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Welcome to GeoNode’s Documentation.

GeoNode is an Open Source, Content Management System (CMS) for geospatial data. It is a web-based application and platform for developing geospatial information systems (GIS) and for deploying spatial data infrastructures (SDI).
1.1 What is GeoNode

GeoNode is a geospatial content management system, a platform for the management and publication of geospatial data. It brings together mature and stable open-source software projects under a consistent and easy-to-use interface allowing non-specialized users to share data and create interactive maps.

Data management tools built into GeoNode allow for integrated creation of data, metadata, and map visualization. Each dataset in the system can be shared publicly or restricted to allow access to only specific users. Social features like user profiles and commenting and rating systems allow for the development of communities around each platform to facilitate the use, management, and quality control of the data the GeoNode instance contains.

It is also designed to be a flexible platform that software developers can extend, modify or integrate against to meet requirements in their own applications.

1.1.1 Showcase

A handful of other Open Source projects extend GeoNode’s functionality by tapping into the re-usability of Django applications. Visit our gallery to see how the community uses GeoNode: GeoNode Showcase.

The development community is very supportive of new projects and contributes ideas and guidance for newcomers. For a live demo see also Online Demo.
1.1.2 Most useful links

General

- Project homepage: https://geonode.org
- Repository: https://github.com/GeoNode/geonode
- Official Demo: http://master.demo.geonode.org
- GeoNode Wiki: https://github.com/GeoNode/geonode/wiki
- Issue tracker: https://github.com/GeoNode/geonode-project/issues

In case of sensitive bugs like security vulnerabilities, please contact a GeoNode Core Developer directly instead of using issue tracker. We value your effort to improve the security and privacy of this project!

Related projects

- GeoNode Project: https://github.com/GeoNode/geonode-project
- GeoNode at Docker: https://hub.docker.com/u/geonode

1.2 Licensing

GeoNode is Copyright 2018 Open Source Geospatial Foundation (OSGeo).

GeoNode is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version. GeoNode is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with GeoNode. If not, see http://www.gnu.org/licenses.

1.3 Current Version and Features

GeoNode current version: 2.10.3

Main Features: State of GeoNode 2.10

1.4 Get in touch with the community

GeoNode is an open source project and contributors are needed to keep this project moving forward. Learn more on how to contribute on our Community Bylaws.

- User Mailing List: https://lists.osgeo.org/cgi-bin/mailman/listinfo/geonode-users
- Developer Mailing List: https://lists.osgeo.org/cgi-bin/mailman/listinfo/geonode-devel
- Gitter Chat: https://gitter.im/GeoNode/general
1.5 Roadmap

GeoNode’s development roadmap is documented in a series of GeoNode Improvement Projects (GNIPS). They are documented at GeoNode Wiki.

GNIPS are considered to be large undertakings which will add a large amount of features to the project. As such they are the topic of community discussion and guidance.

The community discusses these on the developer mailing list: http://lists.osgeo.org/pipermail/geonode-devel/

1.6 GeoNode Basics

GeoNode is a platform for the management and publication of geospatial data. It brings together mature open-source software projects under an easy to use interface.

1.6.1 With GeoNode, non-specialized users can share data and create interactive maps.

1.6.2 Geospatial data storage

GeoNode allows users to upload vector data (currently shapefiles, json, csv, kml and kmz) and raster data in their original projections using a web form.

Vector data is converted into geospatial tables on a DB, satellite imagery and other kinds of raster data are retained as GeoTIFFs.

Special importance is given to standard metadata formats like ISO 19139:2007 / ISO 19115 metadata standards.
Fig. 1: GeoNode simplified architecture
As soon as the upload is finished, the user can fill the resource metadata in order to make it suddenly available through the CSW (OGC Catalogue Service) endpoints and APIs.

Users may also upload a metadata XML document (ISO, FGDC, and Dublin Core format) to fill key GeoNode metadata elements automatically.

Similarly, GeoNode provides a web based styler that lets the users to change the data portrayals and preview the changes at real time.

### 1.6.3 Data mixing, maps creation

Once the data has been uploaded, GeoNode lets the user search for it geographically or via keywords in order to create fancy maps.

All the layers are automatically re-projected to web Mercator for maps display, making it possible to use different popular base layers, like Open Street Map, Google Satellite or Bing layers.

Once the maps are saved, it is possible to embed them in any web page or get a PDF version for printing.

### 1.6.4 GeoNode as a building block

A handful of other Open Source projects extend GeoNode’s functionality by tapping into the re-usability of Django applications.

Visit our gallery to see how the community uses GeoNode: GeoNode Projects.

The development community is very supportive of new projects and contributes ideas and guidance for newcomers.
MANAGEMENT AND PUBLICATION OF GEOSPATIAL DATA

RASTER DATA
- Users can upload geospatial data from different file types, including Shapefile and GeoTiff.
- Securely stores geospatial data.

VECTOR DATA
- Designed to be extended and modified; it can even be integrated into existing platforms.

METADATA
- Specialized tools to analyze geospatial data.

DATA MANAGEMENT TOOLS
1.6.5 Convinced! Where do I sign?

The next steps are:

1. Make a ride on the *Online Demo*

2. Follow the *Quick Installation Guide* in order to play with your own local instance and access all the admin functionalities

3. Read the documentation starting from the *user guide* to the *admin guide*

4. Subscribe to the geonode-users and/or geonode-devel mailing lists to join the community. See also the section *Get in touch with the community* for more info.

Thanks for your interest!

1.7 Supported Browsers

GeoNode is known to be working on all modern web browsers.

This list includes (but is not limited to):

- Google Chrome.
- Apple Safari.
- Mozilla Firefox.
- Microsoft Edge.
- Microsoft Internet Explorer.

Note: The vast majority of GeoNode developers prefer using Google Chrome.

1.7.1 Internet Explorer

Versions of Microsoft Internet Explorer older than 10, exhibit known issues when used to browse a GeoNode site. As such a message is displayed warning the user that they should upgrade their browser.

![Internet Explorer error message](image)

Fig. 2: Internet Explorer error message

1.7.2 Testing on Internet Explorer

When working on front end code, developers should take care to test carefully with Microsoft Internet Explorer to ensure that the features they are working on do indeed work correctly and on this browser. It is good practice to test on all browsers available, but the use of modern front end libraries like bootstrap and jQuery make it much more likely code will work across browsers seamlessly.

In order to test on Internet Explorer, developers can use the Modern IE site to download virtual machines for use in Oracle VM Virtual Box.

Once the VM is downloaded, follow the instructions to configure it in your VirtualBox setup.
After the VM is setup, you can access your development instance of GeoNode by visiting the IP address of your host machine or on the bridged interface (usually 10.0.2.2) and begin your testing.

1.8 Online Demo

**Note:** **Disclaimer** we do not guarantee for any data published on this Demo Site. Publish the data at your own risk. Every dataset will be removed automatically every Sunday. If you find some dataset that shouldn’t be there, please write suddenly to developers and maintainers.

See the section *Get in touch with the community* for details.


Anyone may sign up for a user account, upload and style data, create and share maps, and change permissions.

Since it is a demo site, every sunday all the datasets will be wiped out. Users, passwords and groups will be preserved.

It should hopefully allow you to easily and quickly make a tour of the main capabilities of GeoNode.

**Warning:** This GeoNode instance is configured with standards settings and a very low security level. This is a demo only not to be considered a really production ready system. For a complete list of settings, refer to the section: *Settings*
Fig. 4: *Oracle VirtualBox admin interface*
Fig. 5: Online Demo @ master.demo.geonode.org
1.9 Quick Installation Guide

1.9.1 Quick Installation Guide

Introduction

The following is a quick guide to get started with GeoNode in most common operating systems.

Note: For a full setup and deployment, please refer to the complete installation guides

This is meant to be run on a fresh machine with no previously installed packages or GeoNode versions.

Warning: The methods presented here are meant to be used for a limited internal demo only. Before exposing your GeoNode instance to a public server, please read carefully the hardening guide

Recommended Minimum System Requirements

A definite specification of technical requirements is difficult to recommend. Accepted performance is highly subjective. Furthermore, the performance depends on factors such as concurrent users, records in the database or the network connectivity of your infrastructure.

For deployment of GeoNode on a single server, the following are the bare minimum system requirements:

• 8GB of RAM.

• 2.2GHz processor with 2 cores. (Additional processing power may be required for multiple concurrent styling renderings)

• 10 GB software disk usage.

• Additional disk space for any data hosted with GeoNode and tiles cached with GeoWebCache. For spatial data, cached tiles, and “scratch space” useful for administration, a decent baseline size for GeoNode deployments is between 50GB and 100GB.

• 64-bit hardware strongly recommended.

OSGeo Live CD

OSGeoLive is a self-contained bootable DVD, USB thumb drive or Virtual Machine based on Lubuntu, that allows you to try a wide variety of open source geospatial software without installing anything.

It is composed entirely of free software, allowing it to be freely distributed, duplicated and passed around.
GeoNode Documentation, Release 2.10

It provides pre-configured applications for a range of geospatial use cases, including storage, publishing, viewing, analysis and manipulation of data.

It also contains sample datasets and documentation.

To try out the applications, simply:

• Insert DVD or USB thumb drive in computer or virtual machine.
• Reboot computer. (verify boot device order if necessary)
• Press Enter to startup & login.
• Select and run applications from the Geospatial menu.

OSGeoLive is an OSGeo Foundation project. The OSGeo Foundation is a not-for-profit supporting Geospatial Open Source Software development, promotion and education.

Install via Ansible

Ansible is an open source automation tool for server configuration and management. It works by organizing your server inventory into groups, describes how those groups should be configured or what actions should be taken on them. We can use ansible for installing GeoNode-project on one or many servers.

• Manual installation of geonode-project by use of Ansible

Install via Docker

Docker is a free software platform used for packaging software into standardized units for development, shipment and deployment.

Note: credits to Docker

Introducing main concepts

A container image is a lightweight, stand-alone, executable package of a piece of software that includes everything needed to run it: code, runtime, system tools, system libraries, settings.

Docker containers running on a single machine share that machine’s operating system kernel; they start instantly and use less compute and RAM.

Containers can share a single kernel, and the only information that needs to be in a container image is the executable and its package dependencies, which never need to be installed on the host system.

Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space.

The following tutorials will introduce the use of Docker community edition on:

• Ubuntu 18.04
• CentOS 7.0

GeoNode provides also an advanced stack of Docker containers for a more stable, production-like setup:

• SPCGeoNode

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1.10 GeoNode Users Guide

1.10.1 Accounts and User Profile

In GeoNode many contents are public so unregistered users have read-only access to public maps, layers and documents. In order to create maps, add layers or documents, edit the data and share these resources with other users, you need to sign in.

GeoNode is primarily a social platform, thus a primary component of any GeoNode instance is the user account.

This section will guide you through account registration, updating your account information and preferences, connections with social networks and email addresses.

Creating a New Account

To take full advantage of all the GeoNode features you need an user account. Follow these step to create a new one.

1. From any page in the web interface, you will see a Register link. Click that link, and the register form will appear.

   **Note:** The registrations in GeoNode must be open, in case you don’t see the register link then it’s not possible to register unless the administrator of the site does that for you.

   ![Sign in screen](image)

   **Fig. 6: Sign in screen**

2. On the next page, fill out the form. Enter a user name and password in the fields. Also, enter your email address for verification.

3. You will be automatically logged in and redirected to the Profile page. An email will be sent confirming that you have signed up. If no errors occur during the registration, the following alerts will appear on the screen:

To logout click on the Log out link of the user menu.

You have to confirm this action as described in the picture below.

Updating the Profile

Once having an account you can enrich your profile with useful information, you can also edit or delete the existing ones. You can connect the account with your social network, associate many e-mail addresses to it and manage many options such as preferences about notifications.

You can update these information anytime from your Profile page, it is accessible from the user menu.
Fig. 7: Registering for a new account

Fig. 8: Alerts
Fig. 9: *Logout link*

Fig. 10: *Confirm Log out*
So, click on your user name in the top right of the screen. A drop-down list will show. Click on Profile to enter the Profile settings page.

![Link to your profile](https://example.com/image.png)

**Fig. 11: Link to your profile**

The Profile page looks like the one shown in the picture below.

Your personal information are shown under the username. At the bottom of the page are listed all the resources associated to your Profile, you can decide to view only layers or maps or documents by clicking on the corresponding tab.

Through the link User layers WMS GetCapabilities document you can retrieve an XML document with the list of the available layers.

On the right side of the page there are many useful links to edit personal information, to upload and create layers or maps, to update your Profile settings and to get in touch with other GeoNode users.

The Favorites link, also accessible from the user menu, drive you to the list of the resources marked as your favorites. Click the Delete from Favorites button to remove the resource from the list.

The My Activities link allows to see all your recent activities on GeoNode such as layers uploading and maps creation. This link is also available in the user menu.

All other links and their functionalities will be described in depth in the following sections.

**Editing Profile Information**

Your Profile contains personal information such as your address, your telephone number, your organization and so on but it is empty by default at the beginning.

Through the Edit profile button of the Profile page (see Updating the Profile) you can set your details, including your avatar.
Fig. 12: User profile page
Fig. 13: Favorites

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Delete from Favorites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle_Routes_polyline</td>
<td>layer</td>
<td></td>
</tr>
<tr>
<td>Tuscany roads</td>
<td>map</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 14: Recent activities

- johnsmith created OSM Railways by johnsmith 21 minutes ago
- johnsmith uploaded geonode:railways 22 minutes ago
Edit Your Profile

First name
John

Last name
Smith

Email address
john.smith@mail.com

Organization Name
- John Smith Foundation
name of the responsible organization

Profile
John Smith profile

Introduce yourself

Position Name
CEO and Founder
role or position of the responsible person

Voice
123456789
telephone number by which individuals can speak to the responsible organization or individual

Facsimile
987654321
telephone number of a facsimile machine for the responsible organization or individual

Delivery Point
John Smith Avenue
physical and email address at which the organization or individual may be contacted

City
John Smith City
city of the location

Administrative Area
John Smith District
state, province of the location

Postal Code
12345
ZIP or other postal code

Country
South Africa
country of the physical address

A space or comma-separated list of keywords

Language
When finished, click *Update profile*. You will be redirected to the *Profile* page. A message will confirm the profile has been correctly updated.

![Profile johnsmith updated.](image)

**Fig. 16: Updating Profile correctly finalized**

**Connecting your Account with Social Networks**

You currently have no social network accounts connected to this account.

**Associating your Account with an e-mail**

Your account is automatically associated with the e-mail that you used to register yourself on the platform.

![E-mail Addresses](image)

**Fig. 17: Accounts e-mail**

By clicking on *Associated e-mails* of the *Profile* page (see *Updating the Profile*), you will have the possibility to fill up a new e-mail address. Type it in the *E-mail* input field then click on *Add E-mail* to perform a new association. You can make it primary if necessary, in order to receive the notification on this address. To do that, select the e-mail that you want, then click on *Make Primary*.

**Managing the Password**

To change your password, click on the *Set/Change password* link of the *Profile* page (see *Updating the Profile*). You will be asked to enter your current password and the new one (two times). Click on *Change my password* to perform the change.

If no errors occur you will see a confirmation message. Next time you log in you will have to use the new password.
Fig. 18: *New e-mail association*

Fig. 19: *Primary e-mail address*

Fig. 20: *Change your password*
Setting Notification Preferences

By default GeoNode sends notifications to the users for events that the users could be subscribe such as a new layer uploaded or a new rate added to a map. You can adjust your notification settings by clicking on the Notifications link of the Profile page (see Updating the Profile).

Note: Make sure to have a verified email address to which notices can be sent. If not see Associating your Account with an e-mail.

Now check/uncheck the notification types you wish to receive or not receive. It is possible to be notified for the events shown in the picture below.

1.10.2 Interacting with Users and Groups

The GeoNode platform allows you to communicate by message with other GeoNode users and groups of users.

You can also invite external users to join your GeoNode. In order to do that, click on Invite Users in the Profile page (see Updating the Profile) or in the About menu in the Home page.

You can invite your contacts typing their email addresses in the input field as shown in the picture below. Click on Submit to perform the action.

A message will confirm that invitations have been correctly sent.

Note: You can invite more than one user at the same time by typing the email addresses inline with a semi-colon separator.

The next sections will show you how to view information about other users and how to contact them.

Viewing other users information

Once your account is created, you can view other accounts on the system.

To see information about other users on the system, click the People link of the About menu in Home page.

You will see a list of users registered on the system.

The Search tool is very useful in case of many registered users, type the name of the user you are looking for in the input text field to filter the users list.
### Notification Settings

<table>
<thead>
<tr>
<th>Notification Type</th>
<th>Email</th>
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<tbody>
<tr>
<td>Request to download a resource</td>
<td></td>
</tr>
<tr>
<td>A request for downloading a resource was sent</td>
<td></td>
</tr>
<tr>
<td>Layer Created</td>
<td></td>
</tr>
<tr>
<td>A Layer was created</td>
<td></td>
</tr>
<tr>
<td>Layer Updated</td>
<td></td>
</tr>
<tr>
<td>A Layer was updated</td>
<td></td>
</tr>
<tr>
<td>Layer Approved</td>
<td></td>
</tr>
<tr>
<td>A Layer was approved by a Manager</td>
<td></td>
</tr>
<tr>
<td>Layer Published</td>
<td></td>
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<td>A Layer was published</td>
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<tr>
<td>Layer Deleted</td>
<td></td>
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<td>A Layer was deleted</td>
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<tr>
<td>Comment on Layer</td>
<td></td>
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<tr>
<td>A layer was commented on</td>
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<tr>
<td>Rating for Layer</td>
<td></td>
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<tr>
<td>A rating was given to a layer</td>
<td></td>
</tr>
<tr>
<td>Map Created</td>
<td></td>
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<tr>
<td>A Map was created</td>
<td></td>
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<tr>
<td>Map Updated</td>
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<td>A Document was updated</td>
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<td>Document Approved</td>
<td></td>
</tr>
<tr>
<td>A Document was approved by a Manager</td>
<td></td>
</tr>
<tr>
<td>Document Published</td>
<td></td>
</tr>
<tr>
<td>A Document was published</td>
<td></td>
</tr>
<tr>
<td>Document Deleted</td>
<td></td>
</tr>
<tr>
<td>A Document was deleted</td>
<td></td>
</tr>
<tr>
<td>Comment on Document</td>
<td></td>
</tr>
<tr>
<td>A Document was commented on</td>
<td></td>
</tr>
<tr>
<td>Document for Map</td>
<td></td>
</tr>
<tr>
<td>A rating was given to a document</td>
<td></td>
</tr>
<tr>
<td>User following you</td>
<td></td>
</tr>
<tr>
<td>Another user has started following you</td>
<td></td>
</tr>
<tr>
<td>User requested access</td>
<td></td>
</tr>
<tr>
<td>A new user has requested access to the site</td>
<td></td>
</tr>
<tr>
<td>Account activated</td>
<td></td>
</tr>
<tr>
<td>This account is now active and can log in the site</td>
<td></td>
</tr>
<tr>
<td>Monitoring alert</td>
<td></td>
</tr>
<tr>
<td>Alert situation reported by monitoring</td>
<td></td>
</tr>
</tbody>
</table>
Invite Users

Email
john.friend1@mail.com,john.friend2@mail.com,john.friend3@mail.com
Submit

Fig. 23: Invite users to join GeoNode

Invitations successfully sent to john.friend1@mail.com, john.friend2@mail.com, john.friend3@mail.com

Fig. 24: Invitations confirm message

Fig. 25: About menu - People link
Fig. 26: List of the registered users
Select a user and click on its *username* to access to the user details page.

![User details](image)

**Fig. 27: User details**

In this page the main information about the user are shown: personal information (name, surname, organization and so on...) and the resources the user owns (layers, maps and documents).

Through the *User Activities* link, in right side of the page, it is possible to visualize all the activities the user has been done.

The *Message User* link lets you to contact other users, see the next section to read more about that.

It is also possible, in GeoNode, to see the recent activities of all users through the *Recent Activities* link of the user
Fig. 28: User activities

In the picture below an example.

As you can see, you can decide whether to see only the activities related to layers or those related to maps or comments by switching the tabs.

**Contacting other users**

GeoNode allows you to communicate by message with other registered users and groups.

To send a message to some user and/or groups you can follow the link *Message User* from your *Profile* page (see *Updating the Profile*) or from the *Profile* details page (see the previous section *Viewing other users information*) of that user.
Fig. 30: Recent Activities
Fig. 31: Send message to users and groups

Insert your content, type a subject and click on Send message to send the message to the users and groups you have selected.
You will be redirected to the Conversation details page related to the subject.

The Inbox page

You can view your conversations in your Inbox page, reachable through the Back to inbox button (see the picture above) or from the Inbox link of the user menu.
The picture below shows how your Inbox page should look like.
In Inbox all the unread messages are listed. You haven’t received any message yet so your Inbox is empty. If you switch to the All tab you can see all the conversations you are involved in.
When some user send a reply to your message your Inbox shows it, see the picture below for an example.
You can open the Conversation details by clicking on the Subject link.
As you can see in the picture above, in the Conversation page you have the ability to write a quick reply. Type your message in the text box and click on Send Reply to do that.
In the Inbox page there is also the Create Message button that provides you a quick link to the message creation form.
Greetings from John Smith

June 4, 2019, 4:25 a.m. by me
Hello, I'm John Smith, I'm now registered on GeoNode!

Fig. 32: Your message

Fig. 33: Inbox link

Fig. 34: Inbox page
Fig. 35: *All your conversations*

Fig. 36: *A reply to your message*

Fig. 37: *Conversation details*
1.10.3 Data

Data management tools built into GeoNode allow for integrated creation of data, documents, link to external documents, and map visualizations. Each dataset in the system can be shared publicly or restricted to allow access to only specific users. Social features like user profiles and commenting and rating systems allow for the development of communities around each platform to facilitate the use, management, and quality control of the data the GeoNode instance contains.

The following sections will explain more in depth what data can be managed in GeoNode and how to easily find that data.

Data Types

GeoNode welcome page shows a variety of information about the current GeoNode instance.

You can explore the existing data using many search tools and filters (see Finding Data) or through the links of the navigation bar at the top of the page.

There are three main types of resources that GeoNode can manage:

1. Documents
2. Layers
3. Maps

Documents and layers can be accessed from the Data menu of the navigation bar.

![Data menu](image)

Fig. 38: Data menu

The Maps menu let you to manage maps.

![Maps menu](image)

Fig. 39: Maps menu
Documents

GeoNode allows to publish tabular and text data and to manage metadata and associated documents.
Documents can be uploaded directly from your disk (see Uploading Documents for further information).
The following documents types are allowed: .doc, .docx, .gif, .jpg, .jpeg, .ods, .odt, .odp, .pdf, .png, .ppt, .pptx, .rar,
.sld, .tif, .tiff, .txt, .xls, .xlsx, .xml, .zip, .gz, .qml.
Through the document detailed page is possible to view, download and manage a document.

Layers

Layers are a primary component of GeoNode.
Layers are publishable resources representing a raster or vector spatial data source. Layers also can be associated
with metadata, ratings, and comments.

By clicking the Layers link you will get a list of all published layers. If logged in as an administrator, you will also
see the unpublished layers in the same list.
GeoNode allows the user to upload vector and raster data in their original projections using a web form.

Vector data can be uploaded in many different formats (ESRI Shapefile, KML and so on...). Satellite imagery and
other kinds of raster data can be uploaded as GeoTIFFs.

Maps

Maps are a primary component of GeoNode.
Maps are comprised of various layers and their styles. Layers can be both local layers in GeoNode as well as remote
layers either served from other WMS servers or by web service layers such as Google or MapQuest.

GeoNode maps also contain other information such as map zoom and extent, layer ordering, and style.
You can create a map based on uploaded layers, combine them with some existing layers and a remote web service
layer, share the resulting map for public viewing. Once the data has been uploaded, GeoNode lets the user search for
it geographically or via keywords and create maps. All the layers are automatically reprojected to web mercator for
maps display, making it possible to use popular base maps such as OpenStreetMap.

Finding Data

This section will guide you to navigate GeoNode to find layers, maps and documents by using different routes, filters
and search functions.
In Home page you can find some quick search tool.

The Search box in the navigation bar (see the picture below) let you type a text and find all the data which have to deal
with that text.
When you trigger a search you are brought to the Search page which shows you the search result through all data
types.
Fig. 40: *Search tool in GeoNode welcome page*

Fig. 41: *The Search page*
This page contains a wealth of options for customizing a search for various information on GeoNode. This search form allows for much more fine-tuned searches than the simple search box is available at the top of every page. It is possible to search for data by Text, Categories, Type, Keywords, Owners, Date, Regions or Extent.

Try to set some filter and see how the resulting data list changes accordingly. An interesting type of filter is *EXTENT*: you can apply a spatial filter by moving or zooming a map within a box as shown in the picture below.

![Search filter by EXTENT](image)

**Fig. 42: Search filter by EXTENT**

Data can be ordered by date, name and popularity.

The GeoNode welcome page offers you many other options to find resources.

- The *Search for data* tool allows you to search for data by name.

  The *Search* page, which you will be redirected to, will have the TEXT filter already set with the name you have typed in the search box (see the picture below). If you want to reach the *Search page* directly, without any input text, you can click the *Advanced Search* link.

- In the *Home* page section shown below are listed all the categories available in the GeoNode instance you are using. You can search for data by category by clicking on it.

  In the *Search* page, data will be filtered by that category.
Search:

![Search Result](image)

Fig. 43: Ordering Data

![Search Form](image)

Fig. 44: Searching for data
Fig. 45: Results of searching made by name

Fig. 46: Searching for datasets by category
Fig. 47: Results of searching made by category
• The Featured Datasets section (see the picture below) shows you aggregate data about Layers, Maps, Documents and Users. You can trigger a search on layers by clicking on the Layers icon, the same happens for Maps, Documents and Users. The Explore all datasets drive you to the Search page with no filter on data types. In this section there are also useful quick links to add new resources: the Add layers drives you to the layer uploading page, the Add documents to the document uploading page and the Create maps guide you to the map creation.

![Featured Datasets](image)

Fig. 48: Featured Datasets

For each data type GeoNode makes available an individual Search page, the next paragraphs will explain that in depth. For Users see Viewing other users information.

**Documents**

When you are searching for Documents you can:

• use the Documents quick link of the Featured Datasets section as described above
• click on the Documents link of the Data menu in the navigation bar

The Documents search page looks like the generic one but only Document is considered as data type. You can filter documents by CATEGORIES, as in the example below, or by TEXT, KEYWORDS and so on. You can also use more than one filter at the same time.

**Layers**

To find Layers you can:

• use the Layers quick link of the Featured Datasets
• click on the Layers link of the Data menu in the navigation bar
Fig. 49: Link for Documents

Fig. 50: Documents filtered by categories
In the *Layers* search page only *Layer* will be considered as data type. You can set one or more filter to refine the search. In the example below the layers have been filtered by EXTENT and CATEGORIES.

Maps

If you are searching for *Maps* you can:

- use the *Maps* quick link of the *Featured Datasets* section as described above
- click on the *Explore Maps* link of the *Maps* menu in the navigation bar

As seen for the other data types, the *Maps* search page allows you to filter your maps by a combination of criteria. The example below shows maps filtered by REGIONS.

### 1.10.4 Managing Documents

In this section all the aspects concerning *Documents* will be discussed.

You will learn how to upload a document and how to inspect its metadata and details. All the editing tools will be also explained.
Fig. 54: Maps filtered by regions

Uploading Documents

GeoNode allows to share reports, conceptual notes, posters, spreadsheets, etc. A wide range of documents files can be hosted on the platform, including text files (.doc, .docx, .txt, .odt), spreadsheets (.xls, .xlsx, .ods), presentations (.ppt, .pptx, .odp), images (.gif, .jpg, .png, .tif, .tiff), PDF, zip files (.rar, .zip, .gz), SLD, XML or QML files.

**Warning:** Only authenticated users can upload data into GeoNode.

Documents uploading is accessible from two positions:

- the *Upload Documents* button of the *Documents Search* page (see *Documents*)
- the *Upload Document* link of the *Data* menu in the navigation bar

The *Document Upload* page looks like the one shown in the picture below.

In order to upload a document:

1. select a file from your disk or enter a URL address if the document is stored on the internet
2. insert the title of the document
3. select one or more published resources the document can be linked to (optional)
4. click the red **Upload** button

At the end of the uploading process you will be driven to the **Metadata** page to fill out other information about the document. See the next section to know more about that.

**Filling the Document Metadata**

Metadata contains all the information related to the document: they are its ID card. They provide essential information for its identification and its comprehension. Metadata also make the document more easily retrievable through search by other users.

Editing a document’s metadata is done in three steps (**Basic Metadata**, **Location and Licenses**, **Optional Metadata**). The first two steps are mandatory (no documents will be published if the required information are not provided) whereas the last one is optional.

1. On the **Basic Metadata** page, the essential information that has to be filled is:
   - The **Title** of the document, which should be clear and understandable;
   - The **Resources** the document should be linked to;
   - An **Abstract** on the document;
   - The **Creation/Publication/Revision** dates which define the time period that is covered by the document;
• The **Keywords**, which should be chosen within the available list. The contributor search for available keywords by clicking on the searching bar, or on the folder logo representing, or by entering the first letters of the desired word. Key-words should be relevant to the imported document;

• The **Category** in which the document belongs;

• The **Group** to which the document is linked.

![Metadata for Old italian boundaries](image)

Fig. 58: Document Basic Metadata

Once all the fields are filled, click on the blue button **Next >>** in the bottom right corner of the page.

**Note:** When a document is linked to some resources, you can see that link on the **Resource Page**. It will be also visible on the **Document Information** page.

2. On the **Location and Licenses** page, the following information should be filled:

   • The **Language** of the document;

   • The **Regions**, which informs on the spatial extent covered by the document. Proposed extents cover the following scales: global, continental, regional, national;

   • The **Data Quality statement** (general explanation of the data producer’s knowledge about the lineage of a dataset);

   • Potential **Restrictions** to sharing the document should be provided in the Restrictions box.

   Click on the blue button **Next >>** to go ahead to the next step.
Fig. 59: Documents linked to a Layer
Fig. 60: Resources linked to a Document

Fig. 61: Document Location and Licenses
3. On the **Optional Metadata** page, complementary information can be added:

- The *Edition* to indicate the reference or the source of the document;
- The *Purpose* of the document and its objectives;
- Any *Supplemental information* that can provide a better understanding of the uploaded document;
- The *Maintenance frequency* of the document;
- The *Spatial representation type* used.

*Responsible Parties, Owner* and *Permissions* are listed on the right side of the page, you can edit them.

![Metadata for Old Italian boundaries](image)

**Fig. 62: Document Optional Metadata**

If all the mandatory information is filled out the document can be published, if not the *Completeness* progress bar warns you that something is missing.

Click on the blue button *Update* to save information on the system.
Document Information

From the Documents Search Page (see Documents) you can select the document you are interested in and see some basic information about it. You can access the document details page by clicking on its name. That page looks like the one shown in the picture below.

Fig. 63: Document Information page

On the page of a document, the resource is either directly displayed on the page or accessible by clicking on the link provided under the title.

Exploring the Tabs Sections

There is a Tab Section below the document, where you can first view Info about the document.
The **Info Tab** section shows the document metadata such as its title, abstract, date of publication etc. The metadata also indicates the user who is responsible for uploading and managing this content, as well as the group to which it is linked.

The **Share Tab** provides the social media links for the document to share. There is also a link to share the document through email.

![Share This Document](image)

Fig. 64: *Document Sharing*

You can **Rate** the document through the **Ratings system**.

![Rate this document](image)

Fig. 65: *Rate the Document*

In the **Comments Tab** section you can post your comment. Click on *Add Comment*, insert your comment and click *Submit Comment* to post it.

Your comment will be added next to the last already existing comment. If you want to remove it click on the red *Delete* button.

If you want this document in your **Favorites** (see *Updating the Profile*), open the **Favorite Tab** and click on *Add to Favorites*.

GeoNode also supports the **EXIF (EXchangeable Image Format)** for **jpeg** and **tiff** image documents. The **EXIF** means that additional information (metadata) are stored within the image, so GeoNode allows you to see those information in the **Exif Tab**.

**The Tools Section**

On the right side of the **Document Page** you can see other useful information such as the links to the resources linked to the document, the document **Owner**, the **Point of Contact** and the **Metadata Author**.
Fig. 66: Document Comments

Fig. 67: Your Comment
Fig. 68: *Your Favorite Comment*

Fig. 69: *The EXIF tab*
Fig. 70: Document useful tool
In the same section of the Document Page you can find the following useful tool:

- **Metadata Detail** to explore in detail the document metadata (see the next paragraph)
- **Download Document** to download the document
- **Edit Document** to change the document metadata, replace the file etc (see Document Editing)
- **Download Metadata** to download the whole set of metadata in various formats

![Document Metadata download](image)

**Fig. 71: Document Metadata download**

- **Change Document Permissions** to assign permissions on the document to users and groups (see Changing the Document Permissions).

**Exploring Metadata Details**

When clicking on the Metadata Detail button the Metadata Details Page will open.

It displays the whole set of available metadata about the document. Metadata are grouped in order to show the following types of information:

- **Identification** to uniquely identify the document
- **Owner**, the user who own the document
- **Information**, the identification image, the Spatial Extent, Projection System and so on
- **Features**, Restrictions, Language and so on
- **Contact Points**, the user available to have a contact
- **References**, various links to the resource information
- **Metadata Author**, the metadata author information
### Metadata: Old Italian Boundaries

#### Identification

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Title</td>
<td>Old Italian boundaries</td>
</tr>
<tr>
<td>Abstract</td>
<td>Old Italian boundaries</td>
</tr>
<tr>
<td>License</td>
<td>Not Specified</td>
</tr>
<tr>
<td>Publication Date</td>
<td>June 5, 2019, 4:51 a.m.</td>
</tr>
<tr>
<td>Keywords</td>
<td>Com2016, WGS84, g</td>
</tr>
<tr>
<td>Category</td>
<td>Boundaries</td>
</tr>
<tr>
<td>Regions</td>
<td>Global</td>
</tr>
<tr>
<td>Approved</td>
<td>Yes</td>
</tr>
<tr>
<td>Published</td>
<td>Yes</td>
</tr>
<tr>
<td>Featured</td>
<td>No</td>
</tr>
<tr>
<td>Group</td>
<td>Geosolutions</td>
</tr>
</tbody>
</table>

#### Owner

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>John Smith (johnsmith)</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:johnsmith@mail.com">johnsmith@mail.com</a></td>
</tr>
<tr>
<td>Position</td>
<td>CEO and Founder</td>
</tr>
<tr>
<td>Organization</td>
<td>John Smith Foundation</td>
</tr>
<tr>
<td>Location</td>
<td>John Smith Avenue 12345 John Smith City John Smith District ZAF</td>
</tr>
<tr>
<td>Voice</td>
<td>123456789</td>
</tr>
<tr>
<td>Fax</td>
<td>987654321</td>
</tr>
</tbody>
</table>

#### Information

<table>
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<th>Value</th>
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<td>Identification Image</td>
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<td>Spatial Extent</td>
<td>---</td>
</tr>
<tr>
<td>Projection System</td>
<td>EPSG:4326</td>
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<td>Extension x0</td>
<td>312379.251400000000000</td>
</tr>
<tr>
<td>Extension x1</td>
<td>1312016.1506000000000000</td>
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<tr>
<td>Extension y0</td>
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<tr>
<td>Extension y1</td>
<td>5220292.2922000000000000</td>
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</table>

#### Features

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<tr>
<td>Restrictions</td>
<td>exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
</tr>
<tr>
<td>Data Quality</td>
<td>good</td>
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</table>

#### Contact Points

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</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>John Smith (johnsmith)</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:johnsmith@mail.com">johnsmith@mail.com</a></td>
</tr>
<tr>
<td>Position</td>
<td>CEO and Founder</td>
</tr>
<tr>
<td>Organization</td>
<td>John Smith Foundation</td>
</tr>
<tr>
<td>Location</td>
<td>John Smith Avenue 12345 John Smith City John Smith District ZAF</td>
</tr>
<tr>
<td>Voice</td>
<td>123456789</td>
</tr>
<tr>
<td>Fax</td>
<td>987654321</td>
</tr>
</tbody>
</table>

#### References

- Link Online: [documents/37]
- Metadata Page: [documents/37/metadata_detail]
- Online Link: [documents/37/download]
- Hosted Document: Old Italian boundaries
- Thumbnail: Old Italian boundaries.png
Document Editing

The Document Information page makes available useful tools for document editing. Click on the Edit Document button to see what you can do to make changes. The picture below shows you the Editing Panel that will appear on the screen.

![Editing Panel](image1)

Fig. 73: Document Editing panel

You can Replace the document file with another one by clicking on Replace. It will drive you to the Document Upload page (see Uploading Documents) where you can upload a new file.

The Remove button allows you to delete the document. You will have to confirm that choice.

![Document Removal](image2)

Fig. 74: Document Removal confirmation

The Editing Panel shows you also some links for editing the metadata and the thumbnail. These actions will be explained more in depth in the next paragraphs.

Setting the Document Thumbnail

From the Editing Panel, it is also possible to Set the Thumbnail of the document. Click on Set to open the Thumbnail Uploading page and chose the image that will illustrate your document. You can either drag and drop it in the Drop files here box or selecting from your folders by clicking on Choose Files. Once this is done, click on the red button Upload files. If the thumbnail has been successfully uploaded you can see it by coming back to the document list. Click on the Explore Documents button to check that.

If no errors occur the following message will be shown.
Fig. 75: **Upload Document’s Thumbnail**

Fig. 76: **Uploading success**
Editing the Document Metadata

You can edit the metadata of your document through the buttons shown in the red rectangle in below picture.

![Edit Document](image)

Fig. 77: Editing Metadata

The **Wizard** button drive you to the wizard described in the *Filling the Document Metadata* section. The **Advanced Edit** button takes you to a big form where all the available metadata of the document can be edited.

Some information are mandatory such as the **Title** or the **Category** the document belongs to, some others are optional.

In the example shown in the picture above, the information inside the red rectangles have been changed. To save the changes click on **Update**, you will be redirected to the document page.

Changing the Document Permissions

GeoNode encourages to publicly, share and make available for download information uploaded on the platform. By default, anyone can see and download a document. However, the document responsible can choose to limit access to the document to some contributors and/or groups.

Through the button shown in the picture below it is possible to manage the document permissions.

The **Change Document Permissions** button on the right side of the document page allows to set up who can:

- View the document;
- Download it;
- Edit its metadata;
- Manage it (update, delete, change permissions, publish/unpublish).

See an example in the picture below.
Edit Metadata

Editing details for Old italian boundaries

Owner
© johnsmith

Title
Nouvelle Carte de l'Italie

Alternate

Date
2019-06-05 04:51 am

Date type
Publication

Edition
v1

Abstract
A map from the Moll's map collection

Purpose
Study

Maintenance frequency

Free-text Keywords
Com2016_WGS84

Regions
Global, Italy

Restrictions
exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic
Fig. 79: The button to change permissions
Fig. 80: Changing the Document permissions
Usually that editing of metadata and the management of a document are in charge of the responsible of the document, i.e. the contributor who uploaded it and who has those permissions by default.

Once the permissions are set, click *Apply changes* to save them.

### 1.10.5 Managing Layers

Layers are published resources representing raster or vector spatial data sources. Layers can also be associated with metadata, ratings, and comments.

In this section, you will learn how to create a new layer by uploading a local data set, add layer info, change the style of the layer, and share the results.

#### Layers Uploading

The most important resource type in GeoNode is the *Layer*. A layer represents spatial information so it can be displayed inside a map.

To better understand what we are talking about let’s upload your first layer.

The *Layer Uploading* page can be reached from the *Upload Layer* link of the *Data* menu in the navigation bar.

![Fig. 81: Link for Layers Uploading](image)

There is also an *Upload Layers* button in the *Layers Page*.

![Fig. 82: Button for Layers Uploading](image)
The *Layers Uploading* page looks like the one in the picture below.

![Layers Uploading Page](image)

**Fig. 83: The Layers Uploading page**

Through the *Choose Files* button you can select files from your disk, make sure they are valid raster or vector spatial data. You can also change the default *Permissions* settings (see *Changing the Layer Permissions* for further information on how to set permissions).

Select the *charset*, then click on *Upload files* to start the process or click *Clear* to remove all the loaded files form the page.

![Shapefile Uploading](image)

**Fig. 84: Shapefile Uploading**

In this example the *roads* ESRI Shapefile, with all its mandatory files (*shp*, *shx*, *dbf* and *prj*), has been chosen. A progress bar shows the operation made during the layer upload and alerts you when the process is over. When the process ends click the *Layer Info* to check the layer has been correctly uploaded.

**Note:** There are lot of free spatial dataset available in the Internet. In this example, an extract of the Berlin city center roads map from the BBBike extracts OpenStreetMap dataset has been used.

In the next paragraphs you will learn how to create a layer from scratch, how to set permissions, how to explore the layer properties and how to edit them.
Creating a Layer from scratch

An interesting tool that GeoNode makes available to you is the Create Layer. It allows you to create a new vector layer from scratch. The Layer Creation Form is reachable through the Create Layer link shown in the picture below.

![Create layer link](image)

Fig. 85: Create layer link

In order to create the new Layer you have to fill out the required fields:

- Name
- Title
- Geometry type

![Geometry types](image)

Fig. 86: Geometry types

Usually the layers features should have some Attributes that enrich the amount of information associated with each of them. Through the Add Attribute button you can add new attributes.

![New Layer creation from scratch](image)

Fig. 87: New Layer creation from scratch

At this time you can also change the default Permissions settings, see Changing the Layer Permissions to learn how.

Once the form has been filled out, click on Create. You will be redirected to the Layer Page (see Layer Information). Now your Layer is created but is still empty, no features have been added yet. See the Layer Editing section to learn how to add new features.

Using Remote Services

In GeoNode you can add new layers not only by loading them from your disk but also using Remote Services. In this section you will learn how to add a new service and how to load resources in GeoNode through that.

Let’s try it!
Click on the *Remote Services* link of the *Data* menu in the navigation bar. The page that opens will contain the list of the available services.

![Remote Services](image)

To configure a new service:

- click on *Register a new Service*
- type the *Service URL*
- select the *Service Type*

![Service Types](image)

- click on *Create*

GeoNode supports three *types of remote services:*

- **Web Map Service**
  
  Generic Web Map Service (WMS) based on a standard protocol for serving georeferenced map images over the Internet. These images are typically produced by a map server (like GeoServer) from data provided by one or more distributed geospatial databases. Common operations performed by a WMS service are: *GetCapabilities*
(to retrieves metadata about the service, including supported operations and parameters, and a list of the available layers) and GetMap (to retrieves a map image for a specified area and content).

**Note:** Lots of WMS services are available on the internet, in this example we used the https://demo.geo-solutions.it/geoserver/wms.

- **GeoNode Web Map Service**

  Generally a WMS is not directly invoked; client applications such as GIS-Desktop or WEB-GIS are used that provide the user with interactive controls. A GeoNode WMS automatically performs some operations and lets you to immediately retrieve resources.

  **Note:** An example of GeoNode WMS is available at http://dev.geonode.geo-solutions.it/geoserver/wms.

- **ArcGIS REST MapServer**

  This map service provides basic information about the map, including the layers that it contains, whether the map is cached or not, its spatial reference, initial and full extents, whether the service is allowed to export tiles and max tiles export count, etc. A set of operations that manage the state and contents of the service are allowed: Edit Service, Refresh, Update Tiles. The URL should follow this pattern: https://<servicecatalog-url>/services/<serviceName>/MapServer.

  **Note:** Try the following service to better understand how it works: https://sampleserver6.arcgisonline.com/arcgis/rest/services/USA/MapServer.

Once the service has been configured, you can load the resources you are interested in through the Import Resources page where you will be automatically redirected to. Take a look at the gif below to see the whole process.

**Fig. 91: A new Remote Service**

From the page where the services are listed, it is possible to click on the Title of a service. It opens the Service Details page.

Each service has its own metadata such as the Service Type, the URL, an Abstract, some Keywords and the Contact user. You can edit those metadata through the form available from the Edit Service Metadata button of the Service Details page (see the picture below).

### Changing the Layer Permissions

When creating or uploading a new Layer you have to set who can view, download, edit and manage that Layer. By default only owners can edit and manage layers, anyone can view and download them.

In order to modify the Layer Permissions settings you have to click the Change the Layer Permissions button in the Layer page.

Through the Permissions Settings Panel you can add or remove permissions for users and groups. The picture below shows an example.

You can set the following types of permissions:
Fig. 92: Remote Service metadata

- **View** allows to view the layer;
- **Download** allows to download the layer;
- **Change Metadata** allows to change the layer metadata;
- **Edit Data** allows to change attributes and properties of the layers features;
- **Edit Style** allows to change the layer style;
- **Manage** allows to update, delete, change permissions, publish and unpublish the layer.

**Warning:** When assigning permissions to a group, all the group members will have those permissions. Be careful in case of editing permissions.

Click on **Apply Changes** to save these settings.

**Layer Information**

In this section you will learn more about layers. In the **Layers** section we explain how to find layers, now we want to go more in depth showing you how to explore detailed information about that.

From the layers list page, click on the layer you are interested in. The **Layer Page** will open.

As shown in the picture above, the **Layer Page** is divided into three main sections:

1. the **Layer Preview** section, under the title
2. the **Tabs** section, under the layer preview
3. the **Tools** section, on the right side of the page

**Layer Preview**

The **Layer Preview** shows the layer in a map with very basic functionalities:
Italian Towers

Maps using this layer
This layer is not currently used in any maps.

Create a map using this layer
Click the button below to generate a new map based on this layer.
Create a Map

Add the layer to an existing map
Click the button below to add the layer to the selected map.
Add to Map

Styles
The following styles are associated with this layer. Choose a style to view it in the preview map.
* (default style) Default Point

Refresh Attributes and Statistics of this layer
Click the button below to allow GeoNode refreshing the list of available Layer Attributes. If the option ‘WPS_ENABLED’ has been also set on the backend, it will recalculate their statistics too.
Refresh Attributes and Statistics

Clear the Server Cache of this layer
Click the button below to wipe the tile-cache of this layer.
Empty Tiled-Layer Cache

Permissions
Click the button below to change the permissions of this layer.
Change Layer Permissions
Fig. 94: Layer Permissions settings for users and groups
Italian Towers

Maps using this layer
This layer is not currently used in any maps.

Create a map using this layer
Click the button below to generate a new map based on this layer.

Add the layer to an existing map
Click the button below to add the layer to the selected map.

Styles
The following styles are associated with this layer. Choose a style to view it in the preview map.

Refresh Attributes and Statistics of this layer
Click the button below to allow GeoNode refreshing the list of available Layer Attributes. If the option ‘WPS_ENABLED’ has been also set on the backend, it will recalculate their statistics too.

Clear the Server Cache of this layer
Click the button below to wipe the tile-cache of this layer.

Permissions
Click the button below to change the permissions of this layer.

About
Owner, Point of Contact, Metadata Author
• the *Base Map Switcher* that allows you to change the base map;
• the *Zoom in/out* tool to enlarge and decrease the view;
• the *Zoom to max extent* tool for the zoom to fit the layer size;
• the *Query Objects* tool to retrieve information about the map objects by clicking on the map;
• the *Print* tool to print the preview.

Fig. 96: *Layer Preview*

The GeoNode map viewer is MapStore based, see the MapStore Documentation to learn more.

**Tabs Sections**

The *Layer Page* shows you some tabs sections containing different information about the layer:

- The tab *Info* is active by default. This tab section shows some layer metadata such as its title, the abstract, date of publication etc. The metadata also indicates the layer owner, what are the topic categories the layer belongs to and which regions are affected.

Fig. 97: *Layer Info tab*

- The *Attributes* tab shows the data structure behind the layer. All the attributes are listed and for each of them some statistics (e.g. the range of values) are estimated (if possible).
- The *Share* tab provides the links for the layer to share through social media or email.
- You can *Rate* the layer through the *Rating system*. 
Fig. 98: *Layer Attributes* tab

Fig. 99: *Layer Sharing*
In the *Comments* tab section you can post your comment. Click on *Add Comment*, insert your comment and click *Submit Comment* to post it.

![Fig. 100: Rate the Layer](image)

- If you want this layer in your *Favorites* (see *Updating the Profile*), open the *Favorite* tab and click on *Add to Favorites*.

**Layer Tools**

In the right side of the *Layer Page* there are some buttons and information that can help you to manage your layer. This paragraph will cover only those tools which show layers information. The *Editing Tools* will be explored in the *Layer Editing* section.

- through the *Download Layer* button you can download your layer with some options, see *Downloading Layers*;
- the *Metadata Detail* button to see the layer metadata, see *Layers Metadata* to read more;
- the *Editing Tools* button allows you to access to many editing tools. Those functionalities will be explained in the *Layer Editing* section;
- the *View Layer* button opens the layer loaded in a map, see the *Map Information* for more details;
The **Download Metadata** button allows you to download the layer metadata in various formats;

- the **Legend** shows what the symbols and styles on the map are referring to;

- in the **Map using this layer** section all the maps which use the layer are listed;

- in the **Create a map using this layer**, the **Create a Map** button allows you to create a map from scratch using the layer;

- in the **Add the layer to an existing map** shows you a dropdown menu in which all the maps the user can view are listed. The button **Add to Map** allows you to add the layer to the map you have selected in the previous menu;

- the **Styles** section shows all the styles associated with the layer. Click on the checkbox corresponding to one of the styles listed to apply it the preview;

- in the **Refresh Attributes and Statistics of this layer** section the **Refresh Attributes and Statistics** allows GeoNode to refresh the list of available Layer Attributes. If the option ‘WPS_ENABLED’ has been also set on the backend, it will recalculate their statistics too;

- in the **Clear the Server Cache of this layer** section the **Empty Tiled-Layer Cache** allows to wipe the tile-cache of this layer;

- the **About** section shows you the layer **Owner**, the **Contact** user and the **Metadata Author**.

### Downloading Layers

At the top of the **Layer Page** there is the **Download Layer** button (see [Layer Information](#)). It provides access to the ability to extract geospatial data from within GeoNode.

You will see a list of options of the supported export formats. You can choose the **Images** formats PNG, PDF, JPEG if you want to save a “screenshot-like” image of the layer.

You can also download the layer data, the supported export formats will be listed in the **Data** tab. Click on your desired format to trigger the download.

As shown in the image above, GeoNode allows you to download a subset of data. Click on **Do you want to filter it?** to filter the layer data before the download.

### Layer Editing

The **Editing Tools** button of the **Layer Page** (see [Layer Information](#)) opens a panel like the one shown in the picture below.
roads

Fig. 103: *Change the Layer Style in preview*
Download Layer

Images  Data
- PNG
- PDF
- JPEG

Close

Fig. 104: Downloading Layers as Images

Download Layer

Images  Data

Do you want to filter it?

Pick your download format:
- GeoJSON
- Excel
- CSV
- GML 3.1.1
- GML 2.0
- Zipped Shapefile
- Original Dataset

Close

Fig. 105: Downloading the Layer Data
Fig. 106: Downloading the Layer Data

Fig. 107: The Layer Editing panel
In that panel you can see many options grouped by four categories:

1. Metadata
2. Styles
3. Thumbnail
4. Layer

In this section you will learn how to edit a Layer, how to replace and edit its data. See Layers Metadata to learn how to explore the layer Metadata, how to upload and edit them. The Styles will be covered in a dedicated section, see Layer Styling.

**Setting the Layer Thumbnail**

The Thumbnail of the layer that will be displayed on the Layers list page can be changed by dragging and zooming on the layer preview to select which portion will be displayed, then by clicking on the Set button of the Layer Editing panel.

A message will confirm the thumbnail has been correctly changed.

---

It is also possible to manually upload a thumbnail by using the Upload button of the Layer Editing panel. Using the “Upload Thumbnail” page it is possible to enable the automatically generated thumbnail or upload an image to be used in place of it.
Replacing the Layer

From the Layer Editing panel click on Replace to change the layer source dataset. You will be driven to the Replace Layer page in which Choose Files button allows you to select files from your disk.

Once the Charset selected the upload process can be triggered by clicking on Replace Layer. If no errors occur you will see a message like the one in the picture below.

We have replaced the roads dataset with the railways one. You can see the differences in the Layer Preview.

Editing the Layer Data

The Edit data button of the Layer Editing panel opens the Layer within a Map.

The Attribute Table panel of the Layer will automatically appear at the bottom of the Map. In that panel all the features are listed. For each feature you can zoom to its extent by clicking on the corresponding magnifying glass icon at the beginning of the row, you can also observe which values the feature assumes for each attribute.

Click the Edit Mode button to start an editing session.

Now you can:

- **Add new Features**

  Through the Add New Feature button, it is possible to set up a new feature for your layer. Fill the attributes fields and click to save your change. Your new feature doesn’t have a shape yet, click on to draw its shape directly on the Map then click on to save it.

  **Note:** When your new feature has a multi-vertex shape you have to double-click the last vertex to finish the drawing.

- **Delete Features**

  If you want to delete a feature you have to select it on the Attribute Table and click on.
Fig. 110: Replace a Layer

- **Change the Feature Shape**
  
  You can edit the shape of an existing geometry dragging its vertices with the mouse. A blue circle lets you know what vertex you are moving.
  
  Features can have *multipart shapes*. You can add parts to the shape when editing it.

- **Change the Feature Attributes**
  
  When you are in *Edit Mode* you can also edit the attributes values changing them directly in the corresponding text fields.

Once you have finished you can end the *Editing Session* by clicking on the button.

By default the GeoNode map viewer is *MapStore* based, see the *MapStore Documentation* for further information.

**Layers Metadata**

In GeoNode special importance is given to *Metadata* and their standard formats. You can explore the *Metadata* of a *Layer* by clicking the *Metadata Detail* button from the *Layer Page*.

The *Layer Metadata* page will be displayed.

In that page you can see the whole set of available metadata about the layer. Metadata are grouped in order to show the following types of information:

- **Identification** to uniquely identify the layer (Title, Abstract, Publication Date etc.);
- **Owner**, the user who owns the layer;
Fig. 111: Replace Layer success
roads

Fig. 112: Result of the Layer Replacement
Fig. 113: Editing the Layer Data

Fig. 114: Add a New Feature to the Layer

Fig. 115: Delete a Feature

Fig. 116: Feature Shape Editing - Change the existing shape

Fig. 117: Feature Shape Editing - Add parts to the existing shape

Fig. 118: Feature Attributes Editing
Fig. 119: The Layer Metadata Detail button
### Metadata: roads

#### Identification

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>roads</td>
</tr>
<tr>
<td>Abstract</td>
<td>No abstract provided</td>
</tr>
<tr>
<td>License</td>
<td>Not Specified</td>
</tr>
<tr>
<td>Publication Date</td>
<td>June 10, 2019. 12:58 p.m.</td>
</tr>
<tr>
<td>Type</td>
<td>Vector Data</td>
</tr>
<tr>
<td>Keywords</td>
<td>features.ne_10m_roads</td>
</tr>
<tr>
<td>Category</td>
<td>Transportation</td>
</tr>
<tr>
<td>Regions</td>
<td>Global</td>
</tr>
<tr>
<td>Approved</td>
<td>Yes</td>
</tr>
<tr>
<td>Published</td>
<td>Yes</td>
</tr>
<tr>
<td>Featured</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Owner

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>johnsmith</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:johnsmith@mail.com">johnsmith@mail.com</a></td>
</tr>
</tbody>
</table>

#### Information

**Identification Image**

![Identification Image](image_url)

**Spatial Extent**

- **Projection System**: EPSG:4226
- **Extension X0**: 13.326002500000000
- **Extension X1**: 13.386976000000000
- **Extension Y0**: 52.503005700000000
- **Extension Y1**: 52.525999000000000

**Features**

- **Language**: English
- **Supplemental Information**: No information provided

#### Contact Points

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>johnsmith</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:johnsmith@mail.com">johnsmith@mail.com</a></td>
</tr>
</tbody>
</table>

**References**
• Information, the Identification Image, the Spatial Extent, Projection System and so on;
• Features, Language, Supplemental and other Information;
• Contact Points, the available user to get in contact;
• References, various links to the resource information and data;
• Metadata Author, information about the author of the metadata.

Downloading Metadata

The Download Metadata button of the Layer Page allows you to download the layer metadata in various formats.

The available download formats are grouped in three categories:

• Full metadata
• Standard Metadata - XML format
• Attribute Information

Click on the format name that you prefer to start the download.

Metadata Wizard

Metadata contains all the information related to the layer. They provide essential information for its identification and its comprehension. Metadata also make the layer more easily retrievable through search by other users.
The Metadata of a layer can be changed through a Wizard which involves four steps, one for each type of metadata considered:

- **Basic Metadata**
  
  The first two steps are mandatory (no layers will be published if the required information are not provided) whereas the last two are optional.

  ![Basic Layer Metadata](image)

  **Fig. 122: Basic Layer Metadata**

  In the first step the system asks you to insert the following metadata:
  
  - The Thumbnail of the layer (click Edit to change it);
  - The Title of the layer, which should be clear and understandable;
  - An Abstract on the layer;
  - The Creation/Publication/Revision Dates which define the time period that is covered by the layer;
  - The Keywords, which should be chosen within the available list. The contributor search for available keywords by clicking on the searching bar, or on the folder logo representing, or by entering the first letters of the desired word;
  - The Category which the layer belongs to;
  - The Group which the layer is linked to.

- **Location and Licenses**
  
  The following list shows what kinds of metadata you are required to enter (see also the picture below):
Fig. 123: *Location and Licenses Metadata for Layers*
– The Language of the layer;
– The License of the dataset;
– The Regions, which informs on the spatial extent covered by the layer. Proposed extents cover the following scales: global, continental, regional, national;
– The Data Quality statement (general explanation of the data producer's knowledge about the lineage of a dataset);
– Potential Restrictions on layer sharing.

• Optional Metadata

Complementary information are:
– The Edition to indicate the reference or the source of the layer;
– The Purpose of the layer and its objectives;
– Any Supplemental information that can provide a better understanding of the uploaded layer;
– The Maintenance frequency of the layer;
– The users who are Responsible for the layer, its Owner, and the Author of its metadata;
The Spatial representation type used.

- **Dataset Attributes**

![Dataset Attributes Metadata for Layers](image)

Fig. 125: Dataset Attributes Metadata for Layers

At this step you can enrich the dataset attributes with useful information like the following:

- The Label displayed
- A detailed Description
- The Display Order

Use `next >>` or `<< back` to navigate through those steps. Once you have finished click on `Update`.

Some metadata are mandatory, if you miss any of that metadata the Completeness bar shows you a red message like the one in the picture below.

**Metadata Advanced Editing**

In the Layer Editing panel the Advanced Edit is also available.
Fig. 126: *Completeness Progress Bar*

Fig. 127: *The Advanced Edit button*
Click on it to display the *Metadata Advanced Editing Page*. That page allows you to edit all the layer metadata described in the previous paragraph. Once you have finished to edit them click on *Update* to save your changes.

**Uploading Metadata**

Users may also upload a metadata XML document (in ISO, FGDC, or Dublin Core format) to fill in key GeoNode metadata elements automatically. The picture below shows you how the page looks like.

![The Metadata Advanced Editing page](image)

Click on *Choose Files* to select the document from your disk, then click on *Upload files* to trigger the uploading process.

**Layer Styling**

Maps are helpful because they allow you gain a deeper understanding of your data by allowing you to visualize it in many different ways. So you can tell different stories depending on how the data is presented. For any given data or layer, you should explore different styling options and choose the best style for that.

In GeoNode each layer has a *Default Style* which is determined by the nature of the data you’re mapping. When uploading a new layer (see *Layers Uploading*) a new default style will be associated to it.

Referring to the example above, dark orange lines are not very good to represent waterways so we would need to change this style. In the following paragraphs you will learn how to create a new style starting from given templates, how to edit a style, how to upload styles from file and how to manage them.

**Creating new Styles**

In order to create a new style, open the *Layer Page* (see *Layer Information*) and click on *Editing Tools*. Then click the *Edit* button in the *Styles* section of the *Layer Editing* panel (see the picture below).
Fig. 129: Default Style for Layers
The Layer will open in a new Map. The Styles Panel will show you all the available styles for the layer and some useful tools.

Now follow the steps below:

1. Click the button. The Style Templates Panel will open.

2. Choose a Style Template from the list (both CSS and SLD styles are available).

3. Click the button to add the Style Template to the styles list.

4. Insert a Title and an Abstract (optional), then click on Save.

The style you have created is now added to the Styles List. You will also see this new style in the Layer Page.

