



D2.3 Infrastructure release

*Connecting Europe and Latin America
Transforming Today's Data into
Tomorrow's Solutions*



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Leading Beneficiary	Karel Charvát, Jr. (Lesprojekt)
Contributing Beneficiary (ies)	František Zadražil (BOSC), Jiří Kvapil (Lesprojekt)
Peer Reviewers	Michal Kepka (BOSC), Adam Hruška (CZU)
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0.4	24.2.2025	LESP	Finalisation of document for review
1.0	5.3.2025	LESP	Finalisation of comments after





			review
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Table of content

Executive Summary.....	6
Introduction.....	7
1. COMUNIDAD Infrastructure deployment status.....	8
2. Data deployment status.....	15
3. Future plans for releases.....	15
Conclusion.....	16



Project Summary

The COMUNIDAD project, led by Lesprojekt, utilises Copernicus satellite data and the European Global Navigation Satellite System (EGNSS), along with Artificial Intelligence (AI), Big Data technologies and numerical modelling to transfer technologies and know-how to Latin America. The COMUNIDAD project focuses on improving agricultural and forestry management in Chile and Colombia through infrastructure development and an essential platform for creating applications that enhance precision, efficiency, and sustainability. The South American region benefits from this initiative by contributing to its socio-economic growth. Technological advancements are expected to lead significantly to practical applications due to the open-source approach in development.

Lesprojekt, the project coordinator, draws on its expertise in technology applications in agriculture and forestry to guide the consortium. The project provides actionable insights by employing advanced techniques to incorporate Copernicus services, EGNSS and other spatial datasets. These insights help stakeholders, including farmers, advisors, policymakers, and land managers, make informed decisions that support sustainable practices. Essential data on crop health, land use, and forestry conservation are provided, enhancing land management practices and boosting agricultural productivity.

In the COMUNIDAD project, experiences and knowledge are transferred through developing and using technological components, infrastructure, and training materials.

The COMUNIDAD project aims to transform agricultural and forestry management in South America through technological innovation and international collaboration based on experiences and know-how from European partners and international cooperation with partners from Latin America. The integration of cutting-edge technologies with strategic data analysis is set to improve different domains and promote environmental sustainability in the region.





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Executive Summary

This deliverable is a documentation of the initial release of the COMUNIDAD infrastructure and a list of applications and services provided by the first release. It is an overview of services and addresses of endpoints of the Infrastructure. The document describes the status of datasets available at the Infrastructure at this moment of document publication. The deliverable outlines the future plans for the subsequent releases and cooperation with the COMUNIDAD Platform.





Introduction

Meeting the ambitious objectives of the COMUNIDAD project requires integrating and extending the functionality of various software tools, leading to the creation and deployment of the COMUNIDAD infrastructure and platform.

The COMUNIDAD platform will serve as a publication and presentation component of datasets and functions deployed on the Infrastructure.

The infrastructure design is described in the deliverable D2.2 - "Infrastructure design document" and is based on the collected infrastructure requirements from various sources.

The focus of this deliverable D2.3 - "Infrastructure release" is to document the first version of the COMUNIDAD infrastructure in its current state, including an overview of the different components that are currently deployed, the data that are being made available and a brief explanation of how the further development of the infrastructure will proceed, reflecting the feedback that will be gathered during the implementation of the pilots in Chile and Colombia.





1. **COMUNIDAD Infrastructure deployment status**

The Infrastructure was deployed on the Lesprojekt cloud as one virtual server with an initial disk space of 3 TB, mainly for storing remote sensing data. The server is designed as a scalable server where the memory and cores can be extended based on the needs of applications. The server is regularly backed up.

The infrastructure provides different interfaces to deployed applications or libraries. Data sets integrated into the infrastructure are published using different APIs or standardised interfaces, mainly OGC standards.

Several components are deployed on the infrastructure server, the core components for pilot applications. Some elements are provided as standalone applications and will be integrated into the Infrastructure server in the next release.

a. PostgreSQL database with PostGIS extension

A new instance of the PostgreSQL database system was installed on the Infrastructure server. The version 17 (v17.2) of PostgreSQL was used. PostgreSQL was extended by installing the PostGIS spatial extension.

The database is inaccessible directly from the Internet, so VPN tunnelling is necessary for security reasons. Access to the content of the database will be provided by a set of web services or publication servers, like GeoServer.

b. Metadata Catalogue

The last stable version (v7.008) of the Open Micka was installed on the Infrastructure server. The Micka client application is available at the URL <https://comunidad-project.eu/micka/>. The Micka catalogue will include infrastructure services for spatial data and available national services from Chile and Colombia will be gradually harvested and integrated into the catalogue.



