

GEOHUB PLATFORM

FROM DAILY UPDATED SATELLITE DATA TO USER-FRIENDLY APPLICATIONS

<https://www.geohub.net>

<https://app.geohub.net/compute/>

1. General Description
2. Capabilities
3. Why use Geohub platform?
4. Architecture
 - 4.1. Description
 - 4.2. Scheme
5. Automated Data & AI-Driven Insights
6. User experience
7. Interoperability and data integration
8. Service Levels
9. Usage example
 1. Scenarios
 2. Video
10. Storage Structure
11. Tools & Functionalities
12. User and regional impact
13. Integrated open apps
14. Use Instructions
15. Colaboration opportunities

1. GeoHub platform - General description

Unified and Scalable Platform

Enabling:

- Efficient decision-making
- Operational excellence
- Sharing data between users

Secure and reliable data infrastructure

Data is:

- Encrypted & backed up daily
- Automatically replicated across independent EU sites
- Fully versioned with edit history

Serving a wide range of users:

- Forestry, agriculture, and utilities
- Municipalities and government agencies
- Private companies
- R&D institutions and universities

2. GeoHub Platform - Capabilities

End-to-End EO Service Platform

Dataset	Discover and select data, services, and applications
Upload	Upload, validate, and deploy custom applications
Process	Process, analyze, and visualize geospatial data
Publish	Publish results and products for reuse by other users

3. Why use GeoHub platform?

- ✓ Simple, user-friendly interface
- ✓ Secure and cost-efficient operations
- ✓ Always up to date (5+ years history + the most actual data)
- ✓ Ready for integration into public and private sector workflows
- ✓ From data to ready-to-use apps
- ✓ Superior user support

4.1. Geohub Platform - Architecture Description

Built for Performance and Adaptability

- ✓ Deployment in cloud and/or on-premise infrastructure
 - ✓ Low maintenance costs
- ✓ Multi-format publishing : GeoTIFF, SpatiaLite, GeoJSON, ShapeFile, XYZ/TMS, WMS, MVT services



