# ODYSSEA

**Observatory of the dynamics of interactions between societies and environment in the amazon**

Grant Agreement No. 691053

**Deliverable D5.1: "** User´s Guide and publication on-line of the virtual collaboration platform **"**

WP5: "COLLABORATIVE PLATFORM FOR KNOWLEDGE INTEGRATION AND SHARING BUILDING END-USERS PRODUCTS"

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# 1. Context

ODYSSEA is an international and inter-sectoral network of organizations that aims to contribute in the production of knowledge and operational and innovative tools helping to design more effective public policy instruments for sustainability in the Amazon, and to promote new skills and perspective careers for Europeans and Brazilians.

To achieve this impact, the proposed activities are organized around interrelated strategic areas, namely "Environment & Health", "Biodiversity, carbon & resource's uses", "water resource monitoring & spatial observation" that are the basis of currently running or expected international scientific collaboration projects with Brazil. In particular, ODYSSEA members are associated to three proposals sent last year to the call for the creation of National Institutes of Science and Technology (INCT) launched by the Brazilian Ministry of Science and Technology (MCTI) to help structure the Brazilian institutions and promoting high level research and innovation.

ODYSSEA offers the opportunity to reinforce the involvement of European organizations in these Brazilian networks and to bring them together into a joint project. To favour interaction between researchers and produce operational tools, the project proposes to build an observatory which will monitoring environmental and social dynamics and analyses of environmental governance, but also engaged in a strong interaction with society, through socio-environmental modelling to produce sustainability indicators and prospective scenarios to enable to access the impact of public policies and local stakeholder's strategies. ODYSSEA overall goal will strengthen the interactions between social and environmental sciences but also between academic and non-academic sectors to ensure the production of operational tools and knowledge for decision-makers and the general public, which will be made through a web-portal. The offer of research training, workshops and summer schools open to professionals will promote individual skills but also new perspectives for careers in particular related to digital information, monitoring and consultancy.

## 2. Objectives

In this context, the objectives of WP5 is to share point of view on the studied socio-ecosystems (multi-sites approach and transversal themes) to build integrative end-user products based on the research conducted in the WPs #3 and #4 and on WP#2 activities with stakeholders. Three types of products are expected from these WPs, a set of indicator's and prospective scenarios, maps and information systems (demonstrators) that will integrate the three points of view (environmental, social and politic) and transversal themes. A end-user products sharing platform will be set up to facilitate for the end-user the discovery, the access and the use of all resources produced in all WPs.

More specifically, the task #5.1 have objectives to make available the data, information and tools in other WPs to facilitate the exchanges between researchers. This platform will provide the end-users with functions of discovery, visualization and access to the tools produced by the project (demonstrator Task #5.3 and #5.4 simulator) and to the cartographic products (Task #5.2). This task will define: a) metadata model and normalized web services; b) thematic vocabularies (multi-lingual thesaurus). Along the course of the project, the partners will enrich the platform content through the description (metadata) of the resources they will share.

The open source platform Constellation-sdi1 implemented by Geomatys SARL is provided to expected functional requirements. This deliverable provide the user's Guide to install and administrate the constellation-sdi in order to share and manage the geospatial data collection.

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# 3. User's Guide and installation

## 3.1 Web sites for urser's guidelines

As an open source tool, constellation-sdi provide description of main features and user' guidelines in a dedicated web site. The web addresses to access the different online user's guidelines are:

- **Installation Guideline** : http://www.constellation-sdi.org/en/doc/installation.html

- **Launching the application:** http://www.constellation-sdi.org/en/doc/launching.html

- **Get starting :** http://www.constellation-sdi.org/en/doc/start-shapefile.html

- **Data management:** http://www.constellation-sdi.org/en/doc/data-management.html

- **Services Management**: http://www.constellation-sdi.org/en/doc/services-management.html

- **Style Management:** http://www.constellation-sdi.org/en/doc/styles-management.html

- **Map context management:** http://www.constellation-sdi.org/en/doc/mapcontexts-management.html

- **Administration**: http://www.constellation-sdi.org/en/doc/mapcontexts-management.html

## 3.2 Pre-requites for installation

Several pre-requites exist for the installation of Constellation-sdi-1.2.1:

1) Installation of Apache Tomcat, version 7.0.47 or above

2) Installation of PostgreSQL, version 9.1 or above

3) Installation of Oracle JDK, version 7u45 or above

## 3.3 Download Constellation-sdi

The application Constellation-sdi-1.2.1 can be downloaded from the page: https://www.constellation-sdi.org/en/doc/installation.html

Create a directory named constellation and save inside the file cstl-sdi-1.2.1.war.