Now you can switch the style by clicking on the corresponding checkbox.

It would be nice to change the style in order to decrease the opacity of the filling color as well as to reduce the lines width. The embedded MapStore makes available a powerful Style Editor to accomplish that tasks. In the next paragraph we will explain how.
The following steps show you how to edit styles:

1. From inside the map open the TOC (Table Of Content) by clicking the button

2. Click on

3. Open the Style tab

**Warning:** Styles editing is allowed only to those users who have the needed permission. See *Changing the Layer Permissions* to read more

4. Select the Style and click on

5. Edit the style. The Style Editor helps you to write valid styles through the Syntax Validator which shows you a popup in case of errors (see the picture below).

6. Click on to save your changes.

See the following gif to recap the whole process.

You can also decide to make your new style the Default Style of that layer. Click on to do that.

Click on to delete the style.
Fig. 132: Create new Styles
**Fig. 133: Style Templates**

**Fig. 134: Title and Abstract for new Styles**
Uploading Styles

In GeoNode it is also possible to upload an existing style from file.

**Warning:** Currently only styles in **SLD (Style Layer Descriptor 1.0, 1.1)** format can be uploaded in GeoNode.

From the *Layer Page* click on *Editing Tools* to open the *Editing Tools* panel and follow the steps below:

1. Click the *Upload* button of the *Styles* section

2. Click on *Choose Files* and select your style from your disk

3. Click on *Upload files*

Once the process has been finished the new *Style* will be visible in the *Layer Page*.

Managing Styles

Given a layer, you can manage all its styles in the *Styles Management Page* accessible from the *Manage* button of the *Layer Editing* panel.

In that page you can:

- See the *Layer Name*
Fig. 136: *The Layer Page with the new Style*
Fig. 137: The Style Editor Syntax Validation

Fig. 138: The Style Editor

Fig. 139: Upload Styles button
Fig. 140: *Upload Styles*

Fig. 141: *Managing Styles*
• Add/remove styles to/from the *Available styles* list
• Choose the *Layer Default Style* from the *Available styles* list

Click on *Update Available Styles* to save your changes.

### 1.10.6 Managing Maps

Maps are sets of layers displayed together on an interactive web map. Maps can be composed in the map composer and saved as GeoNode resources. Maps can also be associated with metadata, ratings, and comments. In this section, you will learn how to create a new map and share it.

**Creating Maps**

In this section, we’ll create a *Map* using some uploaded layers, combine them with some other layers from remote web services, and then share the resulting map for public viewing.

In order to create new maps you can use:

• the *Create Map* link of the *Maps* menu in the navigation bar

![Fig. 142: The Create Map link](image)

• the *Create Map* button in the *Layer Page* (it creates a map using a specific layer)
• the *Create New Map* button in the *Explore Maps* page

The new *Map* will open in a *Map Viewer* like the one in the picture below.

In the upper left corner the button opens the *Table of Contents (TOC)* of the *Map*. It allows to manage all the layers associated with the map and to add new ones from the *Catalog*. The *TOC* component makes possible to manage layers overlap on the map by shifting their relative positions in the list (drag and drop them up or down in the list).

It also allows to hide/show layers (and), to zoom to layers extents (and) and to manage their properties (pencil).

Once the map layers have been settled it is possible to save the *Map* by clicking on and choosing *Save as*.

If you followed the steps above, you have just created your first *Map*. Now you should see it in the *Explore Maps* page, see *Map Information* for further details.

We will take a closer look at the *Map Viewer* tools in the *Exploring Maps* section.
waterways

Fig. 143: *The Create Map button*

Fig. 144: *The Create New Map button*
Map Information

As mentioned in the Maps section, in GeoNode you can see your maps and all the published maps through the Explore Maps link of the navigation bar. Click on the title of the Map you are interested in to open its Information page, it should looks like the following.

The Map Page is divided into three main sections:

1. the Map Preview section, under the title
2. the Tabs section, under the layer preview
3. the Tools section, on the right side of the page

Map Preview

The Map Preview shows the Map with very basic functionalities:

- the Base Map Switcher that allows you to change the base map;
- the Zoom in/out tool to enlarge and decrease the view;
- the Zoom to max extent tool for the zoom to fit the layers extents;
- the Query Objects tool to retrieve information about the map objects by clicking on the map;
- the Print tool to print the preview.

See the MapStore Documentation to learn more.
My New Map

Fig. 147: The Map Information page

Fig. 148: Map Preview
Tabs Sections

The Map Information page shows you some tabs sections containing different information about the map:

- The tab Info is active by default. This tab section shows some metadata such as its Title, the License, the Publication Date etc. The metadata also indicates the map owner and which regions are involved. The Map Layers WMS GetCapabilities document link is also provided.

![Maps Info tab](image1)

- The Share tab provides the links for the map to share through social media or email.

![Map Sharing](image2)

- You can Rate the map through the Rating system.
- In the Comments tab section you can post your comment. Click on Add Comment, insert your comment and click Submit Comment to post it.
  
  Your comment will be added next to the last already existing comment. If you want to remove it click on the red Delete button.
- If you want this map in your Favorites (see Updating the Profile), open the Favorite tab and click on Add to Favorites.
Rate this Map

Average Rating

Fig. 151: Map Rating

Comments (1 total)

Great Map!
By johnsmith on Jun 12, 2019

Add Comment

Delete

Fig. 152: Map Comments

Favorite

Add to Favorites

Go to Favorites

Fig. 153: Your Favorite Maps
Map Tools

In the right side of the Map Information page there are some tools that can help you to manage your maps. In this paragraph you will learn how to discover and retrieve information about maps. The following is a list of actions you can take in order to accomplish this task:

- click the Download Map button, to download the map as image;
- click the Metadata Detail button to see the map metadata, see Maps Metadata;
- click the Editing Tools button to access to many editing tools. Those functionalities will be explained in the Exploring Maps section;
- click the View Map button to open the map, see the Exploring Maps section for more details;
- see the Map Layers section to konw which layers are used by the map (you can open the Layer Page by clicking on its name, available only for local layers);
- click the Create a Map button of the Copy this map section to duplicate the map;
- click the Publish Map WMS of the Map WMS section to publish local map layers as WMS layer group;
- see the About section to know the map Owner, the Contact user and the Metadata Author.

Maps Metadata

Maps Metadata can be explored by clicking the Metadata Detail button from the Map Information page.

![Map Metadata Detail button](image)

The Map Metadata page will open.

Fig. 154: The Map Metadata Detail button
### Metadata: My New Map

#### Identification
- **Title**: My New Map
- **License**: Not Specified
- **Publication Date**: June 12, 2019, 8:17 a.m.
- **Approved**: Yes
- **Published**: Yes
- **Featured**: No

#### Owner
- **Name**: John Smith (johnsmith)
- **email**: johnsmith@mail.com
- **Position**: CEO and Founder
- **Organization**: John Smith Foundation
- **Location**: John Smith Avenue 12345 John Smith City John Smith District ZAF
- **Voice**: 123456789
- **Fax**: 987654321

#### Information
- **Identification Image**: ![no image]
- **Spatial Extent**: ---
- **Projection System**: EPSG:3857
- **Extension x0**: -20037397.023299999535084
- **Extension x1**: 666726.14282700000003308
- **Extension y0**: -5787726.067250000012924
- **Extension y1**: 20037397.023299999535084

#### Features
- **Language**: English
- **Supplemental Information**: No information provided

#### Contact Points
- **Name**: John Smith (johnsmith)
- **email**: johnsmith@mail.com
- **Position**: CEO and Founder
- **Organization**: John Smith Foundation
- **Location**: John Smith Avenue 12345 John Smith City John Smith District ZAF
- **Voice**: 123456789
- **Fax**: 987654321

#### References
- **Link Online**: ![map](map)
- **Metadata Page**: ![metadata](metadata)

#### Metadata Author
- **Name**: John Smith (johnsmith)
- **email**: johnsmith@mail.com
- **Position**: CEO and Founder
- **Organization**: John Smith Foundation
- **Location**: John Smith Avenue 12345 John Smith City John Smith District ZAF
- **Voice**: 123456789
- **Fax**: 987654321
Lots of information are displayed in this page. Those information are grouped as follow:

- **Identification** to uniquely identify the map (Title, License, Publication Date and Regions. There are also some flags which tell you the state of the map, in particular if it is Approved and/or Published);
- the map **Owner**;
- **Information**, the Identification Image, the Spatial Extent, the Projection System and the Extent;
- **Features**, Language, Supplemental and other Information;
- **Contact Points**, the available user to get in contact;
- **References**, links to the map and its metadata;
- **Metadata Author**, information about the author of the metadata.

**Metadata Wizard**

Metadata provide essential information for the identification and the comprehension of the map. They also make the map more easily retrievable through the search tools. Those **Metadata** can be filled out through a three-steps **Wizard** in which you have to provide all mandatory information to complete the process. Those three steps are described below.

- **Basic Metadata**

Fig. 156: *Basic Map Metadata*
In the first step the system asks you to insert the following metadata (required fields are highlighted with red outlines):

- The Thumbnail of the map (click Edit to change it);
- The Title of the map, which should be clear and understandable;
- An Abstract;
- The Creation/Publication/Revision Dates which define the time period that is covered by the map;
- The Keywords, which should be chosen within the available list;
- The Category which the map belongs to;
- The Group which the map is linked to.

Click Next >> to go to the next step.

• Location and Licenses

Fig. 157: Location and Licenses Metadata for Maps

The following list shows what kinds of metadata you are required to enter (see also the picture below):

- The Language of the layer;
- The License of the dataset;
- The Regions covered by the layers extent. Proposed extents cover the following scales: global, continental, regional, national;
– The Data Quality statement (general explanation of the data producer’s knowledge about the lineage of a dataset);

– Potential Restrictions on layer sharing.

No further mandatory metadata are required in the next step so, once the required fields have been filled out, a green Done button will be visible in the screen. Click Next >> to go to the next step or << Back to go back to the previous step.

• Optional Metadata

![Metadata for My New Map](image)

Fig. 158: Optional Map Metadata

Complementary information are:

– The Edition of the map;
– The Purpose of the map and its objectives;
– Any Supplemental information that can provide a better understanding of the map;
– The Maintenance frequency of the map;
– The Spatial representation type, the method used to represent geographic information in the dataset;
– The users who are Responsible for the layer, its Owner, and the Author of its metadata;

If you miss some mandatory metadata the Completeness bar shows you a red message like the one in the picture below.
Metadata Advanced Editing

The Advanced Edit editing tool allows to change the map metadata. You can find this button into the map Editing Tools.

Click on it to display the Metadata Advanced Editing Page. That page allows you to edit all the layer metadata described in the previous paragraph. Once you have finished to edit them click on Update to save your changes.

Changing the Map Permissions

In the Map Information section of this guide we said that you can see your maps and all the published maps. In GeoNode the permissions management system is indeed more complex. Administrators can choose who can do what for each map. Users can manage only the maps they own or the maps which they are authorize to manage.

By default only owners can edit and manage maps, anyone can view and download them.

In order to modify the Map Permissions settings you have to click the Change the Layer Permissions button in the Map Page.

Through the Permissions Settings Panel you can add or remove permissions for users and groups. The picture below shows an example.

You can set the following types of permissions:

- View allows to view the map;
- Download allows to download the map;
Fig. 161: Change Map Permissions
Fig. 162: *Map Permissions settings for users and groups*
• *Change Metadata* allows to change the map metadata;
• *Manage* allows to update, delete, change permissions, publish and unpublish the map.

**Warning:** When assigning permissions to a group, all the group members will have those permissions. Be careful in case of editing permissions.

Click on *Apply Changes* to save these settings.

**Exploring Maps**

From the *Explore Maps* link of the navigation bar you can reach the *Maps List* page (see *Maps*). Select a map you are interested in and click on it, the *Map Page* will open.

Click on the *View Map* button to open the *Map Viewer*.

The Map Viewer (based on MapStore) provides the following tools:

• the *Table of Contents (TOC)* to manage the map contents;
• the *Basemap Switcher* to change the basemap (see the next paragraphs);
• the *Search Bar* to search by location, name and coordinates (see the paragraph below);
• the *Options Menu Tools* which contains the link to the *Print* tool, to the layers *Catalog* and to the *Measure* tool;
• the *Sidebar* and its tools such as the *Zoom* tools and the *Get Features Info* tool;
• the *Footer Tools* to manage the scale of the map, to track the mouse coordinates and change the CRS (Coordinates Reference System).
Table of Contents (TOC)

In the upper left corner, click on the TOC to open the Table Of Contents, briefly TOC from now on, of the map. The TOC shows all the layers involved with the Map and allows to manage their properties and representations on the map.

From the TOC you can:

• manage the layers Overlap;
• filter the layers list by typing text in the Filter Layers field;
• add new layers from the Catalog by clicking the Add Layer button;
• manage the layers properties such as Opacity (scroll the opacity cursor), Visibility (click on to make the layer not visible, click on to show it on map);
• manage the Layer Settings, see the next paragraph.

Select a Layer from the list and click on it, the Layer Toolbar should appear in the TOC.

The Toolbar shows you many buttons:

• allows you to zoom to the layer extent;
• drives you through the layer settings customization (see the next paragraph);
• to explore the features of the layer and their attributes (more information at Attributes Table);
• to delete layers (click on Delete Layer to confirm your choice);
Fig. 165: *The Table Of Contents (TOC)*

Fig. 166: *Scrolling the Layer Opacity*
Fig. 167: *The Layer Toolbar*

Fig. 168: *Deleting Layers*
• to create Widgets (see Creating Widgets).

Managing Layer Settings

The Layer Settings panel looks like the one below.

![Layer Settings Panel](image)

The Layer Settings are divided in three groups:

1. General settings
2. Display settings
3. Style settings

In the General tab of the Settings Panel you can customize the layer Title, insert a Description and change/create the Layer Group.

Click on the Display tab to see what are the layer appearance properties you can configure.

The Format field allows you to change the output format of the WMS requests. You can set a numeric value of Opacity using the corresponding input field. You can also set the layer as Transparent, decide to Use cache options and to use Single Tile.

The third tab is the Style one. By clicking on it, an advanced Style Editor allows you to create new styles and to modify or delete an existing one. See the Layer Styling section to read more.
Fig. 170: The Layer Display Settings Panel
Attributes Table

When clicking on the button of the Table of Contents (TOC), the Attributes Table panel opens at the bottom of the Map page.

![The Attributes Table Panel](image)

In that panel you can navigate through the features of the layer, zoom to their geometries by clicking on the icon and explore their attributes.

The Attribute Tables has a row for each feature belonging to the layer and a column for each attribute that describes the feature. Each column has a Filter input field through which you can filter the features basing on some value or expression (depending on the data type of the field).

The Attributes Table panel contains a Toolbar which makes you available some useful functionalities. Those functionalities are:

- **Edit Mode**
  By clicking on you can start an editing session. It permits you to add new features, to delete or modify the existing ones, to edit geometries. See the Editing the Layer Data section for further information.

- **Advanced Search**
  Click on a new panel opens. That panel allows you to filter features in many different ways. This functionality will be explained in depth in the Advanced Search section.

- **Zoom to page extent**
  Click on to zoom to the page extent.
• **Hide/show columns**
  When clicking on another panel opens inside the *Attributes Table*. Through that panel you can choose what columns you want to see, see the picture below.

  ![Hide/Show Columns of the Attributes Table](image)

  **Fig. 174: Hide/Show Columns of the Attributes Table**

• **Create a chart**
  Through the button you can open the *Chart Widgets* panel where many functionalities to describe and visualize the layer data are available (see *Creating Widgets*).

• **Sync map with filter**
  Click on the icon to synchronize the map with the filter.

### Advanced Search

As mentioned before, GeoNode allows both an attribute based and spatial filtering. When clicking on from the layer *Attributes Table* the *Advanced Search* panel opens and shows you three different filtering functionalities:

• In the *Attribute Filter* section you can compose a series of conditions about the attributes of the layer. Click on to insert a new empty condition. Select the attribute you are interested in, select an operator and type a comparison value. You can group conditions through the *Add Group* button. Click on to perform
Fig. 175: Advanced Search
the search.

![Attribute Filter](image)

**Fig. 176: Filtering by Attributes**

You can also decide if *All* the conditions have to be met, if only *Any* or *None* of them (see the red arrow in the picture above).

- The **Region of interest** filtering allows you to filter features that have some relationship with a spatial region that you draw on the map.
  
  Select the **Filter Type** (Circle, Viewport, Polygon or Rectangle), draw the spatial region of interest on the map, select a **Geometric Operation** (Intersects, Bounding Box, Contains or Is contained) and then click on ![search](image) Int.

- Through the **Layer Filter** you can select only those features which comply with some conditions on other layers of the map. You can also add conditions on attributes for those layers.

You can read more about the **Attributes Table** and the **Advanced Search** on the MapStore2 Documentation.

### Creating Widgets

**Widgets** are graphical elements that describe the layers data. They can be of different types such as **Charts**, **Texts**, **Tables** and **Counters**. Through the ![TOC](image) button of the **Table of Contents (TOC)** you can open the **Widgets** panel.

### Chart Widgets

**Chart Widgets** are graphical representations of the layer data. They can be **Bar Chart**, **Pie Chart** or **Line Chart** as shown in the picture below.

Let’s create a new **Bar Chart**.

Click on **Bar Chart** then select the **X Attribute**, the **Y Attribute**, the **Operation** and the **Color** you prefer. You can also display the **Legend**, **Hide the Y axis**, **Hide the grid** and decide what **Label** display into the legend.
Fig. 177: *Filtering by Region Of Interest*

Fig. 178: *Layer Filtering*
Fig. 179: Creating Widgets
Select the Chart type

- **Bar Chart**
  - Create a bar chart to add to the map
  - `bar`

- **Pie Chart**
  - Create a pie chart to add to the map
  - `pie`

- **Line Chart**
  - Create a line chart to add to the map
  - `line`

Fig. 180: *Chart Widgets*
Now you can filter the data to be considered for the chart by clicking on the filter icon. We don’t need any filter so click to configure other widget options. Insert a Title and a Description and click on Save.

Fig. 181: Chart Widgets Creation

The green icon means that the chart is connected to the viewport.

Expanding the options menu of the widget you can Show the plotted data, Edit the widget or Delete it, Download the data as a CSV file or Export the image of the graph.

Text Widgets

If you select Text on the Widgets panel you can create Text Widgets. Add a Title and the desired descriptive text, then click on the save icon.

The resulting widget looks like the following.
Fig. 183: *Text Widgets Creation*

Fig. 184: *My Text Widget*
**Table Widgets**

Through the *Table Widgets* you can add the *Attributes Table* of the layer to the map. You can decide to show a subset of the features, through filters, and you can select one or more columns/attributes.

So, choose what attributes you are interested in and click on ![Button](image). Insert *Title* and *Description* (optional) and click on ![Button](image). The example below shows the *Table Widget* on the map.

**Counter Widgets**

*Counter Widgets* are numeric representations of some attributes. For example you can represent the average speed limit on a road network.

Click on ![Button](image), insert *Title* and *Description* then click on ![Button](image). The GeoNode map viewer is MapStore based, see the MapStore Documentation for further information.

**Timeline**

GeoNode can manage layers with a *time dimension*. Those vector layer may vary their data through time so it is useful to represent that variation on the map.

The MapStore based map viewer used in Geonode makes available the *Timeline* tool which allows you to observe the layers’ evolution over time, to inspect the layer configuration at a specific time instant and to view different layer configurations time by time dynamically through animations (see the MapStore Documentation for further details).

**Warning:** Timeline actually works only with WMTS-Multidim extension (WMS time in capabilities is not fully supported).

When loading a temporal layer into the map, the *Timeline* opens automatically.

On the left side of the *Timeline* panel you can set the time value in which you want to observe the data. You can type it directly filling out the corresponding input fields or by using the up/down arrows.

On the other side there are the buttons responsible for managing the animations.

In particular you can *Play* the animation by clicking ![Button](image), go back to the previous time instant through ![Button](image), go forward to next time step using ![Button](image) and stop the animation by clicking ![Button](image).

The *Timeline* panel can be expanded through the ![Button](image) button.

The expanded section of the *Timeline* panel contains the *Time Layers List* and an *Histogram* which shows you:

- the distribution of the data over time
Fig. 185: Table Widgets Columns
Fig. 186: Table Widget

Fig. 187: Counter Widget Creation
Fig. 188: Counter Widget

Fig. 189: The Timeline
Fig. 190: *The Time Control Buttons*

Fig. 191: *The Animation Control Buttons*

Fig. 192: *The Expanded Timeline*

Fig. 193: *The Timeline Histogram*
• the **Time Cursor**

Fig. 194: *The Time Cursor*

You can show/hide the layers list by clicking [ ] (it is active by default).

Through the **Time Range** function you can observe the data in a finite temporal interval. Click on [ ] and set the initial and the final times to use it.

Fig. 195: *The Time Range Settings*

**Animations**

The **Timeline** allows you to see the data configurations (one for each time in which the data are defined) through ordered sequences of steps.

As said before, you can play the resulting **Animation** by clicking the play button [ ]. The layer data displayed on map will change accordingly to the time reach by the cursor on the **Histogram**.

By clicking on [ ] you can manage some **Animation Settings**.

You can activate the **Snap to guide layer** so that the time cursor will snap to the selected layer’s data. You can also set up the **Frame Duration** (by default 5 seconds).

If the **Snap to guide layer** option is disabled, you can force the animation step to be a fixed value.

The **Animation Range** option lets you to define a temporal range within which the time cursor can move. See the following gif to better understand how the **Animation** works or take a look at the **MapStore Documentation**.

**Options Menu Tools**

At the top-right corner of the **Map** there is a **Burger Menu** button [ ]. Click on it to open the **Map Options** panel.
Fig. 196: The Timeline Settings

Fig. 197: The Timeline Animation

Fig. 198: The Map Options Menu
We will explain those tools more in depth in the next paragraphs.

**Printing a Map**

The MapStore based map viewer of GeoNode allows you to print your map with a customizable layout. Click the *PRINT* option from the *Map Options Menu*, the *Printing Window* will open.

![Printing Window](https://images.geonode GeoNode Documentation, Release 2.10

Fig. 199: *The Printing Window*

From this window you can:

- enter *Title* and *Description*;
- choose the *Resolution* in dpi;
- customize the *Layout*
  - the *Sheet size* (A3, A4);
  - if include the legend or not;
  - if to put the legend in a separate page;
  - the page *Orientation* (Landscape or Portrait);
- customize the *Legend*
  - the *Label Font*;
  - the *Font Size*;
  - the *Font Emphasis* (bold, italic);
  - if *Force Labels*;
  - if use *Anti Aliasing Font*;
  - the *Icon Size*;
– the Legend Resolution in dpi.

To print the map click on Print.

The Layers Catalog

All the layers available in GeoNode, both uploaded and remote, can be loaded on the map through the Catalog. Click on the CATALOG option of the Map Options Menu to take a look at the catalog panel.

![Fig. 200: The Layers Catalog](image)

You can navigate through layers and look at their Thumbnail images, Title, Description and Abstract. Click on Add To Map to load a layer into the map, it will be also visible in the Table of Contents (TOC).

Performing Measurements

Click on the MEASURE option of the Map Options Menu to perform a measurement. As you can see in the picture below, this tool allows you to measure Distances, Areas and the Bearing of lines.

To perform a measure draw on the map the geometry you are interested in, the result will be displayed on the left of the unit of measure select menu (this tool allows you to change the unit of measure also).
Fig. 201: *The Measure Tool*

Fig. 202: *Measuring Areas*
Saving a map

Once all the customizations have been carried out, you can Save your map by clicking on the SAVE AS option of the Map Options Menu.

A new popup window will open.

![Saving Maps](image)

You have to fill out a Title and an optional Description, then click on Save. The page will reload and your map should be visible in the Maps list.

Search Bar

The Search Bar of the map viewer allows you to find point of interests (POIs), streets or locations by name. Let’s type the name of some place then select the first record.

The map will automatically re-center on that area delimiting it by a polygon in the case of an area, by a line in the case of a linear shape (e.g. streets, streams) and by a marker in the case of a point.

Sidebar Tools

The Map Viewer makes also available the Sidebar. It is a navigation panel containing various tools that help you to explore the map such as tools for zooming, changing the extent and querying objects on the map.

By default the Sidebar shows you the zooming buttons + and -, other options can be explored by clicking on which expands/collapses the toolbar.
Fig. 204: *Your Map into the List*

Fig. 205: *The Search Bar*
Fig. 206: Result of a Search

Fig. 207: The Default Sidebar
Fig. 208: The Expanded Sidebar
The Sidebar contains the following tools:

- The *Query Objects on map* allows you to get feature information through the button. It allows you to retrieve information about the features of some layers by clicking them directly on the map.

  ![Querying Objects on map](image)

  Fig. 209: *Querying Objects on map*

When clicking on map a new panel opens. That panel will show you all the information about the clicked features for each active loaded layer.

- You can *Zoom To Max Extent* by clicking .

- You can switch between the previous and the next zoom level through the *Go Back* button and the *Go Forward* one .

- The *Switch to Full Screen* button allows to have a full screen map.

**Basemap Switcher**

By deafault, GeoNode allows to enrich maps with many world backgrounds:

- *OpenStreetMap*
- *OpenTopoMap*
- *Sentinel-2-cloudless*

You can also decide to have an *Empty Background*.

**Footer Tools**

At the bottom of the map, the *Footer* shows you the *Scale* of the map and allows you to change it.

The button allows you to see the pointer *Coordinates* and to change the Coordinates Reference System (CRS), WGS 84 by default.

**1.10.7 Publishing Data**

In GeoNode, each resource can be published in order to share it with other people. Once a *Map* has been published you can embed it in your web pages, your blog or your web site.

An easy way to accomplish that is to use an *iframe*. See the following steps:

- Open the *Map Information* page and copy the URL
- Add “/embed” to the URL so that it will be like this “http://master.demo.geonode.org/maps/11/embed”
- Use this URL inside an html *iframe* as *src* value
Fig. 210: *The Basemap Switcher Tool*

Fig. 211: *Switching the Basemap*
Fig. 212: *The Map Scale*

Fig. 213: *The Pointer Coordinates and the CRS*
• Put this html block of code inside your web pages to display the map.

Saving an html file with this code you can test your map on your pc, look at the following picture.

As you can see, some basic functionalities will be available to the user: the Table of Contents (TOC), the Basemap Switcher, the Sidebar Tools and the Options Menu Tools.

1.10.8 Using GeoNode with Other Applications

Your GeoNode project is based on core components which are interoperable and as such, it is straightforward for you to integrate with external applications and services. This section will walk you through how to connect to your GeoNode instance from other applications and how to integrate other services into your GeoNode project. When complete, you should have a good idea about the possibilities for integration, and have basic knowledge about how to accomplish it. You may find it necessary to dive deeper into how to do more complex integration in order to accomplish your goals, but you should feel comfortable with the basics, and feel confident reaching out to the wider GeoNode community for help.
Fig. 215: The Embedded Map
1.11 GeoNode Core

1.11.1 Overview

The following steps will guide you to a fresh setup of GeoNode. All guides will first install and configure the system to run it in DEBUG mode (also known as DEVELOPMENT mode) and then by configuring an HTTPD server to serve GeoNode through the standard HTTP (80) port.

Those guides are not meant to be used on a production system. There will be dedicated chapters that will show you some hints to optimize GeoNode for a production-ready machine. In any case, we strongly suggest to task an experienced DevOp or System Administrator before exposing your server to the WEB.

1.11.2 Ubuntu 18.04

This part of the documentation describes the complete setup process for GeoNode on an Ubuntu 18.04 64-bit clean environment (Desktop or Server). All examples use shell commands that you must enter on a local terminal or a remote shell. - If you have a graphical desktop environment you can open the terminal application after login; - if you are working on a remote server the provider or sysadmin should has given you access through an ssh client.

Install the dependencies

In this section, we are going to install all the basic packages and tools needed for a complete GeoNode installation. To follow this guide, a basic knowledge about Ubuntu Server configuration and working with a shell is required. This guide uses vim as the editor; fill free to use nano, gedit or others.

Upgrade system packages

Check that your system is already up-to-date with the repository running the following commands:

```
sudo apt update
dsudo apt upgrade
```

Packages Installation

**Note:** You don’t need to install the system packages if you want to run the project using Docker

We will use example.org as fictitious Domain Name.

First, we are going to install all the system packages needed for the GeoNode setup. Login to the target machine and execute the following commands:

```
# Install packages from GeoNode core
sudo apt install -y python-gdal gdal-bin
sudo apt install -y python-pip python-dev python-virtualenv virtualenvwrapper
dep gettext
dep install -y libxslt1-dev libjpeg-dev libpng-dev libpq-dev libgdal-dev
libgdal20
libxml2 libxml2-dev gettext
libxslt1-dev libjpeg-dev libpng-dev libpq-dev libgdal-dev
```

(continues on next page)
Create a Dedicated User

In the following steps a User named geonode is created (if needed) and used: to run installation commands the user must be in the sudo group.

Create User geonode if not present:

```
# Follow the prompts to set the new user’s information.
# It is fine to accept the defaults to leave all of this information blank.
sudo adduser geonode

# The following command adds the user geonode to group sudo
sudo usermod -aG sudo geonode

# make sure the newly created user is allowed to login by ssh
# (out of the scope of this documentation) and switch to User geonode
su geonode
```

GeoNode Installation

This is the most basic installation of GeoNode. It won’t use any external server like Apache Tomcat, PostgreSQL or HTTPD.

It will run locally against a file-system based SQLite database.

First of all we need to prepare a new Python Virtual Environment

Since geonode needs a large number of different python libraries and packages, it’s recommended to use a python virtual environment to avoid conflicts on dependencies with system wide python packages and other installed software. See also documentation of Virtualenvwrapper package for more information

```
# Create the GeoNode Virtual Environment (first time only)
sudo /usr/bin/mkvirtualenvwrapper.sh
mkvirtualenv geonode
```

At this point your command prompt shows a (geonode) prefix, this indicates that your virtualenv is active.

Note: The next time you need to access the Virtual Environment just run

```
sudo /usr/bin/mkvirtualenvwrapper.sh
```
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
workon geonode

Note: In order to save permanently the virtualenvwrapper environment

nano ~/.bashrc

# Write to the bottom of the file the following lines
export WORKON_HOME=/home/geonode/.virtualenvs
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh

# Let's create the GeoNode core base folder and clone it
sudo mkdir -p /opt/geonode/
sudo usermod -a -G www-data geonode
sudo chown -Rf geonode:www-data /opt/geonode/
sudo chmod -Rf 775 /opt/geonode/

# Clone the GeoNode source code on /opt/geonode
cd /opt
git clone https://github.com/GeoNode/geonode.git geonode

# Install the Python packages
cd /opt/geonode
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e . --upgrade

# Install GDAL Utilities for Python
pip install pygdal="`gdal-config --version`.*"

Run GeoNode for the first time in DEBUG Mode

Warning: Be sure you have successfully completed all the steps of the section Install the dependencies.

This command will run both GeoNode and GeoServer locally after having prepared the SQLite database. The server will start in DEBUG (or DEVELOPMENT) mode, and it will start the following services:


This modality is beneficial to debug issues and/or develop new features, but it cannot be used on a production system.

# Prepare the GeoNode SQLite database (the first time only)
paver setup
paver sync

Note: In case you want to start again from a clean situation, just run

paver reset_hard
# Run the server in DEBUG mode
paver start

Once the server has finished the initialization and prints on the console the sentence GeoNode is now available, you can open a browser and go to:

http://localhost:8000/

Sign-in with:

user: admin
password: admin

---

**Postgis database Setup**

**Warning:** Be sure you have successfully completed all the steps of the section Install the dependencies.

In this section, we are going to setup users and databases for GeoNode in PostgreSQL.

**Install and Configure the PostgreSQL Database System**

In this section we are going to install the PostgreSQL packages along with the PostGIS extension. Those steps must be done **only** if you don’t have the DB already installed on your system.

```
sudo sh -c 'echo "deb http://apt.postgresql.org/pub/repos/apt/ `lsb_release -cs`-pgdg-" >> /etc/apt/sources.list.d/pgdg.list'
sudo wget --no-check-certificate --quiet -O - https://www.postgresql.org/media/keys/ACCC4CF8.asc | sudo apt-key add -
sudo apt update
sudo apt install -y postgresql-11 postgresql-11-postgis-2.5 postgresql-11-postgis-2.5-scripts postgresql-contrib-11 postgresql-client-11
```

We now must create two databases, geonode and geonode_data, belonging to the role geonode.

**Note:** This is our default configuration. You can use any database or role you need. The connection parameters must be correctly configured on settings, as we will see later in this section.

**Databases and Permissions**

First, create the geonode user. GeoNode is going to use this user to access the database
**sudo -u postgres createuser -P geonode**

You will be prompted asked to set a password for the user. Enter `geonode` as password.

---

**Warning:** This is a sample password used for the sake of simplicity. This password is very weak and should be changed in a production environment.

---

Create database `geonode` and `geonode_data` with owner `geonode`

**sudo -u postgres createdb -O geonode geonode**

**sudo -u postgres createdb -O geonode geonode_data**

Next let’s create PostGIS extensions

**sudo -u postgres psql -d geonode_data -c 'CREATE EXTENSION postgis;';**

**sudo -u postgres psql -d geonode_data -c 'GRANT ALL ON geometry_columns TO PUBLIC;';**

**sudo -u postgres psql -d geonode_data -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;';**

**sudo -u postgres psql -d geonode_data -c 'GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA public TO geonode;';**

---

Final step is to change user access policies for local connections in the file `pg_hba.conf`

**sudo vim /etc/postgresql/11/main/pg_hba.conf**

Scroll down to the bottom of the document. We only need to edit one line.

```
# "local" is for Unix domain socket connections only
# local  all     all        peer
local  all     all        trust
```

---

**Warning:** If your PostgreSQL database resides on a separate/remote machine, you’ll have to allow remote access to the databases in the `/etc/postgresql/11/main/pg_hba.conf` to the geonode user and tell PostgreSQL to accept non-local connections in your `/etc/postgresql/11/main/postgresql.conf` file.

Restart PostgreSQL to make the change effective.

**sudo service postgresql restart**

PostgreSQL is now ready. To test the configuration, try to connect to the `geonode` database as `geonode` role.

**psql -U geonode geonode**

```
\q
```

---

**Install GeoServer**

When running the command `paver start`, as we have seen before, the script runs automatically a Jetty Servlet Java container running GeoServer with the default settings.
GeoNode Documentation, Release 2.10

Warning: Before executing the next steps, be sure GeoNode and GeoServer paver services have been stopped.
In order to do that
workon geonode
cd /opt/geonode/
paver stop

This is not the optimal way to run GeoServer. This is a fundamental component of GeoNode and we must be sure
it is running on a stable and reliable manner.
In this section, we are going to install the Apache Tomcat 8 Servlet Java container, which will be started by default
on the internal port 8080.
We will also perform several optimizations to:
1. Correctly setup the Java VM Options, like the available heap memory and the garbage collector options.
2. Externalize the GeoServer and GeoWebcache catalogs in order to allow further updates without the risk of
deleting our datasets.
Note: This is still a basic setup of those components. More details will be provided on sections of the documentation
concerning the hardening of the system in a production environment. Nevertheless, you will need to tweak a bit those
settings accordingly with your current system. As an instance, if your machine does not have enough memory, you
will need to lower down the initial amount of available heap memory. Warnings and notes will be placed below the
statements that will require your attention.
# Install Openjdk
sudo -i apt update
sudo apt install openjdk-8-jdk-headless default-jdk-headless -y
sudo update-java-alternatives --jre-headless --jre --set java-1.8.0-openjdk-amd64
# Check Java version
java -version
openjdk version "1.8.0_212"
OpenJDK Runtime Environment (build 1.8.0_212-8u212-b03-0ubuntu1.18.04.1-b03)
OpenJDK 64-Bit Server VM (build 25.212-b03, mixed mode)
# Install Apache Tomcat 8
sudo wget http://www-us.apache.org/dist/tomcat/tomcat-8/v8.5.50/bin/apache-tomcat-8.5.
˓→50.tar.gz
sudo tar xzf apache-tomcat-8.5.50.tar.gz
sudo mv apache-tomcat-8.5.50 /usr/local/apache-tomcat8
sudo useradd -m -U -s /bin/false tomcat
sudo usermod -a -G www-data tomcat
sudo sed -i -e 's/xom-\*\.jar/xom-\*\.jar,bcprov\*\.jar/g' /usr/local/apache-tomcat8/
˓→conf/catalina.properties
export JAVA_HOME=$(readlink -f /usr/bin/java | sed "s:bin/java::")
echo 'JAVA_HOME='$JAVA_HOME | sudo tee --append /usr/local/apache-tomcat8/bin/setenv.
˓→sh
# Add Tomcat user to www-data group !important!
sudo usermod -a -G www-data tomcat
sudo sh -c 'chmod +x /usr/local/apache-tomcat8/bin/*.sh'
sudo chown -Rf tomcat:www-data /usr/local/apache-tomcat8

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Chapter 1. Table of contents


Let’s create a system service to manage tomcat startup

```bash
sudo vim /etc/systemd/system/tomcat.service
```

```
[Unit]
Description=Tomcat 8.5 servlet container
After=network.target

[Service]
Type=forking
User=tomcat
Group=tomcat
Environment="JAVA_HOME=/usr/lib/jvm/default-java"
Environment="JAVA_OPTS=-Djava.security.egd=file:///dev/urandom"
Environment="CATALINA_BASE=/usr/local/apache-tomcat8"
Environment="CATALINA_HOME=/usr/local/apache-tomcat8"
Environment="CATALINA_PID=/usr/local/apache-tomcat8/temp/tomcat.pid"
ExecStart=/usr/local/apache-tomcat8/bin/startup.sh
ExecStop=/usr/local/apache-tomcat8/bin/shutdown.sh

[Install]
WantedBy=multi-user.target
```

To test the service:

```bash
sudo systemctl daemon-reload
sudo systemctl restart tomcat
sudo systemctl status tomcat.service
```

To make it enabled by default

```bash
sudo systemctl enable tomcat
```

**GeoServer Optimizations**

Let’s externalize the GEOSERVER_DATA_DIR and logs

```bash
# Create the target folders
sudo mkdir -p /opt/data
sudo chown -Rf geonode:www-data /opt/data
sudo chmod -R 775 /opt/data
sudo mkdir -p /opt/data/logs
sudo chown -Rf geonode:www-data /opt/data/logs
sudo chmod -R 775 /opt/data/logs

# Download and extract the default GEOSERVER_DATA_DIR
sudo wget --no-check-certificate https://build.geo-solutions.it/geonode/geoserver/\n   _latest/data-2.15.4.zip
sudo unzip data-2.15.4.zip -d /opt/data/

sudo mv /opt/data/data/ /opt/data/geoserver_data
sudo chown -Rf tomcat:www-data /opt/data/geoserver_data
```

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(continued from previous page)

```bash
sudo chmod -Rf 775 /opt/data/geoserver_data
sudo mkdir -p /opt/data/geoserver_logs
sudo chown -Rf tomcat:www-data /opt/data/geoserver_logs
sudo chmod -Rf 775 /opt/data/geoserver_logs

sudo mkdir -p /opt/data/gwc_cache_dir
sudo chown -Rf tomcat:www-data /opt/data/gwc_cache_dir
sudo chmod -Rf 775 /opt/data/gwc_cache_dir

# Download and install GeoServer
sudo wget --no-check-certificate https://build.geo-solutions.it/geonode/geoserver/ → latest/geoserver-2.15.4.war
sudo mv geoserver-2.15.4.war /usr/local/apache-tomcat8/webapps/geoserver.war

Let's now configure the JAVA_OPTS, i.e. the parameters to run the Servlet Container, like heap memory, garbage collector and so on.

```bash
sudo sed -i -e "s/JAVA_OPTS=/#JAVA_OPTS=/g" /usr/local/apache-tomcat8/bin/setenv.sh
echo 'GEOSERVER_DATA_DIR="/opt/data/geoserver_data"' | sudo tee --append /usr/local/ → apache-tomcat8/bin/setenv.sh
echo 'GEOSERVER_LOG_LOCATION="/opt/data/geoserver_logs/geoserver.log"' | sudo tee --append /usr/local/apache-tomcat8/bin/setenv.sh
echo 'GEOWEBCACHE_CACHE_DIR="/opt/data/gwc_cache_dir"' | sudo tee --append /usr/local/ → apache-tomcat8/bin/setenv.sh
echo 'GEOFENCE_DIR="$GEOSERVER_DATA_DIR/geofence"' | sudo tee --append /usr/local/ → apache-tomcat8/bin/setenv.sh
echo 'TIMEZONE="UTC"' | sudo tee --append /usr/local/apache-tomcat8/bin/setenv.sh

echo 'JAVA_OPTS="-server -Djava.awt.headless=true -Dorg.geotools.shapefile. → datetime=true -XX:+UseParallelGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 - → Duser.timezone=$TIMEZONE -Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 → -Djavax.servlet.response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DGEOSERVER_ → DATA_DIR=$GEOSERVER_DATA_DIR -Dgeofence.dir=$GEOFENCE_DIR -DGEOSERVER_LOG_LOCATION= → $GEOSERVER_LOG_LOCATION -DGEOWEBCACHE_CACHE_DIR=$GEOWEBCACHE_CACHE_DIR"' | sudo tee → --append /usr/local/apache-tomcat8/bin/setenv.sh
```

Note: After the execution of the above statements, you should be able to see the new options written at the bottom of the file /usr/local/apache-tomcat8/bin/setenv.sh.

```bash
...
# If you run Tomcat on port numbers that are all higher than 1023, then you
# do not need authbind. It is used for binding Tomcat to lower port numbers.
# (yes/no, default: no)
#AUTHBIND=no
JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64/jre/
GEOSERVER_DATA_DIR="/opt/data/geoserver_data"
GEOSERVER_LOG_LOCATION="/opt/data/geoserver_logs/geoserver.log"
GEOWEBCACHE_CACHE_DIR="/opt/data/gwc_cache_dir"
GEOFENCE_DIR="$GEOSERVER_DATA_DIR/geofence"
TIMEZONE="UTC"
JAVA_OPTS="-server -Djava.awt.headless=true -Dorg.geotools.shapefile.datetime=true - → XX:+UseParallelGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Duser.timezone= → $TIMEZONE -Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 -Djavax.servlet. → response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DGEOSERVER_DATA_DIR= → $GEOSERVER_DATA_DIR -Dgeofence.dir=$GEOFENCE_DIR -DGEOSERVER_LOG_LOCATION= → $GEOSERVER_LOG_LOCATION -DGEOWEBCACHE_CACHE_DIR=$GEOWEBCACHE_CACHE_DIR"
```
Those options could be updated or changed manually at any time, accordingly to your needs.

**Warning:** The default options we are going to add to the Servlet Container, assume you can reserve at least 4GB of RAM to GeoServer (see the option `-Xmx4096m`). You must be sure your machine has enough memory to run both GeoServer and GeoNode, which in this case means at least 4GB for GeoServer plus at least 2GB for GeoNode. A total of at least 6GB of RAM available on your machine. If you don’t have enough RAM available, you can lower down the values `-Xms512m -Xmx4096m`. Consider that with less RAM available, the performances of your services will be highly impacted.

In order to make the changes effective, you’ll need to restart the Servlet Container.

```bash
# Restart the server
sudo systemctl daemon-reload
sudo systemctl restart tomcat
sudo systemctl status tomcat.service

# Follow the startup logs
sudo tail -F -n 300 /opt/data/geoserver_logs/geoserver.log
```

If you can see on the logs something similar to this, without errors

```none
... 2019-05-31 10:06:34,190 INFO [geoserver.wps] - Found 5 bindable processes in
  →GeoServer specific processes 2019-05-31 10:06:34,281 INFO [geoserver.wps] - Found 89 bindable processes in
  →ras:ConvolveCoverage as the input kernel of type class javax.media.jai.KernelJAI
  →cannot be handled 2019-05-31 10:06:34,319 INFO [geoserver.wps] - Blacklisting process
  →ras:RasterZonalStatistics2 as the input zones of type class java.lang.Object cannot
  →be handled 2019-05-31 10:06:34,320 INFO [geoserver.wps] - Blacklisting process
  →ras:RasterZonalStatistics2 as the input nodata of type class it.geosolutions.jaiext.
  →ras:RasterZonalStatistics2 as the input rangeData of type class java.lang.Object
  →cannot be handled 2019-05-31 10:06:34,320 INFO [geoserver.wps] - Blacklisting process
  →ras:RasterZonalStatistics2 as the output zonal statistics of type interface java.
  →onto handler 'wfsTestServlet' 2019-05-31 10:06:34,918 INFO [ows.OWSHandlerMapping] - Mapped URL path [/wfs/*] onto
  → handler 'dispatcher'
```

(continues on next page)
Your GeoServer should be up and running at

http://localhost:8080/geoserver/

**Warning:** In case of errors or the file geoserver.log is not created, check the Catalina logs in order to try to understand what’s happened.

sudo less /usr/local/apache-tomcat8/logs/catalina.out

It is possible to test the new running GeoServer with the GeoNode paver service (DEBUG mode). To do that

workon geonode
cd /opt/geonode/
paver start_django

**Warning:** The paver reset command from now on won’t clean up GeoServer and its catalog anymore. Therefore, every data uploaded during those tests will remain on GeoServer even if GeoNode will be reset.

**Web Server**

Until now we have seen how to start GeoNode in DEBUG mode from the command line, through the paver utilities. This is of course not the best way to start it. Moreover you will need a dedicated HTTPD server running on port 80 if you would like to expose your server to the world.

In this section we will see:

1. How to configure NGINX HTTPD Server to host GeoNode and GeoServer. In the initial setup we will still run the services on http://localhost

2. Update the settings in order to link GeoNode and GeoServer to the PostgreSQL Database.

3. Update the settings in order to update GeoNode and GeoServer services running on a public IP or hostname.
4. Install and enable HTTPS secured connection through the Let's Encrypt provider.

**Install and configure NGINX**

**Warning:** Before executing the next steps, be sure GeoNode paver services have been stopped. To do that:

```
workon geonode
cd /opt/geonode/
paver stop_django
```

```
# Install the services
sudo apt install -y nginx uwsgi uwsgi-plugin-python
```

**Serving ("geonode", "geoserver") via NGINX**

```
# Create the GeoNode UWSGI config
sudo vim /etc/uwsgi/apps-available/geonode.ini
```

```
[uwsgi]
socket = 0.0.0.0:8000
uid = geonode
gid = www-data

plugins = python
virtualenv = /home/geonode/.virtualenvs/geonode
env = DEBUG=False
env = DJANGO_SETTINGS_MODULE=geonode.settings
env = SECRET_KEY='RanD0m%3cr3tK3y'
env = SITE_HOST_NAME=localhost
env = SITEURL=http://localhost/
env = LOCKDOWN_GEONODE=False
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = FORCE_SCRIPT_NAME=
env = EMAIL_ENABLE=False
env = DJANGO_EMAIL_HOST_USER=
env = DJANGO_EMAIL_HOST_PASSWORD=
env = DJANGO_EMAIL_HOST=localhost
env = DJANGO_EMAIL_PORT=25
env = DJANGO_EMAIL_USE_TLS=False
env = DEFAULT_FROM_EMAIL=GeoNode <no-reply@localhost>
env = MONITORING_ENABLED=True
env = GEOSERVER_PUBLIC_HOST=localhost
env = GEOSERVER_PUBLIC_PORT=
env = GEOSERVER_ADMIN_PASSWORD=geoserver
env = GEOSERVER_LOCATION=http://localhost/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=http://localhost/geoserver/
env = GEOSERVER_WEB_UI_LOCATION=http://localhost/geoserver/
env = RESOURCE_PUBLISHING=False
env = ADMIN_MODERATE_UPLOADS=False
env = GROUP_PRIVATE_RESOURCES=False
env = GROUP_MANDATORY_RESOURCES=False
```

(continues on next page)
env = OGC_REQUEST_TIMEOUT=60
env = OGC_REQUEST_MAX_RETRIES=3
env = OGC_REQUEST_POOL_MAXSIZE=100
env = OGC_REQUEST_POOL_CONNECTIONS=100
env = EXIF_ENABLED=True
env = CREATE_LAYER=False
env = FAVORITE_ENABLED=True
chdir = /opt/geonode
module = geonode.wsgi:application
processes = 4
threads = 2
enable-threads = true
master = true

# logging
# path to where uwsgi logs will be saved
logto = /opt/data/logs/geonode.log
daemonize = /opt/data/logs/geonode.log
touch-reload = /opt/geonode/geonode/wsgi.py
buffer-size = 32768
max-requests = 500
harakiri = 300 # respawn processes taking more than 5 minutes (300 seconds)
max-requests = 500 # respawn processes after serving 5000 requests
# limit-as = 1024 # avoid Errno 12 cannot allocate memory
harakiri-verbose = true
vacuum = true
thunder-lock = true

# Enable the GeoNode UWSGI config
sudo ln -s /etc/uwsgi/apps-available/geonode.ini /etc/uwsgi/apps-enabled/geonode.ini

# Restart UWSGI Service
sudo service uwsgi restart

# Backup the original NGINX config
sudo mv /etc/nginx/nginx.conf /etc/nginx/nginx.conf.orig

# Create the GeoNode Default NGINX config
sudo vim /etc/nginx/nginx.conf

# Make sure your nginx.conf matches the following one
user www-data;
worker_processes auto;
pid /run/nginx.pid;
include /etc/nginx/modules-enabled/*.conf;

events {
    worker_connections 768;
    # multi_accept on;
}

http {
    ##
# Basic Settings

```
sendfile on;
tcp_nopush on;
tcp_nodelay on;
keepalive_timeout 65;
types_hash_max_size 2048;
# server_tokens off;
# server_names_hash_bucket_size 64;
# server_name_in_redirect off;

include /etc/nginx/mime.types;
default_type application/octet-stream;
```

## SSL Settings

```
ssl_protocols TLSv1 TLSv1.1 TLSv1.2; # Dropping SSLv3, ref: POODLE
ssl_prefer_server_ciphers on;
```

## Logging Settings

```
access_log /var/log/nginx/access.log;
error_log /var/log/nginx/error.log;
```

## Gzip Settings

```
gzip on;
gzip_vary on;
gzip_proxied any;
gzip_http_version 1.1;
gzip_disable "MSIE [1-6]\\.";
gzip_buffers 16 8k;
gzip_min_length 1100;
gzip_comp_level 6;
gzip_proxied any;
gzip_types video/mp4 text/plain application/javascript application/x-javascript text/javascript text/xml text/css image/jpeg;
```

## Virtual Host Configs

```
include /etc/nginx/conf.d/*.conf;
include /etc/nginx/sites-enabled/*;
```

```
# Remove the Default NGINX config
sudo rm /etc/nginx/sites-enabled/default
```
Create the GeoNode App NGINX config

```
sudo vim /etc/nginx/sites-available/geonode
```

```conf
uwsgi_intercept_errors on;

upstream geoserver_proxy {
    server localhost:8080;
}

# Expires map
map $sent_http_content_type $expires {
    default off;
    text/html epoch;
    text/css max;
    application/javascript max;
    ~image/ max;
}

server {
    listen 80 default_server;
    listen [::]:80 default_server;

    root /var/www/html;
    index index.html index.htm index.nginx-debian.html;

    server_name _;

    charset utf-8;

    etag on;
    expires $expires;
    proxy_read_timeout 600s;
    # set client body size to 2M #
    client_max_body_size 50000M;

    location / {
        etag off;
        uwsgi_pass 127.0.0.1:8000;
        uwsgi_read_timeout 600s;
        include uwsgi_params;
    }

    location /static/ {
        alias /opt/geonode/geonode/static_root/;
    }

    location /uploaded/ {
        alias /opt/geonode/geonode/uploaded/;
    }

    location /geoserver {
        proxy_pass http://geoserver_proxy;
        include proxy_params;
    }
}
```
# Enable GeoNode NGINX config

```bash
sudo ln -s /etc/nginx/sites-available/geonode /etc/nginx/sites-enabled/geonode
```

# Restart the services

```bash
sudo systemctl restart tomcat
sudo service nginx restart
```

### Refresh GeoNode static data

```bash
workon geonode
cd /opt/geonode
python manage.py collectstatic --no-input
```

### Refresh GeoNode and GeoServer OAuth2 settings

```bash
workon geonode
cd /opt/geonode

# This must be done the first time only
sudo cp package/support/geonode.binary /usr/bin/geonode
sudo cp package/support/geonode.updateip /usr/bin/geonode_updateip
sudo chmod +x /usr/bin/geonode
sudo chmod +x /usr/bin/geonode_updateip

pip install -e git+https://github.com/justquick/django-activity-stream.git#egg=django-activity-stream

# Update the GeoNode ip or hostname
sudo PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.settings GEONODE_ETC=/opt/geonode GEOSERVER_DATA_DIR=/opt/data/geoserver_data TOMCAT_SERVICE="service tomcat" APACHE_SERVICE="service nginx" geonode_updateip -p
```

The GeoNode service should now run on `http://localhost/`

The GeoServer service should now run on `http://localhost/geoserver/`

You should be able to login with the default user **admin** *(pwd admin)* and upload your layers.

**Update the settings in order to use the PostgreSQL Database**

**Warning:** Make sure you already installed and configured the Database as explained in the previous sections.

```bash
workon geonode
cd /opt/geonode
cp geonode/local_settings.py.geoserver.sample geonode/local_settings.py

# In case you want to change the DB password, run the following
# sudo sed -i -e "s/'PASSWORD': 'geonode',/'PASSWORD': '<your_db_role_password>',/g" geonode/local_settings.py

# Stop Tomcat
sudo systemctl stop tomcat
```

(continues on next page)
Before finalizing the configuration we will need to update the UWSGI settings

```
sudo vim /etc/uwsgi/apps-enabled/geonode.ini
```

Change `geonode.settings` to `geonode.local_settings`:

```
:%s/geonode.settings/geonode.local_settings/g
:wq
```

Restart UWSGI and update OAuth2 by using the new `geonode.local_settings`

```
# Restart UWSGI
sudo service uwsgi restart
```

Update the settings in order to update GeoNode and GeoServer services running on a public IP or hostname

**Warning:** Before exposing your services to the Internet, make sure your system is hardened and secure enough. See the specific documentation section for more details.

Let’s say you want to run your services on a public IP or domain, e.g. `www.example.org`. You will need to slightly update your services in order to reflect the new server name.

In particular the steps to do are:

1. Update NGINX configuration in order to serve the new domain name.

```
sudo vim /etc/nginx/sites-enabled/geonode

# Update the 'server_name' directive
server_name example.org www.example.org;

# Restart the service
sudo service nginx restart
```

2. Update UWSGI configuration in order to serve the new domain name.
3. Update OAuth2 configuration in order to hit the new hostname.

```bash
workon geonode
cd /opt/geonode
# Update the GeoNode ip or hostname
sudo PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.local_settings GEONODE_ETC=/opt/geonode GEOSERVER_DATA_DIR=/opt/data/geoserver_data TOMCAT_SERVICE="service tomcat" APACHE_SERVICE="service nginx" geonode_updateip -l localhost -p www.example.org
```

4. Update the existing GeoNode links in order to hit the new hostname.

```bash
workon geonode
cd /opt/geonode
# Update the GeoNode ip or hostname
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py migrate_baseurl --source-address=http://localhost --target-address=http://www.example.org
```

Install and enable HTTPS secured connection through the Let's Encrypt provider

```bash
# Install Let's Encrypt Certbot
sudo add-apt-repository ppa:certbot/certbot
sudo apt update -y; sudo apt install python-certbot-nginx -y

# Reload NGINX config and make sure the firewall denies access to HTTP
sudo systemctl reload nginx
sudo ufw allow 'Nginx Full'
sudo ufw delete allow 'Nginx HTTP'

# Create and dump the Let's Encrypt Certificates
sudo certbot --nginx -d example.org -d www.example.org
# ...choose the redirect option when asked for
```

1. Update the GeoNode OAuth2 Redirect URIs accordingly.
   From the GeoNode Admin Dashboard go to Home › Django/GeoNode OAuth Toolkit › Applications › GeoServer

2. Update the GeoServer Proxy Base URL accordingly.
   From the GeoServer Admin GUI go to About & Status > Global

3. Update the GeoServer Role Base URL accordingly.
   From the GeoServer Admin GUI go to Security > Users, Groups, Roles > geonode REST role service
Fig. 216: Redirect URIs

Fig. 217: Proxy Base URL
4. Update the GeoServer OAuth2 Service Parameters accordingly.

From the GeoServer Admin GUI go to Security > Authentication > Authentication Filters > geonode-oauth2

5. Update the UWSGI configuration

```
sudo vim /etc/uwsgi/apps-enabled/geonode.ini

# Change everywhere 'http' to 'https'
$https/http/https/g

# Add three more 'env' variables to the configuration
env = SECURE_SSL_REDIRECT=True
env = SECURE_HSTS_INCLUDE_SUBDOMAINS=True
env = AVATAR_GRAVATAR_SSL=True

# Restart the service
sudo service uwsgi restart
```

1.11.3 CentOS 7.0

- TODO

1.11.4 Docker

In this section we are going to list the passages needed to:

1. Install Docker and docker-compose packages on a Ubuntu host
Fig. 219: OAuth2 Service Parameters
```
[uwsgi]
socket = 0.0.0.0:8000
uid = geonode
gid = www-data

plugins = python
virtualenv = /home/geonode/Envs/geonode
env = DEBUG=False
env = DJANGO_SETTINGS_MODULE=geonode.local_settings
env = SECRET_KEY='RanD6m%3cr3tK3y'
env = SITE_HOST_NAME=www.example.org
env = SITEURL=https://www.example.org/
env = LOCKDOWN_GEONode=False
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = FORCE_SCRIPT_NAME=
env = EMAIL_ENABLE=False
env = DJANGO_EMAIL_HOST_USER=
env = DJANGO_EMAIL_HOST_PASSWORD=
env = DJANGO_EMAIL_HOST=www.example.org
env = DJANGO_EMAIL_PORT=25
env = DJANGO_EMAIL_USE_TLS=False
env = DEFAULT_FROM_EMAIL=GeoNode <no-reply@www.example.org>
env = MONITORING_ENABLED=True
env = GEOSERVER_PUBLIC_HOST=www.example.org
env = GEOSERVER_PUBLIC_PORT=
env = GEOSERVER_ADMIN_PASSWORD=geoserver
env = GEOSERVER_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_WEB_UI_LOCATION=https://www.example.org/geoserver/
env = RESOURCE_PUBLISHING=False
env = ADMIN_MODERATE_UPLOADES=False
env = GROUP_PRIVATE_RESOURCES=False
env = GROUP_MANDATORY_RESOURCES=False
env = OGC_REQUEST_TIMEOUT=60
env = OGC_REQUEST_MAX_RETRIES=3
env = OGC_REQUEST_POOL_MAXSIZE=100
env = OGC_REQUEST_POOL.ConnectionStrings=100
env = EXIF_ENABLED=True
env = CREATE_LAYERS=False
env = FAVORITE_ENABLED=True
env = SECURE_SSL_REDIRECT=True
env = SECURE_HSTS_INCLUDE_SUBDOMAINS=True
```

Fig. 220: UWSGI Configuration
GeoNode Documentation, Release 2.10

2. Deploy a vanilla GeoNode 2.10 with Docker
   a. Override the ENV variables to deploy on a public IP or domain
   b. Access the django4geonode Docker image to update the code-base and/or change internal settings
   c. Access the geoserver4geonode Docker image to update the GeoServer version

3. Passages to completely get rid of old Docker images and volumes (prune the environment completely)

Install the Docker and docker-compose packages on a Ubuntu host

Docker Setup (First time only)

```
sudo add-apt-repository universe
sudo apt-get update -y
sudo apt-get install -y git-core git-buildpackage debhelper devscripts
sudo apt-get install -y apt-transport-https ca-certificates curl gnupg-agent software-properties-common
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"
sudo apt-get update -y
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose
sudo apt autoremove --purge
sudo usermod -aG docker geonode
su geonode
```

Install the Docker and docker-compose packages on a CentOS host

Docker Setup (First time only)

```
Warning: The centos-extras repository must be enabled

sudo yum install -y yum-utils device-mapper-persistent-data lvm2
sudo yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
sudo yum install docker-ce docker-ce-cli containerd.io
sudo systemctl start docker
sudo usermod -aG docker geonode
su geonode
```
Test Docker Compose Instance

Logout and login again on shell and then execute:

```
docker run -it hello-world
```

Deploy a vanilla GeoNode 2.10 with Docker

Clone the Project

```
# Let's create the GeoNode core base folder and clone it
sudo mkdir -p /opt/geonode/
sudo usermod -a -G www-data geonode
sudo chown -Rf geonode:www-data /opt/geonode/
sudo chmod -Rf 775 /opt/geonode/

# Clone the GeoNode source code on /opt/geonode
cd /opt
git clone https://github.com/GeoNode/geonode.git geonode
```

Start the Docker instances on localhost

**Warning:** The first time pulling the images will take some time. You will need a good internet connection.

