



D5.1 Definition of architecture for COMUNIDAD platform

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



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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 a basic 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

The deliverable outlines the design of the COMUNIDAD Platform, which serves as the primary interface for end-users to visualise data, analytical results, or multimedia content. The Platform provides a solution to create user applications based on map windows, dynamic web pages or standalone applications using data and services provided by the Infrastructure. It cooperates with external applications by plugins to publish spatial data or maps.

The Platform was also designed using the ArchiMate model described in sections 1 and 2. The detailed model is added as an image in high resolution as Appendix A. Section 3 describes the general purpose of the architecture and overview of target users. Individual components or services of the COMUNIDAD Platform are briefly described in section 4. The data content on the Platform is described in section 5. Section 6 contains a description of options for application deployment, and section 7 provides the deployment of the COMUNIDAD Platform itself.



Introduction

The technical solution of the COMUNIDAD project should provide functions and processes to fulfil the scope and requirements defined by general technical requirements, pilot applications requirements, and final users' needs. The COMUNIDAD Architecture will consist of the Infrastructure and the Platform where the design of the Infrastructure is the scope of the deliverable.

The COMUNIDAD Platform will serve as a publication and presentation component of datasets and functions deployed on the Infrastructure. It will serve as the primary user interface, covering all interfaces provided by the Infrastructure and external data providers. The target users of the Platform are mainly general users and experts using end-user applications.

The design of the COMUNIDAD Platform reflects requirements collected by documents "D2.1 - Requirements for infrastructure", "D4.1 - Colombian applications requirements", and the document "D4.2 - Advanced algorithm for snow coverage", which contains requirements for Chilean pilot.



1. Design methodology

In this deliverable, we also use the ArchiMate specification to continue modelling the overall system and COMUNIDAD Platform, ensuring a comprehensive representation across all layers of the architecture. The schema presented in this document adheres to the ArchiMate framework, providing a structured view that spans from high-level motivations to physical implementation, offering clear traceability and alignment with project goals. This methodology has already been incorporated into the deliverable D2.2 *Infrastructure design document*, while both deliverables are designing the COMUNIDAD Architecture.

The ArchiMate schema provides a standardised framework for modelling an organisation's architecture across multiple perspectives, allowing precise and structured communication between stakeholders. The full ArchiMate model is presented in Appendix A at the end. The schema captures elements from strategy and motivation to the platform, showing the dependencies and interactions across these layers.

1. **Motivational Layer:** This layer represents the *why* of the architecture – motivating factors such as goals, principles, and drivers that inform and guide the system's design. In this schema, only general principles are used, establishing high-level goals and values without specific objectives or requirements.
2. **Business Layer:** Here, the focus is on the *what* – the business processes, functions, and roles required to meet organisational goals. The business layer outlines all necessary system functions in this context, providing a blueprint of the needed capabilities and workflows.
3. **Application Layer:** This layer models the *how* of system functionality, focusing on application components and services that realise business functions. It shows how different software applications interact, the services they provide, and how they support business operations.
4. **Technology (Physical) Layer:** This final layer represents *what*, including hardware, networks, and infrastructure, supports application components. It defines the physical environment where application components operate, such as servers, databases, and other technological resources.

The relationship between these layers is hierarchical and integrative: principles guide business functions; business functions drive application requirements, which then



dictate physical infrastructure needs. This alignment ensures that the architecture supports business objectives while aligning with core principles and technological feasibility.

