



Detecting changes in essential ecosystem and biodiversity properties- towards a Biosphere Atmosphere Change Index: BACI
Deliverable D2.5: Delivery of system state vector data including end to-end testing results at identified sites, regions



Project title:	Detecting changes in essential ecosystem and biodiversity properties- towards a Biosphere Atmosphere Change Index
Project Acronym:	BACI
Grant Agreement number:	640176
Main pillar:	Industrial Leadership
Topic:	EO- 1- 2014: New ideas for Earth-relevant space applications
Start date of the project:	1 st April 2015
Duration of the project:	48 months
Dissemination level:	Confidential
Responsible of the deliverable	Andrew Carrel (Rezatec Ltd) Phone: +44(0) 1235 567395 Email: andrew.carrel@rezatec.com
Contributors	Stuart Green (Rezatec) Alberto Delgado (Rezatec) Maurizio Nagni (Rezatec) Andrew Carrel (Rezatec) Maxim Chernetskiy (UCL Geography) Mathias Disney (UCL Geography)
Date of submission:	28 th March 2018

Summary

This deliverable D2.5 provides a brief summary of end-to-end testing for the on-line delivery of SSV data at selected sites.

Aim/Outcome

- Deployment of the Geospatial Portal incorporating BACI SSV data processed using the EO-LDAS data merging software.
- Description of the Geospatial Portal for web-access to SSV data for BACI users.
- Overview of the platform architecture supporting the Geospatial Portal and incorporating the EO-LDAS data merging code.

Acronyms

CPU	Central Processing Unit
ECV	Essential Climate Variable
EO	Earth Observation
EO-LDAS	Earth Observation Land Data Assimilation Scheme
GeoODK	Geographical Open Data Kit
IT	Information Technology
netCDF	Network Common Data Form
QA	Quality Assurance
RAM	Random Access Memory
SSV	Surface state vector
UCL	University College London

1 Introduction

This document is **D2.5** comprising the confirmation of deployment of the Geospatial Portal with selected site SSV data access provided in a web interface after processing using the EO-LDAS software.

The Geospatial Portal functionality is described as well as the supporting platform incorporating the EO-LDAS data merging code previously provided by UCL.

2 Data delivery portal: Summary

A preliminary BACI Geospatial Portal has been deployed for SSV data access. This deploys the netCDF files generated by the Earth Observation Land Data Assimilation Scheme (EO-LDAS) provided by UCL as D2.4.

The Geospatial Portal allows users to access BACI data via a standard web-browser and will support the dissemination and exploitation of the project outputs. The portal includes base map layers for reference and a number of user tools such as location search and measurement.

UCL have confirmed that they can access the Geospatial Portal through a web-browser and view BACI data.

3 Data delivery portal: Description

3.1 Outline

The Geospatial Portal is an online interactive tool designed to view and interrogate the complex data analysis information prepared by EO analysts, in an intuitive and dynamic interface. The portal is accessed via a web-browser and so there are no special IT requirements for users and Rezatec provides support and maintenance services.

Users securely log into the system with their own credentials and are presented with either satellite imagery or a street map interface, overlaid with selected BACI data layers that can be manipulated and interacted with, allowing the user to make informed decisions based on the geospatial analytical data.

The data layers can either be used within the portal, or they can be downloaded in standard geospatial data format to be imported into other systems alongside other data for further analysis.

Other capabilities include measurement tools to define distances or areas by plotting points on the map, and compartment or location analysis metadata which can be updated by the user. The interface is designed to work with standard pointing devices or by touchscreen, and will scale to any device size, including mobile. It can be used without needing to install a specific app, as the portal is built on web technologies and the data streams directly from a powerful server infrastructure.

It is planned to add further user functionality for searching and analysing BACI SSV data.