```
cd /opt/geonode
docker-compose -f docker-compose.yml -f docker-compose.override.localhost.yml pull
docker-compose -f docker-compose.yml -f docker-compose.override.localhost.yml up -d
```

**Note:** If you want to re-build the docker images from scratch, instead of pulling them from the Docker Hub add the `--build` parameter to the up command, for instance:

```
docker-compose -f docker-compose.yml -f docker-compose.override.localhost.yml up --build
```

In this case you can of course skip the pull step to download the pre-built images.

**Note:** To startup the containers daemonized, which means they will be started in the background (and keep running if you log out from the server or close the shell) add the `-d` option to the up command as in the following, `docker-compose` will take care to restart the containers if necessary (e.g. after boot).

```
docker-compose -f docker-compose.yml -f docker-compose.override.localhost.yml up -d
```

```
# If you want to rebuild the images also
docker-compose -f docker-compose.yml -f docker-compose.override.localhost.yml up --build -d
```

1.11. GeoNode Core
Test the instance and follow the logs

If you run the containers daemonized (with the -d option), you can either run specific Docker commands to follow the startup and initialization logs or entering the image shell and check for the GeoNode logs.

In order to follow the startup and initialization logs, you will need to run the following command from the repository folder

```
cd /opt/geonode
docker logs -f django4geonode
```

Alternatively:

```
cd /opt/geonode
docker-compose logs -f django
```

You should be able to see several initialization messages. Once the container is up and running, you will see the following statements

```
... 789 static files copied to '/mnt/volumes/statics/static'.
static data refreshed
Executing UWSGI server uwsgi --ini /usr/src/app/uwsgi.ini for Production
[uWSGI] getting INI configuration from /usr/src/app/uwsgi.ini
```

To exit just hit CTRL+C.

This message means that the GeoNode containers have bee started. Browsing to http://localhost/ will show the GeoNode home page. You should be able to successfully log with the default admin user (admin/admin) and start using it right away.

With Docker it is also possible to run a shell in the container and follow the logs exactly the same as you deployed it on a physical host. To achieve this run

```
docker exec -it django4geonode /bin/bash
```

Alternatively:

```
docker-compose exec django /bin/bash
```

To exit just hit CTRL+C and exit to return to the host.

Override the ENV variables to deploy on a public IP or domain

If you would like to start the containers on a public IP or domain, let’s say www.example.org, you can

```
cd /opt/geonode
```

```
# Stop the Containers (if running)
docker-compose stop
```

Edit the ENV override file in order to deploy on www.example.org
# Make a copy of docker-compose.override.localhost.yml

cp docker-compose.override.localhost.yml docker-compose.override.example-org.yml

Replace everywhere localhost with www.example.org

vim docker-compose.override.example-org.yml

```yaml
# e.g.: :%s/localhost/www.example.org/g

version: '2.2'
services:

  django:
    build: .
    # Loading the app is defined here to allow for
    # autoreload on changes it is mounted on top of the
    # old copy that docker added when creating the image
    volumes:
      - '.:/usr/src/app'
    environment:
      - DEBUG=False
      - GEONODE_LB_HOST_IP=www.example.org
      - GEONODE_LB_PORT=80
      - SITEURL=http://www.example.org/
      - ALLOWED_HOSTS=['www.example.org', ]
      - GEOSERVER_PUBLIC_LOCATION=http://www.example.org/geoserver/
      - GEOSERVER_WEB_UI_LOCATION=http://www.example.org/geoserver/

  celery:
    build: .
    volumes:
      - '.:/usr/src/app'
    environment:
      - DEBUG=False
      - GEONODE_LB_HOST_IP=www.example.org
      - GEONODE_LB_PORT=80
      - SITEURL=http://www.example.org/
      - ALLOWED_HOSTS=['www.example.org', ]
      - GEOSERVER_PUBLIC_LOCATION=http://www.example.org/geoserver/
      - GEOSERVER_WEB_UI_LOCATION=http://www.example.org/geoserver/

  geoserver:
    environment:
      - GEONODE_LB_HOST_IP=www.example.org
      - GEONODE_LB_PORT=80
      # - NGINX_BASE_URL=
```

**Note:** It is possible to override here even more variables to customize the GeoNode instance. See the GeoNode Settings section in order to get a list of the available options.

Run the containers in daemon mode

```
docker-compose -f docker-compose.yml -f docker-compose.override.example-org.yml up --build -d
```
Access the django4geonode Docker container to update the code-base and/or change internal settings

Access the container `bash`

```
docker exec -i -t django4geonode /bin/bash
```

You will be logged into the GeoNode instance as `root`. The folder is `/usr/src/app/` where the GeoNode project is cloned. Here you will find the GeoNode source code as in the GitHub repository.

**Note:** The machine is empty by default, no Ubuntu packages installed. If you need to install text editors or something you have to run the following commands:

```
apt update
apt install <package name>
e.g.:
  apt install vim
```

Update the templates or the Django models. Once in the `bash` you can edit the templates or the Django models/classes. From here you can run any standard Django management command. Whenever you change a template/CSS/JavaScript remember to run later:

```
python manage.py collectstatic
```

in order to update the files into the `statics` Docker volume.

**Warning:** This is an external volume, and a simple restart won’t update it. You have to be careful and keep it aligned with your changes.

Whenever you need to change some settings or environment variable, the easiest thing to do is to:

```
# Stop the container
docker-compose stop

# Restart the container in Daemon mode
docker-compose -f docker-compose.yml -f docker-compose.override.<whatever>.yml up -d
```

Whenever you change the model, remember to run later in the container via `bash`:

```
python manage.py makemigrations
python manage.py migrate
```

Access the geoserver4geonode Docker container to update the GeoServer version

This procedure allows you to access the GeoServer container. The concept is exactly the same as above, log into the container with `bash`.

```
# Access the container bash
docker exec -it geoserver4geonode /bin/bash
```
You will be logged into the GeoServer instance as root.

GeoServer is deployed on an Apache Tomcat instance which can be found here

```
cd /usr/local/tomcat/webapps/geoserver
```

**Warning:** The GeoServer DATA_DIR is deployed on an external Docker Volume geonode_gsdatadir. This data dir won’t be affected by changes to the GeoServer application since it is external.

Update the GeoServer instance inside the GeoServer Container

**Warning:** The old configuration will be kept since it is external

```
docker exec -it geoserver4geonode bash
```

```
cd /usr/local/tomcat/
wget --no-check-certificate https://build.geo-solutions.it/geonode/geoserver/latest/geoserver-.2.15.4.war
mkdir tmp/geoserver
cd tmp/geoserver/
unzip /usr/local/tomcat/geoserver-2.15.4.war
rm -Rf data
cp -Rf /usr/local/tomcat/webapps/geoserver/data/ .
cd /usr/local/tomcat/
mv webapps/geoserver/ .
mv tmp/geoserver/ webapps/
exit
```

```
docker restart geoserver4geonode
```

**Warning:** GeoNode 2.8.1 is NOT compatible with GeoServer > 2.13.x

GeoNode 2.8.2 / 2.10.x are NOT compatible with GeoServer < 2.14.x

**Remove all data and bring your running GeoNode deployment to the initial stage**

This procedure allows you to stop all the containers and reset all the data with the deletion of all the volumes.

```
cd /opt/geonode
# stop containers and remove volumes
docker-compose down -v
```

**Passages to completely get rid of old Docker images and volumes (reset the environment completely)**

**Note:** For more details on Docker commands, please refer to the official Docker documentation.
It is possible to let docker show which containers are currently running (add \(-a\) for all containers, also stopped ones)

```bash
# Show the currently running containers
docker ps
```

<table>
<thead>
<tr>
<th>CONTAINER ID</th>
<th>IMAGE</th>
<th>COMMAND</th>
<th>CREATED</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3b232931f820</td>
<td>geonode/nginx:production</td>
<td>&quot;nginx -g 'daemon of...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>ff7002ae6e91</td>
<td>geonode/geonode:latest</td>
<td>&quot;/usr/src/app/entryp...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>2f155e5043be</td>
<td>geonode/geoserver:2.15.4</td>
<td>&quot;/usr/local/tomcat/t...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>97f1668a01b1</td>
<td>geonode_celery</td>
<td>&quot;/usr/src/app/entryp...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>1b623598b1bd</td>
<td>geonode/postgis:10</td>
<td>&quot;docker-entrypoint.s...&quot;</td>
<td>About an hour ago</td>
<td>Up 26 minutes</td>
</tr>
</tbody>
</table>

Stop all the containers by running

```
docker-compose stop
```

Force kill all containers by running

```
docker kill $(docker ps -q)
```

I you want to clean up all containers and images, without deleting the static volumes (i.e. the DB and the GeoServer catalog), issue the following commands

```bash
# Remove all containers
docker rm $(docker ps -a -q)

# Remove all docker images
docker rmi $(docker images -q)

# Prune the old images
docker system prune -a
```

If you want to remove a volume also

```bash
# List of the running volumes
docker volume ls

# Remove the GeoServer catalog by its name
docker volume rm -f geonode-gsdatadir

# Remove all dangling docker volumes
docker volume rm $(docker volume ls -qf dangling=true)

# update all images, should be run regularly to fetch published updates
for i in $(docker images| awk 'NR>1{print $1":"$2}'| grep -v '<none>'); do docker pull "$i"; done
```
1.12 GeoNode Project

1.12.1 Overview

The following steps will guide you to a new setup of GeoNode Project. All guides will first install and configure the system to run it in `DEBUG` mode (also known as `DEVELOPMENT` mode) and then by configuring an `HTTPD` server to serve GeoNode through the standard `HTTP (80)` port.

Those guides are not meant to be used on a production system. There will be dedicated chapters that will show you some hints to optimize GeoNode for a production-ready machine. In any case, we strongly suggest to task an experienced DevOp or System Administrator before exposing your server to the WEB.

1.12.2 Ubuntu 18.04

This part of the documentation describes the complete setup process for GeoNode on an Ubuntu 18.04 64-bit clean environment (Desktop or Server). All examples use shell commands that you must enter on a local terminal or a remote shell. If you have a graphical desktop environment you can open the terminal application after login; if you are working on a remote server the provider or sysadmin should has given you access through an ssh client.

Install the dependencies

In this section, we are going to install all the basic packages and tools needed for a complete GeoNode installation. To follow this guide, a piece of basic knowledge about Ubuntu Server configuration and working with a shell is required. This guide uses `vim` as the editor; fill free to use `nano`, `gedit` or others.

Upgrade system packages

Check that your system is already up-to-date with the repository running the following commands:

```
sudo apt update
sudo apt upgrade
```

Create a Dedicated User

In the following steps a User named `geonode` is used: to run installation commands the user must be in the `sudo` group.

Create User `geonode` if not present:

```
# Follow the prompts to set the new user’s information.
# It is fine to accept the defaults to leave all of this information blank.
sudo adduser geonode

# The following command adds the user geonode to group sudo
sudo usermod -aG sudo geonode

# make sure the newly created user is allowed to login by ssh
# (out of the scope of this documentation) and switch to User geonode
su geonode
```
Packages Installation

Note: You don’t need to install the system packages if you want to run the project using Docker

First, we are going to install all the system packages needed for the GeoNode setup.

```
# Install packages from GeoNode core
sudo apt install -y python-gdal gdal-bin
sudo apt install -y python-pip python-dev python-virtualenv
sudo apt install -y libxml2 libxml2-dev gettext
sudo apt install -y libxslt1-dev libjpeg-dev libpng-dev libpq-dev libgdal-dev
sudo apt install -y libgdal20
sudo apt install -y software-properties-common build-essential
sudo apt install -y git unzip gcc zlib1g-dev libgeos-dev libproj-dev
sudo apt install -y sqlite3 spatialite-bin libsqlite3-mod-spatialite

# Install OpenJDK
sudo -i apt update
sudo apt install openjdk-8-jdk-headless default-jdk-headless -y
sudo update-java-alternatives --jre-headless --jre --set java-1.8.0-openjdk-amd64
sudo apt update -y
sudo apt upgrade -y
sudo apt autoremove -y
sudo apt autoclean -y
sudo apt purge -y
sudo apt clean -y

# Install Packages for Virtual environment management
sudo apt install -y virtualenv virtualenvwrapper

# Install text editor
sudo apt install -y vim
```

Geonode Project Installation

Geonode project is the proper way to run a customized installation of Geonode. The repository of geonode-project contains a minimal set of files following the structure of a django-project. Geonode itself will be installed as a requirement of your project. Inside the project structure is possible to extend, replace or modify all geonode components (e.g. css and other static files, templates, models..) and even register new django apps without touching the original Geonode code.

Note: You can call your geonode project whatever you like following the naming conventions for python packages (generally lower case with underscores (_)). In the examples below, replace `my_geonode` with whatever you would like to name your project.

See also the README file on geonode-project repository

First of all we need to prepare a new Python Virtual Environment

Prepare the environment
GeoNode Documentation, Release 2.10

```bash
sudo mkdir -p /opt/geonode_custom/
sudo usermod -a -G www-data geonode
sudo chown -Rf geonode:www-data /opt/geonode_custom/
sudo chmod -Rf 775 /opt/geonode_custom/
```

Clone the source code

```bash
cd /opt/geonode_custom/
git clone https://github.com/GeoNode/geonode-project.git
```

Make an instance out of the Django Template

**Note:** We will call our instance `my_geonode`. You can change the name at your convenience.

```bash
vim ~/.bashrc
# add the following line to the bottom
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
```

```bash
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
mkvirtualenv my_geonode
pip install Django==1.11.25
django-admin startproject --template=./geonode-project -e py,sh,md,rst,json,ini,--env,sample -n monitoring-cron -n Dockerfile my_geonode
```

```bash
# Install the Python packages
cd /opt/geonode_custom/my_geonode
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e . --upgrade
```

```bash
# Install GDAL Utilities for Python
pip install pygdal="`gdal-config --version`.*"
```

**Run GeoNode Project for the first time in DEBUG Mode**

**Warning:** Be sure you have successfully completed all the steps of the section *Install the dependencies.*

This command will run both GeoNode and GeoServer locally after having prepared the SQLite database. The server will start in DEBUG (or DEVELOPMENT) mode, and it will start the following services:


This modality is beneficial to debug issues and/or develop new features, but it cannot be used on a production system.

```bash
# Prepare the GeoNode SQLite database (the first time only)
paver setup
paver sync
```

**Note:** In case you want to start again from a clean situation, just run
paver reset_hard

**Warning:** This will blow up completely your `local_settings`, delete the SQLite database and remove the GeoServer data dir.

```bash
# Run the server in DEBUG mode
paver start
```

Once the server has finished the initialization and prints on the console the sentence *GeoNode is now available*.. you can open a browser and go to:

```
http://localhost:8000/
```

Sign-in with:

```text
user: admin
password: admin
```

From now on, everything already said for GeoNode Core (please refer to the section *Postgis database Setup* and following), applies to a GeoNode Project.

**Be careful** to use the new paths and names everywhere:

- Everytime you’ll find the keyword *geonode*, you’ll need to use your geonode custom name instead (in this example *my_geonode*).
- Everytime you’ll find paths pointing to `/opt/geonode/`, you’ll need to update them to point to your custom project instead (in this example `/opt/geonode_custom/my_geonode`).

### 1.12.3 Docker

**Warning:** Before moving with this section, you should have read and clearly understood the INSTALLATION > GeoNode Core sections, and in particular the Docker one. Everything said for the GeoNode Core Vanilla applies here too, except that the Docker container names will be slightly different. As an instance if you named your project `my_geonode`, your containers will be called:

```
'django4my_geonode' instead of 'django4geonode' and so on...
```

**Deploy an instance of a geonode-project Django template 2.10.3 with Docker on localhost**

Prepare the environment

```bash
sudo mkdir -p /opt/geonode_custom/
sudo usermod -a -G www-data geonode
sudo chown -Rf geonode:www-data /opt/geonode_custom/
sudo chmod -Rf 775 /opt/geonode_custom/
```

Clone the source code
cd /opt/geonode_custom/

Make an instance out of the Django Template

**Note:** We will call our instance `my_geonode`. You can change the name at your convenience.

```bash
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
mkvirtualenv my_geonode
pip install Django==1.11.25
django-admin startproject --template=./geonode-project -e py,sh,md,rst,json,yml,ini,env,sample -n monitoring-cron -n Dockerfile my_geonode
cd /opt/geonode_custom/my_geonode
```

Modify the code and the templates and rebuild the Docker Containers

```bash
docker-compose -f docker-compose.yml build --no-cache
```

Finally, run the containers

```bash
docker-compose -f docker-compose.yml up -d
```

### Deploy an instance of a geonode-project Django template 2.10.2 with Docker on a domain

**Note:** We will use `www.example.org` as an example. You can change the name at your convenience.

Stop the containers

```bash
cd /opt/geonode_custom/my_geonode
docker-compose -f docker-compose.yml stop
```

Edit the ENV override file in order to deploy on `www.example.org`

Replace everywhere `localhost` with `www.example.org`

```bash
vim .env
```

```bash
# e.g.: :%s/localhost/www.example.org/g
```

**Note:** It is possible to override here even more variables to customize the GeoNode instance. See the GeoNode Settings section in order to get a list of the available options.

Run the containers in daemon mode

```bash
docker-compose -f docker-compose.yml -f docker-compose.override.example-org.yml up --build -d
```
1.12.4 Ansible

Ansible is an open-source software provisioning, configuration management, and application-deployment tool for IT infrastructure. It is written in Python and allows users to manage nodes (computers) over SSH. Configuration files are written in YAML, a simple, human-readable, data serialization format.

Ansible can be used for automating the manual installation process of GeoNode. In case you’re new to GeoNode we suggest first to get an Overview of GeoNode Core components.

Installing Ansible

Before you install Ansible make sure you have Python 2 (version 2.7) or Python 3 (versions 3.5 and higher) on the controlling machine, you will also need an SSH client. Most Linux distributions come with an SSH client preinstalled.

Note: For further installation instruction, please visit the official installation documentation.

Test your Setup

After you’ve installed Ansible, you can test your setup by use of the following command

```
ansible localhost -m ping
```

You should get the following output:

```
localhost | success >> {
  "changed": false,
  "ping": "pong"
}
```

Ansible Hosts file

Ansible keeps information about the managed nodes in the inventory or hosts file. Edit or create the hosts file with your favorite editor:

```
vim /etc/ansible/hosts
```

This file should contain a list of nodes for Ansible to manage. Nodes can be referred to either with IP or hostname. The syntax is the following:

```
192.168.1.50
aserver.example.org
bserver.example.org
```

For targeting several servers you can group them like:

```
mail.example.com
[webservers]
foo.example.com
bar.example.com
[dbservers]
```

(continues on next page)
Public Key access

To avoid having to type your user’s password to connect to the nodes over and over, using SSH keys is recommended. To setup Public Key SSH access to the nodes. First, create a key pair:

```bash
ssh-keygen
```

And follow the instructions on the screen. A new key pair will be generated and placed inside the `.ssh` folder in your user’s home directory.

All you need to do now is copy the public key (id_rsa.pub) into the `authorized_keys` file on the node you want to manage, inside the user’s home directory. For example, if you want to be able to connect to mygeonode.org as user `geo` edit the `/home/geo/.ssh/authorized_keys` file on the remote machine and add the content of your public key inside the file.

For more information on how to set up SSH keys in Ubuntu refer to this document.

Connect to managed nodes

Now that SSH access to the managed nodes is in place for all the nodes inside the Ansible inventory (hosts file), we can run our first command:

```bash
ansible geonode -m ping -u geo
```

**Note:** change `geo` with the username to use for SSH login

The output will be similar to this:

```bash
ansible all -m ping -u geo
84.33.2.70 | success >> {
    "changed": false,
    "ping": "pong"
}
```

We asked Ansible to connect to the machine in our Inventory grouped under `[geonode]` as user `geo` and run the module ping (modules are Ansible’s units of work). As you can see by the output, Ansible successfully connected to the remote machine and executed the module ping.

Ad hoc commands and playbooks

Ansible integrates two basic concepts of running commands: An ad-hoc command is something that you might type in to do something immediately, but don’t want to save for later. One example of an ad-hoc command is the ping command we just ran. We typed in the command line and ran it interactively.

For more information on ad-hoc command refer to the adhoc documentation section.
Playbooks are Ansible’s configuration, deployment and orchestration language. In contrast to ad hoc commands, playbooks can declare configurations, but they can also orchestrate steps of any manual ordered process. For more information on playbooks refer to the playbook documentation section.

In the following, we will provide you an example on how to setup a playbook for installing GeoNode on a server.

**Installing GeoNode project by use of a playbook**

First, we have to install the underlying steps for installing geonode provided by the official GeoNode role:

```
$ ansible-galaxy install geonode.geonode
```

**Note:** Roles are ways of automatically loading certain vars_files, tasks, and handlers based on a known file structure. Grouping content by roles also allows easy sharing of roles with other users.

See: https://docs.ansible.com/ansible/latest/user_guide/playbooks_reuse_roles.html

To find out how these install tasks are defined, we suggest having a look at the different tasks of role geonode.

**Setup a playbook**

After installation of the role geonode.geonode we will now create a simple playbook which defines what should happen. Create the playbook file where it suits best for you. For example in your home folder:

```
mkdir ~/geonode_ansible
vim ~/geonode_ansible/install_geonode.yml
```

with following content

```yaml
---
- name: Provision a GeoNode into Production
  hosts: geonode
  remote_user: geo
  vars:
    app_name: my_geonode
    server_name: 84.33.2.70
    deploy_user: ubuntu
    code_repository: https://github.com/GeoNode/geonode-project.git
    branch_name: master
    virtualenv_dir: /home/geo/.venvs
    site_url: http://mygeonode.org/
    geoserver_url: https://build.geo-solutions.it/geonode/geoserver/latest/geoserver-2.15.4.war
    pg_max_connections: 100
    pg_shared_buffers: 128MB
    tomcat_xms: 1024M
    tomcat_xmx: 2048M
    nginx_client_max_body_size: 400M
  gather_facts: False
  pre_tasks:
    - name: Install python for Ansible
      become: yes
      become_user: root
      raw: test -e /usr/bin/python || (apt -y update && apt install -y python-minimal)
```

(continues on next page)
roles:
  - { role: GeoNode.geonode }

The playbook is composed of different parts. The most important are:

The **hosts part** specifies to which hosts in the Inventory this playbook applies and how to connect to them. This points to your hosts file with grouped servers under `[geonode]` as explained before. (Most likely you will only have one node under group geonode)

The **vars** section mainly describe configured settings. Please visit the geonode ansible readme regarding role variables. **Roles** points to our installed geonode role which has all needed installation tasks.

### Run the Playbook

Now that we have created our Playbook, we can execute it with:

```bash
ansible-playbook ~/geonode_ansible/install_geonode.yml -u geo
```

```
PLAY [84.33.2.70] *************************************************
GATHERING FACTS ***********************************************
ok: [84.33.2.70]
```

Ansible should connect to the host specified in the hosts section grouped by `[geonode]` and run the install tasks one by one. If something goes wrong Ansible will fail fast and stop the installation process. When successfully finished you should be able to see GeoNode’s welcome screen at your `site_url`.

This concludes our brief tutorial on Ansible. For a more thorough introduction refer to the official documentation. Also, take a look at the Ansible examples repository or a set of Playbooks showing common techniques.

### 1.13 SPCGeoNode

#### 1.13.1 Overview

SPCgeonode is a setup for Geonode deployment at SPC. It makes it easy to deploy a production ready Geonode. The setup aims for simplicity over flexibility, so that it will only apply for typical small scale Geonode installations.

The setup is also usable for Geonode development or customization.

#### 1.13.2 Prerequisites

Make sure you have a version of Docker (tested with 17.12) and docker-compose.

- **Linux** : https://docs.docker.com/install/linux/docker-ce/ubuntu/#install-from-a-package and https://docs.docker.com/compose/install/#install-compose
- **Windows** : https://store.docker.com/editions/community/docker-ce-desktop-windows
- **Mac** : https://store.docker.com/editions/community/docker-ce-desktop-mac
## 1.13.3 Usage

All the following commands happen from this folder:

```
cd /path/to/geonode/scripts/spcgeonode
```

### Development

To start only the main services (should be enough for development):

```
docker-compose up --build -d django geoserver postgres nginx
```

To start the whole stack:

```
docker-compose up --build -d
```

If not familiar with Docker, read below to know how to see what’s happening. On first start, the containers will restart several times. Once everything started, you should be able to open http://127.0.0.1 in your browser. See how to edit the configuration below if you install on another computer.

### Production (using composer)

Using a text editor, edit the `.env` file (you can also override those with environment variables):

```
# General configuration
nano .env
```

When ready, start the stack using this commands:

```
# Run the stack
docker-compose -f docker-compose.yml up -d --build
```

Alternatively, you can pull the images from dockerhub instead of rebuilding (only applies if you haven’t changed the docker setup):

```
# Pull the images and run the stack
docker-compose -f docker-compose.yml pull
docker-compose -f docker-compose.yml up -d
```

If not familiar with Docker, read below to know how to see what’s happening. On first start, the containers will restart several times. Once everything started, you should be able to open http://your_http_host or https://your_https_host in your browser.

## 1.13.4 Upgrade

If at some point you want to update the SPCgeonode setup (this will work only if you didn’t do modifications, if you did, you need to merge them):

```
# Get the update setup
git pull
```
Upgrade the stack

docker-compose -f docker-compose.yml up -d --build

1.13.5 Development vs Production

Difference of dev setup vs prod setup:

- Django source is mounted on the host and uwsgi does live reload (so that edits to the python code is reloaded live)
- Django static and media folder, Geoserver’s data folder and Certificates folder are mounted on the host (just to easily see what’s happening)
- Django debug is set to True
- Postgres’s port 5432 is exposed (to allow debugging using pgadmin)
- Nginx debug mode is activated (not really sure what this changes)
- Docker tags are set to dev instead of latest

1.13.6 Releases

To make a release:

- checkout spcgeonode-release
- merge spcgeonode
- replace the version tag in docker-compose.yml with the version (format x.x.x)
- commit
- create a git tag (format spc/x.x.x)
- push spcgeonode-release with tags

This will trigger an automatic build on docker hub.

If you need to manually publish the image (e.g. dockerhub build fail) :

docker login
docker-compose -f docker-compose.yml build
docker-compose -f docker-compose.yml push

1.13.7 FAQ

Docker-primer - How to see what’s happening?

If not familiar with Docker, here are some useful commands:

- docker ps: list all containers and their status
- docker-compose logs -f: show live stdout from all containers
- docker-compose logs -f django: show live stdout from a specific container (replace django by geoserver, postgres, etc.)
• `docker-compose down -v`: brings the stack down including volumes, allowing you to restart from scratch. **THIS WILL ERASE ALL DATA!!**

**During startup, a lot of container crash and restart, is it normal?**

This is the normal startup process. Due to the nature of the setup, the containers are very interdependent. Startup from scratch can take approx. 5-10 minutes, during which all containers may restart a lot of times.

In short, Django will restart until Postgres is up so it can migrate the database. GeoServer will restart until Django has configured OAuth so it can get OAuth2 configuration. Django will restart until GeoServer is running so it can reinitialize the master password.

**Backups**

*Backups* are made using [RClone](https://rclone.org/docs/). RClone is a flexible file syncing tool that supports all commons cloud provider, regular file transfer protocols as well as local filesystem. It should be able to accommodate almost any setup.

The only available configuration provided with the setup assumes Amazon S3 is being used, in which case you need to replace the following parts of the `rclone.backup.config` file:

- `YOUR_S3_ACCESS_KEY_HERE`
- `YOUR_S3_SECRET_KEY_HERE`
- `YOUR_S3_REGION_HERE`
- `THE_NAME_OF_YOUR_BUCKET_HERE`

You can learn how to get these keys by watching [this](https://www.youtube.com/watch?v=BLTy2tQXQLY) video.

Also consider enabling **versioning** on the Bucket, so that if data won’t get lost if deleted accidentally in GeoNode.

If you want to setup backups using another provider, check the [RClone documentation](https://rclone.org/docs/). It should be easy to add any RClone supported provider to SPCgeonode.

**How to migrate from an existing standard Geonode install**

This section lists the steps done to migrate from an apt-get install of Geonode 2.4.1 (with GeoServer 2.7.4) to a fresh SPCgeonode 0.1 install. It is meant as a guide only as some steps may need some tweaking depending on your installation. Do not follow these steps if you don’t understand what you’re doing.

**Prerequisites**

- access to the original server
- a new server for the install (can be the same than the first one if you don’t fear losing all data) - ideally linux but should be OK as long as it runs docker (64bits)
- an external hard-drive to copy data over

**On the old server**

```
# Move to the external hard drive
cd /path/to/your/external/drive
```

1. Find the current database password (look for DATABASE_PASSWORD, in my case it was XbFAYE4w)

```
more /etc/geonode/local_settings.py
```
2. Dump the database content (you will be prompted several time for the password above)

   `pg_dumpall --host=127.0.0.1 --username=geonode --file=pg_dumpall.custom`

3. Copy all uploaded files

   `cp -r /var/www/geonode/uploaded uploaded`

4. Copy geoserver data directory

   `cp -r /usr/share/geoserver/data geodatadir`

**On the new server**

Setup SPCGeoNode by following the prerequisite and production steps on https://github.com/GeoNode/geonode/tree/master/scripts/spcgeonode up to (but not including) run the stack.

Then run these commands:

```bash
# Prepare the stack (without running)
docker-compose -f docker-compose.yml pull --no-parallel
docker-compose -f docker-compose.yml up --no-start

# Start the database
docker-compose -f docker-compose.yml up -d postgres

# Initialize geoserver (to create the geodatadir)
docker-compose -f docker-compose.yml run --rm geoserver true

# Go to the external drive
cd /path/to/drive/

# Restore the dump (this can take a while if you have data in postgres)
cat pg_dumpall.custom | docker exec -i spcgeonode_postgres_1 psql -U postgres

# Rename the database to postgres
docker exec -i spcgeonode_postgres_1 dropdb -U postgres postgres
docker exec -i spcgeonode_postgres_1 psql -d template1 -U postgres -c "ALTER DATABASE "geonode" RENAME TO postgres;"

# Restore the django uploaded files
docker cp uploaded/. spcgeonode_django_1:/spcgeonode-media/

# Restore the workspaces and styles of the geoserver data directory
docker cp geodatadir/styles/. spcgeonode_geoserver_1:/spcgeonode-geoserver/data/styles

docker cp geodatadir/workspaces/. spcgeonode_geoserver_1:/spcgeonode-geoserver/data/workspaces

docker cp geodatadir/data/. spcgeonode_geoserver_1:/spcgeonode-geoserver/data

# Back to SPCGeoNode
cd /path/to/SPCGeoNode

# Fix some inconsistency that prevents migrations (public.layers_layer shouldn’t have service_id column)
docker exec -i spcgeonode_postgres_1 psql -U postgres -c "ALTER TABLE public.layers__layer DROP COLUMN service_id;"
```

(continues on next page)
One last step was to connect to the GeoServer administration and change the PostGIS store host, user and password to ‘postgres’.

On windows, I have error like standard_init_linux.go:190: exec user process caused “no such file or directory”

This may be due to line endings. When checking out files, git optionally converts line endings to match the platform, which doesn’t work well it .sh files.

To fix, use `git config --global core.autocrlf false` and checkout again.

### 1.14 GeoNode Settings

#### Settings

#### 1.14.1 Settings

Here’s a list of settings available in GeoNode and their default values. This includes settings for some external applications that GeoNode depends on.

For most of them, default values are good. Those should be changed only for advanced configurations in production or heavily hardened systems.

The most common ones can be set through environment variables to avoid touching the `settings.py` file at all. This is a good practice and also the preferred one to configure GeoNode (and Django apps in general). Whenever you need to change them, set the environment variable accordingly (where it is available) instead of overriding it through the `local_settings`. 

```
# Migrate with fake initial
docker-compose -f docker-compose.yml run --rm --entrypoint "python manage.py migrate --fake-initial" django

# Create the SQL diff to fix the schema # TODO : upstream some changes to django-extensions for this to work directly
docker-compose -f docker-compose.yml run --rm --entrypoint '/bin/sh -c "DJANGO_COLORS=nocolor python manage.py sqldiff -ae"' django >> fix.sql

# Manually fix the SQL command until it runs (you can also drop the tables that have no model)
nano fix.sql

# Apply the SQL diff (review the sql file first as this may delete some important tables)
cat fix.sql | docker exec -i spcgeonode_postgres_1 psql -U postgres

# Set all layers as approved
docker exec -i spcgeonode_postgres_1 psql -U postgres -c 'UPDATE base_resourcebase SET is_approved = TRUE;'

# This time start the stack
docker-compose -f docker-compose.yml up -d
```
ACCESS_TOKEN_EXPIRE_SECONDS

Default: 86400
Env: ACCESS_TOKEN_EXPIRE_SECONDS

When a user logs into GeoNode, if no ACCESS_TOKEN exists, a new one will be created with a default expiration time of ACCESS_TOKEN_EXPIRE_SECONDS seconds (1 day by default).

ACCOUNT_ADAPTER

Default: geonode.people.adapters.LocalAccountAdapter
Custom GeoNode People (Users) Account Adapter.

ACCOUNT_APPROVAL_REQUIRED

Default: False
Env: ACCOUNT_APPROVAL_REQUIRED

If ACCOUNT_APPROVAL_REQUIRED equals True, newly registered users must be activated by a superuser through the Admin gui, before they can access GeoNode.

ACCOUNT_CONFIRM_EMAIL_ON_GET

Default: True
This is a django-allauth setting It allows specifying the HTTP method used when confirming e-mail addresses.

ACCOUNT_EMAIL_REQUIRED

Default: True
This is a django-allauth setting which controls whether the user is required to provide an e-mail address upon registration.

ACCOUNT_EMAIL_VERIFICATION

Default: optional
This is a django-allauth setting

ACCOUNT_LOGIN_REDIRECT_URL

Default: SITEURL
Env: LOGIN_REDIRECT_URL
This is a django-user-accounts setting It allows specifying the default redirect URL after a successful login.
ACCOUNT_LOGOUT_REDIRECT_URL

Default: SITEURL
Env: LOGOUT_REDIRECT_URL

This is a django-user-accounts setting. It allows specifying the default redirect URL after a successful logout.

ACCOUNT_NOTIFY_ON_PASSWORD_CHANGE

Default: True
Env: ACCOUNT_NOTIFY_ON_PASSWORD_CHANGE

This is a django-user-accounts setting.

ACCOUNT_OPEN_SIGNUP

Default: True
Env: ACCOUNT_OPEN_SIGNUP

This is a django-user-accounts setting. Whether or not people are allowed to self-register to GeoNode or not.

ACCOUNT_SIGNUP_FORM_CLASS

Default: geonode.people.forms.AllauthReCaptchaSignupForm
Env: ACCOUNT_SIGNUP_FORM_CLASS

Enabled only when the RECAPTCHA_ENABLED option is True.
Ref. to RECAPTCHA_ENABLED

ACTSTREAM_SETTINGS

Default:

```python
{
    'FETCH_RELATIONS': True,
    'USE_PREFETCH': False,
    'USE_JSONFIELD': True,
    'GFK_FETCH_DEPTH': 1,
}
```

Actstream Settings.

ADMIN_MODERATE_UPLOADS

Default: False

When this variable is set to True, every uploaded resource must be approved before becoming visible to the public users.
Until a resource is in `PENDING APPROVAL` state, only the superusers, owner and group members can access it, unless specific edit permissions have been set for other users or groups.

A Group Manager can approve the resource, but he cannot publish it whenever the setting `RESOURCE_PUBLISHING` is set to `True`. Otherwise, if `RESOURCE_PUBLISHING` is set to `False`, the resource becomes accessible as soon as it is approved.

**AGON_RATINGS_CATEGORY_CHOICES**

Default:

```python
{
    "maps.Map": {
        "map": "How good is this map?"
    },
    "layers.Layer": {
        "layer": "How good is this layer?"
    },
    "documents.Document": {
        "document": "How good is this document?"
    }
}
```

**ALLOWED_DOCUMENT_TYPES**

Default:

```python
['doc', 'docx', 'gif', 'jpg', 'jpeg', 'ods', 'odt', 'odp', 'pdf', 'png',
'ppt', 'pptx', 'rar', 'sld', 'tif', 'tiff', 'txt', 'xls', 'xlsx', 'xml',
'zip', 'gz', 'qml']
```

A list of acceptable file extensions that can be uploaded to the Documents app.

**ANONYMOUS_USER_ID**

Default: `-1`

Env: `ANONYMOUS_USER_ID`

The id of an anonymous user. This is a django-guardian setting.

**API_INCLUDE_REGIONS_COUNT**

Default: `False`

Env: `API_INCLUDE_REGIONS_COUNT`

If set to `True`, a counter with the total number of available regions will be added to the API JSON Serializer.

**API_LIMIT_PER_PAGE**

Default: `200`
Env: API_LIMIT_PER_PAGE

The number of items returned by the APIs 0 equals no limit. Different from
CLIENT_RESULTS_LIMIT, affecting the number of items per page in the resource list.

API_LOCKDOWN

Default: True
Env: API_LOCKDOWN

If this is set to True users must be authenticated to get search results when search for for users, groups,
categories, regions, tags etc. Filtering search results of Resourcebase-objects like Layers, Maps or Doc-
ments by one of the above types does not work. Attention: If API_LOCKDOWN is set to False all
details can be accessed by anonymous users.

ASYNC_SIGNALS

Default: False
Env: ACCOUNT_NOTIFY_ON_PASSWORD_CHANGE

AUTH_EXEMPT_URLS

Default:

```
(r'^/?$',
 '/gs/*',
 '/static/*',
 '/o/*',
 '/api/o/*',
 '/api/roles',
 '/api/adminRole',
 '/api/users',
 '/api/layers',)
```

A tuple of URL patterns that the user can visit without being authenticated. This setting has no effect if
LOCKDOWN_GEONODE is not True. For example, AUTH_EXEMPT_URLS = ('/maps',) will allow
unauthenticated users to browse maps.

AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME

Default: True
Env: AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME

Auto assign users to a default REGISTERED_MEMBERS_GROUP_NAME private group after
AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT.

AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT

Default: activation
Env: AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT
Options: "registration" | "activation" | "login"

Auto assign users to a default `REGISTERED_MEMBERS_GROUP_NAME` private group after `{"registration" | "activation" | "login"}`.

Notice that whenever `ACCOUNT_EMAIL_VERIFICATION == True` and `ACCOUNT_APPROVAL_REQUIRED == False`, users will be able to register and they became active already, even if they won’t be able to login until the email has been verified.

**AUTO_GENERATE_AVATAR_SIZES**

Default: 20, 30, 32, 40, 50, 65, 70, 80, 100, 140, 200, 240

An iterable of integers representing the sizes of avatars to generate on upload. This can save rendering time later on if you pre-generate the resized versions.

**AWS_ACCESS_KEY_ID**

Default: ''

Env: `AWS_ACCESS_KEY_ID`

This is a Django storage setting Your Amazon Web Services access key, as a string.

| Warning: This works only if DEBUG = False |

**AWS_BUCKET_NAME**

Default: ''

Env: `S3_BUCKET_NAME`

The name of the S3 bucket GeoNode will pull static and/or media files from. Set through the environment variable `S3_BUCKET_NAME`. This is a Django storage setting

| Warning: This works only if DEBUG = False |

**AWS_QUERYSTRING_AUTH**

Default: False

This is a Django storage setting Setting `AWS_QUERYSTRING_AUTH` to False to remove query parameter authentication from generated URLs. This can be useful if your S3 buckets are public.

| Warning: This works only if DEBUG = False |
AWS_S3_BUCKET_DOMAIN

https://github.com/GeoNode/geonode/blob/master/geonode/settings.py#L1661
AWS_S3_BUCKET_DOMAIN = '%s.s3.amazonaws.com' % AWS_STORAGE_BUCKET_NAME

**Warning:** This works only if `DEBUG = False`

AWS_SECRET_ACCESS_KEY

Default: ''
Env: AWS_SECRET_ACCESS_KEY

This is a Django storage setting Your Amazon Web Services secret access key, as a string.

**Warning:** This works only if `DEBUG = False`

AWS_STORAGE_BUCKET_NAME

Default: ''
Env: S3_BUCKET_NAME

This is a Django storage setting Your Amazon Web Services storage bucket name, as a string.

**Warning:** This works only if `DEBUG = False`

B

BING_API_KEY

Default: None
Env: BING_API_KEY

This property allows to enable a Bing Aerial background.

If using mapstore client library, make sure the `MAPSTORE_BASELAYERS` include the following:

```python
if BING_API_KEY:
    BASEMAP = {
        "type": "bing",
        "title": "Bing Aerial",
        "name": "AerialWithLabels",
        "source": "bing",
        "group": "background",
        "apiKey": "{{apiKey}}",
        "visibility": False
    }
    DEFAULT_MS2_BACKGROUNDS = [BASEMAP,] + DEFAULT_MS2_BACKGROUNDS
```

If using geoext client library, make sure the `MAP_BASELAYERS` include the following:
if BING_API_KEY:
    BASEMAP = {
        'source': {
            'ptype': 'gxp_bingsource',
            'apiKey': BING_API_KEY
        },
        'name': 'AerialWithLabels',
        'fixed': True,
        'visibility': True,
        'group': 'background'
    }
    MAP_BASELAYERS.append(BASEMAP)

**BROKER_HEARTBEAT**

Default: 0

Heartbeats are used both by the client and the broker to detect if a connection was closed. This is a Celery setting.

**BROKER_TRANSPORT_OPTIONS**

Default:

```python
{
    'fanout_prefix': True,
    'fanout_patterns': True,
    'socket_timeout': 60,
    'visibility_timeout': 86400
}
```

This is a Celery setting.

**CACHES**

Default:

```python
CACHES = {
    'default': {
        'BACKEND': 'django.core.cache.backends.dummy.DummyCache',
    },
    'resources': {
        'BACKEND': 'django.core.cache.backends.locmem.LocMemCache',
        'TIMEOUT': 600,
        'OPTIONS': {
            'MAX_ENTRIES': 10000
        }
    }
}
```
A dictionary containing the settings for all caches to be used with Django. This is a Django setting

The 'default' cache is disabled because we don’t have a mechanism to discriminate between client sessions right now, and we don’t want all users fetch the same api results.

The 'resources' is not currently used. It might be helpful for caching Django template fragments and/or Tastypie API Caching.

**CACHE_BUSTING_MEDIA_ENABLED**

Default: False
Env: CACHE_BUSTING_MEDIA_ENABLED

This is a Django ManifestStaticFilesStorage storage setting A boolean allowing you to enable the ManifestStaticFilesStorage storage. This works only on a production system.

**Warning:** This works only if DEBUG = False

**CACHE_BUSTING_STATIC_ENABLED**

Default: False
Env: CACHE_BUSTING_STATIC_ENABLED

This is a Django ManifestStaticFilesStorage storage setting A boolean allowing you to enable the ManifestStaticFilesStorage storage. This works only on a production system.

**Warning:** This works only if DEBUG = False

**CASCADE_WORKSPACE**

Default: geonode
Env: CASCADE_WORKSPACE

**CATALOGUE**

A dict with the following keys:

- **ENGINE**: The CSW backend (default is geonode.catalogue.backends.pycsw_local) URL: The FULLY QUALIFIED base URL to the CSW instance for this GeoNode USERNAME: login credentials (if required) PASSWORD: login credentials (if required)

pycsw is the default CSW enabled in GeoNode. pycsw configuration directives are managed in the PYCSW entry.
**CELERYD_POOL_RESTARTS**

Default: **True**

This is a Celery setting.

**CELERY_ACCEPT_CONTENT**

Default: ['json']

This is a Celery setting.

**CELERY_ACKS_LATE**

Default: **True**

This is a Celery setting.

**CELERY_BEAT_SCHEDULE**

Here you can define your scheduled task.

**CELERY_DISABLE_RATE_LIMITS**

Default: **False**

This is a Celery setting.

**CELERY_ENABLE_UTC**

Default: **True**

This is a Celery setting.

**CELERY_MAX_CACHED_RESULTS**

Default: **32768**

This is a Celery setting.

**CELERY_MESSAGE_COMPRESSION**

Default: **gzip**

This is a Celery setting.
**CELERY_RESULT_PERSISTENT**

Default: False
This is a Celery setting.

**CELERY_RESULT_SERIALIZER**

Default: json
This is a Celery setting.

**CELERY_SEND_TASKSENT_EVENT**

Default: True
If enabled, a task-sent event will be sent for every task so tasks can be tracked before they are consumed by a worker. This is a Celery setting.

**CELERY_TASK_ALWAYS_EAGER**

Default: False if ASYNC_S Signal s else True
This is a Celery setting.

**CELERY_TASK_CREATE_MISSING_QUEUES**

Default: True
This is a Celery setting.

**CELERY_TASK_IGNORE_RESULT**

Default: True
This is a Celery setting.

**CELERY_TASK_QUEUES**

Default:

```
Queue('default', GEONODE_EXCHANGE, routing_key='default'),
Queue('geonode', GEONODE_EXCHANGE, routing_key='geonode'),
Queue('update', GEONODE_EXCHANGE, routing_key='update'),
Queue('cleanup', GEONODE_EXCHANGE, routing_key='cleanup'),
Queue('email', GEONODE_EXCHANGE, routing_key='email'),
```

A tuple with registered Queues.
**CELERY_TASK_RESULT_EXPIRES**

Default: 43200

This is a Celery setting.

**CELERY_TASK_SERIALIZER**

Default: json

This is a Celery setting.

**CELERY_TIMEZONE**

Default: UTC

Env: TIME_ZONE

This is a Celery setting.

**CELERY_TRACK_STARTED**

Default: True

This is a Celery setting.

**CELERY_WORKER_DISABLE_RATELIMITS**

Default: False

Disable the worker rate limits (number of tasks that can be run in a given time frame).

**CELERY_WORKER_SEND_TASK_EVENTS**

Default: False

Send events so the worker can be monitored by other tools.

**CLIENT_RESULTS_LIMIT**

Default: 20

Env: CLIENT_RESULTS_LIMIT

The number of results per page listed in the GeoNode search pages. Different from API_LIMIT_PER_PAGE, affecting the number of items returned by the APIs.

**CREATE_LAYER**

Default: False

Enable the create layer plugin.
CKAN_ORIGINS

Default:

```python
CKAN_ORIGINS = [{
    "label": "Humanitarian Data Exchange (HDX)",
    "url": "https://data.hdx.rwlabs.org/dataset/new?title={name}&notes=
        →{abstract}",
    "css_class": "hdx"
}]
```

A list of dictionaries that are used to generate the links to CKAN instances displayed in the Share tab. For each origin, the name and abstract format parameters are replaced by the actual values of the Resource-Base object (layer, map, document). This is not enabled by default. To enable, uncomment the following line: SOCIAL_ORIGINS.extend(CKAN_ORIGINS).

CSRF_COOKIE_HTTPONLY

Default: False

Env: CSRF_COOKIE_HTTPONLY

Whether to use HttpOnly flag on the CSRF cookie. If this is set to True, client-side JavaScript will not be able to access the CSRF cookie. This is a Django Setting.

CSRF_COOKIE_SECURE

Default: False

Env: CSRF_COOKIE_HTTPONLY

Whether to use a secure cookie for the CSRF cookie. If this is set to True, the cookie will be marked as “secure,” which means browsers may ensure that the cookie is only sent with an HTTPS connection. This is a Django Setting.

DATA_UPLOAD_MAX_NUMBER_FIELDS

Default: 100000

Maximum value of parsed attributes.

DEBUG

Default: False

One of the main features of debug mode is the display of detailed error pages. If your app raises an exception when DEBUG is True, Django will display a detailed traceback, including a lot of metadata about your environment, such as all the currently defined Django settings (from settings.py). This is a Django Setting.
DEBUG_STATIC

Default: False
Load non minified version of static files.

DEFAULT_ANONYMOUS_DOWNLOAD_PERMISSION

Default: True
Whether the uploaded resources should downloadable by default.

DEFAULT_ANONYMOUS_VIEW_PERMISSION

Default: True
Whether the uploaded resources should be public by default.

DEFAULT_LAYER_FORMAT

Default: image/png
Env: DEFAULT_LAYER_FORMAT
The default format for requested tile images.

DEFAULT_MAP_CENTER

Default: (0, 0)
Env: DEFAULT_MAP_CENTER_X DEFAULT_MAP_CENTER_Y
A 2-tuple with the latitude/longitude coordinates of the center-point to use in newly created maps.

DEFAULT_MAP_CRS

Default: EPSG:3857
Env: DEFAULT_MAP_CRS
The default map projection. Default: EPSG:3857

DEFAULT_MAP_ZOOM

Default: 0
Env: DEFAULT_MAP_ZOOM
The zoom-level to use in newly created maps. This works like the OpenLayers zoom level setting; 0 is at the world extent and each additional level cuts the viewport in half in each direction.
DEFAULT_SEARCH_SIZE

Default: 10
Env: DEFAULT_SEARCH_SIZE

An integer that specifies the default search size when using geonode.search for querying data.

DEFAULT_WORKSPACE

Default: geonode
Env: DEFAULT_WORKSPACE

The standard GeoServer workspace.

DELAYED_SECURITY_SIGNALS

Default: False
Env: DELAYED_SECURITY_SIGNALS

This setting only works when GEOFENCE_SECURITY_ENABLED has been set to True and GeoNode is making use of the GeoServer BACKEND.

By setting this to True, every time the permissions will be updated/changed for a Layer, they won’t be applied immediately but only and only if either:

a. A Celery Worker is running and it is able to execute the geonode.security.tasks.synch_guardian periodic task; notice that the task will be executed at regular intervals, based on the interval value defined in the corresponding PeriodicTask model.

b. A periodic cron job runs the sync_security_rules management command, or either it is manually executed from the Django shell.

c. The user, owner of the Layer or with rights to change its permissions, clicks on the GeoNode UI button Sync permissions immediately

Warning: Layers won’t be accessible to public users anymore until the Security Rules are not synchronized!

DISPLAY_COMMENTS

Default: True
Env: DISPLAY_COMMENTS

If set to False comments are hidden.

DISPLAY_RATINGS

Default: True
Env: DISPLAY_RATINGS

If set to False ratings are hidden.
DISPLAY_SOCIAL

Default: True
Env: DISPLAY_SOCIAL
If set to False social sharing is hidden.

DISPLAY_WMS_LINKS

Default: True
Env: DISPLAY_WMS_LINKS
If set to False direct WMS link to GeoServer is hidden.

DISPLAY_ORIGINAL_DATASET_LINK

Default: True
Env: DISPLAY_ORIGINAL_DATASET_LINK
If set to False original dataset download is hidden.

DOWNLOAD_FORMATS_METADATA

Specifies which metadata formats are available for users to download.
Default:

```
DOWNLOAD_FORMATS_METADATA = [ 'Atom', 'DIF', 'Dublin Core', 'ebRIM', 'FGDC', 'ISO', ]
```

DOWNLOAD_FORMATS_VECTOR

Specifies which formats for vector data are available for users to download.
Default:

```
DOWNLOAD_FORMATS_VECTOR = [ 'JPEG', 'PDF', 'PNG', 'Zipped Shapefile', 'GML 2.0', 'GML 3.1.1', 'CSV', 'Excel', 'GeoJSON', 'KML', 'View in Google Earth', 'Tiles', ]
```

DOWNLOAD_FORMATS_RASTER

Specifies which formats for raster data are available for users to download.
Default:

```
DOWNLOAD_FORMATS_RASTER = [ 'JPEG', 'PDF', 'PNG', 'Tiles', ]
```
EMAIL_ENABLE

Default: False

Options:

- EMAIL_BACKEND
  Default: django.core.mail.backends.smtp.EmailBackend
  Env: DJANGO_EMAIL_BACKEND
- EMAIL_HOST
  Default: localhost
- EMAIL_PORT
  Default: 25
- EMAIL_HOST_USER
  Default: ''
- EMAIL_HOST_PASSWORD
  Default: ''
- EMAIL_USE_TLS
  Default: False
- DEFAULT_FROM_EMAIL
  Default: GeoNode <no-reply@geonode.org>

EPSG_CODE_MATCHES

Default:

```json
{
  'EPSG:4326': '(4326) WGS 84',
  'EPSG:900913': '(900913) Google Maps Global Mercator',
  'EPSG:3857': '(3857) WGS 84 / Pseudo-Mercator',
  'EPSG:3785': '(3785 DEPRECATED) Popular Visualisation CRS / Mercator',
  'EPSG:32647': '(32647) WGS 84 / UTM zone 47N',
  'EPSG:32736': '(32736) WGS 84 / UTM zone 36S'
}
```

Supported projections human readable descriptions associated to their EPSG Codes. This list will be presented to the user during the upload process whenever GeoNode won’t be able to recognize a suitable projection. Those codes should be aligned to the UPLOADER ones and available in GeoServer also.

FREETEXT_KEYWORDS_READONLY

Default: False
Env: FREETEXT_KEYWORDS_READONLY

Make Free-Text Keywords writable from users. Or read-only when set to False.

G

GEOFENCE_SECURITY_ENABLED

Default: True (False is test is true)
Env: GEOFENCE_SECURITY_ENABLED

Whether the geofence security system is used.

GEOIP_PATH

Default: Path to project
Env: PROJECT_ROOT

The local path where GeoIPCities.dat is written to. Make sure your user has to have write permissions.

GEONODE_APPS

If enabled contrib apps are used.

GEONODE_CLIENT_LAYER_PREVIEW_LIBRARY

Default: "mapstore"

The library to use for display preview images of layers. The library choices are:
"mapstore" "geosext" "leaflet" "react"

GEONODE_EXCHANGE

Default: Exchange("default", type="direct", durable=True)

The definition of Exchanges published by geonode. Find more about Exchanges at celery docs.

GEOSERVER_EXCHANGE

Default: Exchange("geonode", type="topic", durable=False)

The definition of Exchanges published by GeoServer. Find more about Exchanges at celery docs.

GEOSERVER_LOCATION

Default: http://localhost:8080/geoserver/
Env: GEOSERVER_LOCATION

Url under which GeoServer is available.
**GEOSERVER_PUBLIC_HOST**

Default: SITE_HOST_NAME (Variable)
Env: GEOSERVER_PUBLIC_HOST
Public hostname under which GeoServer is available.

**GEOSERVER_PUBLIC_LOCATION**

Default: SITE_HOST_NAME (Variable)
Env: GEOSERVER_PUBLIC_LOCATION
Public location under which GeoServer is available.

**GEOSERVER_PUBLIC_PORT**

Default: 8080 (Variable)
Env: GEOSERVER_PUBLIC_PORT
Public Port under which GeoServer is available.

**GEOSERVER_WEB_UI_LOCATION**

Default: GEOSERVER_PUBLIC_LOCATION (Variable)
Env: GEOSERVER_WEB_UI_LOCATION
Public location under which GeoServer is available.

**GROUP_PRIVATE_RESOURCES**

Default: False
Env: GROUP_PRIVATE_RESOURCES
If this option is enabled, Resources belonging to a Group won’t be visible by others

**HAYSTACK_FACET_COUNTS**

Default: True
Env: HAYSTACK_FACET_COUNTS
If set to True users will be presented with feedback about the number of resources which matches terms they may be interested in.

**HAYSTACK_SEARCH**

Default: False
**Env:** HAYSTACK_SEARCH
Enable/disable haystack Search Backend Configuration.

**LEAFLET_CONFIG**
A dictionary used for Leaflet configuration.

**LICENSES**
Default:

```python
{
    'ENABLED': True,
    'DETAIL': 'above',
    'METADATA': 'verbose',
}
```
Enable Licenses User Interface

**LOCAL_SIGNALS_BROKER_URL**
Default: `memory://`

**LOCKDOWN_GEONODE**
Default: `False`

**Env:** LOCKDOWN_GEONODE
By default, the GeoNode application allows visitors to view most pages without being authenticated. If this is set to `True` users must be authenticated before accessing URL routes not included in `AUTH_EXEMPT_URLS`.

**LOGIN_URL**
Default: `{{account/login/}}.format(SITEURL)`

**Env:** LOGIN_URL
The URL where requests are redirected for login.

**LOGOUT_URL**
Default: `{{account/login/}}.format(SITEURL)`

**Env:** LOGOUT_URL
The URL where requests are redirected for logout.
M

MAP_CLIENT_USE_CROSS_ORIGIN_CREDENTIALS

Default: False
Env: MAP_CLIENT_USE_CROSS_ORIGIN_CREDENTIALS

Enables cross origin requests for geonode-client.

MAPSTORE_BASELAYERS

Default:

```json
[
    {
        "type": "osm",
        "title": "Open Street Map",
        "name": "mapnik",
        "source": "osm",
        "group": "background",
        "visibility": true
    },
    {
        "type": "tileprovider",
        "title": "OpenTopoMap",
        "provider": "OpenTopoMap",
        "name": "OpenTopoMap",
        "source": "OpenTopoMap",
        "group": "background",
        "visibility": false
    },
    {
        "type": "wms",
        "title": "Sentinel-2 cloudless - https://s2maps.eu",
        "format": "image/jpeg",
        "id": "s2cloudless",
        "name": "s2cloudless:s2cloudless",
        "url": "https://maps.geo-solutions.it/geoserver/wms",
        "group": "background",
        "thumbURL": "%\$$\$$static/mapstorestyle/img/s2cloudless-s2cloudless.png"
    },
    {
        "source": "ol",
        "group": "background",
        "id": "none",
        "name": "empty",
        "title": "Empty Background",
        "type": "empty",
        "visibility": false,
        "args": [{"Empty Background", {"visibility": false}}]
    }
]
```

Env: MAPSTORE_BASELAYERS
Allows to specify which backgrounds MapStore should use. The parameter `visibility` for a layer, specifies which one is the default one.

A sample configuration using the Bing background without OpenStreetMap, could be the following one:

```json
[
    {
        "type": "bing",
        "title": "Bing Aerial",
        "name": "AerialWithLabels",
        "source": "bing",
        "group": "background",
        "apiKey": "{{apiKey}}",
        "visibility": true
    },
    {
        "type": "tileprovider",
        "title": "OpenTopoMap",
        "provider": "OpenTopoMap",
        "name": "OpenTopoMap",
        "source": "OpenTopoMap",
        "group": "background",
        "visibility": false
    },
    {
        "type": "wms",
        "title": "Sentinel-2 cloudless - https://s2maps.eu",
        "format": "image/jpeg",
        "id": "s2cloudless",
        "name": "s2cloudless:s2cloudless",
        "url": "https://maps.geo-solutions.it/geoserver/wms",
        "group": "background",
        "thumbURL": "%SITEURL%static/mapstorestyle/img/s2cloudless-s2cloudless.png"
    },
    {
        "source": "ol",
        "group": "background",
        "id": "none",
        "name": "empty",
        "title": "Empty Background",
        "type": "empty",
        "visibility": false,
        "args": ["Empty Background", {"visibility": false}]
    }
]
```

**Warning:** To use a Bing background, you need to correctly set and provide a valid `BING_API_KEY`.

### MAX_DOCUMENT_SIZE

Default: 2

Env: `MAX_DOCUMENT_SIZE`  

Allowed size for documents in MB.
MISSING_THUMBNAIL

Default: geonode/img/missing_thumb.png
The path to an image used as thumbnail placeholder.

MODIFY_TOPICCATEGORY

Default: False
Metadata Topic Categories list should not be modified, as it is strictly defined by ISO (See: http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml and check the <CodeListDictionary gml:id="MD_MD_TopicCategoryCode"> element).
Some customization is still possible changing the is_choice and the GeoNode description fields.
In case it is necessary to add/delete/update categories, it is possible to set the MODIFY_TOPICCATEGORY setting to True.

MONITORING_ENABLED

Default: False
Enable internal monitoring application (geonode.monitoring). If set to True, add following code to your local settings:

```
MONITORING_ENABLED = True
# add following lines to your local settings to enable monitoring
if MONITORING_ENABLED:
    INSTALLED_APPS = INSTALLED_APPS + ('geonode.monitoring',)
    MIDDLEWARE_CLASSES = MIDDLEWARE_CLASSES + ('geonode.monitoring.middleware.MonitoringMiddleware',)
```

See Monitoring for details.

MONITORING_DATA_AGGREGATION

Default:

```
{
    timedelta(seconds=0), timedelta(minutes=1),
    timedelta(days=1), timedelta(minutes=60),
    timedelta(days=14),
}
```

Configure aggregation of past data to control data resolution. It lists data age and aggregation in reverse order, by default:

- for current data, 1 minute resolution
- for data older than 1 day, 1-hour resolution
- for data older than 2 weeks, 1 day resolution
See *Monitoring* for further details.

This setting takes effects only if `USER_ANALYTICS_ENABLED` is true.

**MONITORING_DATA_TTL**

Default: 7

Env: MONITORING_DATA_TTL

How long monitoring data should be stored in days.

**MONITORING_DISABLE_CSRF**

Default: False

Env: MONITORING_DISABLE_CSRF

Set this to true to disable csrf check for notification config views, use with caution - for dev purpose only.

**MONITORING_SKIP_PATHS**

Default:

```python
(
    '/api/o/',
    '/monitoring/',
    '/admin',
    '/jsi18n',
    STATIC_URL,
    MEDIA_URL,
    re.compile('^/[a-z]{2}/admin/'),
)
```

Skip certain useless paths to not to mud analytics stats too much. See *Monitoring* to learn more about it.

This setting takes effects only if `USER_ANALYTICS_ENABLED` is true.

**NOTIFICATIONS_MODULE**

Default: `pinax.notifications`

App used for notifications. (pinax.notifications or notification)

**NOTIFICATION_ENABLED**

Default: True

Env: NOTIFICATION_ENABLED

Enable or disable the notification system.
O

**OAUTH2_API_KEY**

Default: None
Env: OAUTH2_API_KEY

In order to protect oauth2 REST endpoints, used by GeoServer to fetch user roles and infos, you should set this key and configure the geonode REST role service accordingly. Keep it secret!

**Warning:** If not set, the endpoint can be accessed by users without authorization.

**OAUTH2_PROVIDER**

Ref.: OAuth Toolkit settings

**OAUTH2_PROVIDER_APPLICATION_MODEL**

Default: oauth2_provider.Application
Ref.: OAuth Toolkit settings

**OAUTH2_PROVIDER_ACCESS_TOKEN_MODEL**

Default: oauth2_provider.AccessToken
Ref.: OAuth Toolkit settings

**OAUTH2_PROVIDER_ID_TOKEN_MODEL**

Default: oauth2_provider.IDToken
Ref.: OAuth Toolkit settings

**OAUTH2_PROVIDER_GRANT_MODEL**

Default: oauth2_provider.Grant
Ref.: OAuth Toolkit settings

**OAUTH2_PROVIDER_REFRESH_TOKEN_MODEL**

Default: oauth2_provider.RefreshToken
Ref.: OAuth Toolkit settings
OGC_SERVER_DEFAULT_PASSWORD

Default: geoserver
Env: GEOSERVER_ADMIN_PASSWORD
The geoserver password.

OGC_SERVER_DEFAULT_USER

Default: admin
Env: GEOSERVER_ADMIN_USER
The GeoServer user.

OGC_SERVER

Default: {} (Empty dictionary)
A dictionary of OGC servers and their options. The main server should be listed in the ‘default’ key. If there is no ‘default’ key or if the OGC_SERVER setting does not exist, Geonode will raise an Improperly Configured exception. Below is an example of the OGC_SERVER setting:

```python
OGC_SERVER = {
    'default': {
        'LOCATION': 'http://localhost:8080/geoserver/',
        'USER': 'admin',
        'PASSWORD': 'geoserver',
    }
}
```

- BACKEND
  Default: "geonode.geoserver"
  The OGC server backend to use. The backend choices are:
  - geonode.geoserver

- BACKEND_WRITE_ENABLED
  Default: True
  Specifies whether the OGC server can be written to. If False, actions that modify data on the OGC server will not execute.

- DATASTORE
  Default: '' (Empty string)
  An optional string that represents the name of a vector datastore, where Geonode uploads are imported into. To support vector datastore imports there also needs to be an entry for the datastore in the DATABASES dictionary with the same name. Example:

  ```python
  OGC_SERVER = {
    'default': {
        'LOCATION': 'http://localhost:8080/geoserver/',
        'USER': 'admin',
        'PASSWORD': 'geoserver',
    }
  }
  ```

(continues on next page)
Databases = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': 'development.db',
    },
    'geonode_imports' : {
        'ENGINE': 'django.contrib.gis.db.backends.postgis',
        'NAME': 'geonode_imports',
        'USER' : 'geonode_user',
        'PASSWORD' : 'a_password',
        'HOST' : 'localhost',
        'PORT' : '5432',
    },
}

- **GEONODE_SECURITY_ENABLED**
  Default: True
  A boolean that represents whether GeoNode’s security application is enabled.

- **LOCATION**
  Default: "http://localhost:8080/geoserver/"
  A base URL from which GeoNode can construct OGC service URLs. If using GeoServer you can determine this by visiting the GeoServer administration home page without the /web/ at the end. For example, if your GeoServer administration app is at http://example.com/geoserver/web/, your server’s location is http://example.com/geoserver.

- **MAPFISH_PRINT_ENABLED**
  Default: True
  A boolean that represents whether the MapFish printing extension is enabled on the server.

- **PASSWORD**
  Default: 'geoserver'
  The administrative password for the OGC server as a string.

- **PRINT_NG_ENABLED**
  Default: True
  A boolean that represents whether printing of maps and layers is enabled.

- **PUBLIC_LOCATION**
  Default: "http://localhost:8080/geoserver/"
  The URL used to in most public requests from Geonode. This setting allows a user to write to one OGC server (the LOCATION setting) and read from a separate server or the PUBLIC_LOCATION.

- **USER**
  Default: 'admin'
The administrative username for the OGC server as a string.

- **WMST_ENABLED**
  Default: False
  Not implemented.

- **WPS_ENABLED**
  Default: False
  Not implemented.

- **TIMEOUT**
  Default: 10
  The maximum time, in seconds, to wait for the server to respond.

**OGP_URL**

Default: `http://geodata.tufts.edu/solr/select`

Env: OGP_URL

Endpoint of geodata.tufts.edu getCapabilities.

**OPENGRAPH_ENABLED**

Default:: True

A boolean that specifies whether Open Graph is enabled. Open Graph is used by Facebook and Slack.

**PINAX_NOTIFICATIONS_BACKENDS**

Default: `("email", _EMAIL_BACKEND, 0),`

Used notification backend. This is a pinax notification setting:

**PINAX_NOTIFICATIONS_LOCK_WAIT_TIMEOUT**

Default: -1
Env: NOTIFICATIONS_LOCK_WAIT_TIMEOUT

It defines how long to wait for the lock to become available. Default of -1 means to never wait for the lock to become available. This is a pinax notification setting:

**PINAX_NOTIFICATIONS_QUEUE_ALL**

Default: -1
**NOTIFICATIONS_LOCK_WAIT_TIMEOUT**

By default, calling `notification.send` will send the notification immediately, however, if you set this setting to True, then the default behavior of the send method will be to queue messages in the database for sending via the `emit_notices` command. This is a Pinax notification setting:

**PINAX_RATINGS_CATEGORY_CHOICES**

Default:

```python
{
    "maps.Map": {
        "map": "How good is this map?"
    },
    "layers.Layer": {
        "layer": "How good is this layer?"
    },
    "documents.Document": {
        "document": "How good is this document?"
    }
}
```

**PROXY_ALLOWED_HOSTS**

Default: () (Empty tuple)

A tuple of strings representing the host/domain names that GeoNode can proxy requests to. This is a security measure to prevent an attacker from using the GeoNode proxy to render malicious code or access internal sites.

Values in this tuple can be fully qualified names (e.g. ‘www.geonode.org’), in which case they will be matched against the request’s Host header exactly (case-insensitive, not including port). A value beginning with a period can be used as a subdomain wildcard: `.geonode.org` will match geonode.org, www.geonode.org, and any other subdomain of geonode.org. A value of `*` will match anything and is not recommended for production deployments.

**PROXY_URL**

Default `/proxy/?url=`

The URL to a proxy that will be used when making client-side requests in GeoNode. By default, the internal GeoNode proxy is used but administrators may favor using their own, less restrictive proxies.

**PYCSW**

A dict with pycsw’s configuration. Of note are the sections `metadata:main` to set CSW server metadata and `metadata:inspire` to set INSPIRE options. Setting `metadata:inspire['enabled']` to `true` will enable INSPIRE support. Server level configurations can be overridden in the `server` section. See [http://docs.pycsw.org/en/latest/configuration.html](http://docs.pycsw.org/en/latest/configuration.html) for full pycsw configuration details.
R

RABBITMQ_SIGNALS_BROKER_URL

Default: amqp://localhost:5672

The Rabbitmq endpoint

RECAPTCHA_ENABLED

Default: False
Env: RECAPTCHA_ENABLED

Allows enabling reCaptcha field on signup form. Valid Captcha Public and Private keys will be needed as specified here https://pypi.org/project/django-recaptcha/#installation

More options will be available by enabling this setting:

- **ACCOUNT_SIGNUP_FORM_CLASS**
  Default: geonode.people.forms.AllauthReCaptchaSignupForm
  Env: ACCOUNT_SIGNUP_FORM_CLASS
  Enabled only when the RECAPTCHA_ENABLED option is True.

- **INSTALLED_APPS**
  The captcha must be present on INSTALLED_APPS, otherwise you’ll get an error.
  When enabling the RECAPTCHA_ENABLED option through the environment, this setting will be automatically added by GeoNode as follows:

  ```python
  if 'captcha' not in INSTALLED_APPS:
      INSTALLED_APPS += ('captcha',)
  ```

- **RECAPTCHA_PUBLIC_KEY**
  Default: geonode_RECAPTCHA_PUBLIC_KEY
  Env: RECAPTCHA_PUBLIC_KEY
  In order to generate reCaptcha keys, please see:
  1. https://pypi.org/project/django-recaptcha/#installation

- **RECAPTCHA_PRIVATE_KEY**
  Default: geonode_RECAPTCHA_PRIVATE_KEY
  Env: RECAPTCHA_PRIVATE_KEY
  In order to generate reCaptcha keys, please see:
  1. https://pypi.org/project/django-recaptcha/#installation
**RECAPTCHA_PUBLIC_KEY**

Default: geonode_RECAPTCHA_PUBLIC_KEY  
Env: RECAPTCHA_PUBLIC_KEY  
Ref. to *RECAPTCHA_ENABLED*

**RECAPTCHA_PRIVATE_KEY**

Default: geonode_RECAPTCHA_PRIVATE_KEY  
Env: RECAPTCHA_PRIVATE_KEY  
Ref. to *RECAPTCHA_ENABLED*

**REDIS_SIGNALS_BROKER_URL**

Default: redis://localhost:6379/0  
The Redis endpoint.

**REGISTERED_MEMBERS_GROUP_NAME**

Default: registered-members  
Env: REGISTERED_MEMBERS_GROUP_NAME  
Used by *AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME* settings.

**REGISTERED_MEMBERS_GROUP_TITLE**

Default: Registered Members  
Env: REGISTERED_MEMBERS_GROUP_TITLE  
Used by *AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME* settings.

**REGISTRATION_OPEN**

Default: False  
A boolean that specifies whether users can self-register for an account on your site.

**RESOURCE_PUBLISHING**

Default: False  
By default, the GeoNode application allows GeoNode staff members to publish/unpublish resources. By default, resources are published when created. When this setting is set to True the staff members will be able to unpublish a resource (and eventually publish it back).
S

S3_MEDIA_ENABLED

Default: False
Env: S3_MEDIA_ENABLED
Enable/disable Amazon S3 media storage.

S3_STATIC_ENABLED

Default: False
Env: S3_STATIC_ENABLED
Enable/disable Amazon S3 static storage.

SEARCH_FILTERS

Default:

```python
'TEXT_ENABLED': True,
'TYPE_ENABLED': True,
'CATEGORIES_ENABLED': True,
'OWNERS_ENABLED': True,
'KEYWORDS_ENABLED': True,
'H_KEYWORDS_ENABLED': True,
'T_KEYWORDS_ENABLED': True,
'DATE_ENABLED': True,
'REGION_ENABLED': True,
'EXTENT_ENABLED': True,
```

Enabled Search Filters for filtering resources.

SECURE_BROWSER_XSS_FILTER

Default: True
Env: SECURE_BROWSER_XSS_FILTER
If True, the SecurityMiddleware sets the X-XSS-Protection: 1; mode=block header on all responses that do not already have it. This is Django settings: https://docs.djangoproject.com/en/2.1/ref/settings/#secure-browser-xss-filter

SECURE_CONTENT_TYPE_NOSNIFF

Default: True
Env: SECURE_CONTENT_TYPE_NOSNIFF
If True, the SecurityMiddleware sets the X-Content-Type-Options: nosniff header on all responses that do not already have it. This is Django settings:
SECURE_HSTS_INCLUDE_SUBDOMAINS

Default: True
Env: SECURE_HSTS_INCLUDE_SUBDOMAINS

This is Django settings: https://docs.djangoproject.com/en/2.1/ref/settings/#secure-hsts-include-subdomains

SECURE_HSTS_SECONDS

Default: 3600
Env: SECURE_HSTS_SECONDS

This is Django settings: If set to a non-zero integer value, the SecurityMiddleware sets the HTTP Strict Transport Security header on all responses that do not already have it.

SECURE_SSL_REDIRECT

If True, the SecurityMiddleware redirects all non-HTTPS requests to HTTPS (except for those URLs matching a regular expression listed in SECURE_REDIRECT_EXEMPT). This is Django settings:

SERVICE_UPDATE_INTERVAL

Default: 0

The Interval services are updated.

SESSION_COOKIE_SECURE

Default: False
Env: SESSION_COOKIE_SECURE

This is a Django setting:

SESSION_EXPIRED_CONTROL_ENABLED

Default: True
Env: SESSION_EXPIRED_CONTROL_ENABLED

By enabling this variable, a new middleware geonode.security.middleware.SessionControlMiddleware will be added to the MIDDLEWARE_CLASSES. The class will check every request to GeoNode and it will force a log out whenever one of the following conditions occurs:

1. The OAuth2 Access Token is not valid anymore or it is expired.

**Warning:** The Access Token might be invalid for various reasons. Usually a misconfiguration of the OAuth2 GeoServer application. The latter is typically installed and configured automatically at GeoNode bootstrap through the default fixtures.
2. The user has been deactivated for some reason; an Admin has disabled it or its password has expired. Whenever the middleware terminates the session and the user forced to log out, a message will appear to the GeoNode interface.

**SHOW_PROFILE_EMAIL**

Default: False

A boolean which specifies whether to display the email in the user’s profile.

**SITE_HOST_NAME**

Default: localhost

Env: SITE_HOST_NAME

The hostname used for GeoNode.

**SITE_HOST_PORT**

Default: 8000

Env: SITE_HOST_PORT

The Site hostport.

**SITEURL**

Default: 'http://localhost:8000/

A base URL for use in creating absolute links to Django views and generating links in metadata.

**SKIP_PERMS_FILTER**

Default: False

Env: SKIP_PERMS_FILTER

If set to true permissions prefiltering is avoided.

**SOCIALACCOUNT_ADAPTER**

Default: geonode.people.adapters.SocialAccountAdapter

This is a django-allauth setting It allows specifying a custom class to handle authentication for social accounts.

**SOCIALACCOUNT_AUTO_SIGNUP**

Default: True

Attempt to bypass the signup form by using fields (e.g. username, email) retrieved from the social account provider. This is a Django-allauth setting:
SOCIALACCOUNT_PROVIDERS

Default:

```python
{
    'linkedin_oauth2': {
        'SCOPE': [
            'r_emailaddress',
            'r_basicprofile',
        ],
        'PROFILE_FIELDS': [
            'emailAddress',
            'firstName',
            'headline',
            'id',
            'industry',
            'lastName',
            'pictureUrl',
            'positions',
            'publicProfileUrl',
            'location',
            'specialties',
            'summary',
        ],
    },
    'facebook': {
        'METHOD': 'oauth2',
        'SCOPE': [
            'email',
            'public_profile',
        ],
        'FIELDS': [
            'id',
            'email',
            'name',
            'first_name',
            'last_name',
            'verified',
            'locale',
            'timezone',
            'link',
            'gender',
        ],
    },
}
```

This is a django-allauth setting It should be a dictionary with provider specific settings

SOCIALACCOUNT_PROFILE_EXTRACTORS

Default:

```python
{
    "facebook": "geonode.people.profileextractors.FacebookExtractor",
    "linkedin_oauth2": "geonode.people.profileextractors.LinkedInExtractor",
}
```
A dictionary with provider ids as keys and path to custom profile extractor classes as values.

**SOCIAL_BUTTONS**

Default: `True`

A boolean which specifies whether the social media icons and JavaScript should be rendered in GeoNode.

**SOCIAL_ORIGINS**

Default:

```python
SOCIAL_ORIGINS = [{
    "label": "Email",
    "url": "mailto:?subject={name}&body={url}",
    "css_class": "email"
}, {
    "label": "Facebook",
    "css_class": "fb"
}, {
    "label": "Twitter",
    "url": "https://twitter.com/share?url={url}",
    "css_class": "tw"
}, {
    "label": "Google +",
    "url": "https://plus.google.com/share?url={url}",
    "css_class": "gp"
}]
```

A list of dictionaries that are used to generate the social links displayed in the Share tab. For each origin, the name and URL format parameters are replaced by the actual values of the ResourceBase object (layer, map, document).

**SRID**

Default:

```python
{
    'DETAIL': 'never',
}
```

**TASTYPIE_DEFAULT_FORMATS**

Default: `json`

This setting allows you to globally configure the list of allowed serialization formats for your entire site. This is a tastypie setting.
THEME_ACCOUNT_CONTACT_EMAIL

Default: 'admin@example.com'

This email address is added to the bottom of the password reset page in case users have trouble unlocking their account.

THESAURI

Default = []

A list of Keywords thesauri settings: For example  THESAURI = [{‘name’:’inspire_themes’, ‘required’:True, ‘filter’:True}, {‘name’:’inspire_concepts’, ‘filter’:True}, ]

TOPICCATEGORY_MANDATORY

Default: False
Env: TOPICCATEGORY_MANDATORY

If this option is enabled, Topic Categories will become strictly Mandatory on Metadata Wizard

TWITTER_CARD

Default:: True

A boolean that specifies whether Twitter cards are enabled.

TWITTER_SITE

Default:: @GeoNode'

A string that specifies the site to for the twitter:site meta tag for Twitter Cards.

TWITTER_HASHTAGS

Default:: ['geonode']

A list that specifies the hashtags to use when sharing a resource when clicking on a social link.

U

UNOCONV_ENABLE

Default: False
Env: UNOCONV_ENABLE
**UPLOADER**

Default:

```python
{
    'BACKEND': 'geonode.rest',
    'OPTIONS': {
        'TIME_ENABLED': False,
    }
}
```

A dictionary of Uploader settings and their values.

- **BACKEND**
  Default: `geonode.rest`
  The uploader backend to use. The backend choices are:
  ```
  'geonode.importer'
  'geonode.rest'
  ```
  The importer backend requires the GeoServer importer extension to be enabled.

- **OPTIONS**
  Default:
  ```python
  'OPTIONS': {
      'TIME_ENABLED': False,
  }
  ```
  - **TIME_ENABLED**
    Default: False
    A boolean that specifies whether the upload should allow the user to enable time support when uploading data.

**USER_MESSAGES_ALLOW_MULTIPLE_RECIPIENTS**

Default: True
Env: `USER_MESSAGES_ALLOW_MULTIPLE_RECIPIENTS`

Set to true to have multiple recipients in /message/create/

**USER_ANALYTICS_ENABLED**

Default: False
Env: `USER_ANALYTICS_ENABLED`

Set to true to anonymously collect user data for analytics. If true you have to set `MONITORING_DATA_AGGREGATION` and `MONITORING_SKIP_PATHS`.

See `Monitoring` to learn more about it.
**USER_ANALYTICS_GZIP**

Default: False  
Env: USER_ANALYTICS_GZIP  
To be used with USER_ANALYTICS_ENABLED. Compress gzip json messages before sending to logstash.

**X_FRAME_OPTIONS**

Default: 'ALLOW-FROM %s' % SITEURL  
This is a Django setting

### 1.15 Customise the Look and Feel

#### 1.15.1 GeoNode Themes

We have already explained in *Simple Theming* how to change the GeoNode theme directly from the *Admin Interface*. This is an easy way for customizing GeoNode appearance but, in some cases, you might want to have more control on it.

In those cases, you have to venture into the code and it is highly recommended to use a GeoNode Project and customize it instead of the GeoNode default HTML/CSS code. See the following sections to learn more about that.

#### 1.15.2 Theming your GeoNode Project

There are a range of options available to you if you want to change the default look and feel of your *GeoNode Project*. Since GeoNode’s style is based on *Bootstrap* you will be able to make use of all that Bootstrap has to offer in terms of theme customization. You should consult Bootstrap’s documentation as your primary guide once you are familiar with how GeoNode implements Bootstrap and how you can override GeoNode’s theme and templates in your own project.

**Logos and graphics**

GeoNode intentionally does not include a large number of graphics files in its interface. This keeps page loading time to a minimum and makes for a more responsive interface. That said, you are free to customize your GeoNode’s interface by simply changing the default logo, or by adding your own images and graphics to deliver a GeoNode experience the way you envision it.

Your GeoNode project has a directory already set up for storing your own images at `<my_geonode>/static/img`. You should place any image files that you intend to use for your project in this directory.

Let’s walk through an example of the steps necessary to change the default logo.

1. Change to the `img` directory:

   ```bash
   $ cd <my_geonode>/static/img
   ```

2. If you haven’t already, obtain your logo image. The URL below is just an example, so you will need to change this URL to match the location of your file or copy it to this location:
3. Change to the css directory:

```bash
$ cd ../..
```

4. Override the CSS that displays the logo by editing `<my_geonode>/static/css/site_base.css` with your favorite editor and adding the following lines, making sure to update the width, height, and URL to match the specifications of your image.

```bash
$sudo vi site_base.css
```

```css
.navbar-brand {
  width: 350px;
  height: 80px;
  background: transparent url("../img/500px-Service_mark.svg.png") no-repeat;
  background-size: 300px 70px;
  background-position-y: center;
}
```

5. Restart your GeoNode project and look at the page in your browser:

```bash
$ cd /home/geonode
$ sudo rm -Rf geonode/geonode/static_root/*
$ cd my_geonode
$ python manage.py collectstatic
$ sudo service apache2 restart
```

**Note:** It is a good practice to cleanup the `static_folder` and the Browser Cache before reloading in order to be sure that the changes have been correctly taken and displayed on the screen.

Visit your site at `http://localhost/` or the remote URL for your site.

![Custom logo](image)

**Fig. 221: Custom logo**

You can see that the header has been expanded to fit your graphic. In the following sections you will learn how to...
customize this header to make it as you want.

**Note:** You should commit these changes to your repository as you progress through this section, and get in the habit of committing early and often so that you and others can track your project on GitHub. Making many atomic commits and staying in sync with a remote repository makes it easier to collaborate with others on your project.

### Cascading Style Sheets

In the last section you already learned how to override GeoNode’s default CSS rules to include your own logo. You are able to customize any aspect of GeoNode’s appearance this way. In the last screenshot, you saw that the main area in the homepage is covered up by the expanded header.

First, we’ll walk through the steps necessary to displace it downward so it is no longer hidden, then change the background color of the header to match the color in our logo graphic.

1. Reopen `<my_geonode>/static/css/site_base.css` in your editor:

   ```bash
   cd /home/geonode/my_geonode/my_geonode/static/css
   sudo vi site_base.css
   ```

   1. Add the following CSS rules to consider the expanded header height:

   ```css
   #wrap {
     margin-top: 100px !important;
     padding-top: 0px;
   }
   ```

   1. Add a rule to change the background color of the header to match the logo graphic:

   ```css
   .navbar-inverse {
     background-color: #ff0000 !important;
   }
   ```

   1. Add a background image for the hero section:

   ```css
   .jumbotron {
     background-size: cover !important;
   }
   ```

   1. Your project CSS file should now look like this:

   ```css
   .navbar-brand {
     width: 350px;
     height: 150px;
     background: transparent url("../img/500px-Service_mark.svg.png") no-repeat;
     background-size: 300px 100px;
     background-position-y: center;
   }
   #wrap {
     margin-top: 100px !important;
     padding-top: 0px;
   }
   ```

   (continues on next page)
1. Collect the static files into STATIC_ROOT, restart the development server and reload the page:

```bash
$ python manage.py collectstatic
$ sudo service apache2 restart
```

You can continue adding rules to this file to override the styles that are in the GeoNode base CSS file which is built from base.less.

**Note:** You may find it helpful to use your browser’s development tools to inspect elements of your site that you want to override to determine which rules are already applied. See the screenshot below.
Templates and static pages

Now that we have changed the default logo and adjusted our main content area to fit the expanded header, the next step is to update the content of the homepage itself. Your GeoNode project includes two basic templates that you will use to change the content of your pages.

The file `site_base.html` (in `<my_geonode>/templates/`) is the basic template that all other templates inherit from and you will use it to update things like the header, navbar, site-wide announcement, footer, and also to include your own JavaScript or other static content included in every page in your site. It’s worth taking a look at GeoNode’s base file on GitHub. You have several blocks available to you for overriding, but since we will be revisiting this file in future sections of this guide, let’s just look at it for now and leave it unmodified.

Open `<my_geonode>/templates/site_base.html` in your editor:

```bash
$ cd /home/geonode/my_geonode/my_geonode/templates
$ sudo vi site_base.html
```

You will see that it extends from `base.html`, which is the GeoNode template referenced above and it currently only overrides the `extra_head` block to include our project’s `site_base.css` which we have modified in the previous section.

```html
{% extends "base.html" %}
{% block extra_head %}

    <link href="{{ STATIC_URL }}css/site_base.css" rel="stylesheet"/>

{% endblock %}
```

You can see on line 189 of the GeoNode `base.html` template that this block is included in an empty state and is set up specifically for you to include extra CSS files as your project is already set up to do.
The file `site_index.html` is the template used to define your GeoNode project’s homepage. Let’s actually override this template.

It extends GeoNode’s default `index.html` template and gives you the option to override specific areas of the homepage like the hero area, but it also allows you to leave other sections as they are. You are of course free to override the sections which you prefer, the following steps give you an example.

1. Open `<my_geonode>/templates/site_index.html` in your editor.

2. Edit the first `<h1>` element inside the `<div class="container">

```html
<h1>{{custom_theme.jumbotron_welcome_title|default:_("GeoNode Project Example")}}</h1>
```

**Warning:** Pay attention to the `custom_theme.jumbotron_welcome_title` part, if you delete it you will cannot use the “admin-based” theme customization option (see Simple Theming)

3. Edit the introductory paragraph to say something about your GeoNode project:

```html
<p>{{custom_theme.jumbotron_welcome_content|default:_("This GeoNode has been customized through my GeoNode Project.")}}</p>
```

**Warning:** Take care of the `custom_theme.jumbotron_welcome_content` if you are using the “admin-based” theme customization option (see Simple Theming)

4. Your edited `site_index.html` file should now look like this:

```html
{% extends 'index.html' %}
{% load i18n %}

{% comment %} This is where you can override the hero area block. You can simply modify the content below or replace it wholesale to meet your own needs. {% endcomment %}

{% block hero %}

<div class="jumbotron">
    <div class="container">
        <h1>{{custom_theme.jumbotron_welcome_title|default:_("GeoNode Project Example")}}</h1>
        <p>{{custom_theme.jumbotron_welcome_content|default:_("This GeoNode has been customized through my GeoNode Project.")}}</p>
        {% if not custom_theme.jumbotron_cta_hide %}
            <p><a class="btn btn-default btn-lg" target="_blank" role="button" href="{{custom_theme.jumbotron_cta_link|default:_('http://docs.geonode.org/en/2.10/usage/index.html')}}">{{custom_theme.jumbotron_cta_text|default:_("Get Started")}}</a>
        {% endif %}
    </div>
</div>

(continues on next page)
5. Collect the static files into STATIC_ROOT, restart the development server and reload the page to see the changes:

```
$ python manage.py collectstatic
$ sudo service apache2 restart
```

![Customized Geonode Project Home Page](image)

**Fig. 224: Customized Geonode Project Home Page**

Other theming options

You are able to change any specific piece of your GeoNode project’s style by adding CSS rules to site_base.css, but since GeoNode is based on Bootstrap, there are many pre-defined themes that you can simply drop into your project to get a whole new look. This is very similar to WordPress themes and it is a powerful and easy way to change the look of your site without much effort.
Bootswatch

From Bootswatch you can download ready-to-use themes for Bootstrap-based website.

**Warning:** Currently GeoNode uses the 3.3.7 version of Bootstrap, so suitable Bootswatch themes should have been built for the same version.

The following steps will show you how to use a theme from Bootswatch in your own GeoNode Project.

1. Download the Bootswatch themes for Bootstrap v3.3.7 archive and extract it on some folder in your disk.
2. Select a theme (in this example we will use Sandstone) and copy the bootstrap.css file inside the theme folder to the `<my_geonode>/static/css` (the static folder of your GeoNode Project).
3. Update the `site_base.html` template to include this file. It should now look like this:

   ```
   $ cd <my_geonode>/templates
   $ sudo vi site_base.html
   ```

   ```
   {% extends "base.html" %}
   {% block extra_head %}
   <link href="{{ STATIC_URL }}css/site_base.css" rel="stylesheet"/>
   <link href="{{ STATIC_URL }}css/bootstrap.css" rel="stylesheet"/>
   {% endblock %}
   ```

5. Collect the static files into STATIC_ROOT, restart the development server and reload the page:

   ```
   $ python manage.py collectstatic
   $ sudo service apache2 restart
   ```

### 1.16 GeoNode permissions

#### 1.16.1 Permissions

Permissions in GeoNode are set per resource, where a resource can be a layer, a map, a document or a service. The way the permissions are set is the same for all of them.

**Warning:** GeoNode has a set of default permissions that are applied on resource creation when you don’t explicitly declare them. This is particularly relevant when creating and saving a map, where you won’t have the possibility to set the its permissions during the creation phase. GeoNode can be tuned to make sure that by default the new created resource are not public, this can be done by changing two settings, see Default view permissions and Default download permissions

**Single Resource permissions**

Resource permissions can be generally set from the resource detail page. The following figure shows how to open the dialog to set permissions on a layer, the same concept applies to documents and maps.
Fig. 225: *Bootswatch Theme for the Geonode Project*
Fig. 226: Change Layer Permissions
The dialog for setting the permission allow a granular selection of each permission type to be applied for users and/or groups. Each permission type is grouped in tabs that are expanded on click. The text boxes have an autosuggest feature to help the compilation of user names and groups, it starts upon typing.

You can set the following types of permissions:

- **View** allows to view the layer;
- **Download** allows to download the layer;
- **Change Metadata** allows to change the layer metadata;
- **Edit Data** allows to change attributes and properties of the layers features;
- **Edit Style** allows to change the layer style;
- **Manage** allows to update, delete, change permissions, publish and unpublish the layer.

**Warning:** When assigning permissions to a group, all the group members will have those permissions. Be careful in case of editing permissions.

**Bulk permissions**

GeoNode offers the possibility to set permissions in bulk, this can be done in any list page. In order to set bulk permissions you have first to fill the shopping cart with the resources you are interested with by clicking the + button on the resource snippet.

Once happy with the selection you can click the Set Permissions button under the shopping cart to open the permissions dialogue that will apply the chosen permission to all selected resources.

**1.17 Monitoring**

**1.17.1 Monitoring**

**Internal Monitoring Application (geonode.monitoring)**

**Note:** This application requires MaxMind’s GeoIP database file.

**Base concepts and objects**

GeoNode monitoring is a configurable monitoring application, that allows internal resources and hardware resources monitoring for GeoNode installations, including GeoServer deployments. Monitoring application is configurable, so different deployment scenarios could be handled - from GeoNode and GeoServer running on single host, through distributed installations, where GeoServer is deployed to several hosts.
Fig. 227: Resource Permission Dialogue
Fig. 228: Add Resource To Shopping Cart

Fig. 229: Shopping Cart Permissions
Monitoring application uses three base entity classes to describe elements of reality: Host, Service Type and Service.

- **Host** is an object describing physical (or virtual) instance of operating system on which GN or GS is running. This object exists only for grouping and is not used directly by monitoring.

- **Service Type** is a description of kind of Service. Depending on service type, different metrics are stored, and different data collection mechanisms are used. Additionally, for system monitoring, it’s not conducted directly, but with GeoNode or GeoServer as monitoring agent. That means, no additional software installation is needed to monitor system, but also, hosts that don’t have GeoNode or GeoServer installed, won’t be monitored. There are four service types:
  - `hostgeonode`, `hostgeoserver` - those types describe system monitoring probes that are running with GeoNode or GeoServer respectively,
  - `geonode`, `geoserver` - application-level probes that monitor one specific GeoNode or GeoServer instance.

- **Service** describes one specific instance of probe, either host-level or application-level. Service references Host and Service Type. Each service must be named, and name should be system-wide unique.

As mentioned above, each Service Type keeps a set of metrics, specific for that type. A metric is a description of measured value, for example: number of requests, response size or time, cpu usage, free memory etc. Each Service Type has it’s own metrics set. Metric value may be either value counter (like country of user), numeric counter (like number of requests) or rate (like bytes in/out on network interface).

Besides metric data, monitoring will also store exception information for exceptions that were captured during request handling.

Data are collected periodically (at most every 1 minute), aggregated and stored in aggregated form. User can see data from predefined relative periods (last minute, last 10 minutes, last hour, last day, last week).

User can enable and configure automated checks, which will be run after each collection/aggregation cycle, and will emit notifications if metric values in that run exceed configured thresholds.

**Analytics**

GeoNode monitoring application makes also available information about resources usage at user level.

Those information are collected whenever an event occurs about some resource. Events can be of different types (`EventType`) which refer to common user activities on resources (upload, view, download, etc.). Those data are stored using a dedicated metric and aggregated based on a configurable granularity, depending on the time interval considered and the wanted resolution.

So the analytics client, once defined a time interval and a time frame, can retrieve stats such as:

- total number of unique visitors;
- number of unique visitors who trigger a specific type of event;
- number of unique visitors who trigger events on some resource type;
- number of unique visitors in a given country;
- number of unique visitors who trigger events on some specific resource;
- number of unique visitors considering a combination of multiple conditions (for example an event type on some resource type).
Installation

**Warning:** This plugin requires a Postgresql DB backend enabled

- ensure UTC Timezone to your DB
  
  ```
  psql -c 'set timezone=UTC;'
  ```

- enable `MONITORING_ENABLED` flag and ensure that following code is in your settings:

```python
# Settings for MONITORING plugin
CORS_ORIGIN_ALLOW_ALL = ast.literal_eval(os.environ.get('CORS_ORIGIN_ALLOW_ALL', 'False'))
GEOIP_PATH = os.getenv('GEOIP_PATH', os.path.join(PROJECT_ROOT, 'GeoIPCities.dat'))
MONITORING_ENABLED = ast.literal_eval(os.environ.get('MONITORING_ENABLED', 'True'))

MONITORING_CONFIG = os.getenv("MONITORING_CONFIG", None)
MONITORING_HOST_NAME = os.getenv("MONITORING_HOST_NAME", HOSTNAME)
MONITORING_SERVICE_NAME = os.getenv("MONITORING_SERVICE_NAME", 'local-geonode')

# how long monitoring data should be stored
MONITORING_DATA_TTL = timedelta(days=int(os.environ.get("MONITORING_DATA_TTL", 7)))

# this will disable csrf check for notification config views, # use with caution - for dev purpose only
MONITORING_DISABLE_CSRF = ast.literal_eval(os.environ.get('MONITORING_DISABLE_CSRF', 'False'))

if MONITORING_ENABLED:
    if 'geonode.monitoring' not in INSTALLED_APPS:
        INSTALLED_APPS += ('geonode.monitoring',)
    if 'geonode.monitoring.middleware.MonitoringMiddleware' not in MIDDLEWARE_CLASSES:
        MIDDLEWARE_CLASSES += \
        ('geonode.monitoring.middleware.MonitoringMiddleware',)

# skip certain paths to not to mud stats too much
MONITORING_SKIP_PATHS = ['/api/o/',
                            '/monitoring/',
                            '/admin',
                            '/jsi18n',
                            STATIC_URL,
                            MEDIA_URL,
                            re.compile('^[a-z]{2}/admin/'),
]

# configure aggregation of past data to control data resolution
# list of data age, aggregation, in reverse order
# for current data, 1 minute resolution
# for data older than 1 day, 1-hour resolution
# for data older than 2 weeks, 1 day resolution
MONITORING_DATA_AGGREGATION = (
    (timedelta(seconds=0), timedelta(minutes=1)),
    (timedelta(days=1), timedelta(minutes=60)),
    (timedelta(days=14), timedelta(days=1)),
)
```

(continues on next page)
# privacy settings

```python
USER_ANALYTICS_ENABLED = ast.literal_eval(os.getenv('USER_ANALYTICS_ENABLED', 'False'))
```

- run

```bash
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py migrate
```

to apply db schema changes and insert initial data

- run

```bash
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py updategeoip
```

to fetch MaxMind’s GeoIP database file. It will be written to path specified by `GEOIP_PATH` setting.

- run

```bash
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py collect_metrics -n -t xml -f --since='yyyy-mm-dd HH:mm:ss'
```

to create first metrics.

**Warning:** Replace `<yyyy-mm-dd HH:mm:ss>` with a real date time to start with.

- update Sites from admin; make sure it contains a correct host name

- do not forget to enable notifications and configure them from user profile

**Enable the collect_metrics cron**

**Warning:** Here below you will find instructions for a Ubuntu 16.04/18.04 based machine, but the procedure is similar for other OSs. The basic concept is that you must allow the system to run the command every minute (without `-f` and `since`):

```bash
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py collect_metrics -n -t xml
```

cront job

```bash
sudo crontab -e
```

```
# Add the following line at the bottom; this will run the supervisor command every minute
* * * * * supervisorctl start geonode-monitoring
```

1.17. Monitoring
supervisor

```bash
sudo apt install supervisor
sudo service supervisor restart
sudo update-rc.d supervisor enable

```

```bash
sudo vim /etc/supervisor/conf.d/geonode-monitoring.conf

```

```bash
[program:geonode-monitoring]
command=<path_to_virtualenv>/geonode/bin/python -W ignore <path_to_your_project>/
    geonode/manage.py collect_metrics -n -t xml
directory = <path_to_your_project>
environment=DJANGO_SETTINGS_MODULE="<your_project>.settings"
user=<your_user>
numproc=1
stdout_logfile=/var/log/geonode-celery.log
stderr_logfile=/var/log/geonode-celery.log
autostart = true
autorestart = true
startsecs = 10
stopwaitsecs = 600
priority = 998

```

```bash
sudo service supervisor restart
sudo supervisorctl start geonode-monitoring
sudo supervisorctl status geonode-monitoring

```

```bash
sudo vim /etc/hosts

```

```bash
127.0.0.1 localhost
<pre>
<public_ip> <your_host.your_domain> <your_host>
</pre>

# The following lines are desirable for IPv6 capable hosts

Configuration

In order to have working monitoring, at least Service should be configured. Let’s assume following deployment scenario:

- there’s one machine, geo01
- geo01 hosts both GeoNode and GeoServer (including PostgreSQL).
- applications are served with nginx+uwsgi, on port 80, but they are reachable on localhost address.
- GeoServer is served from /geoserver/ path
- GeoNode is served from / path

Here’s step-by-step instruction how to create monitoring setup for deployment scenario:

1. Log in as admin, and go to admin section:
2. Go to monitoring section (or type `/admin/monitoring/` as a path in URL):

<table>
<thead>
<tr>
<th>Layers</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Layers</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Styles</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Upload sessions</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Maps</td>
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</tr>
<tr>
<td>Map layers</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Map snapshots</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Maps</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Exception events</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Hosts</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Metric labels</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Metric notification checks</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Metrics</td>
<td>Add, Change</td>
</tr>
<tr>
<td>Monitored resources</td>
<td>Add, Change</td>
</tr>
</tbody>
</table>

3. Go to Hosts:
4. Click on Add host +:

5. Enter following information: *host: localhost* *ip: 127.0.0.1* Note, that host value is arbitrary. You can enter other name if you like. Don’t forget to save.

6. Go to Services:
7. Click on Add service +:

8. Enter following information:
   
   • **name**: `local-geonode`  
   • **host**: `localhost`  
   • **service type**: `geonode`
9. Add another Service Enter following information:

- **name**: local-system-geonode
- **host**: localhost
- **service type**: hostgeonode
- **url**: http://localhost/ (should point to GeoNode home page)
10. Add another Service and enter following information:

- **name**: `local-geoserver`
- **host**: `localhost`
- **service type**: `geoserver`
- **url**: `http://localhost/geoserver/` (should point to GeoServer home page)
To summarize, following entries should be created in admin/monitoring:

- **Host**: `localhost`, with ip: `127.0.0.1`
- **Service**: `local-geonode`:
  - `host` `localhost`
  - `type` `geonode`
- **Service**: `local-geoserver`:
  - `url` `http://localhost/geoserver/`
  - `host` `localhost`
  - `type` `geoserver`
- **Service**: `local-system-geonode`:
  - `url` `http://localhost/`
  - `host` `localhost`
  - `type` `hostgeonode`

**Usage**

Monitoring interface is available for superusers only. It’s available in profile menu:
Dashboard

Main view offers overview of recent situation in GeoNode deployment.

Top bar and indicators

With top bar buttons User can:
• go back from nested interface elements (charts, alerts, errors)
• select time window from which data will be aggregated and shown (last 10 minutes, last 1 hour, last day or last week from now)
• see what’s currently used time window
• enable/disable autorefresh

Below there are four main health indicators:

• **aggregated Health Check information.** This element will be:
  - *green* if there is no alerts nor errors
  - *yellow* if there are alerts
  - *red* if there are errors

• **Uptime** that shows GeoNode’s system uptime.

• **Alerts** shows number of notifications from defined checks. When clicked, Alerts box will show detailed information. See Notifications description for details.

• **Errors** - shows how many errors were captured during request processing. When clicked, Errors box will show detailed list of captured errors. See Errors description for details.

Indicators in error state

**Software Performance**

Software Performance view shows GeoServer web service statistics, for all requests monitored and detailed, OWS-specific, per service type (WMS, WFS, OCS etc).
Clicking on will show charts with data history for overall performance and per-OWS performance:
Hartware Performance

Hardware performance box shows hardware usage statistics for selected host (monitored with any of hostgeonode or hostgeoserver type Service): % of CPU usage and average memory consumption. User can select from which host data will be presented.
Clicking on **Hardware Performance** will show charts with data history for selected host and time period.
Errors view will show list of captured errors in GeoNode and GeoServer. List contents is displayed for selected time window.

For each error, details are available:

- error class, message and stack trace
- basic request context (IP, path, user agent)
Alerts

An alert is a descriptive information on situation when observed metric contains values outside allowed range (for example, response time is above 30 seconds, or no requests were served within last 30 minutes). Alerts are generated by notifications mechanism described below.

Alerts view will show list of alerts for current moment (alerts that were generated in past are not displayed here):

Each alert contains more descriptive information what is wrong:
Notifications

Notification mechanism (not to be confused with notifications application in GeoNode) is a way to inform selected users about situations, where collected metric data would indicate a problem with deployment. Notifications are accessible from Alerts view:

There can be several notification configurations available.

Each notification configuration contains two main elements:

- list of email addressess which should be notified when alert is generated
- list of checks (at least one check must be in invalid state to generate alert)
User can add arbitrary number of emails. Email address doesn’t need to point to user registered in GeoNode instance. If email provided doesn’t belong to any of users, alert will be send as a regular email. If email provided can be associated with specific user, notifications application (and thus, notification settings for that user) will be used to send alert.

Integration with GeoHealthCheck

GeoNode can also be easily monitored with external tools, like GeoHealthCheck. See Documentation on adding resources for details.

1.17.2 Monitoring: API

Overview

Geonode monitoring is an optional infrastructure for monitoring resource usage in GeoNode, accompanying GeoServer(s) and hosts on which each service is running. This is not full-fledge monitoring, like zabbix or nagios, rather a moderate size tool to diagnose deployment health. It will be used by users that mostly are not full-time sysops, so usage is simplified.

API

Monitoring API exposes various data to monitoring client.

API root URL is /monitoring/, each path in this documentation is relative to that root.

Valid from/valid to

Monitoring collects data periodically, in fixed periods (usually 1 minute). Each metric data is a value (or values if they are split by additional indicators, like resource, label etc) accumulated within that period.

Host

Host is a physical or virtualized instance, on which specific service (GeoNode or GeoServer) is running. This entity is not monitored, but it’s used to group services by their deployment location. Hosts list is available in API in /api/hosts/ endpoint:
GET /monitoring/api/hosts/

```
{
  "hosts": [
  {
    "ip": "127.0.0.1",
    "name": "localhost"
  }
  ]
}
```

While host is not monitored directly, some service types (and services of those types) are responsible for monitoring underlying host, hardware resources are monitored indirectly (no dedicated system-level agent is needed).

**Service**

Service is a name of monitored service. Services are configurable from admin interface, and exposed in API in /api/services/:

GET /monitoring/api/services/

```
{
  "services": [
  {
    "name": "local-system",
    "last_check": "2017-08-03T13:33:26.674",
    "host": "localhost",
    "check_interval": 60,
    "type": "hostgeonode",
    "id": 3
  },
  {
    "name": "local-geoserver",
    "last_check": "2017-08-03T13:33:26.455",
    "host": "localhost",
    "check_interval": 60,
    "type": "geoserver",
    "id": 2
  },
  {
    "name": "local-geonode",
    "last_check": "2017-08-03T13:33:27.741",
    "host": "localhost",
    "check_interval": 60,
    "type": "geonode",
    "id": 1
  }
  ]
}
```

Each service is described by properties:

- **name** - unique name of service
- **type** - service type name
- **host** - host on which service is running
- **id** - object id
• last_check - timestamp with last check (data collection) on that service
• check_interval - interval in seconds, how often data should be collected from this service.

Service type

Service type describes kind of services to which it’s assigned. There are several service types available:
• geonode - service is a GeoNode instance
• geoserver - service is a GeoServer instance
• hostgeonode - service is not an application, service is underlying host measured with GeoNode (see Host)
• hostserver - service is not an application, service is underlying host measured with GeoServer (see Host)

Resource

Resource is an object that can be served by GeoNode or GeoServer. There are several resource types monitored:
• layer
• document
• map
• url

Resource can be served from either GeoNode or GeoServer. We don’t check if specific resource actually exists, just keep list of items used and recorded for monitoring. Also, it won’t show renames/copies/moves of the same resource.

Resources list is available in /api/resources/ endpoint:

GET /monitoring/api/resources/

```json
{
  "resources": [
    {
      "type": "layer",
      "id": 13,
      "name": "unesco:Unesco_point"
    },
    {
      "type": "layer",
      "id": 7,
      "name": "geonode:test"
    },
    {
      "type": "layer",
      "id": 14,
      "name": "http://www.opengis.net/gml:GridCoverage"
    },
    {
      "type": "map",
      "id": 17,
      "name": "some map"
    }
  ]
}
```
Resource is described with following attributes:
  • id - numeric id of resource record in monitoring
  • type - type of resource
  • name - name of resource.

Resources list can be filtered with following query string arguments:
  • metric_name - name of metric for which resources should be returned
  • resource_type - name of type of resource (layer, map, document, style, url)
  • valid_from - list resources that are available since that timestamp
  • valid_to - list resources that are available until that timestamp

Example:

GET /monitoring/api/resources/?resource_type=layer&metric_name=request.count&valid_from=2017-08-01

```json
{
    "resources": [
        {
            "type": "layer",
            "id": 24,
            "name": "atlantis:landmarks"
        },
        {
            "type": "layer",
            "id": 2,
            "name": "topp:states"
        },
        {
            "type": "layer",
            "id": 22,
            "name": "atlantis:island"
        },
        {
            "type": "layer",
            "id": 23,
            "name": "atlantis:poi"
        },
        {
            "type": "layer",
            "id": 16,
            "name": "dissolveroad2"
        },
        {
            "type": "layer",
            "id": 21,
            "name": "atlantis:roads"
        }
    ]
}
```
**Resource type**

Resource Types describe which types of resource the GeoNode monitoring consider. To retrieve the full list of Resource Types the `/api/resource_types/` is available:

```
GET /monitoring/api/resource_types/
```

```
{
    "status": "ok",
    "data": {
        "key": "resource_types"
    },
    "errors": {},
    "resource_types": [
        {
            "type": "No resource",
            "name": ""
        },
        {
            "type": "Layer",
            "name": "layer"
        },
        {
            "type": "Map",
            "name": "map"
        },
        {
            "type": "Resource base",
            "name": "resource_base"
        },
        {
            "type": "Document",
            "name": "document"
        },
        {
            "type": "Style",
            "name": "style"
        },
        {
            "type": "Admin",
            "name": "admin"
        },
        {
            "type": "URL",
            "name": "url"
        },
        {
            "type": "Other",
            "name": "other"
        }
    ],
    "success": true
}
```
Event Types

Event Types describe the way resources were used in GeoNode. Resource can be accessed as a regular view (through GeoNode, like `/layers/X` URL), or through OWS request. Full list of Event Types handled is available in `/api/event_types` endpoint:

GET `/monitoring/api/event_types/`

```json
{
   "status": "ok",
   "errors": { },
   "data": {
      "key": "event_types"
   },
   "event_types": [
      { "name": "all" },
      { "name": "other" },
      { "name": "download" },
      { "name": "view" },
      { "name": "OWS:TMS" },
      { "name": "OWS:WMS-C" },
      { "name": "OWS:WMTS" },
      { "name": "OWS:WCS" },
      { "name": "OWS:WFS" },
      { "name": "OWS:WMS" },
      { "name": "OWS:WPS" },
      { "name": "OWS:ALL" },
      { "name": "create" },
      { "name": "upload" }
   ]
}
```

(continues on next page)
Event types starting with *OWS:* prefix mean they’re related to OWS service. *OWS:ALL* is a cumulative event type, which keeps requests for any OWS.

Event type *other* means request not related to OWS. This is also cumulative event type, and should be used as a baseline of all non-ows requests.

In order to retrieve *OWS* only requests the *ows-service* flag (possible values are True, true, False, false, 0, 1) can be used:

- *OWS* event types

  ```
  GET /monitoring/api/event_types/?ows_service=true
  ```

  ```json
  { 
  "status": "ok",
  "errors": {},
  "data": { 
    "key": "event_types",
    "event_types": [
      { 
        "name": "OWS:TMS",
        "type_label": "TMS"
      },
      { 
        "name": "OWS:WMS-C",
        "type_label": "WMS-C"
      },
      { 
        "name": "OWS:WMTS",
        "type_label": "WMTS"
      },
      { 
        "name": "OWS:WCS",
        "type_label": "WCS"
      },
      { 
        "name": "OWS:WFS",
        "type_label": "WFS"
      }
    ]
  }
  ```

  (continues on next page)
non-OWS event types

GET /monitoring/api/event_types/?ows_service=false

```json
{
  "status": "ok",
  "errors": {},
  "data": {
    "key": "event_types",
    "event_types": [
      { "name": "other", "type_label": "Not OWS" },
      { "name": "all", "type_label": "All" },
      { "name": "create", "type_label": "Create" },
      { "name": "upload", "type_label": "Upload" },
      { "name": "change", "type_label": "Change" },
      { "name": "change_metadata", "type_label": "Change Metadata" },
      { "name": "view_metadata", "type_label": "View Metadata" },
      { "name": "view", "type_label": "View" }
    ]
  }
}
```
Event type *all* means any request.

**Label**

Label is a description of subset of metric data that is not described by resources (it’s not served as logical data set). Things that can be described with label:

- user tracking id
- volume mount point
- network interface name
- request path
- request method
- response status code
- etc …

List of all labels recorded is available in `/api/labels/` endpoint:

GET `/monitoring/api/labels/`

```json
{
    "labels": [
        {
            "id": 306,
            "name": "Other / Other / Python Requests 2.13"
        },
        {
            "id": 315,
            "name": "Kent"
        }
    ]
}
```
Each metric data set will have at least one label attached. List of labels can be filtered with following query string arguments:

- `metric_name` - name of metric for which labels should be returned
- `valid_from` - list labels that are available since that timestamp
- `valid_to` - list labels that are available until that timestamp

Example:

```plaintext
GET /monitoring/api/labels/?metric_name=request.ua&valid_from=2017-08-05
```

```json
{
    "labels": [
        {
            "id": 298,
            "name": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Safari/537.36"
        },
        {
            "id": 261,
            "name": "lo"
        },
        {
            "id": 331,
            "name": "PUT"
        },
        {
            "id": 334,
            "name": "Other / Other / Python Requests 2.18"
        }
    ]
}
```
**Metric name**

Metric name is a semi-namespace description of what kind of data metric stores. Typical metric names: - request.count - request.ip - response.size - response.status

Each service type has a set of metrics available. Application-level services will have different metric set than host-level services.

Full list of metrics is available in /api/metrics/ endpoint. Returned list is not filterable. Sample response:

GET /monitoring/api/metrics/

```
{
  "metrics": [
    {
      "metrics": [
        {
          "type": "count",
          "name": "request.count",
          "unit": "Count"
        },
        {
          "type": "count",
          "name": "request.ip",
          "unit": "Count"
        },
        ...
      ],
      "service": "geonode"
    },
    {
      "service": "geoserver",
      "metrics": [..]
    }
  ]
}
```

Metrics are grouped by service. Each metric has following structure:

```
{
  "type": "count",
  "name": "request.ip",
  "unit": "Count"
}
```

where:

- *type* is a metric data type (it can be count, value or rate). This is internal description of how to deal with aggregation of data for metric.
- *name* name of metric
- *unit* suggested Y-axis label, describing data units

**Metric Data**

Core feature of monitoring API is ability to get data for given metric for specified period. Metric value is a data set for fixed period of time, from which data were collected and processed for one specific metric name. Additionally, each
metric can have data calculated for specific services, resources, labels and event_types. Metric data API has several features:

- it can show metric data within specific time frame, down to 1 minute granularity (may be less if collection intervals are lower).
- it can show metric data aggregated with custom granularity (for example from last 48 hours with 15 minutes granularity).
- it can show metric data for whole monitored setup or for specific resource, label (like user agent type), monitored service (just for geonode or just for geoserver), Event type. Params can be joined in one query.

API endpoint is: /api/metric_data/METRIC_NAME/

Sample request for request.ua metric in specific time window (between 10am and 2pm of 2017-08-03) and data granularity (1h)

```
GET /monitoring/api/metric_data/request.ua/?
valid_from=2017-08-03%2010:00:00&valid_to=2017-08-03%2014:00:00&interval=3600
```

```
{
    "data": {
        "input_valid_from": "2017-08-03T10:00:00",
        "input_valid_to": "2017-08-03T14:00:00",
        "data": [
            {
                "valid_from": "2017-08-03T10:00:00",
                "data": [],
                "valid_to": "2017-08-03T11:00:00"
            },
            {
                "valid_from": "2017-08-03T11:00:00",
                "data": [
                    {
                        "samples_count": 10,
                        "val": "10.0000",
                        "min": "1.0000",
                        "max": "1.0000",
                        "sum": "10.0000",
                        "label": "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:53.0) Gecko/20100101 Firefox/53.0",
                        "metric_count": 10
                    },
                    {
                        "samples_count": 790,
                        "val": "790.0000",
                        "min": "19.0000",
                        "max": "79.0000",
                        "sum": "790.0000",
                        "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.78 Safari/537.36",
                        "metric_count": 22
                    },
                    {
                        "samples_count": 150,
                        "val": "150.0000",
```
}(continues on next page)
"min": "15.0000",
"max": "15.0000",
"sum": "150.0000",
"label": "Mozilla/5.0 (Macintosh; Intel Mac OS X) AppleWebKit/538.1 (KHTML, like Gecko) PhantomJS/2.1.1 Safari/538.1",
"metric_count": 10
},
"valid_to": "2017-08-03T12:00:00"
},
{ "valid_from": "2017-08-03T12:00:00",
"data": [],
"valid_to": "2017-08-03T13:00:00"
},
{ "valid_from": "2017-08-03T13:00:00",
"data": [
{ "samples_count": 37,
"val": "37.0000",
"min": "4.0000",
"max": "12.0000",
"sum": "37.0000",
"label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.40 Safari/537.36",
"metric_count": 4
},
"valid_to": "2017-08-03T14:00:00"
}
],
"metric": "request.ua",
"interval": 3600,
"type": "count",
"axis_label": "Count",
"label": null
}]

Metric data response is wrapped with following envelope:

"data": {
"input_valid_from": "2017-08-03T10:00:00",
"input_valid_to": "2017-08-03T14:00:00",
"metric": "request.ua",
"interval": 3600,
"type": "count",
"axis_label": "Count",
"label": null,
"data": [ ... # actual data ],
}

where:

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• `input_valid_from` and `input_valid_to` are parsed and aligned timestamps for which data are returned,
• `metric` is metric name for which response is returned,
• `interval` data aggregation interval used, in seconds (if none is provided, 60 seconds are used, unless time window is larger than 24 hours),
• `type` is metric data type, which describes internally how data are aggregated (sum, average or min/max function).
• `axis_label` is suggested value-axis label to be used in chart
• `label` is metric data label used (no label by default).

Metric data item is build as following structure:

```json
{
    "valid_from": "2017-08-03T13:00:00",
    "valid_to": "2017-08-03T14:00:00",
    "data": [
        {
            "samples_count": 37,
            "val": "37.0000",
            "min": "4.0000",
            "max": "12.0000",
            "sum": "37.0000",
            "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.40 Safari/537.36",
            "metric_count": 4
        },
        {
            "samples_count": 20,
            "val": "20.0000",
            "min": "4.0000",
            "max": "10.0000",
            "sum": "20.0000",
            "label": "Internet Explorer 4.0",
            "metric_count": 3
        }
    ]
}
```

where:
• `valid_from` and `valid_to` are timestamps of data aggregation period
• `data` is a list of value rows. When `data` is empty, that means no data were collected for input params.
• each `data` element contains:
  – `label` label value associated with metric data value. This can describe user-provided differentiation value (user agent string, request method etc), or, if such value is not in use, default, “count” or “value” label.
  – `val` is metrid data aggregated value, which should be used by frontend application. For `request.ua` this means count of requests for given user agent string, for `response.time` that will return average response time.
  – `min`, `max`, `sum` are helper statistical values to give insight on data used,
  – `samples_count` is a sum of all samples counts (actual requests) used for this calculation
  – `metric_count` is a number of metric data used to calculate the value.
– resource (optional) key with resource structure (id, name, type). This element will be visible when grouping by resource is used.

– event_type (optional) key with name of event type related to rest of row. This element will be visible when grouping by event type is used

Metric data can be filtered with following params:

• valid_from timestamp (date or date + time) meaning that data should be newer than this timestamp
• valid_to timestamp (date or date + time) meaning that data should be older than this timestamp
• interval data aggregation interval, in seconds. See below notes about intervals and timestamps alignment
• label label value only for which data should be returned (see [Labels](#labels))
• resource id of resource (see [Resources](#resources)) for which data should be returned
• service name of service (see [Services](#services)) for which data should be returned
• event_type name of service (see [Event Types](#ows_service)) for which data should be returned
• resource_type name of resource type to filter by, for example layer to show only data for layer objects (exclude urls, documents, maps).

**grouping metric data**

Additionally, in some cases client application may want to receive list of data points in one period for several resources (typical usage scenario: list top-most requested layers). In such case, metric data should be queried also with following params:

• group_by - name of object which should be used for grouping. At the moment two grouping modes are available:
  – resource - group by resource affected. This will produce metrics for the same label but each resource affected will be listed separately. Returned metric data items will have additional resource key, which will hold dictionary with keys name and type. Sample response:

```json
{
    "data": {
        "input_valid_from": "2017-09-01T00:00:00",
        "input_valid_to": "2017-09-08T13:50:34.024",
        "data": [
            