## 3.4 Installation of Oracle JDK

The Java TM platform, standard edition development kit (JDK$^{TM}$) is an environment developed for building applications and components using the Java programming language. The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform. The Oracle JDK version 7u45 or above must be installed:

(a) Go to the web page: http://www.oracle.com/technetwork/pt/java/javase/downloads/jdk8-downloads-2133151.html and download the JDK for the adequate operating system (for ex. windows x64) from the panel Java SE Development Kit 8u16: jdk-8u161-windows-x64.exe

(b) Save the file jdk-8u161-windows-x64.exe in the directory constellation

(c) Run the file jdk-8u161-windows-x64.exe and identify the installation directory (for ex. C:\Program Files\Java\jdk1.8.0_161)

(d) The directory will be used to the configuration of Tomcat application.


## 3.5 Installation of Apache Tomcat

The Apache Tomcat software is an open source implementation of the Java servlet, JavaServer Pages, Java expression language and Java websocket technologies. A Java servlet is a Java program that extends the capabilities of a server and they can contribute to the implementation of applications hosted on Web servers. Several steps must be followed to install Tomcat:

(a) Go to the web page: http://tomcat.apache.org/index.html and download a Tomcat version above 7.0.47 (for ex. download Tomcat 7.0.82 version)

(b) Save it in the directory Constellation

(c) Unzip apache-tomcat-7.0.82.zip to the disk C

(d) Move the file cstl-sdi-1.2.1.war to the webapps directory of apache-tomcat-7.0.82 and unzip it inside

(e) Create a file in Notepad application named Setenv.sh and save it in the Tomcat bin directory with the following content:

```
CATALINA_OPTS="$CATALINA_OPTS -Dfile.encoding=UTF8 -Xmx1024m
-XX:MaxPermSize=128m -Dgeotk.image.cache.size=128m
-XX:-HeapDumpOnOutOfMemoryError -XX:HeapDumpPath=./constellation.hprof"
JAVA_HOME=<PATH_TO_JDK>
JRE_HOME=<PATH_TO_JDK>/jre
```

And replace <PATH_TO_JDK> with the path to the JDK home directory (for ex. C:\Program Files\Java\jdk1.8.0_161)

**Note1**: This procedure will increase the memory available for run Tomcat application

**Note2**: Activate the extension option in windows explorer to remove txt extension and save only with sh extension.


## 3.6 Installation of PostgreSQL

The PostgreSQL is an object-relational database management system and the most advanced open source database system. It creates a database that will be used by the constellation application:

(a) Go to the web page: https://www.postgresql.org/download/ and download PostgreSQL version 9.1 or above selecting the operating system (for ex. windows) and the "Download the installer" icon

**Note**: The installer includes PostgreSQL server and pgAdmin III, a graphical tool for managing and developing databases and StackBuilder, a package manager that can be used to download and install additional PostgreSQL tools and drivers.

(b) Select the PostgreSQL version (for ex. PostgreSQL 9.3.20) and the operating system (for ex. Windows x86-64) and press the Download now button. The postgresql-9.3.20-2-windows-x64.exe file will be downloaded. Save it in the directory Constellation

(c) Run the file postgresql-9.3.20-2-windows-x64.exe and create a login (for ex. Postgre) and password (for ex. Postgre)

(d) After installing postgresql-9.3.20-2-windows-x64.exe, a window of Stack Builder 4.1.0 will be open, it must be selected "PostgreSQL 9.3 (x64) on port 5432" option and next button

(e) Select Database server/PostgreSQL (64bit) v9.3.20-1 (installed), that it is the PostgreSQL database server with the pgAdmin III and StackBuilder, and next buttons

(f) Activate the option skip the installation in StackBuilder window, and next buttons until finish the installation

(g) PgAdmin III will be installed

Open PgAdmin III and select PostgreSQL 9.3 (localhost:5432) and click on the right button of the mouse on PostgreSQL 9.3 (localhost:5432), then select connect and enter the password for user postgres on server (Postgre).

**Note**: Database will be open

(h) Create a database for constellation application named cstl, selecting SQL query

(i) A window named Query – postgres on postgres@localhost:5432 will be open

(j) Write there:

CREATE USER cstl WITH ENCRYPTED PASSWORD 'admin'

Followed by execute query and

CREATE DATABASE constellation OWNER cstl ENCODING 'UTF8'

Followed by execute query.


