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POLITECNICO DI MILANO





GeoNode - an Open Source Geospatial Content Management System

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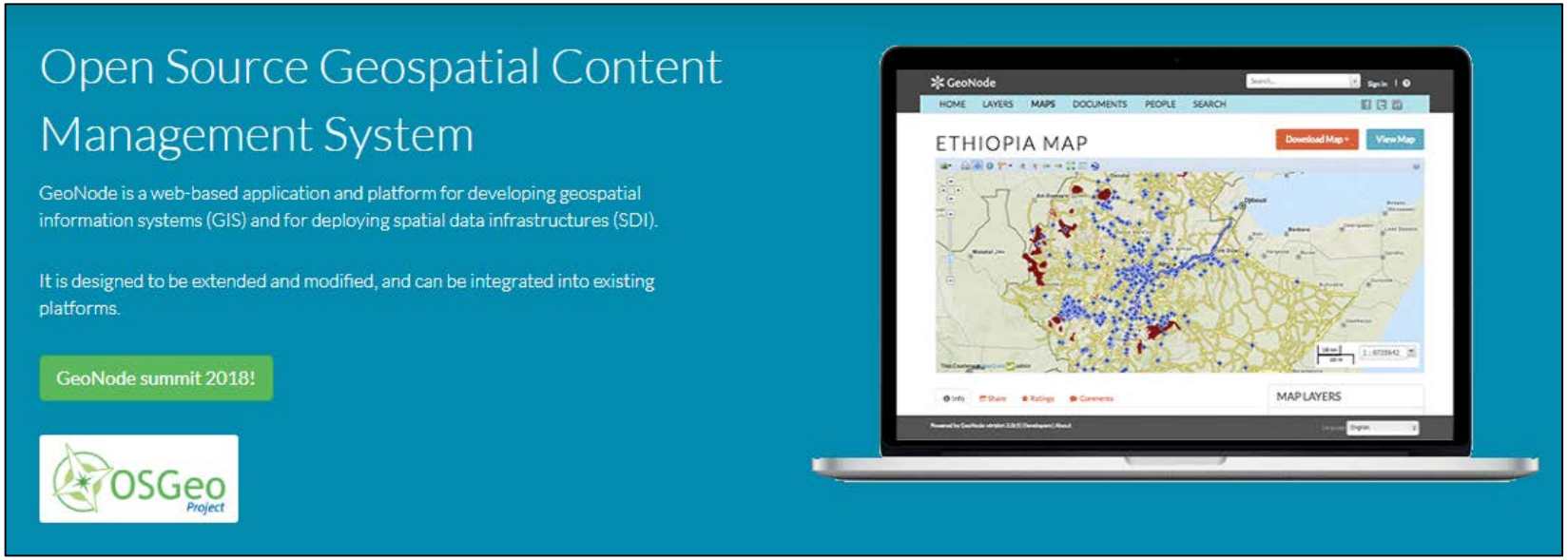
Introduction to GeoNode

- GeoNode is a web-based platform for:
  - developing Geospatial Information Systems (GIS)
  - deploying Spatial Data Infrastructures (SDI)
- GeoNode is a geospatial Content Management System (CMS)
  - It is designed to facilitate the creation, update, sharing, and collaborative use of geospatial data on the web



Introduction to GeoNode

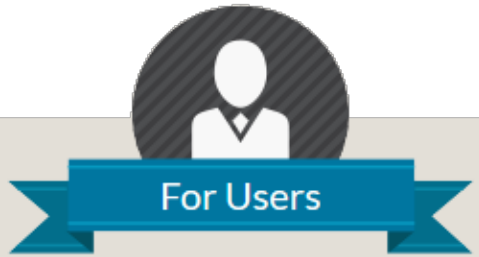
- it is open source, released under the GNU General Public License (GPL):
  - source code: https://github.com/GeoNode/geonode
  - license: https://github.com/GeoNode/geonode/blob/master/license.txt
- it is an official project of the Open Source Geospatial Foundation (OSGeo).
- current stable version is 2.7
- website: http://geonode.org
- demo available at http://demo.geonode.org

OSGeo

GeoNode

Introduction to GeoNode

- It provides advanced features for users, developers and admins



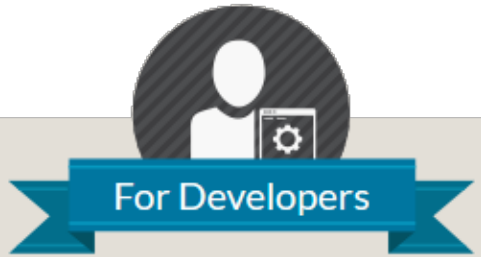
Browse and search for geospatial data and web services

Upload, manage, and share geospatial data

Create and share interactive maps

Collaborate and interact with other users

Take the Tour



Developed with Django

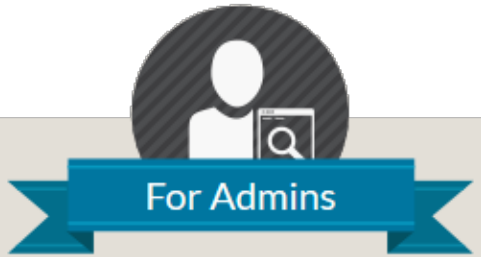
Twitter Bootstrap and jQuery client implementation

Built on stable, mature open source geospatial projects

APIs for customization and connection

Seamless integration with third-party Django apps

Take the Tour



Reliable, scalable platform for deploying spatial data infrastructure

Complete framework for OGC-compliant web services

Metadata management and aggregation platform

Comprehensive security framework

Take the Tour

Features for Developers

- **Open Source Geospatial**:
  - it is based on proven open source components
  - it contributes to the underlying open source projects and software libraries
- **Django**:
  - friendly and extensible environment for web developers
  - large ecosystem of pluggable apps
- **Bootstrap and jQuery**:
  - easy customization of your own GeoNode implementation
- **Interoperability**:
  - it interacts with other services and tools (other GeoNode deployments, OGC-compliant SDIs, social networking platforms, Content Management Systems)

Features for Admins

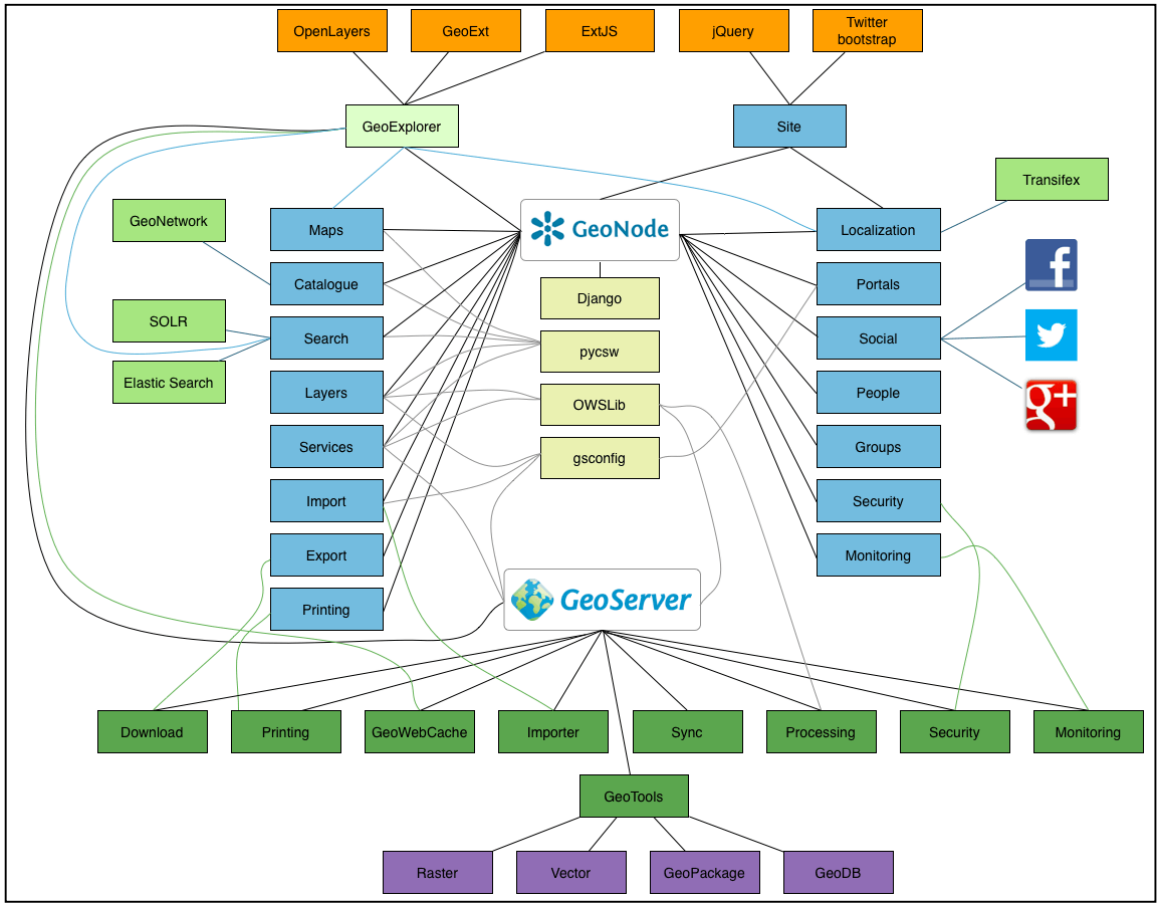
- **Spatial Data Infrastructure**: 
  - it is an OGC-compliant spatial data infrastructure
  - it supports standard metadata and OGC-compliant cataloguing systems
- **Security**: 
  - it builds on Django's authentication framework
  - it integrates with GeoServer's security subsystem
- **Scalability**: 
  - it can implement caching at several levels
- **Administration Console**: 
  - it enables performing administration operations and monitoring user-provided content

Features for Users

- **Spatial data discovery**: 
  - search, process, style, and share geospatial data and maps
  - share spatial datasets through a non-technical user interface
- **Import & manage**: 
  - upload geospatial data on the web via standard OGC protocols (supported formats: shapefile, GeoTIFF, KML, CSV and others)
  - manage metadata and associated documents
  - data is available for searching, styling and processing to generate maps
- **Interactive Mapping**: 
  - graphical style editor to compose maps graphically
  - create interactive, multi-layer, web-based mapping applications
  - share and embed maps in web pages

GeoNode Architecture

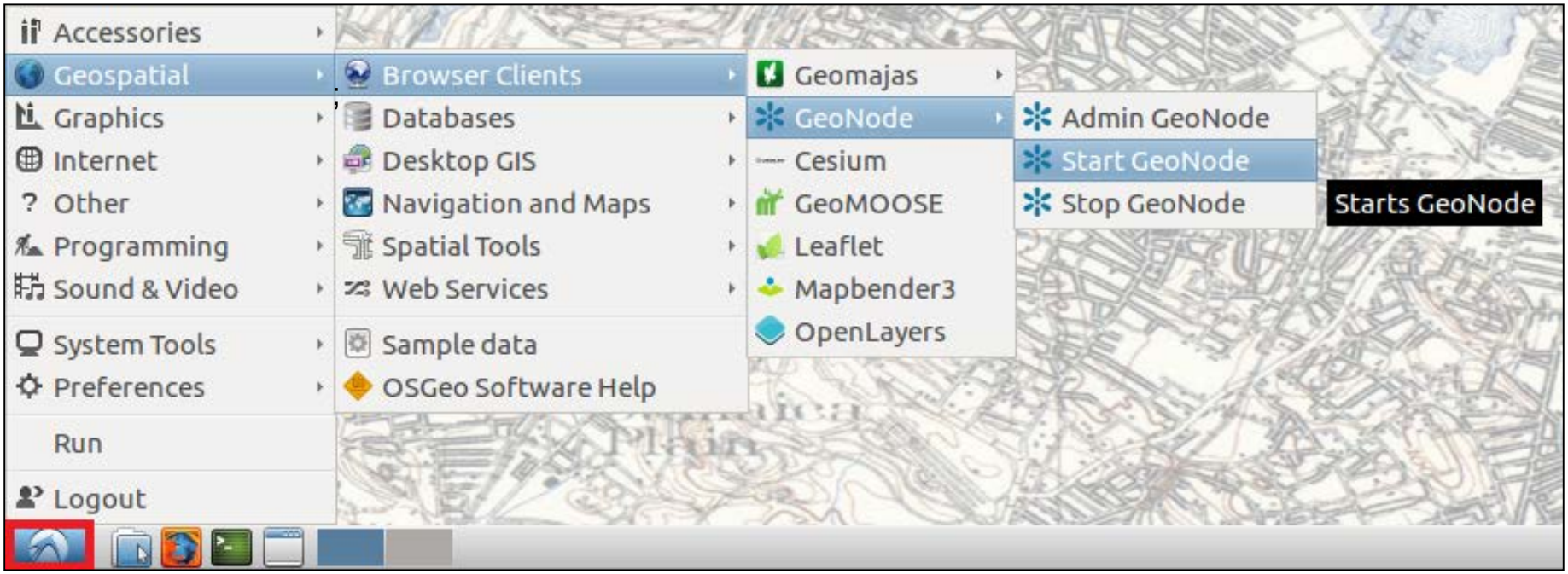
- GeoNode is based on other open source components, mainly:
  - Django
  - GeoServer
  - pyCSW
  - GeoExplorer
  - PostgreSQL/PostGIS



http://docs.geonode.org/en/master/tutorials/overview_and_ref/reference_doc/architecture.html

Get started with GeoNode

- **Start GeoNode**:
  - o click the bottom left button, then select Geospatial > Browser Clients > GeoNode > Start GeoNode
  - o alternatively, open the folder Browser Clients on the desktop and double click on Start GeoNode