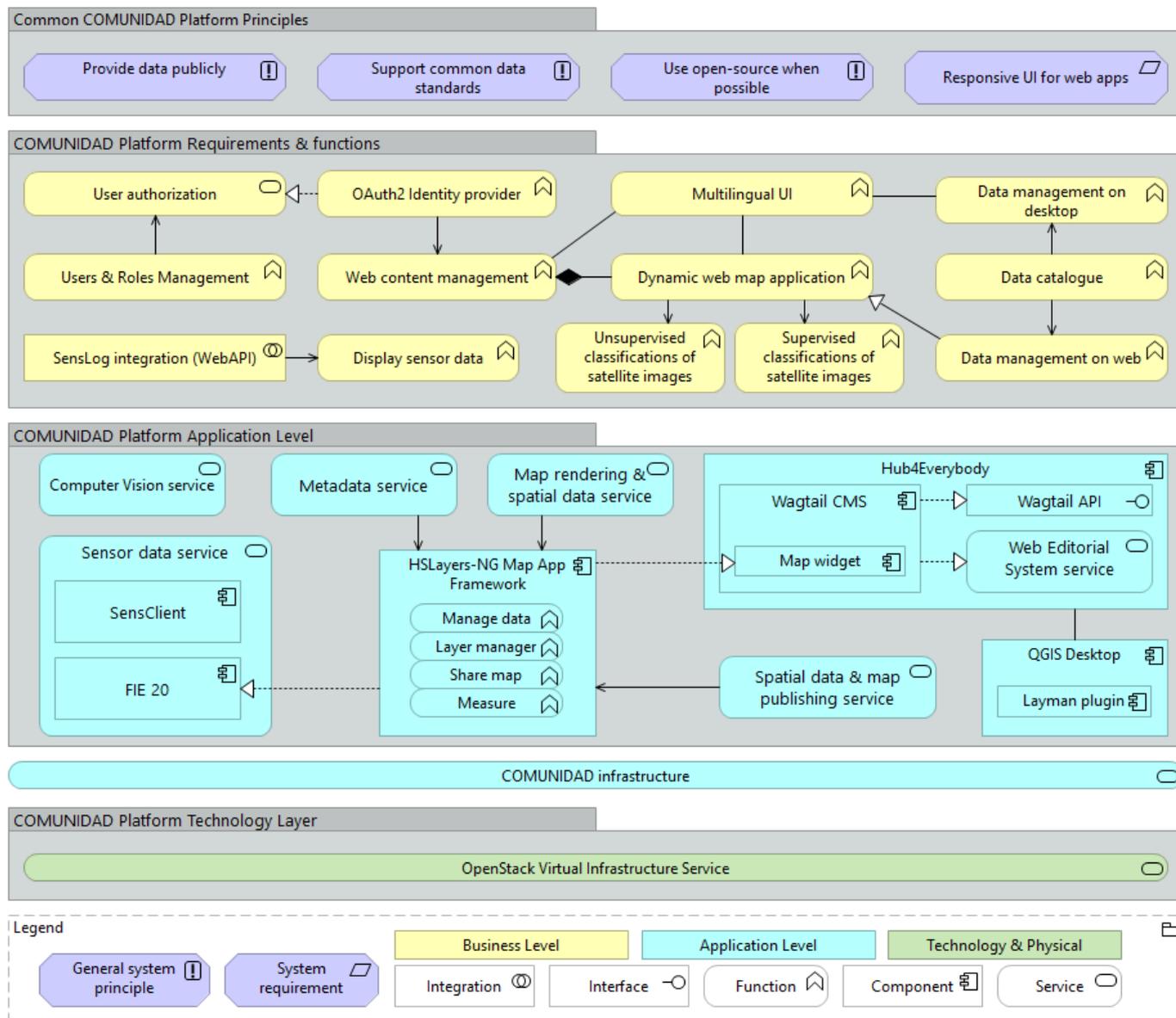


Figure 1 - ArchiMate schema of the COMUNIDAD Platform, full detail is provided in Appendix A.

The general aim of the Platform is to provide an environment for end-user applications and graphical interfaces utilising services provided by the Infrastructure. The platform will host web content containing interactive pages, blogs and learning materials. It will



host web applications utilising services and APIs provided by the Infrastructure.

2. COMUNIDAD Architecture design

COMUNIDAD Architecture relies on the three-tier architecture, often called multi-tier architecture; it breaks down an application into distinct layers, each with a specific responsibility. This separation of concerns fosters modularity, maintainability, and scalability, making it a popular choice for web applications and complex software systems. Both the Infrastructure and Platform will represent this multi-tier architecture.

The three tiers that form the backbone of Architecture are the following.

1. **Presentation Tier** (User Interface, Publication layer):

This tier acts as the user's window into the application. It represents everything the user sees and interacts with, typically a web interface or a mobile app. The presentation tier collects user input through forms, buttons, and other interactive elements. It then processes this input and returns the necessary information or results to the user. The COMUNIDAD Platform will mainly provide the Presentation Tier.

2. **Business Logic Tier** (Application layer):

The business logic tier, also known as the application tier, is the heart and soul of the application. It houses the core functionalities and business rules that define the application's behaviour. This tier receives user input from the presentation tier, processes it according to the business logic, and interacts with the data tier to retrieve or manipulate data as needed. This tier will overlap the Platform and the Infrastructure. The Infrastructure will provide storage, processing, and publishing by APIs. At the same time, the Platform will utilise services provided by the Infrastructure and further process data to provide the final products to users.