            {
                "valid_from": "2017-09-04T00:00:00",
                "data": {
                    
                    "resource": {
                        "type": "layer",
                        "name": "nurc:Arc_Sample"
                    },
                    "samples_count": 300,
                    "val": "300.0000",
                    "min": "100.0000",
                    "max": "100.0000",
                    "sum": "300.0000",
                    "label": "count",
                    "metric_count": 3,
                    "id": 10
                }
            }
        ]
    }
}
```

(continues on next page)
“resource”: {
  "type": "layer",
  "name": "sde:HYP_HR_SR_OB_DR"
},
  "samples_count": 72,
  "val": "72.0000",
  "min": "24.0000",
  "max": "24.0000",
  "sum": "72.0000",
  "label": "count",
  "metric_count": 3,
  "id": 25
},
  "valid_to": "2017-09-05T00:00:00"
},
  "valid_to": "2017-09-09T00:00:00"
},
  "metric": "request.count",
  "interval": 86400,
  "type": "count",
  "axis_label": "Count",
  "label": null
}

resource_no_labels - group by resource affected, but do not distinct by label. This will produce similar result as the other grouping, but it will not contain ‘label’ key.

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=resource_no_labels

{  
  "data": {  
    "input_valid_from": "2018-07-10T15:13:50.784Z",
    "input_valid_to": "2018-07-11T15:13:50.784Z",
    "data": [  
      {  
        "val:id_from": "2018-07-10T15:13:50.784Z",
        "data": [  
          {  
            "resource": {  
              "type": "url",
              "name": "/layers/",
              "id": 15
            },
            "metric_count": 4,
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "4.0000",
            "samples_count": 4
          }
        ]
      }
    ]
  }
}
"resource": {
    "type": "url",
    "name": "/",
    "id": 16
},
"metric_count": 4,
"val": 2,
"min": "1.0000",
"max": "4.0000",
"sum": "7.0000",
"samples_count": 7
},
{
    "resource": {
        "type": "url",
        "name": "/maps/",
        "id": 17
    },
    "metric_count": 4,
    "val": 2,
    "min": "1.0000",
    "max": "2.0000",
    "sum": "5.0000",
    "samples_count": 5
},
{
    "resource": {
        "type": "url",
        "name": "/maps/3",
        "id": 18
    },
    "metric_count": 1,
    "val": 1,
    "min": "1.0000",
    "max": "1.0000",
    "sum": "1.0000",
    "samples_count": 1
},
{
    "resource": {
        "type": "url",
        "name": "/maps/7",
        "id": 20
    },
    "metric_count": 1,
    "val": 1,
    "min": "1.0000",
    "max": "1.0000",
    "sum": "1.0000",
    "samples_count": 1
}
],
"valid_to": "2018-07-11T15:13:50.784Z"
}
- **label** - group by label. This will return number of unique label occurrences within selected period.

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=label

```
{
  "type": "value",
  "axis_label": "Count",
  "label": null
}
```

- **event_type** - group by event type. This will expose event_type field in data items. Grouping will return number of requests per each event type.

- **event_type_on_label** - group by event type but use label to do grouping (instead of metric data value). This will expose event_type field in data items. Grouping will return number of requests per label (especially for request.users, which uses label field as tracking id value, see [User Analytics](https://github.com/geosolutions-it/geonode/wiki/Monitoring:-User-Analytics)).

**Timestamps alignment**

Data collected by monitoring are aggregated into fixed period values. This have several consequences:

- you cannot query for time window smaller than aggregation period
- when querying for time window, input valid_from and valid_to will be aligned to possible actual valid_from and valid_to values. Alignment is calculated from 0:00h each day. For best results, you should use intervals that can be aligned without reminders.
• timestamps alignment may produce more rows than you expect in some cases. For example, let’s say client application want to have data aggregated with 5 minutes interval. Search for data between 12:04 and 12:06, even if interval between those two (2 minutes) is smaller than data interval (5 minutes), this will be aligned to data intervals, which will be:
  – from 12:00 to 12:05
  – from 12:05 to 12:10

If data aggregation period ends in the future, there’s good chance it will not contain any data.

## Exceptions

Exceptions are served with separate API endpoints. Those endpoints will return:

• list of exceptions captured
• exception details

List of exceptions is available in `/api/exceptions/` endpoint:

GET /monitoring/api/exceptions/

```json
{
    "exceptions": [
        {
            "url": "/monitoring/api/exceptions/8/",
            "error_type": "exceptions.ValueError",
            "id": 8,
            "service": {
                "type": "geonode",
                "name": "local-geonode"
            },
            "created": "2017-06-20T17:50:24.922"
        },
        {
            "url": "/monitoring/api/exceptions/9/",
            "error_type": "org.geoserver.platform.ServiceException",
            "id": 9,
            "service": {
                "type": "geoserver",
                "name": "local-geoserver"
            },
            "created": "2017-06-26T15:33:20.152"
        },
        {
            "url": "/monitoring/api/exceptions/10/",
            "error_type": "django.db.utils.ProgrammingError",
            "id": 10,
            "service": {
                "type": "geonode",
                "name": "local-geonode"
            },
            "created": "2017-06-27T12:32:37.032"
        }
    ]
}
```

Each exception in list contains:
- error_type which is a class of exception
- id object id for given exception recorded
- service service object, on which exception was recorded
- created exception recorded timestamp
- url url with exception details

Exception details:

GET /monitoring/api/exceptions/30/

```json
{
    "error_data": "Traceback (most recent call last):
    File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/core/handlers/base.py", line 132, in get_response
        response = wrapped_callback(request, *callback_args, **callback_kwargs)
    File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/views/generic/base.py", line 71, in view
        return self._handle_exception(ex)
    File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/views/generic/base.py", line 423, in _handle_exception
        return self.handle_exception(exc_type, exc_value, traceback)
    File "/mnt/work/cezio/geosolutions/repos/geonode/geonode/contrib/monitoring/views.py", line 176, in get
        return json_response({self.output_name: out})
    File "/mnt/work/cezio/geosolutions/repos/geonode/geonode/utils.py", line 619, in json_response
        body = json.dumps(body, cls=DjangoJSONEncoder)
    File "/usr/lib64/python2.7/json/__init__.py", line 251, in dumps
        chunks = self.iterencode(o, _one_shot=True)
    File "/usr/lib64/python2.7/json/encoder.py", line 270, in iterencode
        return _iterencode(o, 0)
    File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/core/serializers/json.py", line 115, in default
        raise TypeError(repr(o) + ": invalid literal for int() with base 10: " + repr(o2))
TypeError: <Service: Service: local-geoserver@localhost> is not JSON serializable",
    "service": {
        "type": "geonode",
        "name": "local-geonode"
    },
    "error_type": "exceptions.TypeError",
    "request": {
        "event_type": null,
        "client": {
            "ip": "127.0.0.1",
            "position": {
                "lat": null,
                "country": null,
                "lon": null,
                "city": null
            },
            "user_agent": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.40 Safari/537.36",
            "user_agent_family": "PC / Linux / Chrome 60.0.3112"
        },
        "request": {
            "path": "/monitoring/api/exceptions/",
            "host": "localhost:8000",
            "method": "GET",
```
(continues on next page)
Details contain:

- **error_type** which is a class of exception
- **error_message** message provided with error
- **error_data** is a plain text with stack trace
- **service** service object, on which exception was recorded
- **created** exception recorded timestamp
- **request** information on request associated with this error:
  - **event_type** name of Event Type associated with request
  - **client** requesting client information
  - **request** details on request received
  - **response** details on response send back
  - **resources** list of resources affected

**Autoconfiguration**

Autoconfiguration endpoint allows to perform monitoring configuration based on settings values. This API endpoint is available to superusers/staff only. Response is wrapped with standard envelope.

**POST /monitoring/api/autoconfigure/**

```json
{
    "status": "ok",
    "success": true,
    "errors": {}
}
```

### 1.17.3 Monitoring: User Analytics

**Purpose**

UA should provide information about GeoNode resources usage at user level (not request level, like plain monitoring).
Requests

1. total number of unique sessions on GeoNode (excluding ows requests) per day. This gives a base view of the reach.
   - requests from all sessions of all types, ows and non-ows
     
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label
   - non-ows related
     
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label&event_type=other
   - only ows related
     
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label&event_type=OWS:ALL

   ```json
   {
     "data": {
       "input_valid_from": "2018-07-11T15:41:06.419Z",
       "input_valid_to": "2018-07-12T15:41:06.419Z",
       "data": [ {
         "valid_from": "2018-07-11T15:41:06.419Z",
         "data": [ {
           "samples_count": 82,
           "val": 9,
           "min": "0.0000",
           "max": "24.0000",
           "sum": "82.0000",
           "metric_count": 16
         } ],
         "valid_to": "2018-07-12T15:41:06.419Z"
       } ],
       "metric": "request.users",
       "interval": 86400.0,
       "type": "value",
       "axis_label": "Count",
       "label": null
     }
   }
   
   (continues on next page)
   ```

2. total number of unique sessions per URL (excluding ows requests). Let me see how many users visits the layers page or the maps page
   - get number of unique tracking ids for urls
     
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=resource_on_label&resource_type=url&event_type=other

   ```json
   {
     "data": {
       "input_valid_from": "2018-07-11T15:39:25.126Z",
       "input_valid_to": "2018-07-12T15:39:25.126Z",
       "data": [ {
         "valid_from": "2018-07-11T15:39:25.126Z",
         "data": [ {
           "samples_count": 82,
           "val": 9,
           "min": "0.0000",
           "max": "24.0000",
           "sum": "82.0000",
           "metric_count": 16
         } ],
         "valid_to": "2018-07-12T15:39:25.126Z"
       } ],
       "metric": "request.users",
       "interval": 86400.0,
       "type": "value",
       "axis_label": "Count",
       "label": null
     }
   }
   ```

(continues on next page)
3. total number of unique sessions per event_type: for example total number of unique visits of resource pages (independently by resource type and id)

- to get number of requests

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=resource
• to get number of unique tracking ids

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=event_type_on_label

• to get number of unique tracking ids for each event_type on a given resource type

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=event_type_on_label&resource_type=url

```
{
  "data": {
    "input_valid_from": "2018-07-11T17:54:41.467Z",
    "input_valid_to": "2018-07-12T17:54:41.467Z",
    "data": [
      {
        "valid_from": "2018-07-11T17:54:41.467Z",
        "data": [
          {
            "samples_count": 5,
            "event_type": "all",
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          },
          {
            "samples_count": 5,
            "event_type": "other",
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          },
          {
            "samples_count": 5,
            "event_type": "view",
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          }
        ],
        "valid_to": "2018-07-12T17:54:41.467Z"
      }
    ],
    "metric": "request.users",
    "interval": 86400.0,
    "type": "value",
    "axis_label": "Count",
    "label": null
  }
}
```

• to get number of unique users for each event type on specific resource type

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=event_type_on_user&resource_type=url
<table>
<thead>
<tr>
<th>valid_from</th>
<th>input_valid_from</th>
<th>input_valid_to</th>
</tr>
</thead>
</table>

```
{ "data": {  
"input_valid_from": "2018-07-11T17:54:41.467Z",  
"input_valid_to": "2018-07-12T17:54:41.467Z",  
"data": [  
{  
"valid_from": "2018-07-11T17:54:41.467Z",  
"data": [  
{  
"samples_count": 5,  
"event_type": "all",  
"val": 2,  
"min": "1.0000",  
"max": "1.0000",  
"sum": "5.0000",  
"metric_count": 5  
},  
{  
"samples_count": 5,  
"event_type": "other",  
"val": 1,  
"min": "1.0000",  
"max": "1.0000",  
"sum": "5.0000",  
"metric_count": 5  
},  
{  
"samples_count": 5,  
"event_type": "view",  
"val": 1,  
"min": "1.0000",  
"max": "1.0000",  
"sum": "5.0000",  
"metric_count": 5  
}  
],  
"valid_to": "2018-07-12T17:54:41.467Z"  
}  
},  
"metric": "request.users",  
"interval": 86400.0,  
"type": "value",  
"axis_label": "Count",  
"label": null}  
```

4. total number of unique sessions per event_type and single resource: let me see what was the most visited map page in this day, or what was the most downloaded document, what was the most requested ows layer, etc.

- list of most visited resources of *url* type
  
  GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=url

- list of unique tracking ids for each resource (can be narrowed down to specific resource type with *resource_type* values).

  GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=resource_type
{  
  "data": {  
    "input_valid_from": "2018-07-11T17:56:49.381Z",
    "input_valid_to": "2018-07-12T17:56:49.381Z",
    "data": [  
      {  
        "valid_from": "2018-07-11T17:56:49.381Z",
        "data": [  
          {  
            "resource": {  
              "type": "",
              "name": "",
              "id": 1
            },
            "metric_count": 16,
            "val": 9,
            "min": "0.0000",
            "max": "24.0000",
            "sum": "82.0000",
            "samples_count": 82
          },  
          {  
            "resource": {  
              "type": "layer",
              "name": "geonode:ne_50m_admin_0_countries_lakes",
              "id": 2
            },
            "metric_count": 4,
            "val": 3,
            "min": "0.0000",
            "max": "2.0000",
            "sum": "3.0000",
            "samples_count": 3
          },  
          {  
            "resource": {  
              "type": "layer",
              "name": "geonode:world_iso2",
              "id": 12
            },
            "metric_count": 4,
            "val": 2,
            "min": "0.0000",
            "max": "5.0000",
            "sum": "8.0000",
            "samples_count": 8
          },  
          {  
            "resource": {  
              "type": "url",
              "name": "/layers/",
              "id": 15
            },
            "metric_count": 2,
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "samples_count": 8
          }
        ]
      }
    ]
  }
}
5. total number of unique visitor (user) per event_type and single resource: let me see how many users visited the map page in this day, or how many users download some resource, etc.

- number of unique visitors (users) in a year for a given event_type:
GET /monitoring/api/metric_data/request.users/ ?
valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59
&interval=31536000&event_type=upload&group_by=user

• number of unique visitors (users) in a given time interval and for a given resource_type.

GET /monitoring/api/metric_data/request.users/ ?
valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59
&interval=31536000&resource_type=layer&group_by=user

the responses should look like this:

```
{
  "data": {
    "input_valid_from": "2019-01-01T00:00:00Z",
    "input_valid_to": "2019-12-31T23:59:59Z",
    "data": {
      "valid_from": "2019-01-01T00:00:00Z",
      "data": {
        "samples_count": 3,
        "val": 2,
        "min": "1.0000",
        "max": "2.0000",
        "sum": "3.0000",
        "metric_count": 2
      }
    },
    "valid_to": "2020-01-01T00:00:00Z"
  },
  "metric": "request.users",
  "interval": 31536000,
  "type": "value",
  "axis_label": "Count",
  "label": null
}
```

6. total number of unique tracking ids/sessions for a given user.

• sessions count for anonymous users:

GET /monitoring/api/metric_data/request.users/ ?valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59
&interval=31536000&group_by=label&user=AnonymousUser

```
{
  "data": {
    "input_valid_from": "2019-01-01T00:00:00Z",
    "input_valid_to": "2019-12-31T23:59:59Z",
    "data": {
      "valid_from": "2019-01-01T00:00:00Z",
      "data": {
        "samples_count": 5,
        "val": 5,
        "min": "1.0000",
```

(continues on next page)
7. total number of unique tracking ids/sessions for each user.

- sessions count for each users:
  
  ```
  GET /monitoring/api/metric_data/request.users/ ?valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59 &interval=31536000&group_by=user_on_label
  ```

  ```json
  "valid_from": "2019-01-01T00:00:00Z",
  "data": [
    {
      "samples_count": 5,
      "val": 5,
      "min": "1.0000",
      "max": "1.0000",
      "sum": "5.0000",
      "user": "AnonymousUser",
      "metric_count": 5
    },
    {
      "samples_count": 16,
      "val": 3,
      "min": "1.0000",
      "max": "2.0000",
      "sum": "16.0000",
      "user": "admin",
      "metric_count": 14
    },
    {
      "samples_count": 4,
      "val": 1,
      "min": "1.0000",
      "max": "1.0000",
      "sum": "4.0000",
      "user": "user1_username",
      "metric_count": 4
    }
  ]
  ```
8. total number of unique users for each monitored resource.

```json
GET /monitoring/api/metric_data/request.users/?valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59
&interval=31536000&resource_type=layer&group_by=user_on_label

```
GET /monitoring/api/metric_data/request.users/ ?
last=31536000&interval=31536000&group_by=resource_on_user

{
   "data": {
      "input_valid_from": "2018-09-10T14:15:39.454Z",
      "input_valid_to": "2019-09-10T14:15:39.454Z",
      "data": [
         {
            "valid_from": "2018-09-10T14:15:39.454Z",
            "data": [
               {
                  "resource": {
                     "href": "/",
                     "type": "url",
                     "name": "/",
                     "id": 1
                  },
                  "metric_count": 36,
                  "val": 4,
                  "max": "2.0000",
                  "sum": "35.0000",
                  "min": "0.0000",
                  "samples_count": 35
               },
               {
                  "resource": {
                     "href": "/maps/",
                     "type": "url",
                     "name": "/maps/",
                     "id": 3
                  },
                  "metric_count": 3,
                  "val": 2,
                  "max": "1.0000",
                  "sum": "3.0000",
                  "min": "1.0000",
                  "samples_count": 3
               }
            ]
         },
         {
            "resource": {
               "href": "/layers/",
               "type": "url",
               "name": "geonode:railways",
               "id": 4
            },
            "metric_count": 5,
            "val": 2,
            "max": "2.0000",
            "sum": "3.0000",
            "min": "0.0000",
            "samples_count": 3
         }
      ]
   }
}
"id": 2,
"metric_count": 4,
"val": 1,
"max": "1.0000",
"sum": "4.0000",
"min": "1.0000",
"samples_count": 4
},

"resource": {
  "href": "/documents/2",
  "type": "document",
  "name": "test_doc_1.txt",
  "id": 5
},
"metric_count": 2,
"val": 1,
"max": "2.0000",
"sum": "4.0000",
"min": "2.0000",
"samples_count": 4
},

"resource": {
  "href": "/maps/3",
  "type": "map",
  "name": "test_map",
  "id": 6
},
"metric_count": 1,
"val": 1,
"max": "1.0000",
"sum": "1.0000",
"min": "1.0000",
"samples_count": 1
},

"resource": {
  "href": "",
  "type": "layer",
  "name": "geonode:waterways",
  "id": 7
},
"metric_count": 2,
"val": 1,
"max": "2.0000",
"sum": "2.0000",
"min": "0.0000",
"samples_count": 2
},
"valid_to": "2019-09-10T14:15:39.454Z"
}
9. total number of resource monitored in a given time range.

GET /monitoring/api/metric_data/request.users/?
last=31536000&interval=31536000&group_by=count_on_resource

```
{
  "data": {
    "input_valid_from": "2018-09-10T14:20:27.335Z",
    "input_valid_to": "2019-09-10T14:20:27.335Z",
    "data": [
      {
        "valid_from": "2018-09-10T14:20:27.335Z",
        "data": [
          {
            "samples_count": 52,
            "val": 7,
            "min": "0.0000",
            "max": "2.0000",
            "sum": "52.0000",
            "metric_count": 53
          }
        ],
        "valid_to": "2019-09-10T14:20:27.335Z"
      }
    ],
    "metric": "request.users",
    "interval": 31536000,
    "type": "value",
    "axis_label": "Count",
    "label": null
  }
}
```

1.17.4 Monitoring: Notifications

Notifications are part of monitoring that is run after each data collection cycle. It’s configurable mechanism to check if metrics values are within allowed value range, and if not, send notification to designated receivers (registered users or external emails).

**Data model**

Notification mechanism is composed of several classes, responsible for different aspects:

- High-level configuration: NotificationCheck:

  keeps general description, list of metric check definition, send grace period configuration and last send marker, list of users to which notification should be delivered (in helper table, NotificationReceiver class).

- Per-metric definition: MetricNotificationDefinition:
keeps per-metric-per-check configuration: name of metric, min, max values allowed for user, check type (if value should be below or above given threshold, or should last read be not older than specific period from metric check), additional scope for check (resource, label, ows service - this part is partially implemented). Definition object is created from `NotificationCheck.user_thresholds` data, and is used to generate validation form. Note, that one `NotificationCheck` can have several definition items, for set of different metrics. Definition rows are created when `NotificationCheck` is created, or updated.

- Per-metric check configuration: `MetricNotificationCheck`

  Keeps per-metric-per-check configuration: metric and threshold values. It is created after user submits configuration form for specific notification.

**Workflow**

Notifications are checked after each collection/processing period in collection script, by calling `CollectorAPI.emit_notifications(for_timestamp)`. This will do following:

- get all notifications,
- for each notification, will get all notification checks
- for each notification check, it will get metric valid for given timestamp and check if value matches given criteria
- each check can raise exception, which will be captured in caller, and for each notification, list of errors will be returned
- based on list of notifications and errors, alerts will be generated and send to users, unless last delivery was before grace period is finished.

Additionally, notifications expose `/monitoring/api/status/ Status API`, which will show errors detected at the moment of request.

### 1.17.5 Web API

**Status API**

Status endpoint presents current state of error checking performed by notifications. Frontend can make requests periodically to this endpoint. There is no history view for status at the moment. Status response is wrapped with standard response envelope. Non-error response will have `status` key set to `ok` and `success` to `true`, otherwise `errors` will be not empty.

No errors response:

GET /monitoring/api/status/

```
{
  "status": "ok",
  "data": [],
  "success": true
}
```

Response with errors reported:

```
{
  "status": "ok",
  "data": [
```
(continues on next page)
Response with reported errors contains list of check elements in `data` element. Each check element contains:

- `check` - serialized `NotificationCheck` object, which was used
- `problems` - list of metric checks that failed. Each element contains name of metric, severity, error message, measured and threshold value.
Severity

Severity is a textual description of potential impact of error. There are three values: warning, error and fatal.

Notification list

This call will return list of available notifications:

GET /monitoring/api/notifications/

```
{
    "status": "ok",
    "data": {
        "problems": [
            {
                "threshold_value": "10.0000",
                "check_url": "/monitoring/api/notifications/config/2/",
                "name": "request.count",
                "check_id": 2,
                "description": "Metric value for request.count should be at least 10, got 4 instead",
                "offending_value": "4.0000",
                "message": "Number of handled requests is lower than 4",
                "severity": "error"
            }
        ],
        "health_level": "error",
        "success": true
    }
}
```

Response will contain list of notifications summary in data key. Each element will have:

- **name** of metric checked
- **message** is error message generated by notification. This describes what the problem is.
- **description** more detailed information what which check failed.
- **offending_value** and **threshold_value** are values that were compared (offending_value is actual value from metric data)
- **check_url** to notification details
- **severity** of error

Also, data will have highest severity value available in health_level.

Notification details

This will return details for notification, including form and list of allowed fields:

GET /monitoring/api/notifications/config/{{notification_id}}/

```
{
    "status": "ok",
    "errors": {},
    "data": {
        "form": {
            "threshold": "10.0000",
            "check_url": "/monitoring/api/notifications/config/2/",
            "name": "request.count",
            "check_id": 2,"
            "description": "Metric value for request.count should be at least 10, got 4 instead",
            "offending_value": "4.0000",
            "message": "Number of handled requests is lower than 4",
            "severity": "error"
        }
    }
}
```
"fields": [
{
  "is_enabled": true,
  "use_resource": false,
  "description": "Number of handled requests is lower than",
  "max_value": "10.0000",
  "metric": {
    "class": "geonode.contrib.monitoring.models.Metric",
    "name": "request.count",
    "id": 2
  },
  "min_value": "0.0000",
  "use_label": false,
  "use_ows_service": false,
  "field_option": "min_value",
  "use_service": false,
  "steps_calculated": [
    "0.0000",
    "3.33",
    "6.67",
    "10.0"
  ],
  "current_value": "30.0000",
  "steps": 3,
  "notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
  },
  "field_name": "request.count.min_value",
  "id": 3,
  "unit": ""
},
{
  "is_enabled": true,
  "use_resource": false,
  "description": "No response for at least",
  "max_value": null,
  "metric": {
    "class": "geonode.contrib.monitoring.models.Metric",
    "name": "request.count",
    "id": 2
  },
  "min_value": "60.0000",
  "use_label": false,
  "use_ows_service": false,
  "field_option": "max_timeout",
  "use_service": false,
  "steps_calculated": null,
  "current_value": {
    "seconds": 120,
    "class": "datetime.timedelta"
  },
  "steps": null,
  "notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
  },
  "field_name": "request.count.max_timeout",
  "id": 4,
  "unit": ""


```json
{
  "id": 2,
  "field_name": "request.count.max_timeout",
  "id": 4,
  "unit": ""
},

{
  "is_enabled": false,
  "use_resource": false,
  "description": "Response time is higher than",
  "max_value": null,
  "metric": {
    "class": "geonode.contrib.monitoring.models.Metric",
    "name": "response.time",
    "id": 11
  },
  "min_value": "500.0000",
  "use_label": false,
  "use_ows_service": false,
  "field_option": "max_value",
  "use_service": false,
  "steps_calculated": null,
  "current_value": null,
  "steps": null,
  "notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
  },
  "field_name": "response.time.max_value",
  "id": 5,
  "unit": "s"
},

{
  "is_enabled": false,
  "use_resource": false,
  "description": "dsfdsf",
  "max_value": null,
  "metric": {
    "class": "geonode.contrib.monitoring.models.Metric",
    "name": "response.time",
    "id": 11
  },
  "min_value": null,
  "use_label": false,
  "use_ows_service": false,
  "field_option": "min_value",
  "use_service": false,
  "steps_calculated": null,
  "current_value": null,
  "steps": null,
  "notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
  },
  "field_name": "response.time.min_value",
}

(continues on next page)
```
"id": 6,
"unit": "s"
},
{
"is_enabled": true,
"use_resource": false,
"description": "Incoming traffic should be higher than",
"max_value": null,
"metric": {
"class": "geonode.contrib.monitoring.models.Metric",
"name": "network.in.rate",
"id": 34
},
"min_value": null,
"use_label": false,
"use_ows_service": false,
"field_option": "min_value",
"use_service": false,
"steps_calculated": null,
"current_value": "1000000.0000",
"steps": null,
"notification_check": {
"class": "geonode.contrib.monitoring.models.NotificationCheck",
"name": "geonode is not working",
"id": 2
},
"field_name": "network.in.rate.min_value",
"id": 7,
"unit": "B/s"
}
"form": "<tr><th><label for="id_emails">Emails:</label></th><td><textarea cols="40" id="id_emails" name="emails" rows="10">
ad@m.in</textarea></td></tr>
<tr><th><label for="id_severity">Severity:</label></th><td><select id="id_severity" name="severity">
<option value="warning">Warning</option>
<option value="error">Error</option>
<option value="fatal">Fatal</option>
</select></td></tr>
<tr><th><label for="id_active">Active:</label></th><td><input checked="checked" id="id_active" name="active" type="checkbox"></td></tr>
<tr><th><label for="id_grace_period">Grace period:</label></th><td><input id="id_grace_period" name="grace_period" type="text" value="00:01:00" /></td></tr>
<tr><th><label for="id_request.count.min_value">Request.
count.min value:</label></th><td><select id="id_request.count.min_value" name="request.count.min_value">
<option value="0.0000">0.0000</option>
<option value="3.33">3.33</option>
<option value="6.67">6.67</option>
<option value="10.0">10.0</option>
</select></td></tr>
<tr><th><label for="id_request.count.max_timeout">Request.
count.max timeout:</label></th><td><input id="id_request.
count.max_timeout" min="60.0000" name="request.count.max_timeout" step="0.01" type="number" />
</td></tr>
<tr><th><label for="id_response.time.max_value">Response.
time.max value:</label></th><td><input id="id_response.time.max_value" min="500.0000" name="response.time.max_value" step="0.01" type="number" />
</td></tr>
<tr><th><label for="id_response.time.min_value">Response.
time.min value:
</label></th><td><input id="id_response.time.min_value" name="response.time.min_
value" step="0.01" type="number" />
</td></tr>
<tr><th><label for="id_network.
in.rate.min_value">Network.in.rate.min value:
</label></th><td><input id="id_network.
in.rate.min_value" name="network.in.rate.min_value" step="0.01" type=
"number" />
</td></tr>
"notification": { (continues on next page)


```
"grace_period": {
  "seconds": 60,
  "class": "datetime.timedelta"
},
"last_send": "2017-09-04T13:13:15.203",
"description": "detects when requests are not handled",
"severity": "error",
"user_threshold": {
  "request.count.max_timeout": {
    "max": null,
    "metric": "request.count",
    "steps": null,
    "description": "No response for at least",
    "min": 60
  },
  "response.time.max_value": {
    "max": null,
    "metric": "response.time",
    "steps": null,
    "description": "Response time is higher than",
    "min": 500
  },
  "request.count.min_value": {
    "max": 10,
    "metric": "request.count",
    "steps": 3,
    "description": "Number of handled requests is lower than",
    "min": 0
  }
},
"active": true,
"id": 2,
"name": "geonode is not working"
},
"success": true
```

Returned keys in `data` element:

- `fields` - list of form fields, including detailed per-resource configuration flags
- `form` - rendered user form, which can be displayed
- `notification` - serialized notification object with `user_thresholds` list (this is a base to create `fields` objects)

Frontend should use `fields` list to create whole form in client-side:

- field name is stored in `field_name`.
- field label can be constructed from `description`.
- unit can be extracted from `unit` field.
- if field definition provides list in `steps_calculated`, this should be used to construct selection/dropdown, otherwise text input should be displayed. If possible, validation should take into account `min_value` and `max_value`.
- currently set value is available in `current_value` field.
- each field has `is_enabled` property, which tells if field is enabled. Currently this value is calculated in following way: field is enabled if `current_value` is not `None`. This may change in the future.
Additionally, each notification configuration accepts list of emails in `emails` field. This field should be send as a list of emails joined with new line char (`n`).

Form should be submitted to the same url as configuration source (`/monitoring/api/notifications/config/{id}/`), see below.

**Notification edition (by user)**

Following API call allows user to configure notification by setting receivers and adjust threshold values for checks:

```plaintext
POST /monitoring/api/notifications/config/{{notification_check_id}}/
request.count.max_value=val
request.count.min_value=1
emails=list of emails
```

Response contains serialized `NotificationCheck` in `data` element, if no errors were captured during form processing:

```json
{
  "status": "ok",
  "errors": {},
  "data": {
    "grace_period": {
      "seconds": 600,
      "class": "datetime.timedelta"
    },
    "last_send": null,
    "description": "more test",
    "severity": "error",
    "user_threshold": {
      "request.count.max_value": {
        "max": null,
        "metric": "request.count",
        "steps": null,
        "description": "Max number of request",
        "min": 1000
      },
      "request.count.min_value": {
        "max": 100,
        "metric": "request.count",
        "steps": null,
        "description": "Min number of request",
        "min": 0
      }
    },
    "id": 293,
    "name": "test"
  },
  "success": true
}
```

Error (non-200) response will have `errors` key populated:

```json
{
  "status": "error",
  "errors": {
    "user_threshold": [
      ...
    ]
  }
}
```
Notification creation

This API call allows to create new notification, it’s different in form layout from edition:

POST /monitoring/api/notifications/

name=Name of notification (geonode doesn't work)
description=This will check **if** geonode is serving any data
e-mails=
user_thresholds=
severity=

Payload elements:

- **name, description** are values visible for user
- **severity** severity value
- **emails** is a list of emails, however, it is encoded to a string, where each email is in new line:

  ```
  email1@test.com
  email2@test.com
  ```

- **user_thresholds** is a json encoded list of per-metric-per-check configurations. Each element of list should be a 10-element list, containing:
  - name of metric
  - field check option (one of three values: **min_value**, **max_value** or **max_timeout**)
  - flag, if metric check can use service
  - flag, if metric check can use resource
  - flag, if metric check can use label
  - flag, if metric check can use ows service
  - minimum value for user input (no minimum check if None)
  - maximum value for user input (no maximum check if None)
  - steps count is a number of steps to generate for user input, so user can select value from select list instead of typing. This will have effect only if both min and max values are also provided Sample payload for **user_thresholds**:
Response is a serialized NotificationCheck wrapped with standard response envelope (status, errors etc). Actual data is in data key. If processing failed, for example because of form validation errors, response will be non-200 OK, and errors key will be populated.

```json
{
  "status": "ok",
  "errors": {},
  "data": {
    "grace_period": {
      "seconds": 600,
      "class": "datetime.timedelta"
    },
    "last_send": null,
    "description": "more test",
    "user_threshold": {
      "request.count.max_value": {
        "max": 100,
        "metric": "request.count",
        "steps": null,
        "description": "Min number of request",
        "min": 0
      },
      "request.count.min_value": {
        "max": null,
        "metric": "request.count",
        "steps": null,
        "description": "Max number of request",
        "min": 1000
      }
    },
    "id": 257,
    "name": "test"
  },
  "success": true
}
```
1.18 GeoNode Backup and Restore

1.18.1 GeoNode Full Backup and Restore

1.18.2 GeoNode selectively Export/Import Layers

1.19 Viewer and Hooksets

1.19.1 GXP

1.19.2 MapStore 2

1.19.3 Leaflet

1.20 GeoNode Components and Architecture

1.20.1 Overview

TODO*

1.20.2 Django

TODO

1.20.3 WebServers

TODO

Apache

TODO

NGINX

TODO

1.20.4 GeoServer

TODO

1.20.5 Databases

TODO
1.20.6 OAuth2 Security: Authentication and Authorization

GeoNode interacts with GeoServer through an advanced security mechanism based on OAuth2 Protocol and GeoFence. This section is a walk through of the configuration and setup of GeoNode and GeoServer Advanced Security.

What we will see in this section is:

- **Introduction**
- **GeoNode** (Security Backend):
  1. Django Authentication
  2. Django OAuth Toolkit Setup and Configuration
  3. Details on settings.py Security Settings
- **GeoServer** (Security Backend):
  1. GeoServer Security Subsystem
  2. Introduction to the GeoServer OAuth2 Security Plugin
  3. Configuration of the GeoNode REST Role Service
  4. Configuration of the GeoNode OAuth2 Authentication Filter
  5. The GeoServer Authentication Filter Chains
  6. Introduction to GeoFence Plugin, the Advanced Security Framework for GeoServer
- **Troubleshooting and Advanced Features**:
  1. Common Issues and Fixes
  2. How to setup HTTPS secured endpoints
  3. GeoFence Advanced Features

**Introduction**

GeoServer, i.e. the geospatial backend server of GeoNode, is a spatial server which needs authenticated users in order to access protected resources or administration functions.

GeoServer supports several kind of Authentication and Authorization mechanisms. Those systems are pluggable and GeoServer can use them at the same time by the use of a Filter Chain. Briefly this mechanism allows GeoServer to check for different A&A protocols one by one. The first one matching is used by GeoServer to authorize the users.

GeoNode Authentication is based by default on Django Security Subsystem. Django authentication allows GeoNode to manage its internal users, groups, roles and sessions.

GeoNode has some external components, like GeoServer or QGis Server, which are pluggable and stand-alone services, devoted to the management of geospatial data. Those external services have their own authentication and authorization mechanisms which must be synchronized somehow with the GeoNode one. Also, those external services maintain, in most of the cases and unless specific configuration does not disable this, alternative security access which for instance allow GeoNode to modify the geospatial catalog under the hood, or a system administrator to have independent and privileged access to the servers.

Before going deeply on how GeoServer/GeoNode A&A works and how it can be configured in order to work correctly with GeoNode, lets quickly clarify the difference between the Authentication and Authorization concepts.
Authentication

Authentication is the process of verifying the identity of someone through the use of some sort of credentials and an handshake protocol. If the credentials are valid, the authorization process starts. Authentication process always proceeds to Authorization process (although they may often seem to be combined). The two terms are often used synonymously but they are two different processes.

For more details and explanation about the authentication concepts, take a look here.

Authorization

Authorization is the process of allowing authenticated users to access protected resources by checking its roles and rights against some sort of security rules mechanism or protocol. In other words it allows to control access rights by granting or denying specific permissions to specific authorized users.

GeoNode Security Backend

DJango Authentication

The Django authentication system handles both authentication and authorization.

The auth system consists of:

1. Users
2. Permissions: Binary (yes/no) flags designating whether a user may perform a certain task.
3. Groups: A generic way of applying labels and permissions to more than one user.
4. A configurable password hashing system
5. Forms and view tools for logging in users, or restricting content
6. A pluggable backend system

The authentication system in Django aims to be very generic and doesn’t provide some features commonly found in web authentication systems. Solutions for some of these common problems have been implemented in third-party packages:

1. Password strength checking
2. Throttling of login attempts
3. Authentication against third-parties (OAuth, for example)

Note: For more details on installation and configuration of Django authentication system, please refer to the official guide https://docs.djangoproject.com/en/1.10/topics/auth/.

GeoNode communicates with GeoServer through Basic Authentication under the hood, in order to configure the data and the GeoServer catalog.

In order to do this, you must be sure that GeoNode knows the internal admin user and password of GeoServer.

Warning: This must be an internal GeoServer user with admin rights, not a GeoNode one.

Make sure the credentials are correctly configured into the file settings.py
OGC_SERVER

Ensure that the OGC_SERVER settings are correctly configured.

Notice that the two properties LOGIN_ENDPOINT and LOGOUT_ENDPOINT must specify the GeoServer OAuth2 Endpoints (see details below). The default values '{j_spring_oauth2_geonode_login}' and '{j_spring_oauth2_geonode_logout}' work in most of the cases, unless you need some specific endpoints different from the latter. In any case those values must be coherent with the GeoServer OAuth2 Plugin configuration.

If in doubt, please use the default values here below.

Default values are:

```
# OGC (WMS/WFS/WCS) Server Settings
# OGC (WMS/WFS/WCS) Server Settings
OGC_SERVER = {
    'default': {
        'BACKEND': 'geonode.geoserver',
        'LOCATION': GEOSERVER_LOCATION,
        'LOGIN_ENDPOINT': 'j_spring_oauth2_geonode_login',
        'LOGOUT_ENDPOINT': 'j_spring_oauth2_geonode_logout',
        # PUBLIC_LOCATION needs to be kept like this because in dev mode
        # the proxy won't work and the integration tests will fail
        # the entire block has to be overridden in the local_settings
        'PUBLIC_LOCATION': GEOSERVER_PUBLIC_LOCATION,
        'USER': 'admin',
        'PASSWORD': 'geoserver',
        'MAPFISH_PRINT_ENABLED': True,
        'PRINT_NG_ENABLED': True,
        'GEONODE_SECURITY_ENABLED': True,
        'WMST_ENABLED': False,
        'BACKEND_WRITE_ENABLED': True,
        'WPS_ENABLED': False,
        'LOG_FILE': '%s/geoserver/data/logs/geoserver.log' % os.path.abspath(os.path.join(PROJECT_ROOT, os.pardir)),
        # Set to name of database in DATABASES dictionary to enable
        'DATASTORE': '', # 'datastore',
        'TIMEOUT': 10 # number of seconds to allow for HTTP requests
    }
}
```

GeoNode and GeoServer A&A Interaction

The GeoServer instance used by GeoNode, has a particular setup that allows the two frameworks to correctly interact and exchange informations on users credentials and permissions.

In particular GeoServer is configured with a Filter Chain for Authorization that makes use of the two following protocols:

1. Basic Authentication; this is the default GeoServer Authentication mechanism. This makes use of rfc2617 - Basic and Digest Access Authentication in order to check for user’s credentials. In other words, GeoServer takes a username and a password encoded Base64 on the HTTP Request Headers and compare them against its internal database (which by default is an encrypted XML file on the GeoServer Data Dir). If the user’s credentials match, then GeoServer checks for Authorization through its Role Services (we will see those services in details on the GeoServer (Security Backend) section below).

1.20. GeoNode Components and Architecture
2. OAuth2 Authentication; this module allows GeoServer to authenticate against the OAuth2 Protocol. If the Basic Authentication fails, GeoServer falls back to this by using GeoNode as OAuth2 Provider by default.

Note: Further details can be found directly on the official GeoServer documentation at section “Authentication Chain”

From the GeoNode backend (server) side, the server will make use of Basic Authentication with administrator credentials to configure the GeoServer catalog. GeoServer must be reachable by GeoNode of course, and GeoNode must know the internal GeoServer admin credentials.

From the GeoNode frontend (browser and GUI) side, the Authentication goal is to allow GeoServer to recognize as valid a user which has been already logged into GeoNode, providing kind of an SSO mechanism between the two applications.

GeoServer must know and must be able to access GeoNode via HTTP/HTTPS. In other words, an external user connected to GeoNode must be authenticated to GeoServer with same permissions. This is possible through the OAuth2 Authentication Protocol.

GeoNode / GeoServer Authentication Mechanism

GeoNode as OAuth2 Provider (OP)

OpenID Connect is an identity framework built on OAuth 2.0 protocol which extends the authorization of OAuth 2.0 processes to implement its authentication mechanism. OpenID Connect adds a discovery mechanism allowing users to use an external trusted authority as an identity provider. From another point of view, this can be seen as a single sign on (SSO) system.

OAuth 2.0 is an authorization framework which is capable of providing a way for clients to access a resource with restricted access on behalf of the resource owner. OpenID Connect allows clients to verify the users with an authorization server based authentication.

As an OP, GeoNode will be able to act as trusted identity provider, thus allowing the system working on an isolated environment and/or allow GeoNode to authenticate private users managed by the local DJango auth subsystem.

GeoServer as OAuth2 Relying Party (RP)

Thanks to the OAuth2 Authentication GeoServer is able to retrieve an end user’s identity directly from the OAuth2 Provider (OP).

With GeoNode acting as an OP, the mechanism will avoid the use of cookies relying, instead, on the OAuth2 secure protocol.

How the OAuth2 Protocol works:
1. The relying party sends the request to the OAuth2 provider to authenticate the end user
2. The OAuth2 provider authenticates the user
3. The OAuth2 provider sends the ID token and access token to the relying party
4. The relying party sends a request to the user info endpoint with the access token received from
   OAuth2 provider
5. The user info endpoint returns the claims.

**GeoNode / GeoServer Authorization Mechanism**

Allowing GeoServer to make use of an OAuth2 in order to act as an OAuth2 RP, is not sufficient to map a
user identity to its roles though.

On GeoServer side we will still need a RoleService which would be able to talk to GeoNode and
transform the tokens into a User Principal to be used within the GeoServer Security subsystem itself.

In other words after a successful Authentication, GeoServer needs to Authorize the user in order to
understand which resources he is enabled to access or not. A REST based RoleService on GeoNode
side, allows GeoServer to talk to GeoNode via REST to get the current user along with the list of its Roles.

Nevertheless knowing the Roles associated to a user is not sufficient. The complete GeoServer Author-
ization needs to catch a set of Access Rules, associated to the Roles, in order to establish which
resources and data are accessible by the user.

The GeoServer Authorization is based on Roles only, therefore for each authenticated user we need also
to know:

1. The Roles associated to a valid user session
2. The access permissions associated to a GeoServer Resource

The Authentication mechanism above allows GeoServer to get information about the user and his Roles,
which addresses point 1.

About point 2, GeoServer makes use of the GeoFence Embedded Server plugin. GeoFence is a java
web application that provides an advanced authentication / authorization engine for GeoServer using the
interface described in here. GeoFence has its own rules database for the management of Authorization
rules, and overrides the standard GeoServer security management system by implementing a sophisticated
Resource Access Manager. Least but not last, GeoFence implements and exposes a REST API allowing
remote authorized clients to read / write / modify security rules.

The advantages using such plugin are multiple:

1. The Authorizations rules have a fine granularity. The security rules are handled by GeoFence in a
   way similar to the iptables ones, and allow to define security constraints even on sub-regions and
   attributes of layers.
2. GeoFence exposes a REST interface to its internal rule database, allowing external managers to
   update the security constraints programmatically
3. GeoFence implements an internal caching mechanism which improves considerably the perfor-
   mances under load.

**GeoNode interaction with GeoFence**

GeoNode itself is able to push/manage Authorization rules to GeoServer through the GeoFence REST
API, acting as an administrator for GeoServer. GeoNode properly configures the GeoFence rules anytime
it is needed, i.e. the permissions of a Resource / Layer are updated.
GeoServer must know and must be able to access GeoNode via HTTP/HTTPS. In other words, an external user connected to GeoNode must be authenticated to GeoServer with same permissions. This is possible through the GeoNodeCookieProcessingFiler.

Summarizing we will have different ways to access GeoNode Layers:

1. Through GeoNode via DJango Authentication and GeoNodeCookieProcessingFiler; basically the users available in GeoNode are also valid for GeoServer or any other backend.

   **Warning:** If a GeoNode user has “administrator” rights, he will be able to administer GeoServer too.

2. Through GeoServer Security Subsystem; it will be always possible to access to GeoServer using its internal security system and users, unless explictly disabled (warning this is dangerous, you must know what you are doing).

   Lets now see in details how the single pieces are configured and how they can be configured.

**DJango OAuth Toolkit Setup and Configuration**

As stated above, GeoNode makes use of the OAuth2 protocol for all the frontend interactions with GeoServer. GeoNode must be configured as an OAuth2 Provider and provide a Client ID and a Client Secret keys to GeoServer. This is possible by enabling and configuring the Django OAuth Toolkit Plugin.

**Warning:** GeoNode and GeoServer won’t work at all if the following steps are not executed at the first installation.

**Default settings.py Security Settings for OAuth2**

Double check that the OAuth2 Provider and Security Plugin is enabled and that the settings below are correctly configured.

**AUTH_IP_WHITELIST**

AUTH_IP_WHITELIST property limits access to users/groups REST Role Service endpoints to the only whitelisted IP addresses. Empty list means ‘allow all’. If you need to limit ‘api’ REST calls to only some specific IPs fill the list like this:

```
AUTH_IP_WHITELIST = ['192.168.1.158', '192.168.1.159']
```

Default values are:

```
... 
AUTH_IP_WHITELIST = []
... 
```

**INSTALLED_APPS**

In order to allow GeoNode to act as an OAuth2 Provider, we need to enable the oauth2_provider DJango application provided by the “Django OAuth Toolkit”.

Default values are:
INSTALLED_APPS = (
    'modeltranslation',
    ...
    'guardian',
    'oauth2_provider',
    ...
) + GEONODE_APPS

MIDDLEWARE_CLASSES

Installing the oauth2_provider DJango application is not sufficient to enable the full functionality. We need also GeoNode to include additional entities to its internal model.

Default values are:

MIDDLEWARE_CLASSES = (
    'django.middleware.common.CommonMiddleware',
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',

    # The setting below makes it possible to serve different languages per
    # user depending on things like headers in HTTP requests.
    'django.middleware.locale.LocaleMiddleware',
    'pagination.middleware.PaginationMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',

    # If you use SessionAuthenticationMiddleware, be sure it appears before
    # OAuth2TokenMiddleware.
    # SessionAuthenticationMiddleware is NOT required for using django-oauth-toolkit.
    'django.contrib.auth.middleware.SessionAuthenticationMiddleware',
    'oauth2_provider.middleware.OAuth2TokenMiddleware',
)

AUTHENTICATION_BACKENDS

In order to allow GeoNode to act as an OAuth2 Provider, we need to enable the oauth2_provider.backends.OAuth2Backend DJango backend provided by the “Django OAuth Toolkit”. Also notice that we need to specify the OAuth2 Provider scopes and declare which generator to use in order to create OAuth2 Client IDs.

Default values are:

# Replacement of default authentication backend in order to support
# permissions per object.
AUTHENTICATION_BACKENDS = (}
OAUTH2_PROVIDER = {
    'SCOPES': {
        'read': 'Read scope',
        'write': 'Write scope',
        'groups': 'Access to your groups'
    },
    'CLIENT_ID_GENERATOR_CLASS': 'oauth2_provider.generators.ClientIdGenerator',
}

---

**Django OAuth Toolkit Admin Setup**

Once the *settings.py* and *local_settings.py* have been correctly configured for your system:

1. Complete the GeoNode setup steps
   - Prepare the model
     ```
     python manage.py makemigrations
     python manage.py migrate
     python manage.py syncdb
     ```
   - Prepare the static data
     ```
     python manage.py collectstatic
     ```
   - Make sure the database has been populated with initial default data
     ```
     Warning: Deprecated this command will be replaced by migrations in the future, so be careful.
     ```
     ```
     python manage.py loaddata initial_data.json
     ```
   - Make sure there exists a superuser for your environment
     ```
     Warning: Deprecated this command will be replaced by migrations in the future, so be careful.
     ```
     ```
     python manage.py createsuperuser
     ```
   - **Note:** Read the base tutorials on GeoNode Developer documentation for details on the specific commands and how to use them.

2. Start the application
Start GeoNode accordingly on how the setup has been done; run debug mode through `paver`, or proxied by an HTTP Server like Apache2 HTTPD, Nginx or others.

3. Finalize the setup of the OAuth2 Provider

First of all you need to configure and create a new OAuth2 Application called `GeoServer` through the GeoNode Admin Dashboard

- Access the GeoNode Admin Dashboard

- Go to Django OAuth Toolkit > Applications

- Update or create the Application named `GeoServer`

  **Warning:** The Application name must be `GeoServer`

- **Client id**: An alphanumeric code representing the OAuth2 Client Id. GeoServer OAuth2 Plugin will use this value.

  **Warning:** In a production environment it is highly recommended to modify the default value provided with GeoNode installation.

- **User**: Search for the `admin` user. Its ID will be automatically updated into the form.

- **Redirect uris**: It is possible to specify many URIs here. Those must coincide with the GeoServer instances URIs.

- **Client type**: Choose **Confidential**

- **Authorization grant type**: Choose **Authorization code**

- **Client secret**: An alphanumeric code representing the OAuth2 Client Secret. GeoServer OAuth2 Plugin will use this value.

  **Warning:** In a production environment it is highly recommended to modify the default value provided with GeoNode installation.

- **Name**: **Must be GeoServer**

**GeoServer Security Backend**

**GeoServer Security Subsystem**

GeoServer has a robust security subsystem, modeled on Spring Security. Most of the security features are available through the Web administration interface.

For more details on how this works and how to configure and modify it, please refer to the official GeoServer guide http://docs.geoserver.org/stable/en/user/security/webadmin/index.html
Django OAuth Toolkit

Access tokens

Applications

Grants

Refresh tokens

Change application

Client id:

User:

Redirect uris:

Allowed URIs list, space separated

Client type:

Authorization grant type:

Client secret:

Name:

Skip authorization
By using the GeoServer Data Dir provided with GeoNode build, the following configuration are already available. You will need just to update them accordingly to your environment (like IP addresses and Host names, OAuth2 Keys, and similar things). However it is recommended to read carefully all the following passages in order to understand exactly how the different component are configured and easily identify any possible issue during the deployment.

The main topics of this section are:

1. Connection to the GeoNode REST Role Service
2. Setup of the GeoServer OAuth2 Authentication Filter
3. Configuration of the GeoServer Filter Chains
4. Setup and test of the GeoFence Server and Default Rules

Connection to the GeoNode REST Role Service

Preliminary checks

- GeoServer is up and running and you have admin rights
- GeoServer must reach the GeoNode instance via HTTP
- The GeoServer Host IP Address must be allowed to access the GeoNode Role Service APIs (see the section `AUTH_IP_WHITELIST` above)

Setup of the GeoNode REST Role Service

1. Login as `admin` to the GeoServer GUI

   **Warning:** In a production system remember to change the default admin credentials `admin geoserver`
2. **Access the Security > Users, Groups, Roles section**

3. **If not yet configured** the service `geonode REST role service`, **click on Role Services > Add new**

   **Note:** This passage is not needed if the `geonode REST role service` has been already created. If so it will be displayed among the Role Services list.

4. **If not yet configured** the service `geonode REST role service`, choose AuthKEY REST - Role service from REST endpoint

5. **Create / update the geonode REST role service accordingly**
   - Name: **Must be geonode REST role service**
   - Base Server URL: Must point to the GeoNode instance base URL (e.g. `http://<geonode_host_url>`)  
   - Roles REST Endpoint: `Enter /api/roles`
   - Admin Role REST Endpoint: `Enter /api/adminRole`
   - Users REST Endpoint: `Enter /api/users`
Users, Groups, and Roles

Manage user group and role services

<table>
<thead>
<tr>
<th>Services</th>
<th>Users/Groups</th>
<th>Roles</th>
</tr>
</thead>
</table>

**User Group Services**

+ Add new

- Remove selected

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>Default XML user/group service</td>
</tr>
</tbody>
</table>

Results 1 to 1 (out of 1 item)

**Role Services**

+ Add new

- Remove selected

New Role Service

Create and configure a new Role Service

XML - Default role service stored as XML

J2EE - Role service extracting roles from web.xml

AuthKEY REST - Role service from REST endpoint

JDBC - Role service stored in database

LDAP - Role service stored in LDAP repository
AuthKEY REST Role Service

Role service from REST endpoint

**Settings**  **Roles**

Name
geonode REST role service

Administrator role
ROLE_ADMIN

Group administrator role
ROLE_ADMIN

**REST Role Service Settings**

Base Server URL
http://<geonode_host_url>

Roles REST Endpoint
/api/roles

Admin Role REST Endpoint
/api/adminRole

Users REST Endpoint
/api/users

Roles JSON Path
$.groups

Admin Role JSON Path
$.adminRole

Users JSON Path

Roles JSON Path: Enter $.groups
Admin Role JSON Path: Enter $.adminRole
Users JSON Path: Enter $.users[0].groups

Once everything has been setup and it is working, choose the Administrator role and Group administrator role as ROLE_ADMIN

Allow GeoFence to validate rules with ROLES

**Warning:** The following instruction are different accordingly to the GeoServer version you are currently using.

GeoServer 2.9.x and 2.10.x

1. Access the Security > Settings section

2. Choose the geonode REST role service as Active role service

GeoServer 2.12.x and above

With the latest updates to GeoFence Plugin, the latter no more recognizes the Role Service from the default settings but from the geofence-server.properties file.

That said, it is important that the Security > Settings role service will be set to default, in order to allow GeoServer following the standard authorization chain.

On the other side, you will need to be sure that the geofence-server.properties file under the $GEOSERVER_DATA_DIR/geofence folder, contains the two following additional properties:

```
gwc.context.suffix=gwc
org.geoserver.rest.DefaultUserGroupServiceName=geonode REST role service
```

Setup of the GeoServer OAuth2 Authentication Filter

It is necessary now check that GeoServer can connect to OAuth2 Providers (specifically to GeoNode OP), and being able to Authenticate users through it.
Security Settings

Configure security settings

Active role service

- geonode REST role service
- default

- Encrypt web admin URL parameters

Password encryption

- Weak PBE

⚠️ No strong cryptography available

Save  Cancel
Preliminary checks

- GeoServer is up and running and you have admin rights
- GeoServer must reach the GeoNode instance via HTTP
- OAuth2 Client ID and Client Secret have been generated on GeoNode and known

Setup of the GeoNode OAuth2 Security Filter

1. Access the Security > Authentication section

2. If not yet configured the Authentication Filter geonode-oauth2 - Authentication using a GeoNode OAuth2, click on Authentication Filters > Add new

   Note: This passage is not needed if the geonode-oauth2 - Authentication using a GeoNode OAuth2 has been already created. If so it will be displayed among the Authentication Filters list

3. If not yet configured the Authentication Filter geonode-oauth2 - Authentication using a GeoNode OAuth2, choose GeoNode OAuth2 - Authenticates by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter
4. Create / update the geonode-oauth2 - Authentication using a GeoNode OAuth2 accordingly

### Authentication using a GeoNode OAuth2 geonode-oauth2

Authenticate by looking up for a valid GeoNode OAuth2 access token key sent as URL parameter

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>geonode-oauth2</td>
</tr>
<tr>
<td>OAuth2 provider connection</td>
<td></td>
</tr>
<tr>
<td>Enable Redirect Authentication EndPoint</td>
<td></td>
</tr>
<tr>
<td>Login Authentication EndPoint</td>
<td>/j_spring_oauth2_geonode_login</td>
</tr>
<tr>
<td>Logout Authentication EndPoint</td>
<td>/j_spring_oauth2_geonode_logout</td>
</tr>
<tr>
<td>Force Access Token URI HTTPS Secured Protocol</td>
<td></td>
</tr>
<tr>
<td>Access Token URI</td>
<td></td>
</tr>
</tbody>
</table>

- **Name; Must be** geonode-oauth2
- **Enable Redirect Authentication EntryPoint;** It is recommended to put this to False, otherwise GeoServer won’t allow you to connect to its Admin GUI through the Form but only through GeoNode
- **Login Authentication EntryPoint;** Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_login
- **Logout Authentication EntryPoint;** Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_logout
- **Force Access Token URI HTTPS Secured Protocol;** This must be False unless you enabled a Secured Connection on GeoNode. In that case you will need to trust the GeoNode Certificate on the GeoServer JVM KeyStore. Please see details below
• Access Token URI: Set this to http://<geonode_host_base_url>/o/token/
• Force User Authorization URI HTTPS Secured Protocol: This must be False unless you enabled a Secured Connection on GeoNode. In that case you will need to trust the GeoNode Certificate on the GeoServer JVM Keystore. Please see details below
• User Authorization URI: Set this to http://<geonode_host_base_url>/o/authorize/
• Redirect URI: Set this to http://<geoserver_host>/geoserver. This address must be present on the Redirect uris of GeoNode OAuth2 > Applications > GeoServer (see above)
• Check Token Endpoint URL: Set this to http://<geonode_host_base_url>/api/o/v4/tokeninfo/
• Logout URI: Set this to http://<geonode_host_base_url>/account/logout/
• Scopes: Unless you have specific needs, keep the default value read,write,groups
• Client ID: The Client id alphanumeric key generated by the GeoNode OAuth2 > Applications > GeoServer (see above)
• Client Secret: The Client secret alphanumeric key generated by the GeoNode OAuth2 > Applications > GeoServer (see above)
• Role source: In order to authorize the user against GeoNode, choose Role service > geonode REST role service

Configuration of the GeoServer Filter Chains

The following steps ensure GeoServer can adopt more Authentication methods. As stated above, it is possible to Authenticate to GeoServer using different protocols.

GeoServer scans the authentication filters chain associated to the specified path and tries them one by one sequentially. The first one matching the protocol and able to grant access to the user, breaks the cycle by creating a User Principal and injecting it into the GeoServer SecurityContext. The Authentication process, then, ends here and the control goes to the Authorization one, which will try to retrieve the authenticated user’s Roles through the available GeoServer Role Services associated to the Authentication Filter that granted the access.

Preliminary checks

• GeoServer is up and running and you have admin rights
• GeoServer must reach the GeoNode instance via HTTP
• The geonode-oauth2 - Authentication using a GeoNode OAuth2 Authentication Filter and the geonode REST role service have been correctly configured

Setup of the GeoServer Filter Chains

1. Access the Security > Authentication section

2. Identify the section Filter Chains
Security

Settings
Authentication
Passwords
Users
Authentication providers and settings

Filter Chains

Add service chain
Add HTML chain

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓</td>
<td>web</td>
<td>/web/<strong>, /gwc/rest/web/</strong>,/</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>webLogin</td>
<td>/j_spring_security_check,,/j_spring_security_check,,/</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>webLogout</td>
<td>/j_spring_security_logout,,/j_spring_security_logout,,/</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>rest</td>
<td>/rest/**</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>gwc</td>
<td>/gwc/rest/**</td>
</tr>
<tr>
<td>↑</td>
<td>default</td>
<td>/**</td>
</tr>
</tbody>
</table>

<<  <  1  >  >> Results 1 to 6 (out of 6 items)
3. Make sure the web Filter Chain is configured as shown below

<table>
<thead>
<tr>
<th>Available</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>basic</td>
<td>geonode-auth2</td>
</tr>
<tr>
<td>geonodeAnonymousFilter</td>
<td>rememberme</td>
</tr>
<tr>
<td>geonodeCookieFilter</td>
<td>form</td>
</tr>
<tr>
<td>anonymous</td>
<td>anonymous</td>
</tr>
</tbody>
</table>

**Warning:** Every time you modify a Filter Chain, **don’t forget to save** the Authentication settings. This **must** be done for each change.

4. Make sure the rest Filter Chain is configured as shown below

<table>
<thead>
<tr>
<th>Available</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>geonodeAnonymousFilter</td>
<td>basic</td>
</tr>
<tr>
<td>geonodeCookieFilter</td>
<td>geonode-auth2</td>
</tr>
<tr>
<td>anonymous</td>
<td>anonymous</td>
</tr>
</tbody>
</table>

**Warning:** Every time you modify a Filter Chain, **don’t forget to save** the Authentication settings. This **must** be done for each change.

5. Make sure the gwc Filter Chain is configured as shown below

<table>
<thead>
<tr>
<th>Available</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>anonymous</td>
<td>basic</td>
</tr>
<tr>
<td>geonodeAnonymousFilter</td>
<td>geonode-auth2</td>
</tr>
</tbody>
</table>
6. Make sure the default Filter Chain is configured as shown below

<table>
<thead>
<tr>
<th>Available</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>geonodeAnonymousFilter</td>
<td>basic</td>
</tr>
<tr>
<td>geonodeCookieFilter</td>
<td>geonode-oauth2</td>
</tr>
<tr>
<td></td>
<td>anonymous</td>
</tr>
</tbody>
</table>

**Warning:** Every time you modify a Filter Chain, don’t forget to save the Authentication settings. This must be done for each change.

7. Add the GeoNode Login Endpoints to the comma-delimited list of the webLogin Filter Chain

**Filter chain**

Configure an individual filter chain

**Chain settings**

Name

webLogin

Comma delimited list of ANT patterns (with optional query string)

 lithium2_geonode_login, j_spring_oauth2_geonode_login

- Disable security for this chain
- Allow creation of an HTTP session for storing the authentication token
- Accept only SSL requests

**Warning:** Every time you modify a Filter Chain, don’t forget to save the Authentication settings. This must be done for each change.
8. Add the GeoNode Logout Endpoints to the comma-delimited list of the webLogout Filter Chain

