

Tutorial III

How to work with JupyterLab on the Comunidad platform

JupyterLab is an open-source, web-based interactive development environment that brings together code, data, and documentation in a single, flexible workspace. It enables researchers and developers to combine live code execution, narrative text, and visual outputs, ensuring transparent and reproducible workflows.

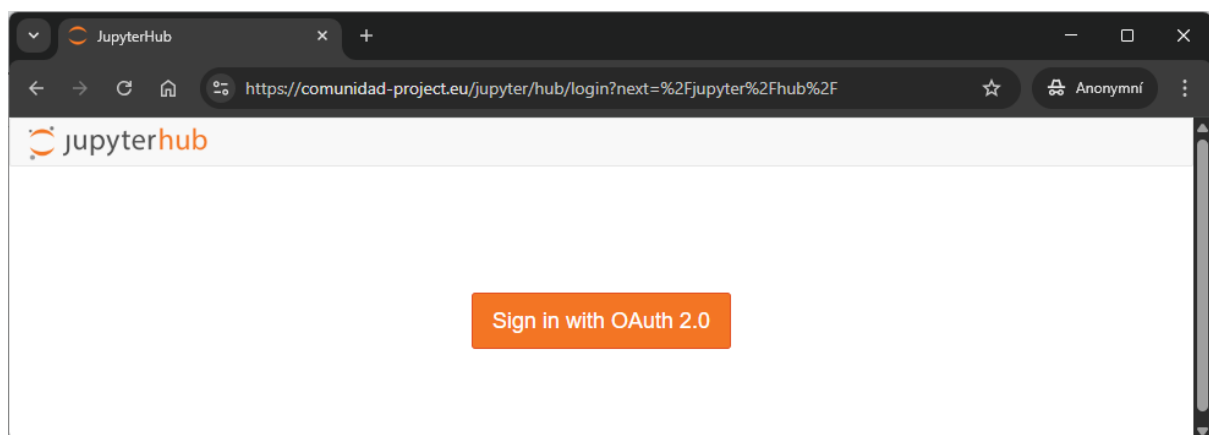
Within the COMUNIDAD project, JupyterLab serves as a central environment for:

- Data access and exploration: Integration with the SpatioTemporal Asset Catalog (STAC) standard allows users to query, discover, and access Earth Observation (EO) datasets from distributed sources in a standardized way.
- Reproducible analysis: Notebooks capture both methodology and results, supporting verification and knowledge transfer across project partners.
- Multi-language support: Python is the main programming language supported by default, but support for others, like R, Julia, can be set up through kernels, making it adaptable for diverse research teams.
- Visualisation and geospatial analysis: Compatibility with libraries such as GeoPandas, rasterio, and Leaflet enables processing and visualisation of geospatial data retrieved from STAC endpoints or directly from the mapped Sentinel scenes repository located at the COMUNIDAD infrastructure.
- Extensibility: Its modular design allows integration with project-specific services (e.g. MapProxy, APIs, cloud-based storage) and plugins tailored to EO and IoT use cases.
- Collaboration: Notebooks can be shared, versioned, and reused across institutions, fostering cross-border cooperation and alignment with FAIR data principles (Findable, Accessible, Interoperable, Reusable).