3. **Data Tier:**

The data tier, or the persistence tier, is responsible for storing and managing the application's data. It is the permanent repository for data accessed by the business logic tier. Databases are the main components of this tier. The Infrastructure will provide the data tier, which will provide interfaces for individual datasets to be used on the Platform.

The separation of concerns in three-tier architecture offers several advantages:

- **Modularity:** Each tier performs a specific function, making it easier to develop, maintain, and modify individual components independently.
- **Scalability:** Different tiers can be scaled independently based on their specific



needs. For instance, you can scale the presentation tier to handle more users while scaling the database server to accommodate growing data volumes.

- **Maintainability:** Fixing bugs or adding new functionalities becomes easier as developers can focus on a specific tier without worrying about the intricate workings of the entire system.
- **Security:** The three-tier architecture enhances data security by placing the data tier behind a secure layer.
- **Reusability:** The business logic and data access layers can often be reused across different applications, saving development time and resources.

3. COMUNIDAD infrastructure and platform general purpose and target users

The proposed COMUNIDAD architecture consists of two main components – Infrastructure and Platform. The Infrastructure is represented by the Remote Sensing Data Processing Platform (RSDPS), responsible for downloading satellite imagery, processing storage, and publishing it using standardised services. The primary data storage is represented by a relation database management system with a spatial extension, allowing the storage of vector and raster spatial data necessary for analysis and visualisations. Most of the infrastructure components are expected to have no graphical user interface, and the important part will be the utilisation of standardised interfaces and commonly used formats in the GIS domain. The Infrastructure should integrate existing data sources or provide links to existing data hubs (e.g., open data portals, national geoportals). The design of the Infrastructure is described in the document “D2.2 – Infrastructure design document” in detail.

The Platform is represented by different application layer components for data processing and analyses and by the publication layer components for visualisation and presentation (e.g. content management systems). The Platform is planned as the environment to deploy user applications, providing expected functionalities or addressing defined use cases’ needs.

The structure of target users is very complex, including the general public, experts in different domains, application developers, students, decision-makers, etc. The access of various types of users to the COMUNIDAD architecture can be summarised in Table 1. Table 1 presents the expected utilisation of different parts of the architecture by several



types of users.

Infrastructure is divided into several components like the spatial database or the Remote Sensing Data Processing Platform, which can be described as the “Infrastructure component”. Some components provide an API to get data or methods, which is defined as an “Infrastructure API.” The Platform will provide different services like analytical, catalogue, and publication, which can be defined as “Platform services.” Different types of applications will be deployed on the Platform to solve different use cases and tasks, these can be defined as “Platform application”. The Platform will contain web pages, blogs, tutorials, visualisations, maps, etc., described as “Platform content.”

The types of target users are characterised by the expected access to the COMUNIDAD architecture and tasks where the Architecture can support users. We have identified the following list of types of target users:

- GIS expert – the GIS expert can be characterised as an advanced user who can prepare spatial datasets to be integrated into the Infrastructure, work with services provided by the Infrastructure, use services provided by the Platform, and develop and use applications on the Platform. The COMUNIDAD Architecture should support the need to publish and use datasets and to provide further analysis and presentation of results.
- Domain expert – the domain expert is an expert from any expected domains (e.g. hydrology, soil science, urban planning, environment, agriculture, forestry, land management, climatology) where the Architecture can be utilised from the perspective of dataset providing and Platform applications utilisation.
- Developer – the developer is an advanced user who could contribute to developing individual components and final applications for different types of users.
- Decision maker – a decision maker is a type of high-level user who should receive analysis results, maps and explanatory visualisations to support the decision-making process based on qualified information.
- Farmer/Forester – farmers, coffee growers and foresters are basic-level users who will work with applications and their outputs regularly, which should fulfil defined tasks on a defined level of accessibility and usability of applications.
- Student – students are potential future users of different types who have already used the Architecture during their education. Incorporating Architecture into the learning process can reduce the learning curve in the future.





- General public – the general public is expected to profit from the final products of applications and published content with maps and analysis results.

Table 1 - Overview of user access to COMUNIDAD architecture components

	Infrastructure component	Infrastructure API	Platform services	Platform application	Platform content
GIS expert	X	X	X	X	X
Domains experts		X	X	X	X
Developer	X	X	X	X	
Decision maker				X	X
Farmer / Forester				X	X
Student		X	X	X	X
General public					X

4. COMUNIDAD Platform components

This chapter describes in detail the individual components of the COMUNIDAD Platform, which are included in the ArchiMate model in Appendix A. Individual components will cover requirements collected in the document “D2.1 - Requirements for infrastructure”, which cover requirements for infrastructure as well as for the platform. The platform will provide the main environment for the development of end-user applications defined by pilots’ documents “D4.1 - Colombian applications requirements” and “D4.2 - Advanced algorithm for snow coverage”. The platform covers the basic components needed for the development and deployment.