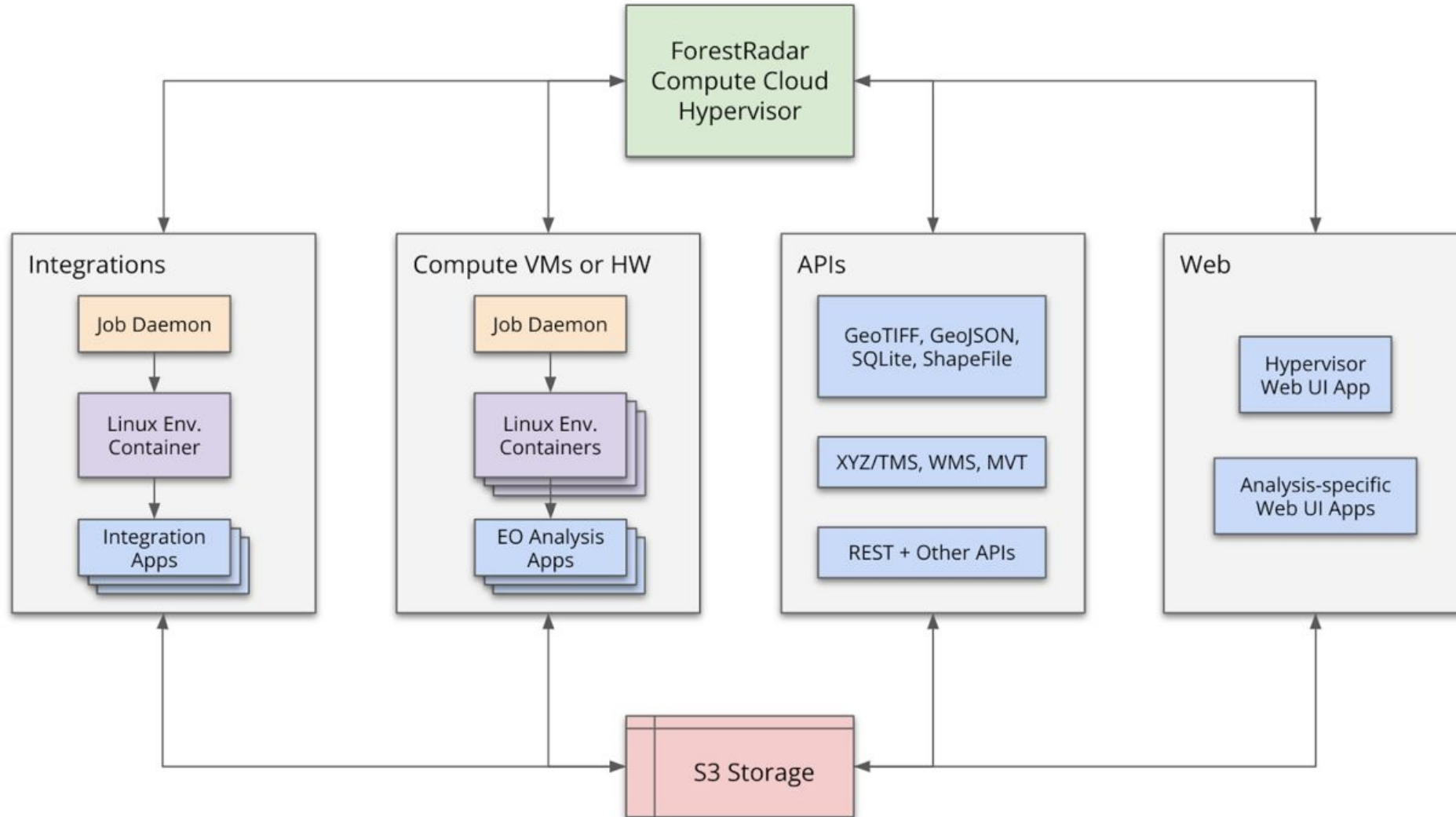
Flexible

- ✓ Flexible architecture tailored to different operational needs
- ✓ Data source flexibility - Sentinel (1/2/3/5/6) + Lidar, orthophoto, custom integrations

Scalable

- ✓ Virtually unlimited scalability
- ✓ Large processing capacity : 80k+ CPU hours/month, 30-170k jobs/month, 16vCPU+120GB per job

4.2. Geohub Platform - Architecture Scheme



5. Automated Data & AI-Driven Insights

From Data to Actionable Intelligence

- ✓ Automated data pipelines (satellite, orthophoto, drone, sensor, harvester, and other geospatial data)
- ✓ End-to-end automated processing workflows
- ✓ AI-powered analytics for fast, reliable, and up-to-date insights
- ✓ Real-time access to critical information

6. Geohub Platform - User Experience

Powerful Yet Easy to Use

- ✓ Built-in AI capabilities for change detection:
 - ◆ Urban environments
 - ◆ Infrastructure risk zones
 - ◆ Forest and land-use monitoring
 - ◆ Fires, floods, temporary structures, and more
- ✓ User-friendly interface – **no coding required**
- ✓ Fast deployment and onboarding
- ✓ Virtual assistant