Figure 1 - Micka web client for the Infrastructure instance

c. Layman

The last stable version (v1.23.2) of the Layman was deployed on the Infrastructure server. The simple web client is available on the URL: <https://comunidad-project.eu/client/>. The client provides an overview of available REST API and WFS services, which are the primary interfaces of the Layman application.





Test Client of Layman REST API

[Layman REST API Documentation](#)

Endpoints and Actions

Publication Layer Map **Others**

Endpoint	URL	GET	POST	PATCH	DELETE
Users	/rest/users	GET	x	x	x
Current User	/rest/current-user	GET	x	PATCH	DELETE
Roles	/rest/roles	GET	x	x	x
Version	/rest/about/version	GET	x	x	x

GET Users

Parameters

Submit

Figure 2 – Layman web client for the Infrastructure instance

d. GeoServer

The last version (v2.21) of the GeoServer application was deployed on the Infrastructure and will provide different datasets integrated into the Infrastructure. The endpoint is available at <https://comunidad-project.eu/geoserver/web>.



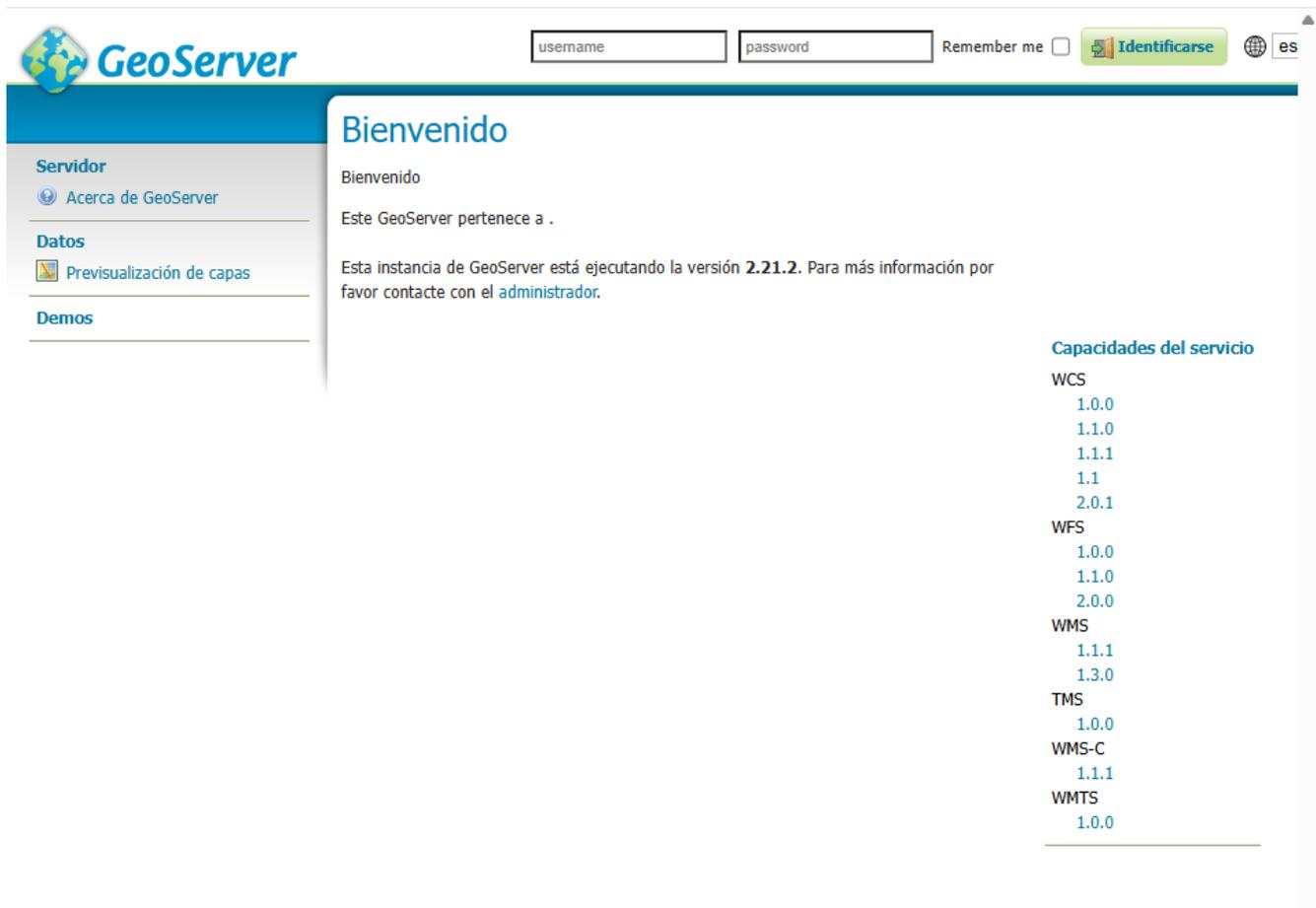


Figure 3 – GeoServer web client for the Infrastructure instance

e. Remote Sensing Data Processing System (RSDPS)