- Web content management and publication - Hub4Everybody, Wagtail CMS
- Web mapping library - HSLayers NG
- Spatial data catalogue - Micka
- Sensor data management and visualisation - SensClient, FIE20
- Spatial data processing and publication to the Web - QGIS Desktop, Layman QGIS plugin



- Processing remote sensing data - computer vision service
- Management of users and user roles - Hub4Everybody

4.1 Hub4Everybody

Hub4Everybody is a modifiable solution for publishing, sharing, and collaborative management of geospatial data. It encompasses many data types, including professional data, measurements, research project outputs, student work results, teaching materials, sensory maps, field survey visualisations, and other maps, tables, or databases.

The following points can summarise Key Features of the Hub4Everybody:

- **Seamless Data Upload and Management:** Easily upload your data to the Hub4Everybody environment, modify it as needed, and adjust sharing parameters for specific target groups.
- **Open-Source Alternative:** Hub4Everybody is an open-source alternative to existing commercial solutions, offering a broader range of customisation options.
- **Versatile Functionality:** It combines the functionality of online office software with a spatial data editorial system, providing a comprehensive platform for geospatial data management.
- **Flexibility:** The modifiable nature of Hub4Everybody allows users to tailor the platform to their specific needs.
- **Openness:** The platform's open-source nature encourages community contributions and ensures long-term sustainability.
- **Versatility:** The platform's support for a wide range of data types and functionalities makes it a valuable tool for various geospatial data management applications.

Hub4Everybody is a powerful and versatile platform that empowers users to manage, share, and collaborate on geospatial data. Its unique features and open-source nature make it an ideal solution for individuals, organisations, and communities seeking a comprehensive and customisable geospatial data management platform. It will be used as the primary visualisation solution for spatial data and analytical results from application during the COMUNIDAD project.

The editorial system serves as the cornerstone of the geospatial data processing system, acting as both the foundation for a user-friendly web portal and a central hub for navigating the various components within the system.



The Hub4Everybody is the crucial component of the Platform which will integrate other components. It will manage users and identities, deployment of end-user applications and other elements of UI.

4.1.1 Wagtail CMS

Wagtail CMS was chosen as a platform for the editorial system and was enhanced with the CodeRed CMS extension. Wagtail is a leading open-source Content Management System (CMS) trusted by organisations of all sizes, including industry leaders like Google, NASA, and the British NHS. Built upon the Django framework with Python as its primary development language, Wagtail offers exceptional extensibility. Functionality can be readily expanded through custom widgets, page templates, permission configurations, and other system parameters. This inherent flexibility paves the way for seamless integration with potentially existing organisational systems, such as a city geoportal, should that need arise. Wagtail thrives thanks to a vibrant community that fosters a continuous stream of valuable plugins and extensions.

The selection of Wagtail CMS as the editorial system's platform offered several core advantages. Firstly, the system's inherent flexibility allows customisation to align perfectly with the organisation's needs. Furthermore, being open source ensures long-term sustainability and fosters ongoing contributions from the community. Finally, the active Wagtail community provides users with a wide range of support and resources, further solidifying its position as the ideal choice for this project.

Wagtail is the CMS for the Hub4Everybody component which will manage web content for web pages and content on the Hub4Everybody.

4.2 HS Layers NG

HS Layers-NG¹ framework is the open-source web mapping component. Lesprojekt and BOSCA have actively participated in developing this tool for more than 10 years, and it can be significantly customised or functionally extended depending on the system's specific requirements.

Moreover, there is already a functional integration with the Wagtail CMS in the form of a map widget. This widget enables straightforward map creation within all HTML pages of the content management system, including detailed configuration of map layers and

¹ <https://ng.hslayers.org/>



tools, if required.

Key Features of the HSLayers Mapping Component can be summarised in the following points:

- **Map Field for Data Visualization:** Provides a dedicated map field for visualising geospatial data.
- **Publication of Map Layers and Maps:** Facilitates the publication of individual map layers and entire maps.
- **Viewing Outputs of Other Users:** Allows users to view and explore the map outputs created by other users.
- **User-defined Map Layers and Services:** Empowers users to add additional map layers and services, including external ones.
- **User-driven Data Drawing and Editing:** Offers user-friendly tools for drawing and editing geospatial data directly on the map.
- **Export and Printing of Map Content:** Supports the export and printing of map content, including any added or drawn data.
- **Comparison of Multiple Map Layers:** Provides a powerful tool for comparing two or more map layers within a single window using a slider.