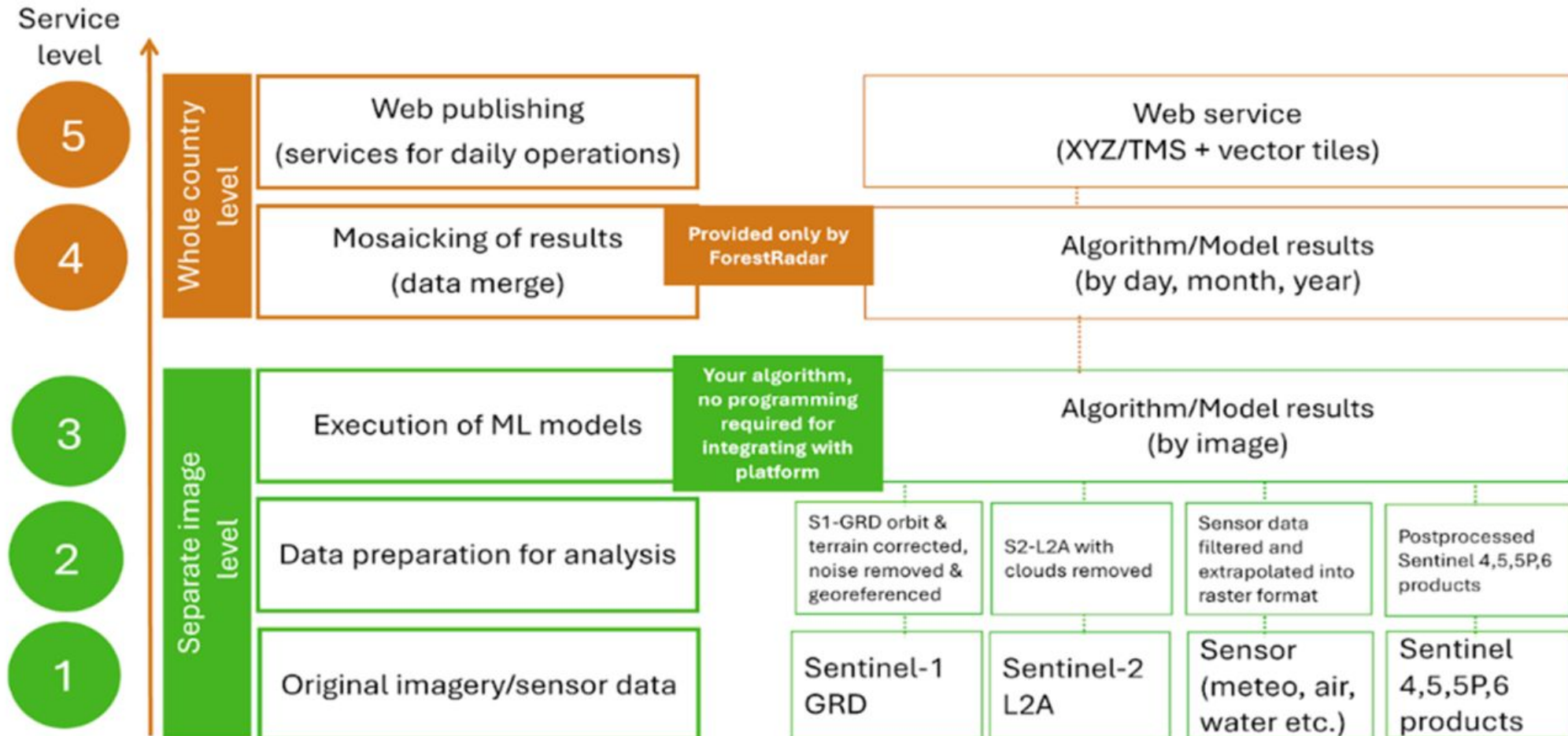
7. Interoperability and data integration