```
Filter chain
Configure an individual filter chain

Chain settings

Name
webLogout

Comma delimited list of ANT patterns (with optional query string)
2_geonode_logout,/j_spring_oauth2_geonode_logout/

☐ Disable security for this chain
☐ Allow creation of an HTTP session for storing the auth
☐ Accept only SSL requests

Role filter
```

**Warning:** Every time you modify a Filter Chain, **don’t forget to save** the Authentication settings. This **must** be done for **each** change.

9. Add the GeoNode Logout Endpoints to the comma-delimited list of the formLogoutChain XML node in `<GEOSERVER_DATA_DIR>/security/filter/formLogout/config.xml`

You will need a text editor to modify the file.

**Note:** If the `<formLogoutChain>` XML node does not exist at all, create a **new one** as specified below

```
<logoutFilter>
  ...
  <redirectURL>/web/</redirectURL>
  <formLogoutChain>/j_spring_security_logout,/j_spring_security_logout/,
  →/j_spring_oauth2_geonode_logout,/j_spring_oauth2_geonode_logout/</formLogoutChain>
</logoutFilter>
```

**Warning:** The value **j_spring_oauth2_geonode_logout** must be the same specified as Logout Authentication EndPoint in the geonode-oauth2 - Authentication using a GeoNode OAuth2 above.
Setup and test of the GeoFence Server and Default Rules

In order to work correctly, GeoServer needs the GeoFence Embedded Server plugin to be installed and configured on the system.

The GeoServer configuration provided for GeoNode, has the plugin already installed with a default configuration. In that case double check that the plugin works correctly and the default rules have been setup by following the next steps.

Preliminary checks

- GeoServer is up and running and you have admin rights
- The GeoFence Embedded Server plugin has been installed on GeoServer

Setup of the GeoServer Filter Chains

1. Access the Security > Authentication section

2. Identify the section Authentication Providers and make sure the geofence Authentication Provider is present

3. Make sure the Provider Chain is configured as shown below

    Warning: Every time you modify a Authentication Providers, don’t forget to save the Authentication settings. This must be done for each change.
Setup of the GeoFence Server and Rules

1. Make sure GeoFence server works and the default settings are correctly configured
   • Access the Security > GeoFence section
     
     • Make sure the Options are configured as follows and the server works well when performing a Test Connection
       - Allow remote and inline layers in SLD; Set it to True
       - Allow SLD and SLD_BODY parameters in requests; Set it to True
       - Authenticated users can write; Set it to True
       - Use GeoServer roles to get authorizations; Set it to False

2. Check the GeoFence default Rules
   • Access the Security > GeoFence Data Rules section

   • Make sure the DENY ALL Rule is present by default, otherwise your data will be accessible to everyone
GeoFence Admin Page

GeoFence options Administration Page

General settings

GeoServer Instance name for GeoFence

default-gs

GeoFence services URL (GeoServer restart is required if changed)

internal:

Test Connection

Options

- Allow remote and inline layers in SLD
- Allow SLD and SLD_BODY parameters in requests
- Authenticated users can write
- Use GeoServer roles to get authorizations
GeoFence Data Rules

Configure data rules for the internal GeoFence server.

- Add new rule
- Remove selected rules

Warning: If that rule does not exists at the very bottom (this rule is always the last one), add it manually.

- Access the Security > GeoFence Admin Rules section

- No Rules needed here

Troubleshooting and Advanced Features

Common Issues and Fixes

- GeoServer/GeoNode OAuth2 does not authenticate as Administrator even using GeoNode admin users
GeoFence Admin Rules

Configure admin rules for the internal GeoFence server.

- Add new rule
- Remove selected rules
Symptoms

When trying to authenticate with an admin user using OAuth2, the process correctly redirects to GeoServer page but I’m not a GeoServer Administrator.

Cause

That means that somehow GeoServer could not successfully complete the Authorization and Authentication process.

The possible causes of the problem may be the following ones:

1. The OAuth2 Authentication fails on GeoServer side

   This is usually due to an exception while trying to complete the Authentication process.

   – A typical cause is that GeoServer tries to use HTTPS connections but the GeoNode certificate is not trusted:

     In that case please refer to the section below. Also take a look at the logs (in particular the GeoServer one) as explained in debug_geonode. The GeoServer logs should contain a detailed Exception explaining the cause of the problem. If no exception is listed here (even after raised the log level to DEBUG), try to check for the GeoNode Role Service as explained below.

   – Another possible issue is that somehow the OAuth2 handshake cannot complete successfully:

     1. Login into GeoServer as administrator through its WEB login form.

     2. Double check that all the geonode-oauth2 - Authentication using a GeoNode OAuth2 parameters are correct. If everything is ok, take a look at the logs (in particular the GeoServer one) as explained in debug_geonode. The GeoServer logs should contain a detailed Exception explaining the cause of the problem. If no exception is listed here (even after raised the log level to DEBUG), try to check for the GeoNode Role Service as explained below.

2. GeoServer is not able to retrieve the user Role from a Role Service

   Always double check both HTTP Server and GeoServer log as specified in section debug_geonode. This might directly guide you to the cause of the problem.

   – Check that the GeoServer host is granted to access GeoNode Role Service REST APIs in the AUTH_IP_WHITELIST of the settings.py

   – Check that the geonode REST role service is the default Role service and that the GeoServer OAuth2 Plugin has been configured to use it by default

   – Check that the GeoNode REST Role Service APIs are functional and produce correct JSON.

   This is possible by using simple cUrl GET calls like

   ```
curl http://localhost/api/adminRole

$> {"adminRole": "admin"}
```
How to setup HTTPS secured endpoints

In a production system it is a good practice to encrypt the connection between GeoServer and GeoNode. That would be possible by enabling HTTPS Protocol on the GeoNode REST Role Service APIs and OAuth2 Endpoints.

Most of the times you will rely on a self-signed HTTPS connection using a generated certificate. That makes the connection untrusted and you will need to tell to the GeoServer Java Virtual Machine to trust it.

This can be done by following the steps below.

For any issue take a look at the logs (in particular the GeoServer one) as explained in debug_geonode. The GeoServer logs should contain a detailed Exception explaining the cause of the problem.

SSL Trusted Certificates

When using a custom Keystore or trying to access a non-trusted or self-signed SSL-protected OAuth2 Provider from a non-SSH connection, you will need to add the certificates to the JVM Keystore.

In order to do this you can follow the next steps:

1. Retrieve SSL Certificate from GeoNode domain:
   “Access Token URI” = https://<geonode_host_base_url>/o/token/ therefore we need to trust https://<geonode_host_base_url> or (geonode_host_base_url):443

   **Note:** You will need to get and trust certificates from every different HTTPS URL used on OAuth2 Endpoints.

   2. Store SSL Certificates on local hard-disk
   3. Add SSL Certificates to the Java Keystore
   4. Enable the JVM to check for SSL Certificates from the Keystore

   1. Retrieve the SSL Certificate from GeoNode domain

   Use the openssl command in order to dump the certificate

   For https://<geonode_host_base_url>
2. Store SSL Certificate on local hard-disk

Copy-and-paste the section `-BEGIN CERTIFICATE-`, `-END CERTIFICATE-` and save it into a .cert file

**Note:** .cert file are plain text files containing the ASCII characters included on the `BEGIN CERTIFICATE-`, `END CERTIFICATE-` sections

geonode.cert (or whatever name you want with .cert extension)

3. Add SSL Certificates to the Java Keystore

You can use the Java command `keytool` like this

```
keytool -import -noprompt -trustcacerts -alias geonode -
-file geonode.cert -keystore $({KEYSTOREFILE}) -storepass $({KEYSTOREPASS})
```

or, alternatively, you can use some graphic tool which helps you managing the SSL Certificates and Keystores, like Portecle
4. Enable the JVM to check for SSL Certificates from the Keystore

In order to do this, you need to pass a JAVA_OPTION to your JVM:

```
-Djavax.net.ssl.trustStore=F:\tmp\keystore.key
```

5. Restart your server

**Note:** Here below you can find a bash script which simplifies the Keystore SSL Certificates importing. Use it at your convenience.

```
HOST=myhost.example.com
PORT=443
KEYSTOREFILE=dest_keystore
KEYSTOREPASS=changeme

# get the SSL certificate
openssl s_client -connect ${HOST}:${PORT} > ${HOST}.cert

# create a keystore and import certificate
keytool -import -noprompt -trustcacerts -alias ${HOST} -file ${HOST}.cert -keystore ${KEYSTOREFILE} -storepass ${KEYSTOREPASS}

# verify we've got it.
keytool -list -v -keystore ${KEYSTOREFILE} -storepass ${KEYSTOREPASS} -alias ${HOST}
```
No keystore loaded
No keystore loaded
Import Trusted Certificate

Look in: tmp

- geoserver
- xml
- apache.crt
- google.cert
- google-apis.cert

File Name: google.cert
Files of Type: X.509 Certificate Files (*.cer;*.crt;*.cert;*.pem)

Import  Cancel

Keystore type: JKS, provider: SUN, size: 3 entries
Import Trusted Certificate

Could not establish a trust path for the certificate.
The certificate information will now be displayed after which you may confirm whether or not you trust the certificate.

Keystore type: JKS, provider: SUN, size: 3 entries
1.20. GeoNode Components and Architecture
<table>
<thead>
<tr>
<th>Alias Name</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.googleapis.com (google internet authority g2)</td>
<td>Oct 28, 2016 11:20:59 AM CEST</td>
</tr>
<tr>
<td>accounts.google.com (google internet authority g2)</td>
<td>Oct 28, 2016 11:09:09 AM CEST</td>
</tr>
<tr>
<td>geonode-dev-server</td>
<td>Sep 23, 2016 3:26:18 PM CEST</td>
</tr>
</tbody>
</table>

Keystore type: JKS, provider: SUN, size: 3 entries
Import Trusted Certificate

Trusted Certificate Import Successful.

Keystore type: JKS, provider: SUN, size: 3 entries
Save the loaded keystore to disk
GeoFence Advanced Features

GeoFence Rules Management and Tutorials

- This tutorial shows how to install and configure the Geofence Internal Server plug-in. It shows how to create rules in two ways: using the GUI and REST methods.
- GeoFence Rules can be created / updated / deleted through a REST API, accessible only by a GeoServer Admin user. You can find more details on how the GeoFence REST API works here.

GeoFence Rules Storage Configuration

By default GeoFence is configured to use a filesystem based DB stored on the GeoServer Data Dir `<GEOSERVER_DATA_DIR>/geofence`.

- It is possible also to configure GeoFence in order to use an external PostgreSQL / PostGIS Database. For more details please refer to the official GeoFence documentation here.

1. Add Java Libraries to GeoServer

   ```
   wget --no-check-certificate https://build.geo-solutions.it/geonode/
   →geoserver/latest/hibernate-spatial-postgis-1.1.3.1/hibernate-spatial-postgis-1.1.3.1.jar
   wget --no-check-certificate https://build.geo-solutions.it/geonode/
   →geoserver/latest/postgis-jdbc-1.3.3/postgis-jdbc-1.3.3.jar
   cp hibernate-spatial-postgis-1.1.3.1.jar <GEOSERVER_WEBAPP_DIR>/WEB-INF/lib
   cp postgis-jdbc-1.3.3.jar <GEOSERVER_WEBAPP_DIR>/WEB-INF/lib
   restart geoserver
   ```

2. Either create a DB with the updated schema here https://github.com/geoserver/geofence/blob/master/doc/setup/sql/002_create_schema_postgres.sql or enable the hbm2ddl auto creation through the configuration file (see step 3)

   **Note:** Notice that “update” also creates the tables if they do not exist. In production, however, I would suggest to change it to “validate”

   ```
   # If you want to create a new DB for GeoFence
   sudo -u postgres createdb -O geonode geofence; \
   sudo -u postgres psql -d geofence -c 'CREATE EXTENSION postgis;' \
   sudo -u postgres psql -d geofence -c 'GRANT ALL ON geometry_columns TO PUBLIC;'; \
   sudo -u postgres psql -d geofence -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;'; \
   sudo -u postgres psql -d geofence -c 'GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA public TO geonode;'
   ```

3. Add configuration similar to `geofence-datasource-ovr.properties` sample below (if loaded as GeoServer extension)

   ```
   <GEOSERVER_DATA_DIR>/geofence/geofence-datasource-ovr.properties
   ```
# /* (c) 2019 Open Source Geospatial Foundation - all rights reserved
# * This code is licensed under the GPL 2.0 license, available at the
# * root
# * application directory.
# */

geofenceVendorAdapter.databasePlatform=org.hibernatespatial.postgis.PostgisDialect
geofenceDataSource.driverClassName=org.postgresql.Driver
geofenceDataSource.url=jdbc:postgresql://localhost:5432/geofence
geofenceDataSource.username=postgres
geofenceDataSource.password=postgres
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.default_schema]=public

#########################################################################
## Other setup entries
#########################################################################

## hbm2ddl.auto may assume one of these values:
## - validate: validates the DB schema at startup against the internal
to model. May fail on oracle spatial.
## - update: updates the schema, according to the internal model.
Updating automatically the production DB is dangerous.
## - create-drop: drop the existing schema and recreates it according to
the internal model. REALLY DANGEROUS, YOU WILL LOSE YOUR DATA.
## You may want not to redefine the property entirely, in order to leave
the default value (no action).
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.hbm2ddl.auto]=update
geofenceEntityManagerFactory.jpaPropertyMap[javax.persistence.validation.mode]=none
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.apply_to_ddl]=false
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.autoregister_listeners]=false

## ShowSQL is set to true in the configuration file; putting
## showsql=false in
## this file, you can easily check that this override file has been
## properly applied.

# geofenceVendorAdapter.generateDdl=false
# geofenceVendorAdapter.showSql=false

## Set to "true" in specific use cases
# workspaceConfigOpts.showDefaultGroups=false

#########################################################################
## Disable second level cache.
## This is needed in a geofence-clustered environment.
#geofenceEntityManagerFactory.jpaPropertyMap[hibernate.cache.use_second_level_cache]=false

#########################################################################
## Use external ehcache configuration file.
## Useful to change cache settings, for example diskStore path.
#geofenceEntityManagerFactory.jpaPropertyMap[hibernate.cache.provider_configuration_file_resource_path]=file:/path/to/geofence-ehcache-override.xml

1.21 Hardening GeoNode

1.21.1 Publish on HTTPS

TBD

1.21.2 OAuth2 Fixtures Update and Base URL Migration

TBD

1.21.3 GeoNode Security Subsystem

TBD

1.21.4 OAuth2 Tokens and Sessions

TBD (ref to OAuth2 Access Tokens)

1.22 Social Login

1.22.1 Overview

1.22.2 Configuration

1.22.3 Linkedin

1.22.4 Facebook

1.23 GeoNode Django Contrib Apps

1.23.1 Geonode auth via LDAP

This package provides utilities for using LDAP as an authentication and authorization backend for geonode.
The `django_auth_ldap` package is a very capable way to add LDAP integration with django projects. It provides a lot of flexibility in mapping LDAP users to geonode users and is able to manage user authentication.

However, in order to provide full support for mapping LDAP groups with geonode’s and enforce group permissions on resources, a custom geonode authentication backend is required. This contrib package provides such a backend, based on `django_auth_ldap`.

**Installation**

Installing this contrib package is a matter of:

1. Installing geonode
2. Installing system LDAP libraries (development packages needed)
3. Cloning this repository locally
4. Change to the `ldap` directory and install this contrib package

```
# 1. install geonode (not shown here for brevity)
# 2. install systemwide LDAP libraries
sudo apt install libldap2-dev libsasl2-dev

# 3. get geonode/contribs code
git clone https://github.com/GeoNode/geonode-contribs.git

# 4. install geonode ldap contrib package
cd geonode-contribs/ldap
pip install .
```

**Configuration**

1. Add `geonode_ldap.backend.GeonodeLdapBackend` as an additional auth backend.

```
# e.g. by updating your settings.py or local_settings.py
AUTHENTICATION_BACKENDS += (  
    "geonode_ldap.backend.GeonodeLdapBackend",
)
```

You may use additional auth backends, the django authentication framework tries them all according to the order listed in the settings. This means that geonode can be setup in such a way as to permit internal organization users to login with their LDAP credentials, while at the same time allowing for casual users to use their facebook login (as long as you enable facebook social auth provider).

**Note:** The django’s `django.contrib.auth.backends.ModelBackend` must also be used in order to provide full geonode integration with LDAP. However this is included by default on GeoNode settings

```py
# The GeoNode default settings are the following
AUTHENTICATION_BACKENDS = (  
    'oauth2_provider.backends.OAuth2Backend',  
    'django.contrib.auth.backends.ModelBackend',  
    ' guardian.backends.ObjectPermissionBackend',  
    ' allauth.account.auth_backends.AuthenticationBackend',
)```
2. Set some additional configuration values. Some of these variables are prefixed with AUTH_LDAP (these are used directly by django_auth_ldap) while others are prefixed with GEONODE_LDAP (these are used by geonode_ldap). The geonode custom variables are:

- **GEONODE_LDAP_GROUP_PROFILE_FILTERSTR** - This is an LDAP search fragment with the filter that allows querying for existing groups. See example below

- **GEONODE_LDAP_GROUP_NAME_ATTRIBUTE** - This is the name of the LDAP attribute that will be used for deriving the geonode group name. If not specified it will default to cn, which means that the LDAP object’s common name will be used for generating the name of the geonode group

- **GEONODE_LDAP_GROUP_PROFILE_MEMBER_ATTR** - This is the name of the LDAP attribute that will be used for deriving the geonode membership. If not specified it will default to member

Example configuration:

```python
# add these import lines to the top of your geonode settings file
from django_auth_ldap import config as ldap_config
from geonode_ldap.config import GeonodeNestedGroupOfNamesType
import ldap

# add both standard ModelBackend auth and geonode.contrib.ldap auth
AUTHENTICATION_BACKENDS += (
    'geonode_ldap.backend.GeonodeLdapBackend',
)

# django_auth_ldap configuration
AUTH_LDAP_SERVER_URI = env("LDAP_SERVER_URL")
AUTH_LDAP_BIND_DN = env("LDAP_BIND_DN")
AUTH_LDAP_BIND_PASSWORD = env("LDAP_BIND_PASSWORD")
AUTH_LDAP_USER_SEARCH = ldap_config.LDAPSearch(
    env("LDAP_USER_SEARCH_DN"),
    ldap.SCOPE_SUBTREE,
    env("LDAP_USER_SEARCH_FILTERSTR")
)
AUTH_LDAP_GROUP_SEARCH = ldap_config.LDAPSearch(
    env("LDAP_GROUP_SEARCH_DN"),
    ldap.SCOPE_SUBTREE,
    env("LDAP_GROUP_SEARCH_FILTERSTR")
)
AUTH_LDAP_GROUP_TYPE = GeonodeNestedGroupOfNamesType()
AUTH_LDAP_USER_ATTR_MAP = {
    "first_name": "givenName",
    "last_name": "sn",
    "email": "mailPrimaryAddress"
}
AUTH_LDAP_FIND_GROUP_PERMS = True
AUTH_LDAP_MIRROR_GROUPS_EXCEPT = [
    "test_group"
]

# these are not needed by django_auth_ldap - we use them to find and match
# GroupProfiles and GroupCategories
GEONODE_LDAP_GROUP_NAME_ATTRIBUTE = env("LDAP_GROUP_NAME_ATTRIBUTE", default="cn")
GEONODE_LDAP_GROUP_PROFILE_FILTERSTR = env("LDAP_GROUP_SEARCH_FILTERSTR", default="(ou=research group)"
GEONODE_LDAP_GROUP_PROFILE_MEMBER_ATTR = env("LDAP_GROUP_PROFILE_MEMBER_ATTR", default="member")
```
Example environment variables:

```
LDAP_SERVER_URL=ldap://<the_ldap_server>
LDAP_BIND_DN=uid=ldapinfo,cn=users,dc=ad,dc=example,dc=org
LDAP_BIND_PASSWORD=<something_secret>
LDAP_USER_SEARCH_DN=dc=ad,dc=example,dc=org
LDAP_USER_SEARCH_FILTERSTR=(&(uid=%(user)s)(objectClass=person))
LDAP_GROUP_SEARCH_DN=cn=groups,dc=ad,dc=example,dc=org
LDAP_GROUP_SEARCH_FILTERSTR=(|(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6))
LDAP_GROUP_PROFILE_MEMBER_ATTR=uniqueMember
```

The configuration seen in the example above will allow LDAP users to login to geonode with their LDAP credentials.

On first login, a geonode user is created from the LDAP user and its LDAP attributes `cn` and `sn` are used to populate the geonode user's `first_name` and `last_name` profile fields.

Any groups that the user is a member of in LDAP (under the `cn=groups,dc=ad,dc=example,dc=org` search base and belonging to one of `(|(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6))` groups) will be mapped to the corresponding geonode groups, even creating these groups in geonode in case they do not exist yet. The geonode user is also made a member of these geonode groups.

Upon each login, the user’s geonode group memberships are re-evaluated according to the information extracted from LDAP. The `AUTH_LDAP_MIRROR_GROUPS_EXCEPT` setting can be used to specify groups whose memberships will not be re-evaluated.

**Note:** Users mapped from LDAP will be marked with an `ldap` tag. This will be used to keep them in sync.

**Warning:** If you remove the `ldap` tag, the users will be treated as pure internal GeoNode ones.

You may also manually generate the geonode groups in advance, before users login. In this case, when a user logs in and the mapped LDAP group already exists, the user is merely added to the geonode group

Be sure to check out `django_auth_ldap` for more information on the various configuration options.

**Keep Users and Groups Synchronized**

In order to constantly keep the remote LDAP Users and Groups synchronized with GeoNode, you will need to run periodically some specific management commands.

```
*/10 * * * * /opt/geonode/my-geonode/manage.sh updateldapgroups >> /var/log/cron.log 2>&1
*/10 * * * * /opt/geonode/my-geonode/manage.sh updateldapusers >> /var/log/cron.log 2>&1
```

Where the `manage.sh` is a bash script similar to the following one:

```
manage.sh

export $(grep -v '^##' /opt/geonode/my-geonode/.env | xargs -d '\n') | /home/<my_user>/.virtualenvs/geonode/bin/python /opt/geonode/my-geonode/manage.py $@
```

and the `/opt/geonode/my-geonode/.env` is something similar to the following one:

```
/opt/geonode/my-geonode/.env
```
DEBUG=False
DJANGO_ALLOWED_HOSTS=<geonode_public_host>,localhost,127.0.0.1
DJANGO_DATABASE_URL=postgresql://my_geonode:**********@localhost:5432/my_geonode_db
DEFAULT_BACKEND_UPLOADER=geonode.importer
DEFAULT_FROM_EMAIL=geonode@example.org
DJANGO_EMAIL_HOST=smtp.example.org
DJANGO_EMAIL_HOST_PASSWORD=**********
DJANGO_EMAIL_HOST_USER=geonode
DJANGO_EMAIL_PORT=465
DJANGO_EMAIL_USE_SSL=True
DJANGO_SETTINGS_MODULE=my_geonode.settings
DJANGO_SECRET_KEY=**********
OAUTH2_API_KEY=**********
PROXY_URL=/proxy/?url=
EXIF_ENABLED=True
EMAIL_ENABLE=True
TIME_ENABLED=True
ACCOUNT_OPEN_SIGNUP=True
ACCOUNT_APPROVAL_REQUIRED=True
ACCOUNT_EMAIL_REQUIRED=True
ACCOUNT_EMAIL_VERIFICATION=optional
AVATAR_GRAVATAR_SSL=True
GEONODE_DB_URL=postgresql://my_geonode:**********@localhost:5432/my_geonode_data
GEOSERVER_ADMIN_PASSWORD=**********
GEOSERVER_LOCATION=https://<geonode_public_host>/geoserver/
GEOSERVER_PUBLIC_HOST=<geonode_public_host>
GEOSERVER_PUBLIC_LOCATION=https://<geonode_public_host>/geoserver/
GEOSERVER_WEB_UI_LOCATION=https://<geonode_public_host>/geoserver/
LDAP_SERVER_URL=ldap://<the_ldap_server>
LDAP_BIND_DN=uid=ldapinfo,cn=users,dc=ad,dc=example,dc=org
LDAP_BIND_PASSWORD=<something_secret>
LDAP_USER_SEARCH_DN=dc=ad,dc=example,dc=org
LDAP_USER_SEARCH_FILTERSTR=(&(uid=%(user)s)(objectClass=person))
LDAP_GROUP_SEARCH_DN=cn=groups,dc=ad,dc=example,dc=org
LDAP_GROUP_SEARCH_FILTERSTR=((cn=abt1) (cn=abt2) (cn=abt3) (cn=abt4) (cn=abt5) (cn=abt6))
LDAP_GROUP_PROFILE_MEMBER_ATTR=uniqueMember
OGC_REQUEST_MAX_RETRIES=3
OGC_REQUEST_POOL_CONNECTIONS=100
OGC_REQUEST_POOL_MAXSIZE=100
OGC_REQUEST_TIMEOUT=60
SITEURL=https://<geonode_public_host>/
SITE_HOST_NAME=<geonode_public_host>
FREETEXT_KEYWORDS_READONLY=False
# Advanced Workflow Settings
ADMIN_MODERATE_UPLOADS=False
GROUP_MANDATORY_RESOURCES=False
GROUP_PRIVATE_RESOURCES=False
RESOURCE_PUBLISHING=False

---

Note: You might want to use the same /opt/geonode/my-geonode/.env for your UWSGI configuration too:

[uwsgi]
socket = 0.0.0.0:8000
uid = <my_user>
gid = www-data

(continues on next page)
plugins = python
virtualenv = /home/<my_user>/.virtualenvs/geonode

# set environment variables from .env file
env LANG=en_US.utf8
env LC_ALL=en_US.UTF-8
env LC_LANG=en_US.UTF-8

for readline = /opt/geonode/my-geonode/.env
    env = %(_)
endfor =

chdir = /opt/geonode/my-geonode
module = my_geonode.wsgi:application

processes = 12
threads = 2
enable-threads = true
master = true

# logging
# path to where uwsgi logs will be saved
logto = /storage/my_geonode/logs/geonode.log
daemonize = /storage/my_geonode/logs/geonode.log
touch-reload = /opt/geonode/my-geonode/my_geonode/wsgi.py
buffer-size = 32768
max-requests = 500
harakiri = 300 # respawn processes taking more than 5 minutes (300 seconds)
# limit-as = 1024 # avoid Errno 12 cannot allocate memory
harakiri-verbose = true
vacuum = true
thunder-lock = true

1.23.2 Geonode Logstash for centralized monitoring/analytics

This contrib app, along with the GeoNode internal monitoring app, lets administrators to configure a service for sending metrics data to a centralized server which comes with Logstash.

So it will be possible to visualize stats and charts about one or more GeoNode instances outside the application. Having a server configured with the ELK stack, it is possible to visualize those information on a Kibana dashboard for example.

If you manage more than one GeoNode instances, that server can receive data from many GeoNode(s) so it can make available both single-instance dashboards (referred to individual instances) and global dashboards (stats calculated on the whole set of instances).

**Warning:** The centralized monitoring service cannot be active if the settings variables `USER_ANALYTICS_ENABLED` and monitoring-enabled are set to `False`. 
Overview

By default, GeoNode will send data to the centralized server every 3600 seconds (1 hour) so, if enabled, the monitoring app will collect 1-hour-aggregated data. This time interval can be configured, see the next paragraphs to know how.

Formatted and compressed data will be sent on a TCP connection (on the 443 standard port by default) through a scheduled celery task which basically logs information via python-logstash-async.

Warning: This feature requires python-logstash-async.

Data and events formats

Each time the centralized monitoring service is called, 4 types of JSON formatted events are sent to the server:

1. Instance overview

   ```json
   {
     "format_version": "1.0",
     "instance": {
       "name": geonode instance HOSTNAME,
       "ip": geonode instance IP
     },
     "time": {
       "startTime": UTC now - 1 hour (default)
       "endTime": UTC now
     },
     "hits": total number of requests,
     "unique_visits": total number of unique sessions,
     "unique_visitors": total number of unique users,
     "registered_users": total number of registered users at the end time,
     "layers": total number of layers at the end time,
     "documents": total number of documents at the end time,
     "maps": total number of maps at the end time,
     "errors": total number of errors
   }
   ```

2. Resources details

   ```json
   {
     "format_version": "1.0",
     "instance": {
       "name": geonode instance HOSTNAME,
       "ip": geonode instance IP
     },
     "time": {
       "startTime": UTC now - 1 hour (default)
       "endTime": UTC now
     },
     "resources": [
       ...
       {
         "type": resource type,
         "name": resource name,
         "url": resource URL,
         "hits": total number of requests about this resource,
       }
       ...
   }
   ```
3. Countries details

```
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 hour (default)
        "endTime": UTC now
    },
    "countries": [
        ...
        {
            "name": country name,
            "hits": total number of requests about the country
        },
        ...
    ]
}
```

4. UA (User Agent) Familie details

```
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 day
        "endTime": UTC now
    },
    "ua_families": [
        ...
        {
            "name": UA family name
            "hits": total number of requests about the UA family
        },
        ...
    ]
}
```

These messages will be gzip compressed in order to improve transport performances and they should be parsed by a logstash filter on the server side (see Logstash configuration).
Configuration

The centralized monitoring service is disabled by default because it needs the internal monitoring to be active and service-specific configurations.

GeoNode configuration

On the GeoNode side, all needed configurations can be set up from the Django admin interface. If enabled, the GEONODE LOGSTASH section will show the Centralized servers feature:

```plaintext
GEONODE_LOGSTASH

Centralized servers

Change
```

Let’s add one:
The **Host** IP address and the **Port** number are mandatory as well as the time **Interval** (3600 seconds by default) which defines the service invocation polling (so the time range on which data should be aggregated).

**Note:** Once the service configured, the user can test the configuration by clicking on **Test connection**. It will test the connection with the centralized server without saving the configuration.

Other settings come with a default value:

- **Db path** → the local SQLite database to cache events between emitting and transmission to the Logstash server (log events are cached even across process restarts and crashes);
- **Socket timeout** → timeout in seconds for TCP connections;
- **Queue check interval** → interval in seconds to check the internal queue for new messages to be cached in the database;
- **Queue events flush interval** → interval in seconds to send cached events from the database to Logstash;
- **Queue events flush count** → count of cached events to send from the database to Logstash;
• **Queue events batch size** –> maximum number of events to be sent to Logstash in one batch;

• **Logstash db timeout** –> timeout in seconds to ‘connect’ the SQLite database.

To better understand what these variables mean, it is recommended to read the python-logstash-async options for the asynchronous processing and formatting.

Other three read-only fields will be visible:

• **Last successful deliver** –> timestamp of the last successful deliver (if exists);

• **Next scheduled deliver** –> timestamp of the next scheduled deliver;

• **Last failed deliver** –> timestamp of the last failed deliver (if exists).

**Logstash configuration**

On the server side, a proper Logstash configuration should be set up.

Some events formats contain arrays (see *Data and events formats*) so Logstash should be able to retrieve a single event for each element of the array. The Split filter plugin helps to correctly parse those messages.

As mentioned above, events messages will be gzip compressed so the *Gzip_lines codec plugin* should be installed along with Logstash and the “gzip_lines” codec should be used for the *tcp* input.

An example of the logstash configuration:

```plaintext
input {  tcp {    port => <logstash_port_number>    codec => "gzip_lines"  }  }
filter {  json {    source => "message"  }  if [format_version] == "1.0" {    if [countries] {      split {        field => "countries"      }    }    if [resources] {      split {        field => "resources"      }    }    if [ua_families] {      split {        field => "ua_families"      }    }    mutate {      remove_field => "message"    }  }  geoip {

(continues on next page)
Usage

When saving the service configuration, if monitoring enabled, GeoNode will create/update a celery Periodic Task which will be executed at regular intervals based on the interval configured.

You can check this behaviour on the Periodic Tasks section of the admin UI:

The dispatch-metrics-task task:

The task details:
Warning: When disabling monitoring is a good practice to disable the corresponding Periodic Task too.

Management command

In addition to the scheduled task, this contrib app makes also available the dispatch_metrics command to manually send metrics to the server.
Obviously the time interval considered will start at the last successful delivery and will finish at the current time.

When the monitoring plugin is enabled (USER_ANALYTICS_ENABLED and monitoring-enabled are set to True) and a Geonode Logstash for centralized monitoring/analytics configured, Geonode sends (hourly by default) metrics data to an external server (which comes with Logstash) for stats visualization and analysis.
The command can be launched using the manage.py script. No options are required.
$ DJANGO_SETTINGS_MODULE=<your_settings_module> python manage.py dispatch_metrics

Possible exceptions raised during the execution will be reported to GeoNode log.

### 1.24 GeoNode Admins Guide

GeoNode has an administration panel, based on the Django admin, which can be used to do some database operations. Although most of the operations can and should be done through the normal GeoNode interface, the admin panel provides a quick overview and management tool over the database.

The following sections will explain more in depth what functionalities the admin panel makes you available. It should be highlighted that the sections not covered in this guide are meant to be managed through GeoNode UI.

#### 1.24.1 Accessing the panel

The Admin Panel is a model-centric interface where trusted users can manage content on GeoNode. Only the staff users can access the admin interface.

**Note:** The “staff” flag, which controls whether the user is allowed to log in to the admin interface, can be set by the admin panel itself.

The panel can be reached from Admin link of the User Menu in the navigation bar (see the picture below) or through this URL: `http://<your_geonode_host>/admin`.

![Admin Link of the User Menu](image)

Fig. 230: The Admin Link of the User Menu

When clicking on that link the Django-based Admin Interface page opens and shows you all the Django models registered in GeoNode.
1.24.2 Reset or Change the admin password

From the Admin Interface you can access the CHANGE PASSWORD link on the right side of the navigation bar.

It allows you to access the Change Password Form through which you can change your password. Once the fields have been filled out, click on CHANGE MY PASSWORD to perform the change.
1.24.3 Simple Theming

GeoNode provides by default some theming options manageable directly from the Administration panel. Most of the times those options allows you to easily change the GeoNode look and feel without touching a single line of HTML or CSS.

As an administrator go to http://<your_geonode_host>/admin/geonode_themes/geonodethemecustomization/.

The panel shows all the available GeoNode themes, if any, and allows you to create new ones.

**Warning:** Only one theme at a time can be **activated** (aka **enabled**). By disabling or deleting all the available themes, GeoNode will turn the gui back to the default one.

Editing or creating a new Theme, will actually allow you to customize several properties.

At least you’ll need to provide a Name for the Theme. Optionally you can specify also a Description, which will allow you to better identify the type of Theme you created.

Just below the Description field, you will find the Enabled checkbox, allowing you to toggle the Theme.

**Jumbotron and Get Started link**

**Note:** Remember, everytime you want to apply some changes to the Theme, you must save the Theme and reload the GeoNode browser tab. In order to quickly switch back to the Home page, you can just click the VIEW SITE link on the top-right corner of the Admin dashboard.
Fig. 235: Theme Name and Description

Fig. 236: Theme Name and Description
The next section allows you to define the first important Theme properties. This part involves the GeoNode main page sections.

![Jumbotron and Logo options](image)

By changing those properties as shown above, you will easily change your default home page from this to this:

It is possible to optionally hide the Jumbotron text and/or the Call to action button.

### Copyright and contact info footer

The default GeoNode footer does not present any type of contact info. By enabling and editing the contact us box fields, it will be possible to show a simple Contact Us info box on the GeoNode footer section. Similarly, by editing the Copyright text box and/or background color, it will be possible to show the Copyright statement to the bottom of the page.
Fig. 238: GeoNode Default Home

Fig. 239: Updating Jumbotron and Logo
Fig. 240: *Hide Jumbotron text and Call to action button*

Fig. 241: *Default GeoNode Footer*
### Enable contact us box

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact name</td>
<td>Mr. Pibody</td>
</tr>
<tr>
<td>Contact position</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>Contact administrative area</td>
<td>Paperopoli</td>
</tr>
<tr>
<td>Contact street</td>
<td>113th street</td>
</tr>
<tr>
<td>Contact postal code</td>
<td>113117</td>
</tr>
<tr>
<td>Contact city</td>
<td>Topolinia</td>
</tr>
<tr>
<td>Contact country</td>
<td>Disney</td>
</tr>
<tr>
<td>Contact delivery point</td>
<td></td>
</tr>
<tr>
<td>Contact voice</td>
<td>+00 000.000.113</td>
</tr>
<tr>
<td>Contact facsimile</td>
<td>+00 000.000.117</td>
</tr>
<tr>
<td>Contact email</td>
<td><a href="mailto:pibody@paperopoli.dis">pibody@paperopoli.dis</a></td>
</tr>
</tbody>
</table>

Fig. 242: *Enable contact us box*
Fig. 243: Contact Us Footer

Fig. 244: Copyright Text and Color

Fig. 245: Copyright
Partners

GeoNode simple theming, allows also a Partners section, in order to easily list links to third-party institutions collaborating to the project.

The example below shows the Partners section of WorldBank CHIANG MAI URBAN FLOODING GeoNode instance made through integrating theming options.

Fig. 246: Urbanflooding GeoNode Partners Section

The Partners items can be managed through the http://<your_geonode_host>/admin/geonode_themes/partner/ Admin section

From here it is possible to add, modify or delete partners items.

A new partner is defined by few elements, a Logo, a Name, a Display Name and a Website

In order to attach or detach a Partner to an existing Theme on GeoNode, you will need to edit the Theme and go to the Partners section

From here you will be able to either to change the Partners title text and/or select/deselect Partners from the multi-select box.

Note: In order to select/deselect elements from the multi-select box, you must use the CTRL+CLICK button combination.
Fig. 247: GeoNode Partners Admin Section

Add partner

Logo: * Choose File  No file chosen

Name: 

This will not appear anywhere.

Display name:

Website:

Fig. 248: Add a Partner
Privacy Policies and Cookie settings

By enabling the Cookies Law Info Bar checkbox (True by default) it will be possible to allow GeoNode presenting the Privacy Policies and Cookie settings pop-ups and links at the bottom of the home page.

There are plenty of options available, allowing you to customize contact info as long as colors of the bar and page.

One of the most important to consider is for sure the Cookie law info bar text.

The default text contained in this section is the following one:

This website uses cookies to improve your experience, check <strong><a style="color:#000000" href="/privacy_cookies/">this page</a></strong> for details. We’ll assume you’re ok with this, but you can opt-out if you wish.

The text can be changed and customized, of course. Nevertheless it points by default to the following page

/privacy_cookies/

aka http://<your_geonode_host>/privacy_cookies/

The page contains a default generic text along with some placeholders, which, most probably, won’t fit your needs.

In order to change this you have two options:

1. Change the link reported into the Cookie law info bar text section, to make it pointing to an external/static page.
2. Change the contents of /geonode/templates/privacy-cookies.html Django template accordingly to your needs; this is basically a plain HTML page which can be easily customized by using a standard text editor.
Fig. 250: Cookies Law Info Bar checkbox

Fig. 251: Cookies Law Info Bar
Privacy & Cookies Policy

This site agrees to respect the privacy of the Website user in accordance with the applicable regulations on the protection of personal data and in particular EU Regulation 2016/679 (hereinafter the "Regulation", "GDPR").

This document ("Privacy & Cookies Policy") provides information on the processing of personal data collected through this Website (hereinafter "Website") and therefore constitutes information to the data subjects in accordance with the aforementioned regulations. Within the specific area of the Website, which collects the personal information of the user, a specific policy is normally published. The following information applies only to this Website and not to other websites accessed via links.

Pursuant to Article 13 of the Regulation, we hereby provide the following information:

DATA CONTROLLER
The Data Controller is GEOSOLUTIONS DI GIANNI ECCHINI SIMONE & C., #DATA_CONTROLLER_ADDRESS; Tel. #DATA_CONTROLLER_PHONE e-mail: #DATA_CONTROLLER_EMAIL.

WHAT DATA DO WE PROCESS?
The following data may be subject to processing:

Browsing Data
The processing of personal data of users who visit only the Website (i.e. without sending communications or using reserved areas) is limited to the navigation data, i.e. those for which the transmission to the Website is necessary for the operation of IT systems responsible for the management of the Website and the Internet communication protocols. This category includes the IP addresses or domain of the computer used to visit the Website and other parameters relative to the operating system used by the user to connect to the Website. The Company collects these and other data (such as, for example, the number of visits and the time spent on the Website) only for statistical purposes and in an anonymous form in order to control the operation of the Website and improve its functionality. This is information that is not collected for the association with other information about users and to identify the latter; however, by their very nature, these data can allow the identification of users through processing and association with data held by third parties.

The legal basis for this processing is the legitimate interest of the Data Controller in the technical management related to the functionality and safety of the Website as defined by Art. 6.1. (f) of the Regulation.

Cookies
Cookies are small text files, which the Website places on the devices in use, such as computers or mobile devices, stored in directories used by the user's web browser. There are various types of cookies, some make the Website experience more efficient, others to enable certain functions.

The Website uses "technical" cookies, such as navigation or session cookies, or tools to make functional and optimize the navigation and use of the Website.
Switching between different themes

In the case you have defined more Themes, switching between them is as easy as enabling one and disabling the others.

Remember to save the Themes everytime and refresh the GeoNode home page on the browser to see the changes.

It is also important that there is only one Theme enabled at a time.

In order to go back to the standard GeoNode behavior, just disable or delete all the available Themes.

1.24.4 Add a new user

In GeoNode, administrators can manage other users. For example, they can Add New Users through the following form.

The form above can be reached from the Admin Panel at the following path: Home > People > Users. Click on ADD USER + to open the form page.

It is also available, in the GeoNode UI, the Add User link of the About menu in the navigation bar.

To perform the user creation fill out the required fields (username and password) and click on SAVE. You will be redirected to the User Details Page which allows to insert further information about the user.

The user will be visible into the Users List Page of the Admin Panel and in the People Page (see Viewing other users information).

1.24.5 Activate/Disable a User

When created, new users are active by default. You can check that in the User Details Page from the Admin Panel (see the picture below).

Active users can interact with other users and groups, can manage resources and, more in general, can take actions on the GeoNode platform.

Untick the Active checkbox to disable the user. It will be not considered as user by the GeoNode system.
Fig. 255: The Add User button in the Users List page

Fig. 256: Add User Link
Fig. 257: *The User Details Page*

Fig. 258: *The User in the People page*
Fig. 259: New Users Active by default

Fig. 260: Disabled Users
1.24.6 Change a User password

GeoNode administrators can also change/reset the password for those users who forget it. As shown in the picture below, click on this form link from the User Details Page to access the Change Password Form.

![Image of Change Password Form]

Fig. 261: Changing Users Passwords

The Change User Password Form should looks like the following one. Insert the new password two times and click on CHANGE PASSWORD.

![Image of Change Password Form]

Fig. 262: Changing Users Passwords

1.24.7 Promoting a User to Staff member or superuser

Active users have not access to admin tools. GeoNode makes available those tools only to Staff Members who have the needed permissions. Superusers are staff members with full access to admin tools (all permissions are assigned to them).

Administrators can promote a user to Staff Member by ticking the Staff status checkbox in the User Details Page. To make some user a Superuser, the Superuser status checkbox should be ticked. See the picture below.
1.24.8 Creating a Group

In GeoNode is possible to create new groups with set of permissions which will be inherited by all the group members.

The creation of a Group can be done both on the GeoNode UI and on the Admin Panel, we will explain how in this paragraph.

The Create Groups link of About menu in the navigation bar allows administrators to reach the Group Creation Page.

The following form will open.

Fill out all the required fields and click Create to create the group. The Group Details Page will open.

The new created group will be searchable in the Groups List Page.
Create a Group

Title
Cartographers

Logo
Browse... compass-rose.png

Description
This group gathers all the cartographers of GeoNode

Email
geonode.cartographers@mail.com

Email used to contact one or all group members, such as a mailing list, shared email, or exchange group.

Keywords
cartography

A space or comma-separated list of keywords

Access
Public (invite-only)

Public: Any registered user can view and join a public group.
Public (invite-only): Any registered user can view the group. Only invited users can join.
Private: Registered users cannot see any details about the group, including membership. Only invited users can join.

Categories

Create

Fig. 265: The Group Creation Form
Fig. 266: The Group Details Page
As already mentioned above, groups can also be created from the Django-based Admin Interface of GeoNode. The Groups link of the AUTHENTICATION AND AUTHORIZATION section allows to manage basic Django groups which only care about permissions.

To create a GeoNode group you should take a look at the GROUPS section.

Types of Groups

In GeoNode users can be grouped through a Group Profile, an enhanced Django group which can be enriched with some further information such as a description, a logo, an email address, some keywords, etc. It also possible to define some Group Categories based on which those group profiles can be divided and filtered.

A new Group Profile can be created as follow:
• click on the Group Profile + Add button
• fill out all the required fields (see the picture below), Group Profiles can be explicitly related to group categories
• click on SAVE to perform the creation, the new created group profile will be visible in the Group Profiles List

Group Categories

Group Profiles can also be related to Group Categories which represents common topics between groups. In order to add a new Group Category follow these steps:
• click on the Group Categories + Add button
• fill out the creation form (type name and description)
• click on SAVE to perform the creation, the new created category will be visible in the Group Categories List

When a GeoNode resource (layer, document or maps) is associated to some Group Profile, it is also possible to retrieve the Group Category it belongs to.
So when searching for resources (see Finding Data) you can also filter the data by group category.

1.24.9 Managing a Group

Through the Groups link of About menu in the navigation bar, administrators can reach the Groups List Page.
In that page all the GeoNode Group Profiles are listed.
For each group some summary information (such as the title, the description, the number of members and managers) are displayed near the Group Logo.
Administrators can manage a group from the Group Profile Details Page which is reachable by clicking on the title of the group.
As shown in the picture above, all information about the group are available on that page:
• the group Title;
• the Last Editing Date which shows a timestamp corresponding to the last editing of the group properties;
• the Keywords associated with the group;
• Permissions on the group (Public, Public(invite-only), Private);
• Members who join the group;
• Managers who manage the group.
There are also four links:
• The Edit Group Details link opens the Group Profile Form through which the following properties can be changed:
  – Title.
  – Logo (see next paragraphs).
  – Description.
  – Email, to contact one or all group members.
  – Keywords, a comma-separated list of keywords.
## Django administration

**Add group profile**

- **Title:** Transportation Planners
- **Slug:** transportation-planners
- **Logo:** ![transport_logo.png]
- **Description:** Users interested in transports

**Email:** transport.group@mail.com

**Keywords:** railways, roads

**Access:** Public

**Categories:**
- Category: Transport

### GROUP MEMBERS

<table>
<thead>
<tr>
<th>USER</th>
<th>ROLE</th>
<th>JOINED</th>
<th>DELETE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>johnsmith</td>
<td>Manager</td>
<td>Date: 2019-06-26, Time: 15:20:58</td>
<td>Now</td>
</tr>
<tr>
<td>Joe</td>
<td>Member</td>
<td>Date: 2019-06-26, Time: 15:20:58</td>
<td>Now</td>
</tr>
<tr>
<td>Jane</td>
<td>Member</td>
<td>Date: 2018-06-25, Time: 15:20:58</td>
<td>Today</td>
</tr>
</tbody>
</table>

Note: You are 2 hours ahead of server time.
Fig. 270: The Group Profiles List

Fig. 271: A new Group Category
Fig. 272: The Group Categories List

Fig. 273: Filtering Layers by Group Category
Access, which regulates permissions:

- Public: any registered user can view and join a public group.
- Public (invite-only): only invited users can join, any registered user can view the group.
- Private: only invited users can join the group, registered users cannot see any details about the group, including membership.

Categories, the group categories the group belongs to.

- Managing Group Members (see next paragraphs).
- the Delete this Group, click on it to delete the Group Profile. GeoNode requires you to confirm this action.
- the Group Activities drives you to the Group Activites Page where you can see all layers, maps and documents associated with the group. There is also a Comments tab which shows comments on those resources.

Group Logo

Each group represents something in common between its members. So each group should have a Logo which graphically represents the idea that identify the group.

On the Group Profile Form page you can insert a logo from your disk by click on Browse . . .

Click on Update to apply the changes.
Take a look at your group now, you should be able to see that logo.

Managing Group members

The Manage Group Members link opens the Group Members Page which shows Group Members and Group Managers. Managers can edit group details, can delete the group, can see the group activities and can manage memberships. Other Members can only see the group activities.

In Public Groups, users can join the group without any approval. Other types of groups require the user to be invited by the group managers.
Fig. 275: Group Profiles List Page
Fig. 276: Group Profile Details Page
Fig. 277: Group Profile Details Page

Fig. 278: Confirm Group Deletion
Activity Feed for John Smith Foundation Team

1. Admin created `places_landuse_amsterdam` by admin 2 minutes ago
2. Admin uploaded `geonodeplaces` 4 minutes ago
3. Admin uploaded `geonodestanduse` 6 minutes ago

Fig. 279: Group Activities

Update Group

Title
John Smith Foundation Team

Logo

Browse... `John_Smith_Globe_Exploration.jpg`

Description

Members of the Team of John Smith

Fig. 280: Editing the Group Logo
Fig. 281: *The Group Logo*
Only group managers can *Add new members*. In the picture below, you can see the manager can search for users by typing their names into the *User Identifiers* search bar. Once found, he can add them to the group by clicking the *Add Group Members* button. The *Assign manager role* flag implies that all the users found will become managers of the group.

![Adding a new Member to the Group](image)

The following picture shows you the results.

### 1.24.10 Group based advanced data workflow

By default GeoNode is configured to make every resource (Layer, Document or Map) suddenly available to everyone, i.e. publicly accessible even from anonymous/non-logged in users.

It is actually possible to change few configuration settings in order to allow GeoNode to enable an advanced publication workflow.

With the advanced workflow enabled, your layer, document or map won’t be automatically published (i.e. made visible and accessible for all, contributors or simple users).

For now, your item is only visible by yourself, the manager of the group to which the layer, document or map is linked (this information is filled in the metadata), the members of this group, and the GeoNode Administrators.

Before being published, the layer, document or map will follow a two-stage review process, which is described below:

**How to enable the advanced workflow**

You have to tweak the GeoNode settings accordingly.
Fig. 283: New Members of the Group

A **CONTRIBUTOR** uploads a layer or a document, or save a map

The **CONTRIBUTOR** fills the metadata and links their layer, document or map to a **GROUP**

The **MANAGER** of that **GROUP** checks the work done by the **CONTRIBUTOR**. After checking, the layer, document or map can be **approved**

A **ADMIN** does a final check. Once this done, the layer, document or map can be **published**

For now, only the **CONTRIBUTOR**, the group **MANAGER**, members of the **GROUP**, and the **Admin** can see the layer, document or map.

The layer, document or map can now be seen by anyone, in accordance with the permissions set by the **CONTRIBUTOR**.

Fig. 284: From upload to publication: the review process on GeoNode
Please see the details of the following GeoNode Settings:

- ADMIN_MODERATE_UPLOADS
- GROUP_PRIVATE_RESOURCES
- RESOURCE_PUBLISHING

The group Manager approval

Here, the role of the Manager of the group to which your layer, document or map is linked is to check that the uploaded item is correct. Particularly, in the case of a layer or a map, it consists of checking that the chosen cartographic representation and the style are fitting but also that the discretization is appropriate.

The Manager must also check that the metadata are properly completed and that the mandatory information (Title, Abstract, Edition, Keywords, Category, Group, Region) are filled.

If needed, the Manager can contact the contributor responsible of the layer, document or map in order to report potential comments or request clarifications.

Members of the group can also take part in the reviewing process and give some potential inputs to the responsible of the layer, document or map.

When the Manager considers that the layer, document or map is ready to be published, he should approve it. To do so, the Manager goes to the layer, document or map page, then opens the Wizard in order to edit the metadata. In the Settings tab, the manager checks the Approved box, and then updates the metadata and saves the changes:

Fig. 285: The approbation process of an item by a Manager

Following this approval, the GeoNode Administrators receive a notification informing them that an item is now waiting for publication.

The publication by the GeoNode Administrator

Prior to the public release of an approved layer, a document or a map, the Administrator of the platform performs a final validation of the item and its metadata, notably to check that it is in line with licence policies.

If needed, the GeoNode Administrator can contact the Manager who has approved the layer, document or map, as well as its responsible.

Once the layer, document or map is validated, the item is made public by the Administrator. It can now be viewed, accessed, and downloaded in accordance with the Permissions set by the responsible contributor.

1.24.11 Manage profiles using the admin panel

So far GeoNode implements two distinct roles, that can be assigned to resources such as layers, maps or documents:

- party who authored the resource
- party who can be contacted for acquiring knowledge about or acquisition of the resource

These two profiles can be set in the GeoNode interface by accessing the metadata page and setting the Point of Contact and Metadata Author fields respectively.

Is possible for an administrator to add new roles if needed, by clicking on the Add Role button in the Base -> Contact Roles section:
Fig. 286: An approved layer, waiting for publication by the GeoNode administrators.
Clicking on the People section (see figure) will open a web form with some personal information plus a section called Users.

Is important that this last section is not modified here unless the administrator is very confident in that operation.

### 1.24.12 Manage layers using the admin panel

Some of the Layers information can be edited directly through the admin interface although the best place is in the Layer -> Metadata Edit in GeoNode.

Clicking on the Admin > Layers link will show the list of available layers.

<table>
<thead>
<tr>
<th>Layers</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Layers</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Styles</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Upload sessions</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>

**Warning:** It is not recommended to modify the Layers’ Attributes or Styles directly from the Admin dashboard unless you are aware of your actions.

The Metadata information can be changed for multiple Layers at once through the Metadata batch edit action.

By clicking over one Layer link, it will show a detail page allowing you to modify some of the resource info like the metadata, the keywords, the title, etc.

**Note:** It is strongly recommended to always use the GeoNode Metadata Wizard or Metadata Advanced tools in order to edit the metadata info.

The Permissions can be changed also for multiple Layers at once through the Set layers permissions action.

By clicking over one Layer link, it will show a detail page allowing you to modify the permissions for the selected resources.
Django administration

Home › Layers › Layers

Select layer to change

2019 November 14

Action: Set Layers Permissions ▼ Go 2 of 2 selected

<table>
<thead>
<tr>
<th>ID</th>
<th>ALTERNATE</th>
<th>TITLE [EN]</th>
<th>DATE</th>
<th>CATE</th>
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<tr>
<td>28</td>
<td>geonode:tasmania_water_bodies</td>
<td>tasmania_water_bodies</td>
<td>Nov 14, 2019, 3:36 p.m.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>geonode:tasmania_state_boundaries</td>
<td>tasmania_state_boundaries</td>
<td>Nov 14, 2019, 3:36 p.m.</td>
<td></td>
</tr>
</tbody>
</table>
1.24.13 Manage the maps using the admin panel

Similarly to the Layers, it is possible to manage the available GeoNode Maps through the Admin panel also.

Move to Admin > Maps to access the Maps list.

The Metadata information can be changed for multiple Maps at once through the Metadata batch edit action.

By clicking over one Map link, it will show a detail page allowing you to modify some of the resource info like the metadata, the keywords, the title, etc.

**Note:** It is strongly recommended to always use the GeoNode Metadata Wizard or Metadata Advanced tools in order to edit the metadata info.

Notice that by enabling the Featured option here, will allow GeoNode to show the Map thumbnail and the Map detail link on the Home Page.
GeoNode Documentation, Release 2.10

Chapter 1. Table of contents
1.24.14 Manage the documents using the admin panel

Similarly to the Layers and Maps, it is possible to manage the available GeoNode Documents through the Admin panel also.

Move to Admin > Documents to access the Documents list.

The Metadata information can be changed for multiple Documents at once through the Metadata batch edit action.

By clicking over one Document link, it will show a detail page allowing you to modify some of the resource info like the metadata, the keywords, the title, etc.
**GeoNode Documentation, Release 2.10**

**Note:** It is strongly recommended to always use the GeoNode *Metadata Wizard* or *Metadata Advanced* tools in order to edit the metadata info.

### 1.24.15 Manage the base metadata choices using the admin panel

*Admin > Base* contains almost all the objects you need to populate the resources metadata choices.

In other words the options available from the *select-boxes* of the *Metadata Wizard* and *Metadata Advanced* panels.

**Note:** When editing the resource metadata through the *Metadata Wizard*, some fields are marked as mandatory and by filling those information the *Completeness* progress will advance accordingly.

Even if not all the fields have been filled, the system won’t prevent you to update the metadata; this is why the Mandatory fields are mandatory to be fully compliant with an ISO 19115 metadata schema, but are only recommended to be compliant with GeoNode.

Also the Completeness indicates how far the metadata is to be compliant with an ISO 19115 metadata schema.

Of course, it is highly recommended to always fill as much as possible at least all the metadata fields marked as Mandatory.

This will improve not only the quality of the data stored into the system, but will help the users to easily search for them on GeoNode.

All the *Search & Filter* panels and options of GeoNode are, in fact, based on the resources metadata fields. Too much generic descriptions and too empty metadata fields, will give highly un-precise and very wide search results to the users.

**Hierarchical keywords**

Through the *Admin > Base > Hierarchical keywords* panel it will be possible to manage all the keywords associated to the resources.

- The *Name* is the human readable text of the keyword, what users will see.
- The *Slug* is a unique label used by the system to identify the keyword; most of the times it is equal to the name.

Notice that through the *Position* and *Relative to* selectors, it is possible to establish a hierarchy between the available keywords. The hierarchy will be reflected in the form of a tree from the metadata panels.

By default each user with editing metadata rights on any resource, will be able to insert new keywords into the system by simply typing a free text on the keywords metadata field.

It is possible to force the user to select from a fixed list of keywords through the *FREE-TEXT_KEYWORDS_READONLY* setting.

When set to *True* keywords won’t be writable from users anymore. Only admins can will be able to manage them through the *Admin > Base > Hierarchical keywords* panel.

**Licenses**

Through the *Admin > Base > Licenses* panel it will be possible to manage all the licenses associated to the resources.

The licence description and the info URL will be shown on the resource detail page.
Django administration

Site administration

**ACCOUNTS**
- Email addresses + Add  Change

**ACTSTREAM**
- Actions + Add  Change
- Follows + Add  Change

**ANNOUNCEMENTS**
- Announcements + Add  Change
- Dismissals + Add  Change

**AUTHENTICATION AND AUTHORIZATION**
- Groups + Add  Change

**AVATAR**
- Avatars + Add  Change

**BASE**
- Backups + Add  Change
- Contact roles + Add  Change
- Hierarchical keywords + Add  Change
- Licenses + Add  Change
- Links + Add  Change
- Menu items + Add  Change
- Menu placeholders + Add  Change
- Menus + Add  Change
- Metadata Regions + Add  Change
- Metadata Restriction Code Types + Change
- Metadata spatial representation types + Change
- Metadata Topic Categories + Add  Change

**DIAGNOSIS**
- Comments + Add  Change

Fig. 287: Admin dashboard Base Panel
The licence text will be shown on the catalogue metadata XML documents.

**Warning:** It is strongly recommended to not publish resources without an appropriate licence. Always make sure the data provider specifies the correct licence and that all the restrictions have been honored.

### Metadata Regions

Through the Admin > Base > Metadata Regions panel it will be possible to manage all the admin areas associated to the resources.

Notice that those regions are used by GeoNode to filter search results also through the resource list view.

**Note:** GeoNode tries to guess the Regions intersecting the data bounding boxes when uploading a new layer. Those should be refined by the user layer on anyway.

### Metadata Restriction Code Types and Spatial Representation Types

Through the Admin > Base > Metadata Restriction Code Types and Admin > Base > Metadata Spatial Representation Types panels, it will be possible to **update only** the metadata descriptions for restrictions and spatial representation types.

Such lists are read-only by default since they have been associated to the specific codes of the ISO 19115 metadata schema. Changing them would require the system to provide a custom dictionary through the metadata catalog too.
Fig. 289: Metadata Advanced Panel

Fig. 290: Metadata Completeness
Fig. 291: *Hierarchical keywords list*

Fig. 292: *Hierarchical keywords edit*
Fig. 293: Metadata editor Licenses
Fig. 296: Resource Metadata Regions

Fig. 297: GeoNode filtering by Metadata Regions
Such functionality is not supported actually by GeoNode.

**Metadata Topic Categories**

Through the Admin > Base > Metadata Topic Categories panel it will be possible to manage all the resource metadata categories available into the system.

Notice that by default, GeoNode provides the standard topic categories available with the ISO 19115 metadata schema. Changing them means that the system won’t be compliant with the standard ISO 19115 metadata schema anymore. ISO 19115 metadata schema extensions are not currently supported natively by GeoNode.

It is worth notice that GeoNode allows you to associate Font Awesome Icons to each topic category through their fa-icon code. Those icons will be used by GeoNode to represent the topic category on both the Search & Filter menus and Metadata panels.

**Warning:** The list of the Metadata Topic Categories on the home page is currently fixed. To change it you will need to update or override the GeoNode index.html HTML template.

By default the Metadata Topic Categories are writable. Meaning that they can be removed or created by the Admin panel.

It is possible to make them fixed (it will be possible to update their descriptions and icons only) through the MODIFY_TOPICCATEGORY setting.

### 1.24.16 Announcements

As an Administrator you might need to broadcast announcements to the world about your portal or simply to the internal contributors.

GeoNode Announcements allow actually to do that; an admin has the possibility to create three types of messages, accordingly to their severity, decide their validity in terms of time period (start date and expiring date of the announcement), who can view them or not (everyone or just the registered members) and whenever a user can hide the message or not and how long.

A GeoNode announcement actually looks like this:

There are three types of announcements accordingly to their severity level: General, Warning and Critical. The difference is mainly the color of the announcement box.

Only administrators and staff members can create and manage announcements.

Currently there two ways to access and manage the announcements list:

1. Via the GeoNode interface, from the Profile panel

   **Note:** Those are accessible by both admins and staff members.

2. Via the GeoNode Admin panel

   **Note:** Those are accessible by admins only.

The functionalities are almost the same for both the interfaces, except that from the Admin panel it is possible to manage the dismissals too.
Fig. 298: A sample Warning Announcement

Fig. 299: General Announcement
Fig. 300: *Warning Announcement*

Fig. 301: *Critical Announcement*
Fig. 302: Announcements from the Profile panel
### Django administration

#### Site administration

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<td>✏️ Change</td>
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</table>

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</tr>
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</tr>
</thead>
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<td>✏️ Change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVATAR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatars</td>
<td>+ Add</td>
<td>✏️ Change</td>
</tr>
</tbody>
</table>

---

Fig. 303: Announcements from the Admin panel
Dismissals are basically records of members that have read the announcement and closed the message box. An announcement can have one dismissal type among the three below:

1. No Dismissal Allowed it won’t be possible to close the announcement’s message box at all.
2. Session Only Dismissal (*) the default one, it will be possible to close the announcement’s message box for the current browser session. It will show up again at next access.
3. Permanent Dismissal Allowed once the announcement’s message box is closed, it won’t appear again for the current member.

How to create and manage Announcements

From the Profile panel, click on Announcements link

![Announcements List from the Profile panel](image)

Fig. 304: Announcements List from the Profile panel

Click either on New Announcement to create a new one or over a title of an existing one to manage its contents.

Create a new announcement is quite straight; you have to fill the fields provided by the form.

**Warning:** In order to be visible, you will need to check the Site wide option in any case. You might want to hide the message to anonymous users by enabling the Members only option too.

Managing announcements form the Admin panel, is basically the same; the fields for the form will be exactly the same. Accessing announcements options from the Admin panel, allows you to manage dismissals also. Through this interface you will be able to selectively decide members which can or cannot view a specific announcement, or force them to visualize the messages again by deleting the dismissals accordingly.

1.24.17 Menus, Items and Placeholders

GeoNode provides some integrated functionalities allowing you to quickly and easily customize the top-bar menu (see the example below).

With minor changes of the basic.html template, potentially, it could be possible to use the same approach for a more complex customization. Let’s start with the simple one.

By default GeoNode provides a custom placeholder already defined into the basic.html template, called TOPBAR_MENU

