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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: 3.1

Main Features: State of GeoNode

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

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.

1.6. GeoNode Basics
MANAGEMENT AND PUBLICATION OF GEOSPATIAL DATA

RASTER DATA

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

VECTOR DATA

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

METADATA

- Securely stores geospatial data.
- 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*
GeoNode Documentation, Release 3.1

1.8. Online Demo

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 (16GB or more preferred for a production deployment).
- 2.2GHz processor with 4 cores. (Additional processing power may be required for multiple concurrent styling renderings)
- 30 GB software disk usage (Reserved to OS and source code only).
- Additional disk space for any data hosted with GeoNode, data stored on the DataBase and tiles cached with GeoWebCache. For db, 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.
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 Docker**

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

### 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.

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.
1.10. GeoNode Users Guide

Fig. 6: Sign in screen

Fig. 7: Registering for a new account
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:

```
Confirmation e-mail sent to john.smith@mail.com.
```

```
Successfully signed in as johnsmith.
```

**Fig. 8: Alerts**

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

**Fig. 9: Logout link**

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.
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](image)

Fig. 10: Confirm Log out

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.
Fig. 12: User profile page
Fig. 13: Favorites

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

Fig. 14: Recent activities

- johnsmith created OSM Railways by johnsmith
  21 minutes ago

- johnsmith uploaded geonode:railways
  22 minutes ago
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.

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

**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.

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.

**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.
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
television 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

Keywords
A space or comma-separated list of keywords

Language
Fig. 16: Updating Profile correctly finalized

Fig. 17: Accounts e-mail

Fig. 18: New e-mail association
Fig. 19: Primary e-mail address

Fig. 20: Change your password

Fig. 21: Change password confirmation
### Notification Settings

<table>
<thead>
<tr>
<th>Notification Type</th>
<th>Email</th>
</tr>
</thead>
<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>
</tr>
<tr>
<td>A Layer was published</td>
<td></td>
</tr>
<tr>
<td>Layer Deleted</td>
<td></td>
</tr>
<tr>
<td>A Layer was deleted</td>
<td></td>
</tr>
<tr>
<td>Comment on Layer</td>
<td></td>
</tr>
<tr>
<td>A layer was commented on</td>
<td></td>
</tr>
<tr>
<td>Rating for Layer</td>
<td></td>
</tr>
<tr>
<td>A rating was given to a layer</td>
<td></td>
</tr>
<tr>
<td>Map Created</td>
<td></td>
</tr>
<tr>
<td>A Map was created</td>
<td></td>
</tr>
<tr>
<td>Map Updated</td>
<td></td>
</tr>
<tr>
<td>A Map was updated</td>
<td></td>
</tr>
<tr>
<td>Map Approved</td>
<td></td>
</tr>
<tr>
<td>A Map was approved by a Manager</td>
<td></td>
</tr>
<tr>
<td>Map Published</td>
<td></td>
</tr>
<tr>
<td>A Map was published</td>
<td></td>
</tr>
<tr>
<td>Map Deleted</td>
<td></td>
</tr>
<tr>
<td>A Map was deleted</td>
<td></td>
</tr>
<tr>
<td>Comment on Map</td>
<td></td>
</tr>
<tr>
<td>A map was commented on</td>
<td></td>
</tr>
<tr>
<td>Rating for Map</td>
<td></td>
</tr>
<tr>
<td>A rating was given to a map</td>
<td></td>
</tr>
<tr>
<td>Document Created</td>
<td></td>
</tr>
<tr>
<td>A Document was created</td>
<td></td>
</tr>
<tr>
<td>Document Updated</td>
<td></td>
</tr>
<tr>
<td>A Document was updated</td>
<td></td>
</tr>
<tr>
<td>Document Approved</td>
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<tr>
<td>A Document was approved by a Manager</td>
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<tr>
<td>Document Published</td>
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<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>Layer Uploaded</td>
<td></td>
</tr>
<tr>
<td>A layer was uploaded</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>
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.

![Invite Users](image)

Fig. 23: Invite users to join GeoNode

A message will confirm that invitations have been correctly sent.

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

Fig. 24: Invitations confirm message

**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.

Select a user and click on its username to access to the user details page.
Fig. 25: About menu - People link

Fig. 26: List of the registered users
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.

![Fig. 28: User activities](image)

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 menu.

![Fig. 29: Recent Activities link](image)

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.
Fig. 30: Recent Activities
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.

![Create Message]

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.
Greetings from John Smith

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

Send Reply

Fig. 32: Your message

Fig. 33: Inbox link

Fig. 34: Inbox page
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.

![Fig. 35: All your conversations](image)

When some user send a reply to your message your *Inbox* shows it, see the picture below for an example.

![Fig. 36: A reply to your message](image)

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.

## 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.

The Maps menu let you to manage maps.
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, .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.

![Search tool in GeoNode welcome page](image)

Fig. 40: Search tool in GeoNode welcome page

When you trigger a search you are brought to the Search page which shows you the search result through all data types.

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.

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.

- 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.

  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.
Fig. 41: The Search page
Fig. 42: Search filter by EXTENT
Search:

Fig. 43: Ordering Data

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
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.
Fig. 50: Documents filtered by categories
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. 51: Link for Layers](image)

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.

![Fig. 52: Layers filtered by extent](image)

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

![Fig. 53: Link for Maps](image)

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.

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.
Fig. 56: Document Upload link

Fig. 57: Document Upload page
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.

   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.

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.
Fig. 58: *Document Basic Metadata*
Fig. 59: *Documents linked to a Layer*
Fig. 60: Resources linked to a Document

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.

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.

You can Rate the document through the Ratings 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.
Fig. 61: *Document Location and Licenses*
Fig. 62: Document Optional Metadata
Old Italian boundaries

Fig. 63: Document Information page
Share This Document

- Email
- Facebook
- Twitter
- Google +

Fig. 64: Document Sharing

Rate this document

🌟🌟🌟🌟

Average Rating

🌟🌟🌟🌟 (1)

Fig. 65: Rate the Document
Fig. 66: *Document Comments*
Your comment will be added next to the last already existing comment. If you want to remove it click on the red Delete button.

![Fig. 67: Your Comment](image)

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

![Fig. 68: Your Favorite Comment](image)

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.

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
Fig. 69: The EXIF tab
Fig. 70: Document useful tool
• 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

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.

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.
Metadata: Old Italian boundaries

Identification
- Title: Old Italian boundaries
- Abstract: Old Italian boundaries
- License: Not Specified
- Publication Date: June 5, 2019, 4:51 a.m.
- Keywords: Com2016, WGS84, Global
- Category: Boundaries
- Regions: Global
- Approved: Yes
- Published: Yes
- Featured: No
- Group: Geosolutions

Owner
- Name: John Smith (johnsmith)
- email: john.smith@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
- Spatial Extent: ---
- Projection System: EPSG:4326
- Extension x0: 313279.2514000000000000
- Extension x1: 1312016.1506000000000000
- Extension y0: 3933846.2156000000000000
- Extension y1: 5220292.2922000000000000

Features
- Restrictions: 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
- Language: English
- Data Quality: good
- Supplemental Information: No information provided

Contact Points
- Name: John Smith (johnsmith)
- email: john.smith@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: documents/37/data_detail
- Online Link: documents/37/download
- Hosted Document: Old Italian boundaries.jpg
- Thumbnail: Old Italian boundaries.png
The *Remove* button allows you to delete the document. You will have to confirm that choice.

![Document Removal confirmation](image)

**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.

**Editing the Document Metadata**

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

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.
Fig. 75: *Upload Document's Thumbnail*

Fig. 76: *Uploading success*
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.

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.
Edit Metadata

Editing details for My New Document

DOI

A DOI will be added by Admin before publication.

Attribution

Authority or function assigned, as to a ruler, legislative assembly, delegate, or the like.

Owner

admin

Title

My New Document

Name by which the cited resource is known

Alternate

Date

2020-11-20 13:49 pm

Date type

Publication

Identification of when a given event occurred

Edition

Version of the cited resource

Abstract

No abstract provided

Purpose

3 WORDS POWERED BY TINY
Fig. 79: The button to change permissions
Fig. 80: Changing the Document permissions
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.

![Link for Layers Uploading](image1.png)

Fig. 81: *Link for Layers Uploading*

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

![Button for Layers Uploading](image2.png)

Fig. 82: *Button for Layers Uploading*

The Layers Uploading page looks like the one in the picture below.

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 from the page.

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.

In order to create the new Layer you have to fill out the required fields:
Fig. 85: *Create layer link*

- Name
- Title
- Geometry type

**Geometry type**

![Geometry types]

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.

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.

To configure a new service:

- click on *Register a new Service*
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 http://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:

• 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;
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:

- 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;
Italian Towers

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

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

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

Title: Italian Towers
License: Not Specified
Abstract: No abstract provided
Publication Date: June 7, 2019, 4:03 a.m.
Type: Vector Data
Keywords: features, italian_towers
Category: Environment
Regions: Global
Owner: johnsmith

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.
• the *Print* tool to print the preview.

![Layer Preview](image)

**Fig. 96: Layer Preview**

The GeoNode map viewer is [MapStore](https://www.mapbox.com) based, see the [MapStore Documentation](https://www.mapbox.com) 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.

![Layer Info tab](image)

**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*.

- 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.
Italian Towers

Fig. 98: Layer Attributes tab

Share This Layer

- Email
- Facebook
- Twitter
- Google +

Fig. 99: Layer Sharing
Fig. 100: *Rate the Layer*

Rate this layer

☆☆☆☆☆

Average Rating

☆☆☆☆☆

(2)

Fig. 101: *Layer Comments*

Comments (1 total)

Very interesting layer
By Johnson on Jun 7, 2019

Add Comment

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

Fig. 102: Your Favorite Layer

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 map which uses 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;
• the section 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.
roads

Fig. 103: Change the Layer Style in preview
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.

![Download Layer](image)

Fig. 104: Downloading Layers as Images

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.

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.
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

Fig. 105: Downloading the Layer Data

Fig. 106: Downloading the Layer Data
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.
Fig. 108: *The Layer Editing panel*

Fig. 109: *The Upload Thumbnail panel*
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 .

- **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
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*
what vertex you are moving.

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

Features can have multipart shapes. You can add parts to the shape when editing it.

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

• 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.

Fig. 118: Feature Attributes Editing

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;
• 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.
roads

Fig. 119: The Layer Metadata Detail button
Metadata: roads

**Identification**

- **Title**: roads
- **Abstract**: No abstract provided
- **License**: Not Specified
- **Publication Date**: June 10, 2019, 12:58 p.m.
- **Type**: Vector Data
- **Keywords**: features/ne_10m_roads
- **Category**: Transportation
- **Regions**: Global
- **Approved**: Yes
- **Published**: Yes
- **Featured**: No

**Owner**

- **Name**: johnsmith
- **Email**: johnsmith@mail.com
- **Position**: None
- **Organization**: None
- **Location**: None
- **Voice**: None
- **Fax**: None

**Information**

**Identification Image**

[Map Image]

**Spatial Extent**

- **Projection System**: EPSG:4226
- **Extension x0**: 13.526602500000000
- **Extension x1**: 13.386978000000000
- **Extension y0**: 52.503006700000000
- **Extension y1**: 52.525999000000000

**Features**

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

**Contact Points**

- **Name**: johnsmith
- **Email**: johnsmith@mail.com
- **Position**: None
- **Organization**: None
- **Location**: None
- **Voice**: None
- **Fax**: None

**References**
Fig. 121: How to Download Metadata
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.

![Metadata for roads](image)

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; brief narrative summary of the content of the Layer
Note: The Abstract panel allows you to insert HTML code through a wysiwyg text editor

- 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

Fig. 123: Location and Licenses Metadata for Layers

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

- The Language of the layer;
GeoNode Documentation, Release 3.1

- The License of the dataset;
- The DOI of the dataset; if available, this represents the Digital Object Identifier of the resource
- The Attribution of the dataset; authority or function assigned, as to a ruler, legislative assembly, delegate, or the like
- 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.

**Note:** The Data Quality statement and Restrictions panels allow you to insert HTML code through a wysiwyg text editor

• **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.

**Note:** The Purpose and Supplemental information panels allow you to insert HTML code through a wysiwyg text editor

• **Dataset Attributes**

At this step you can enrich the dataset attributes with useful information like the following:
- The Label displayed
- A detailed Description
- The Display Order
- The Display Type; the default value is Label, which means that the value of the attribute will be rendered as a plain text. There’s the possibility to instruct GeoNode to threat the values as different media-types. As an instance, if the values of the selected attribute will contain image urls, by selecting the IMAGE Display Type you will allow GeoNode to render the image directly when querying the layer from the maps. The same for VIDEO, AUDIO or IFRAME mime types.
- The Visible flag; allows you to instruct GeoNode whether or not hiding an attribute from the Get Feature Type outcomes

It is possible to define a completely custom HTML template for the Get Feature Type outcome. That is possible by enabling the Use a custom template flag as shown in the figure below.

By using the keyword `${properties.<attribute_name>`, you can tell to GeoNode to render the actual value of the attribute on the map.
Fig. 124: Optional Layer Metadata
### Metadata for roads

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Label</th>
<th>Description</th>
<th>Display Order</th>
<th>Display Type</th>
<th>Visible</th>
</tr>
</thead>
<tbody>
<tr>
<td>fid</td>
<td></td>
<td></td>
<td>1</td>
<td>Label</td>
<td></td>
</tr>
<tr>
<td>the_geom</td>
<td></td>
<td></td>
<td>2</td>
<td>Label</td>
<td></td>
</tr>
<tr>
<td>cat</td>
<td></td>
<td></td>
<td>3</td>
<td>Label</td>
<td></td>
</tr>
<tr>
<td>label</td>
<td></td>
<td></td>
<td>4</td>
<td>Label</td>
<td></td>
</tr>
</tbody>
</table>

#### Dataset Attributes

**Fig. 125: Dataset Attributes Metadata for Layers**
Fig. 126: *Use a custom template*
As an instance, the example below

![Use a custom template: HTML](image)

Fig. 127: *Use a custom template: HTML*

Will render an HTML Table along with values as shown here below

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.

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.

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.
roads

Fig. 128: *Use a custom template: Get Feature Info outcome*

Fig. 129: *Completeness Progress Bar*
Fig. 130: The Advanced Edit button

Fig. 131: The Metadata Advanced Editing page
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.

![Default Style for Layers](image)

Fig. 132: Default Style for Layers

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).

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:
Fig. 133: Edit Styles button

Fig. 134: The Styles Panel in the Map
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.
Fig. 136: *Style Templates*

Fig. 137: *Title and Abstract for new Styles*
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.

### Editing the Layer Style

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).
Fig. 139: The Layer Page with the new Style
6. Click on to save your changes.

See the following gif to recap the whole process.

Fig. 141: *The Style Editor*

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.

**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

• 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. 143: *Upload Styles*

Fig. 144: *Managing Styles*
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 to manage their properties ( ).

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.

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 look 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;
waterways

Fig. 146: The Create Map button

Fig. 147: The Create New Map button
Fig. 148: The Map Viewer

Fig. 149: Creating new Maps

- 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.

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

Fig. 150: The Map Information page

Fig. 151: Map Preview
Fig. 152: Maps Info tab

Fig. 153: Map Sharing

Fig. 154: Map Rating
Fig. 155: Map Comments

Fig. 156: 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 know 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.

Fig. 157: The Map Metadata Detail button

The Map Metadata page will open.
## Metadata: My New Map

### Identification

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>My New Map</td>
</tr>
<tr>
<td>License</td>
<td>Not Specified</td>
</tr>
<tr>
<td>Publication Date</td>
<td>June 12, 2019, 8:17 a.m.</td>
</tr>
<tr>
<td>Regions</td>
<td>Global, Africa, Central Africa, West Africa, Pacific, Kiribati</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

- **Name**: John Smith (johnsmith)
- **email**: john smith@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

- **Spatial Extent**: ---
- **Projection System**: EPSG:3857
- **Extension x0**: -20037397.023299999535084
- **Extension x1**: 666762.14282700003308
- **Extension y0**: -5787726.067250000312924
- **Extension y1**: 20037397.023299999535084

### Features

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

### Contact Points

- **Name**: John Smith (johnsmith)
- **email**: john smith@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**: maps/47
- **Metadata Page**: maps/47/metadata_detail

### Metadata Author

- **Name**: John Smith (johnsmith)
- **email**: john smith@mail.com

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### GeoNode Users Guide

1.10.
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

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**; brief narrative summary of the content of the Map

| Note: The Abstract panel allows you to insert HTML code through a wysiwyg text editor |

- 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

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.
Fig. 159: Basic Map Metadata
Fig. 160: Location and Licenses Metadata for Maps
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. 161: *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.

![Completeness Progress Bar](image)

Fig. 162: Completeness Progress Bar

**Metadata Advanced Editing**

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

![Editing Tools](image)

Fig. 163: 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.

**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.
Fig. 164: Change Map Permissions
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;
- **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.

![GeoNode web interface](image)

**Fig. 166: The View Map button**

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 *Table Of Contents* 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.
Fig. 167: The Map View

Fig. 168: The Table Of Contents (TOC)
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.

Fig. 169: **Scrolling the Layer Opacity**

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

![Layer Toolbar](image)

Fig. 170: **The Layer Toolbar**

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);

![Deleting Layers](image)

Fig. 171: Deleting Layers

• to create Widgets (see Creating Widgets).

Managing Layer Settings

The Layer Settings panel looks like the one below.

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. 172: The Layer Settings Panel
Fig. 173: 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)

• **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. 178: Advanced Search
the search.

![Attribute Filter](image)

**Fig. 179: 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.

- 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 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. 180: *Filtering by Region Of Interest*

Fig. 181: *Layer Filtering*
Fig. 182: 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. 183: *Chart Widgets*
Now you can filter the data to be considered for the chart by clicking on filter. We don’t need any filter so click to configure other widget options. Insert a Title and a Description and click on Save.

Fig. 184: 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.

Fig. 185: Chart Widgets Options

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 resulting widget looks like the following.
Fig. 186: Text Widgets Creation

Fig. 187: 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 .

Insert Title and Description (optional) and click on . 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 , insert Title and Description then click on .

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 , go back to the previous time instant through , go forward to next time step using and stop the animation by clicking .

The Timeline panel can be expanded through the 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. 188: *Table Widgets Columns*
Fig. 189: *Table Widget*

![Table Widget Diagram]

Configure data

39.903 km/h

**Use:**

`maxspeed`

**Operation:**

`AVG`

**Unit of measure:**

`km/h`

Fig. 190: *Counter Widget Creation*
Fig. 191: Counter Widget

Fig. 192: The Timeline
Fig. 193: The Time Control Buttons

Fig. 194: The Animation Control Buttons

Fig. 195: The Expanded Timeline

Fig. 196: The Timeline Histogram
• the \textit{Time Cursor}

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

Through the \textit{Time Range} function you can observe the data in a finite temporal interval. Click on \(	ext{[ ]}\) and set the initial and the final times to use it.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{time_range_settings.png}
\caption{The Time Range Settings}
\end{figure}

\textbf{Animations}

The \textit{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 \textit{Animation} by clicking the play button . The layer data displayed on map will change accordingly to the time reach by the cursor on the \textit{Histogram}.

By clicking on you can manage some \textit{Animation Settings}.

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

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

The \textit{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 \textit{Animation} works or take a look at the \textit{MapStore Documentation}.

\textbf{Options Menu Tools}

At the top-right corner of the \textit{Map} there is a \textit{Burger Menu} button . Click on it to open the \textit{Map Options} panel.
Fig. 199: The Timeline Settings

Fig. 200: The Timeline Animation

Fig. 201: 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://example.com/printing_window.png)

**Fig. 202: 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.

![The Layers Catalog](image)

Fig. 203: The Layers Catalog

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. 204: The Measure Tool

Fig. 205: 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.

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.

Customizing The Layers’ GetFeatureInfo Templates

When “clicking” over a feature of a Layer into a GeoNode Map, an info window popups showing a formatted representation of the raw data identified by the coordinates (see Fig. 1).

The way how such information is presented to the user is defined by what we call “GetFeatureInfo Template”. The latter is basically an HTML snippet containing some placeholders and special inline codes that instruct GeoServer on how to generate the raw data output.

The outcome is a rendered HTML snippet with the real values replacing the placeholders of the Template.

Currently, GeoNode allows a very simple mechanism to customize the “GetFeatureInfo Template” of a Layer.

It is possible, through the Layer Metadata Editor Wizard, to assign a name and a label to the attributes we want to display on the GetFeatureInfo output.

Notice that the attributes without a label and name, in case others are present, won’t be rendered at all.

As an instance, by using the example above, we can customize a bit the Layer Metadata as shown in Fig. 2.

The “GetFeatureInfo” output will change accordingly as shown in Fig. 3.
Fig. 207: *Your Map into the List*

Fig. 208: *Fig. 1*
Fig. 209: Fig. 2

Fig. 210: Fig. 3
Simple Template: Assigning A Media-Type To Attribute Values

The easiest way to render a different media-type (image, audio, video or iframe) to a property value, is to change it from the Metadata Editor Wizard attributes panel.

By changing the Display Type of an attribute from this panel as shown in Fig. 4.

![Metadata Editor Wizard](image)

GeoNode will create automatically the HTML media type when rendering by using the value of the selected property.

So, as an example, if, in the figure above, the attribute NAME contains values representing some links to other resources, GeoNode will create those links automatically for you when clicking over a geometry.

Selecting image as media-type (Fig. 6)

and editing the contents accordingly (Fig. 7)

you will get a nice effect as shown in Fig. 8

Advanced Template: Use A Custom HTML Template

By selecting the option Use a custom template? as shown in Fig. 9

You will be able to provide your own custom HTML Template for the Feature Info output.

The example below shows how it is possible to create a nice HTML output with an image taking the src from the attribute NAME values, through the use of the keyword ${properties.NAME}
Fig. 212: Fig. 5

Fig. 213: Fig. 6
Fig. 214: Fig. 7

Fig. 215: Fig. 8
Fig. 216: Fig. 9

Fig. 217: Fig. 10
Fig. 218: Fig. 11

The beautiful view of San Andrés y Providencia.

Fig. 219: Fig. 12

The beautiful view of San Andrés y Providencia.
Optional: Customizing the HTML WYSIWYG Editor Menu Bar

The Menu Bar and Tool Bar of the HTML Editor, can be easily customized by overriding the `TINYMCE_DEFAULT_CONFIG` variable on settings.py (see `TINYMCE_DEFAULT_CONFIG`).

There are many plugins and options allowing you to easily customize the editor and also provides some predefined templates to speed up the editing.

For more information about the Javascript tool, please refer to https://www.tiny.cloud/

Search Bar

The Search Bar of the map viewer allows you to find point of interests (POIs), streets or locations by name. Lets 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.

The Sidebar contains the following tools:
Fig. 221: *The Search Bar*

Fig. 222: *Result of a Search*
• 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. 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 default, GeoNode allows to enrich maps with many world backgrounds:

• **OpenStreetMap**

• **OpenTopoMap**

• **Sentinel-2-cloudless**

You can also decide to have an **Empty Background.**
Fig. 224: The Expanded Sidebar

Fig. 225: Querying Objects on map
Fig. 226: *The Basemap Switcher Tool*

Fig. 227: *Switching the Basemap*
Footer Tools

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

Fig. 228: The Map Scale

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

```html
<iframe style="border: none;" height="400" width="600"
src="http://master.demo.geonode.org/maps/11/embed">
</iframe>
```

- 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.
Fig. 231: The Embedded Map
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.

#### QGIS Desktop

QGIS is a professional GIS application that is built on top of and proud to be itself Free and Open Source Software (FOSS). QGIS is a volunteer driven project if you are interested you can find more information at [https://www.qgis.org](https://www.qgis.org).

![QGIS Desktop Main Window](image)

*Fig. 232: QGIS Desktop Main Window*
How can I connect to Geonode?

Open QGIS Desktop and go to Layer Menu > Data Source Manager. At the bottom of Data Source Manager, you can see a tab with the name and an icon related to Geonode. This is because Geonode is recognized as a data source inside QGIS.

![Data Source Manager Dialog](image)

**Fig. 233: Data Source Manager Dialog**

*Note:* It’s possible as well load Geonode instances from an existence file this is useful to share between users or to backup existence connections.

To add a new Geonode instance, in the Geonode tab selected click on **New** and you will see the following dialog:

In the dialog Fill the name as you like and in the URL put the link of the Geonode instance. It’s possible edit some WFS and WMS options to optimize the connection. If everything is ok you will receive the following successful connection dialog:

After the successful dialog it’s now possible to load all layers of the Geonode instance clicking on **Connect** button. You can see both WMS and WFS connections of the Geonode and you can load to QGIS Desktop.

After select a layer (WMS or WFS) click on the **Add** button and the layer will be displayed in the main window of QGIS.
Fig. 234: Details of Geonode instance Dialog
Fig. 235: Successful connection Dialog

Fig. 236: Geonode instance layers Dialog
Fig. 237: Example of Geonode layer
Warning: This procedure only work with public layers. If the layers are for private use is necessary to do the standard qgis add remote WMS/WFS layers (through Data Source Manager) along with basic auth method and specific endpoints.

Connect to Private layers by using OAuth2

GeoNode OAuth2 Client App Setup

Login to GeoNode as a superuser

Browse to http://<geonode>/o/applications/

Create a new specific app or, better, edit the existing one (“GeoServer”) based on OAuth2 Authorization Code Grant Type

Click on “Edit” and add the Redirect URI http://127.0.0.1:7070/qgis-client as shown below

Note: This is an example. The port and path of the URI can be customized. They must be the same on both GeoNode
and QGIS Client as shown later.

Also you will need the **Client ID** and **Client Secret** keys later when configuring QGIS.

**Configure QGIS Desktop Client OAuth2 Authentication**

Open the QGIS Desktop Client and add a new OWS remote Layer configuration

Create a new service connection

Provide the connection details

**Note:** It is important that the URL ends with /gs/ows

When finished click on “+” in order to add a new auth configuration

Provide the needed information as shown below:

- Name: *any descriptive string*
Edit application GeoServer

Name: GeoServer
Client id: Jrch2oPY3akmzndmgUYr9gc
Client secret: *****************
Client type: Confidential
Authorization grant type: Authorization code
Redirect uris:
- http://localhost/geoserver/index.html
- http://127.0.0.1:7070/qgis-client
Algorithm: RSA with SHA-2 256

Save
• Type: OAuth2 authentication
• Grant Flow: Authorization Code
• Request URL: must end with /o/authorize/
• Token URL and Refresh URL: must end with /o/token/
• Redirect URL: must match with the one defined on GeoNode above
• Client ID and Client Secret: must match with the one defined on GeoNode above
• Scopes: openid write
• Enable the persistent Token Session via Headers

Save and click on “Connect”. QGis will redirect you on a browser page asking to GeoNode to authenticate. Approve the Claims and go back to QGis.