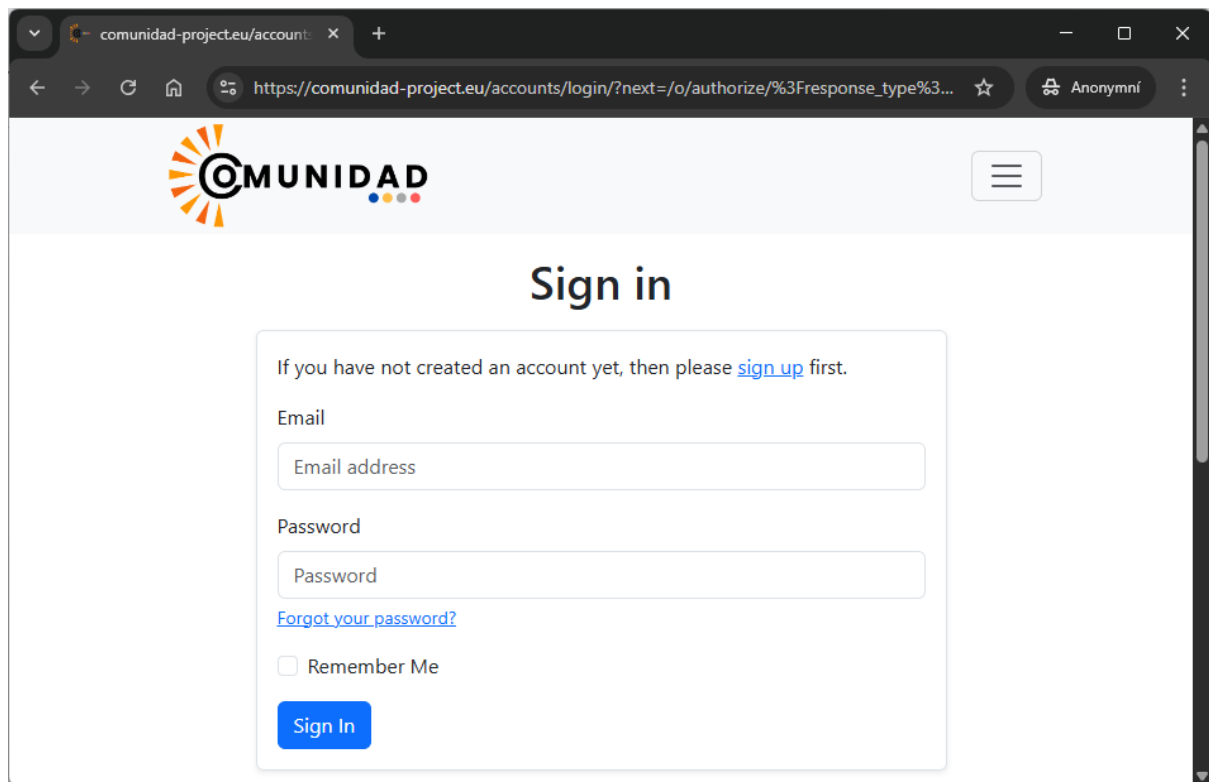
By combining JupyterLab with STAC-based data discovery, the COMUNIDAD project ensures a robust, user-friendly environment for working with Copernicus and other EO data, enabling both technical users and stakeholders to experiment, validate, and scale innovative solutions in line with EU digital priorities.

How to work with JupyterLab

Access the JupyterLab instance of the COMUNIDAD Platform at <https://comunidad-project.eu/jupyter>



Sign in using the COMUNIDAD platform Web Portal and authorise JupyterLab to access your Portal account.



You can start using Jupyter, see the documentation at https://jupyterlab.readthedocs.io/en/stable/getting_started/overview.html!

Use the STAC endpoints of the EO API to get to the Copernicus data available via the COMUNIDAD Platform or access the underlying repository of Copernicus Sentinel scenes directly using the name of the selected scene, eg:

```
import os

# Path to your local GeoTIFF file
path = os.path.expanduser('~/.shared')
tiff_path = os.path.join(path,
    'Caldas/TCI/S2A_MSIL2A_20230103T152641_N0510_R025_T18NVL_20240807T094726.SAFE_TCI.tif')
# print out the TIFF file path
tiff_path
# use the raster for further calculations
...
```

The list of available scenes for each location can be accessed via the EO API, eg.

https://comunidad-project.eu/eo-api/scenes?location=Caldas&api_key=eo-api-key-dev

The scenes can also be filtered by dates, eg.

https://comunidad-project.eu/eo-api/scenes?location=Caldas&start_date=20240101&end_date=20240130&api_key=eo-api-key-dev