RSDPS is deployed on the Infrastructure server, and Copernicus Sentinel-1 and Sentinel-2 scenes are downloaded for defined localities in Chile and Colombia. RSDPS downloads original scenes and processes an initial set of indices stored directly on the Infrastructure.

The complete REST API specification is available in the form of OpenAPI specification at <https://comunidad-project.eu/eo-api-docs/>

Direct access to products is provided by REST API by specifying the region and product, e.g.:

`/eo-api/image/Caldas/TCI?date=2023-08-26&format=png&api_key=eo-api-key-dev`

Or it is published by the GeoServer instance by WMS or WMS-T services, e.g.:

<https://comunidad-project.eu/geoserver/Caldas/wms?service=WMS&request=GetCapabilities>





The STAC specification will describe remote sensing datasets and indices. The [SpatioTemporal Asset Catalog](https://stacspec.org/) (STAC) is an open specification designed to improve the discovery, accessibility, and interoperability of geospatial data.

STAC endpoint is available at: <https://comunidad-project.eu/eo-api/stac/>

The Catalogue Browser for the STAC endpoint is provided at:

<https://comunidad-project.eu/eo/stac/>

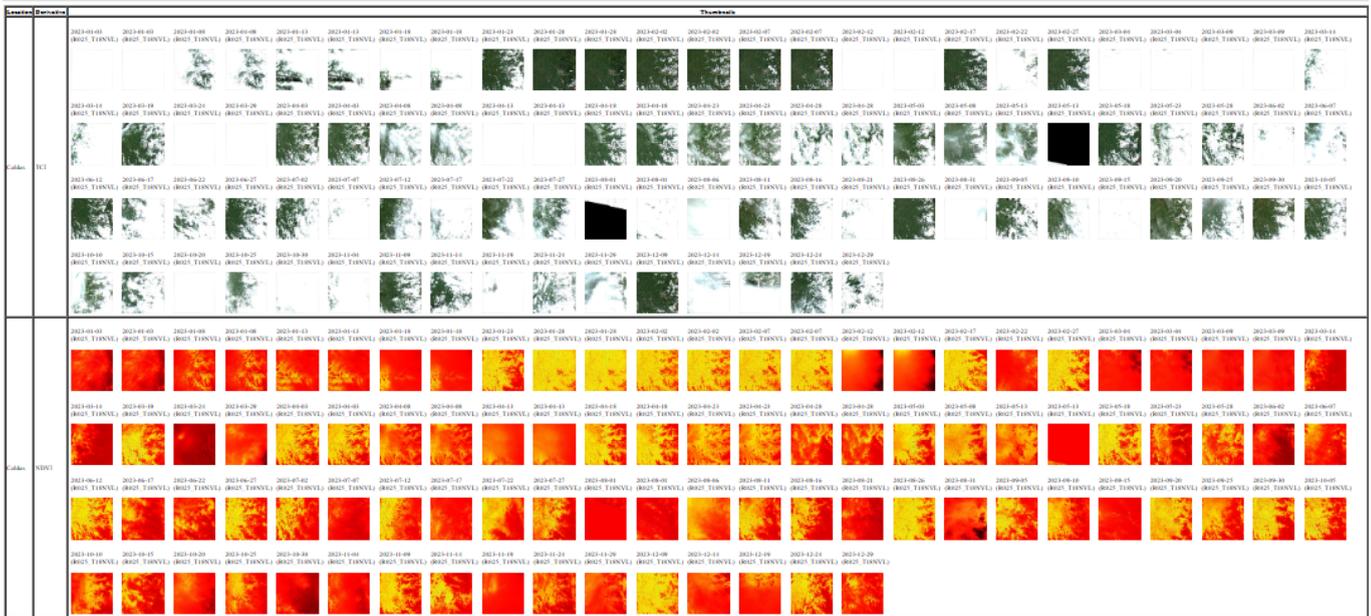


Figure 4 - Simple web visualisation of available scenes and products, for example, for Caldas region.