**Remove Saved Token Sessions From QGis and Login with another User**

Edit the QGis configuration
Click on the “pencil”
Clean up the saved Tokens and save
Try to connect again.

### 1.11 GeoNode Basic Installation

#### 1.11.1 Overview

The followings are the easiest and recommended ways to deploy a full-stack GeoNode server on your host.
### 1.11. GeoNode Basic Installation

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Title</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>geoNode Local...</td>
<td>GeoNode Local... This is a description of your Web Map Server...</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>geonode:ACQU...</td>
<td>acque_interne...</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>geonode:Abruz...</td>
<td>ctr_aquila</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>geonode:CP.Cas...</td>
<td>Particelle</td>
<td>Il layer contiene le particelle catastali.</td>
</tr>
<tr>
<td>7</td>
<td>geonode:CP.Cas...</td>
<td>Mappe</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>9</td>
<td>geonode:RC015...</td>
<td>Praterie</td>
<td>Nam quam nunc, blandit vel, luctus.</td>
</tr>
<tr>
<td>11</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>13</td>
<td>geonode:codice...</td>
<td>Codice_particella</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>15</td>
<td>geonode:provin...</td>
<td>Province - Uffici</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>17</td>
<td>geonode:shp...</td>
<td>shp_monument...</td>
<td>No abstract provided</td>
</tr>
<tr>
<td>20</td>
<td>geonode:states</td>
<td>states</td>
<td>No abstract provided</td>
</tr>
<tr>
<td>24</td>
<td>geonode:strade</td>
<td>Strade</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>26</td>
<td>geonode:typhefe...</td>
<td>Dataset Test</td>
<td>Lorem ipsum dolor sit amet, conse...</td>
</tr>
</tbody>
</table>
1. **First Step**: Deploy GeoNode on a local server, running as http://localhost/ service. GeoServer will be also available at http://localhost/geoserver/

2. **Second Step**: Deploy GeoNode on a production server, running as https://my_geonode.geonode.org/ service. GeoServer will be also available at https://my_geonode.geonode.org/geoserver/

3. **Third Step**: Customize .env to match your needs

4. **Fourth Step**: Secure your production deployment; change the admin passwords and OAUTH2 keys

5. **Further Production Enhancements**

### 1.11.2 First Step: Deploy GeoNode on a local server (e.g.: http://localhost/)

**Ubuntu (18.0 +)**

__Note:__ Recommended version 18.0.4 (Bionic Beaver).

#### Packages Installation

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:

```
sudo apt install -y gdal-bin
sudo apt install -y python3-pip python3-dev python3-virtualenv python3-venv
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 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
# If the following does not work, you can skip it
sudo apt install -y libgdal20
```

#### 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 -y docker-ce docker-ce-cli containerd.io docker-compose
sudo apt autoremove --purge
```

(continues on next page)
CentOS (7.0 +)

**Note:** Recommended version 7.0 or higher.

**Warning:** Accordingly to the version you use, the packages installation might be a bit different.

### Packages Installation

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:

```bash
sudo yum -y install epel-release
sudo yum install -y gdal
sudo yum install -y python3-pip python3-dev python3-virtualenv python3-venv
sudo pip3 install -U virtualenvwrapper
sudo pip3 install -U pip
sudo pip3 install -U virtualenv
sudo yum install -y libxml2 libxml2-dev gettext
sudo yum install -y libxslt1-dev libjpeg-dev libpng-dev libpq-dev libgdal-dev
sudo yum install -y git unzip gcc zlib1g-dev libgeos-dev libproj-dev
# If the following does not work, you can skip it
sudo apt install -y libgdal20
```

**Docker Setup (First time only)**

```bash
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 curl -L "https://github.com/docker/compose/releases/download/1.23.1/docker-compose" -o /usr/local/bin/docker-compose
sudo chmod +x /usr/local/bin/docker-compose
sudo usermod -aG docker $(USER)
su $(USER)
```

### Create an instance of your `geonode-project`

Let's say your project is named `my_geonode` perform the following steps:
git clone https://github.com/GeoNode/geonode-project.git -b 3.x

# Ubuntu
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
mkvirtualenv --python=/usr/bin/python3 my_geonode

Alternatively you can also create the virtual env like below
python3.8 -m venv /home/geonode/dev/.venvs/my_geonode
source /home/geonode/dev/.venvs/my_geonode/bin/activate

pip install Django==2.2.12

# CentOS
virtualenv -p python3 my_geonode
source my_geonode/bin/activate

django-admin startproject --template=./geonode-project -e py,sh,md,rst,json,yml,ini,env,sample,properties -n monitoring-cron -n Dockerfile my_geonode

# If the previous command does not work for some reason, try the following one
python -m django startproject --template=./geonode-project -e py,sh,md,rst,json,yml,ini,env,sample,properties -n monitoring-cron -n Dockerfile my_geonode

Startup the containers

cd my_geonode
./docker-build.sh

- You can follow the containers startup by running the following commands from my_geonode root folder:

  # GeoNode Container
docker-compose logs -f django

  # GeoServer Container
docker-compose logs -f geoserver

  # DB Container
docker-compose logs -f db

  # NGINX Container
docker-compose logs -f geonode

- If any error occurs, try to catch the error stacktrace by running the following commands from my_geonode root folder:

  # GeoNode "entrypoint.sh" Logs
tail -F -n 300 invoke.log

Connect to http://localhost/

The startup typically takes some time, so be patient...

If everything goes well, you should be able to see from the geonode startup logs a line similar to the following one:

1.11. GeoNode Basic Installation
Connect to `http://localhost/`

The default credentials are:

- **GeoNode** (`http://localhost/` **admin**):
  
  username: admin
  
  password: admin

- **GeoServer** (`http://localhost/geoserver/` **admin**):
  
  username: admin
  
  password: geoserver

### 1.11.3 Second Step: Deploy GeoNode on a production server (e.g.: `https://my_geonode.geonode.org/`)

In the case you would like to deploy to, let’s say, `https://my_geonode.geonode.org/`, you will need to change `.env` as follows:

```plaintext
--- geonode-project/.env
+++ my_geonode/.env
@@ -1,7 +1,7 @@
-COMPOSE_PROJECT_NAME={{project_name}}
+COMPOSE_PROJECT_NAME=my_geonode
BACKUPS_VOLUME_DRIVER=local

DOCKER_HOST_IP=
DOCKER_ENV=production
# See https://github.com/geosolutions-it/geonode-generic/issues/28
# to see why we force API version to 1.24
@@ -9,40 +9,40 @@
C_FORCE_ROOT=1
IS_CELERY=false
IS_FIRST_START=true
FORCE_REINIT=false

-SITEURL=http://localhost/
+SITEURL=https://my_geonode.geonode.org/
ALLOWED_HOSTS=['django',]

# LANGUAGE_CODE=pt
# LANGUAGES=(('en','English'),('pt','Portuguese'))

GEONODE_INSTANCE_NAME=geonode
-DJANGO_SETTINGS_MODULE={{project_name}}.settings
-uwsgi --ini /usr/src/{{project_name}}/uwsgi.ini
+DJANGO_SETTINGS_MODULE=my_geonode.settings
+uwsgi --ini /usr/src/my_geonode/uwsgi.ini

# #################
# backend
# #################

-GEONODE_DATABASE={{project_name}}
+GEONODE_DATABASE=my_geonode

GEONODE_DATABASE_PASSWORD=geonode

(continues on next page)
-GEONODE_GEODATABASE=\{project_name\}_data
+GEONODE_GEODATABASE=my_geonode_data
GEONODE_GEODATABASE_PASSWORD=geonode

-DATABASE_URL=postgis://\{project_name\}:geonode@db:5432/\{project_name\}
-GEODATABASE_URL=postgis://\{project_name\}_data:geonode@db:5432/\{project_name\}_data
+DATABASE_URL=postgis://my_geonode:geonode@db:5432/my_geonode
+GEODATABASE_URL=postgis://my_geonode_data:geonode@db:5432/my_geonode_data
DEFAULT_BACKEND_DATASTORE=datastore
BROKER_URL=amqp://guest:guest@rabbitmq:5672/

# #################
# geoserver
# #################
-GEOSERVER_WEB_UI_LOCATION=http://localhost/geoserver/
-GEOSERVER_PUBLIC_LOCATION=http://localhost/geoserver/
+GEOSERVER_WEB_UI_LOCATION=https://my_geonode.geonode.org/geoserver/
+GEOSERVER_PUBLIC_LOCATION=https://my_geonode.geonode.org/geoserver/
GEOSERVER_LOCATION=http://geoserver:8080/geoserver/
GEOSERVER_ADMIN_PASSWORD=geoserver

OGC_REQUEST_TIMEOUT=30
OGC_REQUEST_MAX_RETRIES=1
OGC_REQUEST_BACKOFF_FACTOR=0.3
@@ -58,50 +58,50 @@
MOSAIC_ENABLED=False

# nginx
# HTTPD Server
# #################
-GEONODE_LB_HOST_IP=localhost
+GEONODE_LB_HOST_IP=my_geonode.geonode.org
GEONODE_LB_PORT=80
# IP or domain name and port where the server can be reached on HTTPS (leave HOST
---empty if you want to use HTTP only)
# port where the server can be reached on HTTPS
-HTTP_HOST=localhost
-HTTPS_HOST=
+HTTP_HOST=
+HTTPS_HOST=my_geonode.geonode.org

HTTP_PORT=80
HTTPS_PORT=443

# Let's Encrypt certificates for https encryption. You must have a domain name as
---HTTPS_HOST (doesn't work
# with an ip) and it must be reachable from the outside. This can be one of the
---following :
# disabled : we do not get a certificate at all (a placeholder certificate will be
---used)
# staging : we get staging certificates (are invalid, but allow to test the process
---completely and have much higher limit rates)
# production : we get a normal certificate (default)
-LETSENCRYPT_MODE=disabled
+# LETSENCRYPT_MODE=disabled

(continues on next page)
# LETSENCRYPT_MODE=staging
-# LETSENCRYPT_MODE=production
+LETSENCRYPT_MODE=production

RESOLVER=127.0.0.11

# #################
# Security
# #################
# Admin Settings
ADMIN_PASSWORD=admin
-ADMIN_EMAIL=admin@localhost
+ADMIN_EMAIL=admin@my_geonode.geonode.org

# EMAIL Notifications
EMAIL_ENABLE=False
DJANGO_EMAIL_BACKEND=django.core.mail.backends.smtp.EmailBackend
DJANGO_EMAIL_HOST=localhost
DJANGO_EMAIL_PORT=25
DJANGO_EMAIL_HOST_USER=
DJANGO_EMAIL_HOST_PASSWORD=
DJANGO_EMAIL_USE_TLS=False
DJANGO_EMAIL_USE_SSL=False
-DEFAULT_FROM_EMAIL='GeoNode <no-reply@geonode.org>'
+DEFAULT_FROM_EMAIL='GeoNode <no-reply@my_geonode.geonode.org>'

# Session/Access Control
LOCKDOWN_GEONODE=False
CORS_ORIGIN_ALLOW_ALL=True
SESSION_EXPIRED_CONTROL_ENABLED=True
DEFAULT_ANONYMOUS_VIEW_PERMISSION=True

**Restart the containers**

Whenever you change something on `.env` file, you will need to rebuild the container

**Warning:** Be careful! The following command drops any change you might have done manually inside the containers, except for the static volumes.

```bash
docker-compose up -d
```

**Troubleshooting**

If for some reason you are not able to reach the server on the HTTPS channel, please check the NGINX configuration files below:

1. Enter the NGINX container

   ```bash
docker-compose exec geonode sh
   ```

2. Install an editor if not present
3. Double check that the `nginx.https.enabled.conf` link has been correctly created

```
ls -lah
```

If the list does not match exactly the figure above, please run the following commands, and check again

```
rm nginx.https.enabled.conf
ln -s nginx.https.available.conf nginx.https.enabled.conf
```

4. Inspect the `nginx.https.enabled.conf` contents

```
nano nginx.https.enabled.conf
```

Make sure the contents match the following

**Warning:** Change the *Hostname* accordingly. This is only an example!

```bash
# NOTE: $VARIABLES are env variables replaced by entrypoint.sh using
#       envsubst
# not to be mistaken for nginx variables (also starting with $, but
#       usually lowercase)

# This file is to be included in the main nginx.conf configuration if
# HTTPS_HOST is set
ssl_session_cache shared:SSL:10m;
ssl_session_timeout 10m;

# this is the actual HTTPS host
server {
    listen 443 ssl;
    server_name my_geonode.geonode.org;
    keepalive_timeout 70;
    ssl_certificate /certificate_symlink/fullchain.pem;
}(continues on next page)```
SSL and HTTPS Configuration

```nginx
ssl_certificate_key /certificate_symlink/privkey.pem;
ssl_protocols TLSv1 TLSv1.1 TLSv1.2;
ssl_ciphers HIGH:!aNULL:!MD5;

include sites-enabled/*.conf;
}

# if we try to connect from http, we redirect to https
server {
  listen 80;
  server_name my_geonode.geonode.org; # TODO: once geoserver supports relative urls, we should allow access though both HTTP and HTTPS at the same time and hence remove HTTP_HOST from this line

  # Except for let's encrypt challenge
  location /.well-known {
    alias /geonode-certificates/.well-known;
    include /etc/nginx/mime.types;
  }

  # Redirect to https
  location / {
    return 302 https://my_geonode.geonode.org/$request_uri; # TODO: we should use 301 (permanent redirect, but not practical for debug)
  }
}
```

**Warning:** Save the changes, if any, and exit!

5. **Reload the NGINX configuration**

```bash
nginx -s reload
```

```
2020/06/24 10:00:11 [notice] 112#112: signal process started
/etc/nginx# exit
```

6. **It may be helpful to disable https to isolate the source of errors. After reverting the HTTPS-related changes in the .env file, repeat the above steps and ensure that the nginx.http.enabled.conf link has been correctly created.**

```bash
ln -s nginx.conf nginx.http.enabled.conf
nano nginx.http.enabled.conf
```

### 1.11.4 Third Step: Customize .env to match your needs

In the case you would like to modify the GeoNode behavior, always use the .env file in order to update the settings. If you need to change a setting which does not exist in .env, you can force the values inside my_geonode/settings.py. Refer to the section: **Settings**

You can add here any property referred as

```
Env: PROPERTY_NAME
```
Restart the containers

Whenever you change something on `.env` file, you will need to rebuild the containers.

**Warning:** Be careful! The following command drops any change you might have done manually inside the containers, except for the static volumes.

```
docker-compose up -d django
```

1.11.5 Fourth Step: Secure your production deployment; change the *admin* passwords and *OAUth2* keys

GeoServer Setup

Admin Password Update

![GeoServer](image)

**Note:** In order to generate new strong random passwords you can use an online service like [https://passwordsgenerator.net/](https://passwordsgenerator.net/)

Avoid using Symbols (e.g. `@#$%`) as they might conflict with `.env` file

OAUth2 REST API Key

GeoServer Disk Quota

Update the passwords and keys on `.env` file
Fig. 238: GeoServer Admin Password Update
Fig. 239: OAUth2 REST API Key Update
Fig. 240: GeoServer Disk Quota Update
Note: In order to generate new strong random passwords you can use an online service like https://passwordsgenerator.net/
Avoid using Symbols (e.g. @#$%) as they might conflict with .env file

--- my_geonode\.env
+++ my_geonode\prod.env
@@ -6,13 +6,13 @@
# See https://github.com/geosolutions-it/geonode-generic/issues/28
# to see why we force API version to 1.24
DOCKER_API_VERSION="1.24"

C_FORCE_ROOT=1
IS_CELERY=false
-IS_FIRST_START=true
+IS_FIRST_START=false
FORCE_REINIT=false

SITEURL=https://my_geonode.geonode.org/
ALLOWED_HOSTS=['django',]

# LANGUAGE_CODE=pt
@@ -38,13 +38,14 @@
# SECURITY
# Security
# Admin Settings
-ADMIN_PASSWORD=admin
+ADMIN_PASSWORD=<new_geonode_admin_password>
ADMIN_EMAIL=admin@my_geonode.geonode.org

ACCOUNT_CONFIRM_EMAIL_ON_GET=False
ACCOUNT_EMAIL_VERIFICATION=optional

(continues on next page)
ACCOUNT_EMAIL_CONFIRMATION_EMAIL=False
ACCOUNT_EMAIL_CONFIRMATION_REQUIRED=False

# OAuth2

-OAUTH2_API_KEY=
-OAUTH2_CLIENT_ID=Jrchz2oPY3akmzndmqUTYrs9gczlgoV20YPSvqaV
-OAUTH2_CLIENT_SECRET=rCnp5txobUo83EpQEb1M8fvj3QT5zb5qRfxNsuPzCqzaiRyIoxxM4jdMiZKFfePBHYXCLd7B8N1kfdEY9HKeIQPcy5Cp
+OAUTH2_API_KEY=<new_OAUTH2_API_KEY>
+OAUTH2_CLIENT_ID=<new_OAUTH2_CLIENT_ID>
+OAUTH2_CLIENT_SECRET=<new_OAUTH2_CLIENT_SECRET>

# GeoNode APIs

API_LOCKDOWN=False
TASTYPIE_APIKEY=

# ################################

[Optional] Update your SSH Certificates

In production deployment mode, GeoNode uses by default Let's Encrypt certificates

You may want to provide your own certificates to GeoNode

docker exec -it nginx4my_geonode_geonode sh -c 'mkdir /geonode-certificates/my_geonode'
wget --no-check-certificate 'http://<url_to_your_chain.crt>'
    -O chain.crt
wget --no-check-certificate 'http://<url_to_your_key.key>'
    -O my_geonode.key
docker cp chain.crt nginx4my_geonode_geonode:/geonode-certificates/my_geonode
docker cp my_geonode.key nginx4my_geonode_geonode:/geonode-certificates/my_geonode
docker-compose exec geonode sh
    apk add vim
    vim nginx.https.enabled.conf

-ssl_certificate /certificate_symlink/fullchain.pem;
-ssl_certificate_key /certificate_symlink/privkey.pem;
+ssl_certificate /geonode-certificates/my_geonode/chain.crt;
+ssl_certificate_key /geonode-certificates/my_geonode/my_geonode.key;

nginx -s reload
exit

Restart the GeoNode and NGINX containers

Whenever you change something on .env file, you will need to rebuild the container
Warning: Be careful! The following command drops any change you might have done manually inside the containers, except for the static volumes.

docker-compose up -d django
docker-compose restart geonode

1.11.6 Further Production Enhancements

GeoServer Production Settings

JVM Settings: Memory And GeoServer Options

The .env file provides a way to customize GeoServer JVM Options.

The variable GEOSERVER_JAVA_OPTS allows you to tune-up the GeoServer container and to enable specific GeoServer options.

```
GEOSERVER_JAVA_OPTS=
-Djava.awt.headless=true -Xms2G -Xmx4G -XX:PerfDataSamplingInterval=500
-XX:SoftRefLRUPolicyMSPerMB=36000 -XX:-UseGCOverheadLimit -XX:+UseConcMarkSweepGC
-XX:+UseParNewGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Djavax.servlet.request.encoding=UTF-8
-XX:-UseGCOverheadLimit -XX:+UseConcMarkSweepGC -XX:+UseParNewGC -XX:ParallelGCThreads=4
-Dfile.encoding=UTF8 -Djavax.servlet.request.encoding=UTF-8 -Duser.timezone=GMT
```

-Djava.awt.headless (true)

Work with graphics-based applications in Java without an actual display, keyboard, or mouse. A typical use case of UI components running in a headless environment could be an image converter app. Though it needs graphics data for image processing, a display is not really necessary. The app could be run on a server and converted files saved or sent over the network to another machine for display.

-Xms2G -Xmx4G

This means that your JVM will be started with Xms amount of memory and will be able to use a maximum of Xmx amount of memory. Above will start a JVM like with 2 GB of memory and will allow the process to use up to 4 GB of memory. You need to adjust this value depending on your available RAM.

-DGEOSERVER_CSRF_DISABLED (True)

The GeoServer web admin employs a CSRF (Cross-Site Request Forgery) protection filter that will block any form submissions that didn’t appear to originate from GeoServer. This can sometimes cause problems for certain proxy configurations. You can disable the CSRF filter by setting the GESOSERVER_CSRF_DISABLED property to true.


Whenever you need to change one or more of the JVM options, you will need to restart the GeoServer Docker container.

```
# Hard restart of the container: the only way to update the .env variables
docker-compose up -d geoserver
```

This command will preserve all the GeoServer configuration and data, since the GEOSERVER_DATA_DIR is stored on a Docker static volume.
Nevertheless, any change you have made manually to the container, e.g. added a new plugin to GeoServer or updated some JARs into the WEB-INF/lib library folder, will be lost. You will need to add the JARs again and restart GeoServer softly.

```bash
# Soft restart of the container: the .env variables won't be updated
docker-compose restart geoserver
```

### Global And Services Settings

- Check the GeoServer Memory usage and status; ensure the `GEOSERVER_DATA_DIR` path points to the static volume.

![Fig. 241: GeoServer Status](image)

- GeoServer `Global Settings`; make sure the `Proxy Base Url` points to the public URL and the `LOGGING` levels are set to `Production Mode`.

![Fig. 242: Global Settings](image)
• GeoServer **Image Processing Settings**; unless you are using some specific renderer or GeoServer plugin, use the following recommended options

**Note:** Further details at https://docs.geoserver.org/stable/en/user/configuration/image_processing/index.html#image-processing

---

![Image Processing Settings](image)

**Fig. 243: Image Processing Settings**

• Tune up **GeoServer Services Configuration**; WCS, WFS, WMS and WPS;

  – **WCS**: Update the limits accordingly to your needs. Do not use very high values, this will set GeoServer prone to DoS Attacks.

![WCS Resource Consumption Limits](image)

**Fig. 244: WCS Resource Consumption Limits**

  – **WMS**: Specify here the SRS List you are going to use. Empty means all the ones supported by GeoServer, but be careful since the GetCapabilities output will become huge.

![WMS Supported SRS List](image)

**Fig. 245: WMS Supported SRS List**
GeoNode Documentation, Release 3.1

- **WMS**: *Raster Rendering Options* allows you to tune up the WMS output for better performance or quality. Best Performance: *Nearest Neighbour* - Best Quality: *Bicubic*

**Warning**: Raster Images should be always optimized before ingested into GeoNode. The general recommendation is to **never** upload a non-processed GeoTIFF image to GeoNode.

Further details at:

![Fig. 246: WMS Raster Rendering Options](image)

- **WMS**: Update the limits accordingly to your needs. Do not use very high values, this will set GeoServer prone to DoS Attacks.

![Fig. 247: WMS Resource Consuption Limits](image)

**GeoWebCache DiskQuota On Postgis**

By default GeoWebCache DiskQuota is disabled. That means that the layers cache might potentially grow up indefinitely.

GeoWebCache DiskQuota should be always enabled on a production system. In the case it is enabled, this **must** be configured to make use of a DB engine like Postgis to store its indexes.
• First of all ensure *Tile Caching* is enabled on all available layers

**Note:** GeoNode typically does this automatically for you. It is worth to double check anyway.

![Fig. 248: Tile Caching: Tiled Layers](image)

• Configure *Disk Quota* by providing the connection string to the DB Docker Container as specified in the `.env` file

**GeoFence Security Rules On Postgis**

By default GeoFence stores the security rules on an *H2* db.

On a production system, this is not really recommended. You will need to update the GeoServer Docker container in order to enable GeoFence storing the rules into the DB Docker Container instead.

In order to do that, follow the procedure below:

```bash
# Enter the GeoServer Docker Container
docker-compose exec geoserver bash

# Install a suitable editor
apt update
apt install nano

# Edit the GeoFence DataStore .properties file
nano /geoserver_data/data/geofence/geofence-datasource-ovr.properties
```

**Note:** Make sure to provide the same connection parameters specified in the `.env` file
GeoNode Documentation, Release 3.1

Fig. 249: Tile Caching: Disk Quota Configuration

geofenceVendorAdapter.databasePlatform=org.hibernate.spatial.postgis.PostgisDialect
geofenceVendorAdapter.driverClassName=org.postgresql.Driver
geofenceVendorAdapter.url=jdbc:postgresql://db:5432/my_geonode_data
geofenceVendorAdapter.username=my_geonode_data
geofenceVendorAdapter.password=********
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.default_schema]=public

# Update the GeoServer WEB-INF/lib JARs accordingly
wget --no-check-certificate https://build.geo-solutions.it/geonode/geoserver/latest/
  → postgis-jdbc-1.3.3/postgis-jdbc-1.3.3.jar &&
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 &&
rm /usr/local/tomcat/webapps/geoserver/WEB-INF/lib/hibernate-spatial-postgis-1.1.3.1.jar &&
mv hibernate-spatial-postgis-1.1.3.1.jar /usr/local/tomcat/webapps/geoserver/WEB-INF/ 
  → lib/ &&
mv postgis-jdbc-1.3.3.jar /usr/local/tomcat/webapps/geoserver/WEB-INF/lib/

The container is ready to be restarted now.

Warning: Remember to do a soft restart otherwise the WEB-INF/lib JARs will be reset to the original state

# Exit the GeoServer container
exit

# Soft Restart GeoServer Docker Container
docker-compose restart geoserver
**IMPORTANT:** The first time you perform this procedure, GeoFence won’t be able to retrieve the old security rules anymore.

You will need to *Fixup GeoNode Layers Permissions* in order to regenerate the security rules.

### Fixup GeoNode Layers Permissions

The list of the GeoFence Security Rules is available from the *GeoFence Data Rules* section.

Always double check the list is accessible and the data rules are there. If empty, no layer will be accessible by standard users other than admin.

![GeoFence Data Rules](image)

**Fig. 250: GeoFence Data Rules**

In order to re-sync the GeoFence security rules, follow the procedure below:

```
# Enter the GeoNode Docker Container
docker-compose exec django bash

# Run the `sync_geonode_layers` management command
./manage.sh sync_geonode_layers --updatepermissions
```

### Regenerate GeoNode Layers Thumbnails

The following procedure allows you to *batch* regenerate all Layers Thumbnails:

```
# Enter the GeoNode Docker Container
docker-compose exec django bash

# Run the `sync_geonode_layers` management command
./manage.sh sync_geonode_layers --updatethumbnails
```

### Fixup GeoNode Layers Metadata And Download Links

The following procedure allows you to fix-up broken or incorrect Metadata Links:

```
# Enter the GeoNode Docker Container
docker-compose exec django bash

# Run the `sync_geonode_layers` management command
./manage.sh sync_geonode_layers --updatemetadata
```

(continues on next page)
It is also possible to *force* purging the links before regenerating:

```
# Enter the GeoNode Docker Container
docker-compose exec django bash
# Run the `set_all_layers_metadata` management command
./manage.sh set_all_layers_metadata -d --prune
```

## Migrate GeoNode To A New Hostname

In the case you will need to move your instance to another domain, as an example from `https://my_geonode.geonode.org/` to `https://prod_geonode.geonode.org/`, follow the procedure below:

- Update the `.env` file by specifying the new name accordingly.
- Restart the GeoNode Docker Container.