The benefits of using HSLayers NG can be summarised in the following points:

- **Open-Source:** Being open-source, HSLayers ensures long-term sustainability and encourages community contributions.
- **Extensibility:** The framework's high extensibility allows tailored customisation to meet specific project requirements.
- **Active Development:** The HSLayers project is developed and maintained, ensuring continuous improvements and new features.
- **Wagtail Integration:** The existing integration with Wagtail CMS simplifies map creation and management within the content management system.

HSLayers web mapping component offers a robust and flexible solution for visualising, publishing, and interacting with geospatial data. Its open-source nature, extensibility, and active development make it an ideal choice for various projects.

HS Layers NG is the main web mapping library of the Hub4Everybody, it will be the main library for web map applications deployed on the Hub4Everybody. It will cover the visualisation of spatial data and the development of dynamic web maps.



4.3 Metadata Catalogue (MICKA)

MICKA is a comprehensive system for managing and publishing spatial data metadata. It is built on the ISO 191xx and INSPIRE standards and supports the OGC CSW 2.0.2 ISO AP-1.0 catalogue service. MICKA offers various advanced features and supports multiple other standards, ensuring interoperability with other applications. MICKA Key Features from the perspective of the COMUNIDAD Platform:

- **Online Metadata Editing:** MICKA provides a user-friendly web application for online metadata editing.
- **Feature Catalogue Management:** MICKA enables efficient management of feature catalogues according to ISO 19110.
- **Multilingual Metadata:** MICKA allows the creation and management of multilingual metadata.
- **External Registry and Thesaurus Integration:** The system can integrate external registries and thesauri, such as INSPIRE registries, GEMET, and SPARQL.
- **Configurable User Vocabularies:** MICKA allows for the configuration of user-defined vocabularies.
- **Built-in Metadata Validator:** MICKA features a built-in metadata validator to configure multiple profiles.

MICKA and its associated catalogue client and metadata validator provide a comprehensive suite of tools for effectively managing, publishing, and validating spatial data metadata. The system's support for various standards, user-friendly interface, and extensive customisation options make it a valuable solution for organisations and individuals working with spatial data.

MICKA will be deployed on the Platform as a standalone application publishing metadata of datasets from the Infrastructure and services provided by the Platform. It will cover the data catalogue requirements.

4.4 Sensor data service

Visualisation of measured data and results of analytical functions are essential requirements for end-users of the Platform. The visualisation of sensor data will be provided by web applications – SensClient and FIE20, both applications are published under open-source licences.



4.4.1 SensClient

The SensClient application is available on the web and responsive to smartphone interfaces. The SensClient application visualises sensor data through charts and a map-based view of the sensors' location. The main overview is a dashboard placing all units onto a map. Each unit can be opened, and all assigned sensors will be displayed. A chosen sensor will then visualise its data in a chart. Some specific multi-sensors allow multiple curves within one chart (e.g., groundwater measurement in various high levels). Such graphical data visualisation is convenient for users due to easy and quick data correctness checking. For the convenience of administering sensor networks, the SensClient allows managing new and current sensors and units.

SensClient application will be deployed on the Platform to provide management of sensor data and visualisation in the form of charts and maps.

4.4.2 FIE20

The FIE20 is an expert system that supports farmers in decision-making and planning processes for field interventions. This solution integrates various data sources and analytical methods in a complete system and provides users with an easy-to-use web map application as a standard user interface. The FIE20 solution integrates different types of data, such as local sensor data and online analysis based on this data, Earth Observation and remote sensing data, farm and regional thematic spatial data, and weather model data - to be visualised in the web application and used in implemented analytical functions. The web map application provides an overview of the locality by visualising different thematic spatial data on a local or regional level, as well as Earth Observation data and various indices. Various analytical functions based on spatial and EO data are available in the web map application; these analyses provide information oriented on fields and crops on fields in different stages.