Get started with GeoNode

- **Stop GeoNode**:
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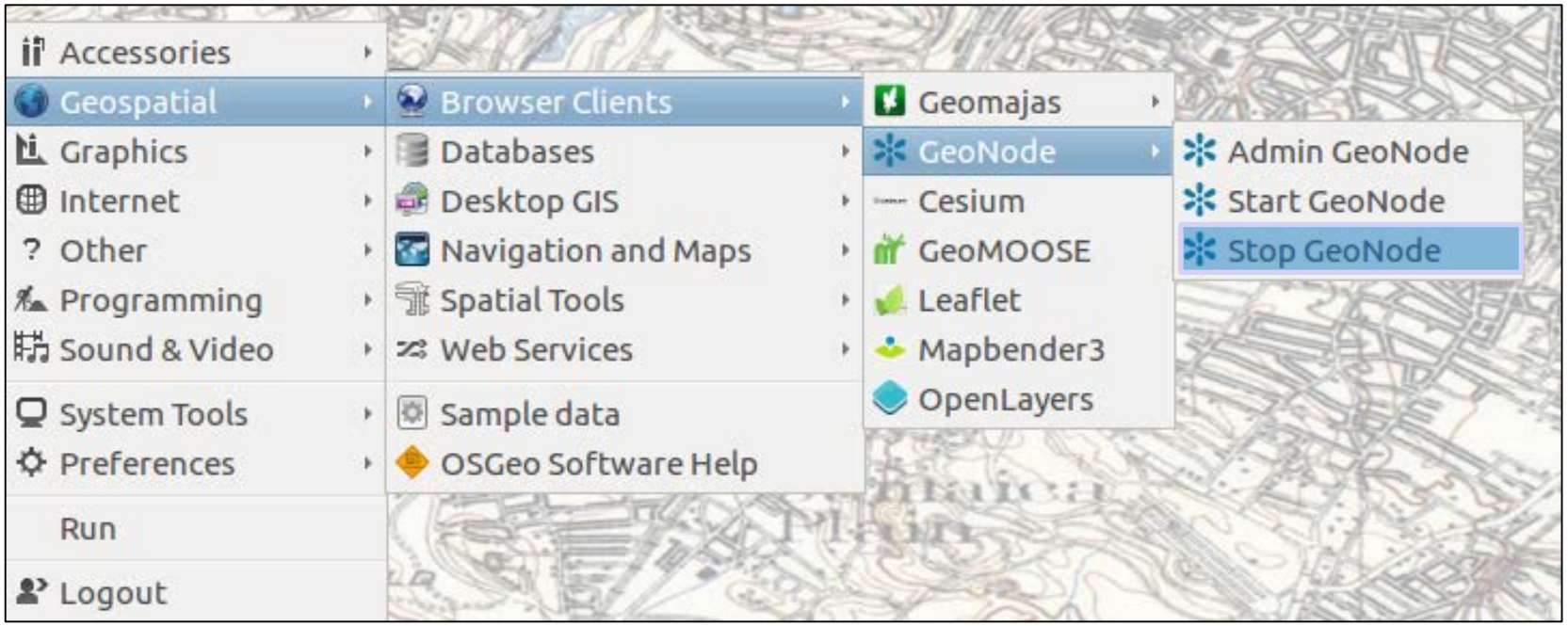
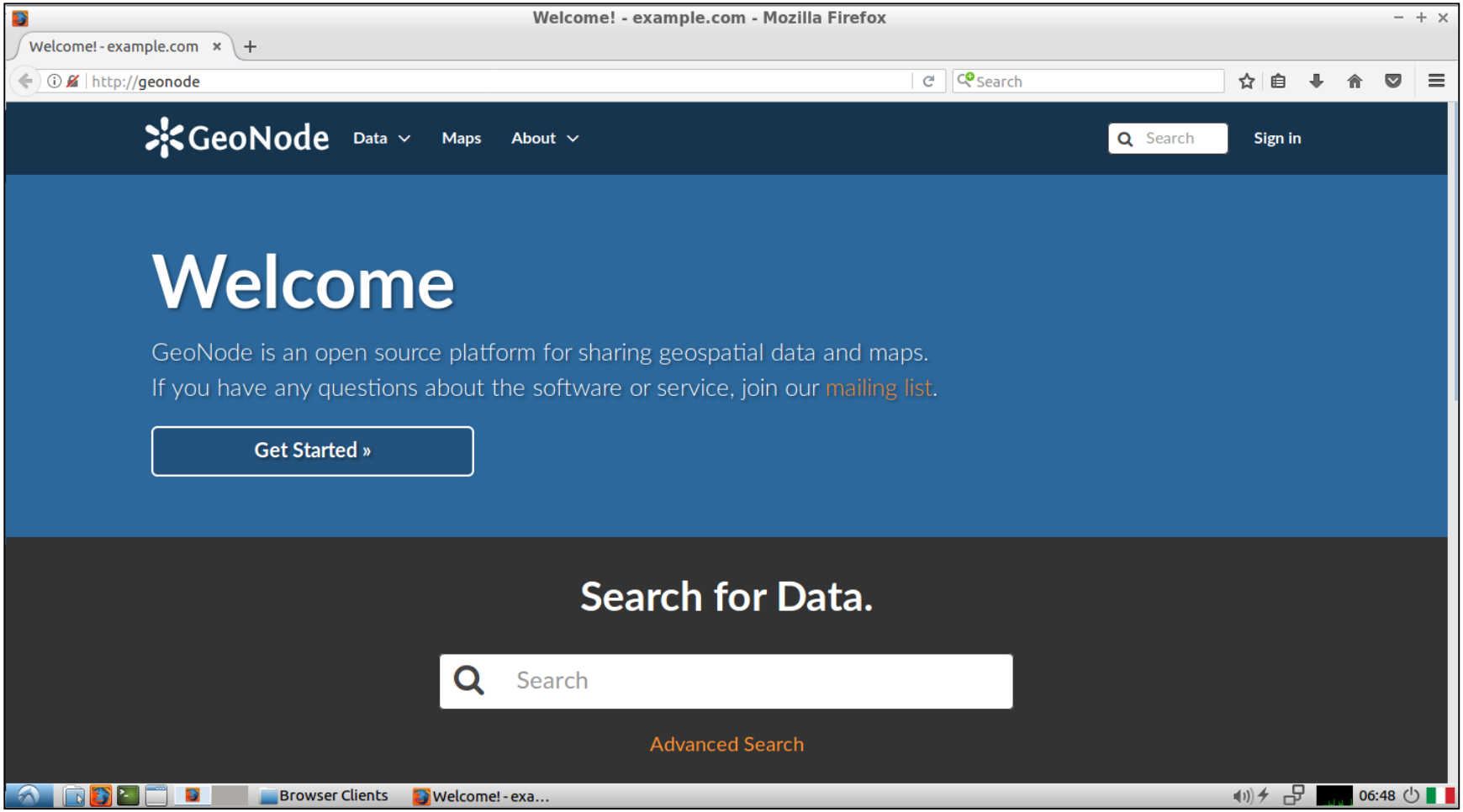


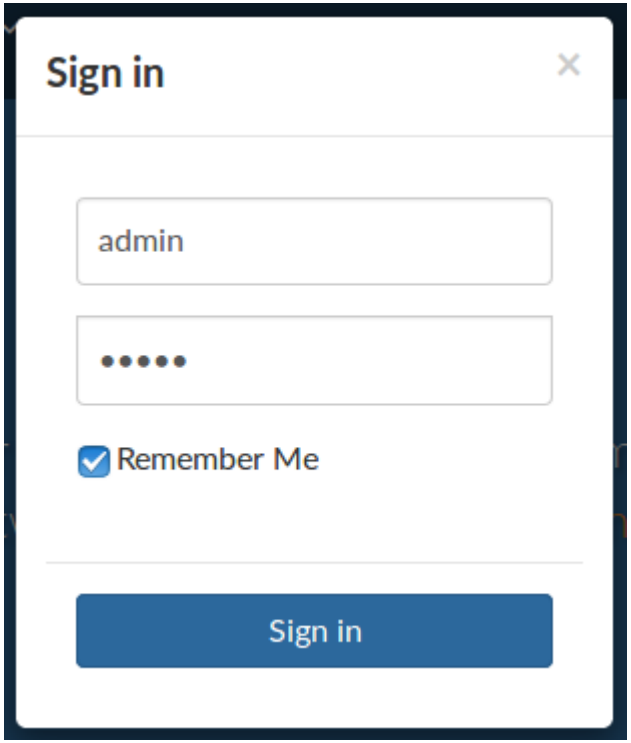
Get started with GeoNode

- The main interface of GeoNode will look like this:



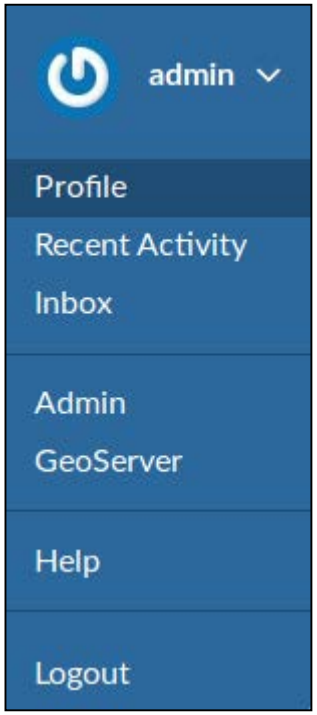
Accounts and Users

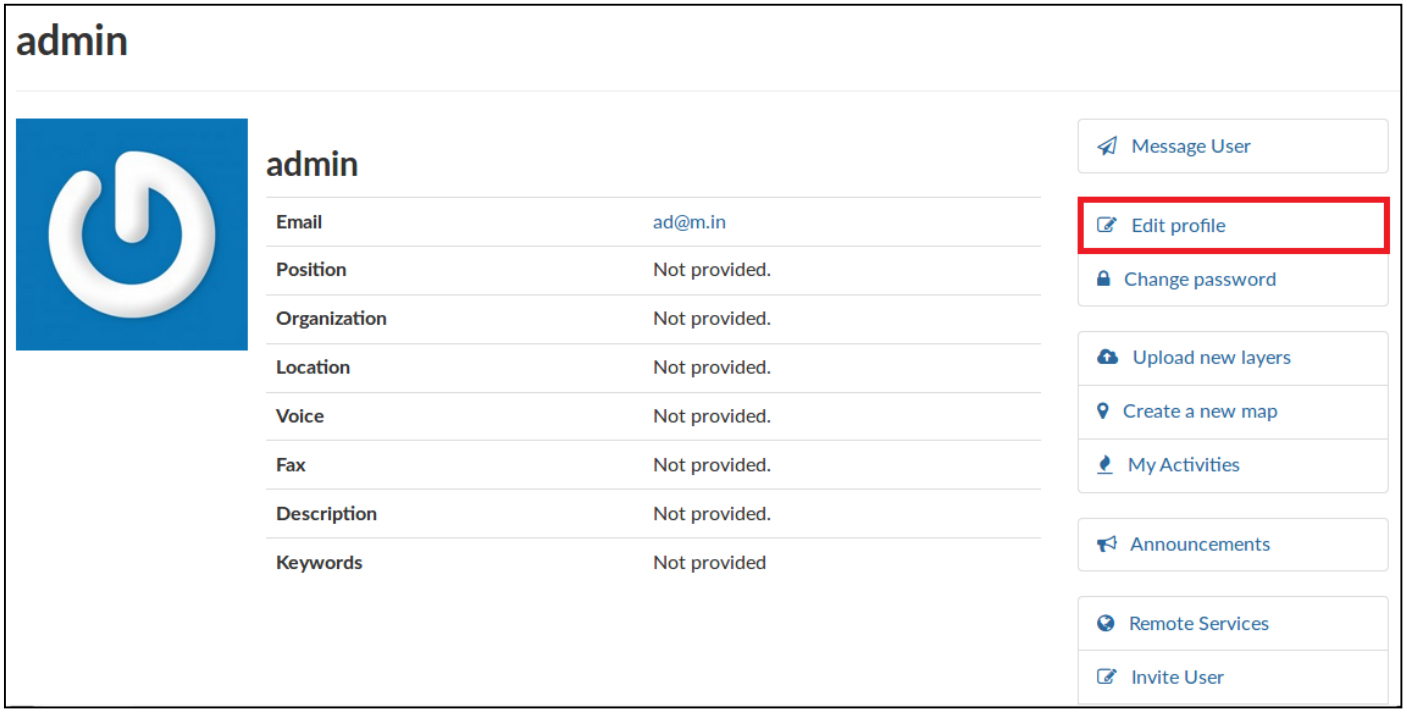
- **Sign in to GeoNode**:
  - click the Sign in button on the top-right of the page
  - fill in the user credentials with admin for both username and password



Accounts and Users

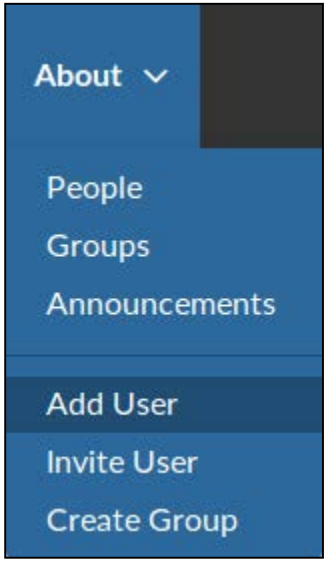
- **Add/change personal information associated to your profile**:
  - click the admin button on the top-right of the page and select Profile
  - select Edit profile and add/change information as you wish