```
docker-compose up -d geonode
```

- Run the following management commands from inside the GeoNode Docker Container.

```
# Enter the GeoNode Docker Container
docker-compose exec django bash
# Run the `migrate_baseurl` management command
./manage.sh migrate_baseurl --source-address=my_geonode.geonode.org --target-address=prod_geonode.geonode.org
# Run the `set_all_layers_metadata` management command
./manage.sh set_all_layers_metadata -d
```

## Add Huge Or DB Datasets To Your Instance

Uploading huge datasets, or DB tables, to GeoNode from the *Web Upload Interface* is not really possible sometimes. The suggested procedure in such cases is the following one:

- Add the dataset to *GeoServer* first directly.

  You must upload the data into the GeoServer Docker Container Static Volume first and then adding manually the layer through the *GeoServer Admin GUI*.

- Once the dataset is correctly configured on GeoServer, run the following management command from inside the GeoNode Docker Container.

```
# Enter the GeoNode Docker Container
docker-compose exec django bash
# Run the `updatelayers` management command
./manage.sh updatelayers -w <workspace_name> -f <layer_name>
```
Update GeoNode Core To The Latest Commit

In the case you will need to update the GeoNode Core codebase to a specific version or commit, please follow the steps below:

```
# Enter the GeoNode Docker Container
docker-compose exec django bash

# Update GeoNode
cd /usr/src/geonode/
git fetch --all --prune
git checkout <commit or branch>

# Update the pip dependencies
pip install -r requirements.txt --upgrade --no-cache
pip install -e . --upgrade

# Synchronize the GeoNode Project
cd /usr/src/my_geonode/
./manage.sh makemigrations
./manage.sh migrate
./manage.sh collectstatic

# Refresh UWSGI Daemons
touch /usr/src/my_geonode/my_geonode/wsgi.py

# Follow the logs and make sure non errors occur
tail -F -n 30 /var/log/geonode.log
```

1.12 GeoNode Advanced Installation

1.12.1 GeoNode Core

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.

**Warning:** 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.

Ubuntu 20.04LTS

This part of the documentation describes the complete setup process for GeoNode on an Ubuntu 20.04LTS **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.

1. Install the dependencies

In this section, we are going to install all the basic packages and tools needed for a complete GeoNode installation.

**Warning:** To follow this guide, a basic knowledge about Ubuntu Server configuration and working with a shell is required.

**Note:** 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 add-apt-repository ppa:ubuntugis/ppa
sudo apt update -y; sudo apt upgrade -y;
```

**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 build-essential gdal-bin
    python3.8-dev python3.8-venv virtualenvwrapper
    libxml2-dev libjpeg-dev libpng-dev libpq-dev libgdal-dev
    software-properties-common build-essential
    git unzip gcc zlib1g-dev libgeos-dev libproj-dev
    sqlite3 spatialite-bin libsqlite3-mod-spatialite libsqlite3-dev

# Install Openjdk
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

# Verify GDAL version
gdalinfo --version
  $> GDAL 3.0.4, released 2020/01/28

# Verify Python version
python3.8 --version
```

(continues on next page)
GeoNode Documentation, Release 3.1

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```bash
$> Python 3.8.5
which python3.8
$> /usr/bin/python3.8

# Verify Java version
java -version
$> openjdk version "1.8.0_265"
$> OpenJDK Runtime Environment (build 1.8.0_265-8u265-b01-0ubuntu2-20.04-b01)
$> OpenJDK 64-Bit Server VM (build 25.265-b01, mixed mode)

# Install VIM
sudo apt install -y vim

# Cleanup the packages
sudo apt update -y; sudo apt upgrade -y; sudo apt autoremove --purge
```

**Warning:** GeoNode 3.x is not compatible with Python < 3.7

### 2. 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 Spatialite 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, its 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

**Note:** The GeoNode Virtual Environment must be created only the first time. You won’t need to create it again everytime.

```bash
which python3.8  # copy the path of python executable

# Create the GeoNode Virtual Environment (first time only)
export WORKON_HOME=~/.virtualenvs
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
mkvirtualenv --python=/usr/bin/python3.8 geonode  # Use the python path from above

# Alterantively you can also create the virtual env like below
mkdir -p ~/.virtualenvs
python3.8 -m venv ~/.virtualenvs/geonode
source ~/.virtualenvs/geonode/bin/activate

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
```

1.12. GeoNode Advanced Installation
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
workon geonode

# Alterantively you can also create the virtual env like below
source ~/.virtualenvs/geonode/bin/activate

Note: In order to save permanently the virtualenvwrapper environment

vim ~/.bashrc

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

# Let's create the GeoNode core base folder and clone it

# Clone the GeoNode source code on /opt/geonode
cd /opt; git clone https://github.com/GeoNode/geonode.git -b 3.x geonode

# Install the Python packages
cd /opt/geonode
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e . --upgrade
pip install pygdal=="`gdal-config --version`.*"

3. Test the GeoNode installation

Warning: Be sure you have successfully completed all the steps of the section 1. Install the dependencies.

Note: This command will run both GeoNode and GeoServer locally after having prepared the Spatialite database. That way or running GeoNode is absolutely discouraged. Nevertheless it is still useful to double check you have been executed all the previous passages correctly.

The server will start in DEBUG (or DEVELOPMENT) mode, by running the following services:


Warning: This modality is beneficial to debug issues and/or develop new features, but it cannot be used on a production system.
# Prepare the GeoNode Spatialite 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.

# 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
```

Stop the server by running
```
paver stop
```

## 4. Postgis database Setup

**Warning:** Be sure you have successfully completed all the steps of the section 1. 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.

```
# Ubuntu 20.04 (focal)
sudo sh -c 'echo "deb http://apt.postgresql.org/pub/repos/apt/ `lsb_release -cs`-pgdg_\n  main" >> /etc/apt/sources.list.d/pgdg.list'
sudo wget --no-check-certificate --quiet -O https://www.postgresql.org/media/keys/\n  ACCC4CF8.asc | sudo apt-key add -
sudo apt update -y; sudo apt install -y postgresql11 postgresql11-postgis-2.5_\n  -postgresql11-postgis-2.5-scripts postgresql-contrib11 postgresql-client11
```

(continues on next page)
Ubuntu 20.10 (groovy)

```bash
sudo apt update -y; sudo apt install -y postgresql-12 postgresql-12-postgis-3
postgresql-12-postgis-3-scripts postgresql-contrib-12 postgresql-client-12
```

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

**Warning:** 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

```bash
sudo service postgresql start
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

```bash
sudo -u postgres createdb -O geonode geonode
sudo -u postgres createdb -O geonode geonode_data
```

Next let’s create PostGIS extensions

```bash
sudo -u postgres psql -d geonode -c 'CREATE EXTENSION postgis;'
sudo -u postgres psql -d geonode -c 'GRANT ALL ON geometry_columns TO PUBLIC;'
sudo -u postgres psql -d geonode -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;'
sudo -u postgres psql -d geonode -c 'GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA public TO geonode;'
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`

```bash
sudo vim /etc/postgresql/11/main/pg_hba.conf
```

Scroll down to the bottom of the document. We want to make local connection trusted for the default user. Make sure your configuration looks like the one below.
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
# Database administrative login by Unix domain socket
local all postgres trust

# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all md5

# IPv4 local connections:
host all all 127.0.0.1/32 md5

# IPv6 local connections:
host all all ::1/128 md5

# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all peer

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 postgres geonode
# This should not ask for any password

psql -U geonode geonode
# This should ask for the password geonode

# Repeat the test with geonode_data DB
psql -U postgres geonode_data
psql -U geonode geonode_data
```

### 5. 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.

**Warning:** Before executing the next steps, be sure GeoNode and GeoServer paver services have been stopped. In order to do that
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.


**Warning:** Apache Tomcat 9 requires Java 8 or newer to be installed on the server. Check the steps before in order to be sure you have OpenJDK 8 correctly installed on your system.

First, it is not recommended to run Apache Tomcat as user root, so we will create a new system user which will run the Apache Tomcat server

```
sudo useradd -m -U -d /opt/tomcat -s /bin/bash tomcat
sudo usermod -a -G www-data tomcat
```

Now, go to the official Apache Tomcat website and download the most recent version of the software to your server.

```
VERSION=9.0.39; wget https://www-eu.apache.org/dist/tomcat/tomcat-9/v$\{VERSION\}/bin/
\→apache-tomcat-$\{VERSION\}.tar.gz
```

Once the download is complete, extract the tar file to the /opt/tomcat directory:

```
sudo tar -xf apache-tomcat-$\{VERSION\}.tar.gz -C /opt/tomcat/; rm apache-tomcat-$\→(VERSION\).tar.gz
```

Apache Tomcat is updated regulary. So, to have more control over versions and updates, we’ll create a symbolic link as below:

```
sudo ln -s /opt/tomcat/apache-tomcat-$\{VERSION\} /opt/tomcat/latest
```

Now, let’s change the ownership of all Apache Tomcat files as below:
sudo chown -R tomcat:www-data /opt/tomcat/

Make the shell scripts inside the bin directory executable:

```
sudo sh -c 'chmod +x /opt/tomcat/latest/bin/*.sh'
```

Create the a systemd file with the following content:

```
# Check the correct JAVA_HOME location
JAVA_HOME=$(readlink -f /usr/bin/java | sed "s:bin/java::")
echo $JAVA_HOME
	> /usr/lib/jvm/java-8-openjdk-amd64/jre strengths

# Let's create a symbolic link to the JRE
sudo ln -s /usr/lib/jvm/java-8-openjdk-amd64/jre/ /usr/lib/jvm/jre

# Let's create the tomcat service
sudo vim /etc/init.d/tomcat9

#!/bin/bash

### BEGIN INIT INFO
# Provides: tomcat9
# Required-Start: $local_fs $remote_fs $network $time
# Required-Stop: $local_fs $remote_fs $network $time
# Should-Start: $syslog
# Should-Stop: $syslog
# Default-Start: 2 3 4 5
# Default-Stop: 0 1 6
# Short-Description: Apache Tomcat init script
### END INIT INFO

#Location of JAVA_HOME (bin files)
export JAVA_HOME=/usr/lib/jvm/jre
export JAVA_OPTS=-Djava.security.egd=file:///dev/urandom

#Add Java binary files to PATH
export PATH=$JAVA_HOME/bin:$PATH

#CATALINA_HOME is the location of the bin files of Tomcat
export CATALINA_HOME=/opt/tomcat/latest

#CATALINA_BASE is the location of the configuration files of this instance of Tomcat
export CATALINA_BASE=/opt/tomcat/latest
export CATALINA_PID=/opt/tomcat/latest/temp/tomcat.pid

#TOMCAT_USER is the default user of tomcat
export TOMCAT_USER=tomcat

#TOMCAT_USAGE is the message if this script is called without any options
TOMCAT_USAGE="Usage: "$0 "start" | "stop" | "status" | "restart"

#SHUTDOWN_WAIT is wait time in seconds for java proccess to stop
SHUTDOWN_WAIT=20

tomcat_pid() { (continues on next page)
```
    echo `ps -fe | grep $CATALINA_BASE | grep -v grep | tr -s " " | cut -d " -f2`
```

```
start() {
    pid=$(tomcat_pid)
    if [ -n "$pid" ]
        then
            echo -e "\e[00;31mTomcat is already running (pid: $pid)\e[00m"
        else
            # Start tomcat
            echo -e "\e[00;32mStarting tomcat\e[00m"
            #ulimit -n 100000
            #umask 007
            #/bin/su -p -s /bin/sh $TOMCAT_USER
            if [ "user_exists $TOMCAT_USER" = "1" ]
                then
                    /bin/su $TOMCAT_USER -c $CATALINA_HOME/bin/startup.sh
                else
                    echo -e "\e[00;31mTomcat user $TOMCAT_USER does not exists. Starting\e[00m"
                    with $(id)\e[00m"
            fi
        fi
    status
    fi
    return 0
}
```

```
status(){
    pid=$(tomcat_pid)
    if [ -n "$pid" ]
        then
            echo -e "\e[00;32mTomcat is running with pid: $pid\e[00m"
        else
            echo -e "\e[00;31mTomcat is not running\e[00m"
            return 3
        fi
}
```

```
terminate() {
    echo -e "\e[00;31mTerminating Tomcat\e[00m"
    kill -9 $(tomcat_pid)
}
```

```
stop() {
    pid=$(tomcat_pid)
    if [ -n "$pid" ]
        then
            echo -e "\e[00;31mStoping Tomcat\e[00m"
            #/bin/su -p -s /bin/sh $TOMCAT_USER
            sh $CATALINA_HOME/bin/shutdown.sh
            let kwait=$SHUTDOWN_WAIT
            count=0;
            until [ `ps -p $pid | grep -c $pid` = '0' ] || [ $count -gt $kwait ]
                do
                    echo -n -e "\n\e[00;31mwaiting for processes to exit\e[00m"
                    sleep 1
                    let count=$count+1;
```
Now you can start the Apache Tomcat 9 server and enable it to start on boot time using the following command:

```bash
sudo chmod +x /etc/init.d/tomcat9
sudo service tomcat9 start
```

For verification, type the following `ss` command, which will show you the 8080 open port number, the default open port reserved for Apache Tomcat Server.

```
ss -ltn
```

If your server is protected by a firewall and you want to access Tomcat from the outside of your local network, you
need to open port 8080.

Use the following command to open the necessary port:

```
sudo ufw allow 8080/tcp
```

**Warning:** Generally, when running Tomcat in a production environment, you should use a load balancer or reverse proxy.

It’s a best practice to allow access to port 8080 only from your internal network.

We will use **NGINX** in order to provide Apache Tomcat through the standard **HTTP** port.

**Note:** Alternatively you can define the Tomcat Service as follow, in case you would like to use **systemctl**

```
sudo vim /usr/lib/systemd/system/tomcat9.service
```

```
[Unit]
Description=Apache Tomcat Server
After=syslog.target network.target

[Service]
Type=forking
User=tomcat
Group=tomcat

Environment=JAVA_HOME=/usr/lib/jvm/jre
Environment=JAVA_OPTS=-Djava.security.egd=file:///dev/urandom
Environment=CATALINA_PID=/opt/tomcat/latest/temp/tomcat.pid
Environment=CATALINA_HOME=/opt/tomcat/latest
Environment=CATALINA_BASE=/opt/tomcat/latest

ExecStart=/opt/tomcat/latest/bin/startup.sh
ExecStop=/opt/tomcat/latest/bin/shutdown.sh

RestartSec=30
Restart=always

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

```
sudo systemctl daemon-reload
sudo systemctl enable tomcat9.service
sudo systemctl start tomcat9.service
```

**Install GeoServer on Tomcat9**

Let’s externalize the **GEOSERVER_DATA_DIR** and logs

```
# Create the target folders
sudo mkdir -p /opt/data
sudo chown -Rf $USER:www-data /opt/data
```

(continues on next page)
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/xom-\*\.jar/xom-\*\.jar,bcprov\*\.jar/g' /opt/tomcat/latest/conf/catalina.properties

export JAVA_HOME=$(readlink -f /usr/bin/java | sed "s:bin/java::")

echo 'JAVA_HOME="$JAVA_HOME"' | sudo tee --append /opt/tomcat/latest/bin/setenv.sh

echo 'GEOSERVER_DATA_DIR=\"/opt/data/geoserver_data\"' | sudo tee --append /opt/tomcat/latest/bin/setenv.sh

echo 'GEOSERVER_LOG_LOCATION=\"/opt/data/geoserver_logs/geoserver.log\"' | sudo tee --append /opt/tomcat/latest/bin/setenv.sh

echo 'GEOFENCE_DIR="$GEOSERVER_DATA_DIR/geofence"' | sudo tee --append /opt/tomcat/latest/bin/setenv.sh

echo 'TIMEZONE="UTC"' | sudo tee --append /opt/tomcat/latest/bin/setenv.sh

echo 'JAVA_OPTS="-server -Djava.awt.headless=true -Dorg.geotools.shapefile.datetime=false -XX:+UseParallelGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Duser.timezone=$TIMEZONE -Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 -Djavax.servlet.response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DPRINT_BASE_URL=http://geoserver:8080/geoserver/pdf -DGEOSERVER_DATA_DIR=$GEOSERVER_DATA_DIR -Dgeofence.dir=$GEOFENCE_DIR -DGEOSERVER_LOG_LOCATION=$GEOSERVER_LOG_LOCATION -DGEOWEBCACHE_CACHE_DIR=$GEOWEBCACHE_CACHE_DIR"" | sudo tee --append /opt/tomcat/latest/bin/setenv.sh
```

1.12. GeoNode Advanced Installation
Note: After the execution of the above statements, you should be able to see the new options written at the bottom of the file /opt/tomcat/latest/bin/setenv.sh.

```
...
# 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="$GEOSERVER_DATA_DIR/geofence"
TIMEZONE="UTC"
JAVA_OPTS="-server -Djava.awt.headless=true -Dorg.geotools.shapefile.datetime=false -
              -XX:+UseParallelGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Duser.timezone=
              -DTIMEZONE-Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 -Djavax.servlet.
              -response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DPRINT_BASE_URL=http://
              -dir=$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.

```
# Restart the server
sudo service tomcat9 restart

# 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
```

```
...
2019-05-31 10:06:34,190 INFO [geoserver.wps] - Found 5 bindable processes in GeoServer specific processes
2019-05-31 10:06:34,311 INFO [geoserver.wps] - Blacklisting process ras:ConvolveCoverage as the input kernel of type class javax.media.jai.KernelJAI cannot be handled
```
(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 /opt/tomcat/latest/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 setup
paver sync
paver start_django
```
Note: 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.

6. 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

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

# Install the services

```
sudo apt install -y nginx uwsgi uwsgi-plugin-python3
```

Serving (“geonode”, “geoserver”) via NGINX

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

Warning: !IMPORTANT!

Change the line `virtualenv = /home/<my_user>/.virtualenvs/geonode` below with your current user home directory!

E.g.: If the user is `afabiani` then `virtualenv = /home/afabiani/.virtualenvs/geonode`

```
[uwsgi]
uwsgi-socket = 0.0.0.0:8000
# http-socket = 0.0.0.0:8000
```

(continues on next page)
gid = www-data
plugins = python3
virtualenv = /home/<my_user>/.virtualenvs/geonode

env = DEBUG=False

env = DJANGO_SETTINGS_MODULE=geonode.local_settings

env = SECRET_KEY='RanD0m%3cr3tK3y'

env = SITE_HOST_NAME=localhost

env = SITEURL=http://localhost/

env = ALLOWED_HOSTS=['localhost',]

env = LOCKDOWN_GEONODE=False

env = SESSION_EXPIRED_CONTROL_ENABLED=True

env = MONITORING_ENABLED=False

env = ADMIN_USERNAME=admin

env = ADMIN_PASSWORD=admin

env = ADMIN_EMAIL=admin@localhost

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 = OGC_REQUEST_TIMEOUT=60

env = OGC_REQUEST_MAX_RETRIES=3

env = OGC_REQUEST_POOL_MAXSIZE=100

env = OGC_REQUEST_POOL_CONNECTIONS=100

logto = /opt/data/logs/geonode.log

pidfile = /tmp/geonode.pid

chdir = /opt/geonode

module = geonode.wsgi:application

strict = false

master = true

enable-threads = true

vacuum = true ; Delete sockets during shutdown

single-interpreter = true

die-on-term = true ; Shutdown when receiving SIGTERM (default is respawn)

need-app = true

# logging

# path to where uwsgi logs will be saved

# logto = /opt/data/geonode_logs/geonode.log
daemonize = /opt/data/logs/geonode.log
touch-reload = /opt/geonode/geonode/wsgi.py
buffer-size = 32768

harakiri = 60 ; forcefully kill workers after 60 seconds
py-callos-afterfork = true ; allow workers to trap signals
max-requests = 1000 ; Restart workers after this many requests
max-worker-lifetime = 3600 ; Restart workers after this many seconds
reload-on-rss = 2048 ; Restart workers after this much resident memory
worker-reload-mercy = 60 ; How long to wait before forcefully killing workers

cheaper-algo = busyness ; Maximum number of workers allowed
processes = 128
cheaper = 8 ; Minimum number of workers allowed
cheaper-initial = 16 ; Workers created at startup
cheaper-overload = 1 ; Length of a cycle in seconds
cheaper-step = 16 ; How many workers to spawn at a time
cheaper-busyness-multiplier = 30 ; How many cycles to wait before killing workers
cheaper-busyness-min = 20 ; Below this threshold, kill workers (if stable)
cheaper-busyness-max = 70 ; Above this threshold, spawn new workers
cheaper-busyness-backlog-alert = 16 ; Spawn emergency workers if more than this many requests are waiting in the queue
cheaper-busyness-backlog-step = 2 ; How many emergency workers to create if there are too many requests in the queue

# daemonize = /var/log/uwsgi/geonode.log
# cron = -1 -1 -1 -1 -1 /usr/local/bin/python /usr/src/{{project_name}}/manage.py collect_metrics -n

# 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.config 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_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

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;
    }

    (continues on next page)
# Prepare the uploaded folder
```
sudo mkdir -p /opt/geonode/geonode/uploaded
sudo chown -Rf tomcat:www-data /opt/geonode/geonode/uploaded
sudo chmod -Rf 777 /opt/geonode/geonode/uploaded/
```
```
sudo touch /opt/geonode/geonode/.celery_results
sudo chmod 777 /opt/geonode/geonode/.celery_results
```

# Enable GeoNode NGINX config
```
sudo ln -s /etc/nginx/sites-available/geonode /etc/nginx/sites-enabled/geonode
```

# Restart the services
```
sudo service tomcat9 restart
sudo service nginx restart
```

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.

```
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 service tomcat9 stop
```

# Initialize GeoNode
```
DJANGO_SETTINGS_MODULE=geonode.local_settings paver reset
DJANGO_SETTINGS_MODULE=geonode.local_settings paver setup
DJANGO_SETTINGS_MODULE=geonode.local_settings paver sync
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py collectstatic --noinput
```

Before finalizing the configuration we will need to update the UWSGI settings

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

**Warning:** !IMPORTANT! In the statement below make sure to use
```
DJANGO_SETTINGS_MODULE=geonode.local_settings
```

# Restart Tomcat
```
sudo service tomcat9 restart
```

# Restart UWSGI
GeoNode Documentation, Release 3.1

(continued from previous page)

```bash
sudo killall /usr/bin/uwsgi
sudo service uwsgi start

# Update the GeoNode ip or hostname
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

# Refresh GeoNode and GeoServer OAuth2 settings
sudo PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.
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˒...
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/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
```

8. 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
dsuo 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
```

Next, the steps to do are:

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. 251: Redirect URIs

Fig. 252: 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

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

# Change everywhere 'http' to 'https'
%s/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
```

9. Enabling Fully Asynchronous Tasks

Install and configure “rabbitmq-server”

**Warning:** Adapt the steps below accordingly to your Ubuntu distribution (see the “rabbitmq-server” links to the documentation).
Fig. 254: OAuth2 Service Parameters
Fig. 255: UWSGI Configuration
sudo apt update && sudo apt install wget -y
sudo apt install apt-transport-https -y
wget -O- https://dl.bintray.com/rabbitmq/Keys/rabbitmq-release-signing-key.asc | sudo apt-key add -
wget -O- https://www.rabbitmq.com/rabbitmq-release-signing-key.asc | sudo apt-key add -
wget http://packages.erlang-solutions.com/site/esl/esl-erlang/FLAVOUR_1_general/esl-erlang_20.1.1-ubuntu-xenial_amd64.deb
sudo dpkg -i esl-erlang_20.1.1-ubuntu-xenial_amd64.deb
echo "deb https://dl.bintray.com/rabbitmq/debian xenial main" | sudo tee /etc/apt/sources.list.d/bintray.rabbitmq.list
sudo apt-get update
sudo apt-get install rabbitmq-server
sudo systemctl start rabbitmq-server.service
sudo systemctl enable rabbitmq-server.service
systemctl is-enabled rabbitmq-server.service
sudo rabbitmq-plugins enable rabbitmq_management
sudo ufw allow proto tcp from any to any port 5672,15672
sudo rabbitmqctl delete_user guest
sudo rabbitmqctl add_user admin <your_rabbitmq_admin_password_here>
sudo rabbitmqctl change_password admin <your_rabbitmq_admin_password_here>
sudo rabbitmqctl set_user_tags admin administrator
sudo rabbitmqctl add_vhost /localhost
sudo rabbitmqctl set_permissions -p / localhost admin ".*" ".*" ".*"
sudo rabbitmqctl set_permissions -p /localhost admin ".*" ".*" ".*"

Install and configure “supervisor” and “celery”

sudo apt install supervisor
sudo mkdir /etc/supervisor
echo_supervisord_conf > /etc/supervisor/supervisord.conf
sudo mkdir /etc/supervisor/conf.d
sudo vim /etc/supervisor/supervisord.conf

Note: !IMPORTANT!
Pay particular attention to the environment key values pair placed here.
They must match the values you have already set on the uwsgi.ini file.

; supervisor config file
[unix_http_server]
file=/var/run/supervisor.sock ; (the path to the socket file)
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```
ch​mod=0700 ; sock​e​t file mode (default 0700)

[supervisord]
nodeamon=true
logfile=/var/log/supervisor/supervisord.log ; (main log file; default $CWD/supervisord.
→log)
pidfile=/var/run/supervisor.pid ; (supervisord pidfile; default supervisor.pid)
childlogdir=/var/log/supervisor ; ('AUTO' child log dir, default $TEMP)

; the below section must remain in the config file for RPC
; (supervisorctl/web interface) to work, additional interfaces may be
; added by defining them in separate rpcinterface: sections
[supervisor.rpcinterface:supervisor]
supervisor.rpcinterface_factory = supervisor.rpcinterface:make_main_rpcinterface

[supervisorctl]
serverurl=unix:///var/run/supervisor.sock ; use a unix:// URL for a unix socket

; The [include] section can just contain the "files" setting. This
; setting can list multiple files (separated by whitespace or
; newlines). It can also contain wildcards. The filenames are
; interpreted as relative to this file. Included files *cannot*
; include files themselves.
[include]
files = /etc/supervisor/conf.d/*.conf
```

```
sudo vim /etc/supervisor/conf.d/geonode-celery.conf

[program:geonode-celery]
command = sh -c "<full_path_to_the_virtuaenv>/bin/celery -A geonode.celery_app:app ˓→worker -B -E --loglevel=DEBUG --concurrency=10 -n worker1@%%h"
directory = /<full_path_to_the_geonode_source_code>
user=geosolutions
numproc=1
stdout_logfile=/var/logs/geonode-celery.log
stderr_logfile=/var/logs/geonode-celery.log
autostart = true
autorestart = true
startssecs = 10
stopwaitsecs = 600
priority = 998
```

Relo​ad and restart supervisor and the celery workers

```
# Restart supervisor
sudo supervisorctl reload
sudo systemctl restart supervisor
```

(continues on next page)
# Kill old celery workers (if any)

```bash
sudo pkill -f celery
```

Make sure everything is green

```bash
# Check the supervisor service status
sudo systemctl status supervisor

# Check the celery workers logs
sudo tail -F -n 300 /var/logs/geonode-celery.log
```

The ‘environment’ directive

The environment variables are placed into the `/etc/supervisor/supervisord.conf` file; they are exposed to the service via the `environment` directive.