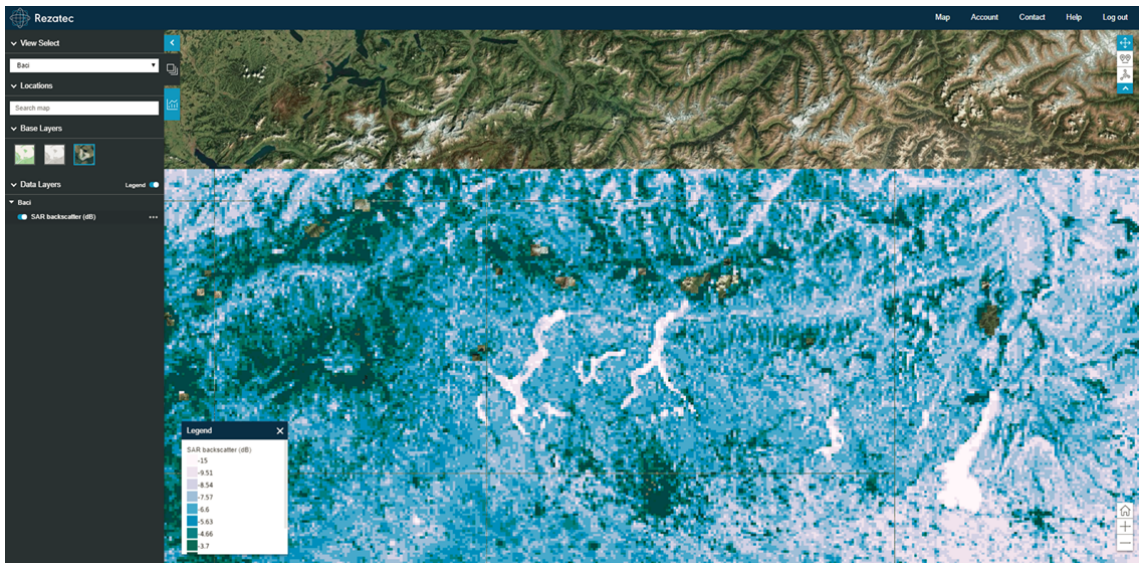


Figure 1. The Geospatial Portal with BACI SSV data

3.2 Technology Stack

The Geospatial Portal is supported by Rezatec’s platform that incorporates a range of software technologies. The major components of the architecture are shown in Figure 2. The satellite data processing in the Geospatial Services layer is fulfilled by the EO-LDAS software that generates the netCDF raster layers.

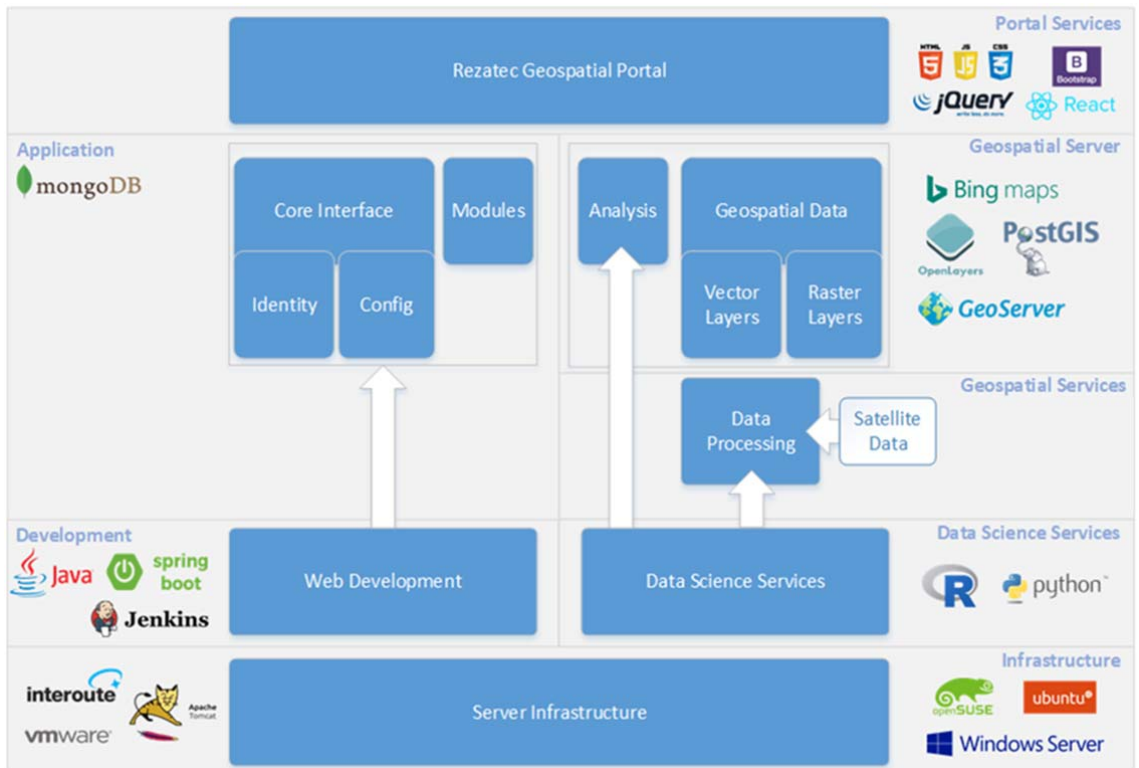


Figure 2: Platform technology solution stack

3.3 Infrastructure

The server infrastructure is split into two sections, described here:

- Data Processing Servers
- Geospatial Portal Servers

These are described below and shown in Figure 3.