```html
...<ul class="nav navbar-nav navbar-right">
  {% block my_extra_right_tab %}
  ...
</ul>
```

(continues on next page)
Create Announcement

Fig. 305: Create Announcement from the Profile panel
Fig. 306: *Create Announcement from the Admin panel*

Fig. 307: *Create Dismissal from the Admin panel*

Fig. 308: *GeoNode Top-Bar Menu customization*
From the Admin > Base panel, it is possible to access to the Menu, Menu Items and Menu Placeholder options.

The hierarchical structure of a custom Menu is the following one:

1. **Menu Placeholder**: first of all you need to define a placeholder both into the Admin > Base panel and the basic.html template.
   
   By default GeoNode provides an already defined one called TOPBAR_MENU.

2. **Menu**: second thing to do is to create a new menu associated to the corresponding placeholder. This is still possible from the Admin > Base panel.
   
   You will need to provide:
   
   - A **Title**, representing the name of the Menu visible by the users
   
   **Warning**: By using this approach, internationalization won’t be supported. For the time being GeoNode does not support this for menus created from the Admin > Base panel.

   - A **Menu Placeholder** from the existing ones.
   - A **Order** in the case you’ll create more menus associated to the same placeholder.

3. **Menu Item**: finally you will need to create voices belonging to the menu. For the time being, GeoNode allows you to create only href links.

   **Warning**: The Menu won’t be visible until you add at least one Menu Item.

### 1.24.18 OAuth2 Access Tokens

This small section won’t cover entirely the GeoNode OAuth2 security integration, this is explained in detail in other sections of the documentation (refer to OAuth2 Fixtures Update and Base URL Migration and OAuth2 Tokens and Sessions).
**BASE**

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<td></td>
</tr>
<tr>
<td>Contact roles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hierarchical keywords</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links</td>
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<td></td>
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</tbody>
</table>

**Menu items**

<table>
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<th>Change</th>
</tr>
</thead>
<tbody>
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<td>Menus</td>
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</table>

<table>
<thead>
<tr>
<th>Metadata Regions</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Metadata Restriction Code Types</th>
<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Metadata Spatial Representation Types</th>
<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Metadata Topic Categories</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</table>

---

**DIALOGOS**

---

Fig. 309: *Menu, Menu Items and Menu Placeholder options on the Admin panel*
Django administration

Home › Base › Menu placebos

Select menu placeholder to change

Action: ▼

0 of 1 selected

NAME

TOPBAR_MENU

1 menu placeholder

Fig. 310: The default ‘TOPBAR_MENU‘ Menu Placeholder on the Admin panel

Django administration

Home › Base › Menus › My Menu

Change menu

Title: My Menu

Placeholder: TOPBAR_MENU

Order: 1

Delete

Fig. 311: Create a new Menu from the Admin panel
Fig. 312: *Create a new Menu Item from the Admin panel*
Here we will focus mainly on the Admin > DJANGO/GEONODE OAUTH TOOLKIT panel items with a specific attention to the Access tokens management.

The Admin > DJANGO/GEONODE OAUTH TOOLKIT panel (as shown in the figure below) allows an admin to manage everything related to GeoNode OAuth2 grants and permissions.

As better explained in other sections of the documentation, this is needed to correctly handle the communication between GeoNode and GeoServer.

Specifically from this panel an admin can create, delete or extend OAuth2 Access tokens.

The section OAuth2 Tokens and Sessions better explains the concepts behind OAuth2 sessions; we want just to refresh the mind here about the basic concepts:

- If the SESSION_EXPIRED_CONTROL_ENABLED setting is set to True (by default it is set to True) a registered user cannot login to neither GeoNode nor GeoServer without a valid Access token.
- When logging-in into GeoNode through the sign-up form, GeoNode checks if a valid Access token exists and it creates a new one if not, or extends the existing one if expired.
- New Access tokens expire automatically after ACCESS_TOKEN_EXPIRE_SECONDS setting (by default 86400)
- When an Access token expires, the user will be kicked out from the session and forced to login again

Create a new token or extend an existing one

It is possible from the Admin > DJANGO/GEONODE OAUTH TOOLKIT panel to create a new Access token for a user.

In order to do that, just click on the Add button beside Access tokens topic.
On the new form, select the followings:

1. **User**: use the search tool in order to select the correct user. The form wants the user PK, which is a number, and **not** the username. The search tool will do everything for you.

2. **Source refresh token**: this is mandatory, leave it blank.

3. **Token**: write here any alphanumeric string. This will be the access_token that the member can use to access the OWS services. We suggest to use a service like https://passwordsgenerator.net/ in order to generate a strong token string.

4. **Application**: select GeoServer, this is mandatory.

5. **Expires**: select an expiration date by using the date-time widgets.

6. **Scope**: select write, this is mandatory.

Do not forget to Save.

From now on, GeoNode will use this Access Token to control the user session (notice that the user need to login again if closing the browser session), and the user will be able to access the OWS Services by using the new Access Token, e.g.: 

![Add a new 'Access token'](image)
Fig. 315: *Create an ‘Access token’*
Fig. 316: Select a User

Fig. 317: Select a Token
Add access token

User: 1000

Source refresh token: 

Token: 123456

Application: GeoServer

Expires: 2029-06-30 11:03:39

Fig. 318: Select the GeoServer Application

Fig. 319: Select the Token Expiration
Notice the ...quest=GetCapabilities\&access_token=123456 (access_token) parameter at the end of the URL.

**Force a User Session to expire**

Everyting said about the creation of a new Access Token, applies to the deletion of the latter.

From the same interface an admin can either select an expiration date or delete all the Access Tokens associated to a user, in order to force its session to expire.

Remember that the user could activate another session by logging-in again on GeoNode with its credentials.

In order to be sure the user won’t force GeoNode to refresh the token, reset first its password or de-activate it.

### 1.25 GeoNode Management Commands

#### 1.25.1 Migrate GeoNode Base URL

The migrate_baseurl Management Command allows you to fix all the GeoNode Links whenever, for some reason, you need to change the Domain Name of IP Address of GeoNode.

This must be used also in the cases you’ll need to chnage the network schema from HTTP to HTTPS, as an instance.

First of all let’s take a look at the –help option of the migrate_baseurl management command in order to inspect all the command options and features.

Run
```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl --help
```

**Note:** If you enabled `local_settings.py` the command will change as following:

```bash
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py migrate_baseurl --help
```

This will produce output that looks like the following

```
usage: manage.py migrate_baseurl [-h] [-v {0,1,2,3}] 
    [--settings SETTINGS] 
    [--pythonpath PYTHONPATH] [--traceback] 
    [--no-color] [-f] 
    [--source-address SOURCE_ADDRESS] 
    [--target-address TARGET_ADDRESS] 

Migrate GeoNode VM Base URL

optional arguments:
- h, --help show this help message and exit
--version show program's version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3} Verbosity level; 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
--settings SETTINGS The Python path to a settings module, e.g. "myproject.settings.main". If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
--pythonpath PYTHONPATH A directory to add to the Python path, e.g. "/home/djangoprojects/myproject".
--traceback Raise on CommandError exceptions
--no-color Don't colorize the command output.
-f, --force Forces the execution without asking for confirmation.
--source-address SOURCE_ADDRESS Source Address (the one currently on DB e.g. http://192.168.1.23)
--target-address TARGET_ADDRESS Target Address (the one to be changed e.g. http://my-public.geonode.org)
```

- **Example 1:** I want to move my GeoNode instance from `http://127.0.0.1` to `http://example.org`

  Warning: Make always sure you are using the **correct** settings

  ```bash
  DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl 
  --source-address=127.0.0.1 --target-address=example.org
  ```

- **Example 2:** I want to move my GeoNode instance from `http://example.org` to `https://example.org`

  Warning: Make always sure you are using the **correct** settings
GeoNode Documentation, Release 2.10

DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl
--source-address=http:\\example.org --target-address=https:\geonode.example.org

- **Example 3:** I want to move my GeoNode instance from https:\example.org to https:\geonode.example.org

**Warning:** Make always sure you are using the correct settings

DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl
--source-address=example.org --target-address=geonode.example.org

**Note:** After migrating the base URL, make sure to sanitize the links and catalog metadata also (*Update Permissions, Metadata, Legends and Download Links*).

### 1.25.2 Update Permissions, Metadata, Legends and Download Links

The following three utility *Management Commands*, allow to fixup:

1. *Users/Groups Permissions* on *Layers*; those will be refreshed and synchronized with the *GIS Server* ones also
2. *Metadata, Legend and Download* links on *Layers* and *Maps*
3. Cleanup *Duplicated Links* and *Outdated Thumbnails*

**Management Command** `sync_geonode_layers`

This command allows to sync already existing permissions on Layers. In order to change/set Layers’ permissions refer to the section *Batch Sync Permissions*

The options are:

- **filter:** Only update data the layer names that match the given filter.
- **username:** Only update data owned by the specified username.
- **updatepermissions:** Update the layer permissions; synchronize it back to the GeoSpatial Server. This option is also available from the *Layer Details* page.
- **updateattributes:** Update the layer attributes; synchronize it back to the GeoSpatial Server. This option is also available from the *Layer Details* page.
- **updatethumbnails:** Update the map styles and thumbnails. This option is also available from the *Layer Details* page.
- **remove-duplicates:** Removes duplicated Links.

First of all let’s take a look at the –help option of the `sync_geonode_layers` management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_layers --help
```
Note: If you enabled $local\_settings\.py$ the command will change as following:

```
DJANGO\_SETTINGS\_MODULE=geonode.local_settings python manage.py sync_geonode_layers --help
```

This will produce output that looks like the following

```
usage: manage.py sync_geonode_layers [-h] [--version] [-v {0,1,2,3}]  
    [--settings SETTINGS]  
    [--pythonpath PYTHONPATH] [--traceback]  
    [--no-color] [-i] [-d] [-f FILTER]  
    [-u USERNAME] [--updatepermissions]  
    [--updatethumbnails] [--updateattributes]

Update the GeoNode layers: permissions (including GeoFence database),  
statistics, thumbnails

optional arguments:  
-h, --help   show this help message and exit  
--version   show program's version number and exit  
-v {0,1,2,3}, --verbosity {0,1,2,3}  
    Verbosity level; 0=minimal output, 1=normal output,  
    2=verbose output, 3=very verbose output  
--settings SETTINGS   The Python path to a settings module, e.g.  
    "myproject.settings.main". If this isn't provided, the  
    DJANGO\_SETTINGS\_MODULE environment variable will be  
    used.  
--pythonpath PYTHONPATH   A directory to add to the Python path, e.g.  
    "/home/djangoprojects/myproject".  
--traceback   Raise on CommandError exceptions  
--no-color   Don't colorize the command output.  
-i, --ignore-errors   Stop after any errors are encountered.  
-d, --remove-duplicates   Remove duplicates first.  
-f FILTER, --filter FILTER   Only update data the layers that match the given  
    filter.  
-u USERNAME, --username USERNAME   Only update data owned by the specified username.  
--updatepermissions Update the layer permissions.  
--updatethumbnails Update the layer styles and thumbnails.  
--updateattributes Update the layer attributes.
```

- **Example 1:** I want to update/sync all layers permissions and attributes with the GeoSpatial Server

```
DJANGO\_SETTINGS\_MODULE=geonode.settings python manage.py sync_geonode_layers --updatepermissions --updateattributes
```

- **Example 2:** I want to regenerate the Thumbnails of all the Layers belonging to afabiani

```
```
Warning: Make always sure you are using the correct settings

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_layers -u afabiani --updatethumbnails
```

### Management Command `sync_geonode_maps`

This command is basically similar to the previous one, but affects the *Maps*; with some limitations.

The options are:

- **filter**: Only update data the map titles that match the given filter.
- **username**: Only update data owned by the specified username.
- **updatethumbnails**: Update the map styles and thumbnails. This option is also available from the *Map Details* page.
- **remove_duplicates**: Removes duplicated Links.

First of all let’s take a look at the `--help` option of the `sync_geonode_maps` management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_maps --help
```

**Note:** If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py sync_geonode_maps --help
```

This will produce output that looks like the following:

```

Update the GeoNode maps: permissions, thumbnails

optional arguments:
-h, --help            show this help message and exit
--version             show program’s version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3}  Verbosity level: 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
--settings SETTINGS   The Python path to a settings module, e.g. "myproject.settings.main". If this isn’t provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
--pythonpath PYTHONPATH A directory to add to the Python path, e.g.
```

(continues on next page)
Management Command set_all_layers_metadata

This command allows to reset Metadata Attributes and Catalogue Schema on Layers. The command will also update the CSW Catalogue XML and Links of GeoNode.

The options are:

- **filter**: Only update data the layers that match the given filter.
- **username**: Only update data owned by the specified username.
- **remove-duplicates**: Update the map styles and thumbnails.
- **delete-orphaned-thumbs**: Removes duplicated Links.

First of all let's take a look at the `--help` option of the `set_all_layers_metadata` management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py set_all_layers_metadata --help
```

**Note:** If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py set_all_layers_metadata --help
```

This will produce output that looks like the following

```
```
Resets Metadata Attributes and Schema to All Layers

optional arguments:
- `h, --help` show this help message and exit
- `--version` show program's version number and exit
- `v {0,1,2,3}, --verbosity {0,1,2,3}` Verbosity level; 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
- `--settings SETTINGS` The Python path to a settings module, e.g. "myproject.settings.main". If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
- `--pythonpath PYTHONPATH` A directory to add to the Python path, e.g. /home/djangoprojects/myproject".
- `--traceback` Raise on CommandError exceptions
- `--no-color` Don't colorize the command output.
- `--ignore-errors` Stop after any errors are encountered.
- `--remove-duplicates` Remove duplicates first.
- `--delete-orphaned-thumbs` Delete Orphaned Thumbnails.
- `f FILTER, --filter FILTER` Only update data the layers that match the given filter
- `u USERNAME, --username USERNAME` Only update data owned by the specified username

**Example 1:** After having changed the Base URL, I want to regenerate all the Catalogue Schema and eventually remove all duplicates.

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py set_all_layers_-d
```

### 1.25.3 Loading Data into GeoNode

There are situations where it is not possible or not convenient to use the *Upload Form* to add new Layers to GeoNode via the web interface. As an instance:

- The dataset is simply too big to be uploaded through a web interface.
- We would like to import some data from the mass storage programmatically.
- We would like to import some tables from a DataBase.
- We need to process the data first and, maybe, transform it to another format.

This section will walk you through the various options available to load data into your GeoNode from GeoServer, from the command-line or programmatically.
Warning: Some parts of this section have been taken from the GeoServer project and training documentation.

Management Command importlayers

The `geonode.layers` Django app includes 2 management commands that you can use to load or configure data in your GeoNode.

Both of them can be invoked by using the `manage.py` script.

First of all let's take a look at the `-help` option of the `importlayers` management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py importlayers --help
```

Note: If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py importlayers --help
```

This will produce output that looks like the following

```
usage: manage.py importlayers [-h] [-v {0,1,2,3}] [-k KEYWORDS] [-l LICENSE] [-c CATEGORY] [-r REGIONS] [-n LAYERNAME] [-t TITLE] [-a ABSTRACT] [-d DATE] [-p] [-m] [-C CHARSET] [path [path ...]]

Brings a data file or a directory full of data files into a GeoNode site.
Layers are added to the Django database, the GeoServer configuration, and the pycsw metadata index.

positional arguments:
path path [path...]

optional arguments:
-h, --help       show this help message and exit
--version        show program's version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3} Verbosity level; 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
--settings SETTINGS The Python path to a settings module, e.g. "myproject.settings.main". If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
--pythonpath PYTHONPATH A directory to add to the Python path, e.g. "/home/djangoprojects/myproject."
--traceback      Raise on CommandError exceptions
--no-color       Don't colorize the command output.
-u USER, --user USER Name of the user account which should own the imported layers
```

(continues on next page)
-i, --ignore-errors  Stop after any errors are encountered.
-o, --overwrite    Overwrite existing layers if discovered (defaults False)
-k KEYWORDS, --keywords KEYWORDS
    The default keywords, separated by comma, for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-l LICENSE, --license LICENSE
    The license for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-c CATEGORY, --category CATEGORY
    The category for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-r REGIONS, --regions REGIONS
    The default regions, separated by comma, for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-n LAYERNAME, --name LAYERNAME
    The name for the imported layer(s). Can not be used with multiple imports
-t TITLE, --title TITLE
    The title for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-a ABSTRACT, --abstract ABSTRACT
    The abstract for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command
-d DATE, --date DATE
    The date and time for the imported layer(s). Will be the same for all imported layers if multiple imports are done in one command. Use quotes to specify both the date and time in the format 'YYYY-MM-DD HH:MM:SS'.
-p, --private
    Make layer viewable only to owner
-m, --metadata_uploaded_preserve
    Force metadata XML to be preserved
-C CHARSET, --charset CHARSET
    Specify the charset of the data

While the description of most of the options should be self explanatory, its worth reviewing some of the key options a bit more in details.

- The -i option will force the command to stop when it first encounters an error. Without this option specified, the process will skip over errors that have layers and continue loading the other layers.
- The -o option specifies that layers with the same name as the base name will be loaded and overwrite the existing layer.
- The -u option specifies which will be the user that owns the imported layers. The same user will be the point of contact and the metadata author as well for that layer.
- The -k option is used to add keywords for all of the layers imported.
- The -C option specifies the character encoding of the data.

The import layers management command is invoked by specifying options as described above and specifying the path to a single layer file or to a directory that contains multiple files. For purposes of this exercise, lets use the default set of testing layers that ship with geonode. You can replace this path with the directory to your own shapefiles.
This command will produce the following output to your terminal.

```
Verifying that GeoNode is running ...
Found 8 potential layers.
No handlers could be found for logger "pycsw"
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_administrative.shp' (1/8)
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_coastline.shp' (2/8)
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_location.shp' (4/8)
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_poi.shp' (6/8)
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_water.shp' (7/8)
[created] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/single_point.shp' (8/8)
```

Detailed report of failures:

Finished processing 8 layers in 30.0 seconds.

8 Created layers
0 Updated layers
0 Skipped layers
0 Failed layers
3.750000 seconds per layer

If you encounter errors while running this command, you can use the -v option to increase the verbosity of the output so you can debug the problem.

The verbosity level can be set from 0-3 with 0 being the default.

An example of what the output looks like when an error is encountered and the verbosity is set to 3 is shown below:

```
Verifying that GeoNode is running ...
Found 8 potential layers.
[failed] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_administrative.shp' (1/8)
[failed] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_location.shp' (4/8)
[failed] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_water.shp' (7/8)
```

(continues on next page)
GeoNode Documentation, Release 2.10

[failed] Layer for '/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/single_point.shp' (8/8)

Detailed report of failures:

/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/san_andres_y_providencia_administrative.shp

Traceback (most recent call last):
File "/Users/geosolutions/projects/geonode/geonode/layers/utils.py", line 682, in upload
  keywords=keywords,
File "/Users/geosolutions/projects/geonode/geonode/layers/utils.py", line 602, in file_upload
  keywords=keywords, title=title)
File "/Users/geosolutions/projects/geonode/geonode/layers/utils.py", line 305, in save
  store = cat.get_store(name)
File "/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/geoserver/catalog.py", line 176, in get_store
  for ws in self.get_workspaces():
File "/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/geoserver/catalog.py", line 489, in get_workspaces
    description = self.get_xml("%s/workspaces.xml" % self.service_url)
File "/Users/geosolutions/.venvs/geonode/lib/python2.7/site-packages/geoserver/catalog.py", line 136, in get_xml
    response, content = self.http.request(rest_url)
File "/Library/Python/2.7/site-packages/httplib2/__init__.py", line 1445, in request
  (response, content) = self._request(conn, authority, uri, request_uri, method,
  body, headers, redirections, cachekey)
File "/Library/Python/2.7/site-packages/httplib2/__init__.py", line 1197, in _request
  (response, content) = self._conn_request(conn, request_uri, method, body, headers)
File "/Library/Python/2.7/site-packages/httplib2/__init__.py", line 1133, in _conn_request
  conn.connect()  
raise socket.error, msg
error: [Errno 61] Connection refused

Note: This last section of output will be repeated for all layers, and only the first one is show above.

This error indicates that GeoNode was unable to connect to GeoServer to load the layers. To solve this, you should make sure GeoServer is running and re-run the command.

If you encounter errors with this command that you cannot solve, you should bring them up on the geonode users mailing list.

You should now have the knowledge necessary to import layers into your GeoNode project from a directory on the servers filesystem and can use this to load many layers into your GeoNode at once.

Note: If you do not use the -u command option, the ownership of the imported layers will be assigned to the primary superuser in your system. You can use GeoNodes Django Admin interface to modify this after the fact if you want them to be owned by another user.
Management Command *updatelayers*

While it is possible to import layers directly from your servers filesystem into your GeoNode, you may have an existing GeoServer that already has data in it, or you may want to configure data from a GeoServer which is not directly supported by uploading data.

GeoServer supports a wide range of data formats and connections to database, and while many of them are not supported as GeoNode upload formats, if they can be configured in GeoServer, you can add them to your GeoNode by following the procedure described below.

GeoServer supports 3 types of data: *Raster*, *Vector*, *Databases* and *Cascaded*.

For a list of the supported formats for each type of data, consult the following pages:

- [https://docs.geoserver.org/latest/en/user/data/raster/index.html](https://docs.geoserver.org/latest/en/user/data/raster/index.html)
- [https://docs.geoserver.org/latest/en/user/data/cascaded/index.html](https://docs.geoserver.org/latest/en/user/data/cascaded/index.html)

**Note:** Some of these raster or vector formats or database types require that you install specific plugins in your GeoServer in order to use them. Please consult the GeoServer documentation for more information.

**Data from a PostGIS database**

Let's walk through an example of configuring a new PostGIS database in GeoServer and then configuring those layers in your GeoNode.

First visit the GeoServer administration interface on your server. This is usually on port 8080 and is available at [http://localhost:8080/geoserver/web/](http://localhost:8080/geoserver/web/)

1. You should login with the superuser credentials you setup when you first configured your GeoNode instance.

   Once you are logged in to the GeoServer Admin interface, you should see the following.

   **Note:** The number of stores, layers and workspaces may be different depending on what you already have configured in your GeoServer.

2. Next you want to select the “Stores” option in the left hand menu, and then the “Add new Store” option. The following screen will be displayed.

3. In this case, we want to select the PostGIS store type to create a connection to our existing database. On the next screen you will need to enter the parameters to connect to your PostGIS database (alter as necessary for your own database).

   **Note:** If you are unsure about any of the settings, leave them as the default.

4. The next screen lets you configure the layers in your database. This will of course be different depending on the layers in your database.
Welcome

This GeoServer belongs to...

GeoServer

About & Status
- Server Status
- GeoServer Logs
- About GeoServer
- Process status

Data
- Layer Preview
- Import Data
- Workspaces
- Stores
- Layers
- Layer Groups
- Styles
- Backup & Restore

Services
- WMS
- WFS

Settings
- Global
- Storage Processing
- Registry access

File Caching
- Tiered Caching
- Sectorization
- Grids
- Varnish Cache
- WebStores

Security
- Database
- Authentication
- Users
- Groups
- Roles
- Edit
- Services
- WFS securely

Service Capabilities
- WFS
- WFS
- WMTS
- WCS
- WMS
- WFS
- WFS
- WMS
- WFS
- WFS

New data source
Choose the type of data source you wish to configure

Vector Data Sources
- CSV - Comma delimited text file
- Directory of spatial files (shapefiles) - Takes a directory of shapefiles and exposes it as a data store
- GeoPackage - GeoPackage
- H2 - H2 Embedded Database
- H2 (JNDI) - H2 Embedded Database (JNDI)
- Microsoft SQL Server (JNDI) - Microsoft SQL Server (JNDI)
- Microsoft SQL Server (JTDs Driver) - Microsoft SQL Server (JTDs Driver)
- Microsoft SQL Server (JTDs Driver) - Microsoft SQL Server (JTDs Driver)
- Oracle NG (JNDI) - Oracle Database (JNDI)
- PostgreSQL - PostgreSQL Database
- PostgreSQL (JNDI) - PostgreSQL Database (JNDI)
- Properties - Allows access to Java Property files containing Feature information
- Shapefile - ESRI(tm) Shapefiles (*.shp)
- Web Feature Server (NG) - Provides access to the Features published a Web Feature Service, and the
5. Select the “Publish” button for one of the layers and the next screen will be displayed where you can enter metadata for this layer. Since we will be managing this metadata in GeoNode, we can leave these alone for now.

6. The things that must be specified are the Declared SRS and you must select the “Compute from Data” and “Compute from native bounds” links after the SRS is specified.

7. Click save and this layer will now be configured for use in your GeoServer.

8. The next step is to configure these layers in GeoNode. The `updatelayers` management command can be used for this purpose. As with `importlayers`, it's useful to look at the command line options for this command by passing the `--help` option

   Run

   ```
   DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers --help
   ```

   **Note:** If you enabled `local_settings.py` the command will change as following:

   ```
   DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py updatelayers --help
   ```

   This will produce output that looks like the following:

   ```
   usage: manage.py updatelayers [-h] [--version] [-v {0,1,2,3}] [-P PYTHONPATH] [--settings SETTINGS] [--pythonpath PYTHONPATH]
   ```

   (continues on next page)
**Keywords**

Current Keywords
- 1_SARMIENTO_ENERO_2018

New Keyword

Vocabulary

Add Keyword

**Metadata links**

No metadata links so far

**Data links**

No data links so far

**Coordinate Reference Systems**

Native SRS
- EPSG:4326

Declared SRS
- EPSG:4326

SRS handling
- Force declared

**Bounding Boxes**

Native Bounding Box

<table>
<thead>
<tr>
<th>Min X</th>
<th>Min Y</th>
<th>Max X</th>
<th>Max Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-69.07843273</td>
<td>-45.60003889</td>
<td>-69.057923871999</td>
<td>-45.579602872</td>
</tr>
</tbody>
</table>

Compute from data
Compute from SRS bounds

Lat/Lon Bounding Box

<table>
<thead>
<tr>
<th>Min X</th>
<th>Min Y</th>
<th>Max X</th>
<th>Max Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-69.07843273</td>
<td>-45.60003889</td>
<td>-69.057923871999</td>
<td>-45.579602872</td>
</tr>
</tbody>
</table>

Compute from native bounds

**Curved geometries control**

---

1.25. GeoNode Management Commands
Update the GeoNode application with data from GeoServer

optional arguments:
-h, --help show this help message and exit
--version show program's version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3} Verbosity level; 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
--settings SETTINGS The Python path to a settings module, e.g. "myproject.settings.main". If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
--pythonpath PYTHONPATH A directory to add to the Python path, e.g. "/home/djangoprojects/myproject".
--traceback Raise on CommandError exceptions
--no-color Don't colorize the command output.
-i, --ignore-errors Stop after any errors are encountered.
--skip-unadvertised Skip processing unadvertised layers from GeoServer.
--skip-geonode-registered Just processing GeoServer layers still not in GeoNode.
--remove-deleted Remove GeoNode layers that have been deleted from GeoServer.
-u USER, --user USER Name of the user account which should own the imported layers
-f FILTER, --filter FILTER Only update data the layers that match the given filter
-s STORE, --store STORE Only update data the layers for the given geoserver store name
-w WORKSPACE, --workspace WORKSPACE Only update data on specified workspace
-p PERMISSIONS, --permissions PERMISSIONS Permissions to apply to each layer

Warning: One of the --workspace or --store must be always specified if you want to ingest Layers belonging to a specific Workspace. As an instance, in order to ingest the layers present into the geonode workspace, you will need to specify the option -w geonode.
9. Let's ingest the layer geonode:_1_SARMIENTO ENERO_2018 from the geonode workspace.

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers -w
˓→geonode -f _1_SARMIENTO_ENERO_2018
```

Inspecting the available layers in GeoServer ...

Found 1 layers, starting processing

Content-Type: text/html; charset="utf-8"
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit
Subject: [master.demo.geonode.org] A new layer has been uploaded
From: webmaster@localhost
To: mapadeldelito@chubut.gov.ar
Reply-To: webmaster@localhost
Date: Tue, 08 Oct 2019 12:26:17 -0000
Message-ID: <20191008122617.28801.94967@d3cf85425231>

<body>
You have received the following notice from master.demo.geonode.org:
<p>
The user <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i> uploaded the following layer:<br/>
  _1_SARMIENTO_ENERO_2018<br/>
You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018
</p>
<p>
To change how you receive notifications, please go to http://master.demo.geonode.org
</p>
</body>
You have received the following notice from master.demo.geonode.org:

The user <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i> uploaded the following layer:<br/>
<strong>_1_SARMIENTO_ENERO_2018</strong><br/>
You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

-----------
Content-Type: text/html; charset="utf-8"
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit
Subject: [master.demo.geonode.org] A new layer has been uploaded
From: webmaster@localhost
To: fmgagliano@gmail.com
Reply-To: webmaster@localhost
Date: Tue, 08 Oct 2019 12:26:17 -0000
Message-ID: <20191008122617.28801.26265@d3cf85425231>

You have received the following notice from master.demo.geonode.org:

The user <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i> uploaded the following layer:<br/>
<strong>_1_SARMIENTO_ENERO_2018</strong><br/>
You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

-----------
Found geoserver resource for this layer: _1_SARMIENTO_ENERO_2018
... Creating Default Resource Links for Layer [geonode:_1_SARMIENTO_ENERO_2018]
-- Resource Links[Prune old links]...
-- Resource Links[Prune old links]...done!
-- Resource Links[Compute parameters for the new links]...
You have received the following notice from master.demo.geonode.org:

The following layer was updated:

**_1_SARMIENTO_ENERO_2018**

owned by

You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org
You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

You have received the following notice from master.demo.geonode.org:

The following layer was updated:

1_SARMIENTO_ENERO_2018, owned by <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i>

You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

-----

Content-Type: text/html; charset=UTF-8
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit
Subject: [master.demo.geonode.org] A layer has been updated
From: webmaster@localhost
To: fmgagliano@gmail.com
Reply-To: webmaster@localhost
Date: Tue, 08 Oct 2019 12:26:20 -0000
Message-ID: <20191008122620.28801.58585@d3cf85425231>

You have received the following notice from master.demo.geonode.org:

The following layer was updated:

1_SARMIENTO_ENERO_2018, owned by <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i>

You can visit the layer's detail page here: http://master.demo.geonode.org/layers/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

-----

Found geoserver resource <strong>for</strong> this layer: _1_SARMIENTO_ENERO_2018

FutureWarning: The behavior of this method will change in future versions. Use specific '<code>len(elem)</code>' or '<code>elem is not None</code>' test instead.

if not user_style:

FutureWarning: The behavior of this method will change in future versions. Use specific '<code>len(elem)</code>' or '<code>elem is not None</code>' test instead.

if user_style:

... Creating Default Resource Links <strong>for</strong> Layer [geonode:_1_SARMIENTO_ENERO_2018]

-- Resource Links[Prune old links]...
-- Resource Links[Prune old links]...done!
-- Resource Links[Compute parameters <strong>for</strong> the new links]...
-- Resource Links[Create Raw Data download link]...
Note: In case you don’t specify the -f option, the layers that already exist in your GeoNode will be just updated and the configuration synchronized between GeoServer and GeoNode.

Warning: When updating from GeoServer, the configuration on GeoNode will be changed!

Using GDAL and OGR to convert your Data for use in GeoNode

GeoNode supports uploading data in ESRI shapefiles, GeoTIFF, CSV, GeoJSON, ASCII-GRID and KML / KMZ formats (for the last three formats only if you are using the geonode.importer backend).

• If your data is in other formats, you will need to convert it into one of these formats for use in GeoNode.

• If your Raster data is not correctly processed, it might be almost unusable with GeoServer and GeoNode. You will need to process it using GDAL.

You need to make sure that you have the GDAL library installed on your system. On Ubuntu you can install this package with the following command:

```
sudo apt-get install gdal-bin
```

OGR (Vector Data)

OGR is used to manipulate vector data. In this example, we will use MapInfo .tab files and convert them to shapefiles with the ogr2ogr command. We will use sample MapInfo files from the website linked below.

http://services.land.vic.gov.au/landchannel/content/help?name=sampledata

You can download the Admin:(Postcode) layer by issuing the following command:

```
```

You will need to unzip this dataset by issuing the following command:
$ unzip admin_postcode_vm.zip

This will leave you with the following files in the directory where you executed the above commands:

|-- ANZVI0803003025.htm
|-- DSE_Data_Access_Licence.pdf
|-- VMADMIN.POSTCODE_POLYGON.xml
|-- admin_postcode_vm.zip
  -- vicgrid94
    -- mif
      -- lga_polygon
        -- macedon\ ranges
          |-- EXTRACT_POLYGON.mid
          |-- EXTRACT_POLYGON.mif
          -- VMADMIN
            |-- POSTCODE_POLYGON.mid
            -- POSTCODE_POLYGON.mif

First, let's inspect this file set using the following command:

$ ogrinfo -so vicgrid94/mif/lga_polygon/macedon\ ranges/VMADMIN/POSTCODE_POLYGON.mid

The output will look like the following:

Had to open data source read-only.
INFO: Open of `vicgrid94/mif/lga_polygon/macedon\ ranges/VMADMIN/POSTCODE_POLYGON.mid'
  using driver 'MapInfo File' successful.

Layer name: POSTCODE_POLYGON
Geometry: 3D Unknown (any)
Feature Count: 26
Extent: (2413931.249367, 2400162.366186) - (2508952.174431, 2512183.046927)
Layer SRS WKT:
  PROJCS["unnamed",
    GEOGCS["unnamed",
      DATUM["GDA94",
        SPHEROID["GRS 80",6378137,298.257222101],
        TOWGS84[0,0,0,-0,-0,-0,0]],
      PRIMEM["Greenwich",0],
      UNIT["degree",0.0174532925199433]],
    PROJECTION["Lambert_Conformal_Conic_2SP"],
    PARAMETER["standard_parallel_1",-36],
    PARAMETER["standard_parallel_2",-38],
    PARAMETER["latitude_of_origin",-37],
    PARAMETER["central мерidian",145],
    PARAMETER["false_easting",2500000],
    PARAMETER["false_northing",2500000],
    UNIT["Meter",1]]
  PFI: String (10.0)
  POSTCODE: String (4.0)
  FEATURE_TYPE: String (6.0)
  FEATURE_QUALITY_ID: String (20.0)
  PFI_CREATED: Date (10.0)
  UFI: Real (12.0)
  UFI_CREATED: Date (10.0)
  UFI_OLD: Real (12.0)
This gives you information about the number of features, the extent, the projection and the attributes of this layer.

Next, let's go ahead and convert this layer into a shapefile by issuing the following command:

```
$ ogr2ogr -t_srs EPSG:4326 postcode_polygon.shp vicgrid94/mif/lga_polygon/macedon\_\_\_ranges/VMADMIN/POSTCODE_POLYGON.mid POSTCODE_POLYGON
```

Note that we have also reprojected the layer to the WGS84 spatial reference system with the \(-t\_srs\) ogr2ogr option.

The output of this command will look like the following:

```
Warning 6: Normalized/laundered field name: 'FEATURE_TYPE' to 'FEATURE_TY'
Warning 6: Normalized/laundered field name: 'FEATURE_QUALITY_ID' to 'FEATURE_QU'
Warning 6: Normalized/laundered field name: 'PFI_CREATED' to 'PFI_CREATE'
Warning 6: Normalized/laundered field name: 'UFI_CREATED' to 'UFI_CREATE'
```

This output indicates that some of the field names were truncated to fit into the constraint that attributes in shapefiles are only 10 characters long.

You will now have a set of files that make up the postcode_polygon.shp shapefile set. We can inspect them by issuing the following command:

```
$ ogrinfo -so postcode_polygon.shp postcode_polygon
```

The output will look similar to the output we saw above when we inspected the MapInfo file we converted from:

```
INFO: Open of `postcode_polygon.shp'
    using driver `ESRI Shapefile' successful.
Layer name: postcode_polygon
Geometry: Polygon
Feature Count: 26
Extent: (144.030296, -37.898156) - (145.101137, -36.888878)
Layer SRS WKT:
GEOGCS["GCS_WGS_1984",DATUM["WGS_1984",SPHEROID["WGS_84",6378137,298.257223563]],PRIMEM["Greenwich",0],UNIT["Degree",0.017453292519943295]]
PFI: String (10.0)
POSTCODE: String (4.0)
FEATURE_TY: String (6.0)
FEATURE_QU: String (20.0)
PFI_CREATED: Date (10.0)
UFI: Real (12.0)
UFI_CREATE: Date (10.0)
UFI_OLD: Real (12.0)
```

These files can now be loaded into your GeoNode instance via the normal uploader.

Visit the upload page in your GeoNode, drag and drop the files that compose the shapefile that you have generated using the GDAL ogr2ogr command (postcode_polygon.dbf, postcode_polygon.prj, postcode_polygon.shp, postcode_polygon.shx). Give the permissions as needed and then click the “Upload files” button.

As soon as the import process completes, you will have the possibility to go straight to the layer info page (“Layer Info” button), or to edit the metadata for that layer (“Edit Metadata” button), or to manage the styles for that layer (“Manage Styles”).
GDAL (Raster Data)

Let’s see several examples on how to either convert raster data into different formats and/or process it to get the best performances.

References:

a) https://geoserver.geo-solutions.it/edu/en/raster_data/processing.html
b) https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/

Raster Data Conversion: Arc/Info Binary and ASCII Grid data into GeoTIFF format.

Let’s assume we have a sample ASCII Grid file compressed as an archive.

```
# Un-tar the files
tar -xvf sample_asc.tar
```

You will be left with the following files on your filesystem:

```
|-- batemans_ele
    |-- dblbnd.adf
    |-- hdr.adf
    |-- metadata.xml
    |-- prj.adf
    |-- sta.adf
    |-- w001001.adf
    |-- w001001x.adf
    |-- batemans_elevation.asc
```

The file `batemans_elevation.asc` is an Arc/Info ASCII Grid file and the files in the batemans_ele directory are an Arc/Info Binary Grid file.

You can use the `gdalinfo` command to inspect both of these files by executing the following command:

```
gdalinfo batemans_elevation.asc
```

The output should look like the following:

```
Driver: AAIGrid/Arc/Info ASCII Grid
Files: batemans_elevation.asc
Size is 155, 142
Coordinate System is '
Origin = (239681.000000000000000,6050551.000000000000000)
Pixel Size = (100.000000000000000,-100.000000000000000)
Corner Coordinates:
Upper Left ( 239681.000, 6050551.000)
Lower Left ( 239681.000, 6036351.000)
Upper Right ( 255181.000, 6050551.000)
Lower Right ( 255181.000, 6036351.000)
Center ( 247431.000, 6043451.000)
Band 1 Block=155x1 Type=Float32, ColorInterp=Undefined
NoData Value=-9999
```

You can then inspect the batemans_ele files by executing the following command:

```
gdalinfo batemans_elevation.asc
```
You will notice that the `batemans_elevation.asc` file does not contain projection information while the `batemans_ele` file does. Because of this, let's use the `batemans_ele` files for this exercise and convert them to a GeoTiff for use in GeoNode. We will also reproject this file into WGS84 in the process. This can be accomplished with the following command.

```
gdalwarp -t_srs EPSG:4326 batemans_ele batemans_ele.tif
```

The output will show you the progress of the conversion and when it is complete, you will be left with a `batemans_ele.tif` file that you can upload to your GeoNode.

You can inspect this file with the `gdalinfo` command:

```
gdalinfo batemans_ele.tif
```

Which will produce the following output:
GeoNode Documentation, Release 2.10

Driver: GTiff/GeoTIFF
Files: batemans_ele.tif
Size is 174, 130
Coordinate System is:
GEOGCS["WGS 84",
    DATUM["WGS_1984",
        SPHEROID["WGS 84",6378137.298.257223563,
            AUTHORITY["EPSG","7030"]],
        AUTHORITY["EPSG","6326"]],
    PRIMEM["Greenwich",0],
    UNIT["degree",0.0174532925199433],
    AUTHORITY["EPSG","4326"]]
Origin = (150.119938943722502,-35.654598806259330)
Pixel Size = (0.001011114155919,-0.001011114155919)
Metadata:
    AREA_OR_POINT=Area
Image Structure Metadata:
    INTERLEAVE=BAND
Corner Coordinates:
Upper Left ( 150.1199389, -35.6545988) (150d 7'11.78"E, 35d39'16.56"S)
Lower Left ( 150.1199389, -35.7860436) (150d 7'11.78"E, 35d47' 9.76"S)
Upper Right ( 150.2958728, -35.6545988) (150d17'45.14"E, 35d39'16.56"S)
Lower Right ( 150.2958728, -35.7860436) (150d17'45.14"E, 35d47' 9.76"S)
Center ( 150.2079059, -35.7203212) (150d12'28.46"E, 35d43'13.16"S)
Band 1 Block=174x11 Type=Float32, ColorInterp=Gray

Raster Data Optimization: Optimizing and serving big raster data

(ref: https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html)

When dealing with big raster datasets it could be very useful to use tiles.

Tiling allows large raster datasets to be broken-up into manageable pieces and are fundamental in defining and implementing an higher level raster I/O interface.

In this example we will use the original dataset of the chiangMai_ortho_optimized public raster layer which is currently available on the Thai CHIANG MAI Urban Flooding GeoNode platform.

This dataset contains an orthorectified image stored as RGBA GeoTiff with 4 bands, three bands for the RGB and one for transparency (the alpha channel).

Calling the gdalinfo command to see detailed information:

gdalinfo chiangMai_ortho.tif

It will produce the following results:

Driver: GTiff/GeoTIFF
Files: chiangMai_ortho.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
    GEOGCS["WGS 84",
        DATUM["WGS_1984",
            SPHEROID["WGS 84",6378137.298.257223563,
                AUTHORITY["EPSG","7030"]],
            AUTHORITY["EPSG","6326"]],
        PRIMEM["Greenwich",0],
        UNIT["degree",0.0174532925199433],
        AUTHORITY["EPSG","4326"]],
    AUTHORITY["EPSG","6326"]],
    UNIT["degree",0.0174532925199433],
    AUTHORITY["EPSG","4326"]]
Origin = (150.119938943722502,-35.654598806259330)
Pixel Size = (0.001011114155919,-0.001011114155919)
Metadata:
    AREA_OR_POINT=Area
Image Structure Metadata:
    INTERLEAVE=BAND
Corner Coordinates:
Upper Left ( 150.1199389, -35.6545988) (150d 7'11.78"E, 35d39'16.56"S)
Lower Left ( 150.1199389, -35.7860436) (150d 7'11.78"E, 35d47' 9.76"S)
Upper Right ( 150.2958728, -35.6545988) (150d17'45.14"E, 35d39'16.56"S)
Lower Right ( 150.2958728, -35.7860436) (150d17'45.14"E, 35d47' 9.76"S)
Center ( 150.2079059, -35.7203212) (150d12'28.46"E, 35d43'13.16"S)
Band 1 Block=174x11 Type=Float32, ColorInterp=Gray

(continues on next page)
As you can see, this GeoTiff has not been tiled. For accessing subsets though, tiling can make a difference. With tiling, data are stored and compressed in blocks (tiled) rather than line by line (stripped).

In the command output above it is visible that each band has blocks with the same width of the image (63203) and a unit length. The grids in the picture below show an image with equally sized tiles (left) and the same number of strips (right). To read data from the red subset, the intersected area will have to be decompressed.

In the tiled image we will have to decompress only 16 tiles, whereas in the stripped image on the right we’ll have to decompress many more strips.

Drone images data usually have a stripped structure so, in most cases, they need to be optimized to increase performances.

Let’s take a look at the `gdal_translate` command used to optimize our GeoTiff:

| PRIMEM | "Greenwich", 0,
| AUTHORITY | ["EPSG", "8901"]],
| UNIT | "degree", 0.0174532925199433,
| AUTHORITY | ["EPSG", "9122"]],
| AUTHORITY | ["EPSG", "4326"]],

| PROJECTION | ["Transverse_Mercator"],
| PARAMETER | ["latitude_of_origin", 0],
| PARAMETER | ["central_meridian", 99],
| PARAMETER | ["scale_factor", 0.9996],
| PARAMETER | ["false_easting", 500000],
| PARAMETER | ["false_northing", 0],
| UNIT | ["metre", 1],
| AUTHORITY | ["EPSG", "9001"]],

| AXIS | ["Easting", EAST],
| AXIS | ["Northing", NORTH],
| AUTHORITY | ["EPSG", "32647"]

Origin = (487068.774750000040513, 2057413.889810000080615)
Pixel Size = (0.028850000000000, -0.028850000000000)
Metadata:
AREA_OR_POINT = Area
TIFFTAG_SOFTWARE = pix4dmapper
Image Structure Metadata:
COMPRESSION = LZW
INTERLEAVE = PIXEL
Corner Coordinates:
Upper Left (487068.775, 2057413.890) (98d52'38.72"E, 18d36'27.34"N)
Lower Left (487068.775, 2055503.702) (98d52'38.77"E, 18d35'25.19"N)
Upper Right (488892.181, 2057413.890) (98d53'40.94"E, 18d36'27.38"N)
Lower Right (488892.181, 2055503.702) (98d53'40.98"E, 18d35'25.22"N)
Center (487980.478, 2056458.796) (98d53'9.85"E, 18d35'56.28"N)
Band 1 Block = 63203x1 Type = Byte, ColorInterp = Red
NoData Value = -10000
Mask Flags: PER_DATASET ALPHA
Band 2 Block = 63203x1 Type = Byte, ColorInterp = Green
NoData Value = -10000
Mask Flags: PER_DATASET ALPHA
Band 3 Block = 63203x1 Type = Byte, ColorInterp = Blue
NoData Value = -10000
Mask Flags: PER_DATASET ALPHA
Band 4 Block = 63203x1 Type = Byte, ColorInterp = Alpha
NoData Value = -10000

As you can see, this GeoTiff has not been tiled. For accessing subsets though, tiling can make a difference. With tiling, data are stored and compressed in blocks (tiled) rather than line by line (stripped).

In the command output above it is visible that each band has blocks with the same width of the image (63203) and a unit length. The grids in the picture below show an image with equally sized tiles (left) and the same number of strips (right). To read data from the red subset, the intersected area will have to be decompressed.

In the tiled image we will have to decompress only 16 tiles, whereas in the stripped image on the right we’ll have to decompress many more strips.

Drone images data usually have a stripped structure so, in most cases, they need to be optimized to increase performances.

Let’s take a look at the `gdal_translate` command used to optimize our GeoTiff:
gdal_translate --co TILED=YES --co COMPRESS=JPEG --co PHOTOMETRIC=YCBCR
--config GDAL_TIFF_INTERNAL_MASK YES -b 1 -b 2 -b 3 -mask 4
chiangMai_ortho.tif
chiangMai_ortho_optimized.tif

Note: For the details about the command parameters see https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html

Once the process ended, call the gdalinfo command on the resulting tif file:

gdalinfo chiangMai_ortho_optimized.tif

The following should be the results:

Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
  GEOGCS["WGS 84",
    DATUM["WGS_1984",
      SPHEROID["WGS 84",6378137,298.257223563,
        AUTHORITY["EPSG","7030"]],
      AUTHORITY["EPSG","6326"]],
    PRIMEM["Greenwich",0,
      AUTHORITY["EPSG","8901"]],
    UNIT["degree",0.0174532925199433,
      AUTHORITY["EPSG","9122"]],
    AUTHORITY["EPSG","4326"]],
  PROJECTION["Transverse_Mercator"],
  PARAMETER["latitude_of_origin",0],
  PARAMETER["central_meridian",99],
  PARAMETER["scale_factor",0.9996],
  PARAMETER["false_easting",500000],
  PARAMETER["false_northing",0],
  UNIT["metre",1],
]
Our GeoTiff is now tiled with 256x256 tiles, has 3 bands and a 1-bit mask for no data.

We can also add internal overviews to the file using the gdaladdo command:

```
$ gdaladdo -r average chiangMai_ortho_optimized.tif 2 4 8 16 32 64 128 256 512
```

Overviews are duplicate versions of your original data, but resampled to a lower resolution, they can also be compressed with various algorithms, much in the same way as the original dataset.

By default, overviews take the same compression type and transparency masks of the input dataset (applied through the gdal_translate command), so the parameters to be specified are:

- `-r average`: computes the average of all non-NODATA contributing pixels
- `2 4 8 16 32 64 128 256 512`: the list of integral overview levels to build (from gdal version 2.3 levels are no longer required to build overviews)

Calling the gdalinfo command again:

```
$ gdalinfo chiangMai_ortho_optimized.tif
```

It results in:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
    GEOGCS["WGS 84",
```
DATUM["WGS_1984"],
  SPHEROID["WGS 84", 6378137, 298.257223563,
    AUTHORITY["EPSG","7030"],
    AUTHORITY["EPSG","6326"],
  PRIMEM["Greenwich",0,
    AUTHORITY["EPSG","8901"],
  UNIT["degree",0.0174532925199433,
    AUTHORITY["EPSG","9122"],
    AUTHORITY["EPSG","4326"],
  PROJECTION["Transverse_Mercator"],
  PARAMETER["latitude_of_origin",0],
  PARAMETER["central_meridian",99],
  PARAMETER["scale_factor",0.9996],
  PARAMETER["false_easting",500000],
  PARAMETER["false_northing",0],
  UNIT["metre",1,
    AUTHORITY["EPSG","9001"],
  PROJECTION["Transverse_Mercator"],
  PARAMETER["latitude_of_origin",0],
  PARAMETER["central_meridian",99],
  PARAMETER["scale_factor",0.9996],
  PARAMETER["false_easting",500000],
  PARAMETER["false_northing",0],
  UNIT["metre",1,
    AUTHORITY["EPSG","9001"],
  AXIS["Easting",EAST],
  AXIS["Northing",NORTH],
  AUTHORITY["EPSG","32647"]]

Origin = (487068.774750000040513, 2057413.889810000080615)
Pixel Size = (0.028850000000000, -0.028850000000000)
Metadata:
AREA_OR_POINT/Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=YCbCr JPEG
INTERLEAVE=PIXEL
SOURCE_COLOR_SPACE=YCbCr
Corner Coordinates:
Upper Left (487068.775, 2057413.890) (98d52'38.72"E, 18d36'27.34"N)
Lower Left (487068.775, 2055503.702) (98d52'38.77"E, 18d35'25.19"N)
Upper Right (488892.181, 2057413.890) (98d53'40.94"E, 18d36'27.38"N)
Lower Right (488892.181, 2055503.702) (98d53'40.98"E, 18d35'25.22"N)
Center (487980.478, 2056458.796) (98d53'9.85"E, 18d35'56.28"N)
Band 1 Block=256x256 Type=Byte, ColorInterp=Red
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Band 2 Block=256x256 Type=Byte, ColorInterp=Green
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Band 3 Block=256x256 Type=Byte, ColorInterp=Blue
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130

1.25. GeoNode Management Commands
Notice that the transparency masks of internal overviews have been applied (their compression does not show up in the file metadata).

UAVs usually provide also two other types of data: DTM (Digital Terrain Model) and DSM (Digital Surface Model).

Those data require different processes to be optimized. Let’s look at some examples to better understand how to use gdal to accomplish that task.

From the CHIANG MAI Urban Flooding GeoNode platform it is currently available the chiangMai_dtm_optimized layer, let’s download its original dataset.

This dataset should contain the DTM file chiangMai_dtm.tif.

Calling the gdalinfo command on it:

```bash
gdalinfo chiangMai_dtm.tif
```

The following information will be displayed:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_dtm.tif
Size is 12638, 13240
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
  GEOGCS["WGS 84",
    DATUM["WGS_1984"],
    SPHEROID["WGS 84",6378137,298.257223563,
      AUTHORITY["EPSG","7030"]],
    AUTHORITY["EPSG","6326"]],
    PRIMEM["Greenwich",0,
      AUTHORITY["EPSG","8901"]],
    UNIT["degree",0.0174532925199433,
      AUTHORITY["EPSG","9122"]],
    AUTHORITY["EPSG","4326"]],
    PROJECTION["Transverse_Mercator"],
    PARAMETER["latitude_of_origin",0],
    PARAMETER["central_meridian",99],
    PARAMETER["scale_factor",0.9996],
    PARAMETER["false_easting",500000],
    PARAMETER["false_northing",0],
    UNIT["metre",1,
      AUTHORITY["EPSG","9001"]],
    AXIS["Easting",EAST],
    AXIS["Northing",NORTH],
    AUTHORITY["EPSG","32647"]]
Origin = (487068.774750000040513,2057413.889810000080615)
Pixel Size = (0.144270000000000,-0.144270000000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=LZW
INTERLEAVE=BAND
Corner Coordinates:
Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left ( 487068.775, 2055503.755) ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.059, 2057413.890) ( 98d53'40.94"E, 18d36'27.37"N)
Lower Right ( 488892.059, 2055503.755) ( 98d53'40.98"E, 18d35'25.22"N)
```
Center (487980.417, 2056458.822) (98d53' 9.85"E, 18d35'56.28"N)
Band 1 Block=12638x1 Type=Float32, ColorInterp=Gray
NoData Value=-10000

Reading this image could be very slow because it has not been tiled yet. So, as discussed above, its data need to be
stored and compressed in tiles to increase performances.

The following gdal_translate command should be appropriate for that purpose:

```bash
gdal_translate -co TILED=YES -co COMPRESS=DEFLATE chiangMai_dtm.tif chiangMai_dtm_optimized.tif
```

When the data to compress consists of imagery (es. aerial photographs, true-color satellite images, or colored maps)
you can use lossy algorithms such as JPEG. We are now compressing data where the precision is important, the band
data type is Float32 and elevation values should not be altered, so a lossy algorithm such as JPEG is not suitable.
JPEG should generally only be used with Byte data (8 bit per channel) so we have choosen the lossless DEFLATE
compression through the COMPRESS=DEFLATE creation option.

Calling the gdalinfo command again:

```bash
gdalinfo chiangMai_dtm_optimized.tif
```

We can observe the following results:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_dtm_optimized.tif
Size is 12638, 13240
Coordinate System is:
PROJCS"WGS 84 / UTM zone 47N",
   GEOGCS"WGS 84",
   DATUM["WGS_1984",
       SPHEROID["WGS 84",6378137,298.257223563,
           AUTHORITY["EPSG","7030"],
           AUTHORITY["EPSG","6326"],
           PRIMEM["Greenwich",0,
               AUTHORITY["EPSG","8901"],
           UNIT["degree",0.0174532925199433,
               AUTHORITY["EPSG","9122"],
               AUTHORITY["EPSG","4326"],
           PROJECTION["Transverse_Mercator"],
           PARAMETER["latitude_of_origin",0],
           PARAMETER["central_meridian",99],
           PARAMETER["scale_factor",0.9996],
           PARAMETER["false_easting",500000],
           PARAMETER["false_northing",0],
           UNIT["metre",1,
               AUTHORITY["EPSG","9001"],
           AXIS["Easting",EAST],
           AXIS["Northing",NORTH],
           AUTHORITY["EPSG","32647"],
           ORIGIN = (487068.774750000040513,2057413.889810000080615)
           Pixel Size = (0.144270000000000,-0.144270000000000)
           Metadata:
           AREA_OR_POINT=Area
           TIFFTAG_SOFTWARE=px4dmapper
           Image Structure Metadata:
           COMPRESSION=DEFLATE
```

(continues on next page)
We need also to create overviews through the `gdaladdo` command:

```
gdaladdo -r nearest chiangMai_dtm_optimized.tif 2 4 8 16 32 64
```

Unlike the previous example, overviews will be created with the **nearest resampling algorithm**. That is due to the nature of the data we are representing: we should not consider the average between two elevation values but simply the closer one, it is more reliable regarding the conservation of the original data.