The syntax of this directive is the following one:

```bash
environment=ENV_KEY_1="ENV_VALUE_1",ENV_KEY_2="ENV_VALUE_2",...,ENV_KEY_n="ENV_VALUE_n"
```

The following are the minimum set of env key value pairs you will need for a standard GeoNode Celery instance:

- `ASYNC_SIGNALS="True"`
- `BROKER_URL="amqp://admin:<your_rabbitmq_admin_password_here>@localhost:5672/"`
- `DEBUG`
- `CACHE_BUSTING_STATIC_ENABLED`
- `CACHE_BUSTING_MEDIA_ENABLED`
- `SITEURL`
- `DJANGO_SETTINGS_MODULE`
- `GEOSERVER_ADMIN_PASSWORD`
- `GEOSERVER_LOCATION`
- `GEOSERVER_PUBLIC_LOCATION`
- `GEOSERVER_WEB_UI_LOCATION`
- `MONITORING_ENABLED`

You will also need to:

a. Add more variables accordingly to your custom tasks (if any)

b. Make always sure the values of the environment variables match the ones of the `uwsgi.ini` file

### Install and configure “memcached”

```bash
sudo apt install memcached

sudo systemctl start memcached
sudo systemctl enable memcached
```

(continues on next page)
workon <your_geonode_venv_name>
cd /<full_path_to_the_geonode_source_code>

```
sudo apt install libmemcached-dev zlib1g-dev
pip install pylibmc==1.6.1
pip install sherlock==0.3.2

sudo systemctl restart supervisor.service
sudo systemctl status supervisor.service
```

---

**RHEL 7.x**

1. Install the dependencies

```
#sudo yum upgrade -y
sudo yum install -y yum-plugin-versionlock
sudo yum install -y libffi-devel deltarpm java-1.8.0-openjdk.x86_64 zlib-devel bzip2-devel openssl-devel readline-devel git vim nginx rpm-build libxml2-devel geos-devel gettext geos-devel libjpeg-devel libpng-devel zlib zlib-devel libspatialite-devel tcl-devel tcl
#libpq needed by psycopg2
sudo yum-builddep -y libpq-12.1-3.el8.src.rpm
rpmbuild --rebuild --nocheck libpq-12.1-3.el7.x86_64.rpm
sudo yum install -y ./rpmbuild/RPMS/x86_64/libpq-12.1-3.el7.x86_64.rpm ./rpmbuild/RPMS/x86_64/libpq-devel-12.1-3.el7.x86_64.rpm
sudo yum versionlock libpq.x86_64 libpq-devel.x86_64

# Build an rpm of SQLITE > 3.8.3 (Django)
sudo yum-builddep -y sqlite-3.26.0-4.el8_1.src.rpm
rpmbuild --rebuild --nocheck sqlite-3.26.0-4.el8_1.src.rpm
sudo yum install -y ./rpmbuild/RPMS/x86_64/sqlite-3.26.0-4.el8_1.x86_64.rpm ./rpmbuild/RPMS/x86_64/sqlite-devel-3.26.0-4.el8_1.x86_64.rpm ./rpmbuild/RPMS/x86_64/sqlite-libs-3.26.0-4.el8_1.x86_64.rpm

#GDAL 2.2.4
sudo yum install -y gdal-devel gdal
```

2. Create necessary users

```
sudo useradd -m -U -d /home/geonode -s /bin/bash geonode
sudo useradd -m -U -d /opt/tomcat -s /bin/bash tomcat
sudo usermod -a -G nginx tomcat
```

---

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3. Give geonode correct sudo powers

Edit sudo configuration with this command:

```bash
sudo visudo
```

Add these lines in the editors

```bash
geonode localhost = (root) NOPASSWD: /usr/bin/geonode
geonode localhost = (root) NOPASSWD: /usr/bin/geonode_updateip
```

Save to /etc/sudoers from temporary file and exit.

4. Configure PostgreSQL 13

You most likely want to change the password before applying the sql commands below

```bash
sudo subscription-manager repos --enable rhel-7-server-optional-rpms --enable rhel-7- ˓
server-extras-rpms --enable rhel-7-server-e4s-rpms --enable rhel-7-server-devtools- ˓
rpms
sudo yum install -y https://download.postgresql.org/pub/repos/yum/reporpms/EL-7-x86_ ˓
64/pgdg-redhat-repo-latest.noarch.rpm
sudo yum install -y postgresql13-server postgis31_13 postgresql13-devel
sudo /usr/pgsql-13/bin/postgresql-13-setup initdb
sudo systemctl enable --now postgresql-13
sudo systemctl start postgresql-13

cat <EOF>> /var/lib/pgsql/13/data/pg_hba.conf
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
# Database administrative login by Unix domain socket
local all postgres trust
# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all md5
# IPv4 local connections:
host all all 127.0.0.1/32 md5
# IPv6 local connections:
host all all ::1/128 md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all peer
host replication all 127.0.0.1/32 md5
host replication all ::1/128 md5
EOF

sudo -u postgres createuser geonode
sudo -u postgres createdb geonode
sudo -u postgres createdb geonode_data
sudo -u postgres psql -c "alter user geonode with encrypted password 'geonode';"
```

(continues on next page)
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(continued from previous page)

sudo -u postgres psql -d geonode -c 'CREATE EXTENSION postgis;'
sudo -u postgres psql -d geonode -c 'GRANT ALL ON geometry_columns TO PUBLIC;'
sudo -u postgres psql -d geonode -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;'
sudo -u postgres psql -d geonode -c 'GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA
˓→public TO geonode;'
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;'

5. Install Tomcat and GeoServer
VERSION=9.0.39; wget https://www-eu.apache.org/dist/tomcat/tomcat-9/v${VERSION}/bin/
˓→apache-tomcat-${VERSION}.tar.gz
sudo tar -xf apache-tomcat-${VERSION}.tar.gz -C /opt/tomcat/
rm apache-tomcat-${VERSION}.tar.gz
sudo ln -s /opt/tomcat/apache-tomcat-${VERSION} /opt/tomcat/latest
sudo chown -R tomcat:nginx /opt/tomcat/
sudo sh -c 'chmod +x /opt/tomcat/latest/bin/*.sh'

6. Install GeoNode
# This is to be performed as user geonode
curl https://pyenv.run | bash

7. Configure pyenv
# This is to be performed as user geonode
# add these lines to .bashrc
export PATH="$HOME/.pyenv/bin:$PATH"
eval "$(pyenv init -)"
eval "$(pyenv virtualenv-init -)"

8. Continue installing a recent python 3.8.x version.
Continue installing custom version of python (3.8.5), virtualenv, GeoNode
# This is to be performed as user geonode
pyenv install 3.8.5
pyenv global 3.8.5
pip install --upgrade pip
pip install virtualenv
mkdir -p ~/.virtualenvs
python3.8 -m venv ~/.virtualenvs/geonode
source ~/.virtualenvs/geonode/bin/activate
cat <<EOF>> .bashrc
source ~/.virtualenvs/geonode/bin/activate
(continues on next page)

1.12. GeoNode Advanced Installation

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9. Configure /etc/uwsgi.d/geonode.ini

```ini
[uwsgi]
http-socket = 0.0.0.0:8000
id = geonode
gid = nginx
virtualenv = /home/geonode/.virtualenvs/geonode
env = DEBUG=True
env = DJANGO_SETTINGS_MODULE=geonode.local_settings
env = SECRET_KEY=""
env = SITE_HOST_NAME=<your_public_geonode_hostname>
env = SITEURL=https://<your_public_geonode_hostname>/
env = ALLOWED_HOSTS=['localhost', 'your_server_public_ip_address', '<your_public_geonode_hostname>']
env = LOCKDOWN_GEONODE=False
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = MONITORING_ENABLED=False
env = ADMIN_USERNAME=admin
env = ADMIN_PASSWORD=admin
env = ADMIN_EMAIL=admin@localhost
env = GEOSERVER_PUBLIC_HOST=<your_public_geonode_hostname>
env = GEOSERVER_PUBLIC_PORT=8080
env = GEOSERVER_ADMIN_PASSWORD=geoserver
env = GEOSERVER_LOCATION=http://<your_geoserver_private_address>:8080/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=https://<your_public_geonode_hostname>/geoserver/
env = GEOSERVER_WEB_UI_LOCATION=https://<your_public_geonode_hostname>/geoserver/
env = OGC_REQUEST_TIMEOUT=60
env = OGC_REQUEST_MAX_RETRIES=3
env = OGC_REQUEST_POOL_MAXSIZE=100
env = OGC_REQUEST_POOL_CONNECTIONS=100
env = SECURE_SSL_REDIRECT=True
env = SECURE_HSTS_INCLUDE_SUBDOMAINS=True
env = AVATAR_GRAVATAR_SSL=True
env = OAUTH2_API_KEY=<secret_here>
env = OAUTH2_CLIENT_ID=<secret_here>
env = OAUTH2_CLIENT_SECRET=<secret_here>
pidfile = /tmp/geonode.pid
chdir = /opt/geonode
module = geonode.wsgi:application
strict = false
master = true
```

(continues on next page)
enable-threads = true
vacuum = true ; Delete sockets during shutdown
single-interpreter = true ; Shutdown when receiving SIGTERM (default is _
  respawn)
need-app = true
daemonize = /opt/data/logs/geonode.log
touch-reload = /opt/geonode/geonode/wsgi.py
buffer-size = 32768
harakiri = 60 ; forcefully kill workers after 60 seconds
py-callos-afterfork = true ; allow workers to trap signals
max-requests = 1000 ; Restart workers after this many requests
max-worker-lifetime = 3600 ; Restart workers after this many seconds
reload-on-rss = 2048 ; Restart workers after this much resident memory
worker-reload-mercy = 60 ; How long to wait before forcefully killing _
  workers
cheaper-algo = busyness
processes = 128 ; Maximum number of workers allowed
cheaper = 8 ; Minimum number of workers allowed
cheaper-initial = 16 ; Workers created at startup
cheaper-overload = 1 ; Length of a cycle in seconds
cheaper-step = 16 ; How many workers to spawn at a time
cheaper-busyness-multiplier = 30 ; How many cycles to wait before killing workers
cheaper-busyness-min = 20 ; Below this threshold, kill workers (if stable _
  for multiplier cycles)
cheaper-busyness-max = 70 ; Above this threshold, spawn new workers
cheaper-busyness-backlog-alert = 16 ; Spawn emergency workers if more than this many _
  requests are waiting in the queue
cheaper-busyness-backlog-step = 2 ; How many emergency workers to create if there _
  are too many requests in the queue
# daemonize = /var/log/uwsgi/geonode.log
# cron = -1 -1 -1 -1 -1 /usr/local/bin/python /usr/src/{{project_name}}/manage.py _
  collect_metrics -n

10. Modify /etc/nginx/nginx.conf

If you are not using letsencrypt, you should put your certificates in the paths suggested below:

user nginx;
worker_processes auto;
error_log /var/log/nginx/error.log;
pid /run/nginx.pid;

# Load dynamic modules. See /usr/share/doc/nginx/README.dynamic.
#include /usr/share/nginx/modules/*.conf;

events {
    worker_connections 1024;
}

http {
    log_format main '$remote_addr - $remote_user [$time_local] "$request" '
    ' $status $body_bytes_sent "$http_referer" '
    '"$http_user_agent" "$http_x_forwarded_for"';
access_log /var/log/nginx/access.log main;

sendfile on;
tcp_nopush on;
tcp_nodelay on;
keepalive_timeout 65;
types_hash_max_size 2048;

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

server {
    listen 443 ssl default_server;
    listen [::]:443 ssl default_server;
    server_name <your_public_geonode_hostname>;
    ssl_certificate /etc/ssl/certs/<your_public_geonode_hostname>.crt;
    ssl_certificate_key /etc/ssl/private/<your_public_geonode_hostname>.key;
    ssl_client_certificate /etc/ssl/certs/ca-bundle.crt;
    ssl_protocols TLSv1 TLSv1.1 TLSv1.2;
    ssl_prefer_server_ciphers on;
    ssl_ciphers "EECDH+AESGCM:EDH+AESGCM:AES256+EECDH:AES256+EDH";
    ssl_ecdh_curve secp384r1;
    ssl_session_cache shared:SSL:10m;
    ssl_sessionTickets off;
    ssl_stapling on;
    ssl_stapling_verify on;
    resolver 8.8.8.8 8.8.4.4 valid=300s;
    resolver_timeout 5s;
    add_header Strict-Transport-Security "max-age=63072000; includeSubdomains";
    add_header X-Frame-Options DENY;
    add_header X-Content-Type-Options nosniff;
    ssl_dhparam /etc/ssl/certs/dhparam.pem;
    charset utf-8;
    client_max_body_size 100G;
    client_body_buffer_size 256K;
    large_client_header_buffers 4 64k;
    proxy_read_timeout 600s;
    fastcgi_hide_header Set-Cookie;
    etag on;
    # compression
    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_types
    text/css
    text/javascript
    text/xml
    text/plain
    application/xml
    application/xml+rss
    application/javascript

(continues on next page)
application/x-javascript
application/json;

# GeoServer
location /geoserver {
  set $upstream 127.0.0.1:8080;
  proxy_set_header Host $http_host;
  proxy_set_header X-Real-IP $remote_addr;
  proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
  proxy_set_header X-Forwarded-Proto https;
  proxy_pass http://$upstream;
}

# GeoNode
location /static/ {
  alias /opt/geonode/geonode/static_root/;
  location ~* \.(html|js|jpg|jpeg|gif|png|css|tgz|gz|rar|bz2|doc|pdf|ppt|tar|wav|bmp|ttf|rtf|swf|ico|flv|txt|woff|woff2|svg|xml) {
    gzip_static always;
    expires 30d;
    access_log off;
    add_header Pragma "public";
    add_header Cache-Control "max-age=31536000, public";
  }
}
location /uploaded/ {
  alias /opt/geonode/geonode/uploaded/;
  location ~* \.(html|js|jpg|jpeg|gif|png|css|tgz|gz|rar|bz2|doc|pdf|ppt|tar|wav|bmp|ttf|rtf|swf|ico|flv|txt|woff|woff2|svg|xml) {
    gzip_static always;
    expires 30d;
    access_log off;
    add_header Pragma "public";
  }
}
location / {
  set $upstream 127.0.0.1:8000;
  include /etc/nginx/uwsgi_params;
  if ($request_method = OPTIONS) {
    add_header Access-Control-Allow-Methods "GET, POST, PUT, PATCH, OPTIONS";
    add_header Access-Control-Allow-Headers "Authorization, Content-Type, Accept";
    add_header Access-Control-Allow-Credentials true;
    add_header Content-Length 0;
    add_header Content-Type text/plain;
    add_header Access-Control-Max-Age 1728000;
    return 200;
  }
  add_header Access-Control-Allow-Credentials false;
  add_header Access-Control-Allow-Headers "Content-Type, Accept, Authorization, Origin, User-Agent";
  add_header Access-Control-Allow-Methods "GET, POST, PUT, PATCH, OPTIONS";
  proxy_connect_timeout 600;
  proxy_send_timeout 600;
  proxy_read_timeout 600;
  send_timeout 600;
}
proxy_redirect off;
proxy_set_header Host $host;
proxy_set_header X-Real-IP $remote_addr;
proxy_set_header X-Forwarded-Host $server_name;
proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
proxy_set_header X-Forwarded-Proto https;
proxy_pass http://$upstream;
# uwsgi_params
location ~* \.\.(?j|p|f|g|p|t|g|z|r|ar|2|d|o|c|p|t|a|w|b|m|t|f|r|s|w|i|c|f|l|v|w|o|f|2|s|v|xml)
  {gzip_static always;
   expires 30d;
   access_log off;
   add_header Pragma "public";
   add_header Cache-Control "max-age=31536000, public";
  }
}
}
}

11. Modify /etc/uwsgi.ini

[uwsgi]
uid = geonode
gid = nginx
emperor = /etc/uwsgi.d
chmod-socket = 660
emperor-tyrant = false
cap = setgid,setuid

12. Create Geonode service /etc/systemd/system/geonode.service

[Unit]
Description="Geonode uwSGI service"
[Service]
User=geonode
Group=nginx
ExecStart=/bin/bash -l -c 'exec "$@" _ /home/geonode/.virtualenvs/geonode/bin/uwsgi / etc/uwsgi.ini
Restart=on-failure
[Install]
WantedBy=multi-user.target

13. Enable uwSGI service

systemctl daemon-reload
systemctl enable --now geonode
14. Configure Postgres Database in GeoNode

```
sudo su - geonode
cd /opt/geonode
cp geonode/local_settings.py.geoserver.sample geonode/local_settings.py
```

15. Configure local_settings.py

```
sed -i -e "s/'PASSWORD': 'geonode',/'PASSWORD': '<your_db_role_password>',/g" geonode/
˓
→ local_settings.py
```

16. Initialize GeoNode

```
DJANGO_SETTINGS_MODULE=geonode.local_settings paver reset
DJANGO_SETTINGS_MODULE=geonode.local_settings paver setup
DJANGO_SETTINGS_MODULE=geonode.local_settings paver sync
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py collectstatic --noinput

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

sudo PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.
˓
→ local_settings GEONODE_ETC=/opt/geonode/geonode GEOSERVER_DATA_DIR=/opt/data/
˓
→ geoserver_data TOMCAT_SERVICE="service tomcat9" APACHE_SERVICE="service nginx"
˓
→ geonode_updateip -l localhost -p <your_public_geonode_hostname>

DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py migrate_baseurl --
˓
→ source-address=http://localhost --target-address=<your_public_geonode_hostname>
```

17. Configure OAuth2

17.1 Update the GeoNode OAuth2 Redirect URIs accordingly.

From the GeoNode Admin Dashboard go to Home > Django/GeoNode OAuth Toolkit > Applications > GeoServer

17.2 Update the GeoServer Proxy Base URL accordingly.

From the GeoServer Admin GUI go to About & Status > Global

17.3 Update the GeoServer Role Base URL accordingly.

From the GeoServer Admin GUI go to Security > Users, Groups, Roles > geonode REST role service
Django administration

Change application

Client id:

User:

Redirect uris:

https://example.org/geoserver/
https://www.example.org/geoserver/

Allowed URLs list, space separated

Fig. 256: Redirect URIs

GeoServer

Global Settings

Settings that apply to all OGC services and control the internal behavior of GeoServer.

OGC Services

Service Settings

Proxy Base URL

https://www.example.org/geoserver

Service Request Settings

Fig. 257: Proxy Base URL
17.4 Update the GeoServer OAuth2 Service Parameters accordingly.

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

18. Using letsencrypt

In case you want to use letsencrypt free certificates, you should configure nginx accordingly:

https://certbot.eff.org/lets-encrypt/centosrhel7-nginx.html

Comment out any ssl parameter in nginx and replace with the parameters and paths given by certbot

Windows

In this section we are going to discuss installation process of geonode in windows. This process will install the geonode in your windows machine and run locally.

1. Python Setup

   1. Download and install python 3.7 from this link
   2. Make sure you added python to environment variable path. If you don’t know how to add python to environment variable, you can check this tutorial
   3. Open your command prompt and type python --version to check whether it added or not
   4. Goto your working directory and clone the geonode repo
Fig. 259: OAuth2 Service Parameters
5. Create virtualenv using pip command

```bash
cd your/working/directory
pip install virtualenv
virtualenv ./venv
# Activate virtualenv
.\venv\Scripts\activate.bat
```

```bash
cd your/working/directory
git clone https://github.com/GeoNode/geonode.git -b 3.x
```

2. Installation of GDAL

The gdal can be install through OSGeo4W. But this time we need to install it manually. This time we need to install the gdal inside our virtual environment.

1. Goto Unofficial Windows Binaries for Python Extension Packages and Download the compatible gdal wheel file

   **Note:** First of all check your python version (python --version). And download the same version of whl file. If you installed python 3.7, then you should download GDAL-2.4.1-cp37-cp37m-win_amd64.whl file. Here cp37 and amd64 means it is compatible with 64 bit python 3.7

2. Install gdal using this whl file

```bash
# Activate virtualenv
cd your/working/directory
.\venv\Scripts\activate.bat
# install gdal inside your virtualenv
pip install <path/to/gdal//wheel/file/GDAL-2.4.1-cp37-cp37m-win_amd64.whl>
```

3. Installation of required libraries and run locally

For installation of required libraries, you should follow following steps,

1. Edit requirement.txt file

```bash
cd your/working/directory
notepad requirement.txt
```

   It will open the requirement.txt file in notepad. Change Shapely==1.7.0 to Shapely==1.6.3. Since we not gonna deploy geonode in windows, remove the production packages from requirement.txt file,

   `# production uWSGI==2.0.18 gunicorn==20.0.4 ipython==7.14.0 docker==4.2.0 invoke==1.4.1`

2. Install the requirement.txt file

```bash
# Activate virtualenv
cd your/working/directory
.\venv\Scripts\activate.bat
```

(continues on next page)
# Install requirement.txt file inside virtualenv
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e .

3. Run the geonode in DEBUG (DEVELOPMENT) mode

# Prepare the GeoNode Spatialite database (the first time only)
paver setup
paver sync
python manage.py runserver

Now the geonode will run on your windows.

4. Postgresql Database setup

In this section we are going to install setup PostgreSQL database on GeoNode. GeoNode uses the PostgreSQL 11 database.

1. Download and install the postgres 11 windows installer
2. After installation of PostgreSQL 11, open stack builder and install the spatial extension named as postgis

**Warning:** Make sure you install the postgis extension from stack builder, otherwise it won’t work.

3. Now it is time create database and add user

**Warning:** Make sure you added postgresql to environment variable path. Otherwise psql will not be recognize in command prompt. Also you can search psql in windows and run the code directly from psql shell

# It will open the psql command line
psql -U postgres

# Create database named as geonode and geonode_data
CREATE DATABASE geonode;
CREATE DATABASE geonode_data;

# Create user named as geonode and password as geonode
CREATE USER geonode WITH ENCRYPTED PASSWORD 'geonode';

# Grant all the privileges of geonode and geonode_data database to user geonode
GRANT ALL PRIVILEGES ON DATABASE geonode TO geonode;
grant all privileges on database geonode_data TO geonode;

4. Change the pg_hba.conf file (C:Program FilesPostgreSQL11datapg_hba.conf) as below, so that you can access the database without password in your local machine

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

5. Restart the PostgreSQL to make the chage effective
5. Update Django setting

Now it is time to connect the postgres database with django. You need to follow following steps,

1. Rename the file `local_settings.py.geoserver.sample` to `local_settings.py` (This file can be found at the `GEONODE_INSTALLATION_DIR/geonode/`)

2. Initialize the GeoNode with `local_settings.py` file.

```bash
# Initialize GeoNode
set DJANGO_SETTINGS_MODULE=geonode.local_settings paver reset
set DJANGO_SETTINGS_MODULE=geonode.local_settings paver setup
set DJANGO_SETTINGS_MODULE=geonode.local_settings paver sync
set DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py collectstatic --noinput
```

Now you can run the geonode locally with postgresql database. using following command

```bash
python manage.py runserver --settings=geonode.local_settings
```

Docker

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

1. Install Docker and `docker-compose` packages on a Ubuntu host
2. Deploy a vanilla GeoNode 3.1 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)

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

Docker Setup (First time only)

```bash
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 ${1} stable"
sudo apt-get update -y
sudo apt-get install -y docker-ce docker-ce-cli containerd.io docker-compose
sudo apt autoremove --purge
sudo usermod -aG docker geonode
su geonode
```
2. 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
```

3. Test Docker Compose Instance

Logout and login again on shell and then execute:

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

4. Deploy a vanilla GeoNode 3.1 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 -R geonode:www-data /opt/geonode/
sudo chmod -R 775 /opt/geonode/

# Clone the GeoNode source code on /opt/geonode
cd /opt
git clone https://github.com/GeoNode/geonode.git -b 3.x 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 pull
docker-compose -f docker-compose.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:

```bash
docker-compose -f docker-compose.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).

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

**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

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

Alternatively:

```bash
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

```bash
... 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

```bash
docker exec -it django4geonode /bin/bash
# Once logged in the GeoNode image, follow the logs by executing
tail -F -n 300 /var/log/geonode.log
```
Alternatively:

```bash
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 sure the new host is correctly configured on the `.env` file
vim .env
```

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/
```

(continues on next page)
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`:

```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`.

```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

```bash
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`

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

```bash
cd /usr/local/tomcat/
wget --no-check-certificate https://build.geo-solutions.it/geonode/geoserver/latest/...geoserver-.2.17.2.war
mkdir tmp/geoserver
cd tmp/geoserver/
unzip /usr/local/tomcat/geoserver-2.17.2.war
rm -Rf data
cp -Rf /usr/local/tomcat/webapps/geoserver/data/ .
cd /usr/local/tomcat/
mv webapps/geoserver/ .
mv tmp/geoserver/ webapps/
exit
```

```bash
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
GeoNode 3.x is **NOT** compatible with GeoServer < 2.16.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.