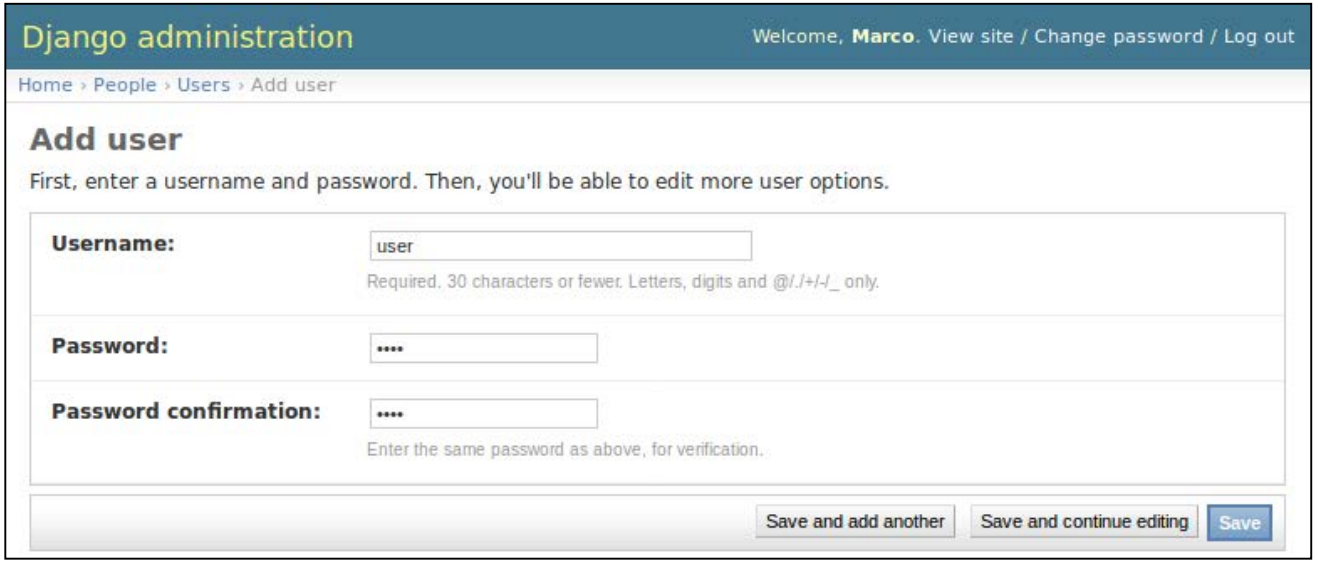




Accounts and Users

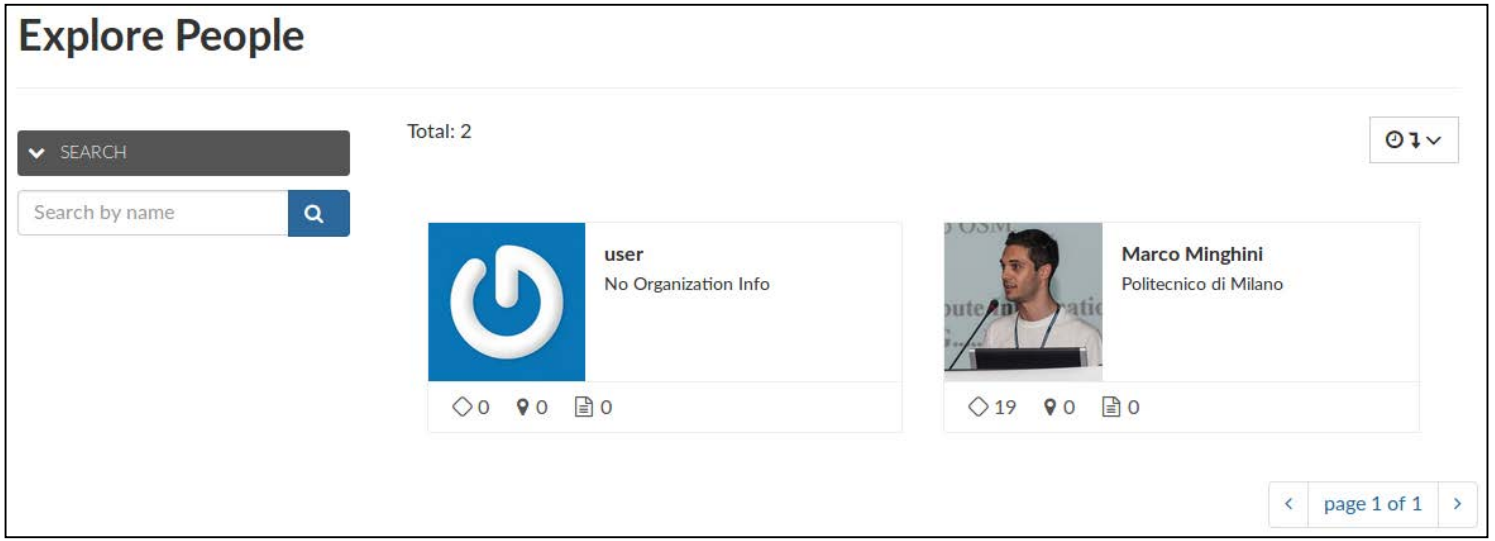
- **Add new users to GeoNode**:
  - open the About menu and click Add User
  - on the Django administration interface, define the username and password of the new user and click Save
  - on the following window, you can add personal information for the new user
  - to check that the new user has been created, try to log in with its credentials





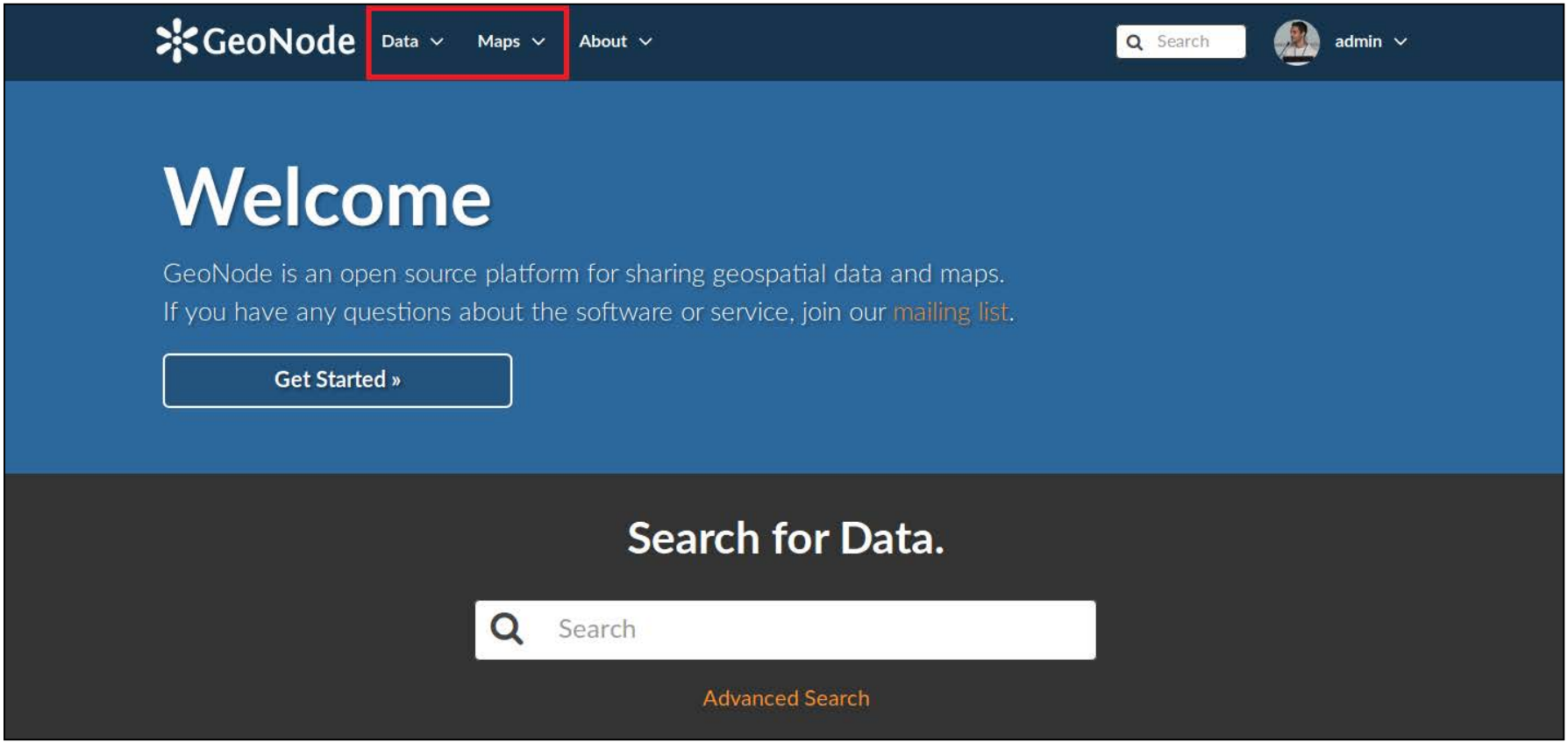
Accounts and Users

- **View the existing GeoNode users**:
  - open the About menu and click People
  - on the following window, you can view all the existing users
  - clicking on one user, you can:
    - access his personal information
    - access the list of resources (layers, maps and documents) owned by that user
    - send a message to that user and see his activities



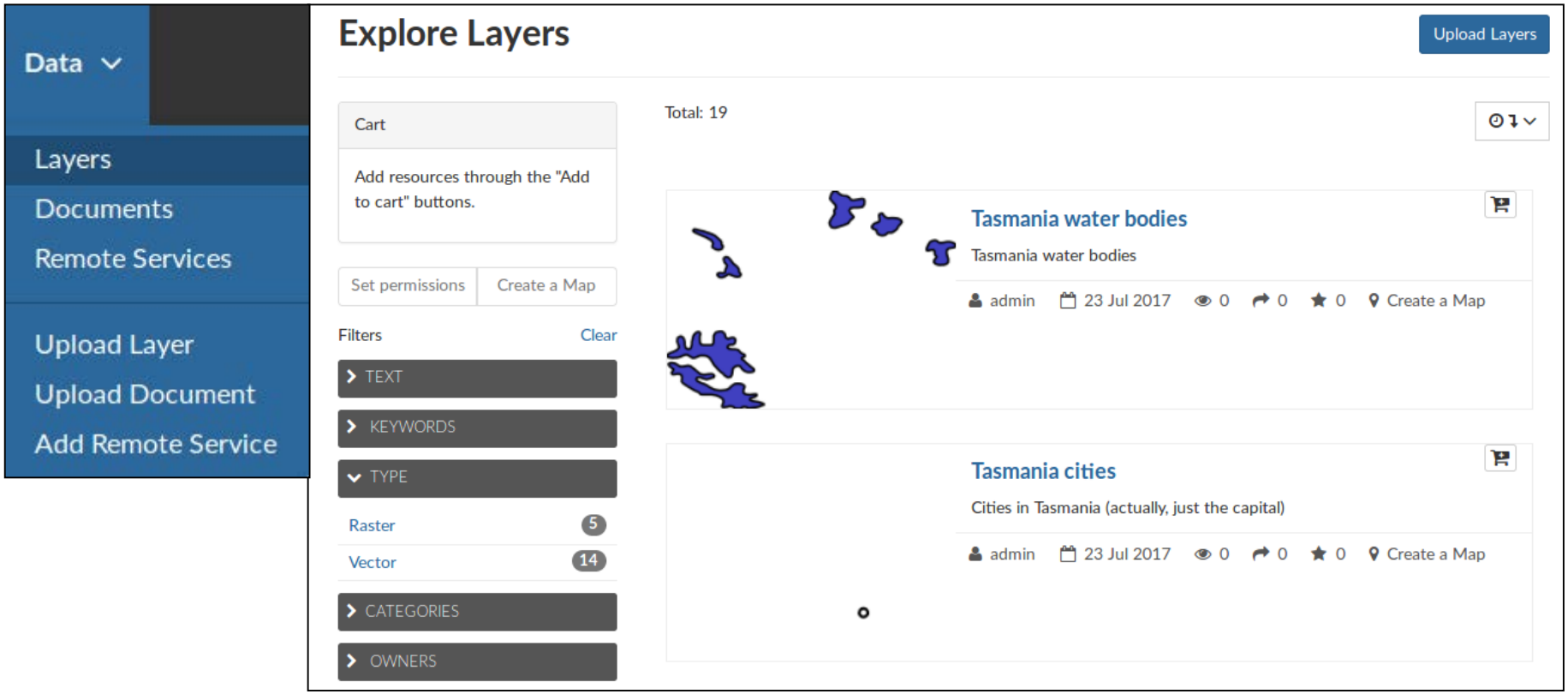
Data Types in GeoNode

- The toolbar at the top of the Welcome page shows quick links to the GeoNode data types:
  - layers, maps and documents



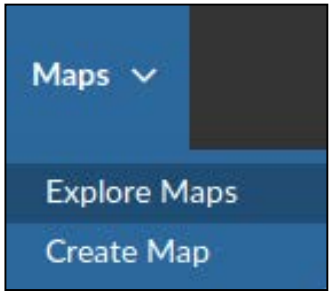
GeoNode Layers

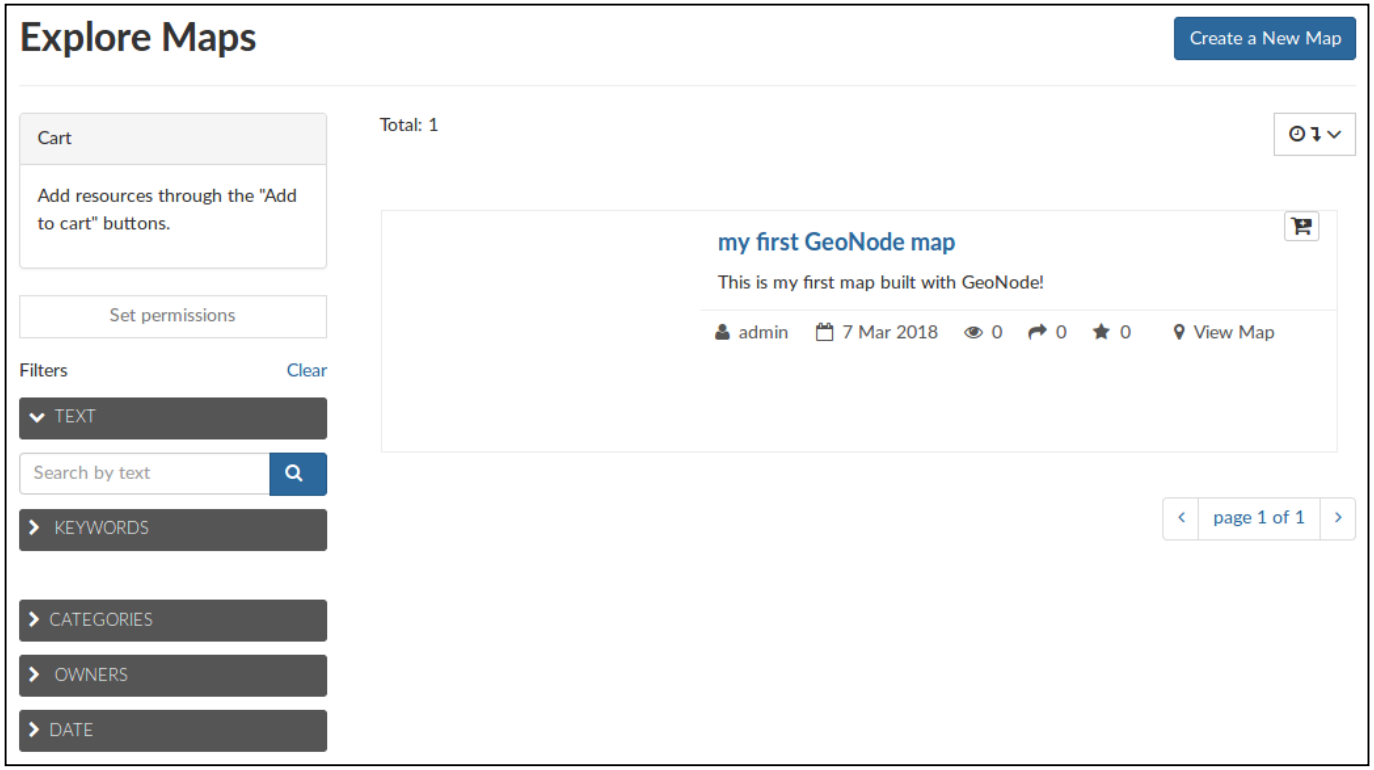
- Layers are publishable resources representing raster/vector spatial data sources:
  - they can be associated with metadata, ratings and comments
- To access the available layers, open the Data menu and click Layers



GeoNode Maps

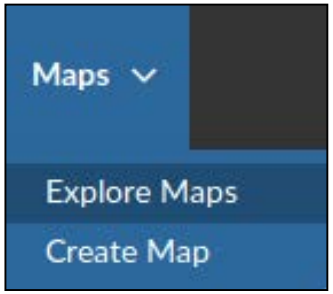
- Maps are compositions of layers (with their styles):
  - local layers & remote layers (from WMS servers or commercial providers)
- To access the available maps, open the Maps menu and click Explore Maps

