



Project of Strategic Interest NEXTDATA

NextData System of Systems Infrastructure (ND-SoS-Ina) Web Portal Architecture

Deliverable D2.7.5 Web Portal Architecture

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1. Introduction

This document presents the work on the SoSIna Web Portal architecture during the second year of activity of the Special Project (2014).

The work was done within the SoSIna WP2 Task 2.3, and the present document can be considered as a prosecution of what was reported in the Deliverable (on the preliminary Web Portal Architecture) for the definition of the requirements.

The goals that have been reached, as well as the results achieved, come as a consequence of an effort directed towards the resolution of a wide range of issues concerning different aspects of the SoSIna Web Portal. These include the definition of:

- the SoSIna Web Portal interface;
- the core concepts of SoSIna Web Portal, following the requirements expressed by users;
- a data access mechanism to download files from end sites;
- the major part of the requested features, including: query specific constraints, an innovative graphical map-oriented layout, data preview and online tooltip-based help guide.

2. Advances in NextData SoSIna Web Portal Architecture

Much work has been done in the last months both to collect novel requirements and to refine the already existing functionalities. The requirements have been re-negotiated time after time with developers and users in a continuous collaboration loop.

Old Requirements vs New Requirements

A first description of functional and nonfunctional requirements was previously prospected in the first version of this Deliverable (Web Portal Architecture), released in 2013. In that document two different versions of the portal were presented. The first one included base features like simple search and advanced search (deadline for the release was the end May 2014). The second one (to be subsequently released) included secondary features like for example: help functions, user feedback and documentation.

However, novel specific requirements have been introduced regarding the user interface and search functionalities. We will now present into details what has been done in the last working period.

New SoSIna Web Portal features

In this section we present the list of the recently added new features divided by category:

- **Discovery**
 - Arrangement of search results into categories based on indexed terms (keywords, source provenance, native format, etc.) along with numerical counts of how many matching documents were found for each term. It makes

it easier for users to explore search results, narrowing on exactly the results users are looking for.

- Browse based navigation system of data sources.
- Improvement of spatial search constraints allowing to select if the returning results must enclose or overlap the selected domain.
- **Access**
 - Direct link to access data in their original format.
 - Metadata modification accordingly to the applied transformation function.
- **General**
 - Main page fit on a single page, without scrolling bar and with the map covering the entire page.
 - Cultural and physical map layers to easily add spatial search constraints.

Changes to the SoSIna Web Portal Layout

The SoSIna Web Portal layout changed to reflect the new portal requirements.

In order to have a more powerful and modern tool and to satisfy the need for a more responsive map, we decided to use the new release of OpenLayer, version 3 [R5]. This library is a complete redesign of the OpenLayers web mapping library version 2 that has been rewritten from the ground up to use modern design patterns. Figure 1 shows the old graphical appearance and Figure 2 shows the new graphical interface.




NextData SoSIna

Sign In

Home
Search
Help
Statistics

Search

Search

Advanced Search

Sources

☒ Data

- ☒ ICTP@CINECA
- ☒ CMCC
- ☒ ENEA
- ☒ CNR-ISAC
- ☒ CRN-ISAC@CINECA
- ☒ EVK2CNR

Constraints

Where



North

South

West

East

When

From

To

mm/dd/yyyy

mm/dd/yyyy

Options

Search

Fields

Operator

Extension

Relation

Keyword

Concept

Fig. 1. SoSIna Web Portal Old Web Interface.