Seamless Integration with Existing Systems

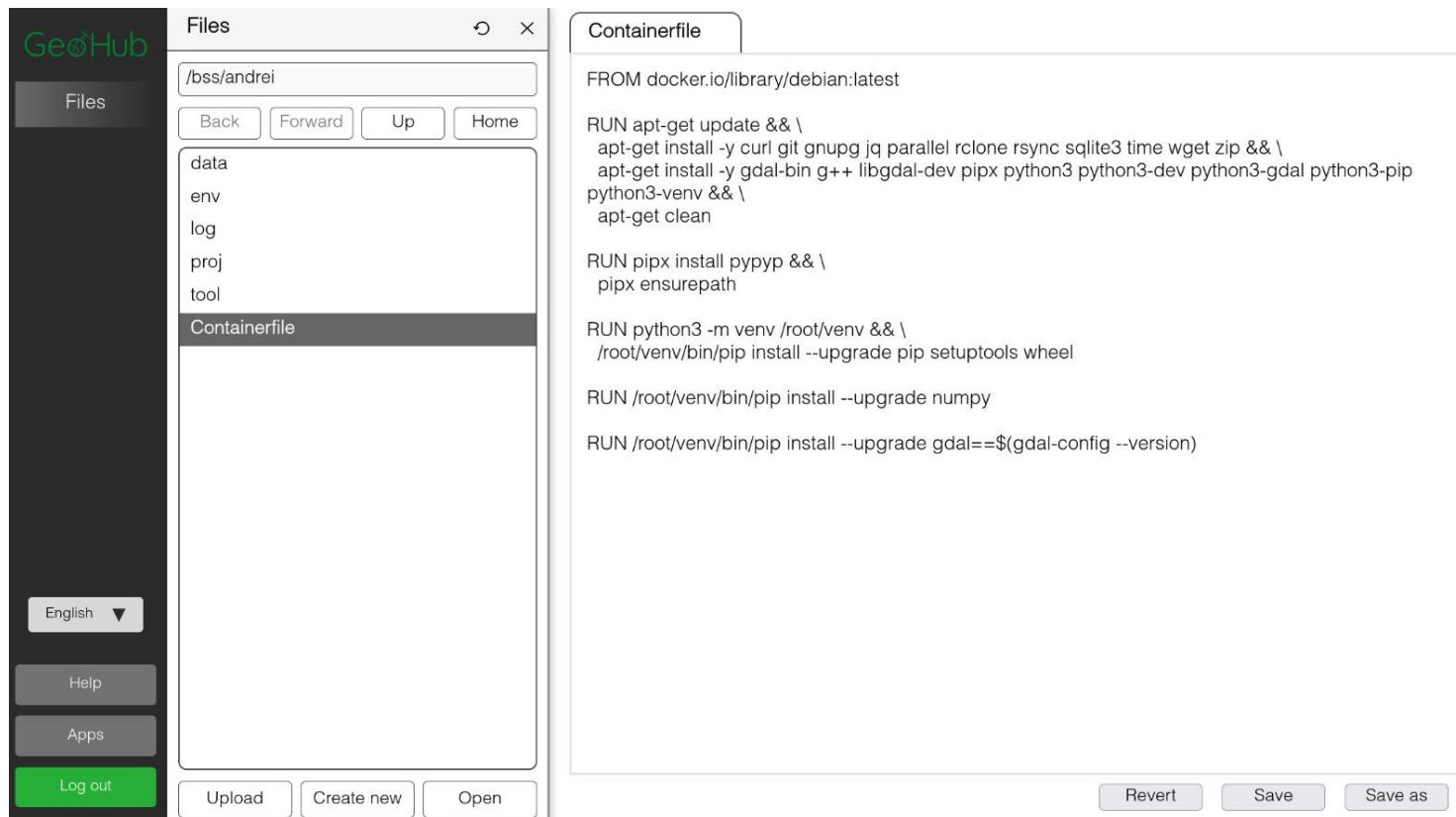
- ✓ Interoperable with e-government platforms
- ✓ Integration of public and private geospatial data sources
- ✓ Support for standard web services:
 - ◆ XYZ / TMS
 - ◆ WMS
 - ◆ JSON / GeoJSON
- ✓ Easy data sharing with external systems (e.g., QGIS, ArcGIS)
- ✓ S3-compatible storage for seamless cloud integration

8. GeoHub Platform - Service Levels

Earth Observation Data Platform *provided by Baltic Satellite Service*



9.1. GeoHub Platform - Usage example scenarios



The screenshot displays the GeoHub platform interface. On the left, a sidebar contains the 'GeoHub' logo, a 'Files' section with a search bar and navigation buttons (Back, Forward, Up, Home), and a list of files including 'data', 'env', 'log', 'proj', 'tool', and 'Containerfile'. The 'Containerfile' is selected and highlighted. Below the sidebar are buttons for 'Upload', 'Create new', and 'Open'. The main area shows the 'Containerfile' content, which includes instructions for setting up a Docker container with various tools and dependencies. At the bottom of the main area are buttons for 'Revert', 'Save', and 'Save as'.

```
FROM docker.io/library/debian:latest

RUN apt-get update && \
  apt-get install -y curl git gnupg jq parallel rclone rsync sqlite3 time wget zip && \
  apt-get install -y gdal-bin g++ libgdal-dev pipx python3 python3-dev python3-gdal python3-pip \
  python3-venv && \
  apt-get clean

RUN pipx install pypyp && \
  pipx ensurepath

RUN python3 -m venv /root/venv && \
  /root/venv/bin/pip install --upgrade pip setuptools wheel

RUN /root/venv/bin/pip install --upgrade numpy

RUN /root/venv/bin/pip install --upgrade gdal==$(gdal-config --version)
```