## 3.7 Variables definition

In the computer system define the two new variables JAVA_HOME and JRE_HOME:

(a) Select the computer name followed by System->System advance definitions-> Environment variables-> new

(b) Name: JAVA_HOME and Variable value (the location): C:\Program Files\Java\jdk1.8.0_161

(c) Name: JRE_HOME and variable value (the location): C:\Program Files\Java\jdk1.8.0_161/jre

(d) Restart PC

# 4. Initializing Constellation

After installation of all itens required, the next step is to open and to run the constellation application. For that:

(a) open the window Command line

(b) Locate in c:\ root

(c) Go to the bin directory of Tomcat through the command line window: cd apache-tomcat-7.0.82\bin

(d) In c:\apache-tomcat-7.0.82\bin> startup.bat and a terminal opens

(e) Go to a browser and write: localhost:8080/cstl-sdi-1.2.1

(f) Constellation application will open (login: admin, password: admin)

(g) To stop constellation, in the directory c:\apache-tomcat-7.0.82\bin>shutdown.bat

# 5. First steps in Constellation

Constellation-sdi is a geographical server written in Java that allows users managing and sharing georeferenced spatial data through a large number of interoperable services. Classical services like OGC (WMS and WMTS) and less common like SOS and WPS are available. It allows, also, reading data and metadata, which can be broadcast via CSW web service.

## 5.1 Standard vector and raster format files

The standard vector file format used by constellation is the large used shapefile and the standard raster file format is the Geotiff. Shapefile require a minimum of 4 files:

1) .shp file, containing the attributes of entities

2) .dbf file, containing the attributes in dBase

3) .shx that, the index file

4) .prj, containing information about the coordinate system used.

## 5.2 Importing vector and raster files

Importing shapefiles and raster files (figure 1):

1) For vector data, use winzip application to zip data, containing at least the 4 files format shp, shx, prj and dbf

2) For raster files, select filename.tif

3) In the Constellation-sdi click in the Data tab and Add data icon, two options are possible:

- From the computer by clicking Local file

- From a server by clicking on Server file.

    **Note**: Choosing the zip vector file, located in the computer, appears a window to select the Metadata file associated to it. It can be loaded or defined now, or later.
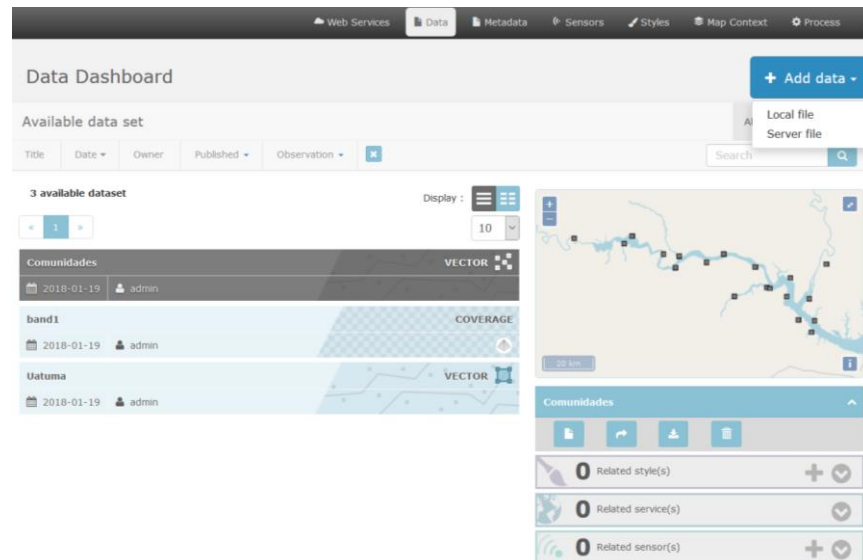


Figure 1 – Importing data

4) Choose the type of data: vector data/ raster data or Sensor data and Finish

5) The vector/raster data will appear in the Data dashboard/ Available data set

6) Title and description of the data can be added in the metadata dashboard following Save changes

### 5.3 Imported data management

Selecting the data, information can be displayed on the right window (Figure 2). Several actions can be done to the data, for ex., metadata can be edited, a new style created and applied and data exported.

### 5.4 Publishing data with web services

Several web services can be created for publishing data (Figure 3):

1) WMS (Web Map Service) providing geographic data as geroferenced images

2) WFS (Web Feature Service) providing spatially referenced data as textual or binary formats (GML, shapefile, geotiff, ..)

3) WCS (Web Coverage Service) providing coverage data as raw data, to get pixel value

4) And others.