```bash
cd /opt/geonode

# stop containers and remove volumes
docker-compose down -v
```

5. 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>3b232931f020</td>
<td>geonode/nginx:production</td>
<td>nginx -g 'daemon of... 26 minutes ago</td>
<td>Up 26 minutes</td>
<td>0.0.0.0.80:80/tcp nginx4geonode</td>
</tr>
<tr>
<td>ff7002ae6e91</td>
<td>geonode/geonode:latest</td>
<td>/usr/src/app/entryp... 26 minutes ago</td>
<td>Up 26 minutes</td>
<td>8000/tcp</td>
</tr>
<tr>
<td>2f1555e5043be</td>
<td>geonode/geoserver:2.17.2</td>
<td>/usr/local/tomcat/t... 26 minutes ago</td>
<td>Up 26 minutes</td>
<td>8080/tcp</td>
</tr>
<tr>
<td>97f1668a01b1</td>
<td>geonode_celery</td>
<td>/usr/src/app/entryp... 26 minutes ago</td>
<td>Up 26 minutes</td>
<td>8000/tcp</td>
</tr>
<tr>
<td>1b623598b1bd</td>
<td>geonode/postgis:10</td>
<td>&quot;docker-entrypoint.s... About an hour ago</td>
<td>Up 26 minutes</td>
<td>5432/tcp</td>
</tr>
</tbody>
</table>

Stop all the containers by running

```bash
docker-compose stop
```

Force kill all containers by running

```bash
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)
```

(continues on next page)
# 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

# 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\n˓→pull "$i" ; done

## 1.12.2 GeoNode Project

### 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.

### 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:
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 gdal-bin
sudo apt install -y python3-pip python3-dev python3-virtualenv python3-venv
  → virtualenvwrapper
sudo apt install -y libxml2 libxml2-dev gettext
sudo apt install -y libxslt1-dev libjpeg-dev libpng-dev libgdal-dev
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

# If the following does not work, you can skip it
sudo apt install -y libgdal20

# 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

(continues on next page)
# Install Packages for Virtual environment management

```bash
sudo apt install -y virtualenv virtualenvwrapper
```

# Install text editor

```bash
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

```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 -b 3.x
```

### 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
```

```bash
# add the following line to the bottom
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
```

```bash
source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
mkvirtualenv --python=/usr/bin/python3 my_geonode
```

Alternatively you can also create the virtual env like below

```bash
python3.8 -m venv /home/geonode/dev/.venvs/my_geonode
source /home/geonode/dev/.venvs/my_geonode/bin/activate
```

```bash
pip install Django==2.2.12
```

(continues on next page)
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 Spatialite 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.

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

```
./paver_dev.sh reset_hard
```

**Warning:** This will blow up completely your `local_settings`, delete the SQLite database and remove the GeoServer data dir.

```
# Run the server in DEBUG mode
./paver_dev.sh 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

From now on, everything already said for GeoNode Core (please refer to the section 4. 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).

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 3.1 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

```bash
cd /opt/geonode_custom/
git clone https://github.com/GeoNode/geonode-project.git -b 3.x
```

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 --python=/usr/bin/python3 my_geonode
```

Alternatively you can also create the virtual env like below

```bash
python3.8 -m venv /home/geonode/dev/.venvs/my_geonode
source /home/geonode/dev/.venvs/my_geonode/bin/activate
```

pip install Django==2.2.12

(continues on next page)
Modify the code and the templates and rebuild the Docker Containers

docker-compose -f docker-compose.yml build --no-cache

Finally, run the containers

docker-compose -f docker-compose.yml up -d

**Deploy an instance of a geonode-project Django template 3.1 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

```
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

```
vim .env

# 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

```
docker-compose -f docker-compose.yml -f docker-compose.override.example-org.yml up --build -d
```

### 1.12.3 SPCGeoNode

**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.
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](https://docs.docker.com/install/linux/docker-ce/ubuntu/#install-from-a-package) and [https://docs.docker.com/compose/install/#install-compose](https://docs.docker.com/compose/install/#install-compose)
- **Windows**: [https://store.docker.com/editions/community/docker-ce-desktop-windows](https://store.docker.com/editions/community/docker-ce-desktop-windows)
- **Mac**: [https://store.docker.com/editions/community/docker-ce-desktop-mac](https://store.docker.com/editions/community/docker-ce-desktop-mac)

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.
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
```

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

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
```
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 common 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` and `THE_NAME_OF_YOUR_BUCKET_HERE` (watch [this](https://www.youtube.com/watch?v=BLTy2tQXQLY) to learn how to get these keys).

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)
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:

```
# 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-geodatadir/styles
docker cp geodatadir/workspaces/. spcgeonode_geoserver_1:/spcgeonode-geodatadir/workspaces
docker cp geodatadir/data/. spcgeonode_geoserver_1:/spcgeonode-geodatadir/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;"

# 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

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 in .sh files.

To fix, use git config –global core.autocrlf false and checkout again.

1.13 GeoNode Settings

Settings
1.13.1 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.

A

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:
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:

```
{
    "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:

```
['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 Documents 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.

**AVATAR_GRAVATAR_SSL**

Default: False
Env: AVATAR_GRAVATAR_SSL
Options: True | False

Force SSL when loading fallback image from gravatar.com.

**AVATAR_DEFAULT_URL**

Default: /geonode/img/avatar.png
Env: AVATAR_GRAVATAR_SSL
Options: "filepath to image"

Allows to set a custom fallback image in case a User has not uploaded a profile image. Needs AVATAR_PROVIDERS to be set correctly.

**AVATAR_PROVIDERS**

Default:

Env: AVATAR_PROVIDERS
**Options:** Avatar provider object

This setting configures in which order gravatar images are loaded. A common use case is the use of a local image over a fallback image loaded from gravatar.com. To do so you would change the order like:

(DefaultAvatarProvider before GravatarAvatarProvider)

---

**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
```

**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_TASK_SENT_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_SIGNALS 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
Env: CELERY_TASK_RESULT_EXPIRES
This is a Celery setting.

**CELERY_TASK_SERIALIZER**

Default: json Env: CELERY_TASK_SERIALIZER
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_RATE_LIMITS**

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: 5

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

Env: CREATE_LAYER

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_SECURE

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](https://docs.djangoproject.com/en/3.1/topics/security/#csrf)

**DATA_UPLOAD_MAX_NUMBER_FIELDS**

Default: 100000

Maximum value of parsed attributes.

**DEBUG**

Default: False  
Env: DEBUG

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](https://docs.djangoproject.com/en/3.1/topics/logging/)

**DEBUG_STATIC**

Default: False  
Env: DEBUG_STATIC

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: \textit{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: \textit{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: \textit{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:

```python
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:

```python
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:

```python
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

- **EMAIL_USE_SSL**
  Default: False

- **DEFAULT_FROM_EMAIL**
  Default: GeoNode <no-reply@geonode.org>

### EPSG_CODE_MATCHES

Default:

```
{
    'EPSG:4326': '(4326) WGS 84',
    'EPSG:900913': '(900913) Google Maps Global Mercator',
    'EPSG:3857': '(3857) WGS 84 / Pseudo-Mercator',
    'EPSG:3785': '(3785 DEPRECATED) Popular Visualization 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.

### GEOFENCE_SECURITY_ENABLED

Default: True (False is Test is true)
Env: GEOPENCE_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" "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.
LICENCES

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.

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": "$%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}}
  }
]
```

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",
    "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
if MONITORING_ENABLED:
    INSTALLED_APPS + ('geonode.monitoring',)
    MIDDLEWARE_CLASSES + ('geonode.monitoring.middleware.MonitoringMiddleware',)
```

See Read-Only and Maintenance Mode for details.

**MONITORING_DATA_AGGREGATION**

Default:

```
{
    (timedelta(seconds=0), timedelta(minutes=1),),
    (timedelta(days=1), timedelta(minutes=60),),
    (timedelta(days=14), timedelta(days=1),),
}
```

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 Read-Only and Maintenance Mode for further details.

This setting takes effects only if USER_ANALYTICS_ENABLED is true.
MONITORING_DATA_TTL

Default: 365
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]+/admin/'),
)
```

Skip certain useless paths to not to mud analytics stats too much. See Read-Only and Maintenance Mode 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)
Database configuration:

```python
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 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.

**OPENGRA...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`
**Env:** 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:

```
{
    '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:

```
{
    "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}"
}, {
    "label": "Facebook",
}, {
    "label": "Twitter",
    "url": "https://twitter.com/share?url={url}"
}, {
    "label": "Google +",
    "url": "https://plus.google.com/share?url={url}"
}]
```

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).

**SOCIALACCOUNT_WITH_GEONODE_LOCAL_SINGUP**

Default: True

Variable which controls displaying local account registration form. By default form is visible.

**SRID**

Default:

```python
{
    'DETAIL': 'never',
}
```

**SEARCH_RESOURCES_EXTENDED**

Default: True
This will extend search with additional properties. By default its on and search engine will check resource title or purpose or abstract. When set to False just title lookup is performed.

T

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': 'inspireThemes', 'required': True, 'filter': True}, {'name': 'inspire_concepts', 'filter': True},]

TOPICCATEGORY_MANDATORY

Default: False

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.
**TINYMCE_DEFAULT_CONFIG**

Default:

```javascript
{
    "selector": "textarea#id_resource-featureinfo_custom_template",
    "theme": "silver",
    "height": 500,
    "plugins": 'print preview paste importcss searchreplace autolink autosave directionality code visualblocks visualchars fullscreen image link media template codesample table charmap hr pagebreak nonbreaking anchor toc insertdatetime advlist lists wordcount imagetools textpattern noneditable help charmap quickbars emoticons',
    "imagetools_cors_hosts": ['picsum.photos'],
    "menubar": 'file edit view insert format tools table help',
    "toolbar": 'undo redo | bold italic underline strikethrough | fontselect fontsize select formatselect | alignleft aligncenter alignright alignjustify | outdent indent | numlist bullist | forecolor backcolor | removeformat | pagebreak | charmap emoticons | fullscreen preview save | insertfile image media template link anchor codesample | ltr rtl',
    "toolbar_sticky": "true",
    "autosave_ask_before_unload": "true",
    "autosave_interval": "30s",
    "autosave_prefix": '{path}{query}-{id}-{time}',
    "autosave_restore_when_empty": "false",
    "autosave_retention": "2m",
    "image_advtab": "true",
    "content_css": '//www.tiny.cloud/css/codepen.min.css',
    "importcss_append": "true",
    "image_caption": "true",
    "quickbars_selection_toolbar": 'bold italic | quicklink h2 h3 blockquote quickimage quicktable',
    "noneditable_noneditable_class": "mceNonEditable",
    "toolbar_mode": 'sliding',
    "contextmenu": "link image imagetools table",
    "templates": [
        {
            "title": 'New Table',
            "description": 'creates a new table',
            "content": '<div class="mceTmpl"><table width="98%%" border="0" cellspacing="0" cellpadding="0"><tr><th scope="col"> </th><th scope="col"></th></tr><tr><td> </td><td> </td></tr></table></div>'
        },
        {
            "title": 'Starting my story',
            "description": 'A cure for writers block',
            "content": 'Once upon a time...'
        },
        {
            "title": 'New list with dates',
            "description": 'New List with dates',
            "content": '<div class="mceTmpl"><span class="cdate">cdate</span><br /><span class="mdate">mdate</span><h2>My List</h2><ul><li></li><li></li></ul></div>'
        }
    ],
    "template_cdate_format": '[Date Created (CDATE): %m/%d/%Y : %H:%M:%S]',
}(continues on next page)
HTML WYSIWYG Editor (TINYMCE) Menu Bar Settings. For more info see:

- https://django-tinymce.readthedocs.io/en/latest/installation.html#configuration
- Customizing The Layers’ GetFeatureInfo Templates

UNOCONV_ENABLE

Default: False
Env: UNOCONV_ENABLE

UPLOADER

Default:

```
{
    '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:

  ```
  '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 *Read-Only and Maintenance Mode* 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

### 1.14 Customize the Look and Feel

#### 1.14.1 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.

#### 1.14.2 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:

   ```
   $ 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:

   ```
   $ sudo wget https://upload.wikimedia.org/wikipedia/commons/thumb/a/ac/Service_˓→mark.svg/500px-Service_mark.svg.png
   $ sudo chown -Rf geonode:.
   ```

3. Change to the `css` directory:

   ```
   $ 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.

   ```
   $ sudo vi site_base.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:

   ```
   $ 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.

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 {
   }
   ```
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;
}

.navbar-inverse {
  background-color: #ff0000 !important;
}

.jumbotron {
  background-size: cover !important;
}
```

1. Collect the static files into STATIC_ROOT, restart the development server and reload the page:

```
$ 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:
Fig. 261: CSS override
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">` to say something other than “Welcome”:

Fig. 262: Screenshot of using browser debugger to inspect the CSS overrides
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/master/usage/index.html')}}">
          {{custom_theme.jumbotron_cta_text|default:_("Get Started »")}}
        </a>
      </p>
    {% endif %}
  </div>
</div>
{% endblock %}
```

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
```
Fig. 263: 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

1.15 GeoNode permissions

1.15.1 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.
Fig. 264: *Bootswatch Theme for the Geonode Project*
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.

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.

Geo Limits permissions

**Note:** This feature is available only when enabling `GeoServer` as geospatial backend. Also make sure that the properties `GEONODE_SECURITY_ENABLED`, `GEOFENCE_SECURITY_ENABLED` and `GEOFENCE_URL` are correctly set for the `OGC_SERVER`.

`Geo Limits` are an extension of the GeoNode standard permissions. `Geo Limits` allows the owner of the resource, or the administrator, to restrict users or groups to a specific geographical area, in order to limit the access to the layer to only the portions contained within that geographic restriction, excluding data outside of it.

In order to be able to set `Geo Limits` you must be an `administrator` of the system or the `owner` of the resource or you must have `Manage Permissions` rights to the resource.

Go to the Layer Details page and scroll down to the Change Layer Permissions button, as we have seen on the previous section.

If you have the permissions to set the `Geo Limits`, you should be able to see the limits tab beside the permissions one.

You should be able to see an interactive preview of the layers along with few small drawing tools, that allow you to start creating limits on the map manually if you want.

Moreover at the bottom of the panel, there are two other tabs, one listing the available *Users* and another one listing the available *Groups*. 
Fig. 265: Change Layer Permissions
Set permissions for this resource

Who can view it?
- Anyone
- The following users:
  - admin
- The following groups:
  - Choose groups...

Who can download it?
- Anyone
- The following users:
  - admin
- The following groups:
  - Choose groups...

Who can change metadata for it?

Who can edit data for this layer?

Who can edit styles for this layer?

Who can manage it? (update, delete, change permissions, publish/unpublish it)

Fig. 266: Resource Permission Dialogue
Set permissions for this resource

Who can view it?
- Anyone
- The following users: admin
- The following groups:

Who can download it?

Who can change metadata for it?

Who can edit data for this layer?

Who can edit styles for this layer?

Who can manage it? (update, delete, change permissions, publish/unpublish it)

Fig. 267: Geo Limits Tab
Warning: You will be able to access only Public groups and the Private ones you belong to.

For each entry of the Users and Groups tabs, you will have 3 options:

1. Load Geo Limits

This button allows you to load the Geo Limits already stored on the DB.

Warning: By clicking this button, the geometries present into the map will be cleared. You can add/remove more geometries later on if needed.

2. Upload Geo Limits

This button allows you to upload the Geo Limits from a SHAPEFILE on your hard disk. This button won't save anything yet. It will only load the geometries into the map.

Warning: Be careful using big SHAPEFILES. The geometries will be loaded in memory, and your browser might slow down a lot if you load huge / complex geometries.

Warning: By clicking this button, the geometries present into the map will be cleared. You can add/remove more geometries later on if needed.

3. Save Geo Limits

This button allows you to store the Geo Limits into the DB. The geometries will be associated to the current resource and selected user or group.

Note: By saving the geometries into the DB, the geospatial restrictions won’t be applied yet. In order to apply the restrictions you need to:

a) Set the general permissions to the user / group on the general Permissions dialog.

b) Click on Apply Changes button

See the next paragraph for more details.

Once you finished editing your geometries, save them into the DB.

What you have to do now, in order to apply the Geo Limits correctly, is to go back to the Permissions tab and select View and / or Download permissions for the users / groups you want to apply the restrictions.

When you are happy with your changes, click on Apply Changes button.

The user `afabiani` won’t be able from now on to access the whole layer data.

Warning: The Geo Limits will be persisted on GeoNode DB for that resource. That means that everytime you will update the general permissions, also the geospatial restrictions will be applied.

In order to remove the Geo Limits for a certain user or group, you can just Save an empty geometry. This will delete the entry from the DB also.
Set permissions for this resource

Fig. 268: Geo Limits: Preview Window with Drawing Tools
Fig. 269: Geo Limits: Load from DB

Fig. 270: Geo Limits: Upload from a SHAPEFILE

Fig. 271: Geo Limits: Upload from a SHAPEFILE
Set permissions for this resource

Fig. 272: Geo Limits: Upload from a SHAPEFILE

Fig. 273: Geo Limits: Store the Geo Limits into the DB
Fig. 274: Geo Limits: Editing the Geometries
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.

1.16 Read-Only and Maintenance Mode

1.16.1 Read-Only and Maintenance Modes

Overview

GeoNode gives an option to operate in different modes, according to the needs and demands of the certain application system.

Changing the currently used mode can be done in the admin panel by the user with super-user privileges, by modifying Configuration singleton model in the BASE application:

Read-Only Mode

Activating the Read-Only Mode (by setting Read only True in the Configuration) activates a middleware rejecting all modifying requests (POST/PUT/DELETE), with an exception for:
Fig. 276: Geo Limits: Set View/Download Permissions for the user afabiani
Fig. 277: Geo Limits: Apply Permissions and Restrictions to the users and groups

Fig. 278: Geo Limits: Geospatial restrictions applies for the user afabiani

Fig. 279: Add Resource To Shopping Cart
Fig. 280: Sopping Cart Permissions

Fig. 281: Configuration change in the admin panel
• POST to login view
• POST to logout view
• POST to admin login view
• POST to admin logout view
• all requests to OWS endpoint
• all requests ordered by a super-user

Additionally, all UI elements allowing modifying GeoNode’s content are hidden, so e.g. the button “Upload Layer” is not rendered in the templates.

In case a user tries to perform a forbidden request, they will be presented with a static HTML page informing them, the GeoNode is in the Read-Only mode and this action is currently forbidden.

**Maintenance Mode**

Activating the Maintenance Mode (by setting `Maintenance True` in the `Configuration`) activates the highest level middleware (the one executed as the first) rejecting all requests to the GeoNode instance, with an exception for:

• POST to admin login view
• POST to admin logout view
• all requests ordered by a super-user

In case a user tries to perform any request against the GeoNode (including GET requests), they will be presented with a static HTML page informing them, the maintenance actions are taken on the GeoNode instance, and asking them to try again soon.

The maintenance mode was implemented with a thought of the backup and restore procedures without a necessity to put down the instance, but at the same time with a restriction of any outer interference.

**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.

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:

  ```
  # 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
```
**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
```

```ini
[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
```

```ini
127.0.0.1 localhost
<public_ip> <your_host.your_domain> <your_host>

# 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>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upload sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Map layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Map snapshots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exception events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hosts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric labels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric notification checks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitored resources</td>
<td></td>
<td></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:

---

1.17. Monitoring
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

**Software Performance**

Geonode Data Overview

<table>
<thead>
<tr>
<th>Average Response Time</th>
<th>Max Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 ms</td>
<td>271 ms</td>
</tr>
</tbody>
</table>

Total Requests

772

W*S Data Overview

<table>
<thead>
<tr>
<th>Average Response Time</th>
<th>Max Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ms</td>
<td>591 ms</td>
</tr>
</tbody>
</table>

Total Requests

1734

Clicking on will show charts with data history for overall performance and per-OWS performance:
Hardware 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](image) 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 addresses 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 sting 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

```
{
    "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/
```

```
{
    "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:WFS",
                  "type_label": "WFS"
              }
          ]
      }
  }
  ```
• **non-OWS event types**

GET /monitoring/api/event_types/?ows_service=false

```
{
  "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:

GET /monitoring/api/labels/?metric_name=request.ua&valid_from=2017-08-05
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; rv:53.0) 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"
```

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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:
- `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 metric 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
GET /monitoring/api/metric_data/request.count/?last=86400&interval=86400&group_by=resource

{   "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         }       }     ]   }
```

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– 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_all

```json
{
  "data": {
    "input_valid_from": "2018-07-10T15:13:50.784Z",
    "input_valid_to": "2018-07-11T15:13:50.784Z",
    "data": [
      {
        "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"
}
"metric": "request.users",
"interval": 86400,
– **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

```
{
  "data": {
    "input_valid_from": "2018-07-10T16:29:08.982Z",
    "input_valid_to": "2018-07-11T16:29:08.982Z",
    "data": {
      "valid_from": "2018-07-10T16:29:08.982Z",
      "data": {
        "samples_count": 243,
        "val": 13,
        "min": "0.0000",
        "max": "25.0000",
        "sum": "243.0000",
        "metric_count": 124
      }
    },
    "valid_to": "2018-07-11T16:29:08.982Z"
  },
  "metric": "request.users",
  "interval": 86400.0,
  "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/

```
{
  "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.dispatch(request, *args, **kwargs)
  File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/views/generic/base.py", line 89, in dispatch
    return handler(request, *args, **kwargs)
  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/encoder.py", line 207, in encode
    chunks = self.iterencode(o, _one_shot=True)
  File "/usr/lib64/python2.7/json/encoder.py", line 270, in iterencode
    return super(DjangoJSONEncoder, self).default(o)
File "/usr/lib64/python2.7/json/encoder.py", line 115, in default
    raise TypeError(repr(o) + \" is not JSON serializable\")
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",
      "url": "/monitoring/api/exceptions/30/"
   }
}
```

(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

```
{
  "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
  }
}
```

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

```
{
  "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": [
          
          ],
        "valid_to": "2018-07-12T15:39:25.126Z"
      }
    ],
    "metric": "request.users",
    "interval": 86400.0,
    "type": "value",
    "axis_label": "Count",
    "label": null
  }
}
```
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=event_type
   ```
• to get number of unique tracking ids

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=

• 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=

```
{
    "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=
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=resource_on_label&resource_type=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": 2
}]}
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:

```json
{
  "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

```json
{
  "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",
          "max": "5.0000",
          "sum": "25.0000",
          "metric_count": 1
        }
      }
    ]
  },
  "metric": "request.users",
  "interval": 31536000,
  "type": "value",
  "axis_label": null,
  "label": null
}
``` (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
```

```
{
   "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",
                  "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
         }
      ]
   }
}
```

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GeoNode Documentation, Release 3.1

8. total number of unique users for each monitored resource.

```
• sessions count for each users which do something with a layer:

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

```json
{
  "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. Its 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_tresholds 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": {
    (continues on next page)
  }
}
```
"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
      }
    }
]
<table>
<thead>
<tr>
<th>id</th>
<th>field_name</th>
<th>id</th>
<th>metric</th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>request.count.max_timeout</td>
<td>4</td>
<td>geonode.contrib.monitoring.models.Metric</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>name: response.time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>id: 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>geonode.contrib.monitoring.models.NotificationCheck</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>class: geonode.contrib.monitoring.models.NotificationCheck</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>name: geonode is not working</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>id: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>min_value: 500.0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use_label: false</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use_ows_service: false</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>field_option: max_value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use_service: false</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>steps_calculated: null</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>current_value: null</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>steps: null</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>notification_check: geonode is not working</td>
<td></td>
</tr>
</tbody>
</table>

1.17. Monitoring
"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><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": {  
  "class": "geonode.contrib.monitoring.models.NotificationCheck",
  "name": "geonode is not working",
  "id": 2
}  

(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:

```
POST /monitoring/api/notifications/config/{{notification_check_id}}/
```

Request:

```
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:

```
{
  "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:

```
{
  "status": "error",
  "errors": {
    "user_threshold": [
```

(continues on next page)
```
{
    "name": [
        "This field is required."
    ],
    "description": [
        "This field is required."
    ],
    "data": [],
    "success": false
}
```

### Notification creation

This API call allows to create new notification, it’s different in form layout from edition:

**POST /monitoring/api/notifications/**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>Name of notification (Geonode doesn’t work)</td>
</tr>
<tr>
<td>description</td>
<td>This will check if Geonode is serving any data</td>
</tr>
</tbody>
</table>
| emails      | 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: |

```json
{ "name": "Notification Name", "description": "This notification will check if Geonode is serving any data", "emails": "email1@test.com
eemail2@test.com", "user_thresholds": [ { "name": "some_metric", "field_check_option": "min_value", "flag": true, "min_value": 0, "max_value": 100, "steps": 5 } ] }```
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.

```
{
    "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 Full GeoNode Backup & Restore

The admin command to backup and restore GeoNode, allows to extract consistently the GeoNode and GeoServer data models in a serializable meta-format which is being interpreted later by the restore procedure in order to exactly rebuild the whole structure.

In particular the tool helps developers and administrators to correctly extract and serialize the following resources:

- **GeoNode** (Resource Base Model):
  1. Layers (both raster and vectors)
2. Maps
3. Documents
4. People with Credentials
5. Permissions
6. Associated Styles
7. Static data and templates

- **GeoServer** (Catalog):
  1. OWS Services configuration and limits
  2. Security model along with auth filters configuration, users and credentials
  3. Workspaces
  4. Stores (both DataStores and CoverageStores)
  5. Layers
  6. Styles

The tool exposes two GeoNode Management Commands, ‘backup’ and ‘restore’.

The commands allow to:

1. Fully backup GeoNode data and fixtures on a zip archive
2. Fully backup GeoServer configuration (physical datasets - tables, shapefiles, geotiffs)
3. Fully restore GeoNode and GeoServer fixtures and catalog from the zip archive

The usage of those commands is quite easy and straightforward.

The first step is to ensure that everything is correctly configured and the requisites respected in order to successfully perform a backup and restore of GeoNode.

**Warning:** It is worth to notice that this functionality requires the latest GeoServer Extension (2.9.x or greater) for GeoNode in order to correctly work.

**Note:** GeoServer full documentation is also available here GeoServer Docs

---

**Requisites and Setup**

**Before** running a GeoNode backup / restore, it is necessary to ensure everything is correctly configured and setup.

**Settings**

Accordingly to the admin needs, the file settings.ini must be ceated before running a backup or restore.

The default files can be found at geonode/br/management/commands/settings_sample.ini and geonode/br/management/commands/settings_docker_sample.ini for the classic and Docker environments accordingly. The content is similar in both of them (an example from settings_sample.ini):
The settings.ini file can be created in any directory accessible by GeoNode, and it’s path can be passed to the backup / restore procedures using `-c` (`--config`) argument.

There are few different sections of the configuration file, that must be carefully checked before running a backup / restore command.

### Settings: [database] Section

```
[database]
pdg_dump = pg_dump
pgrestore = pg_restore
```

This section is quite simple. It contains only two properties:

- `pgdump`: the path of the `pg_dump` local command.
- `pgrestore`: the path of the `pg_restore` local command.

**Warning:** Those properties are ignored in case GeoNode is not configured to use a DataBase as backend (see `settings.py` and `local_settings.py` sections)

**Note:** Database connection settings (both for GeoNode and GeoServer) will be taken from `settings.py` and `local_settings.py` configuration files. Make sure they are correctly configured (on the target GeoNode instance, too) and the DataBase server is accessible while executing a backup / restore command.

### Settings: [geoserver] Section

```
[geoserver]
datadir = /opt/gs_data_dir
data_dir_exclude_file_path =
```

(continues on next page)
dumpvectordata = yes
dumprasterdata = yes
data_dt_filter =
data_layername_filter =
data_layername_exclude_filter =

This section allows to enable / disable a full data backup / restore of GeoServer.

- **datadir**: the full path of GeoServer Data Dir, by default /opt/gs_data_dir. The path must be accessible and fully writable by the geonode and / or httpd server users when executing a backup / restore command.

- **datadir_exclude_file_path**: comma separated list of paths to exclude from geoserver_catalog.zip; This list will be sent and managed directly by the GeoServer Backup REST API.