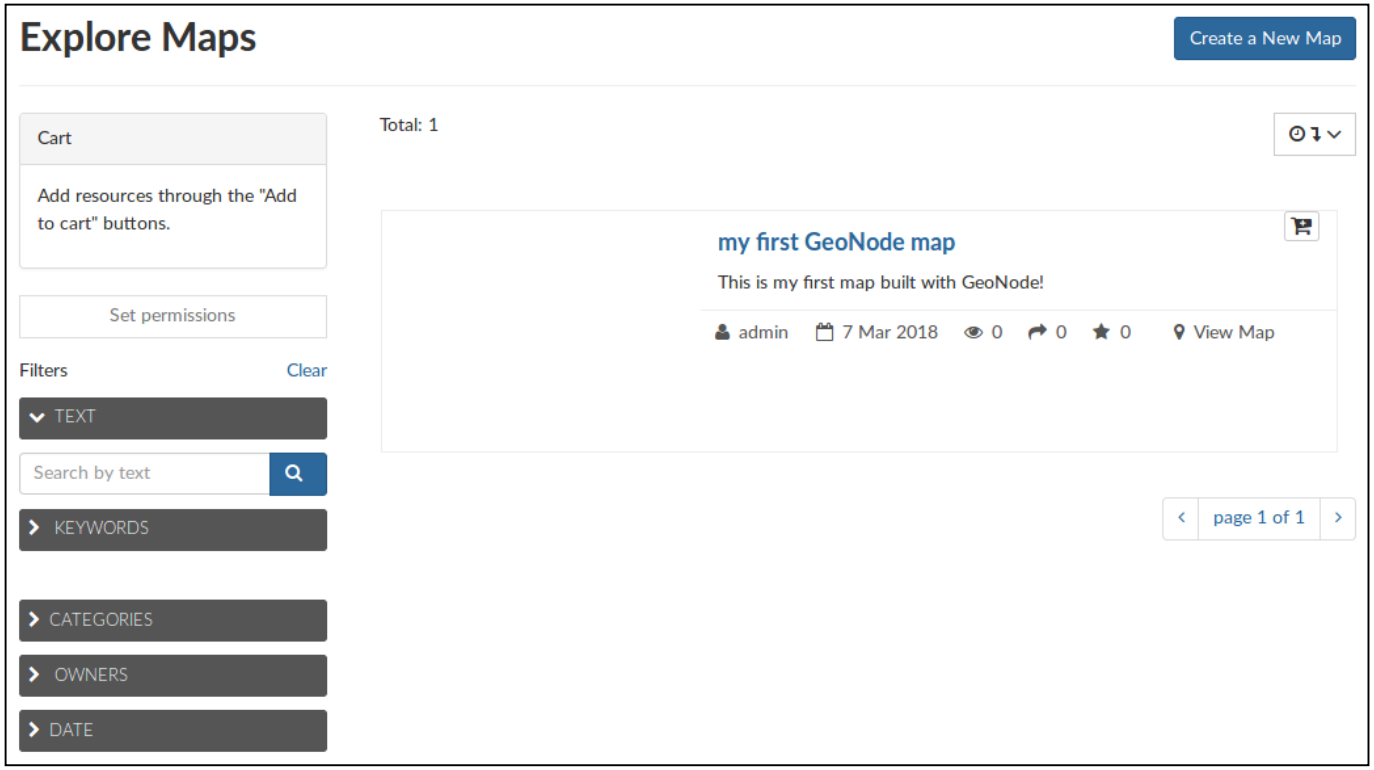




GeoNode Documents

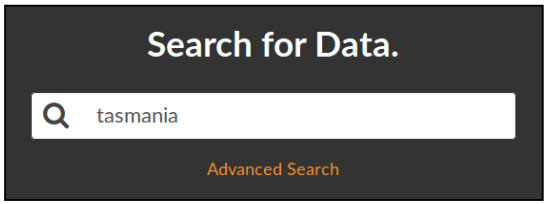
- Documents are other types of non-spatial information (e.g. tabular and text data)
  - GeoNode allows to publish documents and manage their metadata
- To access the available documents, open the Data menu and click Documents

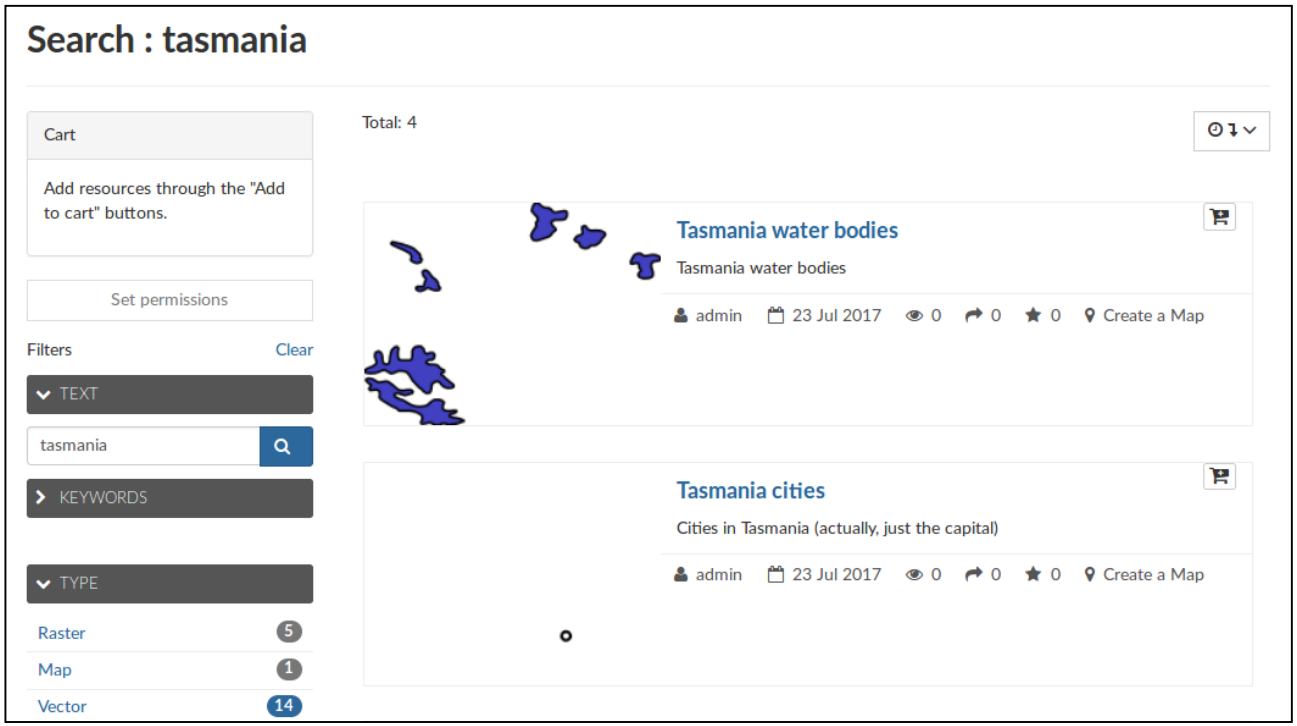




Searching Tool

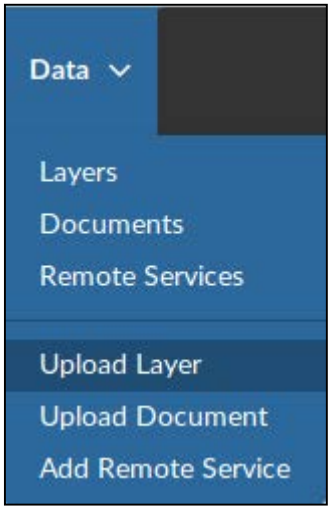
- GeoNode allows to build customized searches of available contents:
  - from the Welcome page, use the Search box to search for a specific text
  - selecting Advanced Search, you can search documents by Text, Keywords, Type, Categories, Owners, Date, Regions or Extent

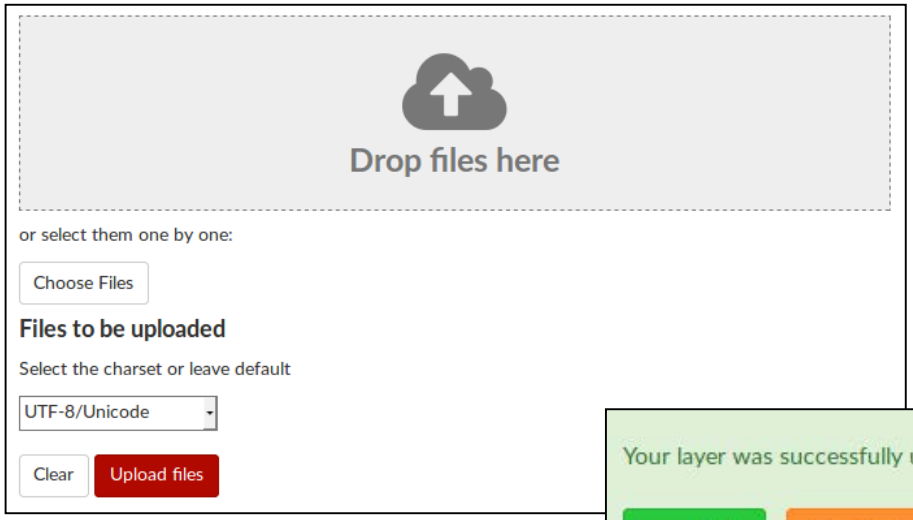




Upload Layer Tool

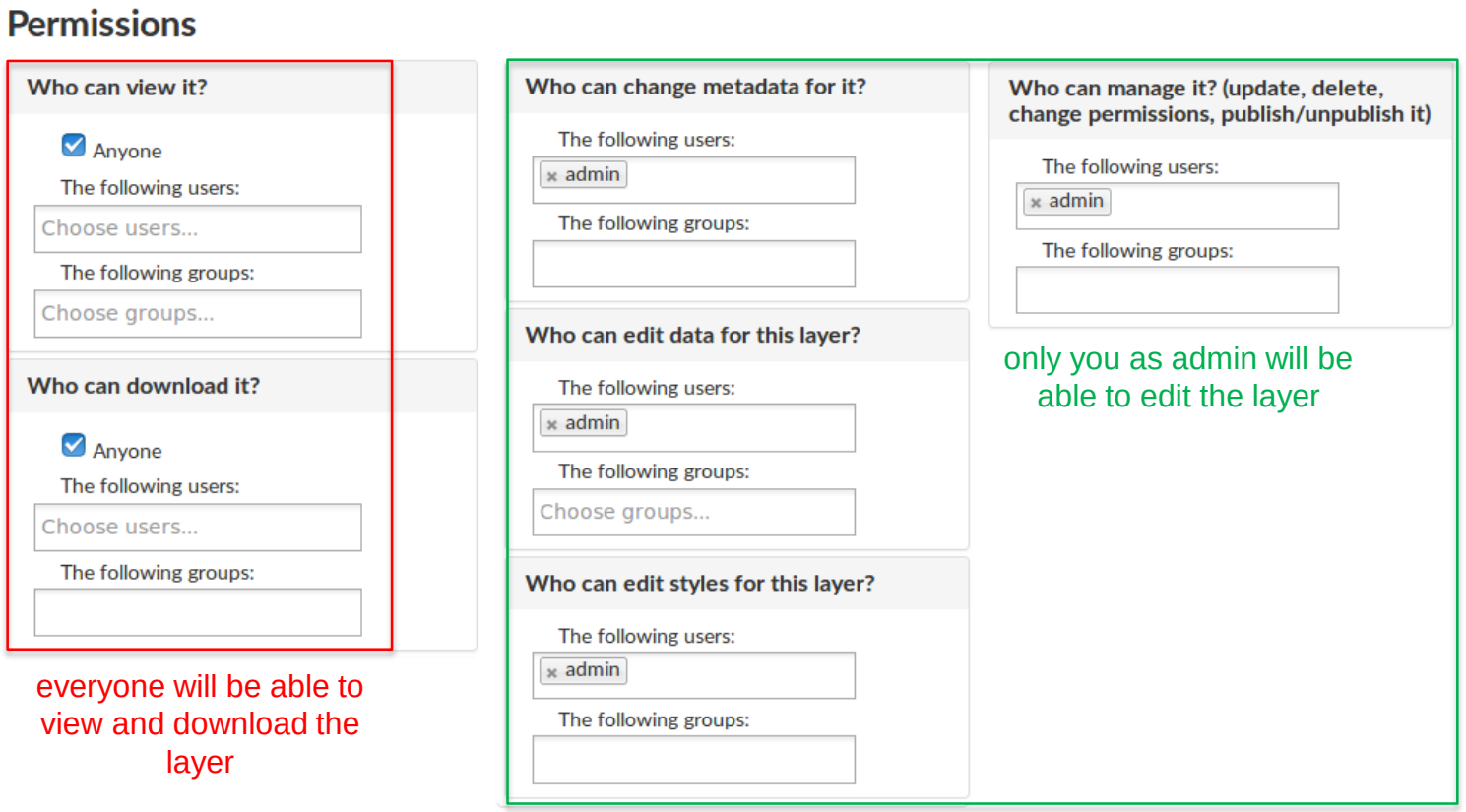
- To upload a new layer in GeoNode:
  - on the Layers page, click the Upload Layers button on the top right
  - alternatively, open the Data menu and click Upload Layers
  - on the following window, upload the 4 files of the shapefile *municipalities_2015_polygon* by either clicking the Choose Files button or dragging and dropping the four files in the Drop files here area, and clicking the Upload files button.