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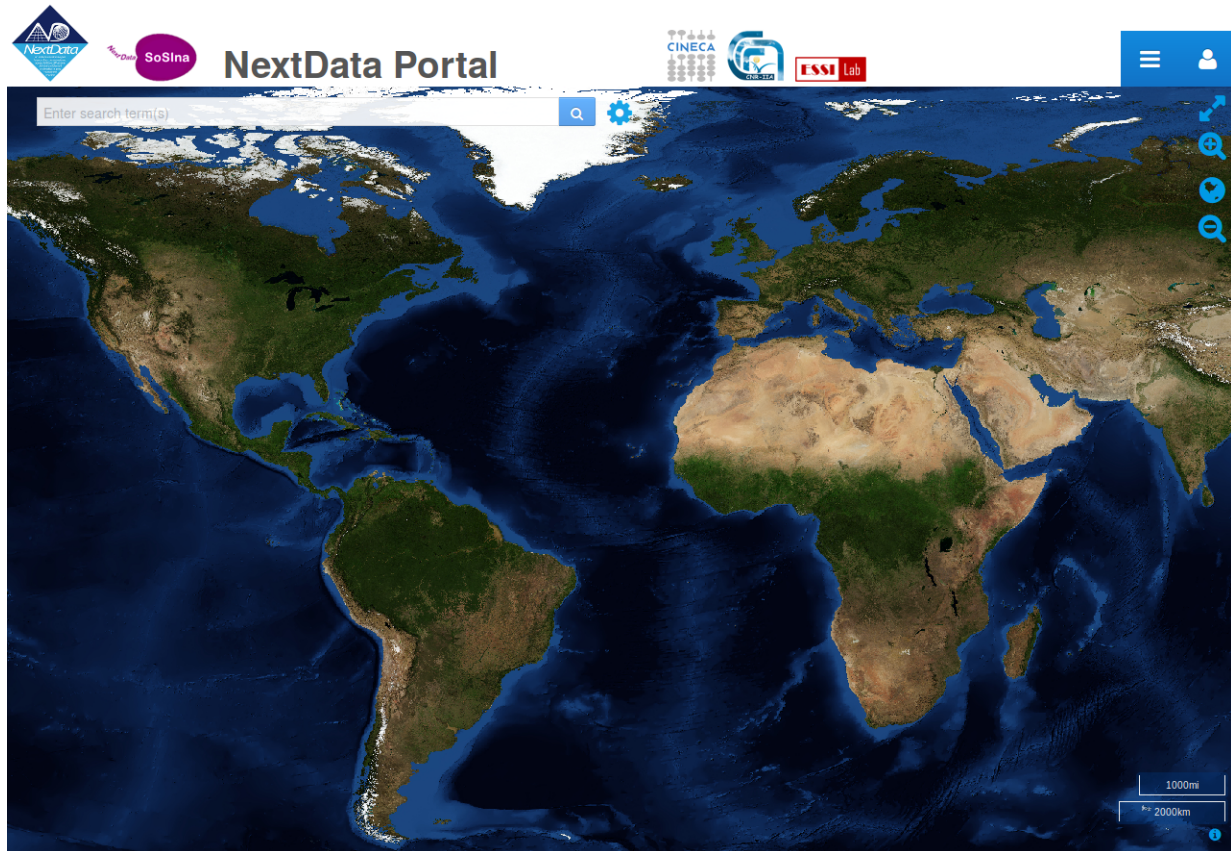


Fig. 2. SoSina Web Portal New Web Interface

3. Technology upgrade

The major upgrade in the adopted software libraries concerned OpenLayers 3 [R5]. Besides the full responsive capability of the new map, OpenLayers 3 allows to run easily in full screen mode and to cluster close points. It also has preliminary features to display 3D maps or using WebGL that will be improved in later releases.

The other tools we adopted were recognized to fully satisfy the requested requirements and just minor release upgrades have been necessary:

- Liferay is now at version 6.2 [R6].
- GI-cat has been updated to version 10.0.3 [R2].
- GI-axe has been updated to version 2.0.3 [R3].
- The GI-API has been updated to version 1.2.8 [R1].
- Geoserver has been updated to version 2.5.1 [R4].

4. Architecture

Figure 3 shows a general view of the portal architecture including the main components involved. Respect to the previous release of this Deliverable, three different Apache Tomcat [R7] containers deploy the three main services:

- Liferay Web Portal
- GEODAB and the relative MarkLogic DB
- Geoserver

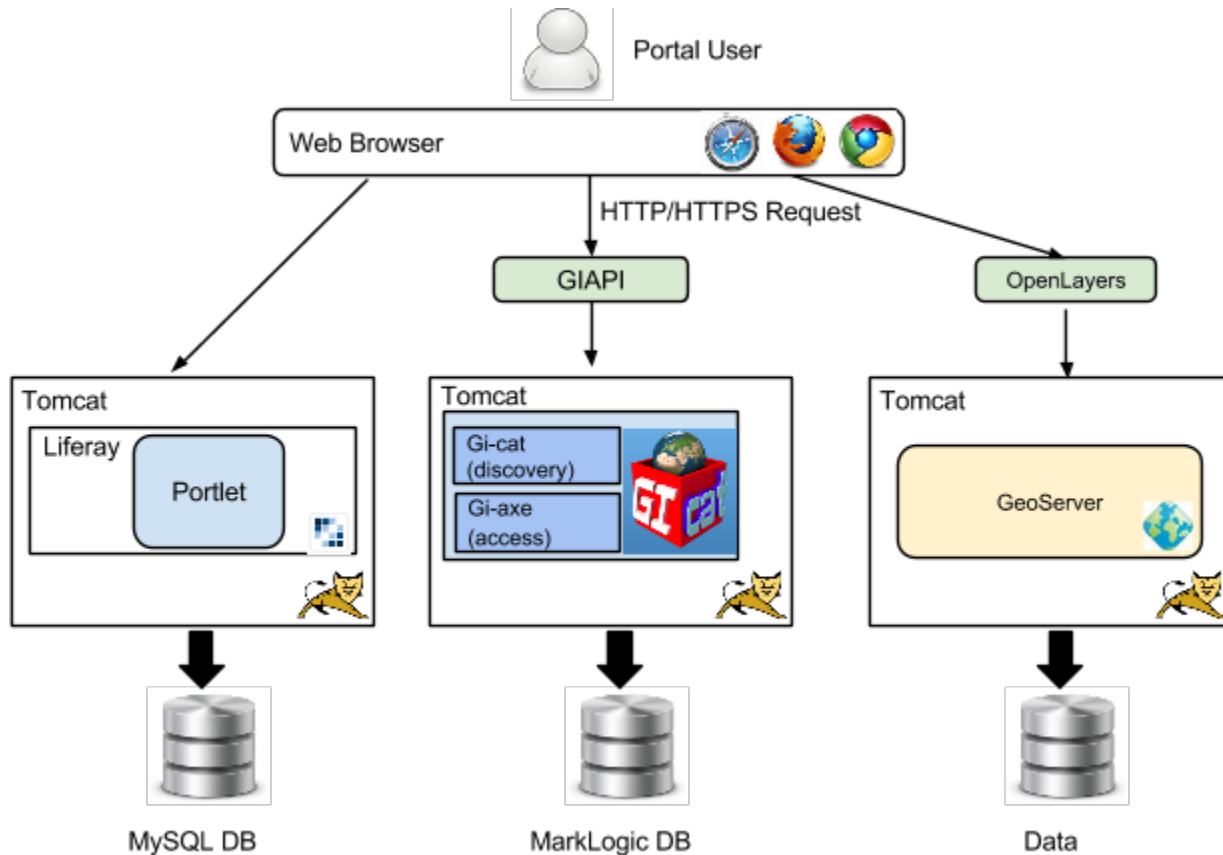


Fig. 3. SoSIna Web Portal Architecture.

Authentication and Security aspects

Both HTTP and HTTPS protocols are adopted for the three services reported above. An authentication mechanism by e-mail address is adopted through HTTPS protocol with an approval mechanism for the account creation.

Resources

Besides the first development instance prototype deployed on the Cineca Front End Cluster (FEC) a new instance (depicted in Figure 3) has been deployed on the test cloud

infrastructure, Nubes, deployed at Cineca and based on OpenStack [R9]. The three Tomcat containers are installed on three Virtual Machines with 8 Virtual CPU, 16 GB of RAM and 80 GB of disk space each. The relative data to store the Marklogic DB and the map served through WMS (Web Map Service) by Geoserver are instead stored on two 160 GB virtual volumes.

5. Development plan

During the third year of activity of this Special Project (2015), the second web portal prototype will be implemented and deployed. It will be fully released at the end of the year.

6. Conclusions and future extensions

After the second year of activity the architecture design was completed and the most part of it was implemented, satisfying the major requirements. New infrastructures could be added in order to improve scalability and availability of services.

7. References

R1	GI-API: http://api.eurogeoss-broker.eu/docs/index.html
R2	GI-cat: http://essi-lab.eu/do/view/GIcat
R3	GI-axe: http://www.essi-lab.eu/do/view/GIaxe/WebHome
R4	Geoserver: http://geoserver.org/
R5	Openlayer3: http://openlayers.org/
R6	Liferay: http://www.liferay.com
R7	Apache Tomcat: http://tomcat.apache.org/
R8	MarkLogic: http://www.marklogic.com/
R9	OpenStack: https://www.openstack.org/