Aysén

in Catalogue

[↑ Up](#)
[📖 Browse](#)
[🔍 Search](#)
[🚪 Log out](#)

[API](#)
[Source](#)
[Share](#)
[Language: English ▾](#)

Description

Collection of Copernicus data and its derived products for the location of Aysén

Items

🔍 Show Filters

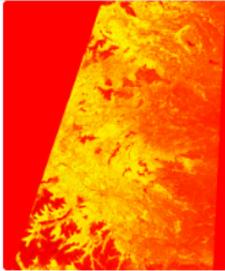
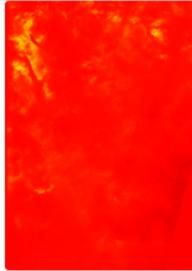
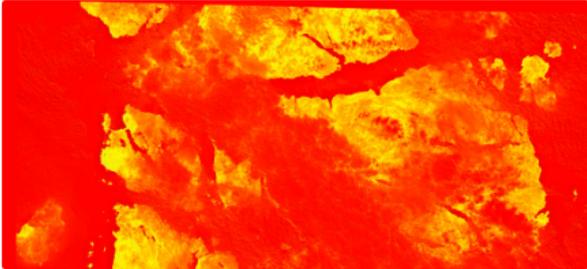
 <p>2024-01-02</p> <p>COG GeoTiff</p> <p>2024-01-02 14:17:09 UTC</p>	 <p>2024-01-08</p> <p>COG GeoTiff</p> <p>2024-01-08 14:37:39 UTC</p>
 <p>2024-01-03</p> <p>COG GeoTiff</p>	 <p>2024-01-10</p> <p>COG GeoTiff</p>

Figure 5 - The available scenes provided by the STAC Catalogue Browser, for example for the Aysén region.

f. Climatic Data Processing System (CDPS)

The CDPS is deployed on the Lesprojekt server to harvest a defined part of the Copernicus ERA5Land dataset for selected pilot regions in Chile and Colombia for the last 10 years and calculate location-based agroclimatic factors. The entire





standalone instance of CDPS will be deployed with harvested data and calculated factors directly on the Infrastructure.

g. SensLog

The full version of the SensLog hasn't been installed on the Infrastructure server yet. It contains only components for downloading weather forecasts from different meteorological models.

When local sensor data providers are identified, the entire SensLog instance will be deployed.

h. GDAL/OGR

The last version of the GDAL library was installed on the Infrastructure, and it is used directly by the RSDPS component. GDAL is not available from outside of the Infrastructure, and it will be used only by processes deployed directly on the Infrastructure server.

i. DRUtes

The DRUtes implementation is deployed at the CZU server, and the results of calculations will be stored in SensLog as sensor data.



2. Data deployment status

The infrastructure contains mainly satellite images and products provided by RSDPS.

- RSDPS provides data from Sentinel-1 and Sentinel-2 for the last 2 years.
- It calculates different indices: NDVI, EVI, SAVI, NDSI and VCI. Other indices will be added based on pilots' requests.
- Scenes and products are available from January 2023 and incrementally processed up to the present.

Data from the Climate Data Store are downloaded based on pilots' requests.

- ERA5Land original data are downloaded for the year 2024 for pilot polygons in Colombia.
- Agroclimatic factors will be calculated for selected pilot regions in Chile and Colombia.

Thematic spatial data

- Pilot partners collect local and regional spatial data from pilot regions.

3. Future plans for releases

The current version of the infrastructure that has been deployed will allow further development, integration, and deployment of the platform components, as well as the availability of the necessary services and data for the development and operation of pilot applications in Chile and Colombia.

The infrastructure will be further enhanced in the second year of the COMUNIDAD project to reflect the needs arising from the platform's development and the feedback gathered during the development and testing of the platform and pilot applications.

The infrastructure architecture will allow storage size and computational power scaling for spatial data analysis to cope with the growing number of users, meet the requirements for accessing additional products derived from Copernicus data or other sources, and cover a larger area of interest.





Conclusion

The COMUNIDAD infrastructure has been deployed to support the processing, storage, and publication of geospatial and climatic data, focusing on leveraging Copernicus datasets for pilot applications in Chile and Colombia. The infrastructure ensures the integration and accessibility of Copernicus-derived products, enabling their use in various applications. It is designed to meet the platform's requirements for data interoperability, processing, and visualisation, facilitating the development of services that rely on Copernicus data and derived products.

Further development will focus on enhancing system capabilities, optimising performance, and incorporating feedback from the development and testing of both the platform and the pilot applications. The infrastructure will be scaled to support increasing data volumes, expanded Copernicus data processing, and broader user access, ensuring its continued alignment with project objectives and operational needs.