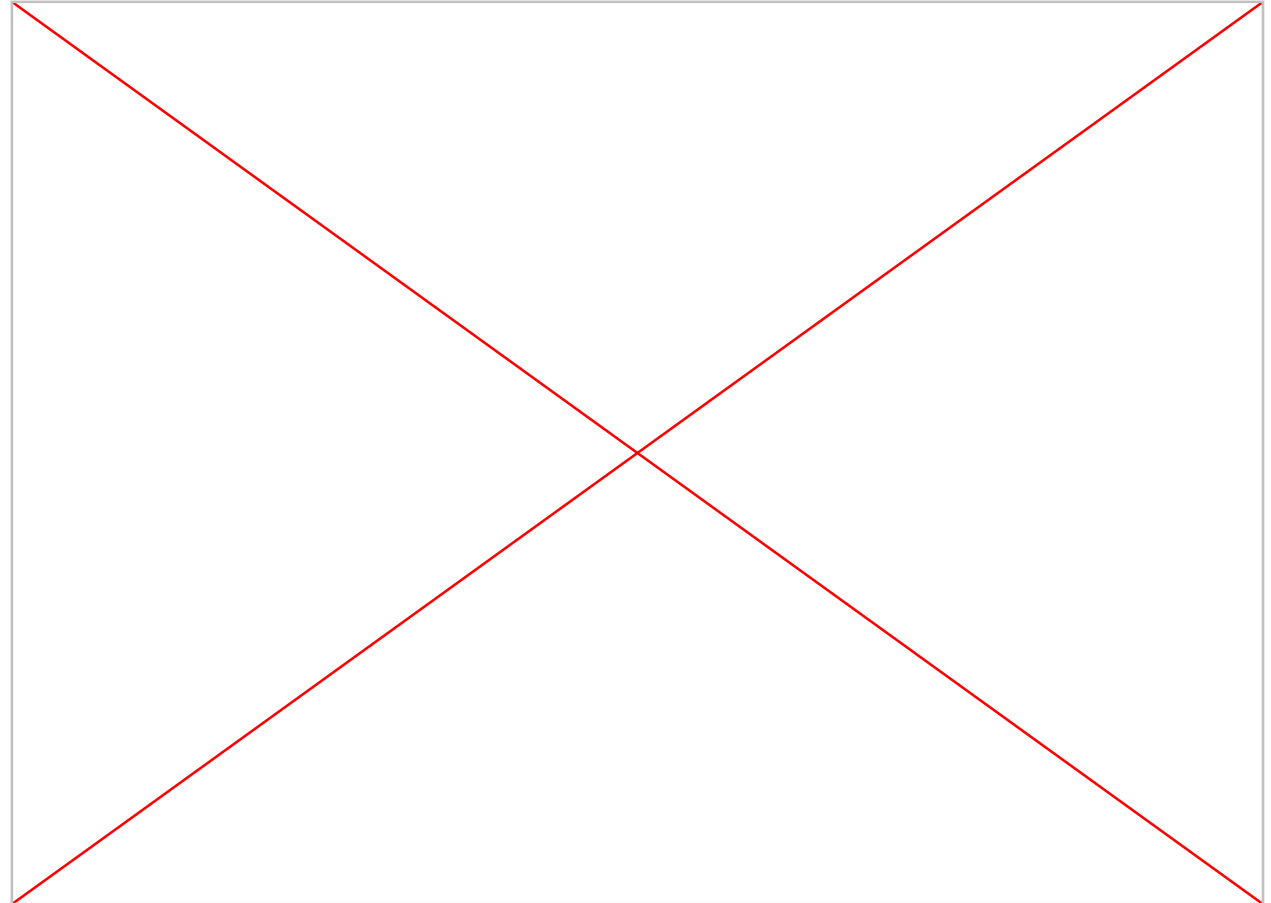
SCENARIOS:

1. Exploring existing platform data.
2. Uploading and downloading data to/from the platform.
3. Running data conversion and web publishing tasks.
4. Sharing data with other users.
5. Setting rules and triggering users tools.
6. Creating environments to use for users tools.

9.2. GeoHub Platform - Usage example video

Example video:

1. Creating new directory inside *.data/*
2. Deleting an object;
3. Uploading a file from local device;
4. Creating a .txt file from Geohub;
5. Opening, updating and saving the example text file.