The FIE20 solution is designed as a modular solution where the main components are mainly built based on open-source software and services. Additional functionality of the solution can be extended by using charged services and datasets. The main idea of the FIE20 solution is to build a complete solution based on open-source services and open datasets that are scalable from small farmers up to large enterprises covering several regions. The FIE20 solution can integrate external services (ordered by the farmer at an external provider) as an additional component or services used by the farmer in different systems. The leading target group are farmers because the design of the FIE20 solution



allows the integration of other data and services from various systems. It will enable farmers to step by step minimise the need for individual applications providing tasks and analyses. The highly modifiable FIE20 solution allows the preparation of an instance of the application according to the needs and specifications of individual farmers. The FIE20 application will be deployed on the Platform and provide visualisation of data from the infrastructure, mainly sensor data and remote sensing datasets or derived products.

4.5 QGIS Desktop

QGIS is a powerful, free, open-source Geographic Information System (GIS) application enabling users to create, edit, visualise, analyse, and share geospatial data. As a cross-platform software, it runs on Windows, macOS, Linux, and Android, offering accessibility to a wide range of users, including researchers, planners, engineers, and educators.

QGIS supports a variety of raster and vector data formats, making it compatible with numerous data sources such as shapefiles, GeoJSON, and databases like PostGIS. It also integrates seamlessly with web services, including WMS, WFS, and WMTS, allowing users to access and work with remote datasets.

The software provides an extensive set of tools for spatial analysis, including buffering, geoprocessing, and network analysis. Its robust cartographic capabilities enable users to design high-quality maps with customisable symbology, labelling, and layout options. QGIS also supports plugin development, extending its functionality through user-contributed tools written in Python or C++.

QGIS is widely recognised for its active community of developers and users who contribute to its continuous improvement. It is a cost-effective alternative to proprietary GIS software, empowering users across diverse industries to make data-driven decisions and explore spatial relationships effectively.

QGIS Desktop represents the standard GIS functionality on the COMUNIDAD Platform, which the Layman QGIS plugin can connect to Web solution.

QGIS Desktop will be recommended to users who would like to work with spatial data, prepare datasets and publish them in the form of web map applications by using a traditional desktop GIS environment.

4.5.1 Layman QGIS plugin

The Layman QGIS plugin is a client application that prepares data in the freeware QGIS environment. The application can upload/download map layers and compose groups of layers into map compositions to a Layman server. Layman publishes the QGIS project layers as a WMS or WFS service under the user workspace. This allows users to set access rights for other users to read or write to the layers/compositions. Both vector and raster layers are supported. Map compositions also support layers from external sources – WMS, WFS, XYZ, PostGIS, ArcGIS REST. QGIS symbology is fully supported via QML and SLD format. The plugin is integrated into the Hub4Everybody software group, where outputs are compatible with the HSLayers web application and publishable via the editorial system to the web. Standard login credentials secure everything. At the same time, the plugin includes a connector to the Micka metadata catalogue and can export map compositions to the QField mobile environment. The application is distributed via a standard plugin repository.

Layman QGIS plugin will be recommended to be included in the QGIS Desktop installation for users to be able to publish datasets and map compositions from the QGIS application to the web map applications on the Platform.

4.6 Computer Vision Service

The Coffee Plantation Monitoring System is a complex computer vision-driven tool for detecting, monitoring, and predicting coffee plantation dynamics running a neural network based on the TensorFlow software library. Built on Sentinel-2 satellite imagery, the neural network identifies active, abandoned, and potential coffee fields and allows the users to see the detected locations as a part of the interactive map within the platform environment.

Key Features for the COMUNIDAD platform:

- **Satellite-Based Monitoring:** Integrates Sentinel-2 data for high-accuracy land-use analysis.
- **Machine Learning Models:** Classifies plantations into active, inactive, and potential fields.
- **Real-Time Updates:** Provides live insights into coffee plantation dynamics.
- **Historical Analysis:** Tracks land-use changes over time for improved planning.



The computer vision system supports sustainable agriculture by helping farmers, policymakers, and researchers make informed decisions about land management and resource allocation. It promotes environmental conservation and enhances coffee production efficiency.

Computer vision service will be deployed on the Platform to be utilised by different end-user applications to process datasets derived from remote sensing data.

5. COMUNIDAD Platform data content

The COMUNIDAD Platform will provide methods to visualise and publish different data types provided by the COMUNIDAD Infrastructure or generated by applications deployed on the Platform. The Platform will distinguish between data generated by applications deployed and used only by those applications or data provided to different applications or outside the COMUNIDAD Platform.

When the application generates data or datasets consumed by that application, this data will be stored only on the platform's operational database. Access to this data set will be provided only by the application itself.