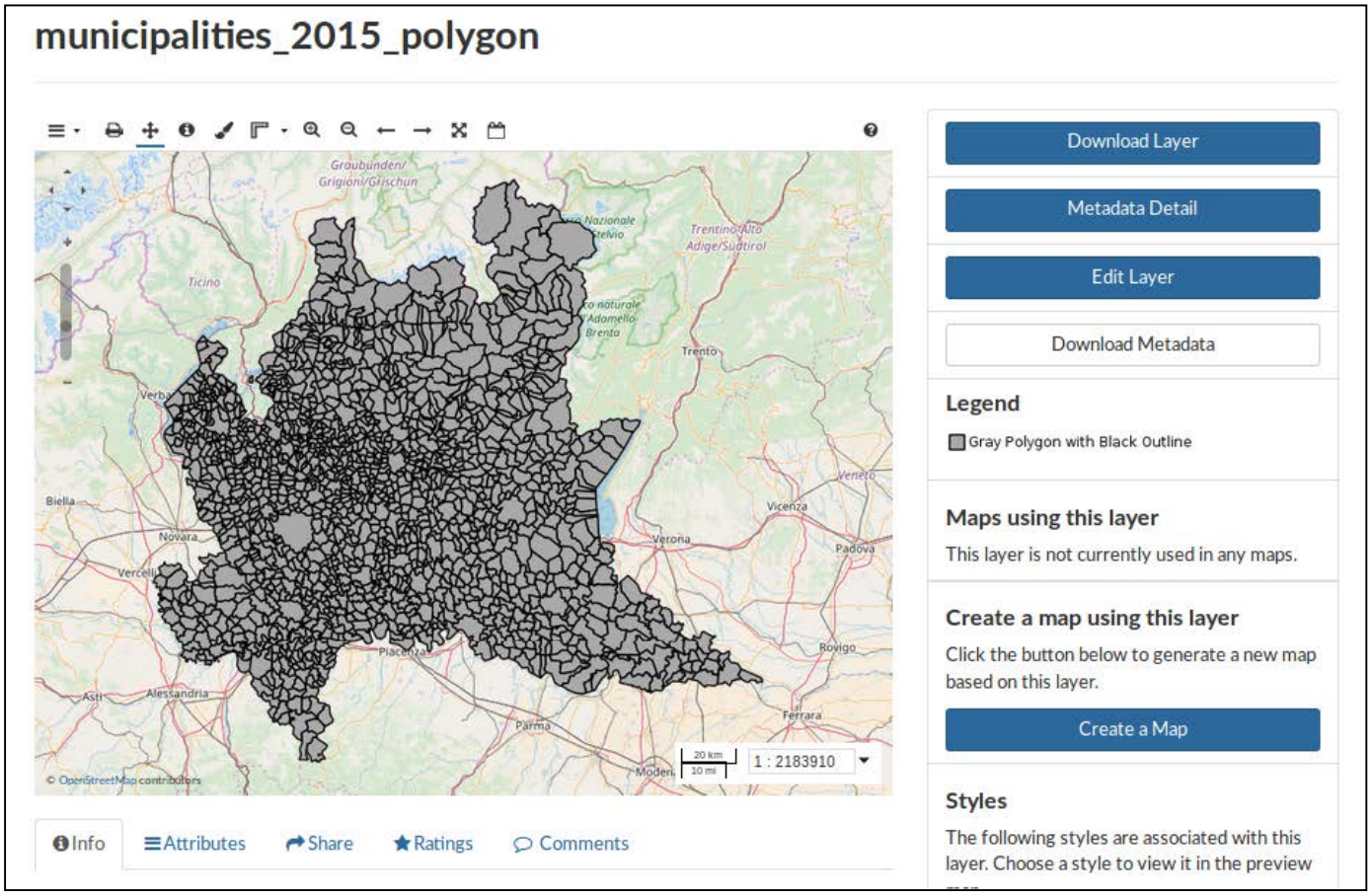
Upload Layer Tool

- Before uploading files, you can limit the access to the layer:
  - from the Permission section on the right of the page, you can restrict who can view, download, edit, and manage the layer



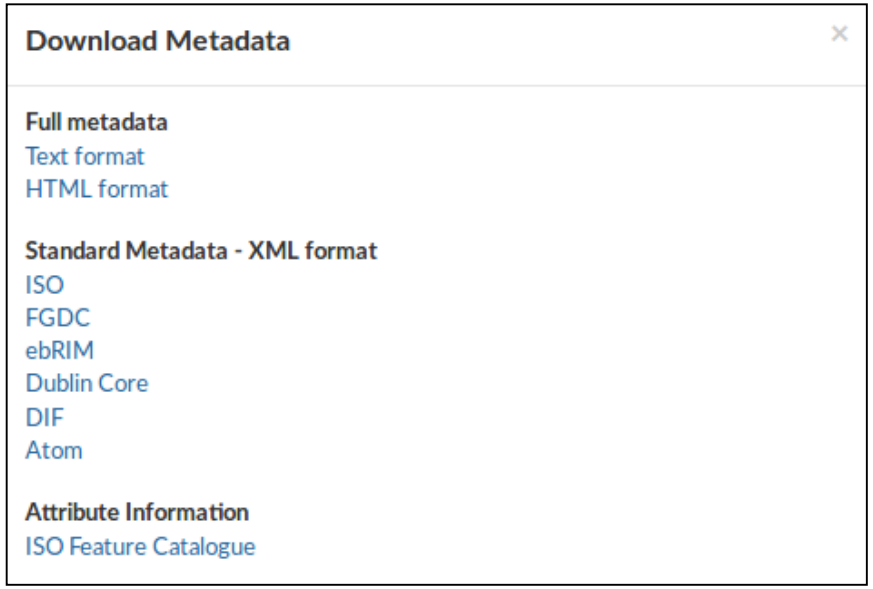
Layer Information Tool

- Once the upload has completed, click on the layer name to access its geographic preview and other related information



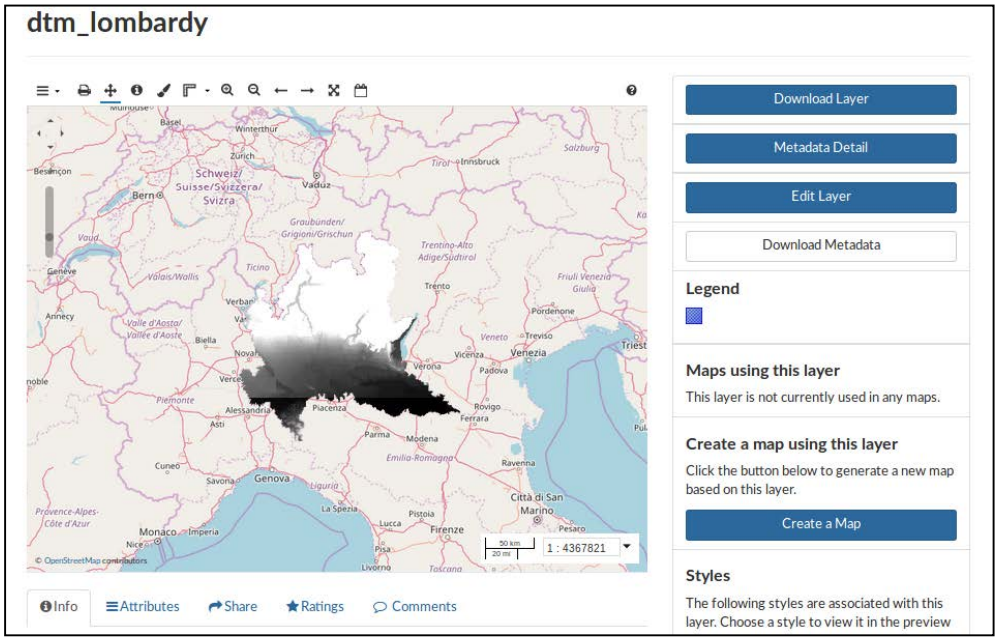
Layer Information Tool

- On the layer page:
  - click the Download Layer button to download the layer in one of the many available export formats
  - click the Metadata Detail button to visualize the metadata of the layer
  - click the Edit Layer button to edit the layer (metadata, style, thumbnail and the data itself)
  - click the Download Metadata button to download the metadata in one of the many formats/metadata standards available



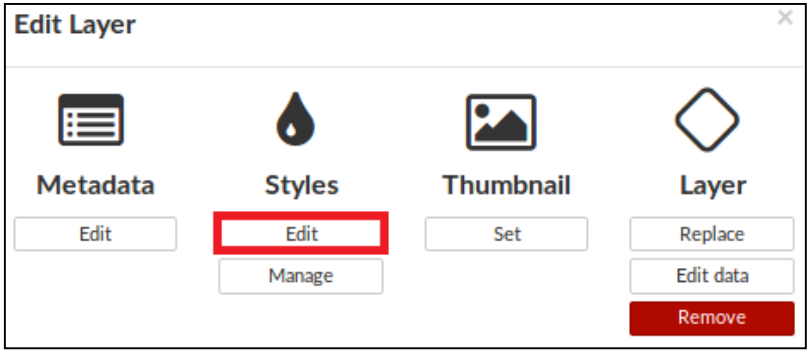
Upload Layer Tool

- Using the same procedure, create new layers from the following shapefiles:
  - main_roads
  - airports
- In the same way, create a new layer from the raster file *dtm_Lombardy.tif*

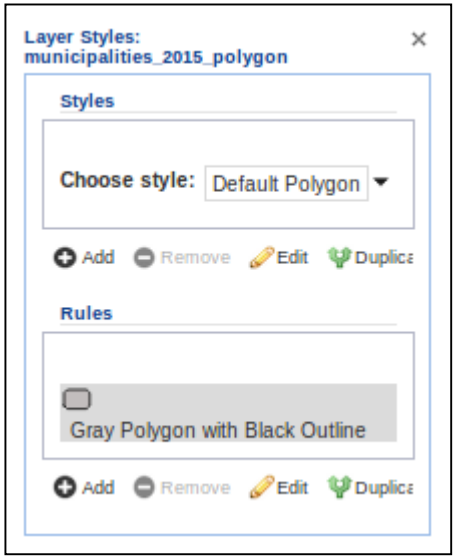


Edit layer style

- Editing a style can only be performed by users with the correct permissions:
  - from the page of a layer, click the Edit Layer button
  - click the Edit button under the Styles icon

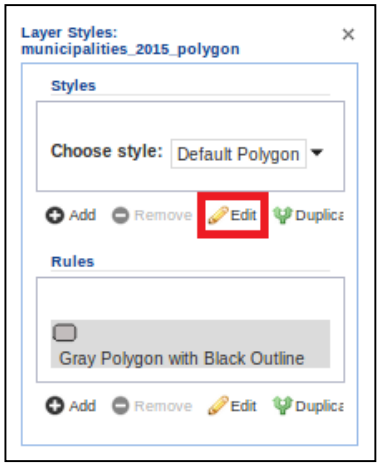


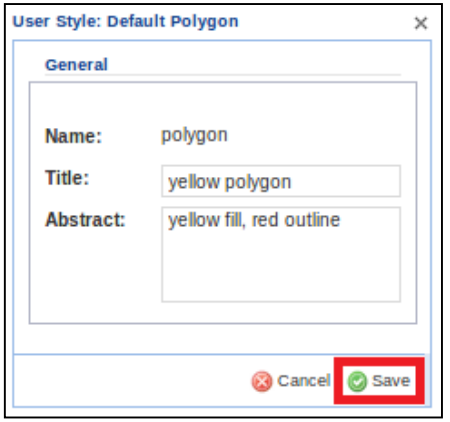
  - from the following interface, it is possible to change the style of the layer graphically, i.e. without the need of programming (no SLD styling required)

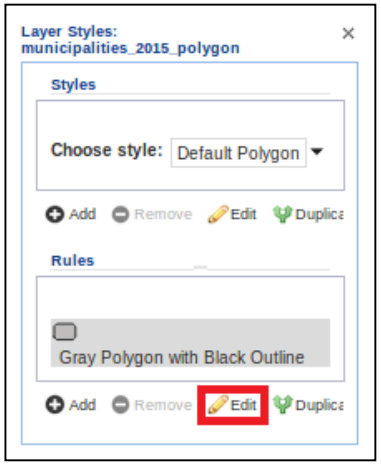


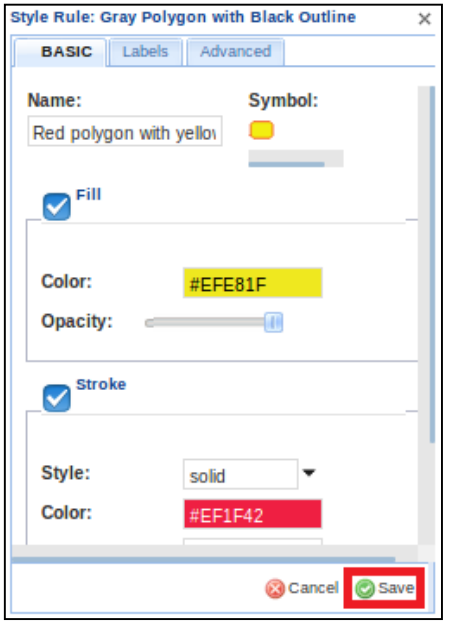
Edit layer style

- The layer *municipalities_2015_polygon* has one style and one rule:
  - click the Edit button to change the name and abstract of the style; click Save when finished
  - select the style preview and click the Edit button; on the Basic tab, change the name, fill (color and opacity) and the stroke (color, width, opacity and type of line); click Save when finished



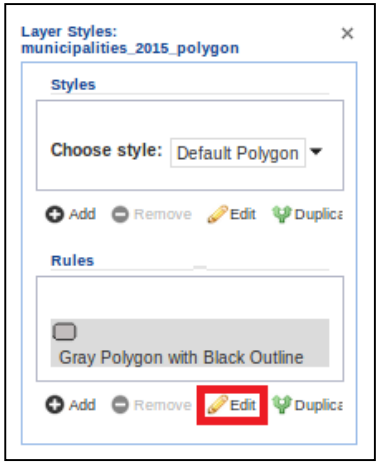


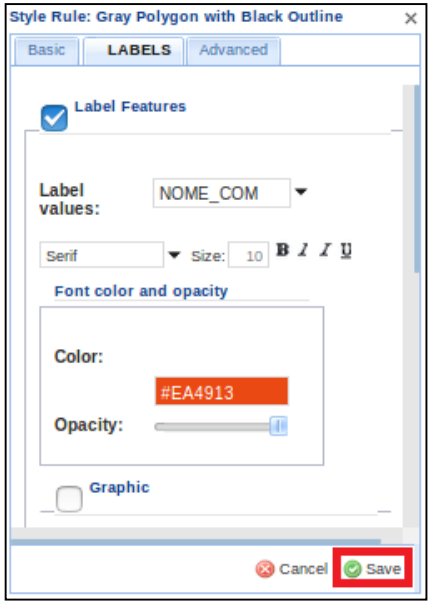


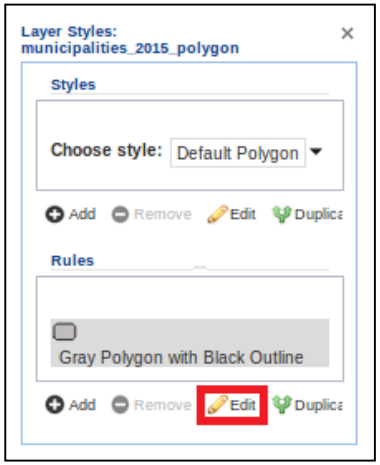


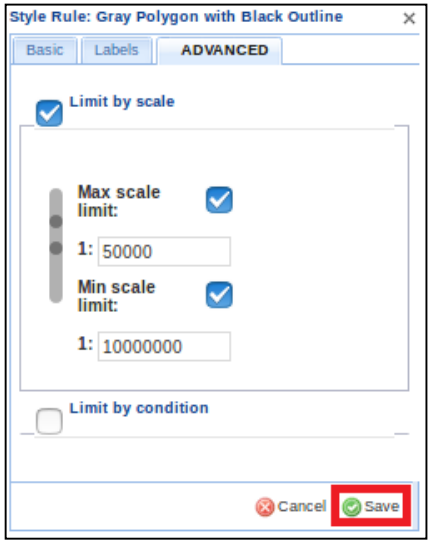
Edit layer style

- The layer *municipalities_2015_polygon* has one style and one rule:
  - select the style preview and click the Edit button; on the Labels tab, check the option Label Features, choose the field used for labels and change the parameters (font, size, color, opacity, etc.); click Save when finished
  - select the style preview and click the Edit button; on the Advanced tab, check the option Limit by scale and choose the minimum and maximum scale for layer visibility; click Save when finished