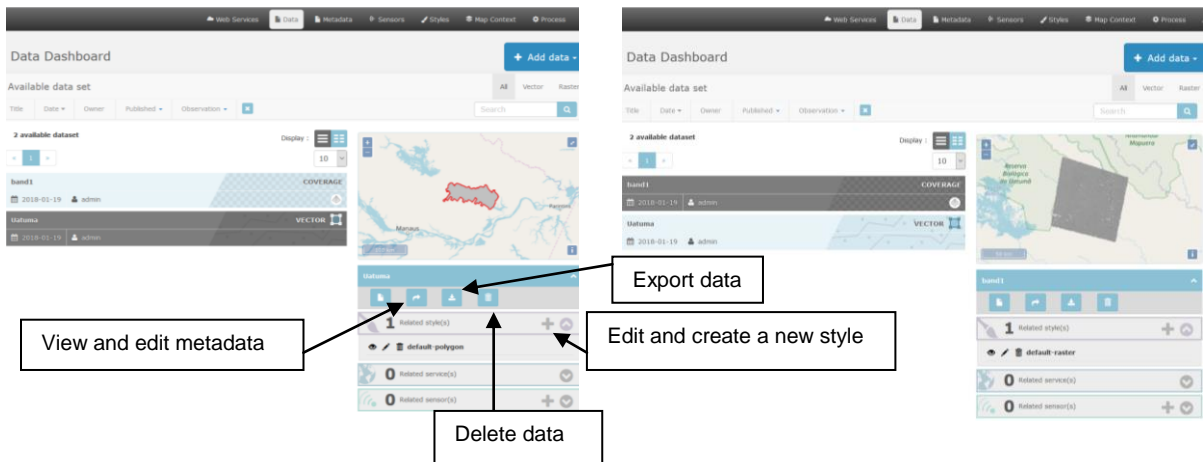Displaying vector data:                                    Displaying raster data:



View and edit metadata

Export data

Edit and create a new style

Delete data
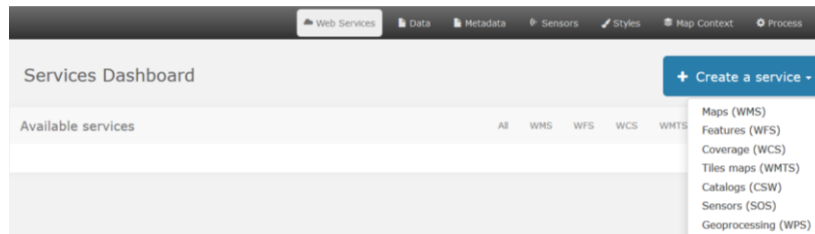
Figure 2 – Displaying vectorial and raster data



Figure 3 – Web services

## 5.5 Managing a map context

Constellation-SDI allows to create interfaces that can be used by users (Figure 4):

1) Selecting the Map context tab and Add a context, is possible to select Layers through Add layer button (internal or WMS options)

2) Selecting the layers, they will be added to the Map Context
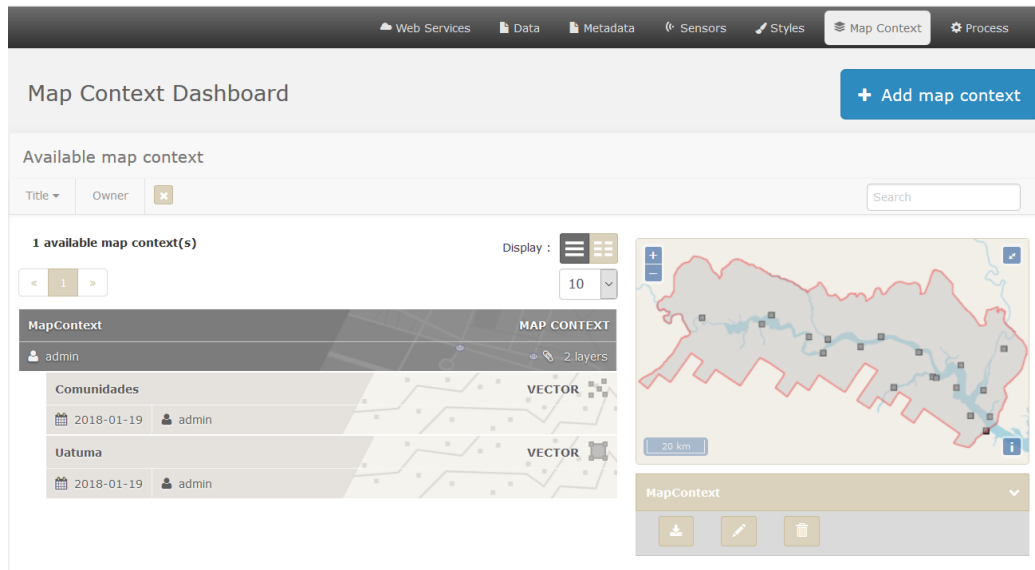
3) Give a name to the Map Context

Figure 4 – Building a map context

Let's start using Constellation-SDI..