When the application generates data or datasets for further utilisation of other applications or outside the platform, it will be stored in the Infrastructure and provided by a set of services fulfilling all requirements of the Infrastructure for data publishing.

6. Applications deployment on the COMUNIDAD Platform

The COMUNIDAD Platform will provide an option to deploy different kinds of applications, providing a specialised functionality or visualisation based on user demand. Most applications deployed on the Platform should be based on a responsive design for mobile devices. The Hub4Everybody solution provides a responsive design by default.

Map applications

The COMUNIDAD Platform will be able to accept map applications to visualise spatial data using services from the COMUNIDAD Infrastructure and services outside the COMUNIDAD architecture.

The simplest option is to deploy a map window as a widget using standard Web technologies (HTML, CSS) and JavaScript widgets HSLayersNG and OpenLayers or Leaflet. This map window can be deployed on the web server and registered in Wagtail CMS. The application can be accessible on the URL of the Platform.



Deploying a standalone web map application designed as a project using different web mapping libraries is possible. Web map application is deployed on the web server and linked by the CMS or built-in using iframe to an existing page on the CMS.

Web applications

General web applications developed by different programming languages (e.g., Java, Python, .NET) will be deployed on the COMUNIDAD Platform. The COMUNIDAD Platform will support different application servers to run web application projects – Apache Tomcat, Nginx, and Django. Then, it is linked by the CMS or built-in using iframe to an existing page on the CMS. The COMUNIDAD Platform can support Docker and allow deployment of Dockerised applications.

Web services

On the other hand, the COMUNIDAD Platform can support applications that provide only a set of web services processing data used by other applications on the COMUNIDAD Platform or by applications outside the COMUNIDAD Architecture. These applications will be primarily used for data processing applications deployed on the Platform.

7. COMUNIDAD Platform deployment

Like the COMUNIDAD Infrastructure, the COMUNIDAD Platform is intended to run on an internal cloud solution managed by Lesprojekt that offers a robust and customisable environment specifically designed to support the development and deployment of services for the COMUNIDAD Infrastructure and the Platform. The entire infrastructure for the complete architecture is built on OpenStack software, based on Linux operating systems and other open-source technologies.

OpenStack enables optimal usage of hardware resources, joining standalone servers in a seamless cloud under a single management. It provides many services, including virtualisation, block device sharing, distributed computing, support for various docking technologies, etc. A robust network stack allows for low-level network isolation, including VLAN support, NAT and an integrated firewall. Fine-grained user management enables logical segmentation of the OpenStack instance into standalone, independent instances as if run on separate physical servers.

Backup is done at least weekly, for critical infrastructure even more frequently and stored at geographically different localities. Lesprojekt manages the company's backup infrastructure.



New virtual servers are rapidly deployed within minutes, as our users request. Various operating systems are prepared as snapshots for instant use.

Built on a dedicated server infrastructure in Prague, Czech Republic, the cloud solution provides complete control and ensures the utmost security for COMUNIDAD data and applications.

The COMUNIDAD Platform design also focuses on future transferability to the pilot countries and maintaining the whole architecture on their local servers.

Conclusion

The deliverable describes the design of the crucial component of the COMUNIDAD Architecture - Platform. The Platform provides functionality for user applications and the presentation of data and analytical results. The Platform will offer different methods to provide content for final users, such as CMS, web mapping library, publishing plugins for spatial data, etc. The Platform will allow the deployment of user-defined applications to satisfy specific needs. The Platform will provide the user interface to processing and analytical functions using different Infrastructure interfaces.