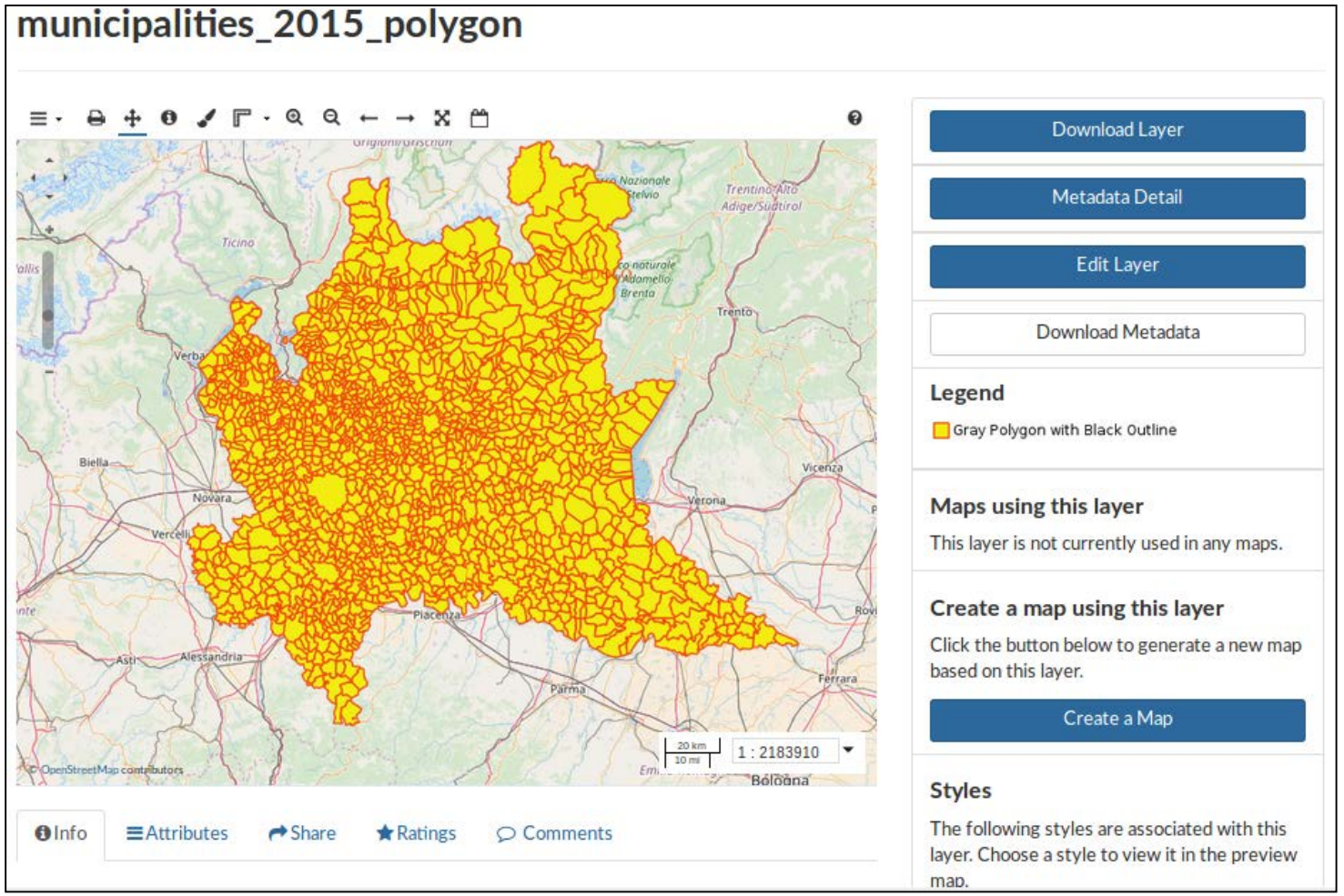






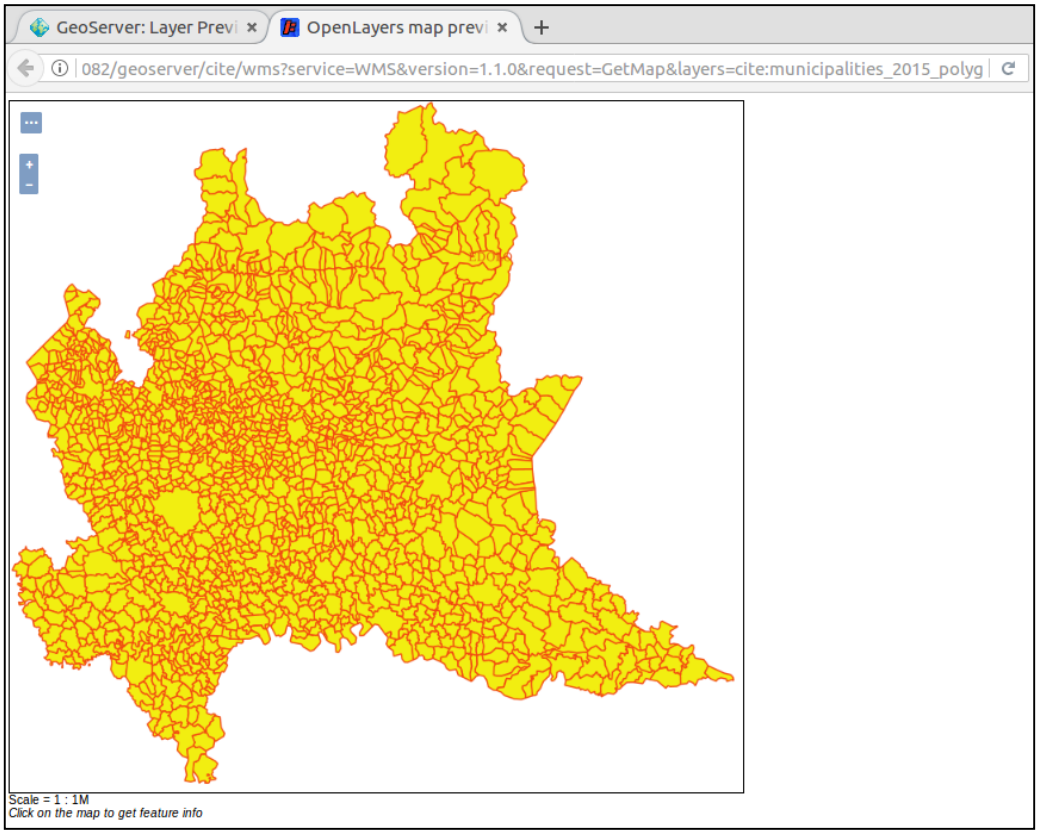
Edit layer style

- The layer *municipalities_2015_polygon* will now look like this:

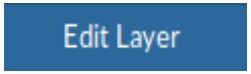


Edit layer style

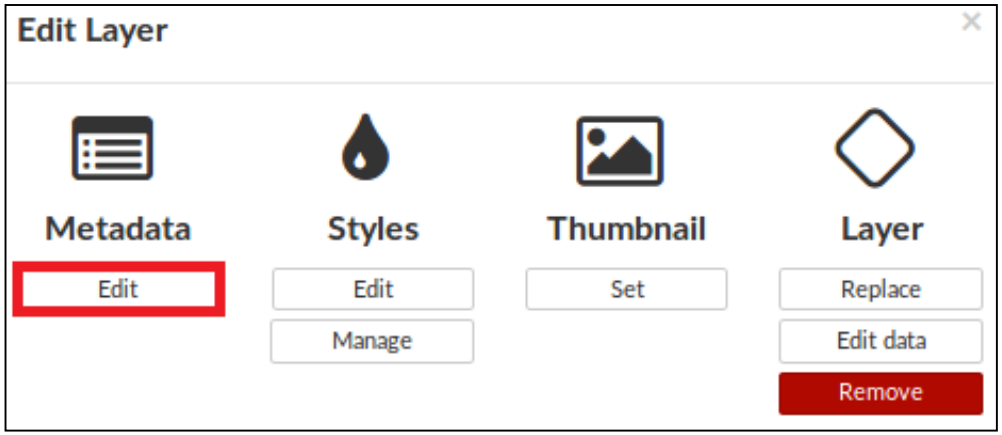
- The layer *municipalities_2015_polygon* has been published by GeoServer (which works behind GeoNode):
  - the output of a WMS GetMap request is available in GeoServer from the usual Layer Preview page
  - if additional styles are associated to the layer from GeoServer, those styles will be available under the Style menu in GeoNode



Edit layer metadata

- Metadata can be also edited once the layer has been published:
  - from the page of a layer, click the Edit Layer button 

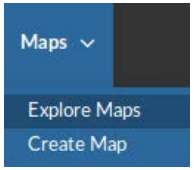
  - click the Edit button under the Metadata icon



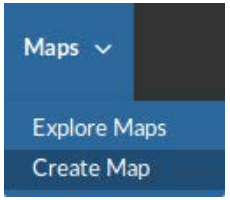
  - from the following interface, it is possible to change the metadata of the layer

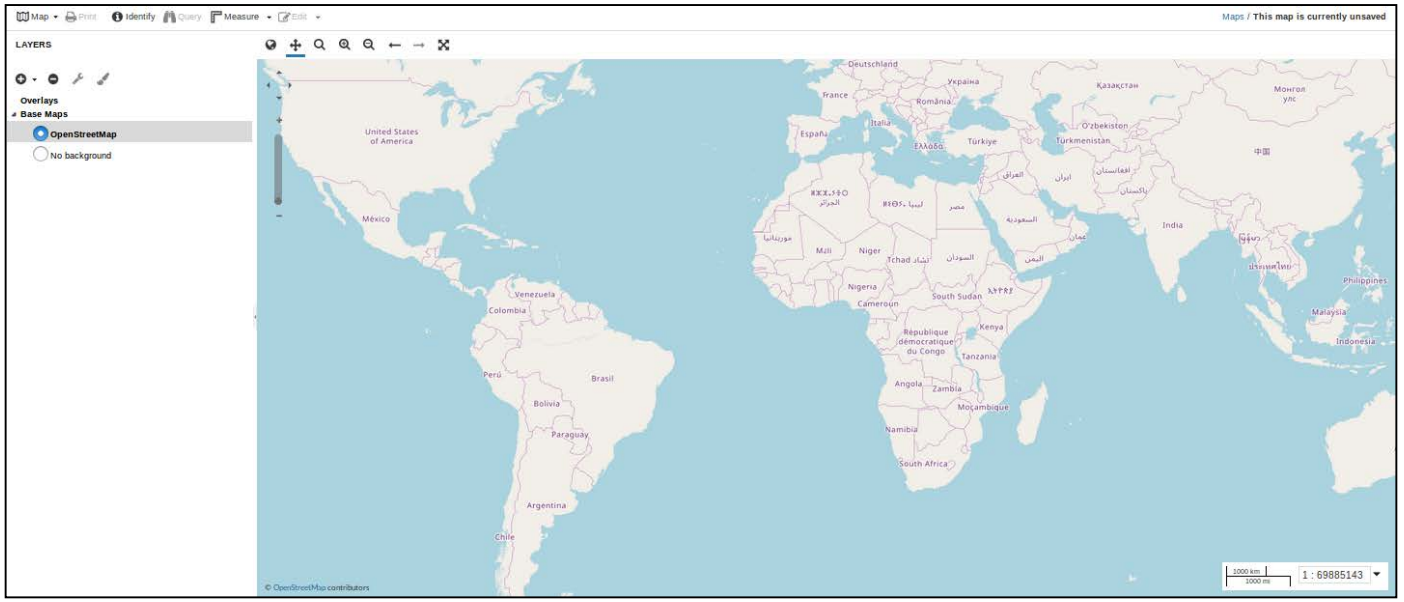
Explore and create maps

- To visualize the available maps:
  - from the Maps menu, select Explore Maps



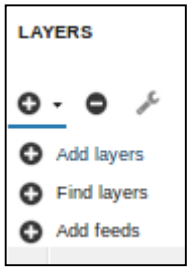
- To create a new map:
  - click the Create a New Map button 
  - alternatively, from the Maps menu select Create Map
  - a map composition interface will display

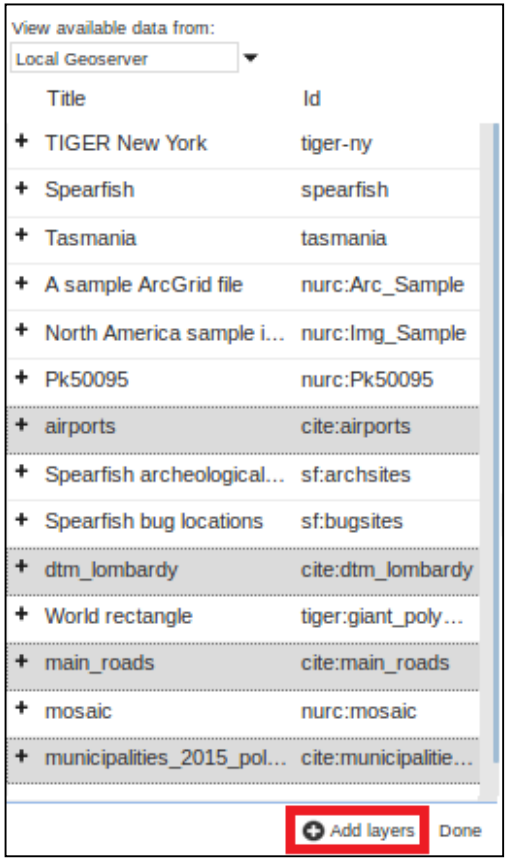




Add layers to a map

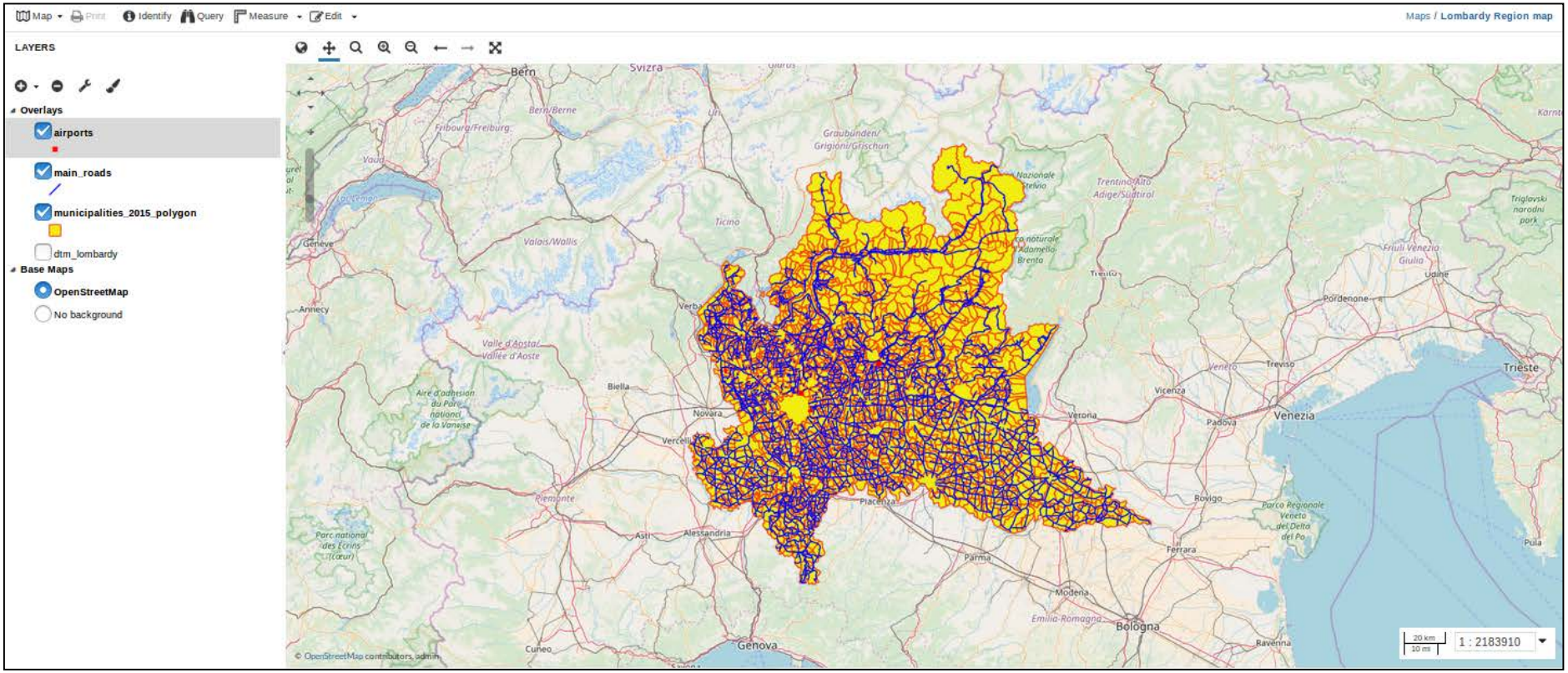
- To add layers to the map:
  - click the Add layers button and select Add layers
  - selecting Local Geoserver as the source of layers, you can see all the available layers, including those added before
  - select the layers by clicking the first entry and then press Ctrl while clicking the rest
  - click Add layers to add them all to the map