Calling the `gdalinfo` command again:

```
gdalinfo chiangMai_dtm_optimized.tif
```

We can see the following information:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_dtm_optimized.tif
Size is 12638, 13240
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
    GEOGCS["WGS 84",
        DATUM["WGS_1984",
            SPHEROID["WGS 84",6378137,298.257223563,
                AUTHORITY["EPSG","7030"]],
            AUTHORITY["EPSG","6326"]],
        PRIMEM["Greenwich",0,
            AUTHORITY["EPSG","8901"]],
        UNIT["degree",0.0174532925199433,
            AUTHORITY["EPSG","9122"]],
        AUTHORITY["EPSG","4326"]],
    PROJECTION["Transverse_Mercator"],
    PARAMETER["latitude_of_origin",0],
    PARAMETER["central_meridian",99],
    PARAMETER["scale_factor",0.9996],
    PARAMETER["false_easting",500000],
    PARAMETER["false_northing",0],
    UNIT["metre",1,
        AUTHORITY["EPSG","9001"]],
    AXIS["Easting",EAST],
    AXIS["Northing",NORTH],
    AUTHORITY["EPSG","32647"]]
Origin = (487068.774750000040513,2057413.889810000080615)
Pixel Size = (0.144270000000000,-0.144270000000000)
```

(continues on next page)
INTERLEAVE=BAND
Corner Coordinates:
Upper Left  ( 487068.775, 2057413.890)  ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left  ( 487068.775, 2055503.755)  ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.059, 2057413.890)  ( 98d53'40.94"E, 18d36'27.37"N)
Lower Right ( 488892.059, 2055503.755)  ( 98d53'40.98"E, 18d35'25.22"N)
Center      ( 487980.417, 2056458.822)  ( 98d53' 9.85"E, 18d35'56.28"N)
Band 1  Block=256x256  Type=Float32,  ColorInterp=Gray
NoData Value=-10000
Overviews: 6319x6620, 3160x3310, 1580x1655, 790x828, 395x414, 198x207

Overviews have been created. By default, they inherit the same compression type of the original dataset (there is no evidence of it in the gdalinfo output).

Other Raster Data Use Cases

- Serving a large number of GrayScale GeoTiff with Palette
- Serving a large number of DTM ASCII Grid Files
- Serving a large number of Cartographic Black/White GeoTiff with Palette
- Serving a large number of satellite/aerial RGB GeoTiff with compression
- Optimizing and serving UAV data
- Optimizing and serving 16-bits satellite/aerial RGB GeoTiff

Process Raster Datasets Programmatically

In this section we will provide a set of shell scripts which might be very useful to batch process a lot of raster datasets programmatically.

1. process_gray.sh

```bash
for filename in *.tif*; do
echo gdal_translate -co TILED=YES -co COMPRESS=DEFLATE $filename ${filename//.tif/.optimized.tif};
done >_gdal_translate.sh
cmd $ gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

```bash
for filename in *.optimized.tif*; do
echo gdaladdo -r nearest $filename _2 4 8 16 32 64 128 256 512; done > gdaladdo.sh
for filename in *.optimized.tif*; do
echo mv "/$filename" "/$filename//_optimized.tif/.tif";
done > rename.sh
chmod +x rename.sh
./gdaladdo.sh
./rename.sh
```

2. process_rgb.sh

```bash
for filename in *.tif*; do
echo gdal_translate -co TILED=YES -co COMPRESS=JPEG -co PHOTOMETRIC=YCBCR -b 1 -b 2 -b 3 $filename $${filename//.tif/.optimized.tif};
done > gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

1.25. GeoNode Management Commands
Your first step will be to create a user. There are three options to do so, depending on which kind of user you want to create you may choose a different option. We will start with creating a superuser, because this user is the most important. A superuser has all the permissions without explicitly assigning them.

The easiest way to create a superuser (in linux) is to open your terminal and type:

```
$ DJANGO_SETTINGS_MODULE=geonode.settings python manage.py createsuperuser
```

Note: If you enabled local_settings.py the command will change as following:
You will be asked a username (in this tutorial we will call the superuser you now create your_superuser), an email address and a password.

Now you’ve created a superuser you should become familiar with the Django Admin Interface. As a superuser you are having access to this interface, where you can manage users, layers, permission and more. To learn more detailed about this interface check this LINK. For now it will be enough to just follow the steps. To attend the Django Admin Interface, go to your geonode website and sign in with your_superuser. Once you’ve logged in, the name of your user will appear on the top right. Click on it and the following menu will show up:

```
Menu

- Upload Layers
- Profile
- Recent Activity
- Inbox
- Announcements
- Remote Services
- Invite User
- GeoServer
- Admin
- Help
```

Clicking on Admin causes the interface to show up.

Go to Auth -> Users and you will see all the users that exist at the moment. In your case it will only be your_superuser. Click on it, and you will see a section on Personal Info, one on Permissions and one on Important dates. For the
# Django administration

## Site administration

<table>
<thead>
<tr>
<th>Section</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Account deletions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signup codes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actstream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announcements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announcements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dismissals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avatar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avatars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact roles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metadata Regions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
moment, the section on Permissions is the most important.

As you can see, there are three boxes that can be checked and unchecked. Because you’ve created a superuser, all three boxes are checked as default. If only the box active would have been checked, the user would not be a superuser and would not be able to access the Django Admin Interface (which is only available for users with the staff status).

Therefore keep the following two things in mind:

- a superuser is able to access the Django Admin Interface and he has all permissions on the data uploaded to GeoNode.
- an ordinary user (created from the GeoNode interface) only has active permissions by default. The user will not have the ability to access the Django Admin Interface and certain permissions have to be added for him.

Until now we’ve only created superusers. So how do you create an ordinary user? You have two options:

1. Django Admin Interface

   First we will create a user via the Django Admin Interface because we’ve still got it open. Therefore go back to Auth -> Users and you should find a button on the right that says Add user.

   Click on it and a form to fill out will appear. Name the new user test_user, choose a password and click save at the right bottom of the site.

   Now you should be directed to the site where you could change the permissions on the user test_user. As default only active is checked. If you want this user also to be able to attend this admin interface you could also check staff status. But for now we leave the settings as they are!

   To test whether the new user was successfully created, go back to the GeoNode web page and try to sign in.

2. GeoNode website
To create an ordinary user you could also just use the GeoNode website. If you installed GeoNode using a release, you should see a Register button on the top, beside the Sign in button (you might have to log out before).

Hit the button and again a form will appear for you to fill out. This user will be named `geonode_user`.

By hitting Sign up the user will be signed up, as default only with the status `active`.

### 1.25.5 Batch Sync Permissions

GeoNode provides a very useful management command `set_layers_permissions` allowing an administrator to easily add / remove permissions to groups and users on one or more layers.

The `set_layers_permissions` command arguments are:

- **permissions** to set/unset -> read (r), write (w), download (d), owner (o)

```python
READ_PERMISSIONS = [ 'view_resourcebase'
]
WRITE_PERMISSIONS = [ 'change_layer_data',
    'change_layer_style',
    'change_resourcebase_metadata'
]
DOWNLOAD_PERMISSIONS = [ 'download_resourcebase'
]
OWNER_PERMISSIONS = [ 'change_resourcebase',
    'delete_resourcebase',
    'change_resourcebase_permissions',

(continues on next page)```
resources (layers) which permissions will be assigned on ➔ type the layer title (use quotation mark for titles with white space), multiple choices can be typed with white space separator, if no titles are provided all the layers will be considered

• users who permissions will be assigned to, multiple choices can be typed with a white space separator

• groups who permissions will be assigned to, multiple choices can be typed with a white space separator

• delete flag (optional) which means the permissions will be unset

Usage examples:

1. Assign write permissions on the layers layer_X and layer Y to the users user_A and user_B and to the group group_C.

   python manage.py set_layers-permissions -p write -u user_A user_B -g group_C -r layer_X 'layer Y'

2. Assign owner permissions on all the layers to the group group_C.

   python manage.py set_layers-permissions -p owner -g group_C

3. Unset download permissions on the layer layer_X for the user user_A.

   python manage.py set_layers-permissions -p download -u user_A -r layer_X -d

The same functionalities, with some limitations, are available also from the Admin Dashboard >> Layers.
An action named *Set layers permissions* is available from the list, redirecting the administrator to a form to set / unset read, write, download and ownership permissions on the selected layers.

1.26 Changing the default Languages

1.26.1 Changing the Default Language

GeoNode’s default language is English, but GeoNode users can change the interface language with the pulldown menu at the top-right of most GeoNode pages. Once a user selects a language GeoNode remembers that language for subsequent pages.

1.26.2 GeoNode Configuration

As root edit the `geonode/geonode/geonode/settings.py` (or `/etc/geonode/settings.py` if GeoNode has been installed using `apt-get`) and change `LANGUAGE_CODE` to the desired default language.

---

**Note:** A list of language codes can be found in the global django config file `/usr/local/lib/python2.7/dist-packages/django/conf/global_settings.py` (or `/var/lib/geonode/lib/python2.7/site-packages/django/conf/global_settings.py` if GeoNode has been installed using `apt-get`).

For example, to make French the default language use:

```
LANGUAGE_CODE = 'fr'
```
Unfortunately Django overrides this setting, giving the language setting of a user’s browser priority. For example, if \texttt{LANGUAGE\_CODE} is set to French, but the user has configured their operating system for Spanish they may see the Spanish version when they first visit GeoNode.

### 1.26.3 Additional Steps

If this is not the desired behaviour, and all users should initially see the default \texttt{LANGUAGE\_CODE}, regardless of their browser’s settings, do the following steps to ensure Django ignores the browser language settings. (Users can always use the pulldown language menu to change the language at any time.)

As \texttt{root} create a new directory within GeoNode’s site packages

\begin{verbatim}
mkdir /usr/lib/python2.7/dist-packages/setmydefaultlanguage
\end{verbatim}

or

\begin{verbatim}
mkdir /var/lib/geonode/lib/python2.7/site-packages/setmydefaultlanguage
\end{verbatim}

if GeoNode has been installed using \texttt{apt-get}.

As root create and edit a new file \texttt{/usr/lib/python2.7/dist-packages/setmydefaultlanguage/__init__.py} and add the following lines

```python
class ForceDefaultLanguageMiddleware(object):
    
    Ignore Accept-Language HTTP headers
    
    This will force the I18N machinery to always choose settings.LANGUAGE\_CODE
    as the default initial language, unless another one is set via sessions or cookies
    
    Should be installed *before* any middleware that checks request.META[\texttt{\textasciitilde HTTP\_ACCEPT\_\textasciitilde\_LANGUAGE'}],
    namely django.middleware.locale.LocaleMiddleware
    
    
    def process_request(self, request):
        if request.META.has_key('HTTP_ACCEPT\_LANGUAGE'):
            del request.META['HTTP_ACCEPT\_LANGUAGE']
```

At the end of the GeoNode configuration file \texttt{/home/geonode/geonode/geonode/settings.py} (or \texttt{/etc/geonode/settings.py} if GeoNode has been installed using \texttt{apt-get}) add the following lines to ensure the above class is executed

\begin{verbatim}
MIDDLEWARE\_CLASSES += {
    'setmydefaultlanguage.ForceDefaultLanguageMiddleware',
}
\end{verbatim}

### 1.26.4 Restart

You will need to restart GeoNode accordingly to the installation method you have choosen.

As an instance in case you are using \texttt{NGINX} with \texttt{UWSGI}, as root you will need to run the following commands

\begin{verbatim}
service uwsgi restart
service nginx restart
\end{verbatim}
Please refer to Translating GeoNode for information on editing GeoNode pages in different languages and create new GeoNode Translations.

### 1.27 GeoNode Upgrade from older versions

#### 1.27.1 Upgrade from 2.8.x

#### 1.27.2 Upgrade from 2.7.x

#### 1.27.3 Upgrade from 2.6.x

#### 1.27.4 Upgrade from 2.4.x

These are the notes of a migration from 2.4.x to 2.10.1. These notes could possibly work also when migrating from 2.6.x, 2.7.x, 2.8.x but were not tested in those scenarios. You should run this procedure on your local machine and once you successfully migrated the database move the backup to your GeoNode 2.10.1 production instance.

### PostgreSQL

Create a role and a database for Django GeoNode 2.4:

```sql
create role user with superuser login with password '***';
create database gn_24 with owner user;
c gn_24
create extension postgis;
```

Restore backup from your production backup:

```bash
psql gn_24 < gn_24.sql
```

### Run GeoNode migrations

Activate your GeoNode virtualenv and set the env vars:

```bash
.env/bin/Activate
e export vars_210
```

Here are the variables to export - update them to your environment settings:

```bash
export DATABASE_URL=postgis://user:***@localhost:5432/dbname
export DEFAULT_BACKEND_DATASTORE=data
export GEODATABASE_URL=postgis://user:***@localhost:5432/geonode_data
export ALLOWED_HOSTS="["localhost", '192.168.100.10']"
export STATIC_ROOT=~/www/geonode/static/
export GEOSERVER_LOCATION=http://localhost:8080/geoserver/
export GEOSERVER_PUBLIC_LOCATION=http://localhost:8080/geoserver/
export GEOSERVER_ADMIN_PASSWORD=geoserver
export SESSION_EXPIRED_CONTROL_ENABLED=False
```

Downgrade psycopg2:
Apply migrations and apply basic fixtures:

```
cd wfp-geonode
./manage.py migrate --fake-initial
paver sync
```

Regenerate from scratch the upload application tables in the database:

```
delete from django_migrations where app = 'upload';
drop table upload_upload cascade;
drop table upload_uploadfile;
```

Regenerate upload tables with migrate:

```
./manage.py migrate upload
```

Upgrade psycopg2:

```
pip install -r geonode/requirements.txt
```

Create superuser

To create a superuser you should drop the following constraints (they can be re-enabled if needed):

```
alter table people_profile alter column last_login drop not null;
```

```
./manage createsuperuser
```

Fixes on database

For some reason some resources were unpublished:

```
UPDATE base_resourcebase SET is_published = true;
```

Remove a foreign key from account_account which is not used anymore (GeoNode dev team: maybe even better let’s remove all of the account tables, I think they are stale now):

```
ALTER TABLE account_account DROP CONSTRAINT user_id_refs_id_726cb6b4;
ALTER TABLE account_signupcode DROP CONSTRAINT "inviter_id_refs_id_49a7c0d9";
```

Fix the remote service layers by running this script:

```
python migration/fixes_remote_layers.py
```
1.28 GeoNode Async Signals

1.28.1 Supervisord and Systemd

1.28.2 Celery

1.28.3 Rabbitmq and Redis

1.29 GeoNode add a thesaurus

1.29.1 Loading a thesaurus

You can add a thesaurus into you GeoNode using the `load_thesaurus` command:

```bash
python manage.py load_thesaurus --help
```

- `-d, --dry-run` Only parse and print the thesaurus file, without performing insertion in the DB.
- `--name=NAME` Identifier name for the thesaurus in this GeoNode instance.
- `--file=FILE` Full path to a thesaurus in RDF format.

In order to add the inspire-themes thesaurus into a geonode instance, download it as file `inspire-theme.rdf` with the command:

```bash
```

and then issue the command:

```bash
python manage.py load_thesaurus --file inspire-theme.rdf --name inspire_themes
```

The `name` is the identifier you’ll use to refer to this thesaurus in your GeoNode instance.

If you only want to make sure that a thesaurus file will be properly parsed, give the `--dry-run` parameter, so that nothing will be added to the DB.

**Note:** if the `name` starts with the string `fake`, the file will not be accessed at all, and some test keywords will be added to a fake new thesaurus. In this case the `dry-run` param will not be used.

1.29.2 Configure a thesaurus in GeoNode

After you loaded a thesaurus into GeoNode, it should be configured in the `settings.py` file (or in the `local_settings`) in this way:

```python
THESAURUS = {'name':'THESAURUS NAME', 'required':True|False, 'filter':True|False,}
```

- `name`: (mandatory string) the identifier you used in the `load_thesaurus` commands.
- `required`: (optional boolean) if True, a keyword of this thesaurus is mandatory to complete the metadata. *Currently not implemented.*
- `filter`: (optional boolean) if True, a faceted list of keywords of this thesaurus will be presented on the search page.
So, in order to set up the INSPIRE themes thesaurus you may set the THESAURUS value as:

```python
THESAURUS = {'name': 'inspire_themes', 'required': True, 'filter': True}
```

### 1.29.3 Apply a thesaurus to a resource

After you’ve finished the setup you should find a new input widget in each resource metadata wizard allowing you to choose a thesaurus for your resource.

After applying a thesaurus to resources those should be listed in the filter section in GeoNodes resource list views.

![Thesaurus Example](image)

### 1.30 Participate in the Discussion

### 1.31 Report Problems on the Issue Tracking System

### 1.32 Write Documentation

### 1.33 Provide Translations

#### 1.33.1 Contribute to Translations

Behind the scenes, GeoNode is using a software called GNU gettext further text-based translation files (django.po and djangojs.po) for translating content. If you’d like to know more about how all of this works you’ll find a full description at the Django Docs. Following will concentrate on what is needed for edit existing or contribute a new translation.

#### Download the translation File

All language files live in a specific subfolder called after their iso code within the `locale` folder. For example, for French, the main translation file called django.po can be downloaded from [here](https://example.com).

Next, to download the language file, we need to install an OpenSource Editor called “poedit” for editing from: [https://poedit.net/download](https://poedit.net/download)
**Translation process**

Make a copy of the file before starting the translation so that you can revert in case of errors.

After installing ‘poedit’, you should be able to double click on the ‘.po’ file to open it. Poedit’s interface should look similar to the one shown in the picture below:

![Translation Interface](image)

**Identifying translation issues**

From the ‘poedit’ menu ‘View’, make sure that ‘Entries with Errors first’ is checked:

Next click on ‘Validate Translations’ from the ‘Catalogue’ menu:

‘Poedit’ will place translations which may require additional consideration on top of the list. A warning mark means that the interpretation might be not entirely consistent with the original phrase. This is not necessarily an error, just a warning asking the user to double check.

Following to marked phrases, ‘Poedit’ will show untranslated sentences. When clicking on one, it can be translated through the bottom panel.

During translation pay special attention to the button saying ‘needs work’. In case this button is checked, the phrase will be marked as ‘fuzzy’ and ignored in GeoNode.
1.33. Provide Translations

- Entries with Errors First
- Validate Translations
<table>
<thead>
<tr>
<th>Source text</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>last modified</td>
<td>Dernière modification</td>
</tr>
<tr>
<td>The following styles are associated with this</td>
<td>Les styles suivants sont associés à cette couche.</td>
</tr>
<tr>
<td>layer. Choose a style to...</td>
<td>Choisissez un st...</td>
</tr>
<tr>
<td>last updated on</td>
<td>Dernière mise à jour sur</td>
</tr>
<tr>
<td>or select them one by one:</td>
<td>ou sélectionnez les un par un</td>
</tr>
<tr>
<td>Replace Layer:</td>
<td>Remplacer la couche :</td>
</tr>
<tr>
<td>Provide CRS for</td>
<td>Fournir des CRS pour</td>
</tr>
<tr>
<td>Editing details for</td>
<td>Modification des informations relatives</td>
</tr>
<tr>
<td>Or just go</td>
<td>Ou tout simplement aller</td>
</tr>
<tr>
<td>A rating was given to a map</td>
<td>Une évaluation a été donnée à une carte</td>
</tr>
<tr>
<td>over URL</td>
<td>URL over</td>
</tr>
<tr>
<td>local OWS</td>
<td>OWS local</td>
</tr>
<tr>
<td>Note: this map’s original metadata was populated</td>
<td>Note: les métadonnées originales de cette carte</td>
</tr>
<tr>
<td>by importing a m...</td>
<td>ont été remplies à...</td>
</tr>
<tr>
<td>An unknown error has occurred</td>
<td>Une erreur inconnue s’est produite</td>
</tr>
<tr>
<td>A party that accepts accountability and</td>
<td>Groupe qui accepte la responsabilité des</td>
</tr>
<tr>
<td>responsibility for the data an...</td>
<td>données et assure la mai...</td>
</tr>
<tr>
<td>You can use the login form at</td>
<td>Vous pouvez vous authentifier sur la page</td>
</tr>
<tr>
<td>Please go to resource page and assign the</td>
<td>d’authentification sur</td>
</tr>
<tr>
<td>download permissions...</td>
<td>S’il vous plait rendez-vous à la page de</td>
</tr>
<tr>
<td>Request to download a resource</td>
<td>télécharger la ressource</td>
</tr>
<tr>
<td>Demander pour télécharger la ressource</td>
<td>Needs Work</td>
</tr>
</tbody>
</table>

Translated: 946 of 946 (100 %)
Saving translations

As soon as the translation is complete, it must be saved and compiled. Saving is straightforward. All you have to do is clicking the ‘Save’ button from the top menu.

As a last step we compile the file. Compiling the translation means to create a binary “.mo” file out of the edited “.po” file. To do so, click on “Compile to MO”

Poedit will ask where to write the “.mo” file to, by default, this is the same folder as the edited ‘.po’ resides in. The ‘.mo’ file can be overwritten if necessary.

Push translations to the repository

For sharing our updates, we must upload the files to GeoNode’s GitHub repository. Go to the correct file position which, in case for French is: https://github.com/GeoNode/geonode/tree/master/geonode/locale/fr/LC_MESSAGES

Click on “Upload Files”

Drag the updated files into the Upload form, and write a title/description of the changes

Click on “Create a new branch for this commit…” and then click on the green button.

The last step will create a PULL REQUEST which can be reviewed and then approved by a developer.

Activate updated translation at your server

Once the files have been pushed to GitHub, it will be necessary to update your server to respect changed files.

At this time, this can be done only by an administrator. From the server ‘shell’ following commands need to be executed:

```
workon geonode
cd /opt/geonode

```
Drag files here to add them to your repository
Or choose your files
DJANGO_SETTINGS_MODULE=geonode.settings python -W ignore manage.py collectstatic --noinput
sudo service uwsgi restart

Texts not listed in .po files

In case you find a template output without corresponding translation you can add it as follows:

Identify the corresponding template file which is responsible for outputting the text. Add a \{% trans "TEXT" %\} tag. Save the template file and run the following:

django-admin makemessages -l en -d django -e "html,txt,py" -i docs
django-admin makemessages -l en -d djangojs -e "js" -i docs -i node_modules -i lib

This will update the english .po file. also to update the language which should be edited by settings the \-l fr parameter. Continue with updating the .po file as described above.

1.34 Write Code

1.35 Frontend Development

1.35.1 Frontend development

Knowledge of handling node/npm is required.

The GeoNode frontend dependencies can be found in ./geonode/static. To manage dependencies, we recommend the use of yarn package manager (https://yarnpkg.com/lang/en).

First steps:

yarn install
Installs the required libraries to ./node_modules

`yarn install <package>@version [--dev]`

Installs a package with a defined version. Using `--dev` installs a dependency that is only available for the build process (see: package.json devDependencies).

`yarn remove <package>`

Removes a package.

`yarn outdated`

Shows version information.

`yarn why <package>`

Get information on why this package was installed.

For further information on how to install or use please visit the official yarn documentation.

**File/Folder overview:**

`.static_dependencies.json`

includes all dependencies associated with each file. For example all files which should be minified to assets.min.js are named as values. All files that should be copied to lib folder (for DEBUG_STATIC) are values of key `other_dependencies` and so on. Before you can use a dependency it has to be added to package.json by use of yarn.

`.Gruntfile.js`

reads the dependencies from static_dependencies.json and contains all workflows.

**geonode/static/geonode**

The ./geonode folder contains GeoNode’s stylesheets and javascript files. The CSS files are generated via less. CSS files should therefore never be changed directly but it’s corresponding less file. Further this folder should never be deleted!

**geonode/static/lib**

The ./lib folder contains all the third-party files. This folder can be deleted as it will be fully generated by use of grunt
deployment|production

**Example 1 – Change styling:**

1. In your settings set `DEBU_STATIC=True`. This will load unminified assets in your template.
2. Start the development server with `paver start`.
3. Use `grunt watch` to watch all less files for change.
4. Change styling in ./geonode/static/geonode/less
5. If our changes are as expected create a new build with `grunt development` (files are not minimized) or `grunt production` (files are minimized)
Example 2 – add/update a new library:

1. In your settings set `DEBU_STATIC=True`. This will load unminified assets in your template.
2. yarn add angular@1.7
3. `vim static_dependencies.json` Edit the file and add your dependency to its fitting destination. For example, assets.min.js
4. Check if some Django template (for example, base.html) includes the file and add it or adjust the version
5. use `grunt production` to build the package

For further tasks have a look at gruntfile.js or ask for help in the development mailing list

Note: Please make maintainers work easier and add a message to your commit why a library has been added. (For example, commit `-m ‘select2 added for permissions form on layer detail page’`)

1.36 How to Develop

1.36.1 Start to develop with Docker

How to run the instance for development

Set the variable `SET_DOCKER_ENV` for development

```
vim .env
```

Change to

```
SET_DOCKER_ENV=development
```

Use dedicated docker-compose files while developing

Note: In this example we are going to keep `localhost` as the target IP for GeoNode

```
docker-compose -f docker-compose.async.yml -f docker-compose.development.yml up
```

How to debug

Note: We are supposing to use `ipdb` for debugging which is already available as package from the container

Stop the container for the `django` service:

```
docker-compose stop django
```
Run the container again with the option for *service ports*:

```bash
docker-compose run \   -e DOCKER_ENV=development \   -e IS_CELERY=False \   -e DEBUG=True \   -e GEONODE_LB_HOST_IP=localhost \   -e GEONODE_LB_PORT=80 \   -e SITEURL=http://localhost/ \   -e ALLOWED_HOSTS=['localhost', ']
   -e GEOSERVER_PUBLIC_LOCATION=http://localhost/geoserver/ 
   -e GEOSERVER_WEB_UI_LOCATION=http://localhost/geoserver/ 
   --rm --service-ports django python manage.py runserver --settings=geonode.
```

Access the site on [http://localhost/](http://localhost/)

**Note:** If you set an ipdb debug point with `import ipdb; ipdb.set_trace()` then you should be facing its console and you can see the django server which is restarting at any change of your code from your local machine.

### 1.36.2 How to Install GeoNode-Core for development

**Summary of installation**

This section demonstrates a summarization of the steps to be followed in order to install GeoNode-Core for development using Ubuntu 18.04. The following steps will be customised to fit both GeoNode-Project and GeoNode-Core for development purpose.

**The steps to be followed are:**

1. Install build tools and libraries
2. Install dependencies and supporting tools
3. Setup Python virtual environment
4. Clone and install GeoNode from Github
5. Install and start Geoserver
6. Start GeoNode

**Note:** The following commands/steps will be executed on your terminal

**Warning:** If you have a running GeoNode service, you will need to stop it before starting the following steps. To stop GeoNode you will need to run:

```bash
gateway apache2 stop   # or your installed server
gateway tomcat7 stop   # or your version of tomcat
```
Install GeoNode-Core for development

GeoNode-Core installation is considered the most basic form of GeoNode. It doesn’t require any external server to be installed and it can run locally against a file-system based SQLite database.

Installation steps

1- Install build tools and libraries

```bash
$sudo apt-get install -y build-essential libxml2-dev libxslt1-dev libpq-dev zlib1g-de
```

2- Install dependencies and supporting tools

   Install python native libraries and tools

```bash
$sudo apt-get install -y python-dev python-pil python-lxml python-pyproj python-shapely python-nose python-httplib2 python-pip software-properties-common
```

   Install python virtual environment

```bash
$sudo pip install virtualenvwrapper
```

   Install postgresql and postgis

```bash
$sudo apt-get install postgresql-10 postgresql-10-postgis-2.4
```

3- Change postgres password expiry and set a password

```bash
$sudo passwd -u postgres # change password expiry information
$sudo passwd postgres # change unix password for postgres
```

4- Create geonode role and database

```bash
$ su postgres
$ createdb geonode_dev
$ createdb geonode_dev-imports
$ psql
$ postgres=#
$ postgres=# CREATE USER geonode_dev WITH PASSWORD 'geonode_dev'; # should be same as password in setting.py
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev" to geonode_dev;
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev-imports" to geonode_dev;
$ postgres=# \q
$ psql -d geonode_dev-imports -c 'CREATE EXTENSION postgis;'
$ psql -d geonode_dev-imports -c 'GRANT ALL ON geometry_columns TO PUBLIC;'
$ psql -d geonode_dev-imports -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;'
$ exit
```

5- Edit PostgreSQL configuration file

```bash
sudo gedit /etc/postgresql/10/main/pg_hba.conf
```

   Scroll to the bottom of the file and edit this line

```
# "local" is for Unix domain socket connections only
local    all       all          peer
```
To be as follows

```bash
# "local" is for Unix domain socket connections only
local  all  all  trust
```

Then restart PostgreSQL to make the changes effective

```bash
sudo service postgresql restart
```

Java dependencies

```bash
$ sudo apt-get install -y openjdk-11-jdk --no-install-recommends
```

Install supporting tools

```bash
$ sudo apt-get install -y ant maven git gettext
```

3- Setup Python virtual environment (Here is where Geonode will be running)

Add the virtualenvwrapper to your new environment.

Since we are using Ubuntu, you can add the following settings to your .bashrc file. Please note that the Ubuntu account here is called “geonode”. So you will need to change it according to the name you picked.

```bash
$ echo export VIRTUALENVWRAPPER_PYTHON=/usr/bin/python >> ~/.bashrc
$ echo export WORKON_HOME=/home/geonode/dev/.venvs >> ~/.bashrc
$ echo source /usr/local/bin/virtualenvwrapper.sh >> ~/.bashrc
$ echo export PIP_DOWNLOAD_CACHE=$HOME/.pip-downloads >> ~/.bashrc
```

And reload the settings by running

```bash
$ source ~/.bashrc
```

Set up the local virtual environment for Geonode

```bash
$ vim ~/.bashrc
$ # add the following line to the bottom
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
```

```bash
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
$ mkvirtualenv -p python2.7 geonode
$ workon geonode
```

This creates a new directory where you want your project to be and creates a new virtualenvironment

4- Download/Clone GeoNode from Github

To download the latest geonode version from github, the command “git clone” is used

```
Note: If you are following the GeoNode training, skip the following command. You can find the cloned repository in /home/geonode/dev
```

```bash
$ git clone https://github.com/GeoNode/geonode.git
```

Install Nodejs PPA and other tools required for static development

This is required for static development
**Note:** If you are following GeoNode’s training, nodejs is already installed in the Virtual Machine skip the first three command and jump to cd geonode/geonode/static

```bash
$ sudo apt-get install nodejs npm
$ cd geonode/geonode/static
$ npm install --save-dev
```

**Note:** Every time you want to update the static files after making changes to the sources, go to geonode/static and run ‘grunt production’.

**Warning:** Starting from the following step, you have to make sure that you installed GDAL correctly according to the documentation page “Install GDAL for Development”

Install GeoNode in the new active local virtualenv

```bash
$ cd /home/geonode/dev  # or to the directory containing your cloned GeoNode
$ pip install -e geonode
$ cd geonode/geonode
```

Create local_settings.py

Copy the sample file /home/geonode/dev/geonode/geonode/local_settings.py.geoserver.sample and rename it to be local_settings.py

```bash
$ cd /home/geonode/dev/geonode
$ cp geonode/local_settings.py.geoserver.sample geonode/local_settings.py
$ gedit geonode/local_settings.py
```

In the local_settings.py file, add the following line after the import statements:

```
SITEURL = "http://localhost:8000/"
```

In the DATABASES dictionary under the ‘default’ key, change only the values for the keys NAME, USER and PASSWORD to be as follows:

```
DATABASES = {
'default': {
    'ENGINE': 'django.db.backends.postgresql_psycopg2',
    'NAME': 'geonode_dev',
    'USER': 'geonode_dev',
    'PASSWORD': 'geonode_dev',
    .......
    ....
    .......
    ....
    ...}
...}
```

In the DATABASES dictionary under the ‘datastore’ key, change only the values for the keys NAME, USER and PASSWORD to be as follows:
# vector datastore for uploads
'datastore': {
    'ENGINE': 'django.contrib.gis.db.backends.postgis',
    # 'ENGINE': '', # Empty ENGINE name disables
    'NAME': 'geonode_dev-imports',
    'USER': 'geonode_dev',
    'PASSWORD': 'geonode_dev',
    .......
    .......
    .......
    .......
    ...
}

In the CATALOGUE dictionary under the ‘default’ key, uncomment the USER and PASSWORD keys to activate the credentials for GeoNetwork as follows:

CATALOGUE = {
    'default': {
        # The underlying CSW implementation
        # default is pycsw in local mode (tied directly to GeoNode Django DB)
        'ENGINE': 'geonode.catalogue.backends.pycsw_local',
        # pycsw in non-local mode
        # 'ENGINE': 'geonode.catalogue.backends.pycsw_http',
        # GeoNetwork opensource
        # 'ENGINE': 'geonode.catalogue.backends.geonetwork',
        # deegree and others
        # 'ENGINE': 'geonode.catalogue.backends.generic',
        # The FULLY QUALIFIED base url to the CSW instance for this GeoNode
        # 'URL': urljoin(SITEURL, '/catalogue/csw'),
        # 'URL': 'http://localhost:8080/geonetwork/srv/en/csw',
        # 'URL': 'http://localhost:8080/deegree-csw-demo-3.0.4/services',
        # login credentials (for GeoNetwork)
        'USER': 'admin',
        'PASSWORD': 'admin',
        # 'ALTERNATES_ONLY': True,
    }
}

### 5- Install and Start Geoserver

From the virtual environment, first you need to align the database structure using the following command:

```bash
$ cd /home/geonode/dev/geonode
$ python manage.py migrate
```

**Warning:** If the start fails because of an import error related to osgeo or libgeos, then please consult the Install GDAL for Development

then setup GeoServer using the following command:

```bash
$ paver setup
$ paver sync
```

### 6- Now we can start our geonode instance
Warning: Don’t forget to stop the GeoNode Production services if enabled

```
service apache2 stop
service tomcat7 stop
```

```
$ paver start
```

The starting process will take around 20 seconds (depends on your machine) and at the end it shows the following message:

![Screenshot of Python output]

Now you can visit the geonode site by typing `http://0.0.0.0:8000` into your browser window.
Install GeoNode-Project for development after installing GeoNode-Core

GeoNode-Project gives the user flexibility to customize the installation of the GeoNode. Geonode itself will be installed as a requirement of your project. Inside the project structure it is possible to extend, replace or modify all geonode components (e.g. css and other static files, templates, models..) and even register new django apps without touching the original Geonode code. In order to install GeoNode-Project, the following steps need to be executed alongside the previous GeoNode-Core installation steps.

1- Use django-admin.py to create a project “my_geonode” from a GeoNode-Project template as follows:

```
$ django-admin.py startproject my_geonode --template=https://github.com/GeoNode/geonode-project/archive/master.zip -e py,rst,json,yml,ini,env,sample -n Dockerfile
```

```
$ ls /home/geonode/dev   # should output: geonode my_geonode
```

**Note:** Before running the following command, make sure that you are currently working on the virtual environment and just outside geonode directory. The command will create a new project called “my_geonode” which should be located at the level of geonode-core installation directory “inside /home/geonode/dev”

```
$ ls /home/geonode/dev   # should output: geonode my_geonode
```

**Note:** Although the following command might show that the majority of requirements are already satisfied “because GeoNode-Core was already installed”, it is recommended to still execute it as it might update or install any missing
2- Install all the required packages/tools for GeoNode-Project as follows:

```
$ pip install -e my_geonode
```

**Note:** As mentioned earlier, GeoNode will be installed as requirement for the GeoNode-Project in order to be able to extend it

**Install GeoNode-Project directly from scratch**

If you didn’t install GeoNode-Core earlier and you wanted to install GeoNode-Project directly, please follow these steps

1- Create a virtual environment as follows:

```
$ vim ~/.bashrc
# add the following line to the bottom
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
```

```
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
$ mkvirtualenv my_geonode
```

2- Clone the geonode-project repo from Github

```
$ git clone https://github.com/GeoNode/geonode-project.git
```

3- Install Django framework as follows

```
$ pip install Django==1.11.25
```

4- Use django-admin.py to create a project “my_geonode” from a GeoNode-Project template as follows:

```
$ django-admin startproject --template=./geonode-project -e py,sh,md,rst,json,yml,ini,env,sample -n monitoring-cron -n Dockerfile my_geonode
```

5- Install all the requirements for the GeoNode-Project and install the GeoNode-Project using pip

```
$ cd my_geonode
$ pip install -r requirements.txt --upgrade
$ pip install -e . --upgrade
```

6- Install GDAL Utilities for Python

```
$ pip install pygdal="`gdal-config --version`.\*" # or refer to the link <Install GDAL for Development <https://training.geonode.geo-solutions.it/005_dev_workshop/004_devel_env/gdal_install.html>
```

7- Install GeoServer and Tomcat using paver

```
$ paver setup
$ paver sync
```

(continues on next page)
8- Visit http://localhost:8000/

1.36.3 How to run GeoNode Core for development

In order to start Geonode Core for development, you need to make sure that no Geonode instance is running first. This can be done by running the following commands:

```
$ cd /home/user/geonode
$ paver stop_geoserver
$ paver stop_django
```

Then you need to start both geoserver and django services as follows:

```
$ paver start_geoserver
$ paver start_django
```

Now you can visit your Geonode GUI by typing http://localhost:8000 into your browser window

1.36.4 How to run GeoNode Project for development

In order to run a project for development, the following steps have to be followed:

1- Make sure there is no running instance of Geonode first by running the following command:

```
$ cd /home/user/my_geonode
$ paver stop
```

The above command will stop all services related to Geonode if running

2- Start the servers by running paver start as follows:

```
$ paver start
```

Now you can visit your geonode project site by typing http://localhost:8000 into your browser window

1.36.5 Workshops

The workshops documentation demonstrates few examples on how to utilize GeoNode-Project in order to extend/customize GeoNode's functionalities according to your business. The covered topics include the following:

1- Customize your GeoNode with the geonode-project
2- Customize the look and feel
3- Create your ResourceBase Metadata
4- Create your own django app
5- Add a custom model
6- Permissions and APIs
7- Deploy your GeoNode

1- Customize your GeoNode with the geonode-project

In this example, GeoNode-Project is cloned to create a template instance in which the rest of the examples will be building on top of it.

1- Assuming you already installed GeoNode-Core, firstly we need to create a GeoNode-Project template and this can be achieved from the following command:

```
$ django-admin.py startproject my_geonode --template=https://github.com/GeoNode/geonode-project/archive/master.zip -e py,rst,json,yml,ini,env,sample -n Dockerfile
```

Here, django-admin is used with startproject option to create my_geonode project copying the template which is passed as GeoNode-project Github repo. It also includes “py,rst,json,yml,ini,env,sample” extensions

2- Once the cloning finished, the next step is to install the GeoNode-Project we just downloaded as follows:

```
$ pip install -e my_geonode
```

3- Install geoserver using paver as follows

```
$ cd /home/geonode/my_geonode
$ paver setup
```

4- Note the GeoNode database connection parameters mentioned in the local_settings.py configuration file. If not found, copy local_settings.py.sample and rename it to local_settings.py then use psql to create the required user and grant the required privileges as follows:

```
$ su postgres
$ createdb geonode
$ psql
postgres=# CREATE USER geonode WITH PASSWORD 'geonode';
CREATE ROLE
postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode" to geonode;
GRANT
postgres=# \q
```

**Warning:** Don’t forget to exit from postgres user before executing the following commands

5- Run GeoNode using paver

```
$ cd /home/geonode/my_geonode
$ paver start
```

**Note:** You may find this warning message: You have 132 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): account, actstream, admin, agon_ratings, announcements, auth, avatar, base, contenttypes, dialogs, documents, favorite, geonode_client, geonode_themes, groups, guardian, invitations, layers, maps, mapstore2_adapter, monitoring, oauth2_provider, people, pinax_notifications, services, sessions, sites, socialaccount, taggit, tastypie, upload, user_messages. Run `python manage.py migrate` to apply them.
Which means you have some sql statements not executed yet and you need to run the “migrate” to sync your database first then “paver start” again as follows:

```
$ python manage.py migrate
$ paver start
```

**Warning:** If encountered this message: *(Invalid HTTP_HOST header: '0.0.0.0:8000'. You may need to add u'0.0.0.0' to ALLOWED_HOSTS) It can be fixed in the settings.py file. You will need to add: ALLOWED_HOSTS = ['0.0.0.0'] in settings.py

6- Once the previous step is done, you can visit 0.0.0.0:8000 to view the GUI of GeoNode. However, we still don’t have an account in order to login from the GUI. This can be done using “paver sync”. The command will create sync with latest fixtures and also creates a superuser “admin” with default password “admin”

7- Use the created account to login from the GUI through localhost:8000 or 0.0.0.0:8000
2- Customize the look and feel

In this section we will change the look and feel of GeoNode, in particular we will do some customization to help understanding how the template inheritance works and how to add new stuff to your GeoNode. The changes will include the home page, the top menu, the footer and a generic GeoNode page.

Homepage:
The geonode-project provides some predefined templates to change the home page and the general site content.
In the “my_geonode/my_geonode/templates” directory we can edit the site_index.html.
Try to edit the content of the “jumbotron” box in the page, save and refresh your browser to see the changes.

The theme:
To change the theme of our geonode-project we can act on the site_base.css file available in the "my_geonode/my_geonode/static/css" folder.

The file is empty so we can inspect elements of the home page with the browser’s developer tools and define css rules in there.

For example, if we want to change the background of the jumbotron, in this file we can add

```css
.home .jumbotron { background: red }
```

Then once we refreshed the browser, we should see the change as follows:

![Welcome to GeoNode](image)

Adding the ".home" class is necessary in order to let the rule have precedence/priority over the GeoNode’s one. We can see this by inspecting the element in the developer console.

**The top menu:**

Now we can make some changes that will apply to the whole site. We can add a Geocollections entry in the top menu bar.

Edit the site_base.html file in the templates folder and uncomment the list item adapting the text as well from:

```html
{% comment %} 
Add Tab for Third Party Apps 
{% endcomment %}
<li>
    <a href="{{ PROJECT_ROOT }}/app">App</a>
</li>
```

To:

```html
<li>
    <a href="{{ PROJECT_ROOT }}/geocollections">Geocollections</a>
</li>
```

On browser refresh you will see a new entry in the nav bar which is persistent to the whole site.
GeoNode generic page

As you can see in the templates folder there are only the site_index.html and the site_base.html files. In order to customize another GeoNode page, for example the layers list page, you need to recreate the same folder structure of the GeoNode templates folder and add a file with the same name.

For the layers list page we can create a directory named “layers” inside the template directory and a file named “layer_list.html” inside layers. The changes made in this file will only affect the layer list page.

```bash
mkdir -p my_geonode/templates/layers/
cp geonode/geonode/layers/templates/layers/layer_list.html my_geonode/templates/
vim my_geonode/templates/layers/layer_list.html
```

For example change in page title to be:

```html
<h2 class="page-title">{% trans "Explore My Layers" %}</h2>
```

then refresh the browser to see the update.
Modify functionality

In this section, we will patch the ResourceBase of GeoNode and update the Templates in order to add one more field to the Metadata Schema.

We will add a DOI field to the ResourceBase model and modify the Templates in order to show the new field both into the Metadata Wizard and the Layer Details page.

Note: Make sure to be inside “my_geonode” directory to execute the following commands

Customizing metadata can be achieved from the model which is defined in the core at “geonode/geonode/base/models.py” as follows:

```python
# internal fields
uuid = models.CharField(max_length=36)
owner = models.ForeignKey(
    settings.AUTH_USER_MODEL,
    blank=True,
    null=True,
    related_name='owned_resource',
    verbose_name=_('Owner'))
contacts = models.ManyToManyField(
    settings.AUTH_USER_MODEL,
    through='ContactRole')
title = models.CharField(_('title'), max_length=255, help_text=_('name by which the cited resource is known'))
alternate = models.CharField(max_length=128, null=True, blank=True)
date = models.DateTimeField(
    _('date'),
    default=now,
    help_text=date_help_text)
date_type = models.CharField(
    _('date type'),
    max_length=255,
    choices=VALID_DATE_TYPES,
    default='publication',
    help_text=date_type_help_text)
edition = models.CharField(
    (continues on next page))```
To add fields directly to the ResourceBase Class without actually modifying it, this can be done from “my_geonode/my_geonode/apps.py” file

The “ready” method is invoked at initialization time and can be currently used to tweak your app in several ways

```python
class AppConfig(BaseAppConfig):
    name = "my_geonode"
    label = "my_geonode"

    def ready(self):
        super(AppConfig, self).ready()
        run_setup_hooks()
```

Now we will add the “patch_resource_base” method to the AppConfig and execute it from the ready method as follows:

```python
from django.db import models
from django.utils.translation import ugettext_lazy as _

class AppConfig(BaseAppConfig):
    name = "my_geonode"
    label = "my_geonode"

    def _get_logger(self):
        import logging
        return logging.getLogger(self.__class__.__module__)

    def patch_resource_base(self, cls):
        self._get_logger().info("Patching Resource Base")
        doi_help_text = _('a DOI will be added by Admin before publication.

        doi = models.TextField(
            max_length=255,
            blank=True,
            help_text=doi_help_text)
```

(continues on next page)
Note: you will need to perform migrations as follows: - Add field doi to resourcebase

Once you run python manage.py migrate:

```
Running migrations:
Applying announcements.0002_auto_20200119_1257... OK
Applying base.0031_resourcebase_doi... OK
Applying people.0027_auto_20200119_1257... OK
```

Till now, we have patched the DB. however, it is not yet sufficient as we still need to display the added field.

Let's extend the default templates so that we can show the newly added field

**Overriding the Metadata Wizard Template Page**

Similar to what we have done before in the Templates directory, we will need to create “layouts” directory under “my_geonode/my_geonode/templates”. This directory will contain a copy from “geonode/src/geonode/geonode/layers/templates/layouts/panels.html” as follows:

```
$ mkdir -p my_geonode/templates/layouts
$ cp ~/geonode/src/geonode/geonode/layers/templates/layouts/panels.html my_geonode/→templates/layouts/panels.html
$ vim my_geonode/templates/layouts/panels.html
```

Inside panels.html, we will add a new div with text input as follows:

```html
{{ layer_form.data_quality_statement }}
</div>
</div>
</span><label for="{{ layer_form.doi|id }}">{{ layer_form.doi.label }}</label>
<input id="id_resource-doi" name="resource-doi"
type="text"
class="has-external-popover"
data-container="body"
data-content="a DOI will be added by Admin before publication." data-html="true"
data-placement="right"
placeholder="a DOI will be added by Admin before publication." value="{{ layer_form.doi.value }}">
```

In addition, we will override the Layer Detail template page as follows:
mkdir -p my_geonode/templates/base

cp /home/geo/Envs/geonode/src/geonode/geonode/base/templates/base/_resourcebase_info_panel.html my_geonode/templates/base/
vim my_geonode/templates/base/_resourcebase_info_panel.html

<dd><a href="/groups/group/{{ resource.group.name }}/activity/{% group %}"></a></dd>

<dt>DOI</dt>
<dd>{{ resource.doi }}</dd>

</dl>

Now from the layer details page, you can see the DOI metadata entry per layer

![Layer details page with DOI metadata](image)

3- Create your own django app

In this section, we will demonstrate how to create and setup the skeleton of a custom app using the django facilities. The app will add a geocollections functionality to our GeoNode.

The Gecollections app allows to present in a single page, resources and users grouped by a GeoNode Group. We can assign arbitrary resources to a Geocollection, a Group and a name that will be also used to build a dedicated URL.

**Note:** Make sure to be inside “my_geonode” directory to execute the following commands

Create the django app
Django gives us an handy command to create apps. We already used startproject to create our geonode-project, now we can use startapp to create the app.

```
python manage.py startapp geocollections
```

This will create a folder named geocollections that contains empty models and views.

We need to add the new app to the INSTALLED_APPS of our project. inside “my_geonode/settings.py” line 54 change:

```
INSTALLED_APPS += (PROJECT_NAME,) to be: INSTALLED_APPS += (PROJECT_NAME,
˓→'geocollections',)
```

### Add a custom model

In this section, we will add a custom model and the related logic as follows:

- Add a new model
- Add urls and views
- Add admin panel
- Add the template

```
vim geocollections/models.py
```

At this point we need to ask django to create the database table. Django since version 1.8 has embedded migrations mechanism and we need to use them in order to change the state of the db.

**Note:** Make sure to be inside “my_geonode” directory to execute the following commands

```
python manage.py makemigrations

# the above command informs you with the migrations to be executed on the database
```

```
python manage.py migrate
```

Next we will use django generic view to show the collections detail. Add the following code in the views.py file:

```
vim geocollections/views.py
```

```python
from django.views.generic import DetailView
from .models import Geocollection

class GeocollectionDetail(DetailView):
    model = Geocollection
```

### Add url configuration

In order to access the created view we also need url mapping. We can create a urls.py file containing a url mapping to our generic view:

```
vim geocollections/urls.py
```

```python
from django.urls import path
from .views import GeocollectionDetail

urlpatterns = [
    path('<int:pk>/', GeocollectionDetail.as_view(), name='geocollection_detail'),
]```
We also need to register the app urls in the project urls. So let’s modify the “my_geonode” urls.py file adding the following:

```python
vim my_geonode/urls.py
```

```python
urlpatterns += [
    # include your urls here
    url(r'^geocollections/', include('geocollections.urls')),
]
```

Enable the admin panel

We need a user interface where we can create geocollections. Django makes this very easy, we just need the admin.py file as follows:

```python
vim geocollections/admin.py
```

```python
from django.contrib import admin
from .models import Geocollection

class GeocollectionAdmin(admin.ModelAdmin):
    prepopulated_fields = {"slug": {"name"},}
    filter_horizontal = ("resources",)

admin.site.register(Geocollection, GeocollectionAdmin)
```

Now we can visit the admin page and create a geocollection from there as follows:
Adding the template

Now we need the template where the geocollection detail will be rendered. Let's create a geocollections directory inside the “my_geonode/templates” directory with a file named geocollection_detail.html:

```
mkdir -p my_geonode/templates/geocollections/
vim my_geonode/templates/geocollections/geocollection_detail.html
```

```html
{% extends "geonode_base.html" %}
{% block body %}
<h2>Geocollection {{ object.name }}</h2>
<p>Group: {{ object.group.title }}</p>
<p>Resources:</p>
<ul>
{% for resource in object.resources.all %}
  <li>{{ resource.title }}</li>
{% endfor %}
</ul>
{% endblock %}
```

To check the results, create a group in the geonode ui interface and load one or more layers/documents
login into the admin panel -> geocollections and create a geocollections
Visit http://localhost:8000/geocollections/<the-name-of-the-created-geocollection> and view the results.
Now you know how to customize an HTML template so you can tune this page as you prefer.

Permissions and APIs

In this section we will add some more advanced logic like permissions and APIs. The permissions in GeoNode are managed with django-guardian, a library which allow to set object level permissions (django has table level authorization).

The APIs are implemented through django-tastypie.

The topics to be covered include:

- Permissions on who can view the geocollection
- How to add templated and js to embed a permission ui in our geocollection detail page
- API to serve json serialized searchable endpoint

Permissions logic (permissions objects)

We need to add the permissions object to the database. We can do this by adding the following meta class to our Geocollection model, guardian will take care of creating the objects for us.

```python
vim geocollections/models.py

class Meta:
    permissions = {
        ('view_geocollection', 'Can view geocollection'),
    }
```

Then run “python manage.py makemigrations” and “python manage.py migrate” to install them

Permissions logic (set_default)

Let’s add a method that will be used to set the default permissions on the Geocollections. We can add this logic to the Geocollection model but could also be a generic Mixin similar to how it is implemented in GeoNode.

```python
vim geocollections/models.py
```
from django.contrib.auth.models import Group
from django.contrib.auth import get_user_model
from django.contrib.contenttypes.models import ContentType
from django.conf import settings
from guardian.shortcuts import assign_perm

def set_default_permissions(self):
    
    # default permissions for anonymous users
    anonymous_group, created = Group.objects.get_or_create(name='anonymous')
    if settings.DEFAULT_ANONYMOUS_VIEW_PERMISSION:
        assign_perm('view_geocollection', anonymous_group, self)

    # default permissions for group members
    assign_perm('view_geocollection', self.group, self)

Permissions logic (methods)

Now we need a method to add generic permissions, we want to be able to assign view permissions to groups and single users. We can add this to our Geocollection model

```
vim geocollections/models.py
```

```python
def set_permissions(self, perm_spec):
    anonymous_group = Group.objects.get(name='anonymous')
    self.remove_object_permissions()
    if 'users' in perm_spec and "AnonymousUser" in perm_spec['users']:
        assign_perm('view_geocollection', anonymous_group, self)

    if 'users' in perm_spec:
        for user, perms in perm_spec['users'].items():
            user = get_user_model().objects.get(username=user)
            assign_perm('view_geocollection', user, self)

    if 'groups' in perm_spec:
        for group, perms in perm_spec['groups'].items():
            group = Group.objects.get(name=group)
            assign_perm('view_geocollection', group, self)

def remove_object_permissions(self):
    from guardian.models import UserObjectPermission, GroupObjectPermission
    UserObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self),
                                         object_pk=self.id).delete()
    GroupObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self),
                                           object_pk=self.id).delete()
```

Permissions logic (views.py)

We can add now a view to receive and set our permissions, in views.py:

```
vim geocollections/views.py
```
import json
from django.core.exceptions import PermissionDenied
from django.http import HttpResponse
from django.contrib.auth import get_user_model
User = get_user_model()

def geocollection_permissions(request, collection_id):
    collection = Geocollection.objects.get(id=collection_id)
    user = User.objects.get(id=request.user.id)
    if user.has_perm('view_geocollection', collection):
        return HttpResponse('You have the permission to view. please customize a template for this view',
        content_type='text/plain')
    if request.method == 'POST':
        success = True
        message = "Permissions successfully updated!"
        try:
            permission_spec = json.loads(request.body)
            collection.set_permissions(permission_spec)
            return HttpResponse(json.dumps({'success': success, 'message': message}),
            status=200,
            content_type='text/plain')
        except:
            success = False
            message = "Error updating permissions :("
            return HttpResponse(json.dumps({'success': success, 'message': message}),
            status=500,
            content_type='text/plain')

Permissions logic (url)
Lastly we need a url to map our client to our view, in urls.py
vim geocollections/urls.py

from django.conf.urls import url
from .views import GeocollectionDetail, geocollection_permissions
urlpatterns = [
    url(r'^(?P<slug>[-\w]+)/$',
        GeocollectionDetail.as_view(),
        name='geocollection-detail'),
    url(r'^permissions/(?P<collection_id>[\d]+)/$',
        geocollection_permissions,
]
Warning: A note on the client part, the server side logic is just one part necessary to implement permissions.

A checklist of what is necessary:

- A template snippet that can be embedded in the geocollection_detail.html, you can copy and simplify: _permissions_form.html and _permissions.html (in geonode/templates)
- A javascript file that will collect permissions settings and send them to the server, you can copy and simplify: _permissions_form_js.html (in geonode/templates)

API

The GeoNode API system easily allows to plug in new APIs. This section demonstrates the required steps:

We need first to create an api.py file in our geocollection app.

```python
import json
from tastypie.resources import ModelResource
from tastypie import fields
from tastypie.constants import ALL_WITH_RELATIONS, ALL

from geonode.api.api import ProfileResource, GroupResource
from geonode.api.resourcebase_api import ResourceBaseResource

from .models import Geocollection
class GeocollectionResource(ModelResource):
    users = fields.ToManyField(ProfileResource, attribute=lambda bundle: bundle.obj._group.group.user_set.all(), full=True)
    group = fields.ToOneField(GroupResource, 'group', full=True)
    resources = fields.ToManyField(ResourceBaseResource, 'resources', full=True)

class Meta:
    queryset = Geocollection.objects.all().order_by('-group')
    ordering = ['group']
    allowed_methods = ['get']
    resource_name = 'geocollections'
    filtering = {
        'group': ALL_WITH_RELATIONS,
        'id': ALL
    }
```
API authorization

We want the API to respect our custom permissions, we can easily achieve this by adding the following to the beginning of api.py:

```python
from tastypie.authorization import DjangoAuthorization
from guardian.shortcuts import get_objects_for_user

class GeocollectionAuth(DjangoAuthorization):
    def read_list(self, object_list, bundle):
        permitted_ids = get_objects_for_user(
            bundle.request.user,
            'geocollections.view_geocollection').values('id')

        return object_list.filter(id__in=permitted_ids)

    def read_detail(self, object_list, bundle):
        return bundle.request.user.has_perm('view_geocollection',
            bundle.obj)
```

And this to the GeocollectionResource Meta class:

```python
authorization = GeocollectionAuth()
```

Add a url for our API

In order to publish our API we need a url and we want that url to appear under the GeoNode’s /api domain.

The final url for our API has to be /api/geocollections.

We can inject the url into the GeoNode API by adding the following lines to “my_geonode/urls.py” file:

```python
from geonode.api.urls import api
from geocollections.api import GeocollectionResource
api.register(GeocollectionResource())
```

And add the following in the urlpatterns:

```python
url(r'', include(api.urls)),
```

The final result will be:

```python
from django.conf.urls import url, include
from django.views.generic import TemplateView
from geonode.urls import urlpatterns
from geonode.api.urls import api
from geocollections.api import GeocollectionResource
```

(continues on next page)
api.register(GeocollectionResource())

urlpatterns += [
    ## include your urls here
    url(r'', include(api.urls)),
    url(r'^geocollections/', include('geocollections.urls')),
]

Let's test permissions on API

We can test the permissions on API by manually set a permission from the command line and check that the API respects it.

With running `python manage.py shell` from inside our “my_geonode” folder, it opens a geonode shell.

A perm spec could look like this:

```python
perms = {
    'users': {
        'AnonymousUser': ['view_geocollection'],
        'alessio': ['view_geocollection']
    }
}
```

and we can assign the permissions with:

```python
from geocollections.models import Geocollection
Geocollection.objects.first().set_permissions(perms)
```

our http://localhost:8000/api/geocollections should now list the geocollection.

If you remove the ‘AnonymousUser’ line from perms and assign again the permissions it will disappear.

```python
perms = {
    'users': {
        'alessio': ['view_geocollection']
    }
}
```

Deploy your GeoNode

So far we demonstrated how to modify, extend and style our GeoNode in dev mode but now it’s time to go on production. In this section we will clarify how to:

- commit your work on GitHub
- setup your server
- setup your GeoNode for production

Push to GitHub It is always a good practice to keep your code in a remote repository, GitHub is one of the options and is indeed the most used.

It is assumed that you already have a GitHub account and that you have git installed and configured with your name and email.

We will push only the my_geonode folder to GitHub and as we knew earlier, GeoNode for us is a dependency and we’ll just reinstall it as it is on the server.

Steps to push your code to GitHub:

- Create an empty repository in GitHub and copy it’s address
• In my_geonode, run git init to initialize an empty repository
• Add your remote repository address with git remote add yourname yourremoteaddress
• edit .gitignore adding all *.pyc files
• git add * to add all content of my_geonode
• git commit -m 'initial import' to make the initial commit
• git push yourname master to push the code to the GitHub repository

Setup the server

There are several options for deploying GeoNode projects on servers. In this section, we explain how to deploy it on Ubuntu server 18.04 using system-wide installation

Note: For quick installation, follow the INSTALLING documentation at http://docs.geonode.org/en/master/install/core/index.html

Setup our my_geonode

We need now to install the developed “my_geonode” project following these steps:

• git clone from your repository (in the folder of your preference)
• sudo pip install -e my_geonode
• edit the settings where needed
• edit /etc/apache2/sites-enabled/geonode.conf replacing the wsgi path to the my_geonode/my_geonode/wsgi.py file
• add the apache rights to the “my_geonode” folder with a directory like

```html
<Directory "/path/to/my_geonode/*">
  Order allow,deny
  Require all granted
</Directory>
```

• Test your server.

This documentation helps developers to install GeoNode-Core and GeoNode-Project from different scenarios. GeoNode-Project can be installed on top of GeoNode-Core if already installed. Also GeoNode-Project can be installed from scratch as it has GeoNode-Core as a prerequisite.