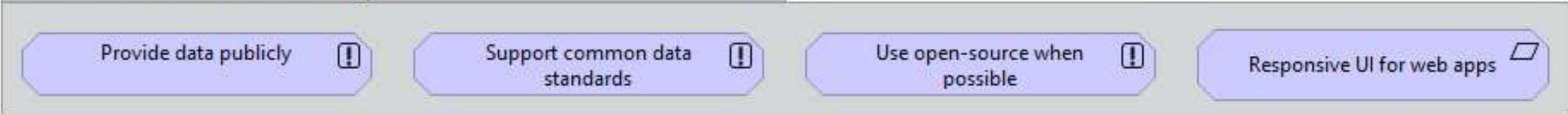


Appendix A

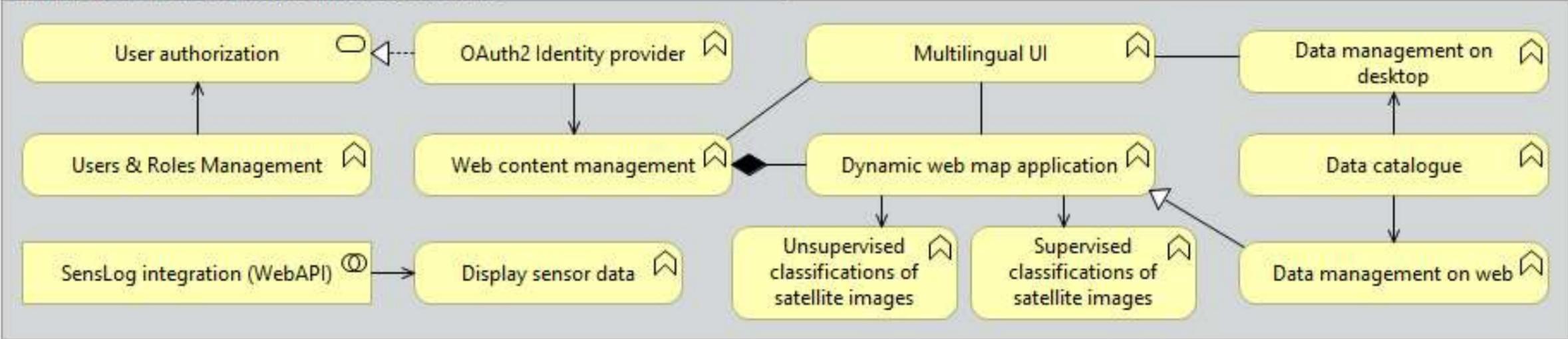
The following image presents a detailed platform model according to the ArchiMate specification.



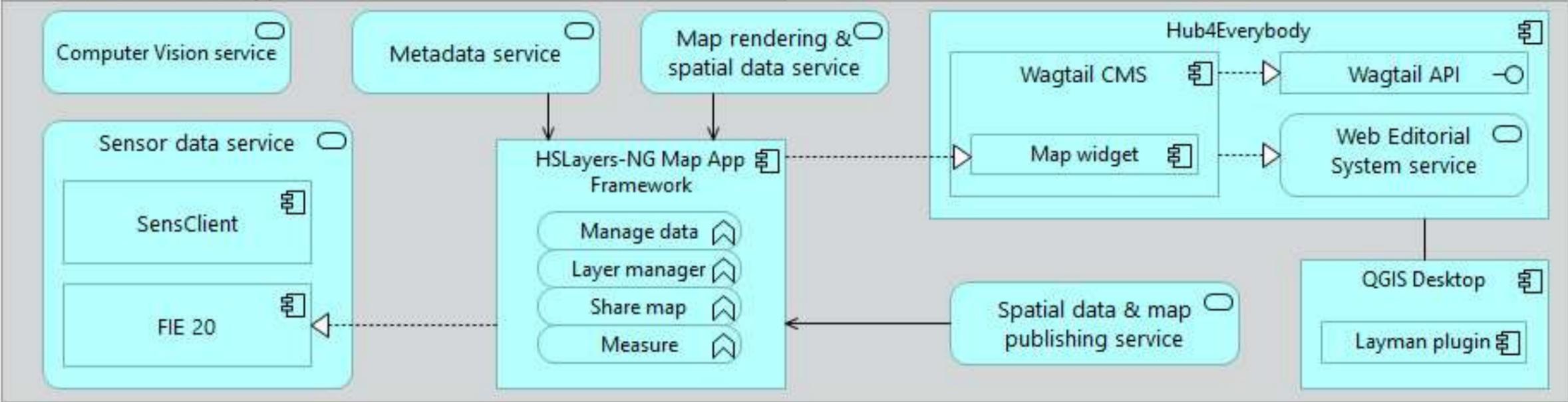
Common COMUNIDAD Platform Principles



COMUNIDAD Platform Requirements & functions

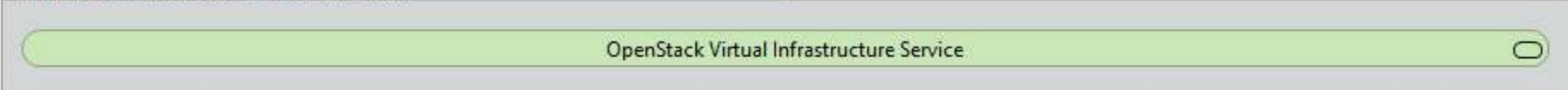


COMUNIDAD Platform Application Level



COMUNIDAD infrastructure

COMUNIDAD Platform Technology Layer



Legend