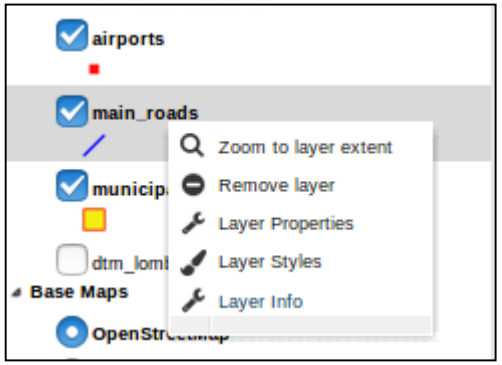
Add layers to a map

- The layers are added to the map, which is centered on their maximum extent:
  - on the layer tree, drag the layers to change their visualization order
  - check/uncheck the layers to turn them on/off



Edit layers from the map interface

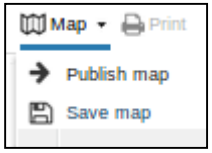
- It is possible to edit layer properties from the map interface:
  - on the layer tree, right click on the layer name to access the list of available operations on that layer



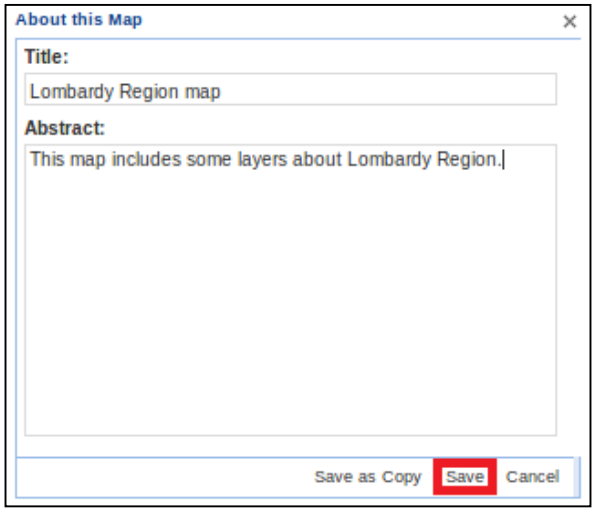
  - the same operations are available from the toolbar located above the layer tree

Save maps

- To save the map in GeoNode:
  - click the Map button and select Save map



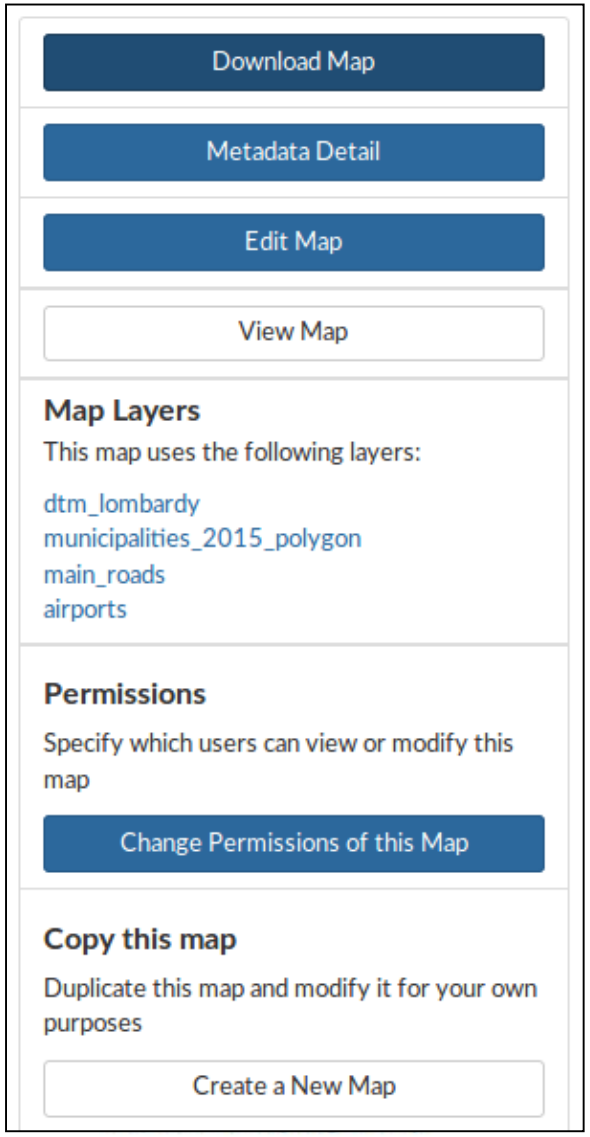
  - enter a title and abstract for the map and press Save



  - the link on the top right of the page has changed to reflect the map's name; this link contains a permalink to the map, i.e. if you open this link, your map will appear exactly as it was saved

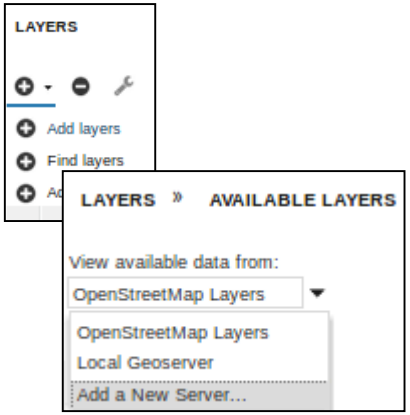
Map information

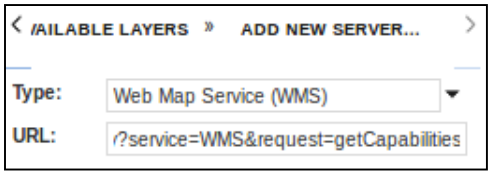
- On the map page:
  - click the Download Map button to download the map layers or the map visualization according to the OGC Web Map Context (WMC) standard
  - click the Metadata Detail button to visualize the metadata of the map
  - click the Edit Map button to edit the map (metadata, style, thumbnail and the data itself) or to remove the map
  - click the Change Permissions of this Map button to restrict who can view, download, edit, and manage the map
  - click the Create a New Map button to create a new map starting from this map

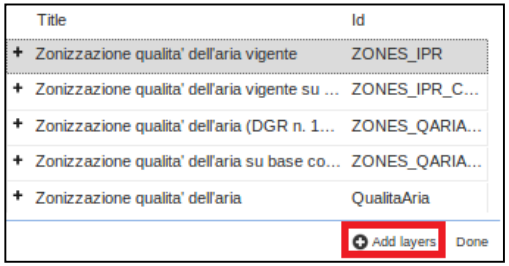


Add external WMS layers to the map

- To add external WMS layers to the map:
  - click the Add layers button and select Add layers
  - on the drop-down menu, select Add a New Server
  - as Type of server, select Web Map Service (WMS)
  - as URL of the WMS server, enter the following one (air quality zoning, from Piedmont Region, Italy): http://geomap.reteunitaria.piemonte.it/ws/siradec/rp-01/siradecwms/wms_srrqa_zones_airquality?service=WMS&request=getCapabilities and click Add Server
  - select the layer with Id ZONES_IPR and click Add layers

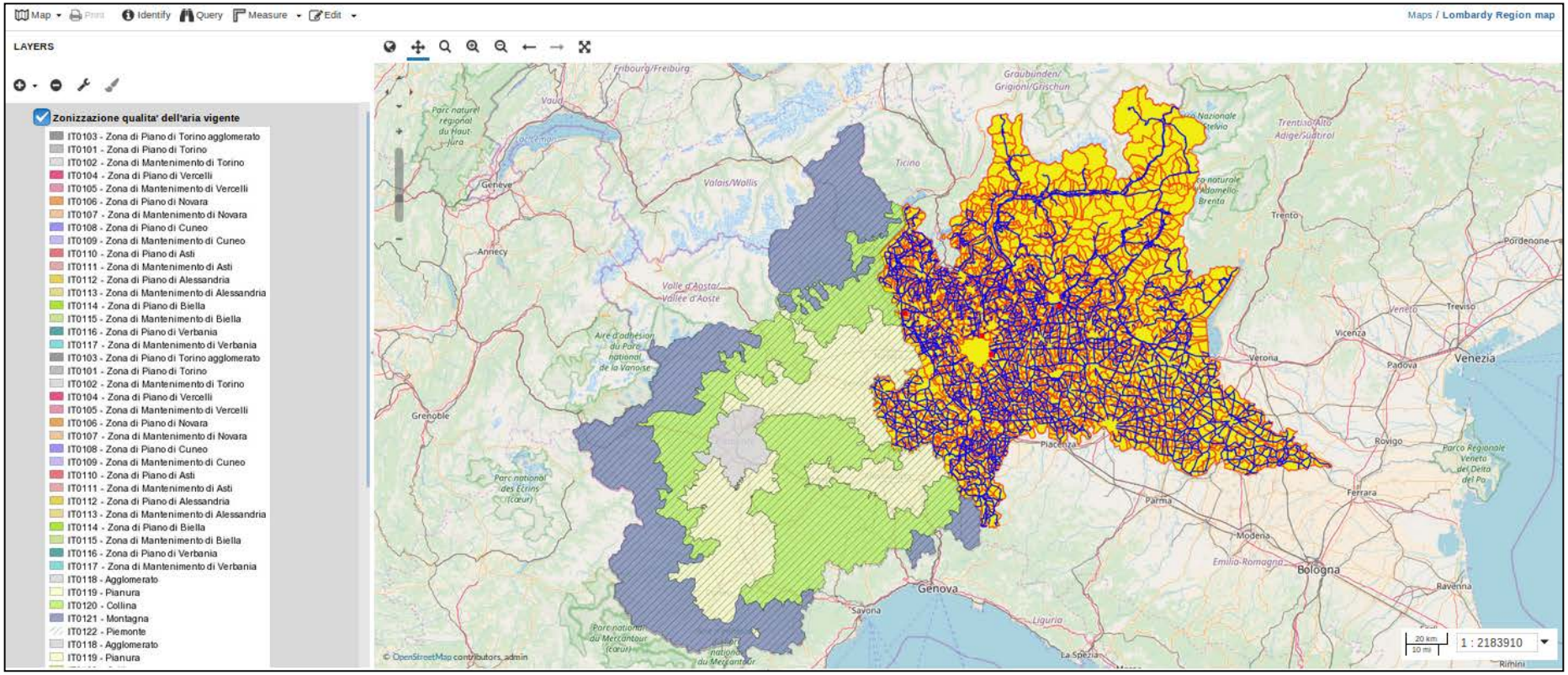






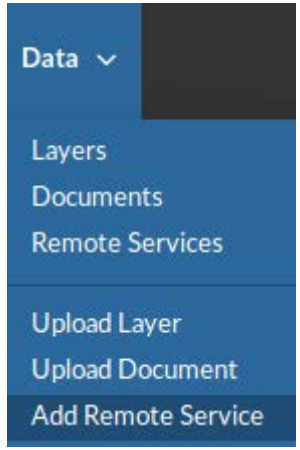
Add external WMS layers to the map

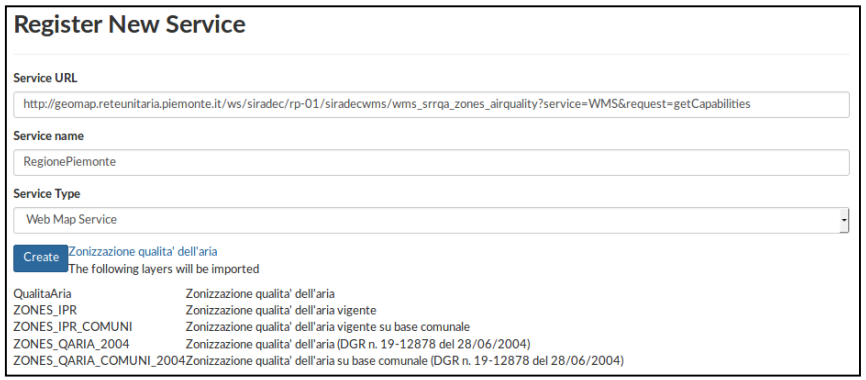
- The new WMS layer is added to the map:
  - save the map again to take into account the presence of the new layer



Add external WMS layers to GeoNode

- External services can be directly added in GeoNode so that they are available for inclusion in any map:
  - from the Data menu, select Add Remote Service
  - specify the Service URL, the Service name and the Service Type and press Create; all the available layers will be added
  - clicking on the service name, a new page will show the details of the layers

