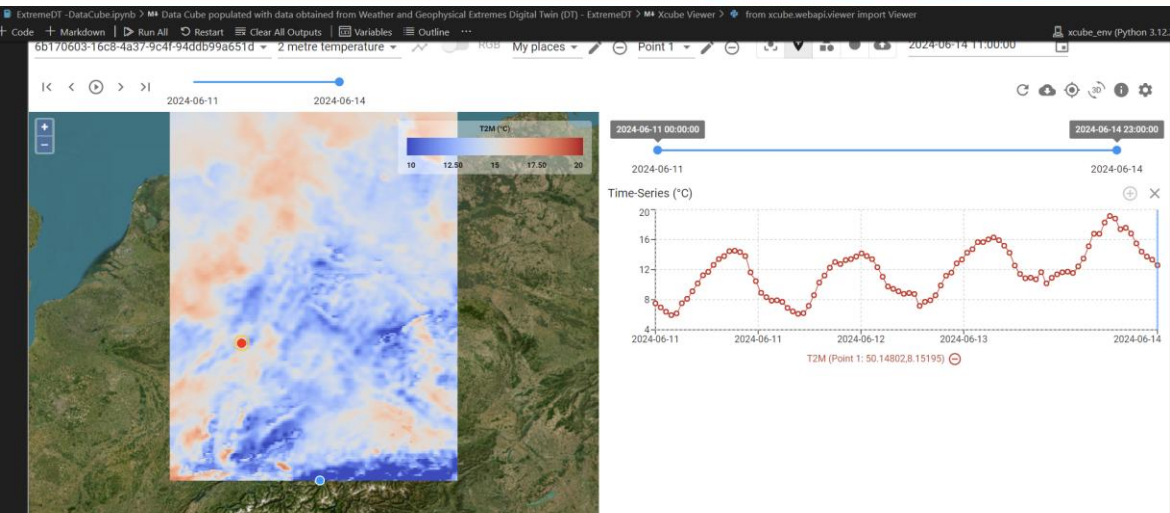
.zarr/.netcdf



Python



Destination Earth





<https://github.com/destination-earth/DestinE-DataLake-Lab>

DestinE-DataLake-LabPublic

Edit PinsWatch

main6 Branches0 TagsGo to fileAdd fileCode

serenaateumdifferent variable in plotter76b4240 · 12 hours ago245 Commits

HDAdifferent variable in plotter12 hours ago

HOOKUpdate Hook Tutorial Desp Only Credentials and Readme4 days ago

STACKData Cube in xviewer - update3 months ago

imgstyle6 months ago

LICENSE.txtCreate LICENSE.txt4 months ago

README.mdREADME instruction updated and different management of er...12 hours ago

READMEMIT license

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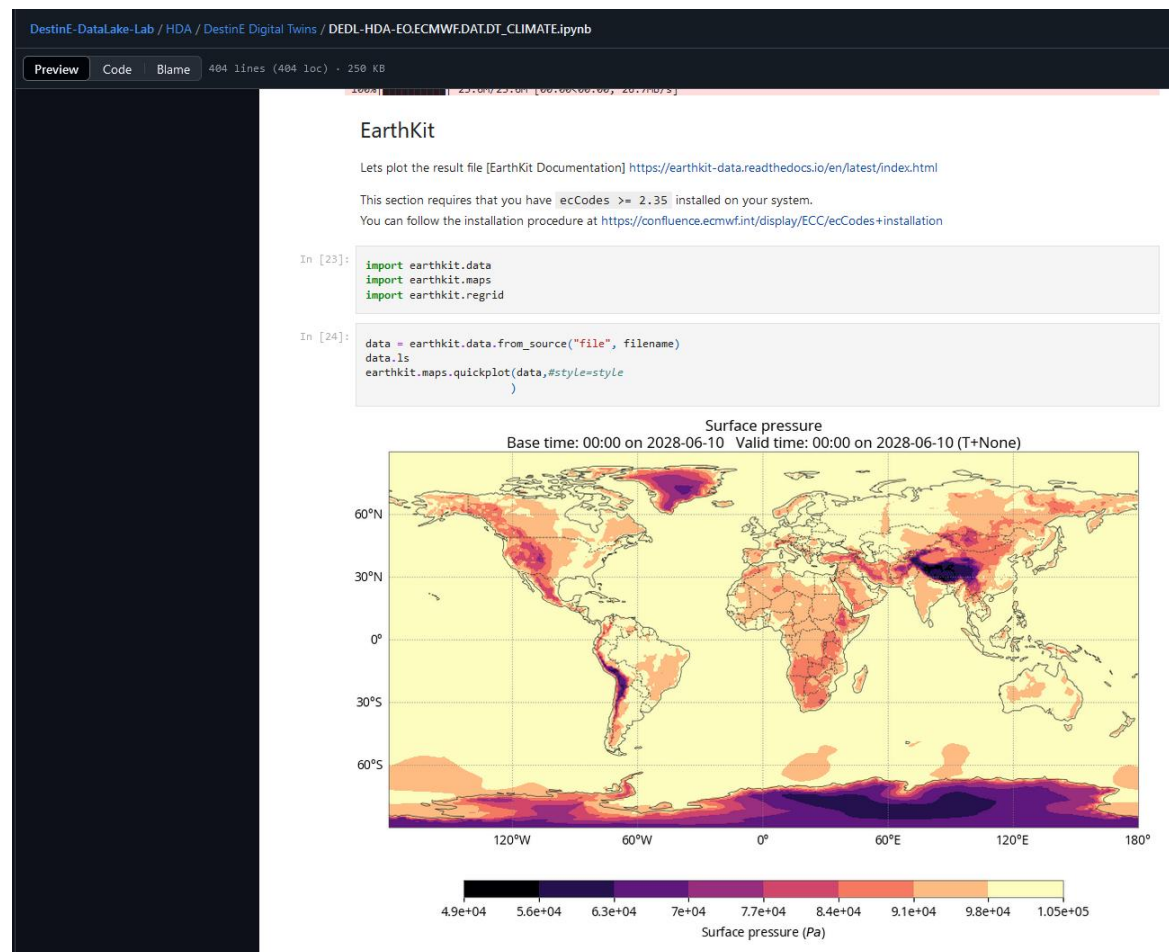
Author: EUMETSAT

Destination Earth Data Lake Laboratory, which contains additional information for working with DestinE Data Lake services:

- Harmonised Data Access (Jupyter notebooks examples + Python Tools)
- STACK service (Jupyter Notebook examples on how to use DASK for near data processing)
- HOOK service (Jupyter Notebook examples on how to use HOOK for workflows)

Further information available in DestinE Data Lake documentation: <https://destine-data-lake-docs.data.destination-earth.eu/en/latest/index.html>

Additional resources:





- One credentials
- One API



- Visualization
- Parallel computation
- WEB browser, without deploying VM



- Computing power **including GPU**
- Near data processing
- S3 to store data and processing results



- Save time - less coding

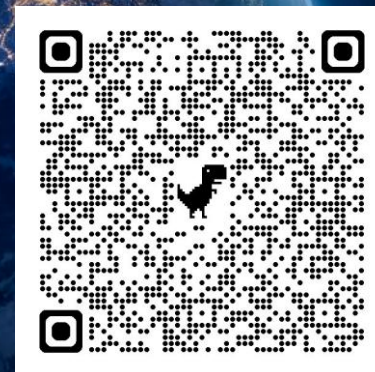


Destination Earth

Thank you!

pgrzybowski@cloudferro.com

Raise « project » request for EDGE services



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Implemented by