- **dumpvectordata**: a boolean flag enabling or disabling creation of a vector data dump from GeoServer (shapefiles or DB tables). If false (or no) vector data won’t be stored / re-stored.

- **dumprasterdata**: a boolean flag enabling or disabling creation of a raster data dump from GeoServer (geotiffs). If false (or no) raster data won’t be stored / re-stored.

- **data_dt_filter**: {cmp_operator} {ISO8601} e.g. > 2019-04-05T24:00 which means “include on backup archive only the files that have been modified later than 2019-04-05T24:00

- **data_layername_filter**: comma separated list of layer names, optionally with glob syntax e.g.: tuscany_* . italy; Only RASTER original data and VECTORIAL table dumps matching those filters will be included into the backup ZIP archive

- **data_layername_exclude_filter**: comma separated list of layer names, optionally with glob syntax e.g.: tuscany_* . italy; The RASTER original data and VECTORIAL table dumps matching those filters will be excluded from the backup ZIP archive

**Warning**: Enabling these options requires the GeoServer Data Dir to be accessible and fully writable for the geonode and / or httpd server users when executing a backup / restore command.

**Settings: [fixtures] Section**

```
[fixtures]
#NOTE: Order is important
apps = people, account, avatar.avatar, base.backup, base.license, base.topiccategory,
      base.region, base.resourcebase, base.contactrole, base.link, base.restrictioncodetype,
      base.spatialrepresentationtype, guardian.userobjectpermission, guardian.
groupobjectpermission, layers.uploadsession, layers.style, layers.layer, layers.
attribute, layers.layerfile, maps.map, maps.maplayer, maps.mapsnapshot, documents.
dumps = people, accounts, avatars, backups, licenses, topiccategories, regions,
        resourcebases, contactroles, links, restrictioncodetypes, spatialrepresentationtypes,
        userpermissions, grouppermissions, uploadsessions, styles, layers, attributes,
        layerfiles, maps, maplayers, mapsnapshots, documents, tags
```

This section is the most complex one. Usually you don’t need to modify it. Only an expert user who knows Python and GeoNode model structure should modify this section.

What its properties mean:
• *apps*; an ordered list of GeoNode Django applications. The backup / restore procedure will dump / restore the fixtures in a portable format.

• *dumps*; this is the list of files associated to the Django applications. The order **must** be the same as in the *apps* property above. Each name represents the file name where to dump to / read from the single app’s fixtures.

**Executing from the CLI**

The following sections shows instructions on how to perform backup / restore from the command line by using the Django Admin Management Commands.

In order to obtain a basic user guide for the management command from the command line, just run

```bash
python manage.py backup --help
python manage.py restore --help
```

`--help` will provide the list of available command line options with a brief description.

By default both procedures activate *Read Only* mode, disabling any content modifying requests, which is reverted to the previous state (from before the execution) after finish, regardless of the command’s result (success or failure). To disable activation of this mode, `--skip-read-only` argument can be passed to the command.

It is worth notice that both commands allows the following option

```bash
python manage.py backup --force / -f
python manage.py restore --force / -f
```

Which enables a non-interactive mode, meaning the user will not be asked for an explicit confirmation.

**Backup**

In order to perform a backup just run the command:

```bash
python manage.py backup --backup-dir=<target_bk_folder_path> --config=</path/to/settings.ini>
```

The management command will automatically generate a `.zip` archive file on the target folder in case of success. In the target directory `.md5` file with the same name as backup will be created. It contains the MD5 hash of the backup file, which can be used to check archive’s integrity before restoration.

It is worth to mention that *br* (Backup & Restore GeoNode application) will not be dumped, even if specified in the `settings.ini` as its content is strictly related to the certain GeoNode instance.

Currently, GeoNode does not support any automatic extraction of the backup file. It should be manually transferred, if needed to the target instance environment.

**Restore**

The *restore* command has a number of arguments, modifying its execution:

# `-c/--config`: path to the `settings.ini` configuration file. If the Backup archive is provided with his settings, the latter will be used by the restore command and this option won’t be mandatory anymore

1. `--skip-geoserver`: the GeoServer backup restoration won’t be performed
2. **--skip-geoserver-info**: (Default: True) Skips GeoServer Global Infos, like the proxy base url and other global GeoServer metadata info

3. **--skip-geoserver-security**: (Default: True) Skips GeoServer all the Security Settings

4. **--backup-file**: (exclusive together with --backup-files-dir) path to the backup .zip archive

5. **--backup-files-dir**: (exclusive together with --backup-file) directory containing backup archives. The directory may contain a number of files, but only backup archives are allowed with a .zip extension. In case multiple archives are present in the directory, the newest one, created after the last already restored backup creation time, will be restored. This option was implemented with a thought of automated restores.

6. **--recovery-file**: Backup archive containing GeoNode data to restore in case of failure.

7. **-l|--with-logs**: the backup file will be checked against the restoration logs (history). In case this backup has already been restored (MD5 based comparision), RuntimeError is raised, preventing restore execution.

8. **-n|--notify**: the restore procedure outcome will be send by an e-mail notification to the superusers of the instance (note: notification will be sent to the superusers of the instance before restoration).

9. **--skip-read-only**: the restore procedure will be conducted without setting Read Only mode during execution.

In order to perform a default backup restoration just run the command:

```
python manage.py restore --backup-file=<target_restore_file_path> --config=</path/to/settings.ini>
```

For restore to run it requires either **--backup-file** or **--backup-files-dir** argument defined.

**Warning**: The Restore will **overwrite** the whole target instances of GeoNode (and by default GeoServer) including users, catalog and database, so be very careful.

**GeoNode Admin GUI Inspection**

The history of restored backups can be verified in the admin panel.

Login to the admin panel and select **Restored backups** table from BACKUP/RESTORE application.

A list will be displayed with a history of all restored backups. You can select a certain backup to view it’s data.

The detailed view of the restored backup shows backup archive’s name, it’s MD5 hash, it’s creation/modification date (in the target folder), and the date of the restoration. Please note Restored Backup history cannot be modified.
B/R in Docker environment

When executing B/R in the Docker environment, creation backup to / restoration from should be executed in /backup_restore directory. It is a shared volume between Geoserver and Geonode images, created for this purpose only. Pointing at another location will fail, as one of the images won’t have an access to the files.

**Warning:** When executing B/R in Docker environment remember to create settings.ini file basing on settings_docker_sample.ini to point at a proper Geoserver data directory! In other case configuration mismatch may cause unexpected errors.

**Warning:** The only other volume shared between images is /geoserver_data/data, but backup creation should not be performed there, as the recursive Geoserver backups may be created in such case.

B/R Jenkins Job in Docker environment

When installing GeoNode through the geonode-project Docker (see GeoNode Basic Installation), an instance of Jenkins CI/CD is also automatically deployed and available through http://<geonode_host>/jenkins.

Configure Jenkins at first startup

The very first time you try to access Jenkins, you will need to unlock it and generate a new administrator username and password.

In order to do that, you need to print the contents of the auto-generated file /var/jenkins_home/secrets/initialAdminPassword

1. First of all search for the Jenkins container ID, usually jenkins4{{project_name}} where {{project_name}} is the name of your geonode-project instance (e.g. my_geonode)
Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

/var/jenkins_home/secrets/initialAdminPassword

Please copy the password from either location and paste it below.

Administrator password

Continue
1. Now just `cat` the file above inside the Jenkins container

```bash
$> docker container exec -u 0 -it jenkins4my_geonode sh -c 'cat /var/jenkins_home/secrets/initialAdminPassword'
```

1. Copy the hash code you just got form the print above, and copy-and-paste to the browser window

In the next step just install the Default Plugins. You can install more of them later on from the management page.

Provide the administrator credentials as requested

Confirm the Jenkins instance URL, this can be changed form the configuration later in case you will need to update the server address

Well done, Jenkins is ready now

The next step is to configure a Jenkins Job able to interact with the Django Docker container and run a full backup

**Configure a Jenkins Job to run a full backup on the Django Container**

Before creating the new Jenkins job, we need to install and configure a new plugin, Publish over SSH

In order to do that, once logged in as admin, go to the Jenkins Management Page > Manage Plugins tab

Click on Available tab and search for SSH available plugins
Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

/var/jenkins_home/secrets/initialAdminPassword

Please copy the password from either location and paste it below.

Administrator password

[Password field]

Continue
Customize Jenkins

Plugins extend Jenkins with additional features to support many different needs.

Install suggested plugins

Install plugins the Jenkins community finds most useful.

Select plugins to install

Select and install plugins most suitable for your needs.
Getting Started

Folders
- OWASP Markup Formatter
- Build Timeout
- Credentials Binding

Timestamp
- Workspace Cleanup
- Ant
- Gradle

Pipeline
- GitHub Branch Source
- Pipeline: GitHub Groovy Libraries
- Pipeline: Stage View

Git
- Subversion
- SSH Build Agents
- Matrix Authorization Strategy

PAM Authentication
- LDAP
- Email Extension
- Mailer

Jenkins 2.231.2
Create First Admin User

Username: admin
Password: *********
Confirm password: *********
Full name: Jenkins Admin
E-mail address: alessio.fabiani@geo-solutions.it

Save and Continue
GeoNode Documentation, Release 3.1

Getting Started

Instance Configuration

Jenkins URL: [http://localhost/jenkins/]

The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for proper operation of many Jenkins features including email notifications, PRI status updates, and the BUILD URL environment variable provided to build steps.

The proposed default value shown is not saved yet and is generated from the current request, if possible. The best practice is to set this value to the URL that users are expected to use. This will avoid confusion when sharing or viewing links.

Jenkins 2.233.2

Not now Save and Finish
Jenkins is ready!

Your Jenkins setup is complete.

Start using Jenkins
Welcome to Jenkins!

Create an agent or configure a cloud to set up distributed builds. Learn more.

Create a job to start building your software project.
Select and check the Publish over SSH one

Install the plugins and restart Jenkins

The next step is to configure the SSH Server Connection for the Publish over SSH plugin.

Move to Jenkins Configuration

Scroll down until you find the Publish over SSH plugin section

Depending on how your HOST SSH service has been configured, you might need several information in order to setup the connection.

Here below an example using a global host (master.demo.geonode.org) accepting SSH connections via RSA keys
Note: Before saving the configuration always ensure the connection is ok by using the Test Configuration button.

1. First of all, be sure OpenSSH Server is correctly installed and running on your PC. Eventually check any firewall rules.

   $> sudo apt install openssh-server

   # Test your connection locally
   $> ssh -p 22 user@localhost
       user@localhost's password:

2. You will need to do some changed to your docker-compose.yml file in order to enable the host network configuration.

It is possible also to run and configure Jenkins to run locally, as an instance on localhost. In that case you will need to change few things in order to allow Jenkins to access your local network.

1. First of all, be sure OpenSSH Server is correctly installed and running on your PC. Eventually check any firewall rules.

   $> sudo apt install openssh-server

   # Test your connection locally
   $> ssh -p 22 user@localhost
       user@localhost's password:

2. You will need to do some changed to your docker-compose.yml file in order to enable the host network configuration.
Note: Enable `network_mode: "host"` on Jenkins container

```
>$> vim docker-compose.yml
...
jenkins:
  image: jenkins/jenkins:lts
  # image: istresearch/jenkins:latest
  container_name: jenkins4${COMPOSE_PROJECT_NAME}
  user: jenkins
  ports:
    - '${JENKINS_HTTP_PORT}:${JENKINS_HTTP_PORT}'
    - '${JENKINS_HTTPS_PORT}:${JENKINS_HTTPS_PORT}'
    - '50000:50000'
  network_mode: "host"
  volumes:
    - jenkins_data:/var/jenkins_home
    - backup-restore:/backup_restore
      # - /var/run/docker.sock:/var/run/docker.sock
  environment:
    - 'JENKINS_OPTS=--httpPort=${JENKINS_HTTP_PORT} --httpsPort=${JENKINS_HTTPS_PORT} --prefix=/jenkins'
...

# Recreate the Jenkins container
>$> docker-compose stop jenkins
>$> docker-compose rm jenkins
>$> docker-compose up -d jenkins
```

Warning: From now on, your local Jenkins instance will be accessible from `http://localhost:9080/jenkins`

3. Add localhost Server to the Publish over SSH plugin configuration

Mode to `http://localhost:9080/jenkins/configure` and fill the required information

Note: Before saving the configuration always ensure the connection is ok by using the Test Configuration button

We are now ready to create the Jenkins Job which will run a full backup & restore of our GeoNode dockerized instance.

1. Move to the Jenkins Home and click on Create a Job button
2. Provide a name to the Job and select Freestyle project
3. Enable the Log rotation strategy if needed
4. Configure the Job Parameters which will be used by the script later on.
   Add three String Parameters
   as shown below
   1. `BKP_FOLDER_NAME`
   2. `SOURCE_URL`
Jenkins

Welcome to Jenkins!

Create an agent or configure a cloud to set up distributed builds. Learn more.

Create a job to start building your software project.

Build Queue
No builds in the queue.

Build Executor Status
1 Idle
2 Idle

Enter an item name

Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in freestyle job type.

Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple views of the same name as long as they are in different folders.

GitHub Organization
Scans a Github organization (or user account) for all repositories matching some defined markers.

Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

OK
This project is parameterised

Add Parameter

- Boolean Parameter
- Choice Parameter
- Credentials Parameter
- File Parameter
- List Subversion tags (and more)
- Multi-line String Parameter
- Password Parameter
- Run Parameter
- String Parameter

String Parameter

- Name: BK_P_FOLDER_NAME
- Default Value: backup_restore
- Description: Shared Backup Folder name. The scripts assume it is located on "root" e.g. /BK_P_FOLDER_NAME/

Options: Trim the string
Warning: Provide the correct URL of your GeoNode instance

3. TARGET_URL

Warning: Provide the correct URL of your GeoNode instance

5. Enable the **Delete workspace before build starts** and **Add timestamps to the Console Output Build Environment** options

6. Finally let’s create the **SSH Build Step**
   
   Select the correct **SSH Server** and provide the **Exec Command** below
Warning: Replace {{project_name}} with your geonode-project instance name (e.g. my_geonode)

```
# Replace {{project_name}} with your geonode-project instance name (e.g. my_geonode)
# docker exec -u 0 -it django4{{project_name}} sh -c 'SOURCE_URL=$SOURCE_URL
TARGET_URL=$TARGET_URL ./{{project_name}}/br/backup.sh $BKP_FOLDER_NAME'
# e.g.: docker exec -u 0 -it django4my_geonode sh -c 'SOURCE_URL=$SOURCE_URL
TARGET_URL=$TARGET_URL ./my_geonode/br/backup.sh $BKP_FOLDER_NAME'
```

Click on Advanced and change the parameters as shown below

Save! You are ready to run the Job...
1.18. GeoNode Backup and Restore
In the case you need to save the backup archives outside the docker container, there’s the possibility to directly link the `backup_restore` folder to a local folder on the **HOST**.

In that case you won’t need to `docker cp` the files everytime from the containers, they will be directly available on the host filesystem.

**Warning:** Always keep an eye to the disk space. Backups archives may be huge.

**Note:** You might want also to consider filtering the files through the backup dt filters on the `settings.ini` in order to reduce the size of the archive files, including only the new ones.

Modify the `docker-compose.override.yml` as follows in order to link the backup folders outside.

**Note:** `/data/backup_restore` is a folder physically located into the host filesystem.

```bash
$> vim docker-compose.override.yml

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/my_geonode'
    - '/data/backup_restore:/backup_restore'  # Link to local volume in the HOST
celery:
  volumes:
    - '/data/backup_restore:/backup_restore'  # Link to local volume in the HOST
geoserver:
  volumes:
    - '/data/backup_restore:/backup_restore'  # Link to local volume in the HOST
jenkins:
  volumes:
    - '/data/backup_restore:/backup_restore'  # Link to local volume in the HOST

# Restart the containers
$> docker-compose up -d
```
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
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, let’s 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 a 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 later. In any case those values must be coherent with the GeoServer OAuth2 Plugin configuration.
GeoNode Documentation, Release 3.1

If in doubt, please use the default values here below.

Default values are:

```python
# 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 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).

   **Note:** GeoServer ships by default with admin and geoserver as the default administrator user name and password. Before putting the GeoServer on-line it is imperative to change at least the administrator password.

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.
GeoNode Documentation, Release 3.1

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 a 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 to 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 Authorization 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 performances 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 explicitly disabled (warning this is dangerous, you must know what you are doing).

Let’s 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` key 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:

```python
... 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:

```python
... 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:

```python
(...
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:

```python
(...
# Replacement of default authentication backend in order to support
# permissions per object.
AUTHENTICATION_BACKENDS = (   'oauth2_provider.backends.OAuth2Backend',
    'django.contrib.auth.backends.ModelBackend',
    'guardian.backends.ObjectPermissionBackend',
)

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.

Change application

- **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.

1.20. GeoNode Components and Architecture 427
- 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

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
Users, Groups, and Roles

Manage user group and role services

User Group Services

- Add new
- Remove selected

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Administrator Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>Default XML user/group service</td>
<td></td>
</tr>
</tbody>
</table>

Results 1 to 1 (out of 1 item)

Role Services

- Add new
- Remove selected

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Administrator Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>geonode REST role service</td>
<td>AuthKEY REST Role Service</td>
<td>ROLE_ADMIN</td>
</tr>
</tbody>
</table>
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

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
   - **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
AuthKEY REST Role Service

Role service from REST endpoint

<table>
<thead>
<tr>
<th>Settings</th>
<th>Roles</th>
</tr>
</thead>
</table>

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

Security Settings

Configure security settings

Active role service

geonode REST role service

default

geonode REST role service

Encrypt web admin URL parameters

Password encryption

Weak PBE

No strong cryptography available

Save Cancel
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.

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:

   - 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 EndPoint; Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_login
   - Logout Authentication EndPoint; Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_logout
Authentication using a GeoNode OAuth2 geonode-oauth2

Authenticate by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter

- 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

3. Make sure the web Filter Chain is configured as shown below

   **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

   **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

   **Warning:** Every time you modify a Filter Chain, don’t forget to save the Authentication settings. This must be done for each change.
# 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>

Results 1 to 6 (out of 6 items)

## Available Filters

<table>
<thead>
<tr>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>basic</td>
</tr>
<tr>
<td>geonodeAnonymousFilter</td>
</tr>
<tr>
<td>geonodeCookieFilter</td>
</tr>
</tbody>
</table>

## Selected Filters

<table>
<thead>
<tr>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>geonode-auth2 rememberme form anonymous</td>
</tr>
</tbody>
</table>

## Available Filters

<table>
<thead>
<tr>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>geonodeAnonymousFilter</td>
</tr>
<tr>
<td>geonodeCookieFilter</td>
</tr>
</tbody>
</table>

## Selected Filters

<table>
<thead>
<tr>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>basic geonode-auth2 anonymous</td>
</tr>
</tbody>
</table>
6. Make sure the default Filter Chain is configured as shown below

![Table showing Filter Chain configurations]

**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

**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

**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.
Filter chain

Configure an individual filter chain

Chain settings

Name
webLogin

Comma delimited list of ANT patterns (with optional query string)

lith2_geonode_login,ji_spring_oauth2_geonode_login/

☐ Disable security for this chain

☐ Allow creation of an HTTP session for storing the authentication token

☐ Accept only SSL requests

Role filter

Filter chain

Configure an individual filter chain

Chain settings

Name
webLogout

Comma delimited list of ANT patterns (with optional query string)

2_geonode_logout,ji_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: 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
GeoNode Documentation, Release 3.1

**Authentication Providers**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>Basic username/password authentication</td>
</tr>
<tr>
<td>geoFence</td>
<td>org.geoserver.geoserver.authentication.GeoFenceAuthenticationProvider</td>
</tr>
<tr>
<td>geonodeAuthProvider</td>
<td>org.geonode.security.GeoNodeAuthenticationProvider</td>
</tr>
</tbody>
</table>

**Warning:** Every time you modify an 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
Note: This rule is always the last one

<table>
<thead>
<tr>
<th>Warning: If that rule does not exist at the very bottom (this rule is always the last one), add it manually.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Access the Security &gt; GeoFence Admin Rules section</td>
</tr>
<tr>
<td>• No Rules needed here</td>
</tr>
</tbody>
</table>

Troubleshooting and Advanced Features

Common Issues and Fixes

• GeoServer/GeoNode OAuth2 does not authenticate as Administrator even using GeoNode admin users

  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.
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
GeoNode Documentation, Release 3.1

1.20. GeoNode Components and Architecture

GeoFence Data Rules

Configure data rules for the internal GeoFence server.

- Add new rule
- Remove selected rules

<table>
<thead>
<tr>
<th>P</th>
<th>Role</th>
<th>User</th>
<th>Service</th>
<th>Request</th>
<th>Workspace</th>
<th>Layer</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DENY</td>
</tr>
</tbody>
</table>

Demo

Configure admin rules for the internal GeoFence server.
GeoFence Admin Rules

Configure admin rules for the internal GeoFence server.

- Add new rule
- Remove selected rules

- 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"}
   ```

   ```
   curl http://localhost/api/users
   $> {"users": [{"username": "AnonymousUser", "groups": [{"anonymous"}], "username": "afabiani", "groups": [{"anonymous", "test"}], {"username": "admin", "groups": [{"anonymous", "test", "admin"}]
   ```

   (continues on next page)
**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>

   ```
   openssl s_client -connect <geonode_host_base_url>:443
   ```

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

```
geonode.cert (or whatever name you want with .cert extension)
```

or, alternatively, you can use some graphic tool which helps you managing the SSL Certificates and Keystores, like Portecle

```
java -jar c:\apps\portecele-1.9\portecele.jar
```

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.
GeoNode Documentation, Release 3.1

Chapter 1. Table of contents
Password for Keystore 'keystore.key'

Enter Password: 

OK Cancel

No keystore loaded
Import Trusted Certificate

Look In: F:\tmp\keystore.key - Portecle

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
### GeoNode Components and Architecture

#### 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
1.20. GeoNode Components and Architecture
Save the loaded keystore to disk
HOST=myhost.example.com
PORT=443
KEYSTOREFILE=dest_keystore
KEYSTOREPASS=changeme

# get the SSL certificate
openssl s_client -connect $HOST:$PORT </dev/null \
    | sed -ne '/-BEGIN CERTIFICATE-/,/-END CERTIFICATE-/p' > $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

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
```

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.hibernate.spatial.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 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).

ageofenceEntityManagerFactory.jpaPropertyMap[hibernate.hbm2ddl.auto]=update
ageofenceEntityManagerFactory.jpaPropertyMap[javax.persistence.validation.mode]=none
ageofenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.apply_to_ddl]=false
ageofenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.autoregister_listeners]=false
```

(continues on next page)
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 GeoNode Social Accounts

Allow GeoNode to Login through Social Accounts (Facebook and LinkedIn)

Base concepts and objects

In order to harmonize the various authentication flows between local accounts and remote social accounts, the whole user registration and authentication codebase has been refactored.

Major changes:

- `geonode-user-accounts` has been retired and is not used anymore. This app was only capable of managing local accounts;
- `django-allauth` has been integrated as a dependency of `geonode`. It provides a solution for managing both local and remote user accounts. It is now used for dealing with most user registration and auth flows;
- `django-invitations` has also been integrated as a dependency of `geonode` and is used for managing invitations to new users. This functionality was previously provided by `geonode-user-accounts`;
- `django-allauth` has been extended in order to provide the following additional features:
  - Automatically registering an e-mail with a user when the e-mail is used to connect to a social account;
  - Automatically extract information from the user’s social account and use that to enhance the user’s profile fields on `geonode`. This was implemented in a pluggable way, allowing custom installs to configure it for other providers;
  - Allow approval of new registrations by staff members before allowing new users to login. This functionality was previously provided by `geonode-user-accounts`;
- There are now extra sections on the user’s profile to manage connected social accounts and e-mail accounts
• When properly configured, the login and register pages now display the possibility to login with social accounts

Installation

• Install the new allauth plugin and remove any of the old dependencies

```
pip install -r requirements.txt --upgrade
pip install -e . --upgrade --no-cache
```

(continues on next page)
pip uninstall geonode-user-accounts -y
pip uninstall django-user-accounts -y

- ensure sure the DJango model is updated and the templates updated to the static folder

```bash
DJANGO_SETTINGS_MODULE=geonode.local_settings python -W ignore manage.py makemigrations
DJANGO_SETTINGS_MODULE=geonode.local_settings python -W ignore manage.py migrate
DJANGO_SETTINGS_MODULE=geonode.local_settings python -W ignore manage.py collectstatic --noinput
```

- ensure that Social Providers are enabled in your settings:

```python
# prevent signing up by default
ACCOUNT_OPEN_SIGNUP = True
ACCOUNT_EMAIL_REQUIRED = True
ACCOUNT_EMAIL_VERIFICATION = 'optional'
ACCOUNT_EMAIL_CONFIRMATION_EMAIL = True
ACCOUNT_EMAIL_CONFIRMATION_REQUIRED = True
ACCOUNT_CONFIRM_EMAIL_ON_GET = True
ACCOUNT_APPROVAL_REQUIRED = True

SOCIALACCOUNT_ADAPTER = 'geonode.people.adapters.SocialAccountAdapter'
SOCIALACCOUNT_AUTO_SIGNUP = False

INSTALLED_APPS += (
    'allauth.socialaccount.providers.linkedin_oauth2',
    'allauth.socialaccount.providers.facebook',
)

SOCIALACCOUNT_PROVIDERS = {
    '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'],
    },
}
```

(continues on next page)
Configuration

1. Go to GeoNode/Django Admin Dashboard and add the Social Apps you want to configure:

admin/socialaccount/socialapp/

- Linkedin
- Facebook
Warning: Make sure to add the sites you want to enable.

Usage

You need first to create and configure OAuth2 Applications on your Social Providers. This will require a personal or business account, which can access to the developers sections of LinkedIn and Facebook and create and configure new Applications. That account won’t be visible to the GeoNode users. This is needed only to generate OAuth2 Client ID and Client Secret Authorization Keys.

In the following sections we will see in details how to configure them for both LinkedIn and Facebook.