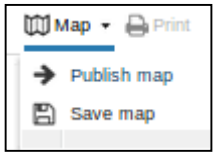




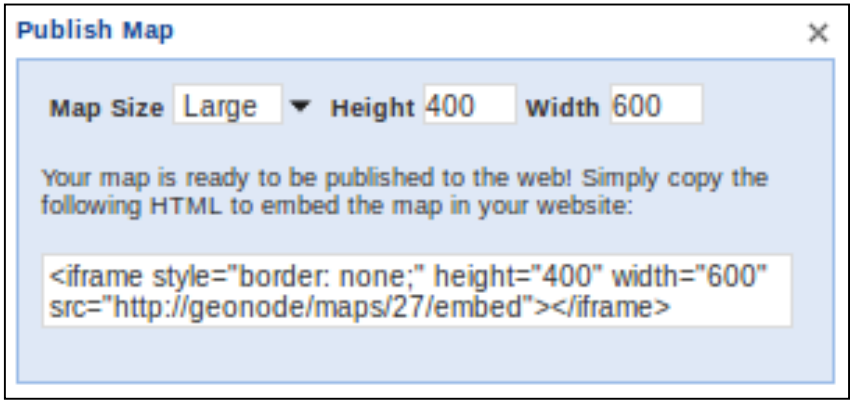
  - the list of available remote services is available from the menu Data > Remote Services

Share maps

- Maps created in GeoNode can be embedded in any webpage:



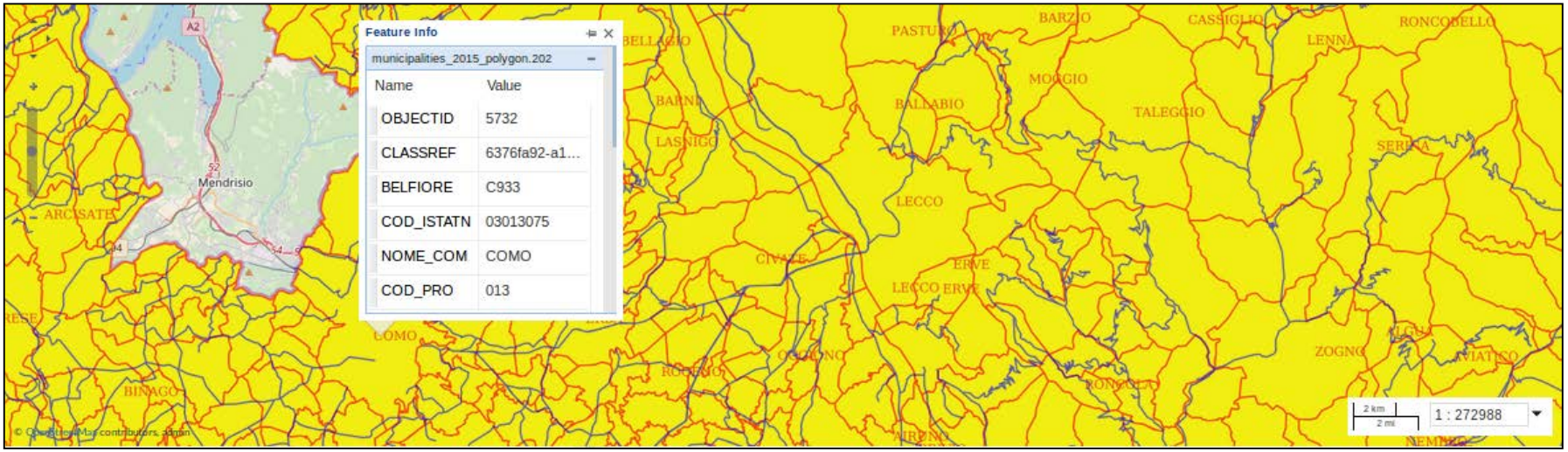
  - click the Map button and select Publish map
  - make any adjustments to the title and abstract created before, and click Save
  - a new dialog appears with instructions on how to embed this map in a webpage, including a code snippet; you can adjust the parameters as necessary



Map Toolbar

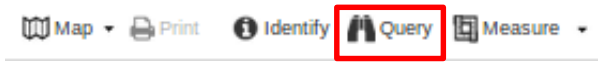
- The toolbar on the top left of the map interface provides additional functions:
  - select a layer on the layer tree

  - click the Identify button and select on the map a feature of the selected layer
  - you will access the content of the attribute table for that feature (or the pixel information, if the layer is a raster)

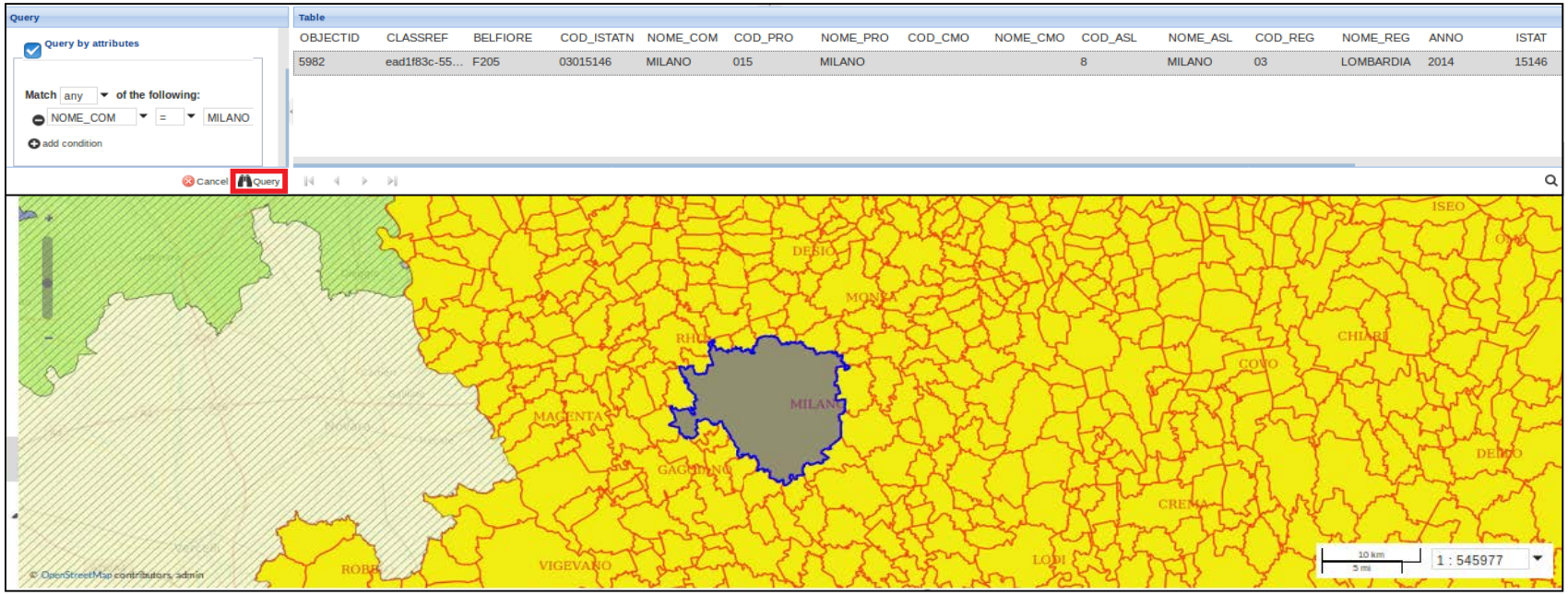


Map Toolbar

- The toolbar on the top left of the map interface provides additional functions:
  - select a layer on the layer tree

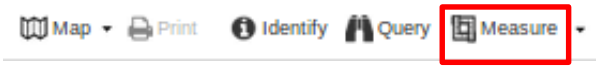


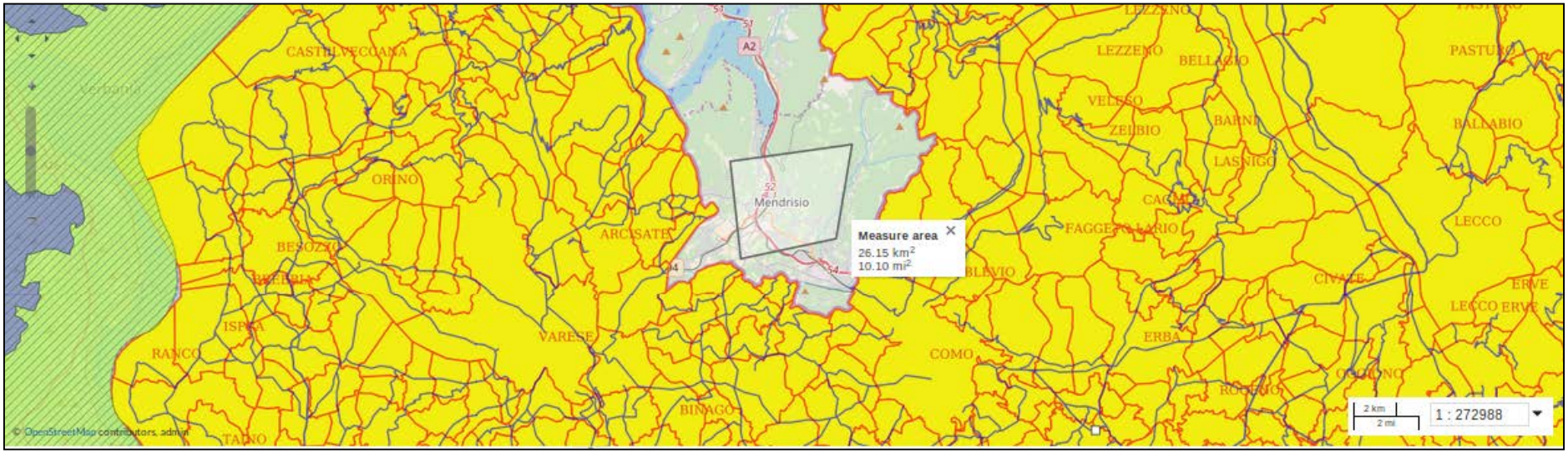
  - click the Query button and and compose a query on the selected layer
  - the result of the query will be displayed on the attribute table and the map



Map Toolbar

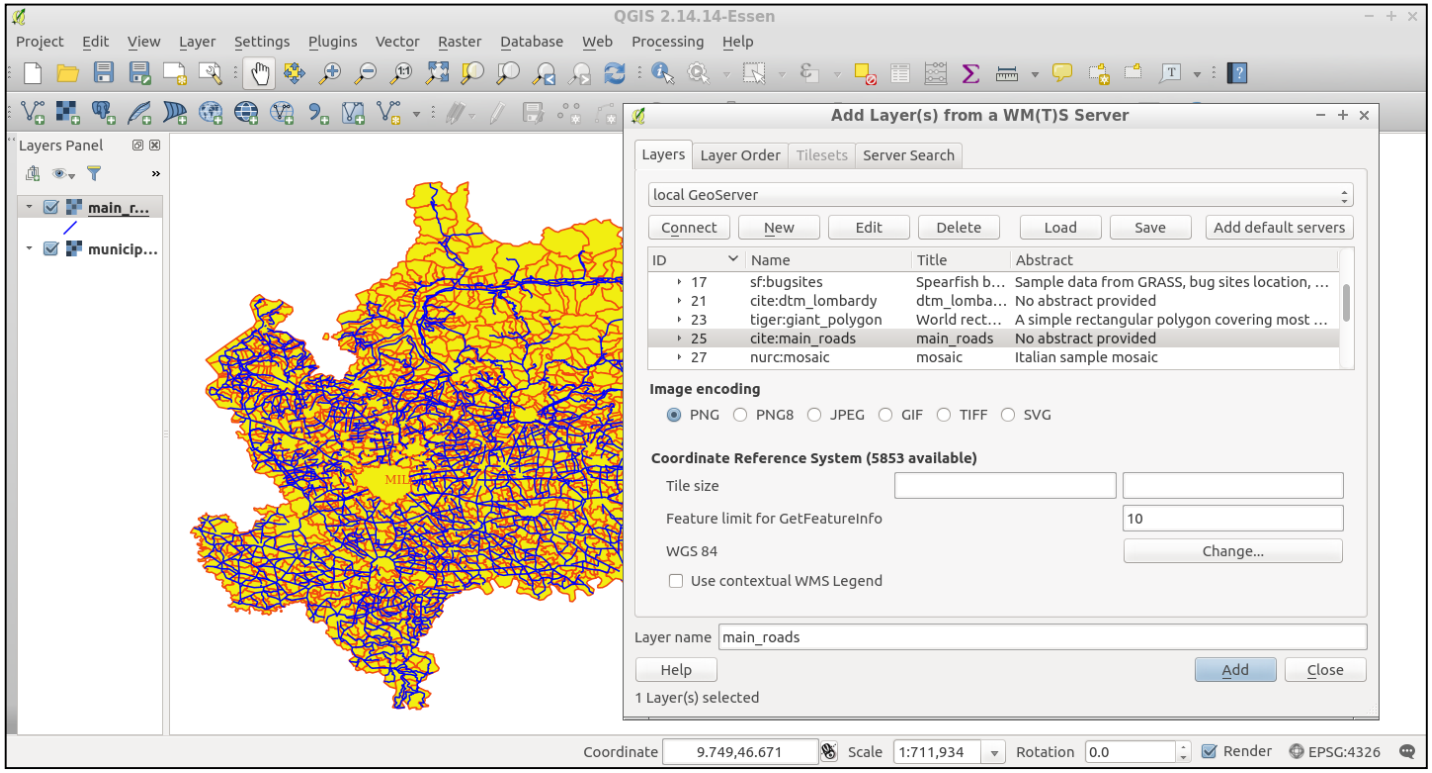
- The toolbar on the top left of the map interface provides additional functions:
  - select a layer on the layer tree
  - click the Measure button and Select Length or Area depending on the variable you want to measure
  - on the map, draw a polyline (for the length) and a polygon (for the area) and look at the result of the measure





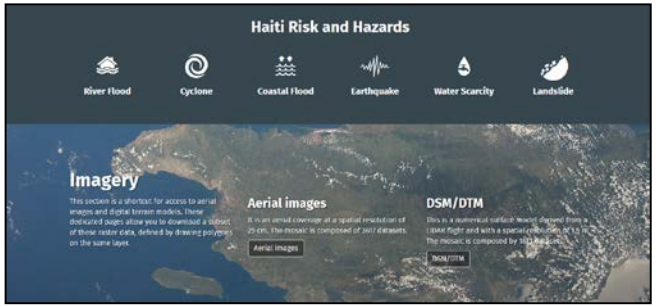
Use GeoNode with other applications

- Being based on OGC services (provided by GeoServer), GeoNode can be easily used with any other application based on the same services:
  - in QGIS, all layers uploaded in GeoNode are available as WMS/WFS/WCS:



Gallery

- GeoNode is used by many subjects and institutions for humanitarian, development, and environmental missions:
  - State GeoNode – U.S. Department of State: http://geonode.state.gov
  - United Nations World Food Programme: https://geonode.wfp.org
  - Syria Damage Assessment – EU JRC: http://geonode.jrc.ec.europa.eu
  - Caribbean Risk Atlas – University of the West Indies (UWI) & World Bank: http://cariska.mona.uwi.edu
  - HaitiData.org – The World Bank: http://haitidata.org



http://geonode.org/gallery

References & contacts

- GeoNode official website: http://geonode.org
- GeoNode users workshop: http://docs.geonode.org/en/latest/tutorials/users
- GeoNode OSGeo Live quickstart: https://live.osgeo.org/en/quickstart/geonode_quickstart.html

Thank you!

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