3.3.1 Data Processing Servers

The data processing servers are high spec virtual machines with multiple CPUs and a large amount of RAM. These processing software runs using techniques and algorithms defined by Rezatec, taking the raw satellite imagery and converting it into useful and appropriate data formats.

The standard processing servers are used manually by our EO analysts. They can be spun up specifically for the duration of an individual project or processing run and retired once complete.

The automated processing server, runs autonomously, pulling down raw data from its cloud source and processing it without intervention from the EO team. This is used for data that is required regularly and the source is refreshed on a fixed regular basis.

3.3.2 Geospatial Portal Servers

The web based geospatial portal is available to the end user through three load balanced clustered production servers. These connect internally to geospatial servers that provide the processed data layers, tiling servers that deliver cached map tiles, and the configuration servers that control what data is made available to each user. A GeoODK server that allows field data to be submitted to the system, and a monitoring server that keeps track of all the servers, ensuring they are working correctly and fully optimised.

From a development perspective, updates are created locally then pushed to a development environment via an integration server. Once development is finalised, this is move to the release candidate server where extensive QA takes place. Once fully approved, this is then pushed to production.

All servers that are user facing and mission critical have redundancy build in to ensure a consistent user experience from processing capacity to failover.

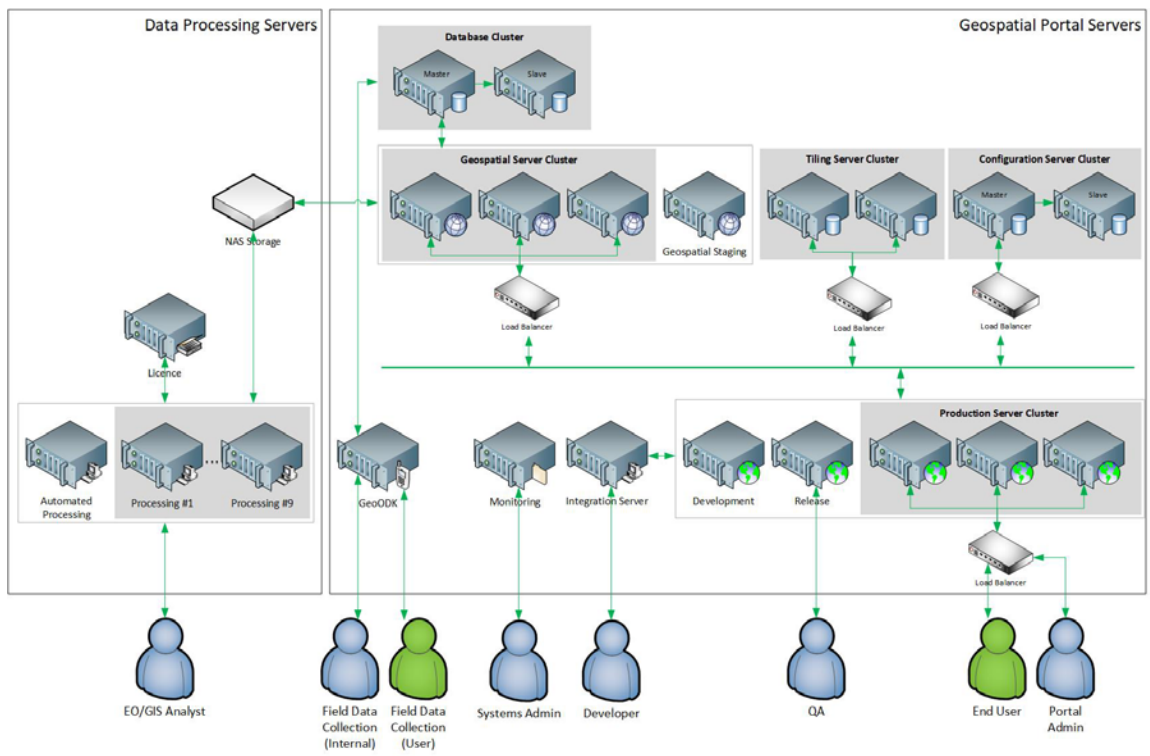


Figure 3: Platform server infrastructure