LinkedIn Application


1. Go to https://www.linkedin.com/developer/apps and select Create Application

![LinkedIn Application Screenshot]

2. Create a new Company

![Create a New Application]
3. Fill the informations

**Note:** The logo must have precise square dimensions

4. Select the following **Default Application Permissions**

**Warning:** Be sure to select the `r_basicprofile` and `r_emailaddress` application permissions.
5. Add OAuth 2.0 Authorized Redirect URLs:

```
http://geonode.geo-solutions.it/account/linkedin_oauth2/login/callback/
http://geonode.geo-solutions.it/account/linkedin/login/callback/
```

6. Save
7. Take note of the Authentication Keys

Authentication Keys

Client ID: [Redacted]

Client Secret: [Redacted]

Default Application Permissions

8. Go to GeoNode/Django admin, Social Applications and select the LinkedIn one

(/admin/socialaccount/socialapp/)
9. Cut and Paste the Client ID and Client Secret on the related fields

10. Save
Facebook Application


1. Go to https://developers.facebook.com/apps and Add a New Application

2. Create the App ID and go to the Dashboard
3. Take note of the **Authentication Keys**

4. Go to GeoNode/Django admin, Social Applications and select the LinkedIn one

   (/admin/socialaccount/socialapp/)
5. Cut and Paste the App ID and Secret Key on the related fields

<table>
<thead>
<tr>
<th>ClientID</th>
<th>&lt;-&gt;</th>
<th>App Id</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Secret</td>
<td>&lt;-&gt;</td>
<td>Secret Key</td>
</tr>
</tbody>
</table>

6. Save

7. Go back to the Facebook Application Dashboard and select Settings

8. Add your App Domain
9. Click on Add Platform

10. Select Web Site
11. Add the URL

12. And Save
13. Go to Add Product

14. Select Facebook Login
15. Select Web

16. Go to Settings
17. Make sure Allow client OAuth and Access via OAuth Web are enabled

18. Add the valid redirect URIs:

   - http://geonode.geo-solutions.it/account/facebook/login/callback/
   - http://geondoe.geo-solutions.it/account/login/

19. Save
Login by using Existing Accounts on GeoNode

If you want to enable an already existing user account to login through social apps, you need to associate it to social accounts.

Usually this could be done only by the current user, since this operation requires authentication on its social accounts.

In order to do that you need to go to the User Profile Settings

Click on “Connected social accounts”
And actually connect them

### Account Connections

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

**Add a 3rd Party Account**

- Connect with LinkedIn
- Connect with Facebook

**Account Connections**

You can sign in to your account using any of the following already connected third party accounts:

- Facebook account: Alessio Fabiani
- LinkedIn account: Alessio Fabiani

Remove

### 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 `geonodeldap.backend.GeonodeLdapBackend` as an additional auth backend.

```
# e.g. by updating your settings.py or local_settings.py
AUTHENTICATION_BACKENDS += (
    "geonodeldap.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

```
# 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

# enable logging
import logging
logger = logging.getLogger('django_auth_ldap')
logger.addHandler(logging.StreamHandler())
logger.setLevel(logging.DEBUG)

# add both standard ModelBackend auth and geonode.contrib.ldap auth
AUTHENTICATION_BACKENDS += ('geonode_ldap.backend.GeonodeLdapBackend',)

# django_auth_ldap configuration
AUTH_LDAP_SERVER_URI = os.getenv("LDAP_SERVER_URL")
AUTH_LDAP_BIND_DN = os.getenv("LDAP_BIND_DN")
AUTH_LDAP_BIND_PASSWORD = os.getenv("LDAP_BIND_PASSWORD")
AUTH_LDAP_USER_SEARCH = ldap_config.LDAPSearch(
    os.getenv("LDAP_USER_SEARCH_DN"),
    ldap.SCOPE_SUBTREE,
    os.getenv("LDAP_USER_SEARCH_FILTERSTR")
)

# should LDAP groups be used to spawn groups in GeoNode?
AUTH_LDAP_MIRROR_GROUPS = strtobool(os.getenv("LDAP_MIRROR_GROUPS", 'True'))

AUTH_LDAP_GROUP_SEARCH = ldap_config.LDAPSearch(
    os.getenv("LDAP_GROUP_SEARCH_DN"),
    ldap.SCOPE_SUBTREE,
    os.getenv("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"
]
```

(continues on next page)
# these are not needed by django_auth_ldap - we use them to find and match
GroupProfiles and GroupCategories

```python
GEONODE_LDAP_GROUP_NAME_ATTRIBUTE = os.getenv("LDAP_GROUP_NAME_ATTRIBUTE", default="cn")
GEONODE_LDAP_GROUP_PROFILE_FILTERSTR = os.getenv("LDAP_GROUP_SEARCH_FILTERSTR", default='(ou=research group)')
GEONODE_LDAP_GROUP_PROFILE_MEMBER_ATTR = os.getenv("LDAP_GROUP_PROFILE_MEMBER_ATTR", default='member')
```

Example environment variables:

```bash
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_MIRROR_GROUPS=True
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))`) 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.

If no LDAP groups shall be mirrored `LDAP_MIRROR_GROUPS` and `LDAP_MIRROR_GROUPS_EXCEPT` must be set to `False`.

**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 threaten 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.
Where the `manage.sh` is a bash script similar to the following one:

```bash
manage.sh
export $(grep -v '^# ' /opt/geonode/my-geonode/.env | xargs -d '
'); /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:

```bash
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=**********
DJANGO_USERS_MODULE=django.contrib.auth
DJANGO_OAUTH2_API_KEY=**********
OGC_REQUEST_MAX_RETRIES=3
OGC_REQUEST_POOL_CONNECTIONS=100
OGC_REQUEST_POOL_MAXSIZE=100
OGC_REQUEST_TIMEOUT=60
SITEURL=https://<geonode_public_host>/
```

1.23. GeoNode Django Contrib Apps
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:

```ini
[uwsgi]
socket = 0.0.0.0:8000
uid = <my_user>
gid = www-data

plugins = python3
virtualenv = /home/<my_user>/virtualenvs/geonode

# set environment variables from .env file
env LANG=en_US.utf8
eval LC_ALL=en_US.UTF-8
eval 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,
   } (continues on next page)
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) Family details

```
{"format_version": "1.0",
"instance": {
   "name": geonode instance HOSTNAME,
   "ip": geonode instance IP
},
"time": {
   "startTime": UTC now - 1 day
   "endTime": UTC now
},
```

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"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:

<table>
<thead>
<tr>
<th>GEONODE LOGSTASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized servers</td>
</tr>
</tbody>
</table>

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 Spatialite 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 Spatialite 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)
```
source => "[instance][ip]"
}
}

output {
elasticsearch {
    hosts => "elasticsearch:<elastic_port_number>"
    index => "logstash-{[instance][name]}-{YYYY.MM.dd}"  
    user => "elastic"
    password => "changeme"
}
    stdout { codec => rubydebug }
}

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 behavior 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.
GeoNode Documentation, Release 3.1

 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

---

Fig. 282: *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.
Change geo node theme customization

**Name:**  
Dev
This will not appear anywhere.

**Description:**

This will not appear anywhere.

**Is enabled**  
Enabling this theme will disable the current enabled theme (if any)

---

**Fig. 287:** Theme Name and Description

**Fig. 288:** Theme Name and Description
The next section, allows you to define the first important Theme properties. This part involves the GeoNode main page sections.

![Fig. 289: 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.

**Slide show**

To switch between a slide show and a jumbotron, flip the value of the welcome theme from “slide show” to “jumbotron” and vice versa to either display a jumbotron with a “get started” link or a slide show in the home page.

For example, to display a slide show, change the welcome theme from jumbotron background to slide show.

Before creating a slide show, make sure you have slides to select from (in the multi-select widget) to make up the slide show.

If no slides exist, click the plus (+) button beside the slide show multi-select widget to add a new slide.

Fill in the slide name, slide content using markdown formatting, and upload a slide image (the image that will be displayed when the slide is in view).

For slide images that already contain text, hide slide content by checking the checkbox labeled “Hide text in the jumbotron slide” as shown below, then save the slide.
Welcome

GeoNode is an open source platform for sharing geospatial data and maps.

Get Started »

Search for Data.

Advanced Search

Fig. 290: GeoNode Default Home

Jumbotron title

Jumbotron content

Call to action

Search for Data.

Advanced Search

Fig. 291: Updating Jumbotron and Logo
Fig. 292: *Hide Jumbotron text and Call to action button*
Add jumbotron theme slide

<table>
<thead>
<tr>
<th>Slide name</th>
<th>New Slide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumbotron slide background</td>
<td>Choose file</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jumbotron slide content</th>
<th>Write Markdown Here To Format Slide Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This is a paragraph in a slide content</td>
</tr>
</tbody>
</table>

- Hide text in the jumbotron slide
  - Check this if the jumbotron background image already contains text

- Is enabled
  - Disabling this slide will hide it from the slide show
It is also possible to hide a slide from all slide show themes that use it by unchecking the checkbox labeled “Is enabled” as shown below.

![Checkbox for enabling slide](image)

Selecting the above slide in a slide show and enabling slide show (using the “welcome theme” configuration) will create a slide show with a slide as shown below:

![Slide show example](image)

**Copyright and contact info footer**

The default GeoNode footer does not present any type of contact info.

![Default GeoNode footer](image)

Fig. 293: Default GeoNode Footer

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.

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.
<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. 294: Enable contact us box
Fig. 295: *Contact Us Footer*

Fig. 296: *Copyright Text and Color*

Fig. 297: *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.

![Image of Partners section with support from various organizations]

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. 299: GeoNode Partners Admin Section

Fig. 300: 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 it 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 feet 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. 302: Cookies Law Info Bar checkbox

Fig. 303: 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 GIANNECCHINI 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 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. 307: The Add User button in the Users List page

Fig. 308: Add User Link
Fig. 309: The User Details Page

Fig. 310: The User in the People page
Fig. 311: New Users Active by default

Fig. 312: 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 the form link from the User Details Page to access the Change Password Form.

The Change User Password Form should look like the following one. Insert the new password two times and click on CHANGE PASSWORD.

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. 317: The Group Creation Form
Fig. 318: *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.

As you can see, GeoNode provides two types of groups. You will learn more about that in the next paragraph.

**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.
Add group profile

Title: Transportation Planners

Title [en]:

Slug: transportation-planners

Logo: Browse... transport_logo.png

Description: Users interested in transports

Description [en]:

Email: transport.group@mail.com

Email is used to contact one or all group members, such as a mailing list, shared email, or exchange group.

Keywords: railways, roads

A space or comma-separated list of keywords.

Access: Public

Public: Any registered user can view and join a public group. Public (view-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:

Category: Transport

Hold down "Ctrl", or "Command" on a Mac, to select more than one.

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</td>
<td>Today</td>
</tr>
<tr>
<td>Time: 15:20</td>
<td>Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: You are 2 hours ahead of server time.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Fig. 322: The Group Profiles List

Fig. 323: A new Group Category
Fig. 324: The Group Categories List

Fig. 325: Filtering Layers by Group Category
Fig. 326: The Groups Link in the navigation bar

- 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 Activities 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.
Explore Groups

Total: 4

- **Test Group**
  - Test
  - 1 Member 1 Manager

- **John Smith Foundation Team**
  - Members of the Team of John Smith
  - 1 Member 1 Manager

- **Transportation Planners**
  - Users interested in transports
  - 3 Members 1 Manager

- **Cartographers**
  - This group gathers all the cartographer of GeoNode
  - 1 Member 1 Manager

Fig. 327: Group Profiles List Page
Fig. 328: **Group Profile Details Page**
Fig. 329: Group Profile Details Page

Fig. 330: Confirm Group Deletion
Activity Feed for John Smith Foundation Team

- admin created places_landuse_amsterdam by admin 2 minutes ago
- admin uploaded geonodeplaces 4 minutes ago
- admin uploaded geonode landuse 6 minutes ago

Fig. 331: 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. 332: Editing the Group Logo
John Smith Foundation Team

Last Modified: June 27, 2019, 9:14 a.m.

Members of the Team of John Smith
OSM john.smith transport

Edit Group Details
Manage Group Members
Delete this Group
Group Activities
Permissions
This group is Public. Anyone may join this group.

Managers
admin
GeoSolutions

Fig. 333: 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.

![Edit Members for John Smith Foundation Team](image)

**Fig. 334: Adding a new Member to the Group**

The following picture shows you the results.

If you want to change the role of group members after adding them, you can use the “promote” button to make a member into a manager, and the “demote” button to make a manager into a regular member.

### 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:
Edit Members for John Smith Foundation Team

Current Members

- **admin** (Manager)
  - Role: manager
- **joe**
  - Role: member
- **johnsmith**
  - Role: member

Add new members

User Identifiers

Choose users...

Assign manager role

Add Group Members

Fig. 335: 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. 336: From upload to publication: the review process on GeoNode
How to enable the advanced workflow

You have to tweak the GeoNode settings accordingly.

Please see the details of the following GeoNode Settings:

- RESOURCE_PUBLISHING
- ADMIN_MODERATE_UPLOADS
- GROUP_PRIVATE_RESOURCES

Summarizing, when all the options above of the Advanced Workflow are enabled, upon a new upload we will have:

- The “unpublished” resources will be hidden to anonymous users only. The registered users will be still able to access the resources (if they have the rights to do that, of course).
- The “unpublished” resources will remain hidden to users if the permission (see Admin Guide section: ‘Manage Permissions’) will be explicitly removed
- During the upload, whenever the advanced workflow is enabled, the owner’s Groups are automatically allowed to access the resource, even if the “anonymous” flag has been disabled. Those permissions can be removed later on
- During the upload, “managers” of the owner’s Groups associated to the resource, are always allowed to edit the resource, the same as they are admin for that resource
- “managers” of the owner’s Groups associated to the resource are allowed to “publish” also the resources, not only to “approve” them

Change the owner rights in case of advanced workflow is on

After switching ADMIN_MODERATE_UPLOADS to True and resource is approved owner is no longer able to modify it. He will see new button on the resource detail page: Request change. After clicking this, view with short form is shown. On this view user can write short message why he want to modify the resource.

This message will be sent through messaging and email system to administrators:

After administrator unapprove the resource owner is again able to modify it.

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:

Following this approval, the GeoNode Administrators receive a notification informing them that an item is now waiting for publication.
Fig. 337: The approbation process of an item by a Manager

Fig. 338: An approved layer, waiting for publication by the GeoNode administrators
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 license 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.

It is possible for an administrator to add new roles if needed, by clicking on the Add Role button in the Base -> Contact Roles section:

![Add contact role](image)

Clicking on the People section (see figure) will open a web form with some personal information plus a section called Users.

![People](image)

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.

**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.

### 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.
Django administration

Select layer to change

<table>
<thead>
<tr>
<th>ID</th>
<th>ALTERNATE</th>
<th>TITLE [EN]</th>
<th>DATE</th>
<th>CATE</th>
</tr>
</thead>
<tbody>
<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>

Layers Permissions

Group

User

Permission Type

- Read
- Write
- Download

Mode

- Set
- Unset

Cancel  Submit
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

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.
2 Documents
As for the layers and maps GeoNode allows to publish tabular and text data, manage theirs metadata and associated documents.

Explore all datasets

22 Users
Geonode allows registered users to easily upload geospatial data and various documents in several formats.

Contact Us
Mr. Pibody
Mr. Pibody
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.

**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.
## Django administration

### Site administration

<table>
<thead>
<tr>
<th>Accounts</th>
<th>Email addresses</th>
<th>Add</th>
<th>Change</th>
</tr>
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### Base

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<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Menu links</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Menu placeholders</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Menus</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</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>

### Dialogs

<table>
<thead>
<tr>
<th>Comments</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
</table>
Licenses

Through the Admin > Base > Licenses panel it will be possible to manage all the licenses associated to the resources. The license description and the info URL will be shown on the resource detail page. The license text will be shown on the catalogue metadata XML documents.

**Warning:** It is strongly recommended to not publish resources without an appropriate license. Always make sure the data provider specifies the correct license 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.
Fig. 341: Metadata Advanced Panel

Fig. 342: Metadata Completeness
Fig. 343: Hierarchical keywords list

Fig. 344: Hierarchical keywords edit
Fig. 345: Metadata editor Licenses
Fig. 346: Resource detail License

Fig. 347: Resource Metadata ISO License
Fig. 348: Resource Metadata Regions

Fig. 349: GeoNode filtering by Metadata Regions
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. 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.
Fig. 350: A sample Warning Announcement

Fig. 351: General Announcement
### Announcements

<table>
<thead>
<tr>
<th>Title</th>
<th>Level</th>
<th>Announcement</th>
<th>Published From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning dear users</td>
<td>Warning</td>
<td>Warning dear users</td>
<td>Published from June 26, 2019 to (no end date).</td>
</tr>
</tbody>
</table>

Fig. 352: *Warning Announcement*

<table>
<thead>
<tr>
<th>Title</th>
<th>Level</th>
<th>Announcement</th>
<th>Published From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning dear users</td>
<td>Critical</td>
<td>Warning dear users</td>
<td>Published from June 26, 2019 to (no end date).</td>
</tr>
</tbody>
</table>

Fig. 353: *Critical Announcement*
Fig. 354: Announcements from the Profile panel
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.

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

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

```
...<ul class="nav navbar-nav navbar-right">
  {% block my_extra_right_tab %}
  {% render_nav_menu 'TOPBAR_MENU' %}
  {% endblock my_extra_right_tab %}
</ul>
```

(continues on next page)
Django administration

Site administration

<table>
<thead>
<tr>
<th>ACCOUNTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Email addresses</td>
<td>+ Add</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTSTREAM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actions</td>
<td>+ Add</td>
</tr>
<tr>
<td>Follows</td>
<td>+ Add</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANNOUNCEMENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcements</td>
<td>+ Add</td>
</tr>
<tr>
<td>Dismissals</td>
<td>+ Add</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUTHENTICATION AND AUTHORIZATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>+ Add</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVATAR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatars</td>
<td>+ Add</td>
</tr>
</tbody>
</table>

Fig. 355: Announcements from the Admin panel

Announcements

<table>
<thead>
<tr>
<th>Title</th>
<th>Level</th>
<th>Announcement</th>
<th>Published From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning dear users</td>
<td>Critical</td>
<td>Warning dear users</td>
<td>Published from June 26, 2019 to (no end date).</td>
</tr>
</tbody>
</table>

Fig. 356: Announcements List from the Profile panel
Create Announcement

**Title**

**Level**
- General

**Content**

- Site wide
- Members only

**Dismissal type**
- Session Only Dismissal

**Publish start**

**Publish end**

**Cancel**  **Save**

Fig. 357: *Create Announcement from the Profile panel*
Fig. 358: *Create Announcement from the Admin panel*

Fig. 359: *Create Dismissal from the Admin panel*

Fig. 360: *GeoNode Top-Bar Menu customization*
From the Admin > Base panel, it is possible to access to the Menu, Menu Items and Menu Placeholder options.

Fig. 361: Menu, Menu Items and Menu Placeholder options on the Admin panel

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, using the same keyword. By default GeoNode provides an already defined one called **TOPBAR_MENU**

![Menu Placeholder](image)

Fig. 362: The default ‘‘TOPBAR_MENU’’ Menu Placeholder on the Admin panel

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](#)).

Here we will focus mainly on the Admin > DJANGO/GEONODE OAUTH TOOLKIT panel items with a specific attention to the Access tokens management.
Fig. 363: Create a new Menu from the Admin panel
Django administration

Home > Base > Menu items > My Item

Change menu item

Title: My Item

Menu: My Menu

Order: 1

Blank target

Url: https://dev.geonode.geo-solutions.it/

Delete

Fig. 364: Create a new Menu Item from the Admin panel
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 want 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 not 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/](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.:

```
https://dev.geonode.geo-solutions.it/geoserver/ows?service=wms&version=1.3.0&
request=GetCapabilities&access_token=123456
```
Fig. 367: Create an ‘‘Access token’’
Fig. 368: Select a User

User: 1000

Source refresh token: 

**Token:** 123456

Application: 

Expires:

Date: Today
Time: Now

Fig. 369: Select a Token
Add access token

User: 1000

Source refresh token: 

Token: 123456

Application: GeoServer

Expires: 2029-06-30 11:03:39

Fig. 370: Select the GeoServer Application

Fig. 371: Select the Token Expiration
Force a User Session to expire

Everything 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 change 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

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl --help
```

Note: If you enabled local_settings.py the command will change as following:
This will produce output that looks like the following

```python
usage: manage.py migrate_baseurl [-h] [--version] [-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}
   Verbose 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
                               DJANGOSETTINGS_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]

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl
˓
    --source-address=http:\example.org --target-address=https:\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

```bash
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

```bash
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:

```bash
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
--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

  ```
  Warning: Make always sure you are using the correct settings
  
  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 maps 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

```bash
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:

```bash
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py sync_geonode_maps --help
```

This will produce output that looks like the following

```
usage: manage.py sync_geonode_maps [-h] [--version] [-v {0,1,2,3}] 
[--settings SETTINGS] 
[--pythonpath PYTHONPATH] [--traceback] 
[--no-color] [-i] [-d] [-f FILTER] 
[-u USERNAME] [--updatethumbnails] 

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 maps that match the given filter.
  -u USERNAME, --username USERNAME
```

(continues on next page)
Only update data owned by the specified username.

--updatethumbnails Update the map styles and thumbnails.

- Example 1: I want to regenerate the Thumbnail of the Map This is a test Map

**Warning:** Make always sure you are using the correct settings

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_maps --updatethumbnails -f 'This is a test Map'
```

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

```bash
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:

```bash
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,
```

(continues on next page)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--settings SETTINGS</td>
<td>The Python path to a settings module, e.g. &quot;myproject.settings.main&quot;. If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.</td>
</tr>
<tr>
<td>--pythonpath PYTHONPATH</td>
<td>A directory to add to the Python path, e.g. &quot;/home/djangoprojects/myproject&quot;.</td>
</tr>
<tr>
<td>--traceback</td>
<td>Raise on CommandError exceptions</td>
</tr>
<tr>
<td>--no-color</td>
<td>Don't colorize the command output.</td>
</tr>
<tr>
<td>-i, --ignore-errors</td>
<td>Stop after any errors are encountered.</td>
</tr>
<tr>
<td>-d, --remove-duplicates</td>
<td>Remove duplicates first.</td>
</tr>
<tr>
<td>-t, --delete-orphaned-thumbs</td>
<td>Delete Orphaned Thumbnails.</td>
</tr>
<tr>
<td>-f FILTER, --filter FILTER</td>
<td>Only update data the layers that match the given filter</td>
</tr>
<tr>
<td>-u USERNAME, --username USERNAME</td>
<td>Only update data owned by the specified username</td>
</tr>
</tbody>
</table>

- **Example 1**: After having changed the Base URL, I want to regenerate all the Catalogue Schema and eventually remove all duplicates.

**Warning:** Make always sure you are using the correct settings

```bash
dJANGO_SETTINGS_MODULE=geonode.settings python manage.py set_all_layers_metadata -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] [--version] [-v {0,1,2,3}] |
|-------------------|-------------------|
|                   | [--settings SETTINGS] [---pythonpath PYTHONPATH] |
|                   | [--traceback] [---no-color] [-u USER] [-i] [-o] |
|                   | [-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=minimum 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
-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, let’s use the default set of testing layers that ship with geonode. You can replace this path with the directory to your own shapefiles.

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py importlayers -v 3 /var/lib/geonode/lib/python2.7/site-packages/gisdata/data/good/vector/
```

This command will produce the following output to your terminal

```
Verifying that GeoNode is running ... Found 8 potential layers.
```

(continues on next page)
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)
[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
    File "/Users/geosolutions/projects/geonode/geonode/layers/utils.py", line 602, in file_upload
    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,
    File "/Library/Python/2.7/site-packages/httplib2/__init__.py", line 1197, in _request
      conn.connect()
    File "/Library/Python/2.7/site-packages/httplib2/__init__.py", line 799, in 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 update.layers

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:


**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**

Lets 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/

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.
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.