10. GeoHub Platform - Storage Structure

Simple and categorized, the paths are always defined as *geohub/[org]/[user]/** and are classified as:

Path	Description	Storage structure
<i>./data</i>	user uploaded data files	user-defined structure
<i>./env</i>	user uploaded environments	system-defined structure
<i>./log</i>	log files created by executing tools	system-defined structure
<i>./rule</i>	user uploaded rules to trigger tools	system-defined structure
<i>./srvc</i>	web services	system-defined structure
<i>./tool</i>	user uploaded tools	system-defined structure
<i>./proj</i>	user uploaded data files for designated projects	user-defined structure

11. GeoHub Platform - Tools & Functionalities

For the best user experience Geohub includes tools and functionalities that ease processing:

Automatic Tool Creation

- Prepares and packages users tool for testing
- Easy to follow instructions and help support
- Updates automatically upon change in tool source files

Automatic Environment Creation

- Automatic container image build from user source inputs
- Simply upload the Containerfile and other necessary files and the image will be built
- Easy to follow instructions and help support

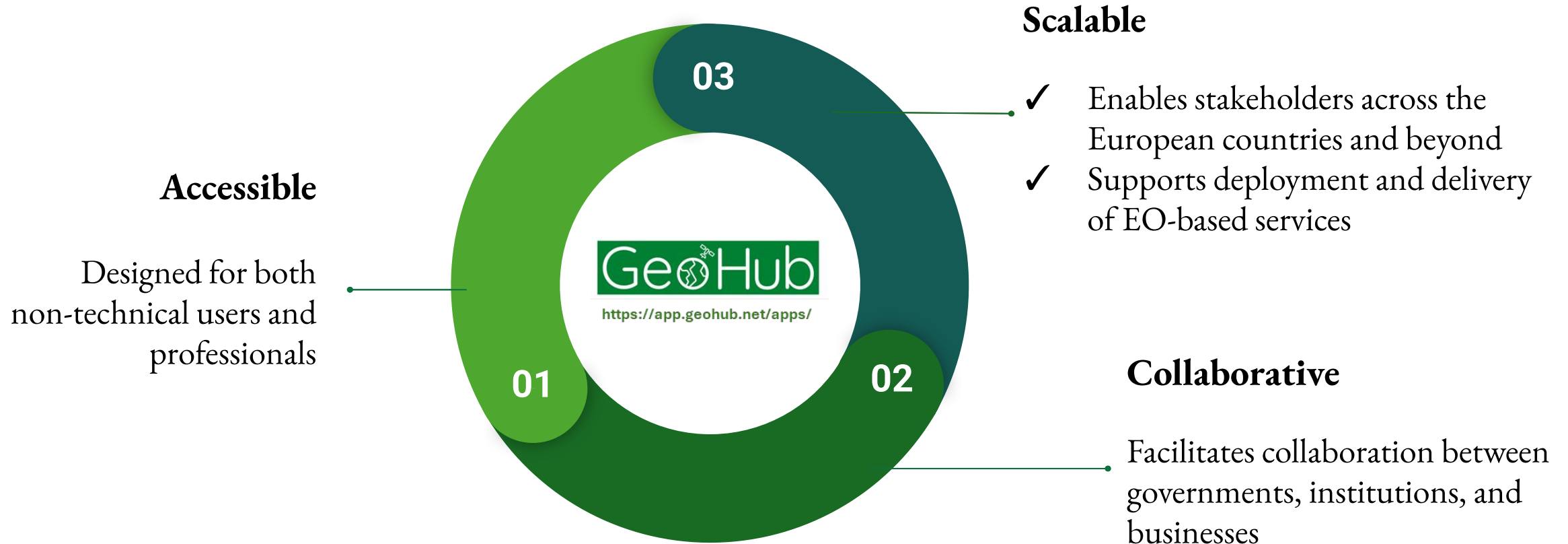
Rule Functionality

- User designed rule to automatically trigger tools
- Simple .toml file based configuration
- Flexibility in setting the environment, tool and data storage files
- Easy to follow instructions and help support

Automatic Publishing

- Automatic publishing tools for GeoTIFF, SpatiaLite, GeoJSON, Esri ShapeFile original data download
- Automatic publishing tools for XYZ/TMS, WMS and MVT web services







12. Geohub Platform - User and regional impact



13. GeoHub Platform - Open apps integrated



- ✓ GeoHub Platform <https://app.geohub.net/compute>
- ✓ Infranstructure and settlement monitoring <https://app.geohub.net/datel>
- ✓ Forest Monitoring <https://app.geohub.net/forest/>
- ✓ Water Quality Monitoring <https://app.geohub.net/ku-water/>
- ✓ Maritime Monitoring <https://app.geohub.net/ku-ship/>
- ✓ Agricultural Land Monitoring <https://app.geohub.net/lad-fire-flood/>
- ✓ Natural Resource Extraction Monitoring <https://app.geohub.net/edi-nrem/>
- ✓ Habitat Monitoring <https://app.geohub.net/dap>
- ✓ SmartAgro <https://app.smartagro.lv>

<p>Agricultural Land Monitoring Service</p>  <p>The main purpose of the application is to improve the management of agricultural land by effectively addressing fire and flooding problems. Key objectives include increasing efficiency through automated mapping using satellite imagery, supporting regulatory compliance processes and rapid response, and centralizing operations for better resource optimization. The application allows users to identify, monitor, analyze, download and manage agricultural areas affected by fires and floods.</p>	<p>Forest Monitoring Service</p>  <p>The Forest Monitoring Service provides monthly monitoring of forestry activities, such as clearcuts, and detects windfalls, along with annual monitoring for less visible forest damage, including excess water, insects, disease, and fire, across the Baltics. This service reduces the need for manual surveys, allowing human resources to focus on damage prevention and enabling timely updates to the State Forest Registry.</p>	<p>Infrastructure and Settlement Monitoring Service</p>  <p>Infrastructure and settlement monitoring application allows to observe subsidence in cities with population more than 60 thousand. The service supports monitoring and analyzing how construction activities affect nearby buildings/infrastructure, identifying and preempting potential issues. InSAR analysis shows vertical displacement grids for the biggest 10 Baltic cities. The grids are derived from the persistent scattered interferometric analysis (PS-InSAR) of Sentinel-1 satellite radar images. Multitemporal InSAR analyzes for the time period of one year are calculated monthly. The precision of InSAR derived displacements is 2 mm on average.</p>
<p>Marine Monitoring Service</p>  <p>This service by using synthetic aperture radar (SAR) technology complements the monitoring of marine vessels in the waters of the exclusive economic zone of the Baltic States, and allows the detection of vessels not connected to the automatic identification system (AIS), especially under harsh weather conditions. Such data can assist in identification of illegal activities such as fishing in protected areas or during prohibited</p>	<p>Natural Resource Extraction Monitoring Service</p>  <p>The Natural Resource Extraction Monitoring service is intended to produce classified maps of Natural Resource Extraction sites using Sentinel-2 imagery and available reference information. Monitoring of the licensed extraction sites is performed by observing the changes of their geographical extent and comparing the licence data with the classification results.</p>	<p>Water Quality Monitoring Service</p>  <p>Satellite data based Water Quality monitoring application significantly expands water monitoring for surface waters in time (weekly observations) and in space (on the scale of almost the entire water body) enhancing the assessment of water quality, the number of problematic water bodies, their change in time and the locations of hot spots. Combining such data with agricultural land monitoring data makes it possible to identify</p>

14. GeoHub Platform - Use Instructions

- ✓ **Tutorial videos of GeoHub open applications** (ENG, LV, LT, EE) - 2 to 4 minutes each
- ✓ **Regular trainings and superior user support**
- ✓ More information about the GeoHub: www.geohub.net

15. Collaboration Opportunities

1) Looking for:

- new users (government, commercial, R&D)
- app & service providers
- EO data contributors and developers

2) R&D Collaborations – EO, environmental and disaster risk monitoring, climate resilience, utility infrastructure, municipal services, other projects

(Open to ESA, Horizon Europe, INTERREG, ERAF and other funding programs)

3) GeoHub Forest Monitoring service offering through the **ESA NoR program for integration to end-user operational GIS/IT systems**



FORESTRADAR

Advanced Forest Intelligence