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.
New Vector Data Source

Add a new vector data source

PostGIS
PostGIS Database

Basic Store Info
Workspace *

geonode

Data Source Name *
my_db_data
Description

Enabled

Connection Parameters
host *
localhost
port *
5432
database
geonode_data

schema
public

user *
geonode

password

Namespace *
http://www.geonode.org/
Keywords

Current Keywords
Features
_1_SARMIENTO_ENERO_2018

New Keyword

Vocabulary

Add Keyword

Metadata links

No metadata links so far

Add link Note only FGDC and TC211 metadata links show up in WMS 1.1.1 capabilities

Data links

No data links so far

Add link

Coordinate Reference Systems

Native SRS
EPSG:4326

Declared SRS
EPSG:4326

SRS handling
Force declared

Bounding Boxes

Native Bounding Box
Min X Min Y Max X Max Y
-56.076485273 -45.000000000 -49.079038671999 -45.000000000

Compute from data
Compute from bounds

Local Bounding Box
Min X Min Y Max X Max Y

Compute from native bounds

Curved geometry control
1.25. GeoNode Management Commands
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

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers --help
```

**Note:** If you enabled *local_settings.py* the command will change as following:

```bash
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py updatelayers --help
```

This will produce output that looks like the following

```plaintext
usage: manage.py updatelayers [-h] [--version] [-v {0,1,2,3}] 
    [--settings SETTINGS] [--pythonpath PYTHONPATH] 
    [--traceback] [--no-color] [-i] 
    [--skip-unadvertised] 
    [--skip-geonode-registered] [--remove-deleted] 
    [-u USER] [-f FILTER] [-s STORE] [-w WORKSPACE] 
    [-p PERMISSIONS]
```

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.
- `--skip-unadvertised` Skip processing unadvertised layers from GeoSever.
- `--skip-geonode-registered` Just processing GeoServer layers still not registered in GeoNode.
- `--remove-deleted` Remove GeoNode layers that have been deleted from GeoSever.
- `u USER`, `--user USER` Name of the user account which should own the imported
GeoNode Documentation, Release 3.1

(continued from previous page)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-f FILTER, --filter FILTER</code></td>
<td>Only update data the layers that match the given filter</td>
</tr>
<tr>
<td><code>-s STORE, --store STORE</code></td>
<td>Only update data the layers for the given store name</td>
</tr>
<tr>
<td><code>-w WORKSPACE, --workspace WORKSPACE</code></td>
<td>Only update data on specified workspace</td>
</tr>
<tr>
<td><code>-p PERMISSIONS, --permissions PERMISSIONS</code></td>
<td>Permissions to apply to each layer</td>
</tr>
</tbody>
</table>

**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 `--workspace 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

FutureWarning: the .identification and .serviceidentification properties will merge into .identification being a list of properties. This is currently implemented in .identificationinfo. Please see https://github.com/geopython/OWSLib/issues/38 for more information

FutureWarning: The .keywords and .keywords2 properties will merge into the .keywords property in the future, with .keywords becoming a list of MD_Keyword instances. This is currently implemented in .keywords2. Please see https://github.com/geopython/OWSLib/issues/301 for more information

You have received the following notice from master.demo.geonode.org:

**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>  

You have received the following notice from master.demo.geonode.org:

The user `<a href="http://master.demo.geonode.org/people/profile/admin">admin</a>` uploaded the following layer: `...`
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 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

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/>
<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>

-------------

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[Create new links]...done!
-- Resource Links[Compute parameters for the new links]...done!
-- Resource Links[Create Raw Data download link]...done!
-- Resource Links[Create Raw Data download link]...done!
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...done!
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...done!
-- Resource Links[Legend link]...done!
-- Resource Links[Legend link]...done!
-- Resource Links[Thumbnails link]...done!
-- Resource Links[Thumbnails link]...done!
-- Resource Links[OWS Links]...done!
-- Resource Links[OWS Links]...done!
Content-Type: text/html; charset="utf-8"
MIME-Version: 1.0
Subject: [master.demo.geonode.org] A layer has been updated
From: webmaster@localhost
To: mapadeldelito@chubut.gov.ar
Reply-To: webmaster@localhost
Date: Tue, 08 Oct 2019 12:26:20 -0000
Message-ID: <20191008122620.28801.81598@d3cf85425231>

<body>
You have received the following notice from master.demo.geonode.org:
<p>
The following layer was updated:<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>

(continues on next page)
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
To change how you receive notifications, please go to http://master.demo.geonode.org

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:

```bash
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:

```bash
```

You will need to unzip this dataset by issuing the following command:

```bash
$ 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:

```bash
$ 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",
(continues on next page)
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:
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_CREATE: 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 composes 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/
Let’s assume we have a sample ASCII Grid file compressed as an archive.

```bash
# 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:

```bash
$ 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_ele

And this should be the corresponding output:

Driver: AIG/Arc/Info Binary Grid
Files: batemans_ele
   batemans_ele/dblblnd.adf
   batemans_ele/hdr.adf
   batemans_ele/metadata.xml
   batemans_ele/prj.adf
   batemans_ele/sta.adf
   batemans_ele/w001001.adf
   batemans_ele/w001001x.adf
Size is 155, 142
Coordinate System is:
   PROJCS["unnamed",
      GEOGCS["GDA94",
         DATUM["Geocentric_Datum_of_Australia_1994",
            SPHEROID["GRS 1980",6378137,298.257222101,
               AUTHORITY["EPSG","7019"]],
            TOWGS84[0,0,0,0,0,0,0],
               AUTHORITY["EPSG","6283"]],
            PRIMEM["Greenwich",0,
               AUTHORITY["EPSG","8901"]],
            UNIT["degree",0.0174532925199433,
               AUTHORITY["EPSG","9122"]],
               AUTHORITY["EPSG","4283"]],
      PROJECTION["Transverse_Mercator"],
      PARAMETER["latitude_of_origin",0],
      PARAMETER["central_meridian",153],
      PARAMETER["scale_factor",0.9996],
      PARAMETER["false_easting",500000],
      PARAMETER["false_northing",10000000],
      UNIT["METERS",1]]
Origin = (239681.000000000000000,6050551.000000000000000)
Pixel Size = (100.000000000000000,-100.000000000000000)
Corner Coordinates:
Upper Left  ( 239681.000, 6050551.000) (150d7'28.35"E, 35d39'16.56"S)
Lower Left  ( 239681.000, 6036351.000) (150d7'11.78"E, 35d46'56.89"S)
Upper Right ( 255181.000, 6050551.000) (150d17'44.07"E, 35d39'30.83"S)
Lower Right ( 255181.000, 6036351.000) (150d17'28.49"E, 35d47'11.23"S)
Center      ( 247431.000, 6043451.000) (150d12'28.17"E, 35d43'13.99"S)

Band 1 Block=256x4 Type=Float32, ColorInterp=Undefined
   Min=-62.102 Max=142.917
   NoData Value=-3.4028234663852886e+38
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:

```
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](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 a 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:
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"],
            Prime["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](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"]],
(continues on next page)
Our GeoTiff is now tiled with 256x256 tiles, has 3 bands and a 1-bit mask for nodata.

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:
It results in:

```bash
gdalinfo chiangMai_ortho_optimized.tif
```

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",6378137,298.257223563,1],
      AUTHORITY["EPSG","7030"]],
    AUTHORITY["EPSG","6326"]],
  PRIMEM["Greenwich",0],
  AUTHORITY["EPSG","8901"]],
UNIT["degree",0.0174532925199433,1],
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
TIFFTAGSOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=YCbCr JPEGLIBRARY=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) ( 98d53'40.99"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, ...
Band 2 Block=256x256 Type=Byte, ColorInterp=Green
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, ...
Mask Flags: PER_DATASET
(continues on next page)
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 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:

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 = (0.1442700000000,0.1442700000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAGSOFTWARE=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:

```
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 chosen the lossless DEFLATE
compression through the COMPRESS=DEFLATE creation option.

Calling the gdalinfo command again:

```
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],
```

(continues on next page)
We need also to create overviews through the gdaladdo command:

```bash
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:

```bash
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],
```

(continues on next page)
Overview has 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
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/"; done > rename.sh
```

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```sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```

2. process_rgb.sh

```sh
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/../optimized.tif/"; done > gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

```sh
for filename in *.optimized.tif*; do echo gdaladdo -r average $filename;
  →2 4 8 16 32 64 128 256 512; done > gdaladdo.sh
for filename in *.optimized.tif*; do echo mv "$filename/" "$filename/
  →optimized.tif/"; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```

3. process_rgb_alpha.sh

```sh
for filename in *.tif*; do echo gdal_translate -co TILED=YES -co
  →COMPRESS=DEFLATE $filename $/
  →filename/../optimized.tif/"; done > gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

```sh
for filename in *.optimized.tif*; do echo gdaladdo -r average $filename;
  →2 4 8 16 32 64 128 256 512; done > gdaladdo.sh
for filename in *.optimized.tif*; do echo mv "$filename/" "$filename/
  →optimized.tif/"; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```

4. process_rgb_palette.sh

```sh
for filename in *.tif*; do echo gdal_translate -co TILED=YES -co
  →COMPRESS=DEFLATE $filename $/
  →filename/../optimized.tif/"; done >
  →gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

```sh
for filename in *.optimized.tif*; do echo gdaladdo -r average $filename;
  →2 4 8 16 32 64 128 256 512; done > gdaladdo.sh
for filename in *.optimized.tif*; do echo mv "$filename/" "$filename/
  →optimized.tif/"; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```

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1.25.4 Create Users and Super Users

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:

```
$ DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py createsuperuser
```

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:

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
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!
## 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>
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<td>Actstream</td>
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<tr>
<td>Actions</td>
<td>+</td>
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<td>Follows</td>
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<td>Announcements</td>
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<td>Announcements</td>
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<td>Dismissals</td>
<td>+</td>
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<tr>
<td>Auth</td>
<td></td>
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<tr>
<td>Groups</td>
<td>+</td>
<td></td>
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<td>Users</td>
<td>+</td>
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<tr>
<td>Avatar</td>
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<td>Avatars</td>
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<td>Base</td>
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<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>

### Permissions

- **Active**
  - Designates whether this user should be treated as active. Unselect this instead of deleting accounts.

- **Staff status**
  - Designates whether the user can log into this admin site.

- **Superuser status**
  - Designates that this user has all permissions without explicitly assigning them.
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',
                     'publish_resourcebase']
```
• **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.
Django administration

Select layer to change

Search

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>
</tr>
</thead>
<tbody>
<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>

Layers Permissions

Group

User

Permission Type
- Read
- Write
- Download

Mode
- Set
- Unset

Cancel  Submit
1.25.6 Delete Certain GeoNode Resources

The `delete_resources` Management Command allows to remove resources meeting a certain condition, specified in a form of a serialized django Q() expression.

First of all let's take a look at the `--help` option of the `delete_resources` management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py delete_resources --help
```

Note: If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py delete_resources --help
```

This will produce output the following output:

```

Delete resources meeting a certain condition

optional arguments:
  -h, --help            show this help message and exit
  -c CONFIG_PATH, --config CONFIG_PATH Configuration file path. Default is: delete_resources.json
  -l LAYER_FILTERS [LAYER_FILTERS ...], --layer_filters LAYER_FILTERS [LAYER_FILTERS ...]
  -m MAP_FILTERS [MAP_FILTERS ...], --map_filters MAP_FILTERS [MAP_FILTERS ...]
  -d DOCUMENT_FILTERS [DOCUMENT_FILTERS ...], --document_filters DOCUMENT_FILTERS [DOCUMENT_FILTERS ...]
  --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.
  --force-color Force colorization of the command output.
```

There are two ways to declare Q() expressions filtering which resources should be deleted:

1. With a JSON configuration file: passing `-c` argument specifying the path to the JSON configuration file.
Example 1: Relative path to the config file (to manage.py)

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py delete_  
resources -c geonode/base/management/commands/delete_resources.json
```

Example 2: Absolute path to the config file

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py delete_  
resources -c /home/User/Geonode/configs/delete_resources.json
```

2. With CLI: passing `-l -d -m` list arguments for each of resources (layers, documents, maps)

Example 3: Delete resources without configuration file

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py delete_  
resources -l 'Q(pk__in=[1, 2]) | Q(title__icontains:"italy")'  
- d '*' - m "Q(pk__in=[1, 2])"
```

Configuration File

The JSON configuration file should contain a single `filters` object, which consists of layer, map and document lists. Each list specifies the filter conditions applied to a corresponding queryset, defining which items will be deleted. The filters are evaluated and directly inserted into Django `filter()` method, which means the filters occurring as separated list items are treated as AND condition. To create OR query `|` operator should be used. For more info please check Django [documentation](https://docs.djangoproject.com/en/3.0/topics/db/queries/#complex-lookups-with-q-objects)). The only exception is passing a list with `'*` which will cause deleting all the queryset of the resource.

Example 4: Example content of the configuration file, which will delete layers with ID’s 1, 2, and 3, those owned by admin user, along with all defined maps.

```
{
    "filters": {
        "layer": [  
            "Q(pk__in=[1, 2, 3]) | Q(title__icontains='italy')",  
            "Q(owner__name=admin)"
        ],  
        "map": ["*"],  
        "document": []
    }
}
```

CLI

The CLI configuration can be specified with `-l -d -m` list arguments, which in fact are a translation of the configuration JSON file. `-l -d -m` arguments are evaluated in the same manner as filters.layer, filters.map and filter.document accordingly from the Example 4. The following example’s result will be equivalent to Example 4:

Example 5: Example CLI configuration, which will delete layers with ID’s 1, 2, and 3, along with all maps.

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py delete_  
resources -l 'Q(pk__in=[1, 2, 3]) | Q(title__icontains:"italy")'  
- d '*' - m '*'
```
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/settings.py` file (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:

```python
LANGUAGE_CODE = 'fr'
```

Unfortunately Django overrides this setting, giving the language setting of a user’s browser priority. For example, if `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 `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 root create a new directory within GeoNode’s site packages

```bash
mkdir /usr/lib/python2.7/dist-packages/setmydefaultlanguage
```

or

```bash
mkdir /var/lib/geonode/lib/python2.7/site-packages/setmydefaultlanguage
```

if GeoNode has been installed using `apt-get`.

As root create and edit a new file `/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['HTTP_ACCEPT_LANGUAGE'], namely django.middleware.locale.LocaleMiddleware

```python
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 `/home/geonode/geonode/geonode/settings.py` (or `/etc/geonode/settings.py` if GeoNode has been installed using `apt-get`) add the following lines to ensure the above class is executed

```python
MIDDLEWARE_CLASSES += {
    'setmydefaultlanguage.ForceDefaultLanguageMiddleware',
}
```

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 NGINX with UWSGI, as root you will need to run the following commands

```
service uwsgi restart
service nginx restart
```

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 2.10.x / 3.0

Upgrade the instance dependencies

Check the 1. Install the dependencies and 2. GeoNode Installation sections in order to upgrade your Python environment.

Also, make sure the code is Python 3.8 compatible and that you switched and aligned the source code and the requirements.txt to the 3.x branch.

This must be done manually and with particular attention.

```
workon geonode3
cd /<full_path_to_geonode>
pip install pip --upgrade
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e . --upgrade
pip install pygdal="gdal-config --version".*
./manage.sh collectstatic --noinput
```
Prepare the Database and Migrate to the new Schema

Fix the tables in order to migrate to the new schema

```
./manage.sh dbshell

ALTER TABLE base_resourcebase ADD COLUMN doi_bkp varchar;
UPDATE base_resourcebase SET doi_bkp = doi;
ALTER TABLE base_resourcebase DROP COLUMN doi;

CREATE TABLE base_backup(name varchar);  
CREATE TABLE base_usergeolimit_bkp ( like base_usergeolimit including all);
CREATE TABLE base_groupgeolimit_bkp ( like base_usergeolimit including all);
CREATE TABLE base_resourcebase_users_geolimits_bkp ( like base_usergeolimit including all);
CREATE TABLE base_resourcebase_groups_geolimits_bkp ( like base_usergeolimit including all);

DROP TABLE base_usergeolimit CASCADE;
DROP TABLE base_groupgeolimit CASCADE;
DROP TABLE base_resourcebase_users_geolimits CASCADE;
DROP TABLE base_resourcebase_groups_geolimits CASCADE;

```

Migrate to the new schema

```
./manage.sh makemigrations
./manage.sh migrate

```

Restore the old contents

```
./manage.sh dbshell

UPDATE base_resourcebase SET doi = doi_bkp;
ALTER TABLE base_resourcebase DROP COLUMN doi_bkp;

INSERT INTO base_usergeolimit (SELECT * FROM base_usergeolimit_bkp);
INSERT INTO base_groupgeolimit (SELECT * FROM base_groupgeolimit_bkp);
INSERT INTO base_resourcebase_users_geolimits (SELECT * FROM base_resourcebase_users_geolimits_bkp);
INSERT INTO base_resourcebase_groups_geolimits (SELECT * FROM base_resourcebase_groups_geolimits_bkp);

DROP TABLE base_usergeolimit_bkp CASCADE;
DROP TABLE base_groupgeolimit_bkp CASCADE;
DROP TABLE base_resourcebase_users_geolimits_bkp CASCADE;
DROP TABLE base_resourcebase_groups_geolimits_bkp CASCADE;

```

1.27. GeoNode Upgrade from older versions
1.27.2 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 are not tested in that 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:

```
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:

```
psql gn_24 < gn_24.sql
```

**Run GeoNode migrations**

Activate your GeoNode virtualenv and set the env vars:

```
. env/bin/Activate
export vars_210
```

Here are the variables to export - update them to your environment settings:

```
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:

```
pip install psycopg2==2.7.7
```

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:
Upgrade psycopg2:

```bash
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):

```sql
alter table people_profile alter column last_login drop not null;
```

```bash
./manage createsuperuser
```

Fixes on database

For some reason some resources were unpublished:

```sql
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):

```sql
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:

```bash
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.

(continues on next page)
In order add the inspire-themes thesaurus into a geonode instance, download it as file `inspire-theme.rdf` with the command:

```shell
```

and then issue the command:

```shell
get 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': 'INSPIRE THEMES', '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.

### 1.30 Participate in the Discussion

#### 1.30.1 Join the community, ask for help or report bugs

In case of general questions the GeoNode Community is present at following `channels`
1.31 Write Documentation

1.31.1 How to contribute to GeoNode’s Documentation

If you feel like adding or changing something in the GeoNode documentation you are very welcome to do so. The documentation always needs improvement as the development of the software is going quite fast.

To contribute to the GeoNode documentation you should:

- Read the GeoServer Style Guidelines
- Create an account on GitHub
- Fork the GeoNode repository
- Edit the files
- Submit pull requests

All these things can generally be done within your browser, you won’t need to download anything. However, if you need to add images or planning bigger changes working locally is recommended.

Style Guidelines

While we do not have strict rules for writing docs, we encourage you to read GeoServer Style Guidelines before you start writing: https://docs.geoserver.org/latest/en/docguide/style.html

Create an account on GitHub

The first step is to create an account on GitHub. Just go to Github, find a username that suits you, enter your email and a password and hit Sign up for Github. After you’ve signed in, visit the geonode_documentation repository https://github.com/geonode/documentation.
Fork the documentation repository

In order to make changes, you first have to fork the repository. On the top right of the website, you will find a button named “fork” to do so.

If you want to read more about forking please visit the official GitHub docs: [https://help.github.com/articles/fork-a-repo](https://help.github.com/articles/fork-a-repo).

Edit files on Github

For smaller changes you can use the GitHub website. Navigate your Browser to your forked repository. To make changes to files, navigate to the file in question and hit the edit button on the right top.

Note: The documentation is written in reStructuredText, a lightweight markup language. To learn how to use it see: [https://docutils.sourceforge.net/docs/user/rst/quickref.html](https://docutils.sourceforge.net/docs/user/rst/quickref.html).

By hitting the preview button you will be able to see how your changes will look like. To save your changes, click on Commit Changes at the bottom of the site.

To ask the documentation maintainers to integrate your changes the creation of a Pull Request is needed. Therefore use the new pull request button to start the process. Find more about Pull requests at the official GitHub documentation: [https://help.github.com/en/github/collaborating-with-issues-and-pull-requests/about-pull-requests](https://help.github.com/en/github/collaborating-with-issues-and-pull-requests/about-pull-requests).

Edit files locally

If you’re planning bigger changes on the structure of the documentation, it is advisable to make your changes locally. Further, while you can work on your master branch, it is recommended to create a dedicated branch for your changes.

Start by navigating to a folder where you like to keep your repository locally and install the needed dependencies

```
$ cd /opt
$ git clone https://github.com/your_documentation_repository
$ git remote add upstream https://github.com/geonode/documentation
# add the GeoNode documentation repository as "upstream" source

$ cd your_documentation_repository
$ git fetch upstream;
# get last commits from upstream

$ git merge upstream/master master
# merge the upstream with your fork
# if you like, you can also use 'git pull', which is nothing else than fetching and merging in one step

$ git push
# update your repository at GitHub (origin)
```

Your repository should now be up to date! For more information on those commands go to [https://git-scm.com/docs](https://git-scm.com/docs). Let’s install the dependencies

```
$ pip install virtualenv
$ virtualenv docs_env
$ source docs_env/bin/activate
$ pip install sphinx sphinx_rtd_theme sphinx-autobuild
```
You can now start the sphinx development server which will serve and live-reload your docs at https://localhost:8000

```
$ sphinx-autobuild . _build
```

When finished create a build with following command

```
$ make html
# for a last check you can open the index.html in _build subdirectory
```

Create a pull request

As with directly editing files in your browser, you will need to create a Pull request to ask for integrating your changes into the main repository.

```
$ git status
# will list all changed files
$ git add ...
# add the files of interest
$ git commit -m 'Fixes #1234 Updated docs for ...'
# choose a meaningful commit message
$ git push <branch>
```

After running these commands, navigate your browser to your GitHub repository and create a pull request as explained above.

### 1.32 Provide Translations

#### 1.32.1 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.

Next, to download the language file, we need to install an OpenSource Editor called “poedit” for editing from: 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:
# Chapter 1. Table of contents

- Request to download a resource
  - A request for downloading a resource was sent
  - computer program or routine
  - feature type
  - copy or imitation of an existing or hypothetical object
  - collection hardware
  - collection session
  - non-geographic data
  - property type
  - field session
  - dataset
  - service interfaces
  - attribute class
  - characteristic of a feature
  - tile or spatial subset of geographic data

  **Translation:**
  
  Demander pour télécharger la ressource
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.

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
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 -i en -d django -e "html,txt,py" -i docs
django-admin makemessages -i 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.

### 1.33 Write Code

#### 1.34 Frontend Development

#### 1.34.1 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:**

```bash
yarn install
```
Installs the required libraries to ./node_modules

```bash
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).

```bash
yarn remove <package>
```
Removes a package.

```bash
yarn outdated
```
Shows version information.

```bash
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
development|production

**Example 1 – Change styling:**

1. In your settings set DEBUG_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’`)

### 1.35 How to Develop

#### 1.35.1 Start to develop with Docker

**How to run the instance for development**

Set the variable `SETDOCKER_ENV` for development

```
vi .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:

```bash
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/

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.

### 1.35.2 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 customized 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:

```
service apache2 stop  # or your installed server
service 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 Spatialite database.

**Installation steps**

1- Install build tools and libraries

**Warning:** Those instructions might be outdated. Please refer to 1. Install the dependencies

```
$ sudo apt-get install -y build-essential libxml2-dev libxslt1-dev libpq-dev zlib1g-dev
```

2- Install dependencies and supporting tools

   Install python native libraries and tools

**Warning:** Those instructions might be outdated. Please refer to 1. Install the dependencies

```
$ sudo apt-get install -y python3-dev python3-pil python3-lxml python3-pyproj python3-shapely python3-nose python3-httplib2 python3-pip software-properties-common
```

Install python virtual environment

**Warning:** Those instructions might be outdated. Please refer to 2. GeoNode Installation

```
$ sudo pip install virtualenvwrapper
```

Install postgresql and postgis

**Warning:** Those instructions might be outdated. Please refer to 4. Postgis database Setup

```
$ sudo apt-get install postgresql-10 postgis-2.4
```

Change postgres password expiry and set a password

```
$ sudo passwd -u postgres # change password expiry information
$ sudo passwd postgres # change unix password for postgres
```
Create geonode role and database

```bash
$ su postgres
$ createdb geonode_dev
$ createdb geonode_dev-imports
$ psql
$ postgres=
$ 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
```

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

```bash
# "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
$ vim ~/.bashrc

# add the following line to the bottom
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh

$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
$ mkvirtualenv --python=/usr/bin/python3 geonode
$ workon geonode

# or $ source /home/geonode/dev/.venvs/geonode/bin/activate

This creates a new directory where you want your project to be and creates a new virtual environment.

Alternatively you can also create the virtual env like below

$ python3.8 -m venv /home/geonode/dev/.venvs/geonode
$ source /home/geonode/dev/.venvs/geonode/bin/activate

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

$ git clone https://github.com/GeoNode/geonode.git -b 3.x

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

$ 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

$ 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

1.35. How to Develop
In the `local_settings.py` file, add the following line after the import statements:

```python
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:

```python
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:

```python
# vector datastore for uploads
'datastore': {
    'ENGINE': 'django.db.backends.postgis',
    '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:

```python
CATALOGUE = {
    'default': {
        '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',
        'URL': urljoin(SITEURL, '/catalogue/csw'),
    }
}
```

(continues on next page)
5- Install and Start Geoserver

From the virtual environment, first you need to align the database structure using the following command:

```
$ 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:

```
$ 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:
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:

```bash
$ 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”

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:

```bash
$ 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:

```bash
$ vim ~/.bashrc
# add the following line to the bottom
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
```

```bash
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
$ mkvirtualenv --python=/usr/bin/python3 my_geonode
```

Alternatively you can also create the virtual env like below

```bash
$ python3.8 -m venv /home/geonode/dev/.venvs/my_geonode
$ source /home/geonode/dev/.venvs/my_geonode/bin/activate
```

2- Clone the geonode-project repo from Github

```bash
$ git clone https://github.com/GeoNode/geonode-project.git -b 3.x
```

3- Install Django framework as follows

```bash
$ pip install Django==2.2.9
```

4- Use django-admin.py to create a project “my_geonode” from a GeoNode-Project template as follows:

```bash
$ django-admin startproject --template=./geonode-project -e py,sh,md,rst,json,yml,ini,env,sample,properties -n monitoring-cron -n Dockerfile my_geonode
```

5- Install all the requirements for the GeoNode-Project and install the GeoNode-Project using pip

```bash
$ cd my_geonode
$ pip install -r requirements.txt --upgrade
$ pip install -e . --upgrade
```

6- Install GDAL Utilities for Python

```bash
$ 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
$paver start

8- Visit http://localhost:8000/

### 1.35.3 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.

### 1.35.4 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.

### 1.35.5 Start MapStore2 client in development mode

**Pre-requisites**

1. You need a running instance of GeoNode somewhere; in this specific example we assume GeoNode is running on :http://localhost:8000
Install needed packages

```bash
sudo apt install nodejs npm
```

Prepare the source code

```bash
git clone --recursive https://github.com/GeoNode/geonode-mapstore-client.git geonode-mapstore-client-dev
```

Compile MapStore2 Client

```bash
cd geonode-mapstore-client/geonode_mapstore_client/client/
npm update
npm install
npm run compile
```

Edit the file `env.json`

```bash
vim env.json
```

```
{
  "DEV_SERVER_HOST": "localhost:8000",
  "DEV_SERVER_HOST_PROTOCOL": "http"
}
```

Run MapStore2 in Development mode

```bash
npm run start
```

Connect to ::http://localhost:8081

This is a proxied version of GeoNode form MapStore2 client. To upload new layers user the original GeoNode.

Everytime you render a map, from GeoNode layers details page or map creation, you will access to the MapStore2 dev mode runnig code.

You can now update the code on the fly.

**Example 1: Disable the PrintPlugin from the Layer Details small map**

```bash
vim js/previewPlugins.js
```

```javascript
...
BurgerMenuPlugin: require('../MapStore2/web/client/plugins/BurgerMenu'),
ScaleBoxPlugin: require('../MapStore2/web/client/plugins/ScaleBox'),
MapFooterPlugin: require('../MapStore2/web/client/plugins/MapFooter'),
```

(continues on next page)
Example 2: Disable the MousePositionPlugin from the big maps

vim js/plugins.js


1.35.6 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:

```bash
$ pip install -e my_geonode
```

3- Install geoserver using paver as follows

```bash
$ 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:

```bash
$ 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

```bash
$ 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, dialogos, 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:

```bash
$ 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

```
.home .jumbotron { background: red }
```

Then once we refreshed the browser, we should see the change as follows:
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
<li>
<a href="{{ PROJECT_ROOT }}/app">App</a>
</li>
{% endcomment %}
```

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/layers/layer_list.html
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):
        import logging
        self.__get_logger__().info("Patching Resource Base")
        doi_help_text = _("a DOI will be added by Admin before publication.")
        doi = models.TextField("DOI (DOI)
```

(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:

```bash
$ 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></span>
    <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 }}">
</div>
```

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/

echo 'Now from the layer details page, you can see the DOI metadata entry per layer'

<dt>DOI</dt>
<dd>{{ resource.doi }}</dd>

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 Geocollections 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:

```python
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
```

```python
from django.db import models
from geonode.base.models import ResourceBase
from geonode.groups.models import GroupProfile

class Geocollection(models.Model):
    """A collection is a set of resources linked to a GeoNode group """
    group = models.ForeignKey(GroupProfile, related_name='group_collections')
    resources = models.ManyToManyField(ResourceBase, related_name='resource_collections')
    name = models.CharField(max_length=128, unique=True)
    slug = models.SlugField(max_length=128, unique=True)

    def __unicode__(self):
        return self.name
```

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:
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:

from django.conf.urls import url
from .views import GeocollectionDetail

urlpatterns = [
    url(r'^(?P<slug>[-\w]+)/$', 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:

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 Mix-in similar to how it is implemented in GeoNode.
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

```python
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:

```python
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]+)/$',
        GeocollectionDetail.as_view(),
        name='geocollection-detail'),
    url(r'^permissions/(?P<collection_id>\d+)/$',
        geocollectionPermissions,
        name='geocollection-permissions',
)
This url will be called with the id of the geocollection, the id will be passed to the view in order to get the 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
vim geocollections/api.py
```

```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')
        allowed_methods = ['get']
        resource_name = 'geocollections'
        filtering = {
            'group': ALL_WITH_RELATIONS,
            'id': ALL
        }
```

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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](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

```xml
<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.